Goose Creek

Game Land Management Plan

2015-2024

EXECUTIVE SUMMARY

Goose Creek Game Land is 7,308 acres in size. The game land is owned by the State of North Carolina, with the North Carolina Wildlife Resources Commission as the primary custodian. Goose Creek Game Land occurs in Beaufort and Pamlico Counties and lies within the Tar-Pamlico River basin. Original land acquisition dates back to August 1944 with the acquisitions of Tracts one and two from Standard oil. Land acquisitions continued through 2001 with the addition of the Windsong Tract. Goose Creek Game Land is managed for its primary users which include hunters, trappers, anglers, and wildlife viewers. Priority species include white-tailed deer, black bear, an assortment of waterbirds, and the federally endangered red-cockaded woodpecker, *Picoides borealis*. In addition to the primary users, there are an increasing number of non-traditional users on Goose Creek Game Land which include hikers/walkers, geocachers, paddlers, researchers, and target shooters. Five dominant habitat types occur on Goose Creek Game Land. The largest of which is the diverse pine forest habitat which covers greater than 36% of the Game Land. Management goals include providing a diversity of habitat types and forest age classes that are properly interspersed and juxtaposed across the landscape though science based land management, ensure that a wide variety of terrestrial and aquatic wildlife species are maintained on the game land, support game species at huntable levels through science based land management and sound regulations, provide quality habitat for endangered, threatened, and rare species, to ensure their populations are maintained or increased, and provide sufficient infrastructure and opportunity to allow all game lands users a quality experience with minimal habitat degradation and conflict among user groups . To assure these goals are met, the North Carolina Wildlife Resources Commission will need to collect various types of information regarding species and users of the game land, secure funding to accomplish management goals, acquire additional properties as they become available, maintain and develop regulations that promote the sustainable use of natural resources, and develop relationships with conservation partners that help meet management goals.

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

Goose Creek Game Land

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INTRODUCTION

North Carolina Wildlife Resources Commission Mission Statement

"To conserve North Carolina's wildlife resources and their habitats and provide programs and opportunities that allow hunters, anglers, boaters; other outdoor enthusiasts to enjoy wildlife-associated recreation."

Creation of North Carolina Wildlife Resources Commission

The North Carolina Wildlife Resources Commission (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 NCWRC (NCWRC Employee Handbook). 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 History

Prior to 1971 game land use was tightly controlled for a limited number of species on Wildlife Management Areas. For example, hunting on Holly Shelter Game Land was limited to white-tailed deer and bear. The current Game Lands Program began in 1971 with the addition of approximately 800,000 acres of land to be used for the purpose of hunting and fishing. The most significant inclusions were the four United States Department of Agriculture Forest Service (USDAFS) National Forests, The Croatan, Uwharrie, Pisgah, and the Nantahala.

The primary goals and objectives for the game lands were to provide public lands for hunting, fishing, and trapping opportunities. The NCWRC currently manages over 2 million acres of State, Federal, and private lands in the game lands program. Land acquisition and management are funded, in part, by the Federal Aid in Wildlife Restoration act of 1937, also known as the Pittman Robertson Act; which is administered by the U.S. Fish and Wildlife Service (USFWS). What is now called the Wildlife and Sport Fish Restoration Act provides a 75/25 match to states for the selection, restoration, rehabilitation and improvement of wildlife habitat, wildlife management research, and the distribution of information produced by those projects. The dollars are derived from an 11 percent excise tax on sporting arms, ammunition, and archery equipment, and a 10 percent tax on handguns. Monies are appropriated to each state using a

formula considering the total area of the state and the number of licensed hunters in the state. To date the NCWRC has received approximately 258 million dollars.

Historically, primary game land users were hunters, trappers, and fishers. We must keep in mind that there is currently a national surge in "non-consumptive" users. 2011 Surveys conducted by the USFWS showed that there were more wildlife watchers than hunters and fishers combined. The 2011 National Survey of Hunting, Fishing, and Wildlife Associated Recreation showed that 71.8 million people fed, photographed, or observed wildlife in 2011, as opposed to 33.1 million fishers and 13.7 million hunters (2011, USFWS). North Carolina is no exception. Currently, the NCWRC is receiving increasing numbers of requests for more "non-traditional" game land use.

Given these facts, the NCWRC must be mindful that the user base is expanding and allowances must be made to provide equal opportunities. The NCWRC's game land program mission statement recognizes these needs. Lands administered by the Wildlife Resources Commission through the Game Lands Program, follow the Program's 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 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."

Land acquisition is the primary tool for land conservation and management. Recent reductions in license sales have forced the NCWRC to look to other funding sources for land acquisition. Sources as the Clean Water Management Trust Fund, Natural Heritage Trust Fund, The Forest Legacy Program, the Department of Defense's Recovery and Sustainment Program (RASP), and the North American Wetland Conservation Act have become primary funding sources. These funds are tax based and have contributed to the purchase of 162 million acres since their creation (NC WAP p.61).

Game Land Program Objectives:

1. To provide, protect, and actively manage habitat conditions to benefit aquatic and terrestrial wildlife resources.
2. To provide public opportunities for hunting, fishing, trapping, and wildlife viewing.
3. To provide 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.

Purpose and Need for the Plan

The function of this Game Land Management Plan is to provide a guide for managers to follow in the creation of future wildlife and land management prescriptions. Fisheries and wildlife habitat enhancements will be given priority; outdoor and wildlife related requests/activities will be 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 collaboration.

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 operations.
- Provide clear management objectives to ensure that these actions are consistent with the game lands program goals.
- Lastly, this plan will provide a basis for future budgetary operational expenses.

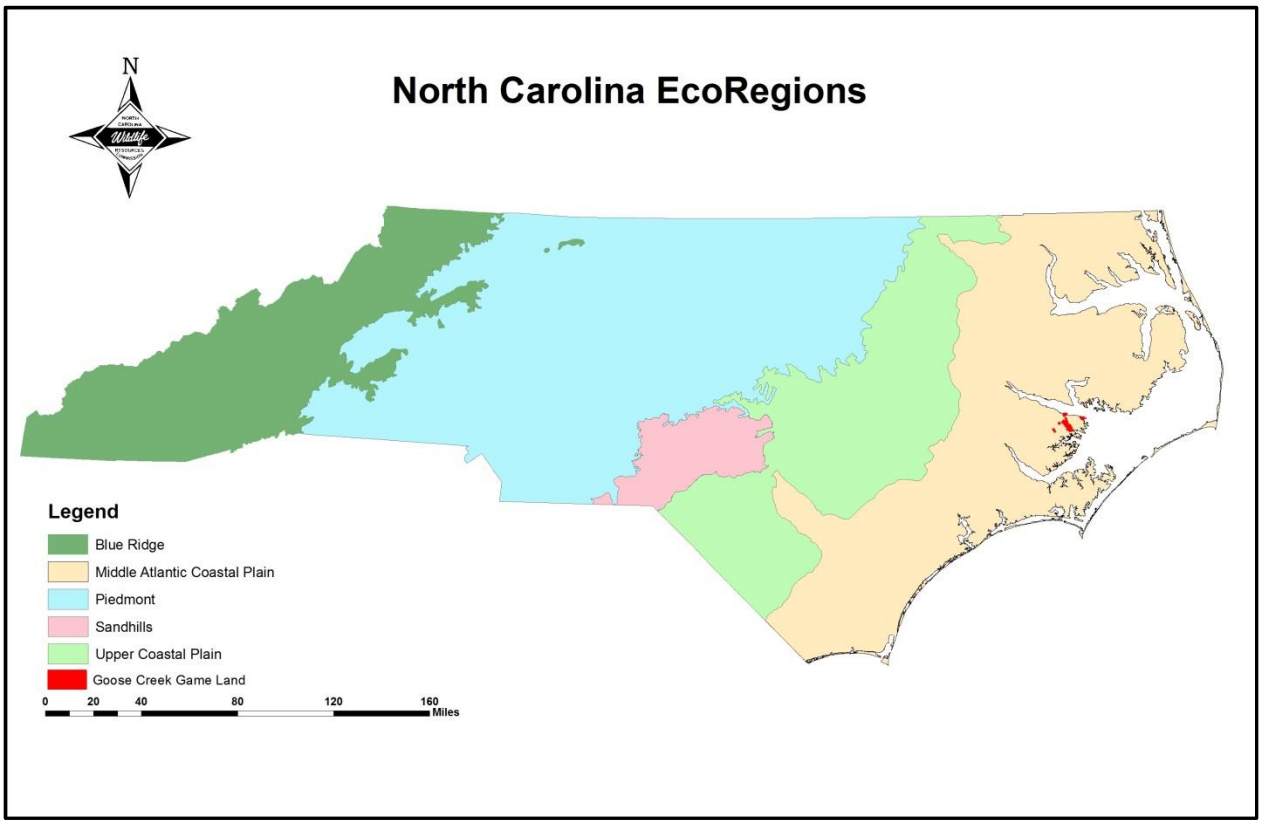
A development team, natural resource stakeholders, and the public have provided input to achieve a "Desired Future Condition" within the 10-year planning horizon. This will be a living document which may be amended as needed.

REGIONAL CONTEXT

Information on Eco-Region

Goose Creek Game Land is located in the Mid-Atlantic Coastal Plain which occupies 26 million acres east of the fall line between the Piedmont and Atlantic Coastal Plain, south of the James River in Virginia and north of Charleston Harbor in South Carolina (*Figure 1).* About two thirds of this very rich ecoregion is in North Carolina. This is the land of longleaf pines and bald cypress trees; of bottomland hardwood forests and swamps; of pocosins and palmettos; of Carolina Bays and Carolina Sandhills; of the Outer Banks and some of the world's best and most active coastal dunes, sounds, and estuaries; of natural fires, floods, and storms are so dominant in this region that the landscape changes very quickly (Landscope, 2013).

Figure 1: Ecoregion delineations in North Carolina (data source: NC GAP; ecoregions as defined by Bailey (1995)



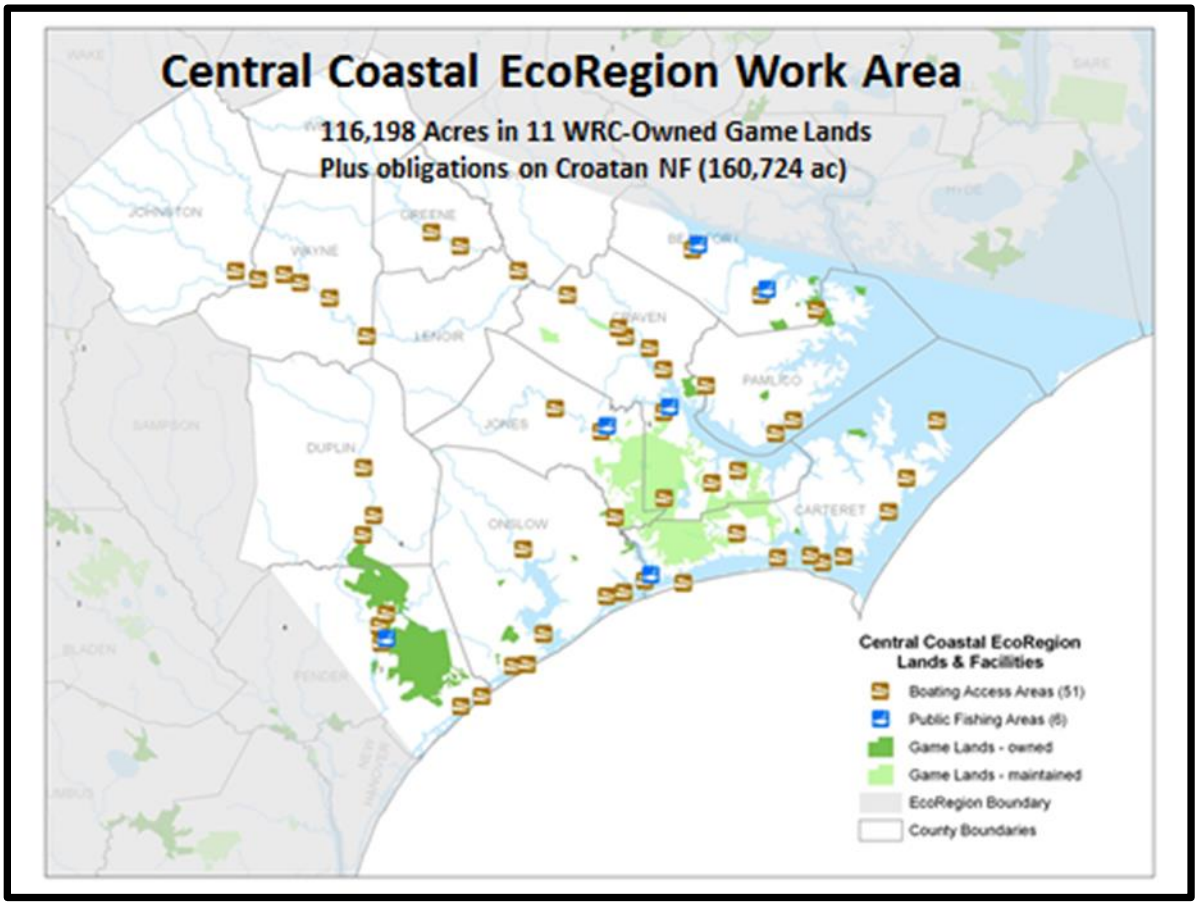
In North Carolina, a huge diversity of fish and wildlife habitats exist across the three distinctive regions of the state; the Coastal Plain, the Piedmont, and the Mountains. These regions fall within larger Eco-Regions that span state borders and link North Carolina to neighboring states. Elevations 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 (NCWAP, 2005).

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 (NCWAP, 2005).

Within North Carolina's borders, GCGL is located in the Central Coastal Eco-Region. This area consists of 8,416 mi^2 in 14 Counties. This particular Eco-Region contains 4 major River Basins,

the Pamlico, Neuse, New, and the Northeast Cape Fear. NCWRC field staff are responsible for management obligations on 116,198 acres on 11 NCWRC owned game lands plus land management practices on the160, 724 ac. Croatan National Forest. Work responsibilities also include the maintenance of 51 Boating Access Areas, 6 Public Fishing Areas and 452 navigational aids bi-annually. Four depots are located within the Eco-Region; Holly Shelter, Chinquapin, Rhems, and New Bern (*Figure 2*).

Figure 2: Central Coastal EcoRegion Work Area.



Role and Importance

The purpose of Goose Creek Game Land is to manage habitats to benefit aquatic and terrestrial wildlife resources and flora on the property. The Game Land provides opportunities for public hunting, fishing, trapping, boating, wildlife viewing, and other outdoor based recreational activities. These are the primary public uses of the Game Land. The Game Land also provides other public outdoor recreational opportunities to the extent that these uses are compatible with the conservation and management of the resources located there and do not displace primary users. The Game Land also provides forest products as allowed by topography, hydrology, and other factors. Silvicultural practices conducted on the GCGL are directed by wildlife management objectives. Lastly, the marshes of GCGL act as a primary nursery area for many

species of fish and crustaceans which are dependent on the protected estuarine habitats found there.

Partnerships and Collaborations

The Game Lands Program is vital to many conservation efforts and partnerships within the Central Coastal Eco-region. NCWRC enjoys a long-standing alliance with the USDAFS with wildlife resources on forest service lands cooperatively managed by both agencies. NCWRC also holds a robust association with the NC Forest Service. The occurrence of incident fires on Game Lands has triggered the creation of a Memorandum of Understanding between NCWRC and the North Carolina Forest Service (*Appendix III)* to address issues regarding levels of response and cooperation between agencies during wildfire events and prescribed burning operations.

The Natural Heritage and Clean Water Management Trust Funds have provided significant and critical funding for the acquisition of key properties that have been added to the Game Lands Program. Many of the properties acquired with these funding sources have been established as or have enhanced existing State Natural Heritage Areas and/or have been dedicated as Nature Preserves by the N.C. Natural Heritage Program.

As a result of funding from The Natural Heritage Trust Fund and The Clean Water Management Trust funds, certain areas of GCGL are designated as "Dedicated Nature Preserves (*Appendix IV*)." Figure 3 shows the locations of these areas on GCGL and their designations as being primary, buffer, and restoration areas.

Goose Creek Game Land lies within the Onslow Bight Conservation Forum Landscape. This Conservation collaborative, administered by the Nature Conservancy, connects Natural Resource professionals to aid each other in land acquisition and funding projects (*Figure 4*).

Figure 3: Location and type of dedicated lands on Goose Creek Game Land.

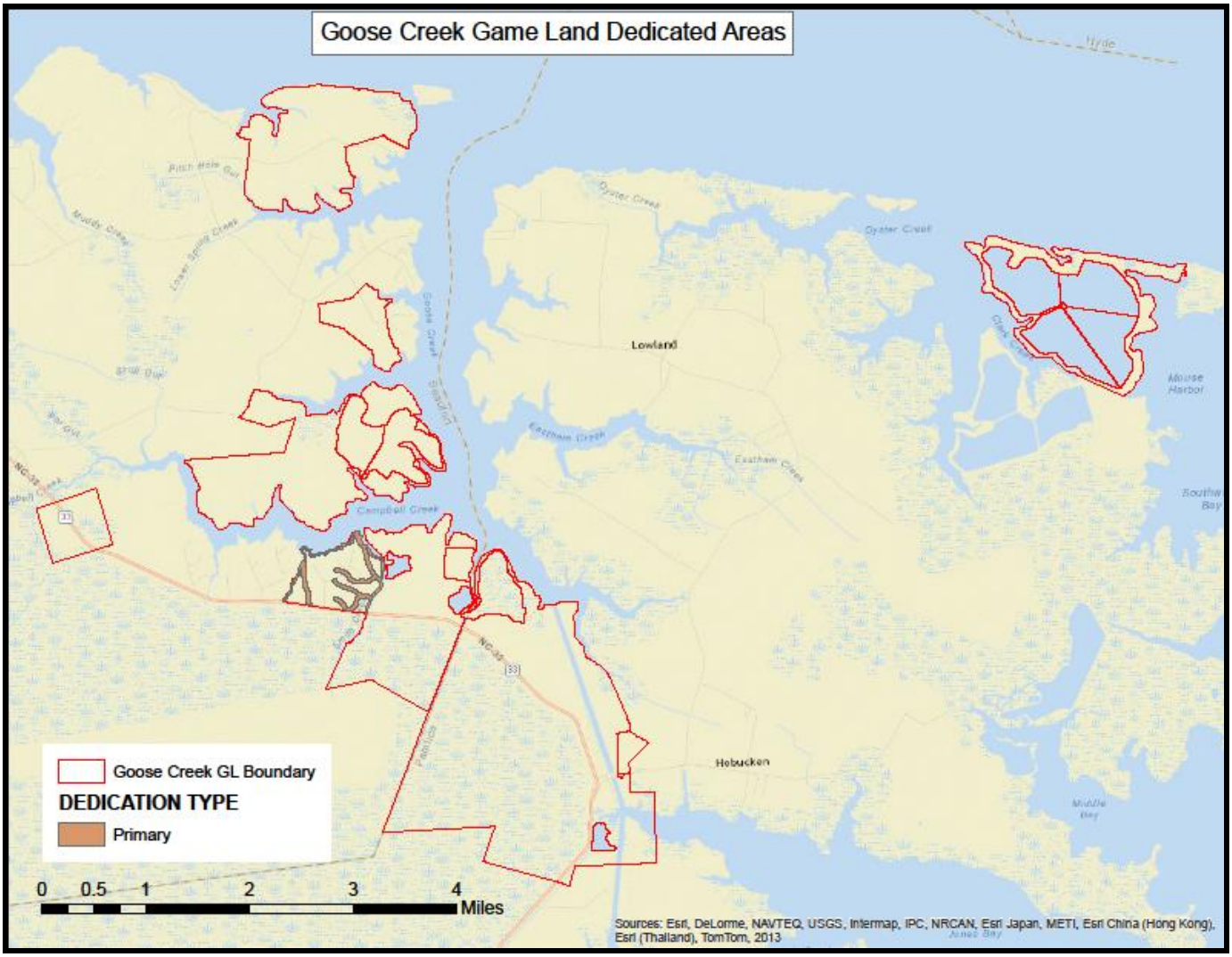
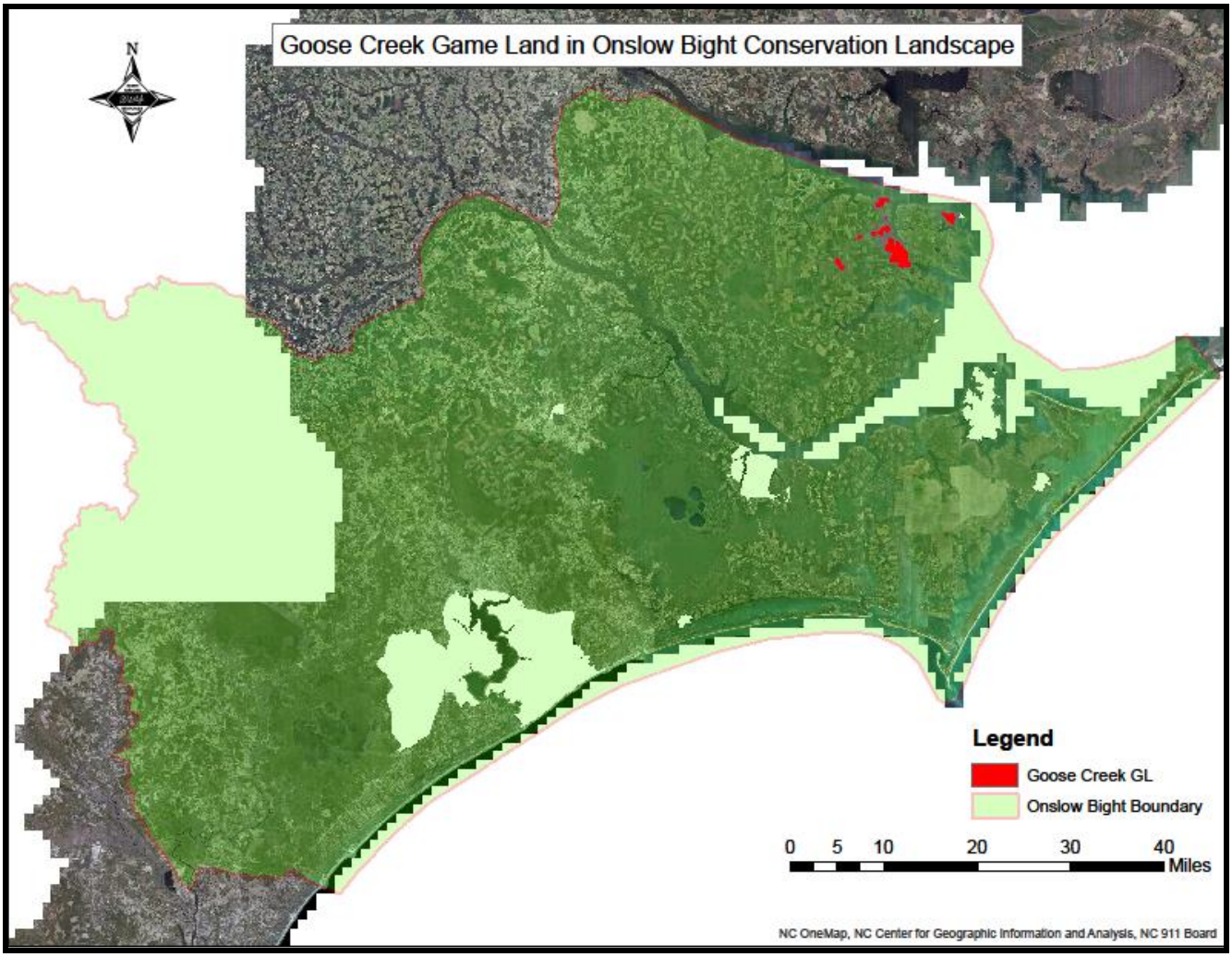


Figure 4: Goose Creek Game Land situated within the Onslow Bight Conservation area.



Adjacent and Use

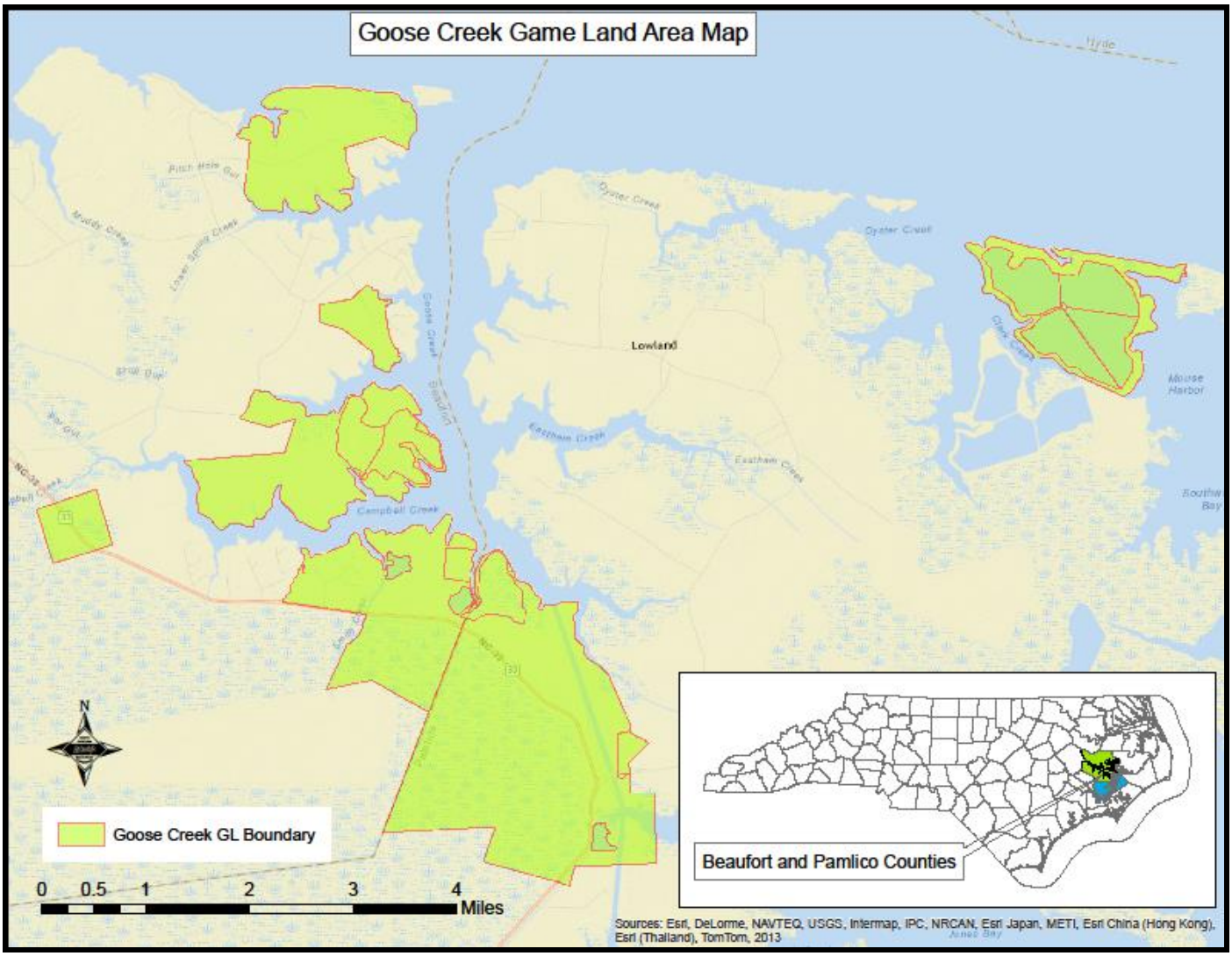
Lands in Beaufort and Pamlico Counties are primarily, forest or agricultural/open lands which comprise approximately 71% and 62% of the total County acreages respectively. Other land uses include: industrial (PCS phosphate), commercial, rural development and residential. Human population growth on lands adjacent to GCGL is slow but steady. Beaufort County's population grew 11.4% during the 20 period of 1980-2000; while population grew 24.4% in Pamlico County during the same time period. This 24.4% increase includes inmates of a correctional institution near Bayboro which was constructed during this time period. Little growth is expected adjacent to GCGL within the ten year planning horizon of the plan (Data compiled from: Beaufort and Pamlico County, Joint CAMA Land Use Plans).

GAME LAND SPECIFIC INFORMATION

Location

Goose Creek Game Land's eight tracts; Tracts 1-6, Pamlico Point, and the Windsong Tract are located in Beaufort and Pamlico Counties in Eastern North Carolina (*Figure 5*). The Game Land was named after Goose Creek which runs adjacent to much of the Game Land. All tracts combined total 7,308 acres.

Figure 5: Goose Creek Game Land area map.



Cultural Resources

North Carolina is not only known for its natural history, but also its rich historical and cultural resources. Archaeological sites exist on GCGL which provide tangible evidence of the varied use of the property by the past residents of the area. Because these sites can be easily damaged, unauthorized artifact collecting activities on all state-owned property, including Commission owned lands, are prohibited by the Archaeological Resources Protection Act (G.S 70 Article 2) (*Appendix V*).

Physical Attributes

Climate

The climate around in the vicinity of GCGL is characterized by hot humid summers with temperatures frequently exceeding 95 degrees with a record high of 102 degrees on 10 June, 1985 at Bayboro. Winters are moderate, with temperatures rarely going below 20 degrees with a record low of -4 degrees on 25 December, 1989. Average first frost is 31 October. Average last frost is 1April, giving approximately 210 growing days (NRCS, 1919). Average annual precipitation is 54.74 inches with a record daily rainfall of 5.14" occurring on 24 June, 2013. Snowfall is rare, on the average, less than 3 inches per year with a record snowfall of 18 inches on 3 March, 1980 (SCONC, 1/28/2015).

In most summers North Carolina's weather is dominated by the "Bermuda High" pressure system. This gives calm, virtually cloudless conditions. Weather is generally hot and humid in the summer, with sea breezes cooling Coastal areas. This phenomenon is the primary cause for the numerous thunderstorms that occur from April through September. Winds in the vicinity of GCGL are predominantly South Westerly year round. Average wind speed is 13 miles per hour (NRCS 1995).

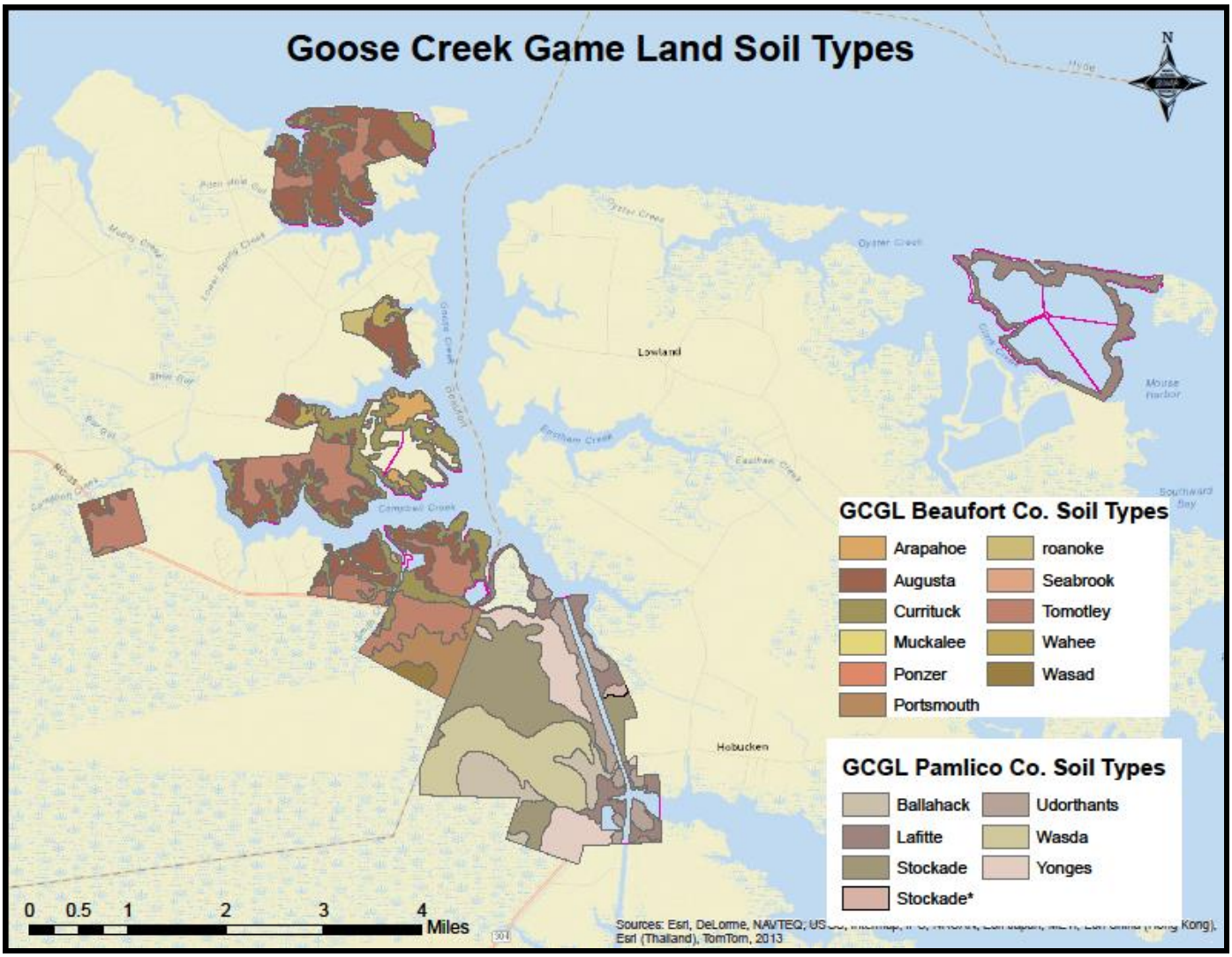
North Carolina is outside the principal tornado area of the United States, but still averages two to three per year. They occur mostly east of the Mountains during early spring (SCONC, 1/28/2015).

Tropical hurricanes come close enough to influence North Carolina weather about twice in an average year. Much less frequently, perhaps averaging once in 10 years, these storms strike a part of the State with sufficient force to do much damage to inland property. Coastal properties occasionally suffer severe damage from associated high tides (SCONC, 1/28/2015).

Soils

Elevations of Beaufort and Pamlico Counties, NC range from sea level to approximately 46 feet above sea level, occuring entirely east of the Minesott Ridge. Seventeen soil types occur on SCGL (*Figure 6*). Most soils, approximately 75%, found on the GCGL are poorly to somewhat poorly drained soils consisting of high organic content. The remaining soils are moderately well drained.

Figure 6: Goose Creek Game Land soils map.



Hydrology

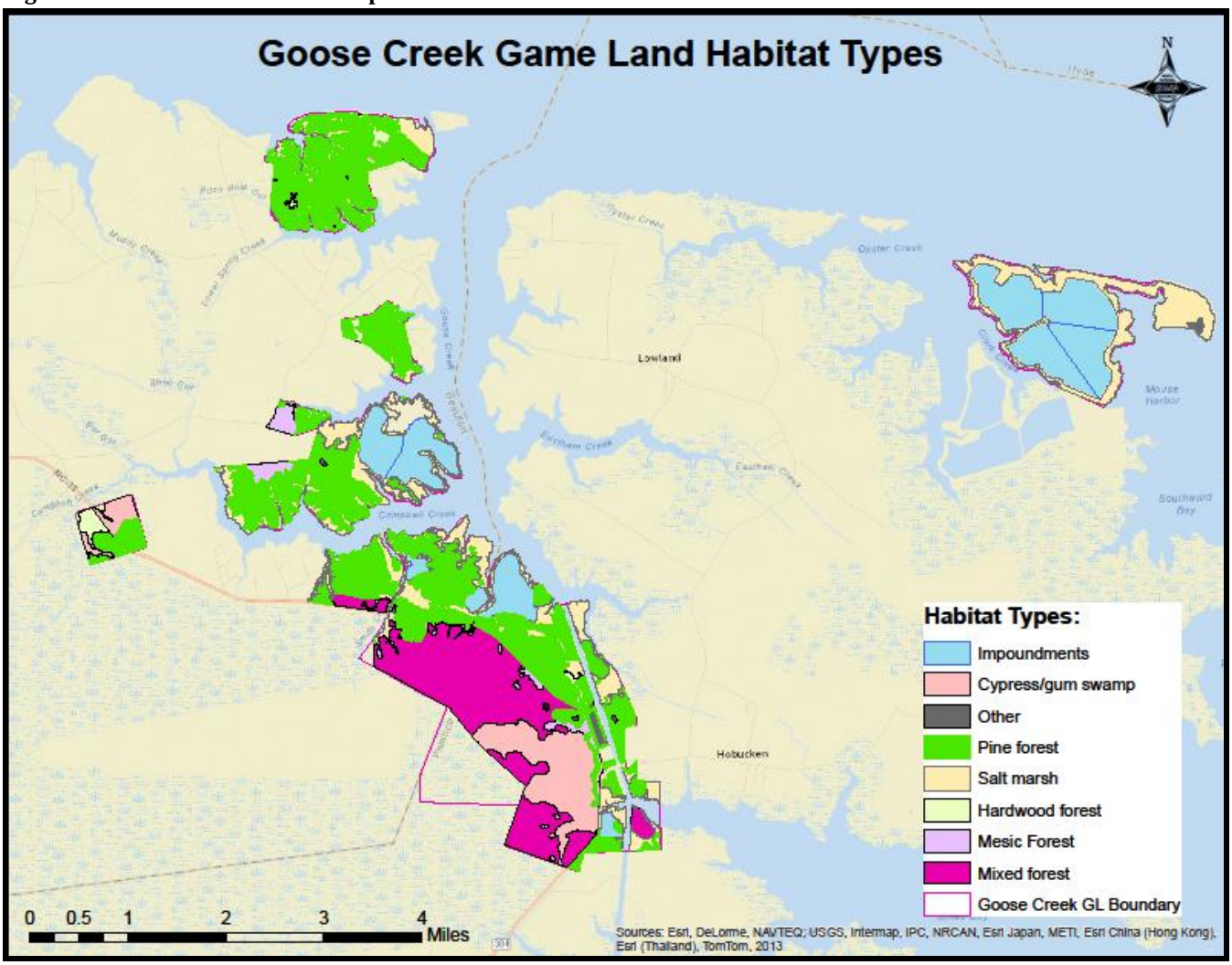
Goose Creek Game Land occurs in the Tar-Pamlico River Basin; the fourth largest in North Carolina. The Tar-Pamlico Basin encompasses 5,578 square miles, with 2,414 stream miles in 16 Counties. Approximately one-third of freshwater streams within this Basin are impaired. Ninety-two percent of pollution is from non-point source pollutants (e.g., agriculture, forestry, urbanization, etc.) (http://www.water.ncsu.edu/tarpam.html)

Groundwater is generally collected from three sources; the superficial sand, the Yorktown, and the Castle Hayne aquifers (http://ncwater.org, 2/9/15). The superficial sand is the shallowest, and the most susceptible to contamination. The surficial aquifer is also very sensitive to variations in rainfall amounts. Therefore, it is first to dry-up during drought conditions. The Yorktown is present throughout most of the northern coastal plain at elevations ranging from 97 to -227 feet, averaging -11 feet. Typical wells yield only 15-90 gallons per minute. The Castle Hayne aquifer is more widely used in the eastern portions of the coastal plain. The aquifer is composed of limestone, sandy limestone, and sand. It is the most productive aquifer in North Carolina. Wells typically yield 200-500 gallons per minute, but can exceed 2000 gallons per minute. (ncwater.org, 2/9/2015)

Habitats

Four major habitat classes make-up GCGL; Forested, 51%, salt marsh, 20%, Impoundments, 17%, and cypress/gum swamps, 8%. Other noteworthy habitat types include, mesic forest, 2%, and hardwood forest, 1%. Ponds, dredge spoil site, openings, and Smith Creek BAA comprise less than 0.5% of GCGL collectively (*Figure 7*).

Figure 7. Goose Creek Habitat Map.



Acquisition and Historical Management

Acquisition of GCGL began in 1944-45, with the acquisitions of Tracts one and two from Standard oil. Subsequent tracts have been acquired via the NC State Board of Education, U. S. Coast Guard, Weyerhauser, and Weyerhauser Real Estate (Table 1). Numerous easements and Right-of-ways exist on GCGL. These documents may be found via the North Carolina State Property Office. Deeds and survey maps can be found in Appendix VI.

Prior to State acquisition, in the late 1800's - 1900, portions of the land was cleared for agriculture. Fields on tract 6 are still visible in aerial photography dating from 1938. Although they were not likely active at that time, field ditches are still present in the woods near the Pamlico River. Land was cleared and abandoned much earlier at tract 4. Openings don't appear in any recent aerial photography. There is evidence of old field perimeters on the southwest side near Campbell Cr. There are some slight mounds with rocks placed on either side in the woods along Snodes Cr. which I might designates grave sites, further evidence of settlement and maybe a home site.

Before that (1850's –late 1800's) the land was for timber; meaning the cutting of second growth timber aimed at increased efforts in naval stores production. Numerous tar kilns present on tracts 4, 5 & 6 are evidence of this.

Purpose of Game Land

The purpose of Goose Creek Game Land is to manage habitats to benefit aquatic and terrestrial wildlife resources and flora on the property. The game land provides opportunities for public hunting, fishing, trapping, wildlife viewing, and other wildlife based recreational activities. These are the primary public uses of the game land. The game land also provides other public outdoor recreational opportunities to the extent that these uses are compatible with the conservation and management of the resources located there and do not displace primary users. The game land will eventually also provide a sustainable yield of forest products as allowed by topography and other factors. All forestry conducted on the game land is directed by wildlife management objectives.

Game Land Goals and Measures of Success

Goals

- Provide for a diversity of habitat types and forest age classes through science based land management practices that are properly interspersed and juxtaposed across the landscape 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 all game lands users a quality experience while on the game land with minimal habitat degradation and minimal conflict among user groups.

Measures of Success will be identified if

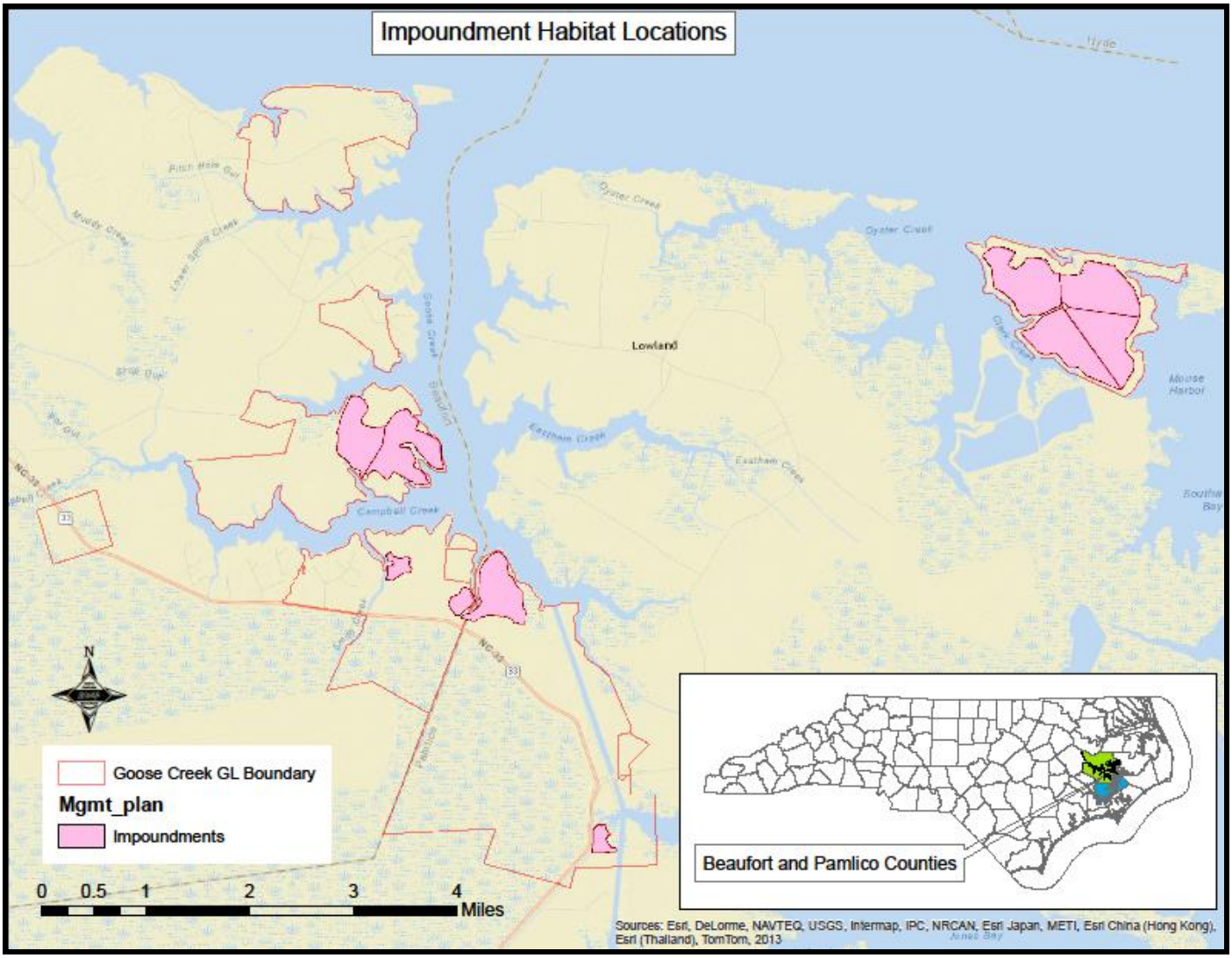
- Inventories/surveys indicate that a wide variety of species are present at sustained levels and are properly managed for on the game land.
- Surveys and inventories of target game species indicate that population levels of these species are being managed at sustained levels.
- Inventories/surveys indicate that populations/habitats of endangered, threatened, and rare species found on the game land are being maintained or restored.
- Inventories/surveys indicate that previously unknown populations or previously unknown endangered, threatened, and rare species are found on the game land.

Habitat Communities

Impoundments

Figure 8 exhibits that impoundments occur on 1,264 acres or 17% of GCGL. The design and construction of GCGL's impoundments was a collaborative effort between Pamlico Co. Health Department (PCHD) and the NCWRC (*Figure 9)*. These impoundments, as designed, served dual purposes, as mosquito abatement ponds and as waterfowl habitat improvement areas. Prior to construction, it was agreed that the PCHD and NCWRC would share costs. The NCWRC was responsible for dike construction pump and installation.

Figure 8: Impoundment habitat type locations on Goose Creek Game Land.



Initial construction began in the early 1960's with Hobucken Impoundment. This was known as the "Poof Project." Impoundment construction continued through the sixties, Pamlico Point was completed in April of 1964, and the remaining impoundments were completed by the mid 1970's. These man-made impoundments provide critical habitat to thousands of water birds yearly during fall and spring migrations.

Figure 9: Spring Creek Impoundment during construction. NCWRC archives

Location and current condition of habitat

Goose Creek Game Land's impoundments are located in Beaufort and Pamlico Counties in eastern North Carolina. These impoundments are situated in the vicinity of Lowland Island near Hobucken, NC. At nearly fifty years old, this complex of waterfowl impoundments is functioning surprisingly well. The infrastructure that allows for the management of these habitats is, however, beginning to show its age in some areas. The maintenance and repair of these items will be described, in more detail, in the Infrastructure Section.

Overall the GCGL impoundments continue to produce superb crops of submerged aquatic (SAV) and moist soil (MS) vegetation. Impoundments are managed on a three year cycle, where they remain flooded (SAV) for three years. On the fourth year, the impoundments are drained below ditch lines (MS) and allowed to crack. Figures 10 and 11 represent typical schedules for MS and SAV water level management plans.

Varying from SAV to MS provides many benefits. The primary benefit is the diversity of high quality forage such as widgeon grass, *Ruppia maritime*, and musk grass, *Chara sp.*, and Moist Soil Vegetation such as dwarf spike rush (*Eleocharis sp.), and seapurslane (Sesuvium portulacastrum*). This forage along with exposed mudflats presents habitat to numerous species of waterbirds *(Epstein and Joyner, 1986).* A primary benefit to drawdown is the consolidation of silts to solids that firm bottoms and allow better rooting of desirable plants (Baldassarre and Bolen 1994). A secondary benefit is improved walking conditions in the impoundment.

Furthermore, this draining and filling of the impoundments provides an avenue to reduce accumulated salts.

Figure 10: Water Level Management Plan for a Goose Creek Submerged Aquatic Vegetation

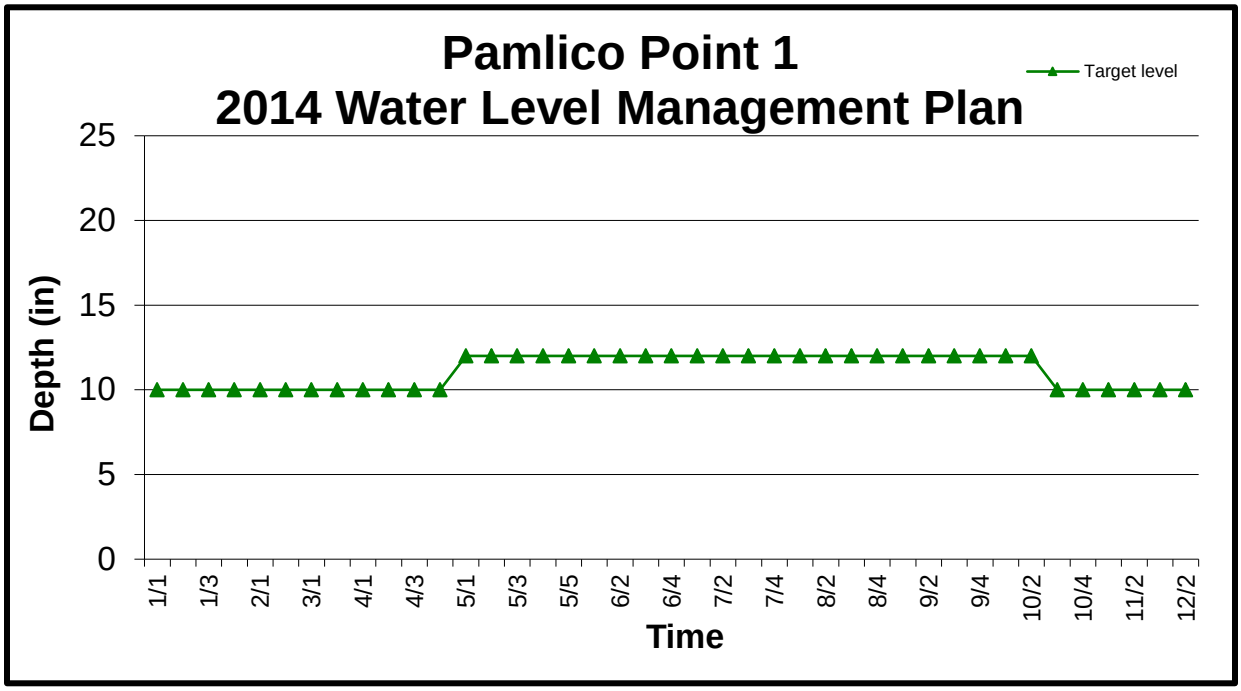
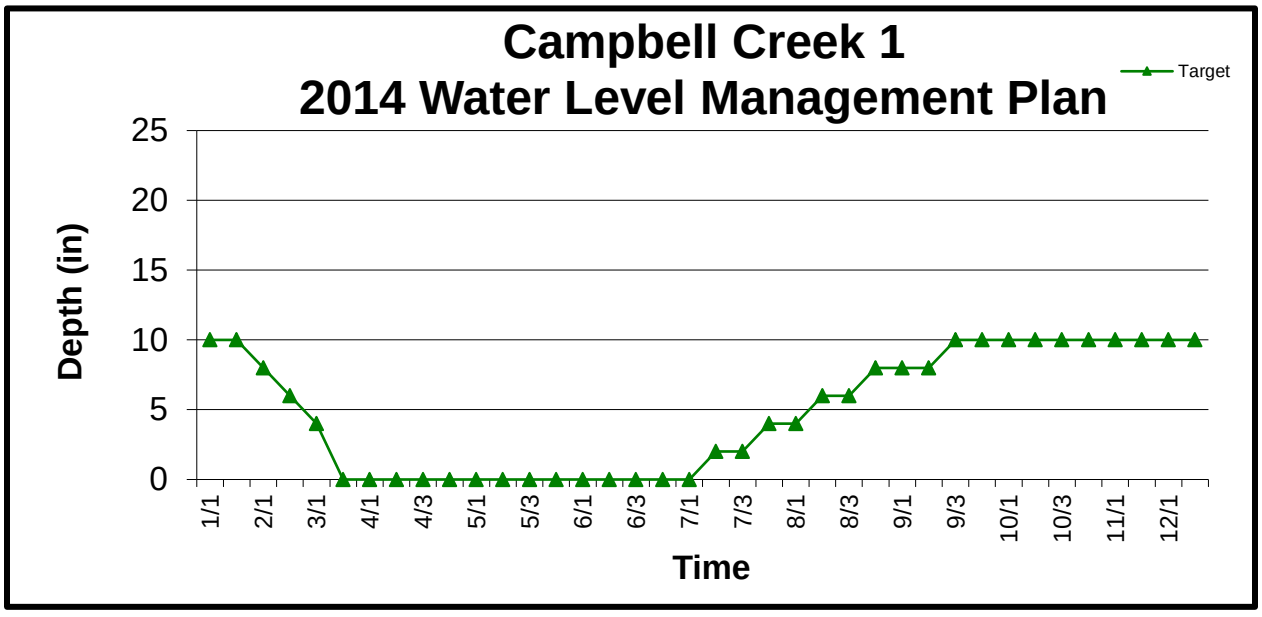


Figure 11: Water Level Management Plan for a Goose Creek Moist Soil Impoundment



Shorebirds using an exposed mudflat.

Unlike many coastal impoundments in other states, which rely on lunar tides, GCGL's impoundments rely almost entirely on pumps to flush fresh water through the system. Tides in the western Pamlico Sound, what little exist, are principally wind driven. A westerly winds will lower water outside the impoundment and aid in draining, while easterly winds raise the water level in the Sound and aid in flooding or flushing ponds. Flushing is accomplished using aluminum fabricated flap-gates which allow managers to maintain target water levels yet still receive the benefit of new water flowing through the impoundment whether it be rain, tide, or pumped water.

Aluminum fabricated flap-gate

Problems affecting species and habitat

Problem associated with impoundment condition are correlated with vegetative condition. Vegetation surveys are conducted annually in the fall. A sample vegetation survey data sheet can be found in appendix V. Quality vegetative coverage of >70% is considered suitable. Each impoundment's condition is affected independently by many factors. For this reason, problems affecting impoundment conditions will be described individually below.

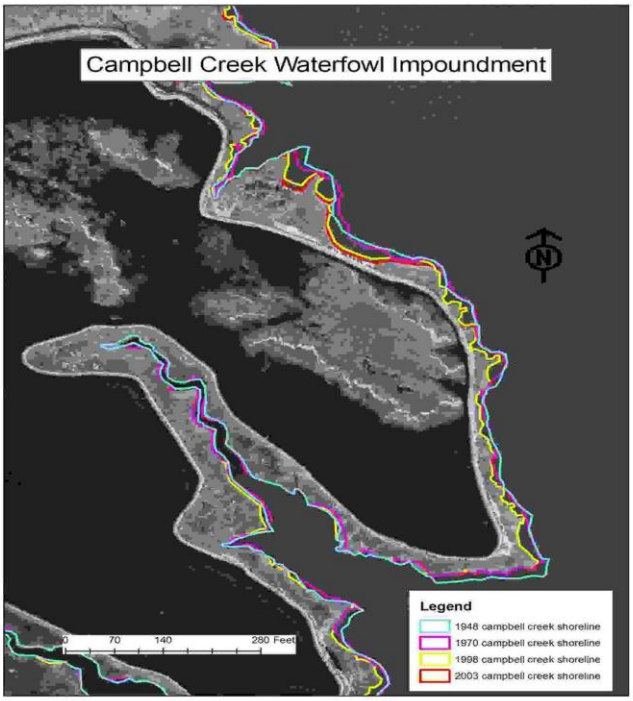
Pamlico Point is located at the conjunction of the Pamlico River and the Pamlico Sound. This impoundment, at 723 acres, is our largest coastal impoundment and is divided in to four sub-impoundments PP1-4. As the easternmost impoundment, Pamlico Point frequently is subjected to numerous adverse environmental factors. Unlike GCGL's other impoundments, Pamlico Point "sticks out there" and has no shoreline/treeline to provide a wind -break. Therefore, the impoundment is subject to damages interior and exterior dikes from wind/wave action no matter the direction. This wind/wave action causes damages in numerous ways, if bottoms are allowed to become and stay soft, eventually the sediment will move ultimately covering seed or clogging drainage ditches. Our inability to "dewater" ponds due to drainage plugs, leads to degraded (soft) bottoms, increased turbidity, and ultimately decreased SAV production. PP2 has seen a marked decline in the coverage of beneficial vegetation. During the 2014 vegetation sampling period, 100% of points sampled contained bare ground, dead vegetation, or other non-beneficial vegetation

Campbell Creek is located adjacent to Goose Creek Snode's and Campbell creeks. Goose Creek, which contains a segment of the Atlantic Intracoastal Waterway (ICW), supports high boat traffic which impacts dikes adjacent to the creek through increased wave action.. This constant activity, has accelerated marsh loss and dike erosion on the CC-2 east facing diking (figure 12). Repairs to this area of dike were accomplished as part of a NAWCA project in 2009. Eroded and "at-risk" sections of dike were reinforced using articulating concrete blocks. Sections of the projects area have become compromised due to differential settling, higher-than-normal tides, and increased vessel traffic.

Spring Creek is directly South of Campbell Creek Impoundment. NCWRC is currently working to receive a CAMA General Permit to clean a clogged WCS and maintain the outlet canal at a depth of approx. 2.5 ft. Other likely factor to adversely affect the habitat and species include increased sediment plugs in interior ditches and increased coverage of phragmites. Any future management prescriptions should specifically target both.

Smith Creek is located adjacent to Smith Creek just downstream from the Smith Creek BAA. Currently there are no known problems affecting this impoundment. Vegetation survey results were 71 and 82% during the 2014 and 2013 respective sampling periods. Special notice should be kept of the coverage of non-beneficial emergent vegetation.

Figure 12: Marsh loss adjacent to Campbell Creek Impoundment



Hunting Creek lies adjacent to Spring Creek impoundment. Currently there are no known problems affecting this impoundment. Vegetation survey results were 61 and 70% during the 2014 and 2013 respective sampling periods. Special notice should be kept of the presence and coverage of non-beneficial emergent vegetation. Ultimately, the creation of better interspersion of water/cover within the impoundment, through chemical applications and water level management, would benefit waterfowl and hunters equally.

Hobucken is located between Goose Creek and S.R. 304 at its intersection with

Hwy. 33. Currently the only known problem affecting this impoundment is the dike wash, associated with boat traffic on the ICW, adjacent to Goose Creek where there is an existing vinyl bulkhead. Vegetation survey results were 50% good during the 2014 sampling period. This is well below the 70% threshold, but given the impoundment's bottom contours and soil composition these are typical and acceptable. Special notice should be kept of the coverage of non-beneficial emergent vegetation.

System wide- Long-term, one of the greatest threats to the impoundment system at Goose Creek is sea level rise.

Recently impoundments have experienced abnormally high water outside. High tides have been mostly due to an uncharacteristically dominant easterly wind. If this phenomenon is just a preview of future sea level rise impacts, it will hinder our ability to drain impoundments; with the existing pumping arrangement. High water for an extended period of time will eventually degrade the bottom, and eventually the vegetation abundance. The expected exterior water will also over-wash the existing marsh and ultimately the diking system. Given the vulnerability of this habitat type, it would seem appropriate for acquisition of impopundments be given high priority in order to replace acres of this habitat type.

Priority species associated with GCGL Impoundments:

Species	**Scientific name**	**NC Status (Federal Status)**	**Natural Heritage Program and Global Rank**
Waterfowl		None	None
American Bittern	*Botaurus lentiginosus*	SR	S_1B, S_3N, G_4
Least Bittern	*Ixobrychus exilis*	None	S_3B, SZN, G_5
Little Blue Heron	*Egretta caerulea*	SC	S_3B,S_3N,G_5
Snowy Egret	Egretta thula	SC	S_3B, S_3N, G_5
Black-necked stilt	Himantopus mexicanus	SR	S_2B, G_5
Glossy Ibis	*Plegadis falcinellus*	SC	S_2B, SZN, G_5
Bald eagle	*Haliaeetus leucocephalus*	T(T)	S_3B,S_3N,G_5
Northern Harrier	*Circus cyaneus*	SR	S_1B, S_4N, G_5
Pigmy rattlesnake	*Sistrurus miliarius*	SC	S_3,G_5

Desired Future Condition

The Desired Future Condition for GCGL impoundment habitat is to maintain current number of acres present during this Planning Horizon. Infrastructure improvements and maintenance will facilitate the preservation of this essential portion of GCGL. Land acquisition should be expedited in coastal areas to ensure that these habitats are replaced by lands adjacent to existing Game Lands and lands already harboring impoundments, or on lands where they could be constructed.

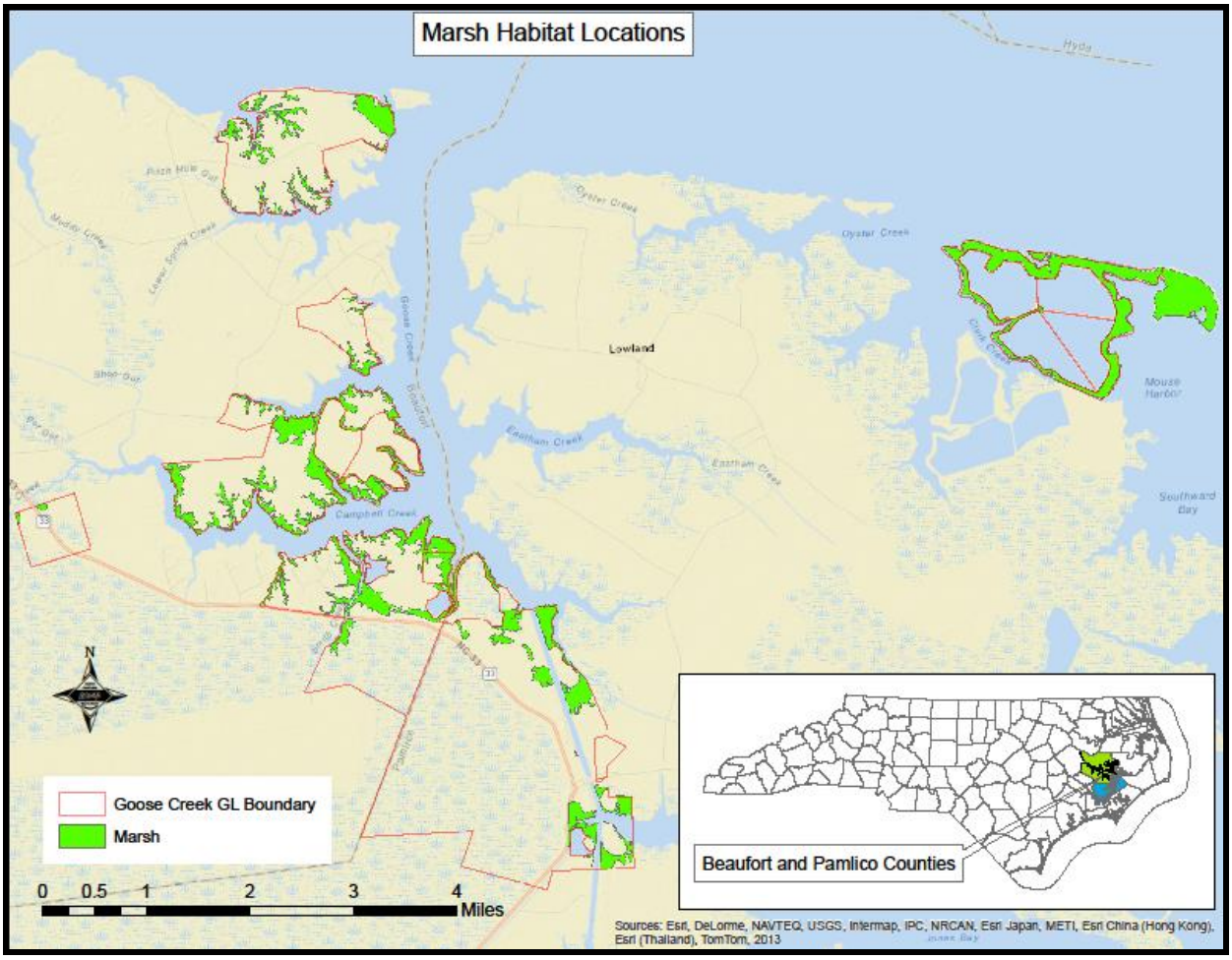
Estuarine Communities

The Coastal Brackish Marsh habitat type (Estuarine Communities NCWAP equivalent) occurs on 1,427 acres or 20% of GCGL. Brackish Marshes occur in areas where the tidal waters are partly diluted by fresh water. These marshes contain a relatively low plant diversity, with black needle rush, and *Spartina sp.* usually dominating vast areas. The abundance of invertebrates such as mollusks and crustaceans indicates the transitional nature of these communities between terrestrial and marine systems (NCWAP *Draft* 2015). These areas often act as buffers of wave action and salt water intrusion in to our impoundments and mesic pine forests.

Location and Current Condition

As indicated in figure 13, brackish marsh habitats occur on all Tracts of GCGL. Acres in this habitat type are thought to be in fair to excellent condition, largely due to the periodic prescribed burning that happens on GCGL. This management practice mimics fires that frequently occurred. Frost, 2000 stated these fires occurred at a frequency from 300 years to annual events. These fires remove the annual “thatch, as well as any” wrack” that continually washes ashore during storm events. Generally, areas that have a diminished condition are those exposed to large expanses of open water or to amplified boat traffic.

Figure 13: Goose Creek Game Land Marsh Habitat Locations.



Problems Affecting Species and Habitat

Degraded water quality:

Marsh habitat losses from point and non-point source pollutants are negligible on GCGL. Farming, forestry, and mining operations all contribute to degraded water quality which, in time, could threaten marsh habitats. (www.water.ncsu.edu/watersheds_2/25/15).

Increased boat traffic/storm surge:

Growing recreational boating traffic and continual storms will have the most visible effects on Goose Creek's marshes. The wakes from these vessels, sometimes in excess of four feet, undercut and eat into the marsh at an alarming rate. Marsh loss from vessels is principally isolated to areas adjacent to the Atlantic ICW. Commercial fishing vessels, industrial barges and

boaters following warm weather use this section in between the Neuse and Pamlico Rivers to avoid the rougher Sound waters.

Storms occur frequently in this region. Whether the storms are of Tropical origins or a Sea Breeze thunderstorm, the Easterly winds commonly associated with them create similar undercutting effects.

Sea Level Rise:

Sea Level rise will lead to widespread marsh loss (Draft NC WAP, 2015). Whether partial or complete inundations, this threat will eventually erode and destroy Goose Creek's current marshland.

Increased SSA's/Rural Development:

Citizens continually pursue Coastal living. This increased shoreline development indefinitely changes existing or potential marsh lands. This increase in local populations has an adverse effect on our ability to effectively manage GCGL, principally our ability to conduct prescribed burning operations on GCGL.

Conclusions:

It's not likely that one factor would have detrimental effects on the marshes associated with GCGL. It's the cumulative effects of all the stated factors, however, that will have the most damaging effects on the marsh on the lower Tar-Pamlico River Basin and the Pamlico Sound.

Priority species associated with GCGL marshes:

Species	Scientific name	NC Status (Federal Status)	Natural Heritage Program and Global Rank
Waterfowl		None	None
American Bittern	*Botaurus lentiginosus*	SR	S_1B, S_3N, G_4
Least Bittern	*Ixobrychus exilis*	None	S_3B, SZN, G_5
Little Blue Heron	*Egretta caerulea*	SC	S_3B,S_3N,G_5
Yellow rail	*Coturnicops noveboracensis*	SR	S_2N, G_4
Black Rail	*Laterallus jamaicensis*	SR	S_3B,S_2N, G_4
Common Moorhen	Gallinula chloropus	None	None
Northern Harrier	*Circus cyaneus*	SR	S_1B, S_4N, G_5
Pigmy rattlesnake	*Sistrurus miliarius*	SC	S_3,G_5
Diamond-backed Terrapin	*Malaclemys terrapin*	SC	S_3, G_4T_4
Marsh Rabbit	*Sylvilagus palustris*	None	None

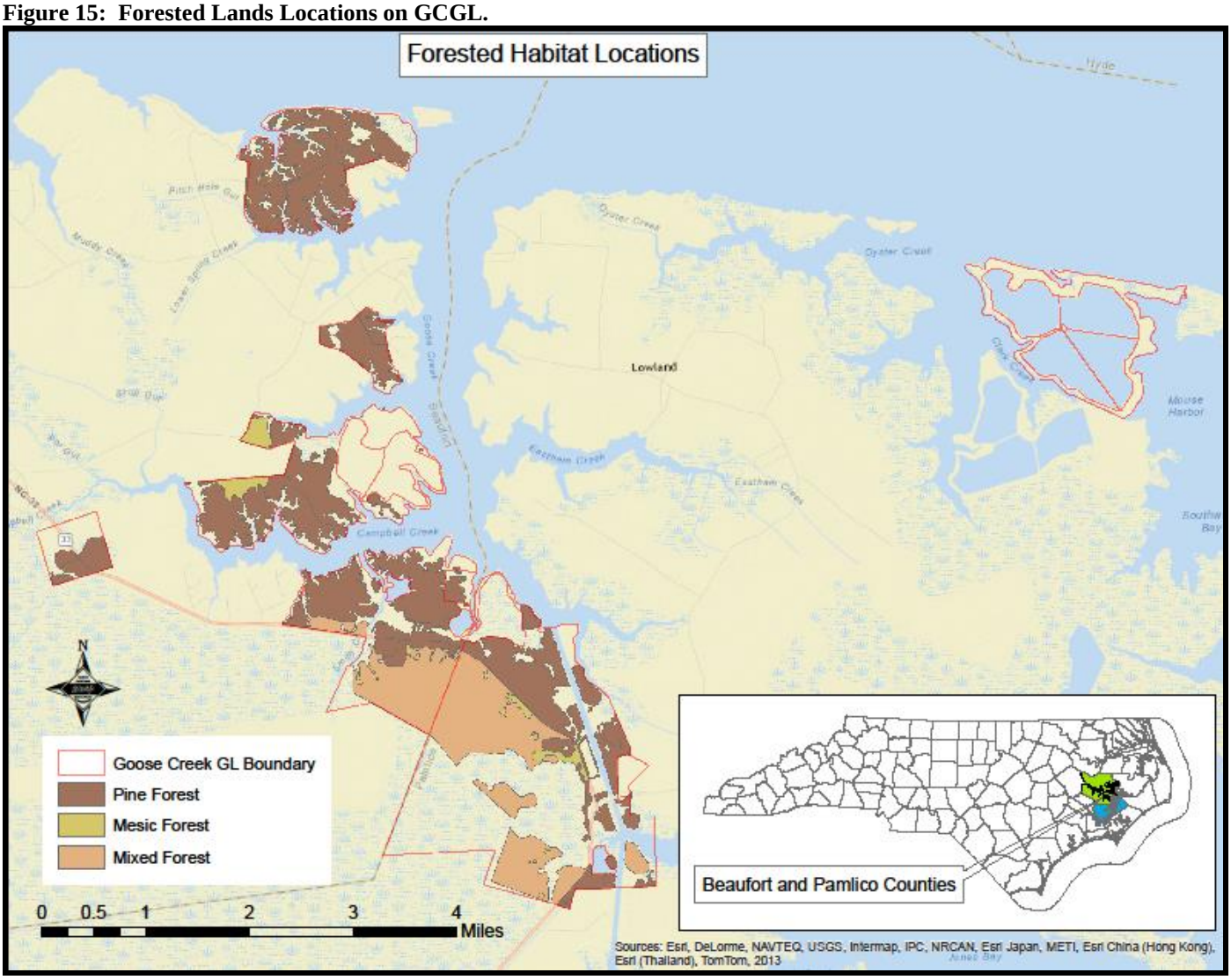
Desired Future Condition

Our Desired Future Condition should be to maintain or increase the acres of Coastal Brackish Marsh associated with Goose Creek Game Land. This can be accomplished in several ways. In the short term, continued use of prescribed fire should be applied to marshes in conjunction with ongoing burning operations. This practice will ensure the propagation of beneficial native plants and accommodate the many native animals that require this habitat. In the long term, the WRC should continue to explore acquisition opportunities adjacent to GCGL. As water levels continue to rise, marsh habitats will move inland occupying former woodlands.

Forested

This cover type consists of 3,773 aces of upland pine forests and upland mixed forests, which equates to 52%of GCGL (*Figure 14*). A large portion of the upland pine acres in this cover type originated from cut over and high-graded second growth timber that naturally regenerated to stands mixed with loblolly pine and hardwood. The understory and midstory in these areas ranges from dense pocosin shrub (e.g., wax myrtle) and hardwood tree species (e.g., oaks, hickories, sweetgum or red maple) to bare ground or pine straw. Midstory and understory species composition and structural diversity in these stands are influenced by soil type, hydrology, fire regime and the amount of sunlight reaching the forest floor. This, in turn, determines the wildlife species present at various seral stages of the stands. Table 4 shows priority species associated with mixed pine forest.

Figure 15: Forested Lands Locations on GCGL.



Location and current condition of habitat

These habitats are evenly distributed across all GCGL tracts. Prior to WRC acquisition, these lands were not managed for fiber production per-sea. These forests were likely to have been cleared of second growth timber for agriculture and tar production.

Table 4: Priority species associated with Goose Creek Game Land Loblolly/slash pine plantations.

Type	Common Name	Scientific Name	NC Status (Federal Status)	Natural Heritage Program State and Global Rank
Nongame	Cooper's hawk	*Accipiter Cooperi*	SC	S_3S_4B, S_4N, G_5
	Red-cockaded woodpecker	*Picoides borealis*	E (E)	S_2, G_3
Game	White tailed deer	*Odocoileus virginianus*	N/A	N/A
	Wild turkey	*Meleagris gallopavo*	N/A	N/A
	Northern bobwhite quail	*Colinus virginianus*	N/A	N/A

Regeneration was in the form "weedy species" (Peacock and Lynch, 1982) that what would be expected in fire suppressed mesic sites (red maple, *Acer rubrum*, sweetgum, *Liquidambar styraciflua*, and loblolly pine, *Pinus taeda*.

However, since acquisition fire and timber management have provided habitat for early successional species, pine specialists and even interior forest species. Additionally, there are stands in different stages of rotation, creating what could be considered an "uneven-aged forest."

Problems affecting species and habitats

The inability to mainain a consistant fire return interval of $\leq$ 3 years is the most detrimental factor to these woodlands, aside from the obvious conversion to off-site pine species. It has greatly increased the hardwood midstory component of these stands and decreased the occurrence of rare and endangered plant species.

While stands with closed canopies and higher basal areas are well suited for some fauna (prairie warbler, worm-eating warbler), dense midstories and lack of age and structural diversity can make them unsuitable for eastern fox squirrels and red-cockaded woodpeckers.

Conservation actions necessary to conserve the species and habitat, and priorities for implementation

Unlike nearly all other forest types mentioned in this plan, most acres in the mixed pine forest are in a Because many acres in this cover type are in a non-native state (either through fire suppression or conversion from longleaf pine, there is a need to restore them towards less-altered conditions. Transitioning from acres in mixed loblolly stands to longleaf pine savannah where soils are appropriate should be the primary goal in this cover type.

To do so, mixed pine overstories should be removed and regenerated to longleaf pine using the most appropriate silvicultural technique to the site. Once longleaf is established it should be

managed in uneven-aged stands using selection cuts in the same manner as current longleaf stands.

Additional older aged pine acreage is needed. Therefore, on soils not conducive to longleaf restoration, pine stands should be managed on long rotation (e.g., 60 – 100+ yrs.) or in uneven-aged stands. Additionally, forest management should mimic the characteristics of older stands (e.g., provide canopy gaps, leave dead and downed material, leave cavity trees) where appropriate. Basal areas should be maintained at levels that allow for an herbaceous understory. When available, mature hardwood trees of desirable species should be retained and released during harvest operations. Specific management should be implemented/continued to manage for red-cockaded woodpecker populations.

Equally high in priority in this cover type is the restoration of a more natural fire regime, regardless of the overstory pine species. This will involve resolving smoke management issues, negative public sentiment and liability concerns associated with prescribed burning. Restoration of natural fire frequency, intensity, and seasonality is critical for pine-related reptiles, amphibians, and their prey (Bailey et al. 2004).

Cooperative efforts related to management activities need to continue and expand with large scale industrial forest landowners to continue to try and improve habitat conditions at the landscape and stand level for a variety of wildlife species (Measells et al. 2002). In addition, continued cooperative efforts with RCW working groups (for translocation, or to manage the Sandhills and coastal populations of red-cockaded woodpeckers) is needed.

Desired future condition

The desired future condition for this habitat type is restored to site-suitable vegetation communities with primary emphasis on the longleaf pine wiregrass ecosystem, and a 3-year fire return interval.

Future forest management

Where soil types are appropriate, loblolly pine will be converted to longleaf pine/wire grass communities. Stand age, stocking, site index, soil type, and spatial orientation will determine when and how appropriate stands are converted to longleaf pine. Silvicultural techniques for conversion will include row thinning, selection harvest, and clear-cutting. Specific timber harvest prescriptions will be made in the annual forest management plans developed each year by the central coastal forester, support and oversight staff.

During harvest operations, attempts will be made to establish permanent locations for loading decks and primary skid trails that will facilitate the continuous entries required for selection harvests and uneven-aged management. All harvest operations will follow North Carolina best management practices for water quality.

Once the final harvest has been made, containerized longleaf plugs will be planted with a spacing that allows for multiple future wildlife management options (i.e., >500 TPA). Mechanical site preparation practices (e.g., v-sheering, bedding) will be avoided for longleaf restoration sites to minimize disturbance of native ground cover. Native understory plantings will also follow timber harvests in areas lacking native understory or a substantial native seed-bank.

Nonriverine Swamp Forest

Nonriverine swamp forests occur on 563 acres or 8% of GCGL. This ecotype contains just a few tree species, tolerant of nearly permanent flooding: bald cypress, pond cypress, and swamp black gum. These communities get little input of nutrients due to the poor inorganic sediment load. The infertile acidic soils and wetness produce slow growth in the trees (Schafale and Weakley, 1990). The difference between cypress and gum dominance is probably related to logging history, but environmental factors such as flooding frequency and depth, water chemistry, soil type and latitude also contribute (Schafale and Weakley, 1990). Since cypress-gum swamps flood for long periods of time their vegetative diversity is usually low but they may serve as important habitat for some aquatic animals and plants. Hollow cypress and swamp black gum are particularly important for bats, chimney swifts and other cavity dwelling species. In addition, several colonial waterbird species rely on swamp forests for nesting habitat (NCWAP, 2005). Table 5 shows the priority species associated with floodplain forests on GCGL.

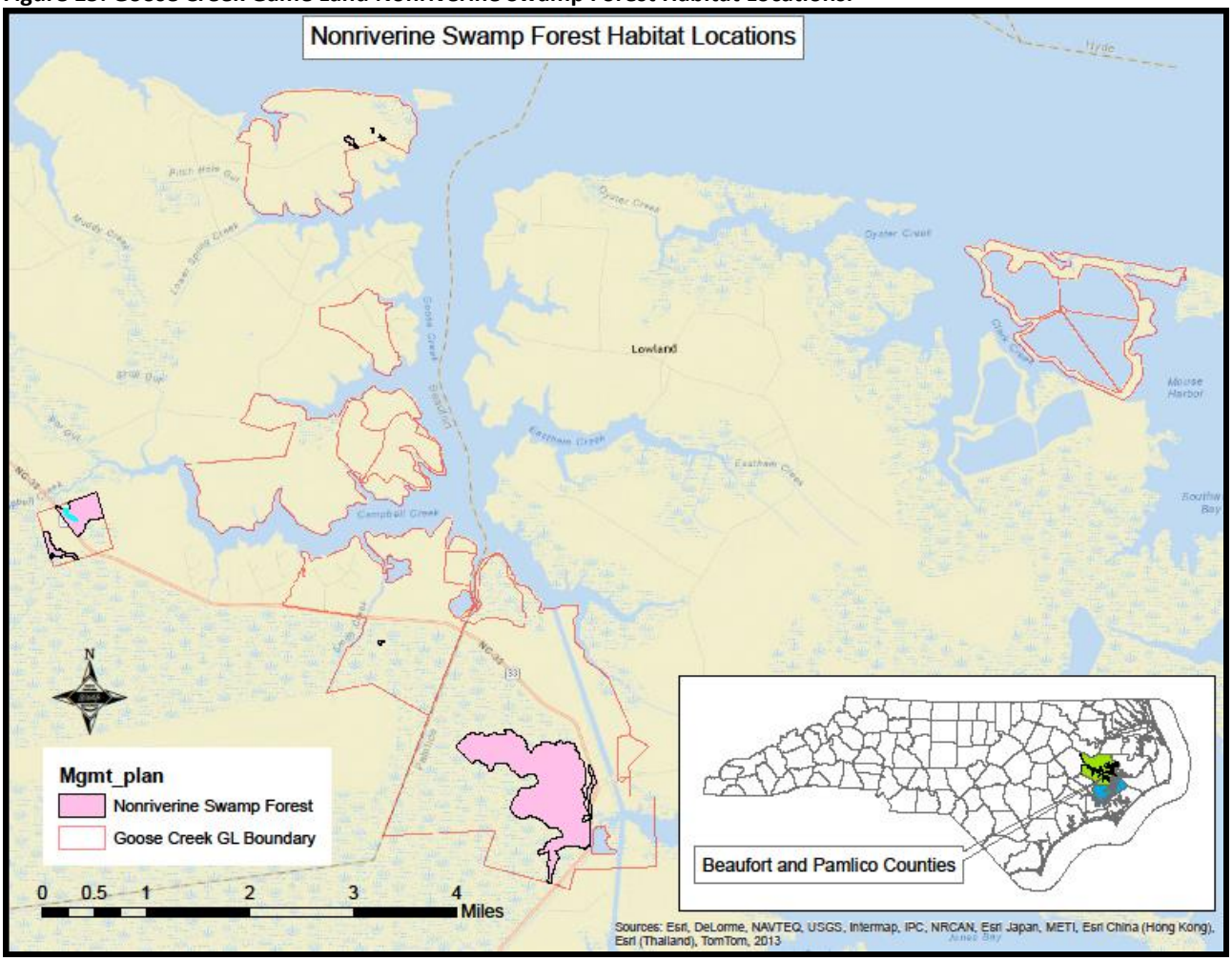
Table 5: Priority Species associated with Goose Creek Game Land Nonriverine Swamp Forests.

Common Name	Scientific Name	NC Status (Federal Status)	Natural Heritage Program State and Global Rank
Anhinga	*Anhinga anhinga*	SR	S_2B , SZN, G_5
Bald Eagle	*Haliaeetus leucocephalus*	T (T)	S_3B, S_3N, G_4
Mississippi Kite	*Ictinia mississippiensis*	SR	S_2B, G_5
Star-nosed Mole	*Condylura cristata*	SC	S_2, G_5T_2Q
Rafinesque' s Big-eared Bat	*Corynorhinus rafinesquii*	T	S_2, G_4T_2
Northern Yellow Bat	*Lasiurus intermedius*	SR	SU, G_4G_5
Southeastern Bat	*Myotis austroriparius*	SC	S2?, G3G4
Eastern Woodrat	*Neotoma floridana*	T (CP pop)	CP: S_1 , G_5T_5

Current Location and Condition

Map 15 shows locations of nonriverine swamp forests on GCGL. This habitat type occurs on Tracts 2, 3, and 6 and is thought to be in excellent condition. Habitats of this type on GCGL contain species assemblages similar to those described by LeGrand et. Al. 1992.

Figure 15: Goose Creek Game Land Nonriverine Swamp Forest Habitat Locations.



Factors affecting Habitat

Factors impacting this habitat type include changing flood regime patterns caused by development, habitat fragmentation, changes in water chemistry and organic matter loads, increased nitrogen from agricultural and development-related runoff, and exotic species. All of these factors, individually or interactively, produce abrupt or gradual changes in floodplain plant and wildlife communities.

Desired Future Condition

The desired future condition for nonriverine swamp forest habitats on GCGL shall be to protect areas of this habitat type from wildfire during drought conditions and to allow the same areas to reach a mature age structure. These conditions can be met by continuing with regular prescribed burning operations and being aware of timber trespass.

Infrastructure

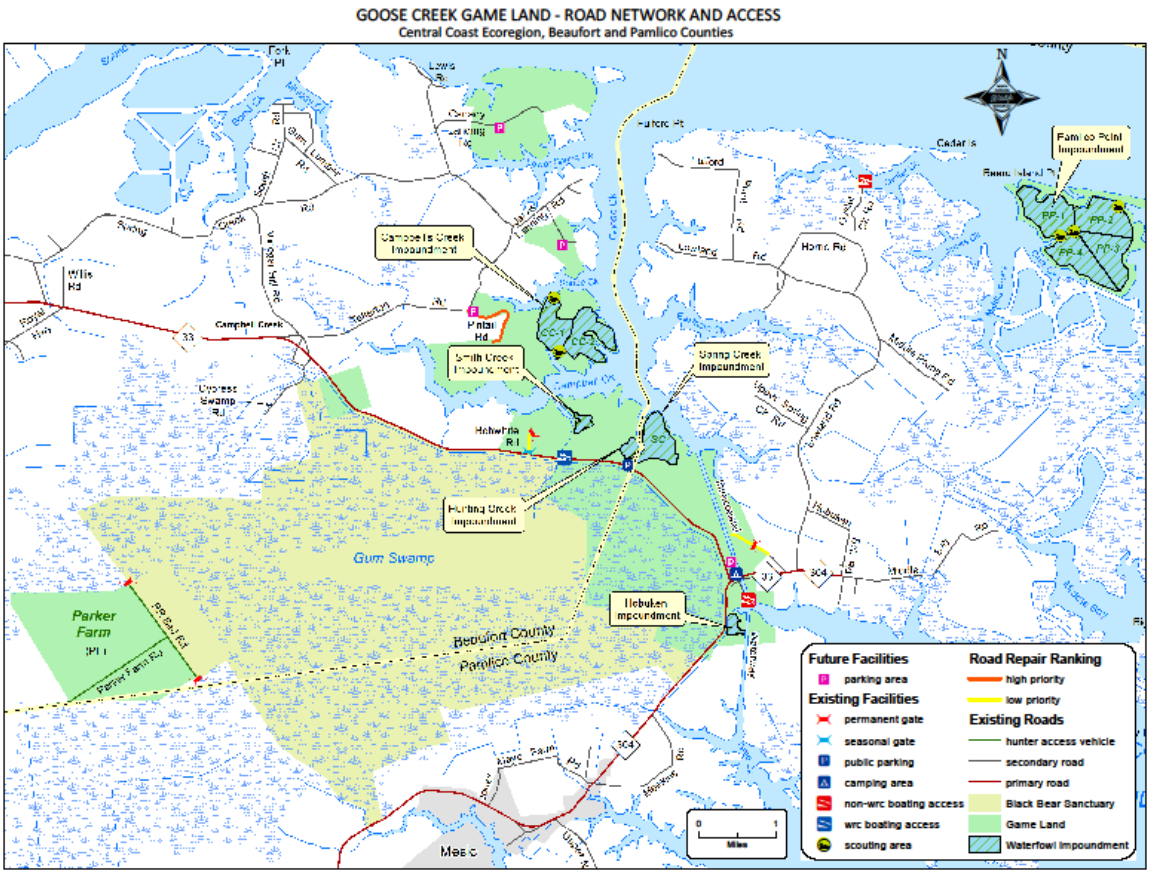
Infrastructure Assessment

Assessments of existing infrastructure throughout the Goose Creek Game Land were conducted by Division of Engineering & Lands Management staff in January of 2015. The infrastructure maps included in the appendix to this document show the locations of existing public roads, administrative access roads, trails, parking areas, dams and gates within the Goose Creek Game Land. The results of the assessments along with recommendations for maintenance and improvements are discussed by category below.

Road Assessment

The Goose Creek Game Land has very few roads within seven separate tracts of land. These roads were inspected by Engineering staff on January 20 of 2015. Coastal Region field staff met with Engineering staff to discuss the current infrastructure conditions and future needs
Good access is provided to the majority of the game land. The roads on Goose Creek are used by WRC staff to access the game land for maintenance and conservation work. They are also used by the public for hunting, hiking, geo-caching, wildlife viewing, and other outdoor recreational purposes (*Figure 16)*.

Figure 16: Goose Creek Game Land Roads and Access Network.



Existing Road Conditions

Most of the roads within the Goose Creek Game Land are in fair to good condition. The observed conditions of these roads are as follows:

Pintail Road

This road is off of Tetterton Road and provides access to Tract 4 of GCGL adjacent to the Campbell's Creek Impoundment. Pintail Road is approximately 1.30 miles long and dead ends at a gate with a small turn around area. This single lane road has a gravel and dirt surface, and is in fair good condition. There are roadside ditches on both sides of the road. The ditches are irregular, over grown in places and have tree debris in places. There are four corrugated metal culverts under this road. There are also several potholes along the road.

Bobwhite Road

This road provides access to the approximately 275 acres of Tract 3, west of Smiths Creek. There is a gated entrance off Highway 33, just west of the Smiths Creek Boating Access Area. Bobwhite Road extends .26 miles from Highway 33 and dead ends at two gates. Grass roads continue beyond the gates that provide walking access. This road has a gravel and dirt surface, is wide enough for two way traffic, and is in fair to good condition.

Hunter Campground Entrance

This road provides access to the hunter campground, just east of Highway 33 on the ICW. This .17 mile long road is gravel and dead ends into a bulkheaded loading area on the Intracoastal Waterway. There is a fair amount of open space that is used for camping as well as construction lay-down. It appears this area gets a good amount of use and the road is in fair condition with some large potholes.

Tract One Road

Tract One Road starts on the eastern side of the ICW about a half of a mile from the bridge on Highway 33. This gravel road follows the eastern boundary of the game land for .54 miles before entering the game land. The road also provides access to a residence to the east of the game land. There is a gate at the boundary of the game land and the road turns from gravel to grass and dirt. There is a ditch along the western side of the road that is overgrown in sections. Due to limited usage, this road is in good condition for a single lane grass road.

Some of the roads just need minor grading and the addition of gravel, while others require more extensive work. The future road improvements have been broken down into high, medium, and low priorities. It should be a goal to perform the high priority projects over the next ten years, with the medium priority projects done next as resources allow. At the end of this ten year period, a new assessment will be performed and new priorities set.

Future Road Improvements

Maintenance and needs for future improvements were identified on the existing sections of NCWRC access roads. The recommended road improvements discussed in this section are grouped by priority as follows:

High Priority

Over the next ten years, the highest priority roads for upgrade are the following:

- Pintail Road
- Hunter Campground Entrance

Pintail Road

Pintail Road provides hunting access to a large portion of the game land tract east of Tetterton Road. The road should be designed and constructed to include a consistent one lane gravel surface. The road width should be widened where possible to allow for roadside parking and two way passing. This improvement should end at the small turn-around area which should also be gravel. Existing potholes and rutting should be graded as needed.

The section of road needing repair and construction is approximately 1.3 miles and will have an estimated cost of $100,000.

Hunter Campground Entrance

This small road appears to get a good amount of use. It should be designed and constructed to handle the amount of use it receives. The road should be constructed as a gravel surface with enough width to accommodate two way traffic. A small gravel parking area and fencing should be constructed to keep vehicles from driving freely through the grassed areas. Designated parking in this are also serves possible hunting opportunities on the large tract of land west of Highway 33. If the loading area along the ICW is going to be used regularly, the gravel paving in this area should be improved as well.

The section of roads needing repair and construction is approximately .17 miles and will have an estimated cost of $30,000.

Low Priority

Other roads on the Goose Game Land that need upgrade, but are considered the lower priority include the following:

- Tract One Road
- Bobwhite Road

Tract One Road
If this road is ever to be upgraded, it should be designed and constructed as a single lane gravel road. The ditches along each side should be rebuilt as well. The driveway used to access the field along this road should be improved also as it will be used as a turn around.

The section of road needing upgrade is approximately .35 miles and will have an estimated cost of $50,000.

Bobwhite Road
This road is in good condition but may need to be improved in the future. If this road is improved it should be designed and constructed as a two lane gravel road since the current width allows for it. Otherwise, it should be re-graded and routinely maintained to provide a consistent surface.

The section of road needing upgrade is approximately .25 miles and will have an estimated cost of $25,000.

Road Maintenance

All roads require inspection and maintenance to function well and avoid damage and deterioration. Maintenance should be performed regularly, as the longer the delay in needed maintenance, the more damage will occur and the costlier the repairs will be.

Typical Road Maintenance Practices

- Inspect roads regularly, especially before the winter season and following heavy rains.
- Keep ditches and culverts free from debris (see also Culvert Maintenance Section of this Plan).
- Remove sediment from the road or ditches where it blocks normal drainage.
- Regrade and shape the road surface periodically to maintain proper surface drainage.
    - Typical road should be crowned at approximately 4%, or ½" per foot.
    - Some roads may not require a crown, but should have a constant cross slope (super-elevation).
    - 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 motorgrader 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 erosion-resistant surfacing such as grass or rip rap in ditches.
- If it is determined that a road needs major repairs or upgrades, contact Regional Supervisor and Design Services to schedule an assessment.

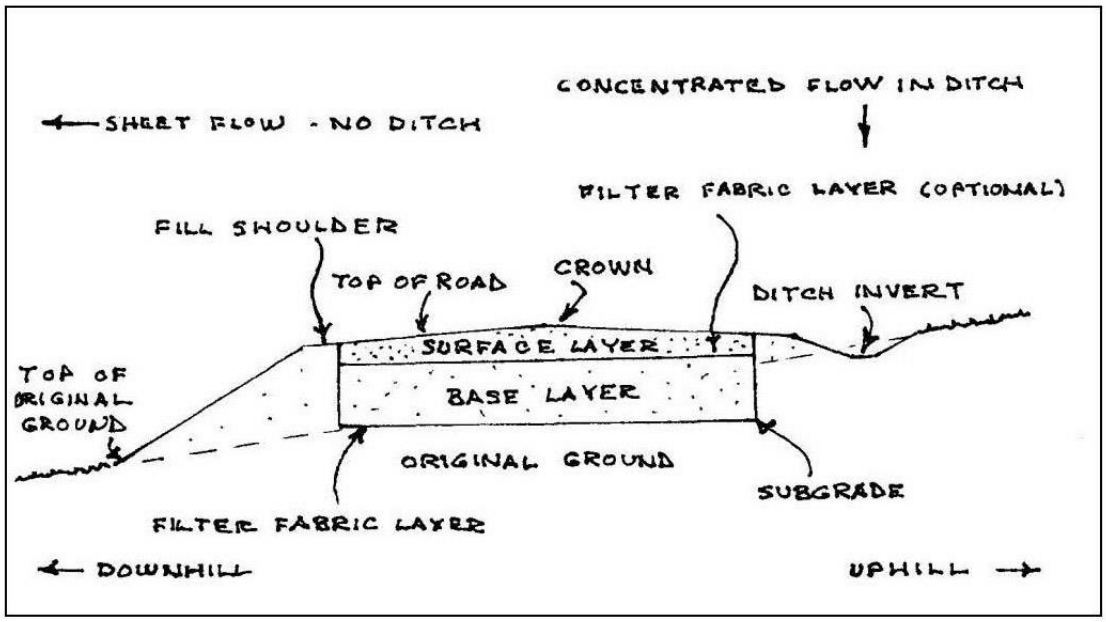


Figure 1 - Typical Road Cross-Section – Canaan, NH Highway Department

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 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.

Gates

Gates should be used on game lands for maintenance and habitat conservation. For maintenance purposes, gates should be used to limit access to roads that are unsafe or are in disrepair, or to limit use on roads to certain times a year in order to minimize the wear and deterioration of the road. If a road is considered unsafe or in disrepair, field staff should contact an engineer. The engineer will perform an inspection to determine the best course of action to repair or upgrade the road.

All gates installed on game lands should the standard swing gate and painted orange for maximum visibility. No cable gates should be installed, and any existing cables should be replaced.

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 regarded. 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 the back.
- Side slopes need to be stabilized with additional vegetation, erosion control mat, or rip rap.

Parking Areas

The Goose Creek Game Land consists of several miles of roads, but only one designated parking area. Currently, users of the game land park on the shoulders of roads or in open grass areas, which can present several problems, ranging from blocking access to safety. The game land road network has been reviewed with field staff and several locations have been identified for the addition of parking areas. These parking areas are generally located at road entrances or further in the game land at currently used grass open areas.

Hunting Creek & Spring Creek Impoundments
This gravel parking area along Highway 33 is the only designated parking area other than the Smiths Creek Boating Access Area parking lot. This gravel area can accommodate 10-12 vehicles. This area is in fair condition and should be improved with a uniform gravel surface. There is +- 175' of retaining wall along the west side of this parking area. This railroad tie retaining wall is showing signs of deterioration. There is no current failure in the structure, but the wall may need to be replaced within the next 10 years.

Hunter Campground
In this area, vehicles park freely on the grass. A small gravel parking area with fencing should be designed & constructed to reduce free movement of vehicles in the grass areas. This area would also be a good location for signage/information kiosk. At the loading area, there is +- 50' of timber bulkhead on the Intracoastal Waterway. This bulkhead is not showing any signs of failure but is showing some minor deterioration. This bulkhead may need replacement within the next 10 years.

Pintail Road

There is no designated parking on Tract 4 and there are limited opportunities as there are ditches on both sides of the road. When this road is improved, small areas of designated parking should be constructed where possible. It may be possible to install a culvert and construct a small parking area along the east side of the road.

Summer Ise Lane (Tract Five)

Summer Ise Lane is a public gravel road off of Jarvis Landing Road that goes through a 196 acre tract of game land north of the Campbell's Creek waterfowl impoundment. This road provides access to several houses to the east of the game land. There is a small dirt area at the curve in the road that is being used for parking & turnaround. This may be another area where designated parking could be constructed.

Canady Landing Road

Canady Landing Road is a paved public road that bisects the 875 acre tract of game land along the Pamlico River. There is no designated parking for this tract of land. There are currently three culverts over the roadside ditches that could allow for some small parking areas to be built. There are two on the north side of Canady Landing Road and one on the south side. These areas provide equipment access to fire lines. Gates should be installed at these two roads to control access.

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 clearing and grading required, it is estimated that each parking area will cost between $5,000 and $15,000.

Gates

There are several gates located throughout the game land, which limit access to certain roads and portions of the game land. The majority of the gates on the game land are swing gates and appear to be in good condition. The game land is typically closed outside of hunting season, with all gates closed and locked. Some of the gates on the game land are closed year round to keep the public off of some of the roads which are in poor condition. Other gates on the game land are opened/closed during specific times of the year, typically for hunting seasons. A Controlled Access Map has been included in this report, which identifies the times of the year when each gate/road is open to the public.

Drainage Structure and Impoundment Assessment

Dams

The Goose Creek Game Land has several waterfowl impoundments with earthen levees. There are no built dams that needed to be inspected for this Management Plan.

Waterfowl Impoundments

The Goose Creek game land has six waterfowl impoundment areas. These include Campbell's Creek, Smith Creek, Spring Creek, Hunting Creek, Hobucken, and Pamlico Point. For the purpose of this Management Plan, only the impoundment areas that have repairs or improvements which require immediate attention are included.

Pamlico Point

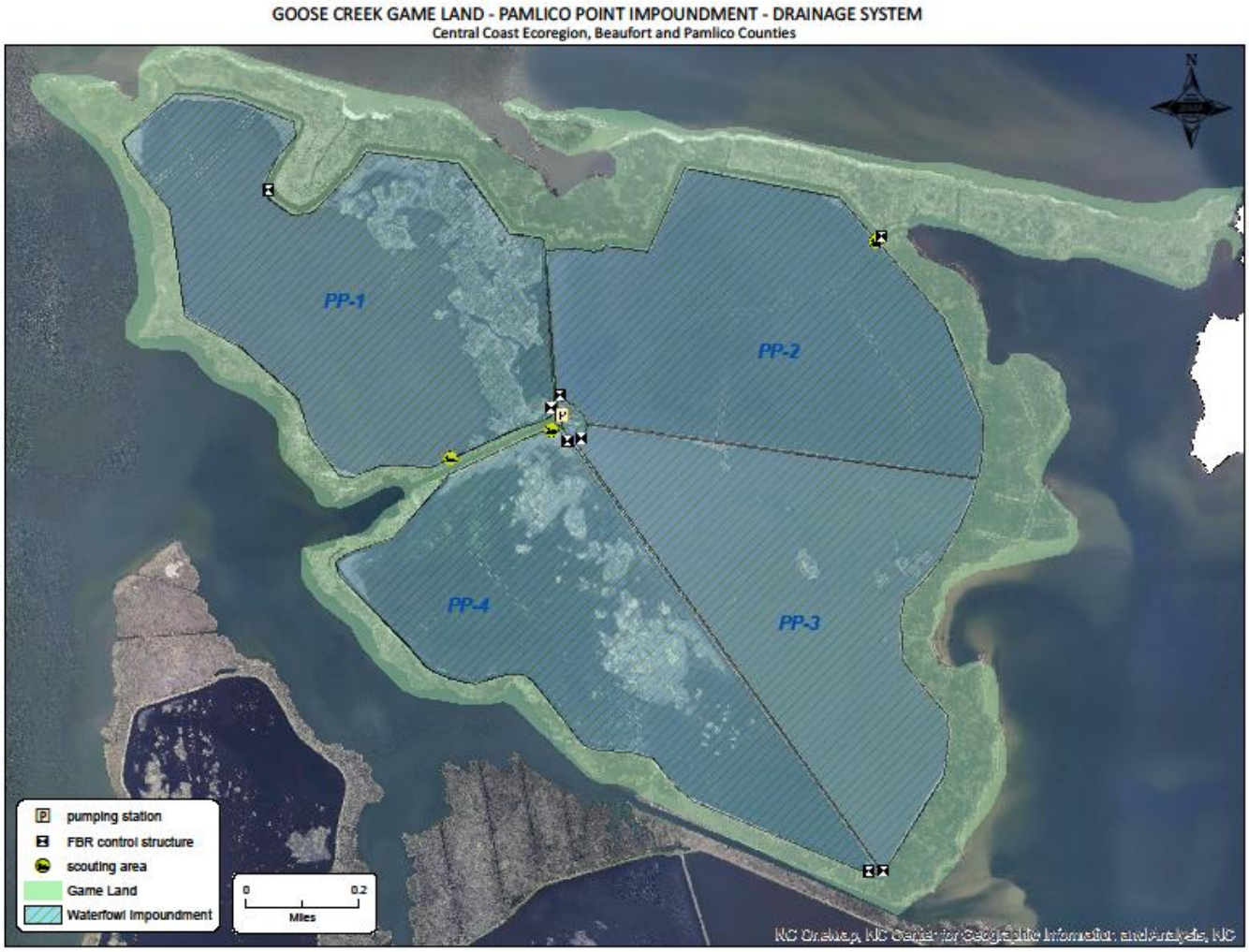
Pamlico Point is the largest of the waterfowl impoundments with four impoundments totaling +-720 acres. The intake and outfall of water is controlled by aluminum barrel structures with timber flash board risers. These structures are in good condition but can be challenging to operate and maintain. If these aluminum structures are to be replaced in the future, it is recommended that reinforced concrete barrel and riser be used. The estimated cost of this improvement is $40,000 per structure (*Figure 17*).

There are several areas along the northern border of impoundments PP-1 & PP-2 where erosion is occurring on the levees. There is a small canal between the levees and a small marsh area that provides boat access to the impoundments. Wind action is causing this erosion on the north side of the levees. If routine maintenance cannot adequately control the erosion, then engineered methods of repair would be necessary. This would be considered a high priority project.

Due to the wind exposure at Pamlico Point, there is significant sediment transport within the impoundments. When these soil accumulations or 'plugs' approach a outfall structure, the ability to control water elevations becomes compromised. Routine maintenance and inspections should be done to prevent the build-up of soils. If this becomes a debilitating problem for the impoundments, an engineered solution such as berms or breakwaters within the impoundments should be considered.

Pamlico Point waterfowl impoundments are only accessible by boat. Boat tie up areas should be improved to provide more secure mooring opportunities near the impoundments.

Figure 17: Infrastructure Associated with Pamlico Point Impoundment; Goose Creek Game Land.

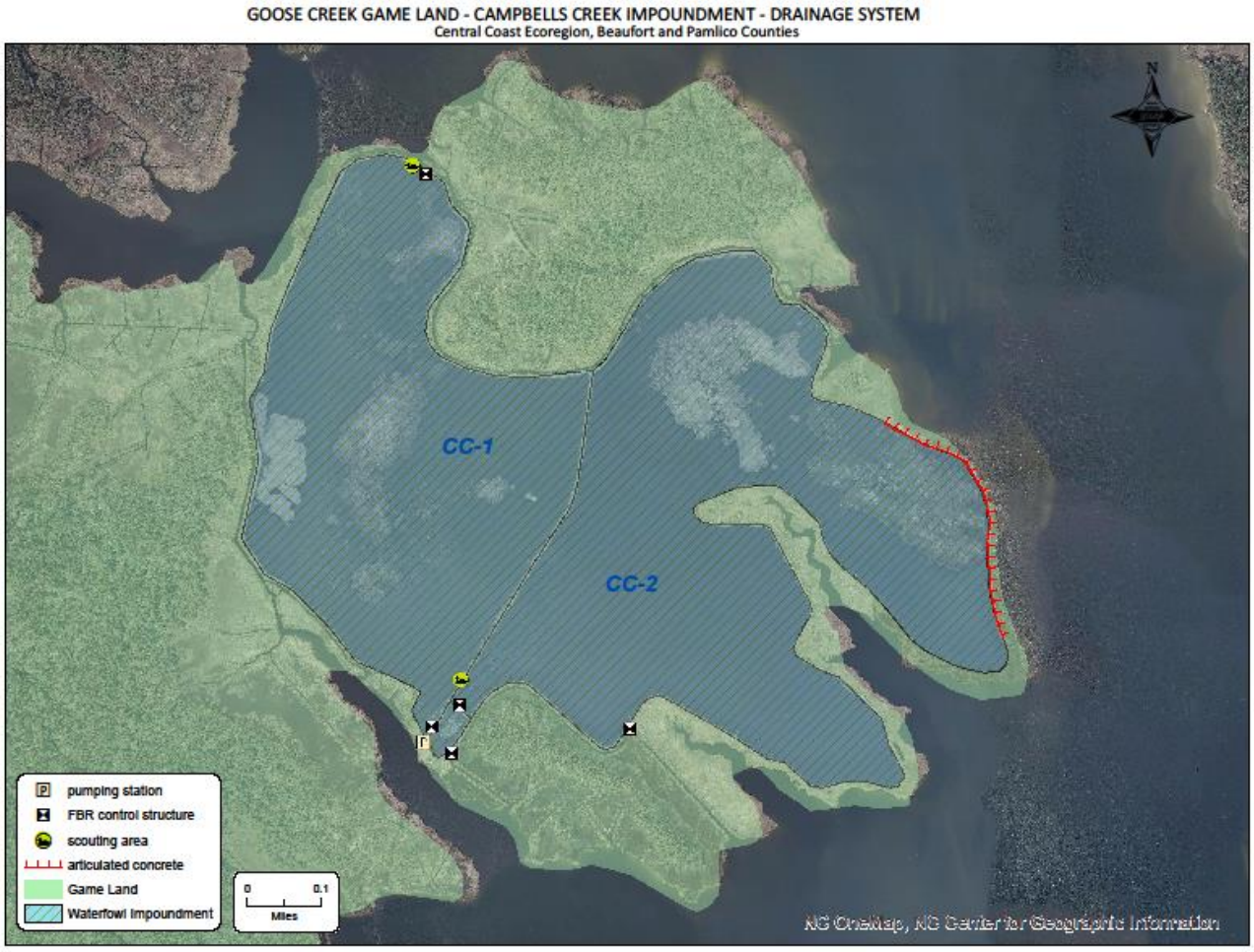


Campbell's Creek

Campbell's Creek is the second largest of the waterfowl impoundments within Goose Creek Game Lands, with two impoundments totaling +-310 acres. Along the eastern boundary of CC-2 impoundment, there was a large erosion control project installed in 2009. Close to 2,000 linear feet of articulated concrete block was installed along the embankment on Goose Creek. There are sections of the articulated concrete that are exposed to wind tides and boat wake action. These sections have been undermined and are beginning to fail. Approximately 120-160 linear feet of articulated concrete needs to be rebuilt. This is a high priority project. This improvement would need to be further studied to provide accurate costs. This work can be roughly estimated at $30,000-$40,000 (*Figure 18*).

Campbell's Creek waterfowl impoundments are only accessible by boat. Boat tie up areas should be improved to provide more secure mooring opportunities near the impoundments.

Figure 18: Infrastructure Associated with Campbell Creek Impoundment; Goose Creek Game Land.



Hunting Creek/Spring Creek

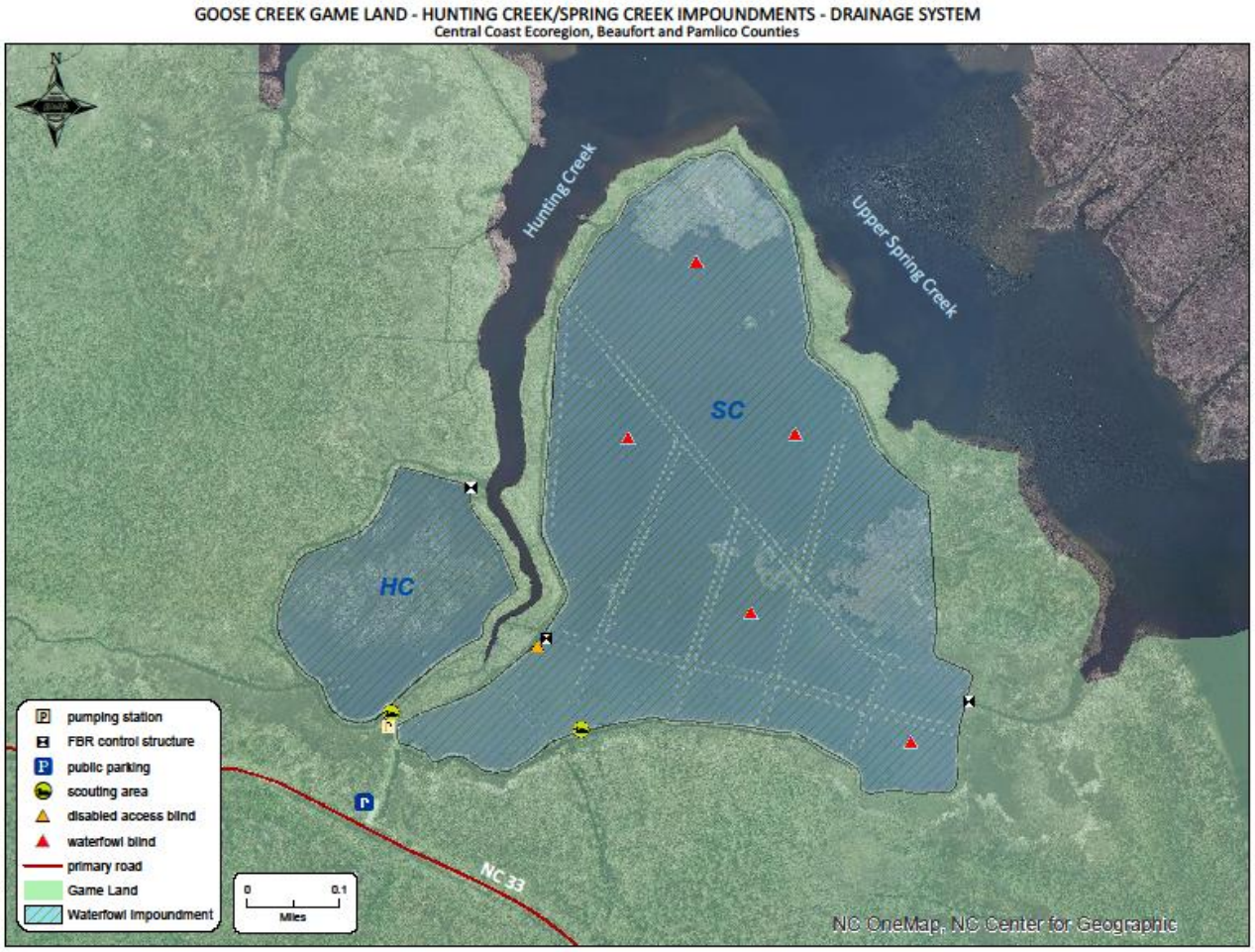
The Hunting Creek & Spring Creek waterfowl impoundments are adjacent to each other and share the same parking area. These impoundments combine for +-170 acres. The Spring Creek impoundment appears to be in good condition for the amount of use it receives. The pump seems to be dated, but in good working condition. Replacing the pump and associated structures and power supply may be an improvement project to consider within the next 5-10 years (*Figure 19*).

There is a small section of bulkhead above a culvert pipe at the Hunting creek impoundment that has substantial wash out behind the wall. This should be repaired immediately to prevent further damage to the structure.

There is a leak in one of the water supply pipes in the area of the foot bridge that needs to be repaired. This condition was not observed during the visit, but should be further studied. This should also be a high priority project.

If not otherwise mentioned, the levees around the impoundments are in good shape and currently need no improvements. They are free of large vegetation and do not appear to be experiencing any erosion problems. Routine maintenance and inspections should be conducted annually to ensure that the impoundment levees stay in good condition.

Figure 19: Infrastructure Associated with Spring and Hunting Creek Impoundments; Goose Creek Game Land.



Dam & Impoundment Maintenance

Dams are complex structures that consist of many parts (see Figure 2). In order to prevent failures, dams must be inspected to identify potential problems, and maintenance must be performed to prevent deterioration of the structure that may result in failures. Because of their complexity, dams can fail in many ways including, but not limited to, overtopping, seepage failure, and structural failure.

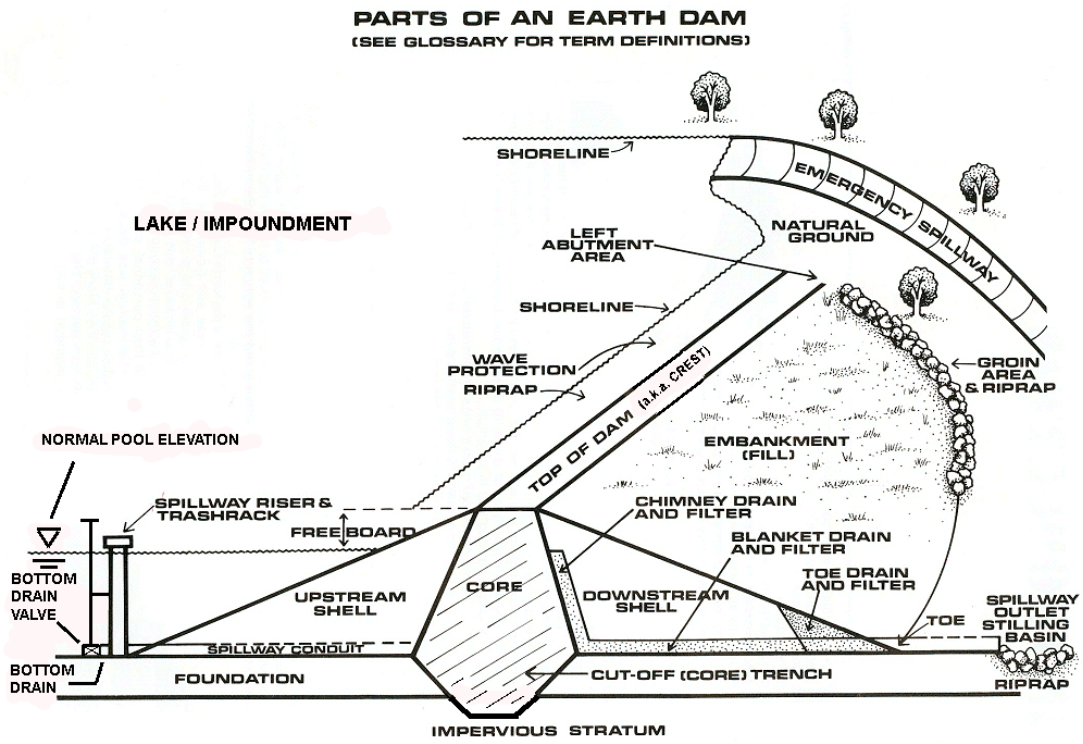


Figure 2 – Parts of an Earthen Dam (from Dam, Operation, Maintenance, and Inspection Manual – NCDENR Land Quality Section)

Periodic Inspection of dams is very important. Dams should be thoroughly visually inspected by technician staff at least twice a year, once in the summer and once in the winter. A closer inspection of the embankment can be made in the winter when the vegetation is dormant and in the summer after the embankment has been mowed. An engineer should be contacted after the embankment has been mowed. Ideally, an engineer will inspect the dam once per year. An engineer should be contacted any time of the year if a problem is observed. Each component of the dam should be inspected for problems, and corrective action should be taken as necessary. Records of inspections and corrective measures should be kept on hand to monitor any problems that may be observed. Checklists for inspections are available in the "Dam, Operation, Maintenance, and Inspection Manual" published by the NC Department of Environment and Natural Resources.

A healthy stand of grass should be maintained on the dam embankment, toe, groin, top (if a road is not present), and in the emergency spillway to prevent erosion. Shrubs and woody vegetation

should not be allowed on the embankment or in the spillway. Roots can cause seepage paths, and trees that fall can leave large holes that can weaken the dam. Brush and trees can also make it difficult to visually inspect the embankment for other issues, and they also provide a haven for burrowing rodents. They also prevent grass growth. As such, all trees, shrubs, and bushy vegetation should be removed from the dam. Embankments should be mowed at least once a year with equipment capable of navigating the potentially steep slopes and capable of removing small woody growth. Emergent vegetation on the shoreline of the embankment should also be controlled. Commercial herbicides can be used in these areas, however all application instructions, environmental precautions, and safety practices should be followed.

Any and all erosion observed on the embankment, on the groin, and in the emergency spillway should be addressed immediately. Vegetation should be re-established in the eroded area by adding soil as necessary and installing topsoil and fertilizer if necessary prior to seeding. Turf reinforcing mat may also be required to stabilize the repair. The cause of the erosion should also be addressed. The upstream face/shoreline of the embankment should also be checked for erosion. This may be caused by wave action. These areas should be repaired immediately by excavating out the eroded material and installing filter fabric and rip rap to prevent further damage.

Dam inspections should also address seepage that is observed. Seepage can occur anywhere on the downstream face, around principal spillway pipes, or beyond the toe of the dam. Seepage may vary in appearance from a soft, wet area to a flowing spring. These areas may show up as areas where the vegetation is more lush and darker green. Marsh or wetland vegetation may also be present in these areas. Seepage can lead to weakening of the embankment evidenced by slides caused by soil saturation or pressures in the soil pores. Seepage can also lead to piping, or the movement of soil particles, which can lead to dam failure. A continuous or sudden drop in the water level may also be an indication that seepage is occurring. Regular inspections and record keeping (seepage flow rates, water levels, content of flow, size of wet areas, and type of vegetation growth) are important to monitor the seepage conditions to determine whether the seepage is steady or in a state of change. If seepage is observed, an engineer should be notified.

The embankment should also be inspected for cracks, slides, sloughing, and settlement. Short, isolated cracks are not usually significant, however larger (wider than ¼ inch), well-defined cracks indicate problems. Transverse cracks that appear across the embankment may be due to differential settlement, and they can provide paths for seepage and piping. Longitudinal cracks that appear parallel to the embankment may indicate the early stages of a slide. Small cracks should be filled to prevent water intrusion. Slides are serious threats to dam safety as they can lead to instability of the embankment and failure. If a slide develops, the water level should be lowered to investigate of the cause and facilitate the construction of a repair. An engineer should be contacted to examine all cracks, slides, and settlements observed.

During the dam inspection, evidence of rodents (groundhogs, muskrat, and beavers) should be noted. Burrows can weaken the embankment and serve as pathways for seepage. Beavers can also plug spillways causing the water level to rise above the design level. Rodents should be removed from the dam by acceptable means and burrows should be filled. Trash racks, spillways, and other outlets should be inspected for clogging and cleaned as necessary.

Roads on top of dams should be maintained to prevent damage to dam embankments. They should be constructed using a proper base and wearing surface. If a wearing surface is not constructed, traffic should not be allowed on the dam during wet conditions. Water trapped in ruts can lead to saturation and weakening of the embankment. A wearing surface will prevent or minimize ponding water and infiltration. A wearing surface should be constructed to drain into the impoundment, and stormwater runoff should not be concentrated at one point.

Principal spillway pipes should be inspected thoroughly once a year. They should be inspected for improper alignment (sagging), elongation and displacement at joints, cracks, leaks, surface wear, loss of protective coating, corrosion, and blockage. Special attention should be paid to pipe joints. The pipe should also be checked for signs of water seeping along the outside. Small or minor problems can be patched, however major problems may require replacement of the pipe. An engineer should be contacted if problems with the pipe are observed. Erosion at the pipe outlet should also be inspected. Severe undermining can lead to pipe joint displacement and weakening of the dam embankment. Rip rap may be installed to mitigate against continued erosion, however an engineer should be contacted if there is severe erosion. Inspection reports should be kept to monitor the progression of any observed problems.

Riser structures should be thoroughly inspected at least once a year. They should be examined for spalling and deterioration. Any cracking, staining, exposed reinforcing bars, and broken out sections that are observed should be further examined as this may lead to structural instability. They should also be checked for alignment and settlement. Mechanical equipment such as valves, gates, stems, and couplings should be inspected for corrosion, broken, or worn parts. It would also be good to operate these devices at least once a year to ensure that they are functioning and seating properly. An engineer should be contacted if problems in riser structures are observed, and they should be addressed immediately.

Trash racks and flashboards should be inspected on a more frequent basis. Clogging of these features can lead to higher water levels that may compromise the stability of the dam. Clogs should be cleared and all trash should be removed. If possible, the cause of the clogging should be identified and addressed. Broken trash racks and boards should be repaired or replaced. Broken trash racks can allow trash and debris to enter the riser and/or principal spillway pipe and can lead to clogging of these features.

Vegetated emergency spillways should be inspected at least twice per year (at the same time as the embankment). Spillway should be mowed to prevent trees, brush, and weeds from becoming established and to promote the growth of grass. Any erosion should be repaired immediately, and any obstructions should be removed. Periodic reseeding and fertilization may be necessary to avoid erosion and bare areas.

Concrete and other lined emergency spillways should be thoroughly inspected at least once a year. Concrete should be inspected for floor or wall movement, improper alignment, settlement, joint displacement, undermining, and cracking. Structural repairs should begin by removing all unsound concrete. Cracks must be repaired carefully to prevent water intrusion. An engineer should be notified if any structural problems are observed with the spillway. Rip rap lined spillways should be inspected for erosion and displacement of stone. All woody vegetation should be removed, and any obstructions should be removed. Inspection forms and notes should be kept to monitor the progression of any observed deficiencies.

It is important to keep detailed and accurate records of all observations, inspections, maintenance, rainfall and pool levels, drawdowns, and other operational procedures. These records can aid in monitoring the progression of deficiencies as well as diagnosing problems. More information on dam inspections, operation, and maintenance can be found in the "Dam, Operation, Maintenance, and Inspection Manual" prepared by NCDENR Division of Land Resources Land Quality Section.

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

The Goose Creek Game Land provides for many recreational uses. These include fishing, geocaching and hiking.

Public Fishing Areas

The Goose Creek Game Land currently has no designated Public Fishing Areas. Engineering staff should coordinate with the Inland Fisheries Division to determine feasibility of public fishing access along the ICW, at the designated hunter campground.

Non-Traditional Uses

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. The Goose Creek game land currently has approximately four hidden caches within the game land and one on Pamlico Point. There are no major infrastructure elements required for this non-traditional use, but it would be beneficial to the participants to provide parking areas near the start/end of the geocaching trails.

Hiking/Camping

Goose Creek also contains several miles of trails, which have typically been for hunter access. Hiking is becoming a more popular activity and will continue to be a demand on the game land. It is recommended that staff works on a long term plan to build additional trails, which can be used for both hunter access and recreational hikers.

Recreational Facility Maintenance

Maintenance of recreational facilities is critical to the overall operation of the game land program. Typical use of the game lands is dispersed, however, recreational facilities concentrates users on a specific area or feature. This concentration of users, whether it is a boating access, fishing access, shooting range, or other use, results in a need to ensure the facility is safe and functional. Routine site visits for inspection and maintenance will accomplish this goal. Site visits should consist of two actions: (1) Inspection for safety issues and functionality; (2) Actual maintenance activities.

1. Inspections should examine the following items
   a. Safety inspection items:

      Facility components
      - Decking
      - Handrails
      - Structural supports (piles, substructure, and floats)
      - Fasteners (bolts, screws, and nails)

      Slip or trip hazards
      - Uneven walking surfaces
      - Mud on walking surfaces
      - Ponded water on walking surfaces
      - Drop offs

      Overhead
      - Dead trees or limbs
      - Overhead utilities

   b. Functionality Inspection Items

      Parking
      - Surface condition (ruts, potholes, gravel)
      - Delineation (wheel stops, paint)

      Ramp
      - Blockages (sediment, wood)
      - Surface condition

      Pier/Dock
      - Bollards
      - Wooden components
      - Bumpers

      Signage
      - Kiosk (entrance, regulation and information)
        - ADA (Americans with Disabilities Act)
        - No Parking
        - Keep Ramp Clear

2. Maintenance activities should include routine and corrective activities
    a. Routine Activities include:
        - Litter and debris removal
        - Grass mowing
        - Woody vegetative growth control
    b. Corrective activities can include but not be limited to:
        - Lumber replacement
        - Sign replacement
        - Minor grading
        - Tree or limb removal

Over time recreational facilities degrade to the point that routine maintenance activities cannot provide corrective action. Examples of this level of degradation include but are not limited to: structural problems, persistent and/or severe erosion issues, and broken/or severely degraded concrete. Once this level of degradation is reached, supervisory personnel should inspect the facility and determine the scope of the needed repairs. If major repairs are required supervisor personnel should contact an engineer for assistance.

Information needs

Current state of knowledge

Our current state of knowledge about wildlife occurrences on Goose Creek is incomplete. Distributions and occurrences of cryptic species of birds, reptiles, amphibians, and mammals (including bats) are under surveyed and their relative abundances are poorly understood. Other than waterfowl, the same could be said for the relative abundance of hunted species. Besides harvest data, there are no surveys in place to track changes in population trends of even the most sought after big game animals (deer, bear, and turkey). At present we must make assumptions based only on hunter harvest data. Management practices and regulations should not be based on assumptions; rather, decisions should be based on best available science. The following is our current knowledge of priority species on Goose Creek Game Land (GCGL), inventory and management needs, and research recommendations for the future. The appropriateness of tracking population trends for some wildlife species, or guilds of species, will be evaluated and appropriate techniques will be identified when it is determined such actions are warranted and only when appropriate staffing levels and finances are available.

It would seem appropriate to work closely with the Natural Heritage Program or North Carolina State University to develop surveys to document the flora and fauna on Goose Creek Game Land.

The identification of Game Land hunters (or other users) would allow the NCWRC to generate a general observation survey in which data on observations of multiple, easily identifiable, species could be collected by hunters or any game land user interested in recording the requested information. Although the quality of the information will vary among observers, surveys of this type would be especially helpful in reducing work load and financial hardships on already stretched resources within the agency.

Reports of diseased animals (regardless of species) should be investigated and, when possible, attempts will be made to diagnose what disease process is occurring. Also, as disease surveillance is conducted (CWD, LPDV, etc…), the game land will be incorporated into the surveillance effort when appropriate.

Nongame

Birds

Red Cockaded Woodpecker (RCW):

Current Knowledge

Currently, no RCWs (*Picoides borealis*) inhabit GCGL. Red cockaded woodpeckers, however, once occupied GCGL. A former cluster occurred on Tract 2, with the last known activity in the late 1990s. Current, habitat conditions support seral stages suitable for RCW habitation. However, it is unknown if a population this disjunct from other viable populations would persist.

The closest known populations on protected land occur on Pocosin Lakes and Alligator River National Wildlife Refuges, 30 and 50 miles, respectively, to the North, and the Croatan National Forest, approximately 35 miles to the South.

Inventory/Monitoring Needs

As of writing, there is no need for organized inventory/monitoring on GCGL for RCWs. In the unlikely event of a sighting or observed activity, field staff should disseminate locations of RCW activity.

Management Needs

NCWRC land management techniques and practices must closely follow recommendations provided by Part I, Section 3 of the U.S. Fish and Wildlife Service's RCW Recovery Plan (USFWS, 2003). This land management would include, but not be limited to including all acres that can be burned into a prescribed fire regime with a goal of a 3-year burn rotation. Adverse weather conditions and unfulfilled prescribed burning contracts have negatively affected NCWRC's prescribed burning activities on GCGL. The practicability of mechanical or chemical midstory removal should be evaluated. This practice may expedite the likelihood of RCW repopulation, would greatly reduce the chance of wildfire, and would diminish tree (pine) scorch or kill when prescribed fire is put back into the system.

Research Needs

No research needs are currently warranted. Opportunities exist for research concerning dispersal of hatch-year RCWs across the landscape.

Bald eagle:

Current Knowledge

No active Bald eagle (*Haliaeetus leucocephalus*) nests are known to occur on GCGL. An old, inactive nest site is known to occupy a treetop near Tract 4 adjacent Snode's Creek. Eagles are frequently seen in the vicinity of Goose Creek's impoundments.

Inventory/Monitoring Needs

Observations and nesting occurrences should be recorded.

Management Needs

Should nesting bald eagles be detected, Federal guidelines should be followed when implementing management practices in the vicinity of nest site.

Research needs

No research needs are warranted at this time.

Shore- and wading birds

Current Knowledge

Shore- and wading birds commonly use GCGL's impoundments. Shallow (≤30 cm) impoundments managed for moist soil vegetation receive the most use. These birds use the exposed mud flats as feeding areas during their spring migration (March/April).

Inventory/Monitoring Needs

Staff is beginning to implement IWMM surveys on selected impoundments. These initial surveys will allow for the collection of baseline data on the usage of these areas by waterbirds.

Seasonal surveys of marshes and impoundments should be conducted, as staff availability allows, determining use of these habitats by shore- and wading birds on Goose Creek Game Land.

Management practices

Management practices that would benefit shore- and wading birds include protection of marshes, from any degradation, and gradual drawdown of water levels in impoundments during early spring (March), and slow increases in water levels in the fall (September). Impoundments should be managed for diverse water levels to benefit the greatest number of waterbird and waterfowl species. Shallow (10-30 cm) water levels in mid- to late summer would increase density of fish in impoundments and greatly benefit herons, egrets, and bitterns.

Research Needs

No research needs are warranted at this time.

Reptiles and Amphibians

Current Knowledge

The amphibian and reptile species richness on GCGL is currently unknown largely due to the cryptic nature of these types of animals.

Inventory/Monitoring Needs

Surveys targeted at Wildlife Action Plan priority upland and aquatic reptilian and amphibian species should be created to increase our knowledge of local populations and how they are distributed throughout the landscape. The institution of an incidental observation reporting system should be developed. Observations of priority species should be reported to help increase our understanding of species distribution. It seems logical to research the potential of using the reporting tool in PAWS to disseminate observations.

Management Needs

Timing of prescribed fire should be discussed among staff to create a plan that poses reduced potential to harm slow moving reptiles and amphibians during late dormant season and growing season burning operations. During logging operations, low ground pressure equipment should be utilized as applicable. It would be preferred that such operations should be conducted during winter months, as much as possible, to reduce the impacts to amphibians and reptiles.

Research needs

No research needs are warranted at this time.

Mammals

Bats:

Rafinesque's big eared bat, Southeastern myotis, Northern long-eared bat:

Current Knowledge

Rafinesque's big eared (*Corynorhinus rafinesquii*), Northern long-eared bat (*Myotis septentrionalis*) and the southeastern bat (*Myotis austroriparius*) are likely to occur on GCGL.

Management Needs

Preservation and management of mature bottomland hardwood and cypress/gum swamps should be continued. These bat species occur mainly in swamps and bottomland forests, where they roost in hollow trees, under loose bark, old buildings, and beneath bridges (mammals in NC 8/4/2014). Coastal Plain habitats will likely act as refuge providing species level protection from white-nose syndrome. Therefore, it is imperative that these habitats remain protected.

Inventory/Monitoring Needs

If staff time allows, a series of mist-netting surveys should be implemented in an attempt to collect information to close gaps in the distribution data of the aforementioned bat species. A cooperative biological inventory should be conducted with the assistance of the Natural Heritage program to explore and update the small mammal communities on GCGL.

Research Needs

No research needs are warranted at this time.

Game Animals:

White-tailed deer:

Current Knowledge

White-tailed deer (*Odocoileus virginianus*) occur on the game land with densities that are likely similar to estimated densities for Beaufort and Pamlico Counties (15-44 deer/mi^2, 2010 statewide density map) (*Appendix VII*). Peak breeding is also likely consistent with peak breeding for Beaufort and Pamlico Counties (Oct. 23rd-Oct.28th, Appendix IX). Deer hunting on GCGL follows the eastern deer season and hunting currently occurs six days/week. Maximum harvest (either sex the entire season) is allowed. The following data were compiled from the last three hunting seasons (2010-2013) and evaluated based on the biological objectives outlined in the ad-hoc deer regulation evaluation tool (Appendix X).

- Antlered buck harvest per square mile over the last 3 seasons (2011-2013) on Goose Creek was 2.7 (impoundment and marsh habitats excluded).
- Total harvest over the last 3 seasons has been 36% does, which is less than our statewide objective of at least 50% does in the harvest.
- Age data are insufficient (n = 0) to assess biological objectives related to the proportion of yearling bucks and does in the adult harvest.
- Sex composition of the harvest that occurs before peak breeding is 32.4% does, which falls short of our statewide objective of at least 50% does in the harvest.
- 39.7% of the antlered buck harvest occurs before peak breeding, which fails to meet the statewide objective that no more than 20% of antlered buck harvest occurs before peak breeding.

Inventory needs

Baseline information should be collected for deer densities and/or population trends on GCGL. These data could be collected via forward-looking infrared (FLIR), spotlight, camera trap surveys, or track count surveys. There is also a great need to identify our game land hunters.

Without these surveys and harvest per effort data we have no way to track deer population trends. Staff will continue investigating whether new methods may better assist us in monitoring and managing deer on GCGL.

Basic biological data from game land deer harvests are difficult to collect. NCWRC has not collected biological data from any deer. If a survey were developed to identify our game land deer hunters, the NCWRC could implement a jawbone/biological mail survey. If not cost prohibitive, response rates could be improved by offering participants something similar to the hats the cooperators of the Bear Program receive (e.g., a raffle, a hat, a t-shirt, etc.). Also, with the identification of our game land specific hunters, the NCWRC would be able to create a survey similar to the one in appendix IX. These data would give us better knowledge of hunter success per unit effort and allow us to make the science-based regulation changes needed to meet the state deer management goals and objectives mentioned earlier.

Management Strategy

It is our desire to manage deer on Goose Creek Game Land according to the statewide deer management goals and objectives outlined in the ad hoc deer evaluation tool.
As a habitat generalist, the white-tailed deer will benefit from the continuation of current land management practices.

Research needs

No known research needs at present.

Black bear:

Current Knowledge

Goose Creek Game Land is currently included in two bear seasons. Pamlico County follows the 8-week season beginning the second Monday in November to January 1 (**15A NCAC 10B .0202)**, while Beaufort County is committed to a split season beginning the second Monday in November to the following Saturday and the third Monday after Thanksgiving to the fifth Saturday after Thanksgiving (**15A NCAC 10B .0202)**. Hound hunting is allowed on Tracts in Beaufort County, while portions in Pamlico County. Still-hunting only is allowed. Only five black bears (*Ursus americanus*) have been harvested on GCGL. This is likely due to GCGL's relatively small size and the patchy distribution of Game Lands Tracts.

Inventory/monitoring needs

No biological data have been collected from the bears harvested on GCGL. Attempts should be made to collect biological data from any bear harvested on GCGL.

Management Strategy

Bears on GCGL should be managed following the guidelines outlined in the NC Black Bear Management Plan (NCBBMP). Many studies have concluded that black bear habitat preferences are simply a function of food availability (Maehr 2001). Therefore, any land management practices to improve or sustain food availability (soft and hard mast) will benefit black bears. Seasonal closure of the game land allows bears to utilize food resources along roads with little to no disturbance. This practice should be continued in the future. Continued long rotation timber

harvest, open land management, and prescribed fire will enhance or maintain habitats for black bears on Stones Creek.

Goose Creek Tract 2 lies adjacent to the Gum Swamp Bear Sanctuary. This 14,685-acre Tract of land is owned by Weyerhaeuser, and serves as refuge for bears in both Beaufort and Pamlico Counties.

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 connectivity. Corridors can also assist in reducing human-bear interactions by decreasing the proximity of traveling bears to human development. As such, corridors for movement are important. Continued acquisition of adjacent lands would support efforts to meet the NCBBMP objective 4 (strategies 3, 4, 5, and 6).

As the availability of huntable areas decrease, acquisition of land would also assist in NCBBMP objective 1 and objective 2, strategy 6. NCWRC game lands will become increasingly important in providing bear hunting opportunities and population management via harvest.

Research needs

No known research needs at present.

Eastern wild turkey:

Current Knowledge

Since 2009, wild turkey (*Meleagris gallopavo*) harvest has averaged 1.83 (0.25/ mi^2) gobblers per year. Unfortunately, there is no tracking method available that provides success per unit of effort for game land hunters. With the identification of our game land specific hunters, the NCWRC would be able to create a survey similar to the one in appendix XI. These data would give us better knowledge or hunter success per unit effort and would allow us to make the science-based regulation changes needed to meet the state deer management goals and objectives mentioned earlier.

Inventory/monitoring needs

Currently there are no baseline data for turkey abundance. Several options are available to gather these data. Two surveys that could be utilized could be the direct observation by chance encounters similar to the Wild Turkey Summer Observation Survey, or a Game Land turkey hunter observation survey. The combined information gathered would allow the NCWRC to make better science based regulation changes in the future.

Management Strategy

Maintain current level of hunter harvest until better data exists. Primary methods for habitat maintenance/enhancement should be through prescribed fire, long timber rotations, and open land management. The establishment of permanent logging decks and subsequent plantings of these areas could provide nesting and escape cover in close proximity to areas planted to small grains which provide bugging areas as well.

Research needs

No known research needs at present.

Furbearers:

Current Knowledge

Hunting opportunities exist for bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), and raccoon (*Procyon lotor*). Trapping opportunities exist for bobcat, raccoon, river otter (*Lontra Canadensis*), mink (*Neovison vison*), long-tailed weasel (*Mustela frenata).*

Inventory/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.

Research needs

No known research needs at present.

Small game (rabbit, squirrel):

Current Knowledge

Rabbit (*Sylvanigus floridanus*) and squirrel are common on GCGL. Hunting seasons follow the statewide seasons for both rabbit and squirrel.

Inventory/monitoring needs

Inventory and monitoring should be considered on an as needed basis.

Management Strategy

Continue to provide current hunting opportunities. Increased use of mulched/disced fire breaks may provide additional small game hunting opportunities. Other current land management practices should continue to provide suitable small game habitat.

Research needs

No known research needs at present.

Webless migratory birds:

Current Knowledge

Mourning doves (*Zenaida macroura*), snipe (*Gallinago gallinago*), rails (Rallidae), and American woodcock (*Scolopax minor*) occur on the game land. Hunting opportunities exist for doves near some of the ponds located on the Game Land. Snipe and woodcock can be found in moist soil impoundments, and on wetter sites close to drains and creeks. Seasons and frameworks are created by the USFWS, but generally run from September through February.

Inventory/monitoring needs

Inventory and monitoring should be considered on an as needed basis. Staff is beginning to implement IWMM surveys on selected impoundments. These initial surveys will allow for the collection of baseline data on the usage of these areas by waterbirds.

Management Strategy

Hunting opportunities should continue following framework set by the USFWS. There has been some interest in managing some WRC impoundments for snipe hunting. Hypothetically, this management practice would require pulling one impoundment out of the permit system yearly to maintain moist soils throughout the winter. An alternative management technique used in other states is to drain impoundments immediately after waterfowl season to provide habitat for snipe through February. Currently, the NCWRC does not have sufficient acres of impoundments to manage impoundments specifically for snipe. Either management technique would remove much needed high quality habitat from waterfowl and other waterbirds. Furthermore, current land management practices, on other sections of GCGL, provide suitable habitat and provide reasonable numbers of webless migratory game birds for satisfactory hunting opportunities.

Research needs

No known research needs at present.

Waterfowl:

Current Knowledge

Waterfowl utilize GCGL year-round. Species observed are wood duck (*Aix sponsa*), blue and green-winged teal (Anas *discors* and *Anas carolinensis*), black duck (*Anas rubripes*), mallard (*Anas platyrhynchos*), ring-neck (*Aythya collaris*), widgeon (*Anas americana*), pintail (*Anas acuta*), scaup (*Aythya affinis*), and gadwall (*Anas strepera*). Hunting is by permit only, and is allowed on Tuesdays, Saturdays, Opening and Closing days, and Holidays.

Inventory/Monitoring Needs

Waterfowl hunter harvest bag surveys occur yearly. These data allow us to track hunter success over time. Impoundment vegetation surveys are also conducted yearly, and allow us to evaluate the vegetation quality and plan for the following year's impoundment management. Staff is beginning to implement IWMM surveys on selected impoundments. These initial surveys will allow for the collection of baseline data on the usage of these areas by waterfowl. Further inventory and monitoring should be considered on an as needed basis.

Management Needs

See Habitat Section for Impoundment management.

Reasearch Needs

No known research needs at present.

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 NCWRC 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 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. 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.

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 NCWRC-owned or controlled game land properties (*Appendix XII*).

Hunting/Trapping

With exception of managed waterfowl impoundments, Hunting is currently allowed on GCGL six days per week. Waterfowl hunting on managed impoundments is by permit only and occurs on opening/closings days, Holidays, Tuesdays, and Saturdays. Primary species pursued are Deer, turkey, black bear, and waterfowl (see information needs for harvest rates). Small game and webless migratory birds (dove, rail, and gallinule) are also hunted. Trapping occurs on the game land with raccoon, otter, coyote, bobcat, the primary species sought.

Management strategies directed towards hunting and trapping should include those that help to maintain or increase the current numbers of hunters and trappers using the game land. Acquisition of properties or easements that provide for better access to remote areas of the game land and improvement of existing unimproved roads would be primary means to help increase the available use of the game land by hunters and trappers.
Threats to a quality hunting or trapping experience include conflicts with other game land users, poorly managed habitats, poor access, and low numbers of species hunted.

Fishing/Crabbing

Fishing and crabbing occurs on frequently inside GCGL's impoundments. Primary species are red drum, speckled trout, bream, and large-mouthed bass. Year-round access is available at the impoundments. However, there are restrictions from November through March to reduce disturbance to waterfowl.

Target Shooting

Target shooting occurs on GCGL. To our knowledge this activity is not currently causing substantial habitat degradation nor are there any known user conflicts.

Financial Statement

The attached statement reflects estimated maintenance and operational expenses for GCGL for the current planning horizon.

Goose Creek Game Land																
Financial Summary of Activities																
Habitat Activities																
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Unit Cost (est.)**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
H	Firebreaks	Maintain firebreaks	5.00	mi	$525.00	$2,625.00	$2,680.12	$2,736.41	$2,829.18	$2,895.35	$2,967.29	$3,040.60	$3,116.06	$3,193.12	$3,272.51	$29,355.80
H	Herbaceous Seeding	Seed or maintain	20.00	ac	$175.00	$3,500.00	$3,588.82	$3,675.75	$3,766.91	$3,860.83	$3,956.27	$4,054.18	$4,154.72	$4,257.76	$4,360.55	$39,175.87
H	Nesting Structures	Maintain Wood Duck boxes	24.00	box	$50.00	$1,200.00	$1,229.76	$1,260.26	$1,291.51	$1,323.54	$1,356.37	$1,390.00	$1,424.48	$1,459.80	$1,496.01	$13,431.75
H	Vegetation Control	Control vegetation on impds	1000.00	ac	$50.00	$46,550.00	$45,694.84	$46,787.06	$47,947.40	$49,136.50	$50,355.08	$51,603.89	$52,883.66	$54,295.18	$55,539.22	$498,962.84
H	Vegetation Control	Prescribe burning	1000.00	ac	$50.00	$50,000.00	$50,384.00	$51,509.48	$52,287.81	$53,050.50	$53,929.54	$54,750.09	$55,611.89	$56,493.07	$57,403.31	$535,758.13
H	Water Level Management	Manage water levels	10.00	sub-imp	$1,166.11	$11,661.10	$11,950.92	$12,248.66	$13,550.88	$12,861.48	$13,180.60	$13,507.48	$13,842.46	$14,185.75	$14,537.56	$130,929.82
H	Population Control	Control muskrats/nutria on impds	1.00	OL	$9,000.00	$9,000.00	$9,074.40	$9,150.88	$9,228.78	$9,308.80	$9,390.81	$9,475.01	$9,561.19	$9,649.51	$9,740.01	$93,979.32
H	Water Level Management	Diesel Pump Units(3)	1075.00	hr	$26.50	$28,487.50	$29,195.99	$29,918.00	$30,659.87	$31,420.23	$32,199.56	$32,998.11	$33,816.46	$34,655.11	$35,514.56	$318,866.38
H	Water Level Management	Electric Pump Units(2)	100000.00	kWhr	$0.09	$9,000.00	$9,074.48	$9,150.71	$9,228.85	$9,308.92	$9,390.98	$9,475.08	$9,561.28	$9,649.53	$9,740.04	$93,579.08
H	Signs and Boundaries	Maintain boundary	10.00	mi	$135.00	$1,350.00	$1,383.48	$1,417.79	$1,452.95	$1,488.98	$1,525.91	$1,563.75	$1,602.54	$1,642.28	$1,683.01	$15,110.69
H	Water Level Management	Diesel Pump Units(1)	168.00	hr	$26.50	$4,452.00	$4,562.41	$4,675.56	$4,791.51	$4,910.34	$5,032.12	$5,156.91	$5,284.81	$5,415.87	$5,550.18	$49,831.72
															Subtotal	$1,497,524.75
Operation and Maintenance Activities																
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Unit Cost (est.)**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
O & M	Bridges	Maintain hunter access bridges	12.00	brg	$150.00	$1,800.00	$1,844.64	$1,890.39	$1,937.27	$1,985.31	$2,034.55	$2,085.01	$2,136.71	$2,189.70	$2,244.01	$20,147.59
O & M	Buildings	Maintain buildings	5.00	bldg	$4,000.00	$20,000.00	$20,496.00	$21,004.30	$21,525.21	$22,059.04	$22,606.10	$23,166.73	$23,741.26	$24,330.05	$24,933.43	$223,862.11
O & M	Dams and Dikes	Maintain dams and dikes	17.00	mi	$500.00	$8,500.00	$8,710.80	$8,926.83	$9,148.21	$9,375.09	$9,607.59	$9,845.86	$10,090.04	$10,340.27	$10,596.71	$95,141.39
O & M	Public Use Facilities	Maintain campground	1.00	camp	$225.00	$225.00	$230.58	$236.30	$242.16	$248.16	$254.32	$260.63	$267.09	$273.71	$280.50	$2,518.45
O & M	Public Use Facilities	Maintain disabled hunter blind	1.00	blind	$225.00	$225.00	$230.58	$236.30	$242.16	$248.16	$254.32	$260.63	$267.09	$273.71	$280.50	$2,518.45
O & M	Public Use Facilities	Maintain hunter blinds(SPCX)	5.00	blinds	$225.00	$1,125.00	$1,152.90	$1,181.49	$1,210.79	$1,240.82	$1,271.59	$1,303.13	$1,335.44	$1,368.57	$1,402.51	$12,592.24
O & M	Road and Trails	Maintain gates	10.00	gate	$100.00	$1,000.00	$1,024.80	$1,050.22	$1,076.26	$1,102.95	$1,130.31	$1,158.34	$1,187.06	$1,216.50	$1,246.67	$11,193.11
O & M	Road and Trails	Maintain road	15.00	mi	$2,500.00	$37,500.00	$38,430.00	$39,383.06	$40,359.76	$41,360.69	$42,386.43	$43,437.61	$44,514.87	$45,618.84	$46,750.19	$419,741.45
O & M	Road and Trails	Maintain trail	3.00	mi	$2,500.00	$7,500.00	$7,686.00	$7,876.61	$8,071.95	$8,272.14	$8,477.29	$8,687.52	$8,902.97	$9,123.77	$9,350.04	$83,948.29
O & M	Signs and Boundaries	Maintain boundary	23.00	mi	$135.00	$3,105.00	$3,182.00	$3,260.92	$3,341.79	$3,424.66	$3,509.60	$3,596.64	$3,685.83	$3,777.24	$3,870.92	$34,754.59
O & M	Public Use Facilities	Maintain Observation Blind	3.00	blind	$225.00	$675.00	$691.74	$708.90	$726.48	$744.49	$762.96	$781.88	$801.27	$821.14	$841.50	$7,555.35
O & M	Public Use Facilities	Maintain parking area	1.00	park	$225.00	$225.00	$230.58	$236.30	$242.16	$248.16	$254.32	$260.63	$267.09	$273.71	$280.50	$2,518.45
															Subtotal	$936,491.46
Development Activities																
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Unit Cost (est.)**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
D	Road Upgrade	Pinkell Rd.	1.30	mi	$76,923.08	$100,000.00										$100,000.00
D	Road Upgrade	Hunter Campground	0.57	mi	$176,470.58		$93,784.00									$93,784.00
D	Road Upgrade	Track One Rd.	0.35	mi	$142,857.14			$52,480.00								$52,480.00
D	Road Upgrade	Bobwhite Rd.	0.25	mi	$150,000.00				$28,880.00							$28,880.00
D	Parking Areas	Parking Area Construction	5.00	ea	$10,000.00			$31,486.00		$21,986.00						$53,472.00
D	WCS Replacement	Pavilion Point	4.00	ea	$40,000.00			$40,992.00		$40,992.00		$40,992.00		$40,992.00		$163,968.00
D	WCS Replacement	Plug Removal and Ditch Maintenance	2.00	ea	$40,000.00			$40,744.00		$40,744.00				$40,992.00		$122,480.00
D	Dike Repair	Articulating Concrete Repair (CC)	1.00	ea	$40,000.00			$40,992.00		$40,992.00						$81,984.00
D	Pump Replacement	Spring/Hunting Creek	1.00	ea	$200,000.00					$204,960.00						$204,960.00
															Subtotal	$816,968.00
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	PFA	PFA Construction	$1.00	ea	$50,000.00										$61,150.00	$61,150.00
															Subtotal	$61,150.00
															Grand Total	$3,282,314.18
Inflation rate is calculated from the Consumer Price Index (CPI-U) which is compiled by the U.S. Bureau of Labor Statistics																
10 yr Av	0.02481															
2013	0.0207															
2012	0.0316															
2010	0.0164															
2009	-0.0034															
2008	0.0385															
2007	0.0285															
2006	0.0324															
2005	0.0339															
2004	0.0268															
2003	0.0227															

Land Acquisition Plan

The current NCWRC statewide plan will address future land acquisition. Special preference will be given to inholdings, adjacent lands, those lands with critical habitats, or habitats of ecological importance. Acquisitions will be evaluated on a case by case basis, based on available funding, and will be from a willing seller. Acquisition proceedings will be conducted following the State Property Offices land acquisition procedures and Phase I and II land evaluation forms (*Appendix XIII*).

Regulations/Enforcement

The following regulations and enforcement issues are identified on Goose Creek Game Land:

- Commercial use of game lands (statewide policy should be developed)
- Use of game lands for large events (statewide policy should be developed)
- Require all users to have game land use permit (statewide policy should be developed)
- Educational group or camp group event use permit (statewide policy should be developed)
- Unauthorized trail development
- Unauthorized camping
- Unauthorized removal of protected species from the game land

Public Input

Summary of Public Input

As part of the creation of the Goose Creek Game Land Management Plan, public input was solicited over the winter of 2014-15. On order to reach as many individuals as possible, Management Biologists and Supervisory staff created a series of questions to gather information that would be most valuable in the creation of the Plan. Two venues were utilized to gather comments; a public input meeting and an online Game Land Management Plan comment application. Public comment was collected via the online/email applications from 16 February, 2015 through 10 April, 2015. The public input meeting was held on 4 March, 2015 at Washington Fire-Rescue-EMS Station 2, in Washington, NC. In total, 45 comments were received collectively.

The following is a summarization of received comments (all comments and response can be found in *Appendix XIV*).

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

75 % of the comments received were directly related to habitats associated with game animals; particularly waterfowl. Generally, these comments included the expansion and improvements to our impoundments and coastal marsh management. Black gum swamps (8%), and long leaf pine savannas (16%), were additional habitats that the public thought were most important.

Q2) 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?

Game animals, and fish, were by far thought to be the most important species for consideration. Specifically, waterfowl was thought to be most important to protect and/or improve. Additionally, crustaceans, birds of prey, and furbearers were mentioned.

Q3) How do you use this game land?

Four of six responses to this question involved "traditional" uses (hunting and fishing). Other users represented were wildlife viewers, and paddlers

Q4) Please explain why you think the current level of access is or is not, satisfactory on this game land?

Levels of satisfaction with regard to access are split nearly 50/50. Common comments of dissatisfaction were that there should be improvements to the permit system at the impoundments. Comments suggesting that the access is generally "good" also added that access was "limited" and WRC should provide another BAA on Lowland Island and a kayak launch adjacent to Spring Creek impoundment.

Q5) What suggestions, if any, do you have for changing how this game land is managed and maintained?

Comments regarding changes in management were concentrated around Impoundment management; especially the Special permit hunt system and water level management regimes currently being utilized. These concerns are addressed in both the Habitat and the Information Needs Sections. Comments received also requested improved public water access, kayak/paddle craft launches, and the installation of a raised and screened camping platform for paddlers.

Q6) What would encourage you to start using this game land, or to continue using it more actively?

Respondents to this question stated that more and better waterfowl hunting opportunities are desired at Goose Creek Game Land. One individual stated that a parking area suitable for horseback riding be established. Lastly, respondents provided that there is some desire to have a launch for paddle craft installed adjacent to the Spring Creek impoundment and also requested the construction of an elevated and screened camping platform in the same location.

Q7) What additional comments do you have regarding this game land?

Additional comments were broad in spectrum. Issues of user equality were expressed. One individual would like to see a limit on the number of shot shells per impoundment hunter limited to a maximum of 25. Two individuals expressed general satisfaction of the Game Land as an avenue to protect water and other resources.

Additional public input was received via online comment period which was open from 6 January, 2018 through 6 February, 2018.

Appendix

Appendix I.

Glossary of Terms, Acronyms, and Rankings

Bedding-Land prepared before planting in the form of small mounds. The prepared land concentrates topsoil and elevates the root zone of seedlings above temporary standing water. Fertilizer is often incorporated into the bedding.

Cape Fear Arch-The Cape Fear Arch is a special geologic feature stretching from Cape Lookout, NC to Cape Romain, SC that contains nationally significant animal and plant communities. Created in 2006, the Cape Fear Arch Conservation Collaboration is a partnership of organizations and individuals interested in protecting this region while balancing the needs of man and nature. Its mission is to develop and implement a community conservation vision to build awareness, protection and stewardship of the region's important natural resources.

CWD-Chronic Wasting Disease is a transmissible spongiform encephalopathy (TSE) of mule deer, white-tailed deer, elk (or "wapiti"), and moose ("elk" in Europe). TSEs are caused by unusual infectious agents known as prions.

DNP-Dedicated Nature Preserve-

DOD-The mission of the Department of Defense is to provide the military forces needed to deter war and to protect the security of our country. The department's headquarters is at the Pentagon.

FAS-Fixed Assets-Number assigned to items for monitoring inventory.

Fire Return Interval-The average interval between fires at a given site, or the average interval between fires in an equivalent specified area.

FLIR-Forward looking infrared (FLIR) cameras, typically used on military and civilian aircraft, use an imaging technology that senses infrared radiation.

LPDV-Lymphoproliferative Disease, a cancer of turkey and chickens, is caused by a retrovirus.

NC GAP-The Gap Analysis Program (GAP) is a national program of the US Geological Survey (USGS) Biological Resources Division whose goal is to work with partners to develop data and conservation plans that serve to keep common species common. The North Carolina Gap Analysis Project (NC GAP) is the state level representative of the National Gap Analysis Program.

Onslow Bight-The Onslow Bight extends from the lower Northeast Cape Fear River to the Pamlico River and from offshore waters to approximately 30 miles inland. The area is a unique landform of barrier islands, marshes, riverine wetlands, pocosins, longleaf pine savannas and many other coastal ecosystems. In 2002, The Nature Conservancy along with several governmental agencies and private conservation groups and other interested agencies and groups, formed the North Carolina Onslow Bight Conservation Forum. This ongoing collaboration aims to increase land protection, promote appropriate land management, create habitat corridors and reach out to local communities to encourage their involvement.

TPA-Trees per Acre-The number of trees per acre vary by the distance between each tree. In plantations, the number of trees per acre would be determined by knowing the spacing within a row and the spacing between rows.

In planting systems, the initial number of trees per acre can be estimated by their spacing. Within general forest management, the spacing between trees and the number of trees per acre can be used to estimate timber volumes and values, prescribe silvicultural treatments, and provide simple examples of forest growth dynamics.

V-Sheering-Slicing or cutting trees or stumps at the ground line. Shearing may be done at harvest or with a KG blade during site preparation.

State rank

S1 (1–5 extant populations): Critically imperiled in North Carolina because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from North Carolina.

S2 (6–20): Imperiled in North Carolina because of rarity or because of some factor(s) making it very vulnerable to extirpation from North Carolina.

S3 (21–100): Rare or uncommon in North Carolina.

S4 (100–1000): Apparently secure in North Carolina, with many occurrences

S5 (1000+): Demonstrably secure in North Carolina and essentially ineradicable under present conditions.

SA (1–?): Accidental or casual; one to several records for North Carolina, but the state is outside the normal range of the species.

SH (0?): Of historical occurrence in North Carolina, perhaps not having been verified in the past 20 years, and suspected to still be extant.

SR (--): Reported from North Carolina, but without persuasive documentation which would provide a basis for either accepting or rejecting the report.

SX (0): Apparently extirpated from North Carolina.

SU (--): Possibly in peril in North Carolina but status uncertain; need more information

S? (--): Unranked, or rank uncertain

_B (1–?): Rank of breeding population in the state. Used for migratory species only.

_N (1–?): Rank of non-breeding population in the state. Used for migratory species only.

_Z_ (1–?): Population is not of signification conservation concern

Global rank - applies to the status of a species throughout its range, and based on data on the species' status range wide.

G1 (1–5 extant populations): Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction.

G2 (6–20): Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 (21–100): Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single physiographic region) or because of other factors making it vulnerable to extinction throughout its range.

G4 (100–1000): Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 (1000+): Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

GH (0?): Of historical occurrence throughout its range, i.e., formerly part of the established biota, with the expectation that it may be rediscovered.

GX (0): Believed to be extinct throughout its range (e.g., Passenger Pigeon) with virtually no likelihood that it will be rediscovered.

GU (--): Possibly in peril range-wide, but status uncertain; need more information

G? (--): Unranked, or rank uncertain

G_Q (--): Questionable taxonomic assignment.

T_ (--): The rank of a subspecies or variety.

Appendix II.

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Appendix III.

NCFS Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

BETWEEN

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

AND

NORTH CAROLINA DEPARTMENT OF
AGRICULTURE & CONSUMER SERVICES
NC FOREST SERVICE

By: _____ Date: 3-1-2018

Gordon S. Myers
Executive Director
North Carolina Wildlife Resources Commission

By: _____ Date: 3.9.18

N. David Smith
Chief Deputy Commissioner, NCDA&CS

By: Scott Bissette Date: 3-8-2018

Scott Bissette
Assistant Commissioner, NCFS

I. BACKGROUND AND OBJECTIVES

This Memorandum of Understanding (MOU) is hereby entered into by and between the North Carolina Department Agriculture & Consumer Service, NC Forest Service (hereinafter referred to as "Forest Service") and the North Carolina Wildlife Resources Commission (hereinafter referred to as "Commission"), hereinafter referred to collectively as the "Parties", to facilitate the cooperation of the two parties in fire management activities. These activities will include, but shall not be limited to, mitigation, training, wildfire prevention, cooperative prescribed burning and wildfire suppression.

The Forest Service is charged under General Statute 106, with the responsibility of protecting state and private forest lands from forest fires and is also charged with enforcing laws· relating to forest fires.

The Commission is charged under General Statute 143 Article 24 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 resources 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.

It is to the Parties mutual advantage to coordinate their efforts in mitigation activities, training, wildfire prevention, cooperative prescribed burning and wildfire suppression.

This MOU shall become effective once it has been executed by both Parties; it shall continue in effect for Five (5) years from the date of the last signature.

Either party may rescind their participation in this MOU with a letter describing the circumstances for withdrawal. There should be an effort to collaboratively solve any differences prior to seeking the termination of this MOU. This MOU will cease to exist 30 days after the letter is received by the other party.

Amendments and/or changes to this MOU will be mutually agreed upon and submitted to each Party for approval and shall become a permanent part of this MOU upon signed approval of both Parties.

II. FOREST SERVICE AGREES:

A. Wildland Fire

1. The Forest Service District Forester or designee will alert the Commission's Area Forester when conditions are at Readiness Plan (RP) 4 or 5. The notification will include information on burn restrictions or bans and recommendations regarding the use of prescribed fire.

2. District Forester or designee will notify the Commission's Area Forester immediately of any known wildfires on or threatening a Commission property and will attempt to consult with and coordinate all responses through the Commission representative to identify a mutually agreeable response.

3. To use best efforts to control and extinguish all wildfires on lands under its protection utilizing the National Incident Management System (NIMS) concepts/Incident Command System. Methods used to suppress wildfires should minimize impacts on Commission property, commensurate with effective control, resource values to be protected and fiscal constraints of both agencies.

4. Firefighter and public safety must be first priority in all fire management activities. However, whenever possible and when mutually agreed to, methods used to control wildfires or escaped prescribed fires on Commission property will be planned and implemented so that secondary impacts, including plowed or bulldozed lines, are minimized. Forest Service staff will attempt to consult with the Commission 's staff on all suppression activities prior to initiating them on Commission property, consistent with the existing threat/safety issue related to the activity and where conditions are deemed acceptable and are agreed to by both parties, wildfires or escaped prescribed fires will be allowed to bum out to already established lines or natural barriers in lieu of establishing new plowed or bulldozed lines on Commission property.

5. To assume direction for the control of any wildfire either on or threatening Commission property as quickly as possible in coordination with Commission personnel.

6. Record and document paid out suppression costs incurred for extended wildfire suppression on Commission property within 60 days of close out. This information will be made available to Forest Service and Commission leadership.

B. Prescribed Fire

1. The District Forester or designee will receive electronic or paper copies of burn plans. Smoke management information, updates on fire weather conditions, spot weather forecasts, and related information will be provided when requested by the Commission for prescribed fire planning on Commission property.

2. On the day of a prescribed burn the District Forester or designee will record smoke management information reported by the Commission. The Commission representative will be notified if smoke management guidelines are exceeded.

3. The District Forester or designee will alert the Commission representative when severe wildfire conditions exist and may advise the Commission not to conduct prescribed burns during severe conditions or when Fire Readiness Plans are 4 or 5.

4. To provide the Commission, if requested, fire suppression assistance and/or take control of fire suppression activities after a prescribed fire escapes.

5. To coordinate with the Commission's Regional Ecoregion Supervisor when Forest Service personnel are available as determined by the District Forester to assist with Commission prescribed fire operations to either allow Forest Service personnel to gain experience/training or for Forest Service personnel to assist with the training of Commission personnel.

C. Training

1. To provide to the Commission notice of pending prescribed fire training available to their personnel.

2. To provide to the Commission Game Land and Forest Resource Manager the Forest Service training calendar that outlines Forest Service fire training.

3. To work collaboratively in developing a prescribed fire program for Commission properties as requested by the Commission.

4. To provide an opportunity for the Commission to be a part of the NC Fire Environment Committee (FEC).

D. Information and Education

1. As requested by Commission, provide a Firewise assessment on Commission facilities outlined in a plan developed by the local Forest Service District Supervisor and Commission representative.

III. COMMISSION AGREES:

A. Wildland Fire

1. Commission representatives will report any wildfire detected either on or threatening Commission property, to the Forest Service District Forester, county ranger/forester or through the 911 system and will initiate immediate and appropriate control measures upon the detection of any unplanned or uncontrolled ignition.

2. Information on each Commission property, including planned prescribed burns, roads, other GIS data, equipment and Commission contacts for wildfire management response will be provided to District Foresters and updated annually at the first of every calendar year.

3. To turn over direction of control of any wildfire not on Commission property to the first Forest Service Incident Commander to arrive. Direction of control of any wildfire on Commission property will be turned over to the first Forest Service Incident Commander to arrive. After taking direction of control of a wildfire on Commission property, Forest Service will consult with local Commission staff regarding best plan of control as related to existing roads, streams, topographic features, resources and personnel allocation.

4. To make available Commission personnel, equipment, and facilities for use in suppressing wildfire on Commission property. The Commission will make available Commission personnel, equipment, and facilities for use in suppressing wildfire not on Commission property in extreme emergencies, in cases of catastrophic wildfires, when Forest Service personnel, equipment, and facilities are unavailable, and with approval from the Commission's Director or his designated representative. Commission personnel will have and use appropriate wildland fire Personal Protective Equipment (PPE) to include at a minimum, fire shirt, fire pants, fire shelter, gloves, goggles, 8" leather lace up boots, and hard hat when assisting with fire suppression activities under the direction of Forest Service personnel on lands not under Commission control.

5. To appoint a Commission resource advisor/liaison officer to an incoming Forest Service Incident Management Team in support of wildland fire suppression efforts on Commission property. This position will be staffed in shifts by rotating personnel as needed for the duration of the incident or until released by the Forest Service Incident Commander.

B. Prescribed Fire

1. When Forest Service is operating on a Fire Readiness Plan 4 or higher, the Commission representative will notify the District Forester prior to any prescribed burn, preferably at least one day in advance. Weather conditions and Commission resource allocation may not allow a one-day notice but notice should be made when a decision has been made to move forward with the burn. Commission will not burn on a Fire Readiness Plan 5 without approval of the Forest Service District Forester for that area.

2. To follow and to abide by the North Carolina Smoke Management Plan and to work collaboratively with the Forest Service to identify plan revisions that provide additional opportunities for prescribed burning.

3. The Commission representative will contact the Forest Service District Operations Officer on the day of a planned prescribed burn prior to ignition for notification purposes and to report smoke management information. The Commission representative will also contact the office of the County Ranger on the day of the prescribed burn and County 911 Dispatch.

4. To coordinate with the District Forester when Commission personnel are available as determined by the Commissions Regional Ecoregion Supervisor to assist with Forest Service prescribed fire operations to either allow Commission personnel to gain experience/training or for Commission personnel to assist with the training of Forest Service personnel.

C. Training

1. To train selected key personnel in the Incident Command System through the following FEMA web-based courses:
   - IS-700: NIMS, An Introduction
   - IS-800 National Response Plan: An Introduction
   - ICS-100: Introduction to ICS
   - ICS-200: Basic ICS

2. To train personnel who may have prescribed fire or wildfire assignments as Commission resources allow at a minimum in the following National Wildfire Coordinating Group (NWCG) courses:
   - S-130,
   - S-190,
   - and L-180 (Basic Firefighter Training).

3. To participate in the Certified Burner Program under the management of the Forest Service.

4. To participate in prescribed fire under the direction of Forest Service personnel on lands not under Commission control for the purpose of additional training/experience as identified by the Commission representative and when the Commission Regional Ecoregion Supervisor determines that Commission personnel are available for that purpose.

5. To participate in the NC Fire Environment Committee (FEC).

D. Information and Education

1. To participate in the NC Firewise Program where applicable.

IV. BOTH PARTIES AGREE:

A. Forest Service District Foresters and/or their designees will be available to meet with the Commission's Area Forester to review burning plans for the year and discuss technical input. Forest Service will not assume responsibility for approval of individual prescribed burn plans.

B. To be responsible for training their employees and to participate in joint training meetings for the purpose of developing closer working relations.

C. Not to direct media or any other non-agency personnel to the location of active prescribed burn or wildfire sites without attempting to advise agency staff at the site that such personnel are in route.

D. Key contact officials for this agreement are the Forest Service's Forest Protection Division Director, and the Commission's Game Land and Forest Resources Manager. These officials will coordinate an Annual Cooperative Meeting by March 1 or some other mutually agreeable date of each year to discuss and review statewide coordination of training, prescribed burning, wildfire prevention, wildfire suppression and cooperative prescribed burning.

E. All Commission prescribed fire management operations will occur pursuant to the North Carolina Smoke Management Plan and only under the direction of an on-site Commission certified prescribed burner and/or burn boss. Commission staff will assume complete control for all prescribed fire operations on Commission property.

F. Commission property closures warranted by wildfire will be a joint decision following consultation between agency directors.

G. The Commission and Forest Service public information officers will consult prior to issuing press releases regarding closures of Commission property.

H. The Commission's Area Foresters and District Foresters, during Annual Operating Plan meetings to be held prior to March or some other mutually agreeable date of each year, will review fire management plans for every Commission property. Development of an Annual Action Plan for each Commission property will include, but not be limited to:

1. Logistics: Including personnel and equipment; maps; communications and notification procedures (radio frequencies); contact information; operational procedures; and other matters as deemed necessary by the participants.

2. Commission Fire Management Planning: a review of each Commission's wildfire. management response plan and, if applicable, the Commission's prescribed fire management plans.

3. Response Plans: Including a review of the incident command system; appropriate, Commission specific suppression methods and response levels based on fire severity and location; access points and containment lines; ecological issues; minimization of secondary impacts from suppression; public safety; facilities protection, etc.

I. In the event of any wildfire or escaped prescribed fire on Commission property requiring Forest Service assistance, Forest Service staff will be briefed and will assume overall responsibility on arrival. Commission staff will be included in a unified Incident Command System and will be included in all discussions and decisions on suppression actions on Commission property. Commission personnel, equipment, and facilities will be made available as necessary and appropriate. Commission will not engage in additional prescribed burning activities while Forest Service is engaged on Commission property without first conferring with district and regional forester to ensure adequate resource availability.

J. Exceptions to full suppression may be ecologically and logistically warranted and are expected to be fully considered, regardless of the ignition source, especially in ecologically sensitive areas and where full suppression is clearly not warranted owing to fire location, size, intensity, etc. Where conditions are deemed acceptable and are agreed to by both parties, wildfires or escaped prescribed fires will be allowed to bum out to already established lines or natural barriers in lieu of establishing new plowed or bulldozed lines on Commission property.

K. Whenever possible, all appropriate measures will be taken to minimize secondary suppression impacts to Commission property. Preferred suppression methods on Commission property will be discussed in the annual fire plan reviews and planned to the extent possible. This will include the identification of ecologically sensitive areas, equipment options and preferences, access areas and existing fire lines, pre-determined control lines, burn-out blocks, etc.

L. In the event of a significant wildfire or escaped prescribed fire on Commission property, a post-fire review will be conducted. This review will be conducted within six months of the fire by the Forest Service District Forester or designee, the Commission representative or designee, the burn boss, and other administrative personnel as deemed appropriate by either agency. The review of escaped Commission prescribed fires will include, but not be limited to, a review of the pre-burn approval records; burn boss and crew qualifications; unit prescriptions; predicted and on-site weather parameters; required and on-site fire management resources; anticipated and actual fire behavior and factors contributing to the fire's spread; pre-fire response planning; the actual response, including methods and equipment used; and suppression impacts.

Administrative contacts for this MOA:

Greg Hicks Forest Protection Director, NC Forest Service NC Department of Agriculture & Consumer Services 1616 Mail Service Center Raleigh, NC 27699-1600 Office: 919-857-4838 Fax: 919-857-4806	Chris Jordan Game Lands and Forest Resources Mgr Land and Water Access NC Wildlife Resources Commission Mailing Address 1720 Mail Service Center Raleigh, NC 27699-1700 office 919 707-0053 // mobile 910 638-3984

Appendix IV.

GCGL Dedications

North Carolina
Department of Administration

Beverly Eaves Perdue, Governor

Britt Cobb, Secretary

January 19, 2010

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 **Goose Creek Game Land**, Beaufort County

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.

This real property is currently administered by the North Carolina Wildlife Resources Commission as a portion of the Goose Creek Game Land and consists of approximately 79 acres located in Beaufort County, 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 **GOOSE CREEK GAME LAND DEDICATED NATURE PRESERVE**.

Dedication of the qualified portion of the tract fulfills the terms of any prior grant agreement, including that of the Clean Water Management Trust Fund.

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919) 807-2425
Fax (919) 733-9571
State Courier #51-01-00
e-mail britt.cobb@doa.nc.gov
An Equal Opportunity Affirmative Action Employer

Location Address:
116 West Jones Street
Raleigh, North Carolina 27603

The Governor and Council of State have approved the dedication of the State-owned lands hereinabove described as the Goose Creek Game Land Dedicated 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 4th day of August, 2009.

Sincerely,

Britt Cobb

BC:ke

Attachment

CONSENTED AND AGREED TO:

Secretary Dee Freeman
Department of Environment and Natural Resources

Gordon S. Myers, Executive Director
Wildlife Resources Commission

THIS DEDICATION OF THE GOOSE CREEK 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 Goose Creek 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 15 NCAC 12H.300.

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 79 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 riparian Primary Areas adjoining parts of Campbell Creek and its tributaries, protecting water quality within the river. 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).

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 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. 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.

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 pol-

lutants 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 be required to prepare and submit for approval to the Secretary of the Department of Environment and Natural Resources a management plan for the preserve. The management plan will be part of the larger management plan developed for the gamelands. This plan shall be subject to all the provisions of this dedication and shall additionally be consistent with the management principles set forth in the North Carolina Administrative Code 15 NCAC 12H.0300 and such other regulations as may be established from time to time by the Secretary of the Department of Environment and Natural Re-

sources. 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-164.8.9.

9. **Permanent Plaque**: The Custodian should erect and maintain a permanent plaque or other appropriate marker at a prominent location within the preserve bearing the following statement: "This Area is Dedicated as a State Nature Preserve."

THIS DEDICATION OF THE GOOSE CREEK 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 Goose Creek 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 15 NCAC 12H.300.

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 79 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 riparian Primary Areas adjoining parts of Campbell Creek and its tributaries, protecting water quality within the river. 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).

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.

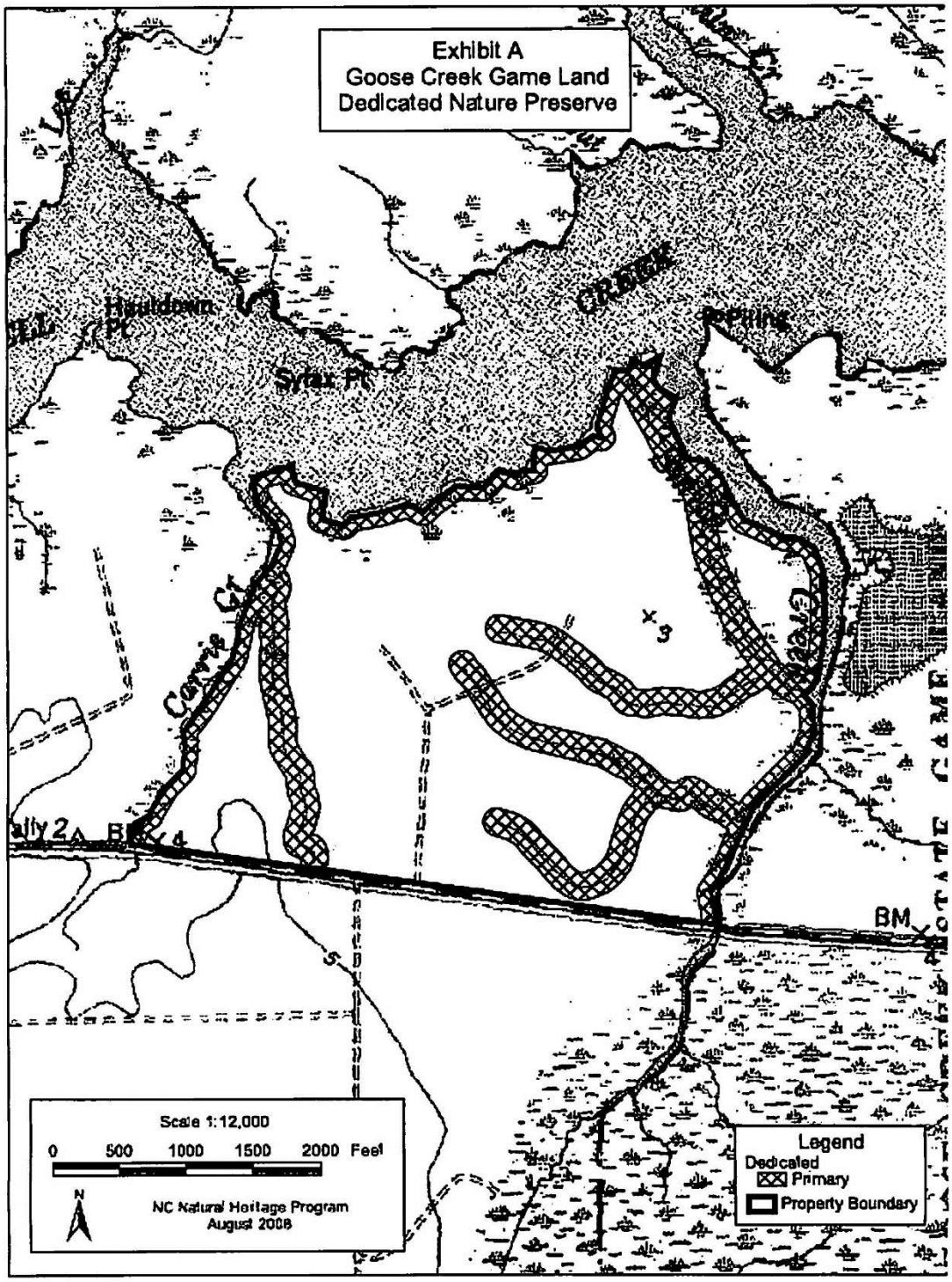


Exhibit A
Goose Creek Game Land
Dedicated Nature Preserve
Hauldown Pt
Sytax Pt
Piling
Corrie Ct
BM
Scale 1:12,000
0 500 1000 1500 2000 Feet
N
NC Natural Heritage Program
August 2008
Legend
Dedicated
Primary
Property Boundary

Appendix V.

Impoundment Vegetation Data Sheet

Waterfowl Vegetation Survey Data Sheet																						
Date:						Observer:																
		Widgeongras	Muskgrass	D. spikerus	Tall Spikerush	Phragmites	Juncus	Bare ground	Dead vegetation	Smartweed	Sprangletop	F Sedge	Milo	Bacopa	Panicum sp	Dog Fennel	Foxtail	Sesbania	S. Paralana	S.Meadow Hay	Cattail	
Unit	Plot	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	

Appendix VI.

Cultural Resources 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.

Appendix VII.

Deeds and Maps

FILED in PAMLICO County, NC
on Apr 08 2008 at 10:38:35 AM
by: SUE H. WHITFORD
REGISTER OF DEEDS
BOOK 513 PAGE 899

Drafted by and Return to:
State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321

RETURNED TO
DATE RETURNED
4-1-08

STATE OF NORTH CAROLINA

COUNTY OF BEAUFORT
COUNTY OF PAMLICO

NOTICE OF FUNDING DISCLOSURE

THIS NOTICE is given by the STATE OF NORTH CAROLINA, C/O State Property Office, 132. Mail Service Center, Raleigh, NC 27699-1321, owner of the real property in that certain instrument recorded in Beaufort County Torrens Book 5, page 351, and Pamlico County Torrens Book 1, page 62.

WITNESSETH:

That the property described herein was purchased with the financial participation of the United States Department of the Interior. The following funding disclosure is required to be recorded in the public records in conjunction with the purchase of the property:

This property was acquired (in part) with funds provided by the U.S. Department of the Interior, Fish and Wildlife Service and will be managed for the purpose of this grant, in accordance with applicable Federal and State Law. Property may not be disposed of in any manner, or used for purposes inconsistent with the Program for which it was acquired, without the prior approval of the Regional Director – Southeast Region, U.S. Fish and Wildlife Service.

All correspondence and requests concerning this notice shall be forwarded to: U.S. Department of the Interior, Fish and Wildlife Service, Division of Federal Aid, 1875 Century Blvd. Suite 240, Atlanta, GA. 30345

IN WITNESS THEREOF, the State of North Carolina has caused this notice to be executed in its name on the day and year mentioned above.

State of North Carolina

BY: _____
Jane W. Michaux, Director, N.C. State Property Office

File #s 7-14 & 69-3

AUG 24 2004 12:22PM NO. 7112 P. 2

APO COPY

FILED

FILED in PAMLICO County, NC
on Aug 11 2004 at 12:48:14 PM
by SUE H. WHITFORD
REGISTER OF DEEDS
BOOK 428 PAGE 571

RETURNED TO Cl. of Court
DATE RETURNED 8-12-04

Prepared by and return to: Teresa L. White, Special Deputy Attorney General, NC Department of Justice, 9001 Mail Service Center, Raleigh, NC 27699-9001

STATE OF NORTH CAROLINA — **IN THE GENERAL COURT OF JUSTICE**
SUPERIOR COURT DIVISION

COUNTY OF PAMLICO — **CIVIL NO. 96-CVS-164**

STATE OF NORTH CAROLINA,
Plaintiff,

vs.

COASTLAND CORPORATION,
Defendant.

CONSENT JUDGMENT

THIS CAUSE, coming on to be heard before the undersigned Judge of Superior Court, and it appearing to the Court and the Court finding as a fact:

That this action was fully instituted on the 29th day of August, 1996, by the issuance of Summons and filing of Complaint and Declaration of Taking and Notice of Deposit and by the deposit of TWO HUNDRED THOUSAND AND NO/100 ($200,000.00) DOLLARS as estimated just compensation by the plaintiff, State of North Carolina (hereinafter "the State"), for the taking of lands of defendant, Coastland Corporation (hereinafter "Coastland"), as hereinafter described; that all the parties who are

QUITCLAIM DEED

STATE OF GEORGIA }
COUNTY OF FULTON }

BOOK 121 PAGE 277

THIS DEED, made this the [illegible] day of February, 19[illegible], by the UNITED STATES OF AMERICA, acting by and through the Administrator of General Services, under and pursuant to the powers and authority contained in the provisions of Public Law 537, 80th Congress, approved May 19, 1948, and the Federal Property and Administrative Services Act of 1949, approved June 30, 1949 (Public Law 152, 81st Congress), as amended, and regulations and orders promulgated thereunder, party of the first part, and STATE OF NORTH CAROLINA, party of the second part.

WITNESSETH:

The party of the first part, for and in consideration of the use and maintenance by the party of the second part of the property hereinafter described for and as a reserve for the conservation of wildlife, other than migratory birds, and the benefits which shall accrue to the UNITED STATES OF AMERICA from the continued use of such property for such purposes, does hereby remise, release and forever quitclaim, unto the party of the second part, its successors and assigns, subject to the restrictions, exceptions, limitations, conditions and covenants hereinafter expressed and set forth, and for the purposes herein expressed and set forth, all its right, title, interest, claim and property in and to those certain seven (7) tracts of land, containing in the aggregate [illegible] acres, more or less, situate, lying and being in the County of [illegible], in the State of North Carolina, and more particularly described as follows, to-wit:

Tract No. 1

3 BEGINNING at a concrete monument, 6 inches square, located on the westerly right of way line near its intersection with the southerly bank of Upper Spring Creek, which monument bears North, [illegible] deg. [illegible] min. [illegible] sec. West, and is distant [illegible] feet from base line station [illegible] plus [illegible]; thence, North, [illegible] deg. [illegible] min. [illegible] sec. West, along the westerly right of way line [illegible] feet, more or less, to the mean water line of the southerly bank of Upper Spring Creek; thence, following the meanderings of the mean water line of the southerly banks of Upper Spring Creek and of a tributary thereto upstream in a generally westerly

U-1

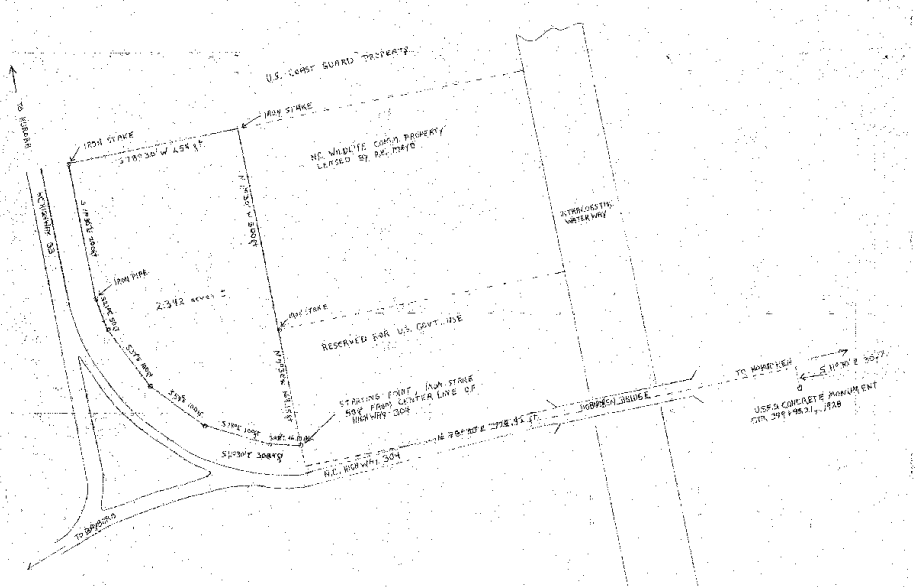
THIS DEED, made this 19th day of August, 1994, between STANDARD OIL COMPANY OF NEW JERSEY, a Delaware corporation, Grantor herein, and the Department of Conservation and Development, under authority of Section 113-76, subsection 3, of the North Carolina General Statutes, Grantee herein,

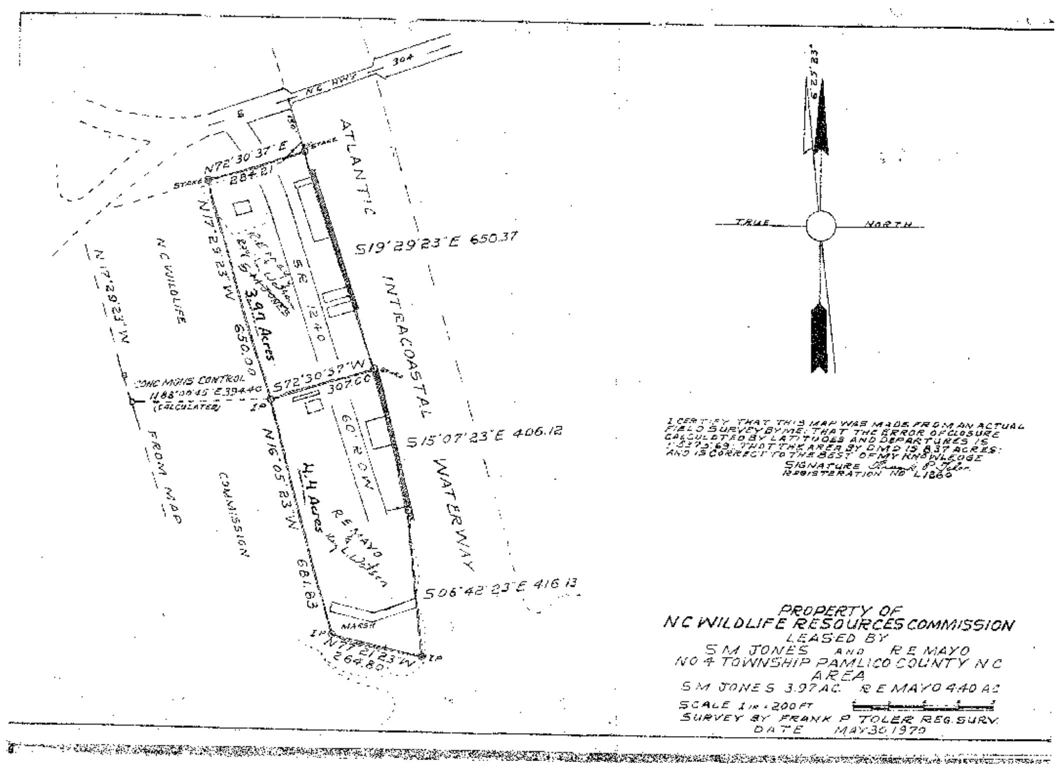
WITNESSETH: That said Grantor, for and in consideration of the sum of Ten ($10.00) Dollars and other good and valuable consideration to it paid, the receipt of which is hereby acknowledged, does hereby grant and convey unto Grantee, the below described lands situated in the Counties of Beaufort and Pamlico, State of North Carolina, to-wit:

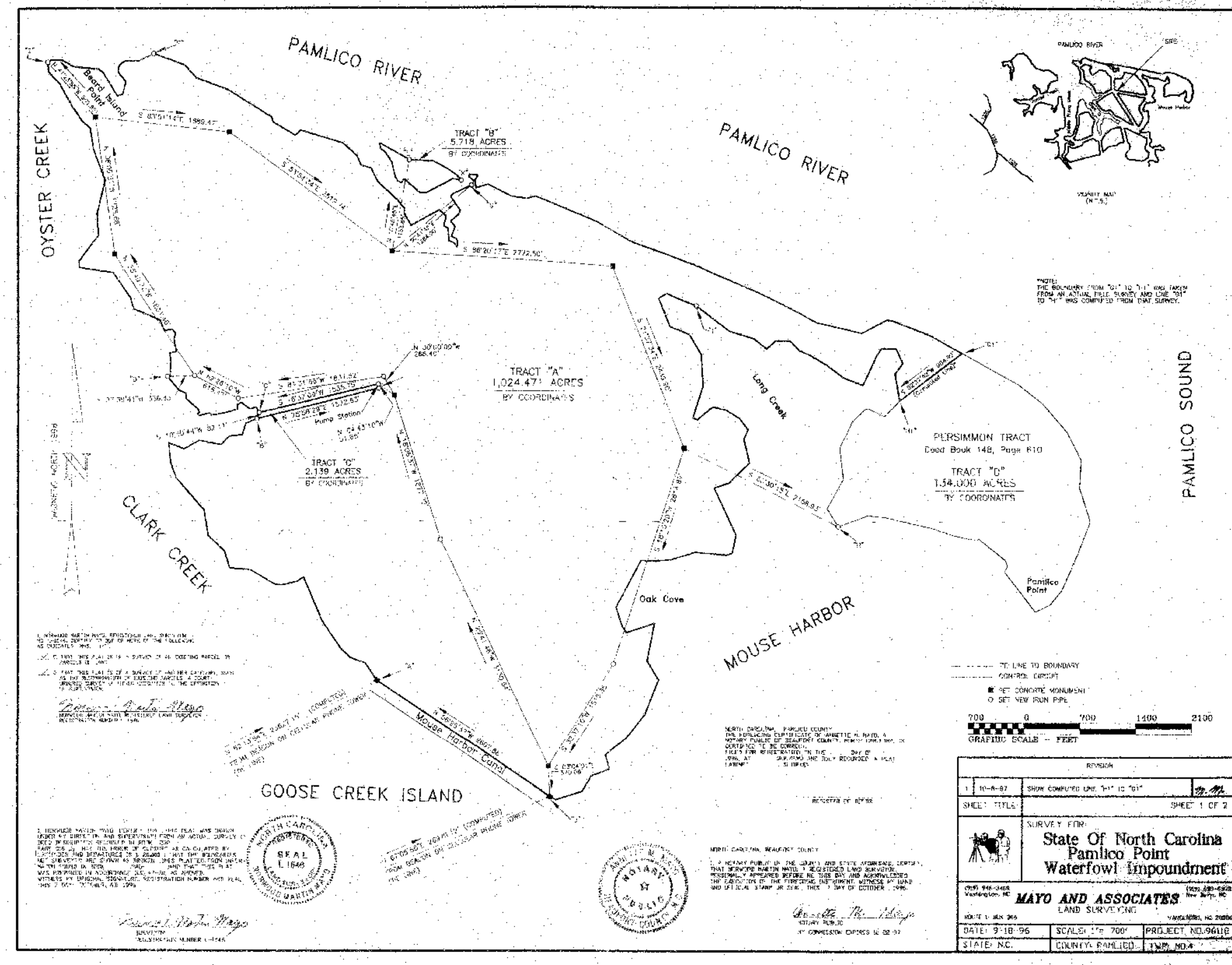
> All of the lands and premises also more particularly described by The Interstate Cooperage Company by two separate deeds dated December 28, 1949 and recorded in the Office of the Register of Deeds for Beaufort County in Book [illegible] at page 11 and Book 5 at page 30 and one of which is recorded in the office of the Register of Deeds for Pamlico County in Book [illegible] pages 34-35.
>
> Being the several pieces or parcels of land situate in the Counties of Beaufort and Pamlico, North Carolina, specifically described in certificates of title issued by the Register of Deeds of Beaufort County, North Carolina, for Registered Estate No. 325, recorded in the office of the Register of Deeds of Beaufort County in Book 5, Page 11, and Registered Estate No. 330, recorded in the office of the Register of Deeds of Beaufort County in Book of Land Titles 3, Page 33, and Registered Estate No. 4 issued by the Register of Deeds of Pamlico County, North Carolina, recorded in the office of the Register of Deeds of Pamlico County in Registration of Land Titles No. 1, Pages 36 and 37. The lands described in Registered Estate No. 4, Pamlico County, and Registered Estate No. 330, Beaufort County, are for the same pieces of land. Said certificates are attached hereto and herewith surrendered in order that they may be cancelled and new certificates issued.
>
> Said lands comprise in the aggregate, according to the recitations in the certificates of title of the three above mentioned registered estates, 5548.51 acres more or less.

Grantee herein, as a part of the consideration for the above referred to tracts of land herein conveyed, expressly agrees that there are excluded from this conveyance and expressly RESERVED AND RETAINED by Grantor, for itself, its successors and assigns, for a period of fifty (50) years from the date of this deed, which is to say, until and including the 19th day of August, 1994, all oil, gas, and any and all other minerals in, on, or under the lands above referred to for the purpose of drilling or otherwise exploring for, producing,

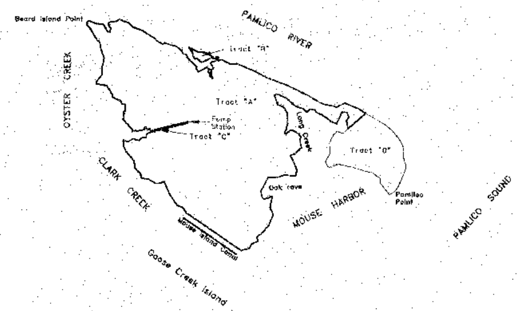
STATE OF NORTH CAROLINA
DIVISION OF FORESTRY
HOBUCKEN TOWER SITE
PAMLICO COUNTY
Scale 1" = 80'
Drawn by HAE 6-26-61
All Bearings Magnetic as of 6-26-61




NC HWY 304
ATLANTIC INTRACOASTAL WATERWAY
N72°30'37"E
284.21
S19°29'23"E 650.37
N17°29'23"W
650.00
3.97 Acres
SR 1240
S72°30'37"W
307.00
S15°07'23"E 406.12
N16°05'23"W
681.83
4.4 Acres
60' R/W
S06°42'23"E 416.13
N77°21'23"W
264.80
MARSH
N C WILDLIFE
COMMISSION
N 17°29'23"W
FROM MAP
CONC MON'S CONTROL
N88°00'45"E 394.40
(CALCULATED)
TRUE NORTH
I CERTIFY THAT THIS MAP WAS MADE FROM AN ACTUAL
FIELD SURVEY BY ME; THAT THE ERROR OF CLOSURE
CALCULATED BY LATITUDES AND DEPARTURES IS
1:5373.69; THAT THE AREA BY DMD IS 8.37 ACRES;
AND IS CORRECT TO THE BEST OF MY KNOWLEDGE
SIGNATURE
REGISTERATION NO L1269
PROPERTY OF
N C WILDLIFE RESOURCES COMMISSION
LEASED BY
S M JONES AND R E MAYO
NO 4 TOWNSHIP PAMLICO COUNTY N C
AREA
S M JONES 3.97 AC. R E MAYO 4.40 AC
SCALE 1 IN = 200 FT
SURVEY BY FRANK P TOLER REG. SURV.
DATE MAY 30 1970



PAMLICO RIVER
PAMLICO RIVER
OYSTER CREEK
PAMLICO SOUND
CLARK CREEK
MOUSE HARBOR
GOOSE CREEK ISLAND
TRACT "A"
1,024.471 ACRES
BY COORDINATES
TRACT "B"
5.718 ACRES
BY COORDINATES
TRACT "C"
2.139 ACRES
BY COORDINATES
PERSIMMON TRACT
Deed Book 148, Page 610
TRACT "D"
154.000 ACRES
BY COORDINATES
Long Creek
Oak Cove
Pamlico Point
Pump Station
Mouse Harbor Canal
GRAPHIC SCALE — FEET
SURVEY FOR:
State Of North Carolina
Pamlico Point
Waterfowl Impoundment
MAYO AND ASSOCIATES
LAND SURVEYING
SHEET 1 OF 2
DATE: 9-18-96
STATE: NC
COUNTY: PAMLICO



"A" TO "B"

BEARING	DISTANCE
N 34°02'18"W	255.07'
N 69°38'00"W	203.92'
N 45°44'02"W	557.79'
N 34°[illegible]'31"W	417.34'
N 23°[illegible]'42"W	594.82'
S 57°43'42"W	99.53'
S 77°32'50"W	187.37'
N 84°57'14"W	89.85'
N 80°19'25"W	587.25'
N 85°06'45"W	267.77'
N 17°38'56"W	210.04'
N 45°40'40"W	290.76'
N 39°16'37"W	313.33'
N 41°38'28"W	526.95'
N 18°22'07"W	203.62'
N 06°26'05"W	245.85'
S 68°44'12"E	208.10'
N 80°02'41"E	314.91'
S 79°05'09"E	283.26'
N 34°35'12"E	150.98'
N 83°26'07"E	181.40'
N 17°03'07"E	140.49'
N 67°53'27"E	147.21'

"C" TO "D"

BEARING	DISTANCE
N 29°37'44"W	76.38'
S 75°15'17"W	85.40'
N 52°05'14"W	126.08'
S 54°13'03"W	56.04'
S 03°42'47"E	55.40'
S 23°37'04"W	174.97'
N 85°03'45"W	167.12'
S 60°56'09"W	85.43'
S [illegible]°[illegible]'13"W	132.68'
N 23°06'25"W	32.09'
N 57°42'43"E	28.68'
N 18°43'09"W	45.10'
N 60°46'24"W	113.88'
N 47°12'11"W	63.22'
N 20°37'15"W	83.48'
N 68°08'17"W	102.42'
N 39°05'27"W	223.27'

"D" TO "E"

BEARING	DISTANCE
N 82°10'45"E	33.38'
N 02°34'18"E	184.93'
N 07°16'29"W	112.81'
N 77°[illegible]'[illegible]"E	82.81'
N 10°07'55"W	160.13'
N 16°24'19"E	73.28'
N 20°55'16"W	85.35'
N 82°49'16"W	99.34'
N 22°47'48"W	139.19'
N 07°12'15"W	350.43'
N 15°09'21"W	138.54'
N 35°04'08"W	379.21'
N 61°35'03"W	428.90'
N 00°36'33"W	74.12'
N 37°20'33"E	398.56'
N 04°05'23"W	269.32'
N 13°20'12"E	435.05'
N 20°38'13"W	404.94'
N 09°52'24"W	284.39'
N 50°20'48"W	122.13'
N 34°55'06"W	216.05'
N 26°18'21"W	328.11'
N 43°29'58"W	203.30'
N 05°34'04"W	120.16'

"E" TO "F"

BEARING	DISTANCE
N 54°56'04"E	47.35'
S 89°42'58"E	135.57'
S 61°21'36"E	181.19'
S 85°07'41"E	302.05'
S 55°02'29"E	57.17'
S 31°58'22"E	410.95'
N 74°[illegible]'20"E	70.17'
N 15°17'38"E	156.09'
N 38°22'46"W	154.79'
N 08°20'34"E	78.08'
N 49°59'24"E	85.85'
N 88°11'19"E	197.22'
N 63°46'13"E	201.55'

"F" TO "G"

BEARING	DISTANCE
S 72°38'60"E	410.25'
S 43°58'12"E	215.36'
S 59°54'37"E	432.70'
S 52°10'21"E	934.57'
S 13°21'35"E	62.62'
S 59°33'18"E	320.71'
N 47°58'46"E	93.27'
S 72°57'37"E	546.79'
S 48°32'27"E	236.04'
S 22°28'59"E	136.04'
S 78°15'08"E	127.57'
S 25°54'40"E	168.51'
S 47°20'13"E	330.52'
S 40°32'49"E	144.15'
S 01°40'12"W	83.57'
S 30°25'08"E	169.71'
N 62°01'28"E	400.93'
S 47°34'05"E	115.91'
S 14°54'56"W	17.39'
S 54°59'13"E	56.89'
S 03°19'51"E	151.38'
S 85°40'40"E	70.70'
S 38°11'23"E	65.07'
N 01°15'35"E	94.81'
N 61°20'48"W	82.57'
N 20°16'08"E	130.82'
N 39°30'29"W	86.92'
N 50°38'54"E	130.74'
N 19°31'57"E	57.12'
N 35°15'30"W	203.55'
N 22°01'40"E	38.74'
N 56°11'57"E	283.24'

"G" TO "G1"

BEARING	DISTANCE
N 20°05'57"E	84.65'
N 02°04'55"W	77.76'
N 07°47'02"E	35.56'
S 83°03'12"E	108.12'
S 31°21'19"W	78.02'
S 10°20'40"E	21.31'
N 73°43'06"E	138.33'
S 63°01'02"E	324.15'
S 80°55'28"E	203.22'
N 74°34'16"E	100.49'
S 88°05'50"E	816.43'
S 60°31'38"E	530.45'
S 70°51'13"E	879.94'
S 68°52'32"E	859.75'
S 63°29'58"E	774.59'
S 79°50'45"E	573.53'
N 61°38'23"E	354.06'
S 84°11'30"E	71.85'
S 68°30'11"E	513.50'
S 60°58'12"E	159.60'

"H1" TO "I"

BEARING	DISTANCE
N 10°32'42"W	340.34'
N 38°34'26"E	158.70'
N 24°08'02"W	202.19'
N 07°50'13"W	148.53'
S 32°27'01"W	109.96'
S 24°38'01"W	414.70'
N 68°11'32"W	267.57'
N 32°56'10"W	249.03'
N 58°43'54"W	250.49'
N 88°30'09"W	145.84'
N 43°29'27"W	155.58'
N 89°38'46"W	163.28'
S 17°54'19"W	148.82'
N 61°55'15"W	202.35'
N 72°47'02"W	320.24'
N 52°39'17"W	525.29'

"I" TO "J"

BEARING	DISTANCE
N 69°08'03"W	202.77'
N 56°50'27"W	169.44'
S 57°11'31"W	119.71'
S 22°10'21"E	376.89'
S 67°39'46"E	254.81'
S 30°49'44"E	283.54'
S 02°54'21"E	402.73'
S 17°49'49"W	407.65'
S 65°12'41"E	50.90'
N 49°42'32"E	252.44'
S 76°19'54"E	171.89'
S 57°48'18"E	198.35'
S 37°55'27"E	173.09'
S 21°59'12"W	134.36'
S 13°38'23"E	297.73'
S 45°18'53"W	356.02'
S 71°29'07"W	107.53'
S 25°20'14"E	639.23'
S 11°38'34"W	226.95'
S 21°35'43"W	60.89'
N 84°33'38"W	386.90'
S 72°37'20"W	322.21'
S 83°55'00"W	186.30'
S 87°13'16"W	159.36'
S 28°13'15"W	660.66'
S 18°50'41"E	257.50'
S 30°33'45"E	84.95'
S 71°39'28"E	358.75'
S 11°07'50"W	477.05'
S 31°39'52"E	275.07'
S 21°26'21"W	408.08'
S 38°24'55"W	394.26'
S 51°25'23"W	324.93'
S 16°13'19"E	177.65'
S 69°02'02"W	249.68'
S [illegible]°[illegible]'28"W	213.32'
S 72°38'35"W	347.04'
N 82°50'11"W	85.13'

"K" TO "L"

BEARING	DISTANCE
N 79°22'15"W	109.97'
S 62°34'14"W	371.56'
N 59°23'02"W	52.04'
N 49°14'19"W	283.92'
S 26°41'15"W	36.22'
N 59°17'02"W	33.61'
N 29°33'51"W	86.69'
N 14°03'53"W	187.01'
N 34°07'57"W	152.20'
N 63°11'50"W	77.76'
N 02°26'25"W	84.02'
S 00°41'48"E	425.18'

"L" TO "K"

BEARING	DISTANCE
S 86°24'08"E	303.93'
S 61°20'38"E	202.02'
S 55°39'07"E	125.45'
S 45°09'35"E	13.46'
S 33°14'42"E	26.85'

"G1" TO "H"

BEARING	DISTANCE
S 60°58'12"E	812.96'
S 51°55'43"E	388.26'
S 40°37'23"E	458.56'
S 27°22'23"E	391.47'
S 02°34'16"W	157.90'
S 17°54'15"E	422.01'
S 21°46'45"W	473.81'
S 23°54'53"W	448.39'
S 39°50'47"W	725.49'
S 03°51'33"W	205.25'
N 57°59'31"W	830.94'
N 30°52'00"E	72.61'
N 18°41'32"W	75.26'
N 51°40'29"W	428.29'
S 66°29'15"W	39.38'
N 79°01'01"W	279.50'
N 21°37'58"W	360.79'
N 77°09'25"W	591.49'
N 83°32'31"W	224.33'
S 59°42'40"W	356.70'

"H" TO "H1"

BEARING	DISTANCE
N 32°58'30"W	260.87'
N 29°28'25"E	417.41'
N 06°43'56"W	393.99'
N 25°46'28"E	387.98'
N 48°12'15"E	215.01'
N 74°04'53"E	19.90'
S 54°43'16"E	227.07'
N 45°36'21"E	272.03'

SEAL L-1540

REVISION

1.	10-8-97	SHOW COMPUTED LINE "H1" TO "G1"

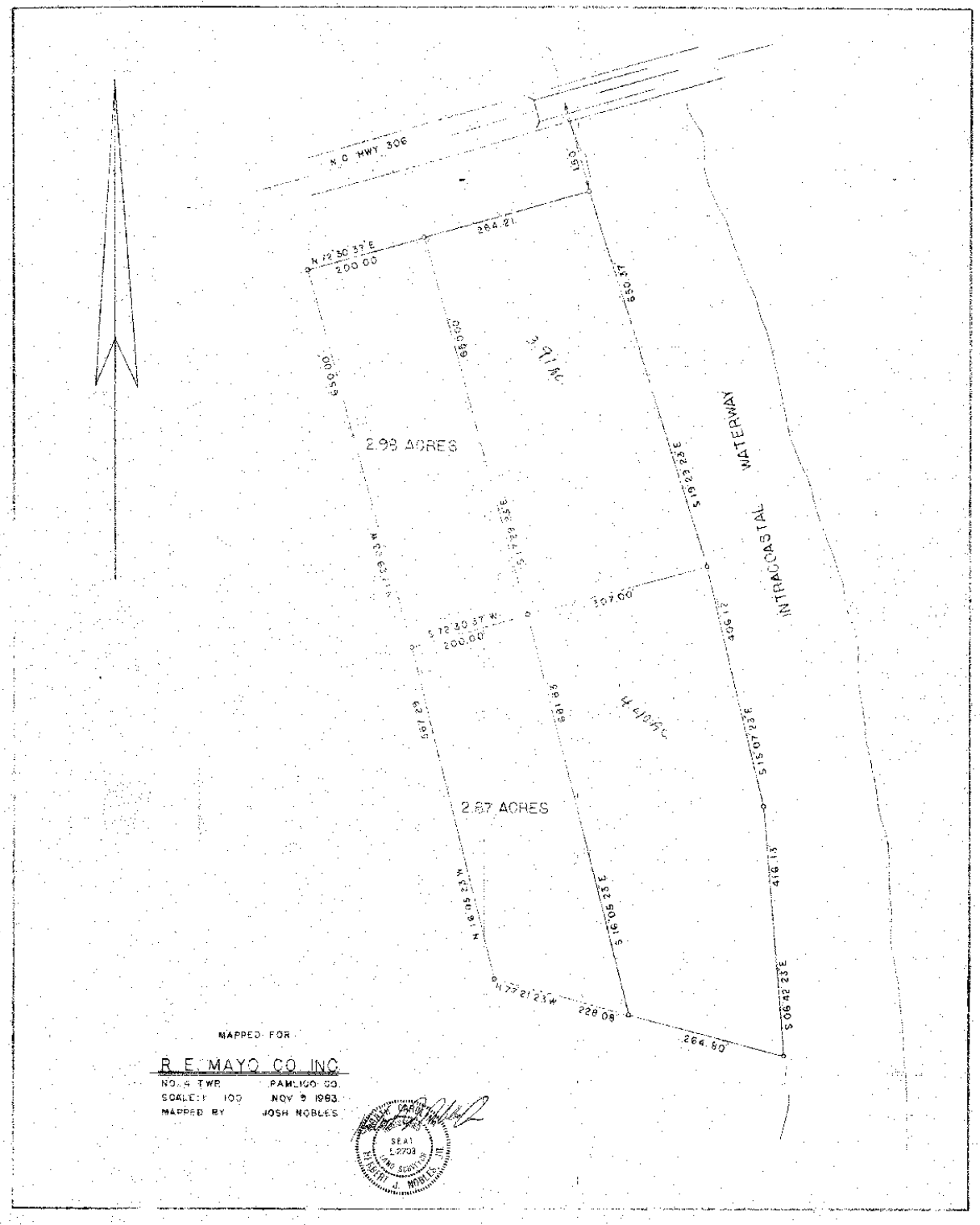
SHEET TITLE: SHEET 2 OF 2

SURVEY FOR:

State Of North Carolina
Pamlico Point
Waterfowl Impoundment

(919) 946-9465 Washington, NC
MAYO AND ASSOCIATES
LAND SURVEYING
(919) 633-6900 New Bern, NC

DATE: 9-18-96	SCALE: 1" = 700'	PROJ. NO.: 9611891
STATE: N.C.	COUNTY: PAMLICO	TWP. NO. 4



MAPPED FOR

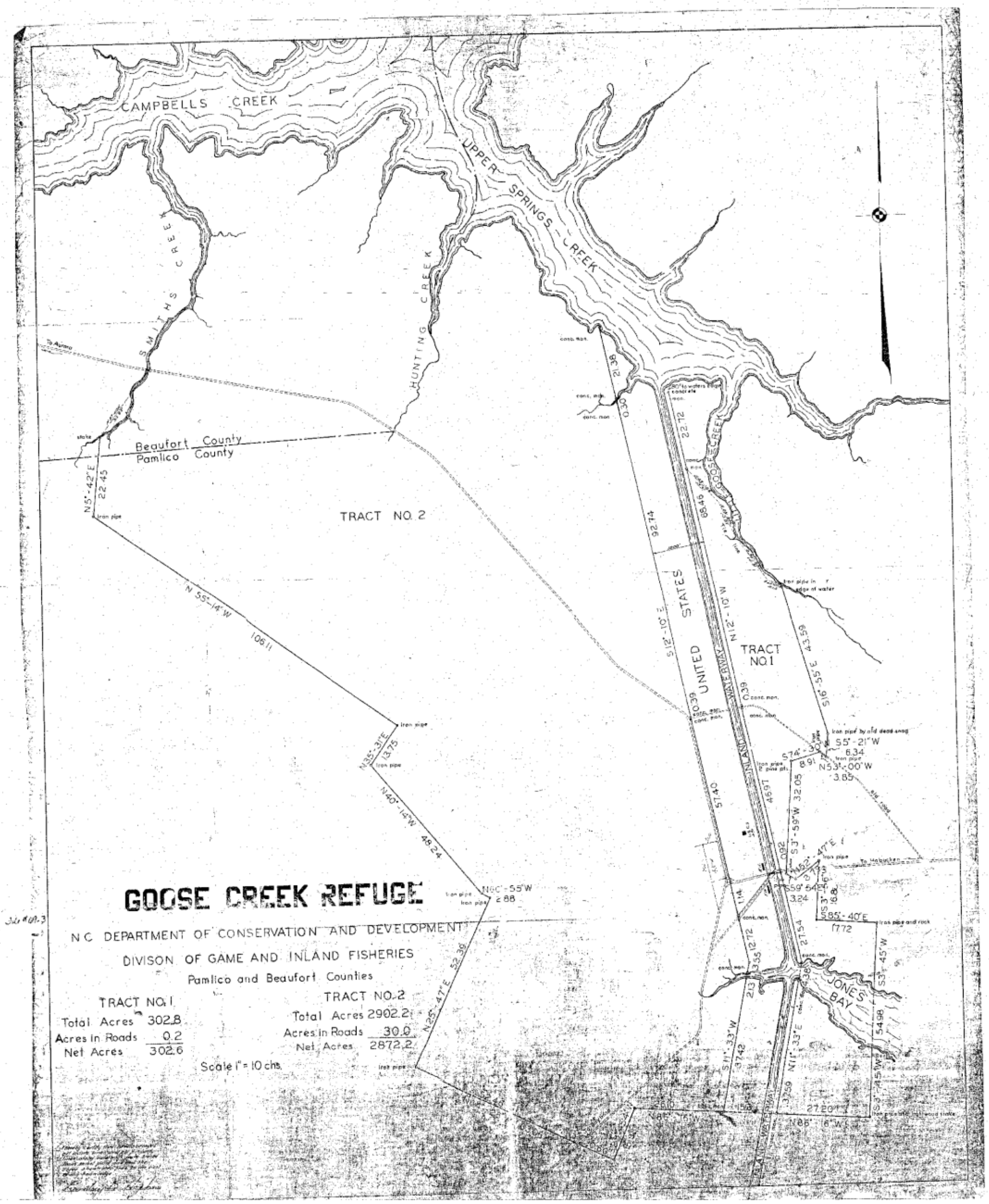
R. E. MAYO CO. INC.

NO. 4 TWP. PAMLICO CO.

SCALE: 1" = 100' NOV 9 1983

MAPPED BY JOSH NOBLES

NORTH CAROLINA
SEAL
L-2703
REGISTERED LAND SURVEYOR
HERBERT J. NOBLES III


GOOSE CREEK REFUGE
N.C. DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISON OF GAME AND INLAND FISHERIES
Pamlico and Beaufort Counties
TRACT NO. 1
Total Acres 302.8
Acres in Roads 0.2
Net Acres 302.6
TRACT NO. 2
Total Acres 2902.2
Acres in Roads 30.0
Net Acres 2872.2
Scale 1" = 10 chs.
CAMPBELLS CREEK
UPPER SPRINGS CREEK
SMITHS CREEK
HUNTING CREEK
JONES BAY
Beaufort County
Pamlico County
TRACT NO. 2
TRACT NO. 1
UNITED STATES
N 55°-14' W
106.11
N 5°-42' E
22.45
N 40°-14' W
48.24
N 25°-47' E
52.36
S 12°-10' E
N 12°-10' W
S 16°-55' E
43.59
S 5°-21' W
6.34
N 53°-00' W
3.85
S 85°-40' E
17.72
N 11°-33' E
S 11°-33' W
S 3°-45' W
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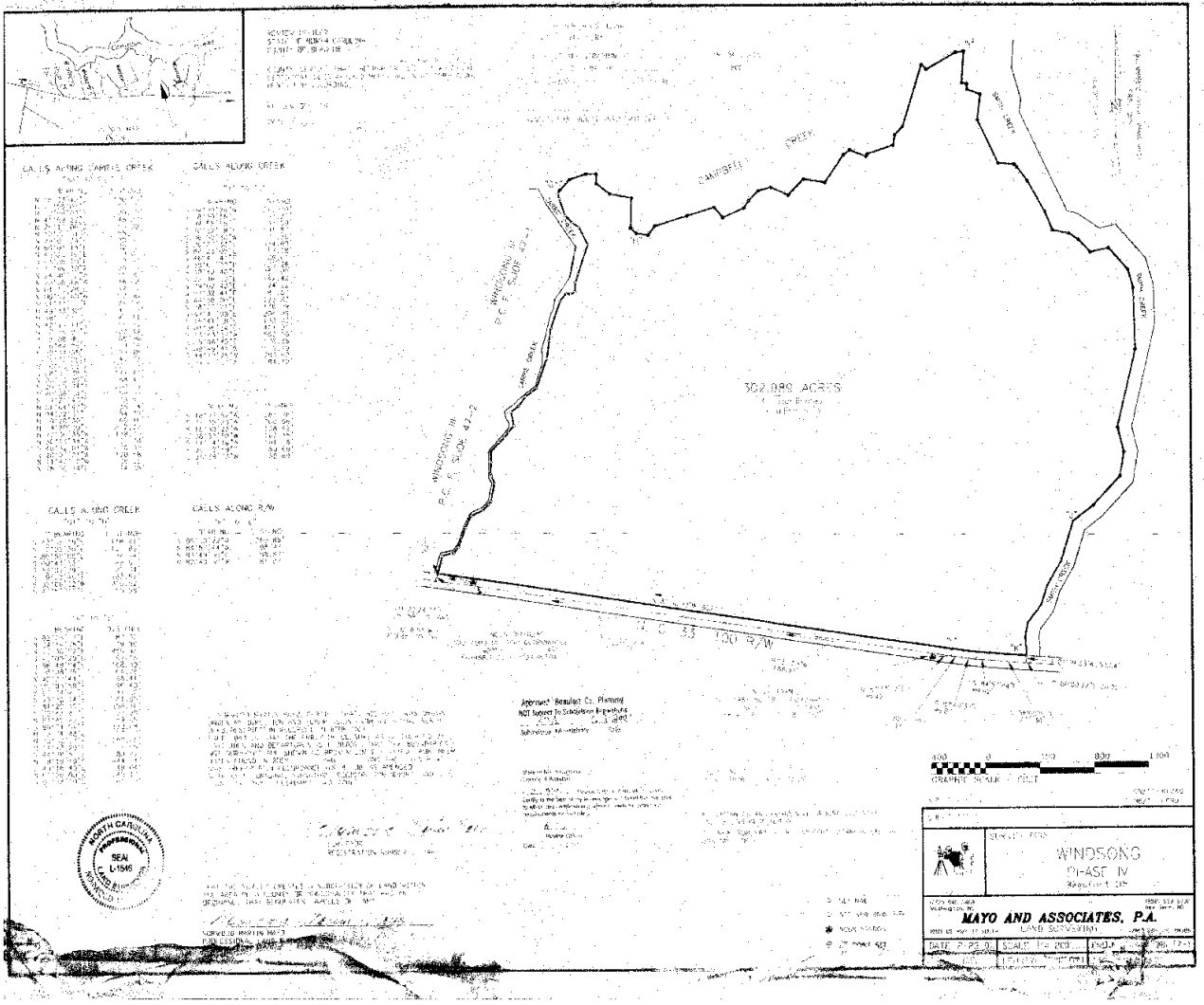
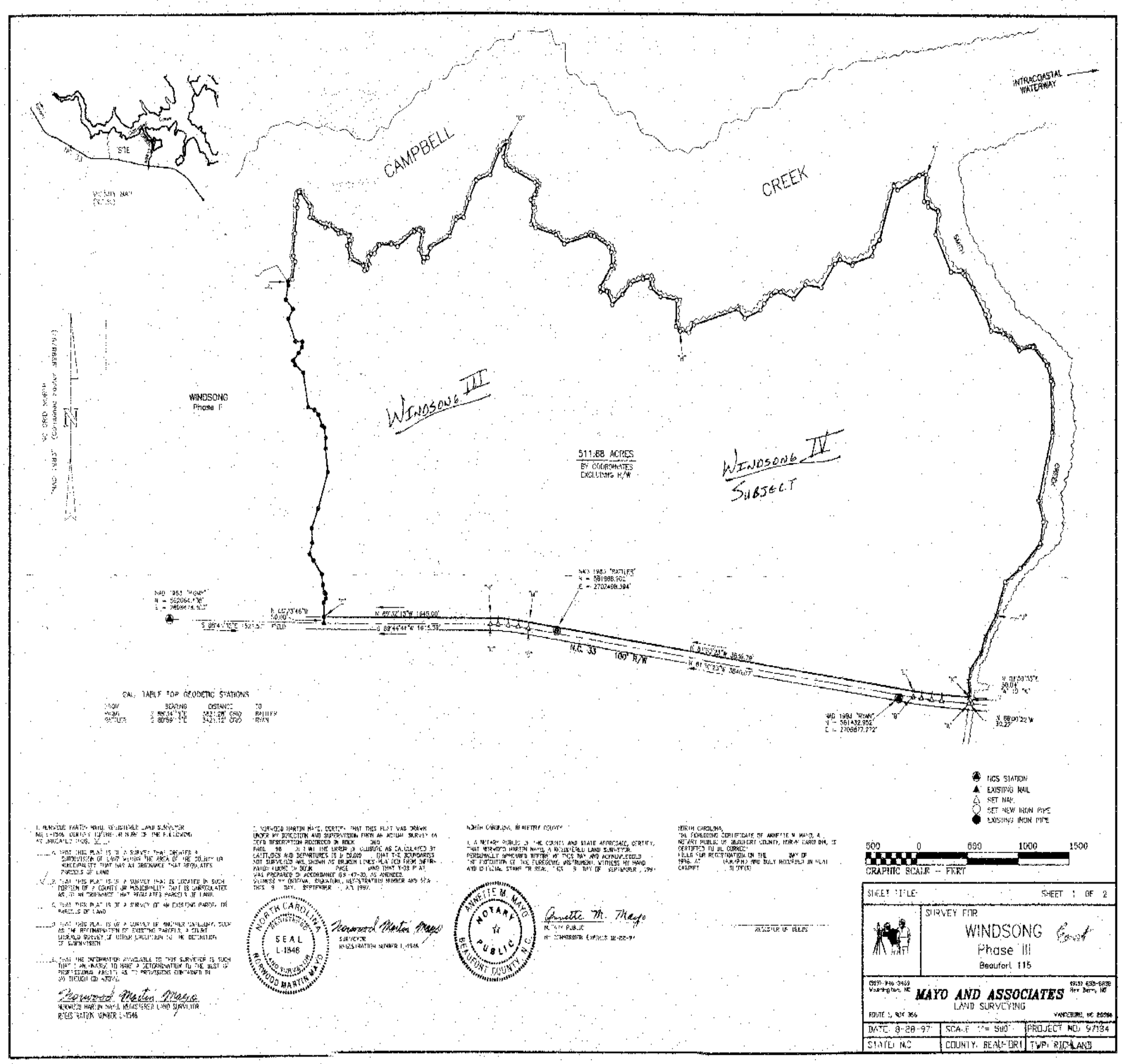
27.20
92.74
88.46
57.40
22.72
21.36

RECORDED PC F/80-6 6-27-07

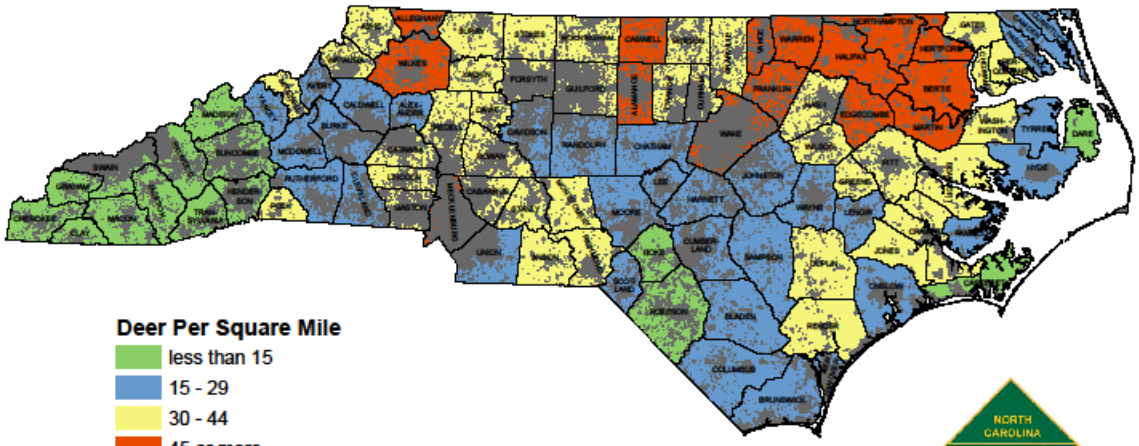



INTRACOASTAL WATERWAY
CAMPBELL
CREEK
SITE
VICINITY MAP
WINDSONG
Phase I
Windsong III
511.88 ACRES
BY COORDINATES
EXCLUDING R/W
Windsong IV
Subject
N.C. 33
100' R/W
NAD 1983 "RYAN"
N = 561432.952'
E = 2706877.272'
NAD 1983 "RATTLER"
N = 561988.902'
E = 2702496.394'
N 88°00'22"W
30.22'
NCS STATION
EXISTING NAIL
SET NAIL
SET NEW IRON PIPE
EXISTING IRON PIPE
500 0 500 1000 1500
GRAPHIC SCALE -- FEET
SHEET TITLE:
SHEET 1 OF 2
SURVEY FOR
WINDSONG
Phase III
Beaufort 115
MAYO AND ASSOCIATES
LAND SURVEYING
ROUTE 1, BOX 356
DATE: 8-28-97
SCALE: 1"= 500'
PROJECT NO. 97134
STATE: NC
COUNTY: BEAUFORT
TWP: RICHLAND
NORTH CAROLINA
SEAL
L-1846
NORWOOD MARTIN MAYO
ANNETTE M. MAYO
NOTARY PUBLIC
BEAUFORT COUNTY, N.C.
Norwood Martin Mayo
Annette M. Mayo

Appendix VIII.

Deer and Turkey Density Maps

2010 North Carolina White-tailed Deer Density Map



Deer Per Square Mile

- less than 15
- 15 - 29
- 30 - 44
- 45 or more

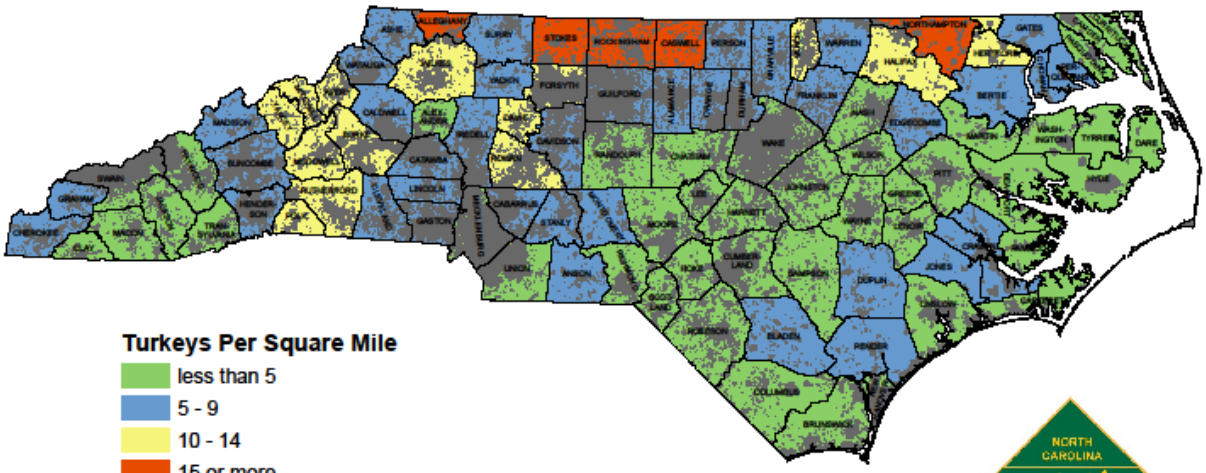
No Density Estimate

Where harvest data are not available to produce density estimates because hunting is limited or prohibited: includes federal and state parks, municipal boundaries, water bodies, and human density greater than 1 person per 2 acres.

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Division of Wildlife Management

2010 North Carolina Wild Turkey Density Map



Turkeys Per Square Mile

- less than 5
- 5 - 9
- 10 - 14
- 15 or more

No Density Estimate

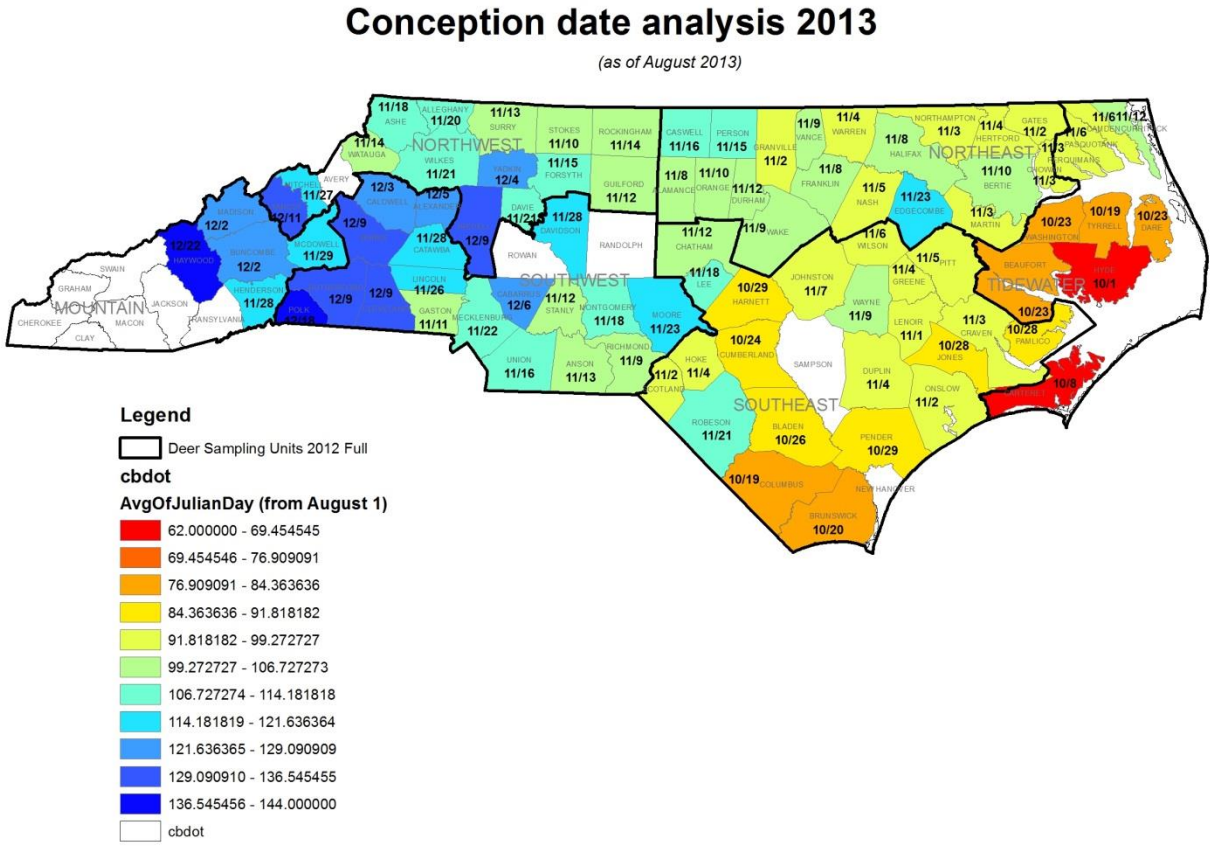
Where harvest data are not available to produce density estimates because hunting is limited or prohibited: includes federal and state parks, municipal boundaries, water bodies, and human density greater than 1 person per 2 acres.

NORTH CAROLINA Wildlife RESOURCES COMMISSION

Division of Wildlife Management

Appendix IX.

Peak Breeding Dates



Appendix X

Ad-Hoc Deer Evaluation Procedure

Evaluating Proposed Changes in Deer Hunting Regulations

November 2010

Herein, we present the North Carolina Wildlife Resource Commission's (NCWRC) goal for deer hunting and management, and provide a process using biological and non-biological parameters for evaluating proposed changes in deer hunting regulations. This process was developed during 2010 by an Ad-hoc committee (see page 15) in the Division of Wildlife Management (DWM). Development of this protocol specifically addresses two elements of the NCWRC's Strategic Plan:

Goal 3 - Strategic Objective 2-- Emphasize best available science in the application of fish and wildlife management programs, and

Goal 7- Strategic Objective 2-- Identify and review core processes to ensure efficiency and effectiveness and evaluate how rules and processes are supporting the needs of the resources.

In addition, this effort directly addresses Objectives 2.1.1, 3.3.9, 3.3.11, 3.6.6, 4.1.16, and 5.2.2 in the DWM Strategic Plan.

The deer management goal provided herein is intended to encompass all aspects related to management of the deer herd and deer hunting throughout the state. However, achieving this goal via hunting will be challenging in urban areas or other places where hunting pressure is limited (Figure 1).

Biological and non-biological evaluations of proposed regulation changes should be completed using evaluation sheets on Pages 4 and 5. Although subjective interpretation may be required to overcome some shortcomings and possible biases in the data, the evaluations are designed to be as objective as possible by relying heavily on data. The biological evaluation of a proposal generates a numerical "score" that indicates the expected impacts on meeting the stated biological objectives. Information related to hunter attitudes, fiscal impacts, administration, and other non-biological issues are presented in such a way as to summarize the overall support, impact, and desirability of a given regulation change proposal.

The timeline presented on Page 6 outlines how the biological and non-biological evaluations can be incorporated into the regulatory process. Following the proposed process will enable the NCWRC to proactively promote sound deer management. Doing so will focus efforts toward developing regulations that address hunter satisfaction and other non-biological issues, but only after ensuring that proposed changes will not have negative biological impacts. The biological parameters (e.g., reported deer harvest, sex and age data, estimated breeding dates) used in the evaluation process draw from scientific knowledge, empirical data, and working experience of NCWRC biologists. Although not perfect, this is currently the best information available and is appropriate for this type of evaluation. Future adjustments may be desirable as data collection and reliability improves.

Goal

The NCWRC goal for deer hunting and management is to:

> Use science-based decision making and biologically-sound management principles to assure long-term viability of deer populations at desirable levels of health, herd composition, and density with respect to land cover type and use, hunter satisfaction, and overall social acceptance.

Achievement of this goal would be reflected by a well-managed herd that:

- may be managed with hunting as the primary tool,
- carries with it a primarily positive resource value, with acceptable levels of long-term negative impacts to people, property, and other natural resources,
- is capable of supporting a broad range of traditional and new hunting opportunities,
- is capable of accommodating diverse landholder deer management goals,
- does not exceed the land's ability to sustain it, and
- can be evaluated using the following biological parameters:
    1. a viable population is maintained within nutritional carrying capacity,
    2. all age classes of bucks and does are adequately represented,
    3. adult sex-ratios are balanced during breeding season to increase the likelihood of synchronized breeding and parturition,
    4. yearling buck dispersal is adequate,
    5. standing genetic diversity is maintained,
    6. the herd is free-ranging, and
    7. the risk of disease introduction and transmission is minimal.

Biological Evaluation of Proposed Deer Regulation Change

Proposal Number:

Area and regulation(s):

In regard to achieving and/or maintaining biological objectives, are current trends expected to be **improved, worsened,** or **not affected** by this proposed rule change?

Biological Objective	For the area considered, what is the 3-year average and trend?	Points to be awarded in answer to the question above: Improved	Worsened	Not Affected or No Data	Points
Harvest of at least 1.0 antlered buck/mi^2, or if less than 1.0 buck/mi^2 the area has a stable or increasing trend.		30	-30	0	
Total adult doe harvest (i.e., excluding fawns) is comprised of 30-35% yearling does (1.5 years old).		10	-10	0	
Total antlered buck harvest (i.e., excluding button bucks) is comprised of no more than 30% yearling bucks (1.5 years old).		10	-10	0	
Total harvest is comprised of at least 50% does.		10	-10	0	
Sex compostion of harvest that occurs prior to peak breeding is comprised of at least 50% does.		10	-10	0	
No more than 20% of total antlered buck harvest (i.e., excluding button bucks) occurs before the time of peak breeding.		10	-10	0	
Deer are a naturally occuring product of the landscape. There is no genetic manipulation and movements are not restricted.		20	-20	0	
The risk of disease transmission is reduced.		20	-20	0	

Explanation of Score: A positive (+) score indicates an overall expected improvement over current regulations. A negative score (-) indicates an expectation that the proposed change will hinder meeting biological objectives. The highest possible score is +100% and the lowest possible score is -100%.

Total Points

Maximum Points Possible 120

Biological Score %

(% of total points possible)

Comments:

Evaluation of Non-Biological Issues Related to Proposed Deer Regulation Change

Proposal Number:
Area and regulation(s):

In considering whether to support this proposed regulation, what is the current level of support or expected impact for the following parameters?

		Direction and Magnitude of Support or Impacts							
		Positive		Neutral Support or Little to No Impact	Negative				
	Parameter	Strong	Moderate		Moderate	Strong	Unknown	Source of Information	Comments
Constituent Considerations	**1. Deer hunters:** Expected level of support				X			Example- Professional Knowledge	Example- Some hunters oppose additional either-sex opportunitites
	2. Deer hunters: Expected impacts on hunting opportunity/long term satisfaction	X						Example- Professional Knowledge	Example - Additional either-sex opportunities not expect to negatively impact herd
	3. Other hunters: Expected level of support								
	4. Other hunters: Expected impacts on hunting opportunity/long term								
	5. Landowners: Impacts and/or support as noted in comments					X		Example Survey from 2009	Example - 75% of landowners are opposed to this type of regulation
	6. Non-hunters: Impacts and/or support as noted in comments								
	7. Fiscal impacts to constituents								
Agency Considerations	8. Impacts on hunter retention and recruitment	X						Example - License data	Example - Similar regulation changes have not impacted license sales in the past
	9. Impacts on enforceability	X						Example - DLE comments	Example - LE staff feels this change will improve ability to enforce regulations
	10. Impacts on ability to monitor changes in the deer herd								
	11. Impacts to agency administration								
	12. Impacts on regulation complexity								
	13. Fiscal impacts to NCWRC								
	14. Other:								
	15. Other:								
	Comments:								

Timeline

Evaluating Proposed Changes in Deer Season Regulations

Deadline	Task
November through January NCWRC Meeting	DWM staff and NCWRC Big Game Committee develop regulation change proposals based on management needs and public input.
Mid-January	All proposals related to deer, whether originated by staff or Commissioners, are due to the DWM Rules Biologist.
Early February	Evaluation Group (i.e., DWM Deer Committee and biologists from affected areas) meets to make biological evaluations and preliminary non-biological evaluations. Proposals receiving a negative (-) biological score do not continue forward, but are returned to originator with explanation and comments regarding how to improve the proposal if submitted in a future regulation cycle.
Mid-February	All non-deer proposals are due to DWM Rules Biologist.
March 1-31	District meetings. Evaluation sheets for biological evaluations and preliminary non-biological evaluations are presented for staff consideration and comment.
Mid-April	DWM rules meeting. Final non-biological evaluation (if different from preliminary evaluation made by Evaluation Group) is made based on input from district meetings.
Mid-April	Central staff meeting
May NCWRC Meeting	Commissioners receive a handout with the proposals and explanations for each. The 1-page evaluation sheets (both biological and non-biological) are attached to deer proposals in this handout. This is an informational handout only with no action required by the NCWRC.
July NCWRC Meeting	NCWRC meeting to vote on proposals to send to public hearings.
August 1 to October 1	Public comment period
September	Public Hearings
October NCWRC Meeting	NCWRC reviews public comments
November NCWRC Meeting	NCWRC votes on proposals
December	Rules Review Commission reviews proposals
August 1st of following year	Approved proposals go into effect

Biological Objectives and Current Herd Status

Herein, we describe our recommended biological objectives and evaluate the current status of the deer herd. The data are the result of multiple collection techniques across the state. The numbers may be biased in certain ways based on the method by which the data were collected. The interpretation of the data thus must be made with the understanding of how and to what extent some of the collection biases might affect these numbers. Meeting all objectives may not be feasible in areas where hunting is limited by land-use practices, soil productivity is poor, or deer habitat is suboptimal.

Biological Objective #1: Harvest of at least 1.0 antlered buck/mi^2, or if less than 1.0 antlered buck/mi^2 the area has a stable or increasing trend.

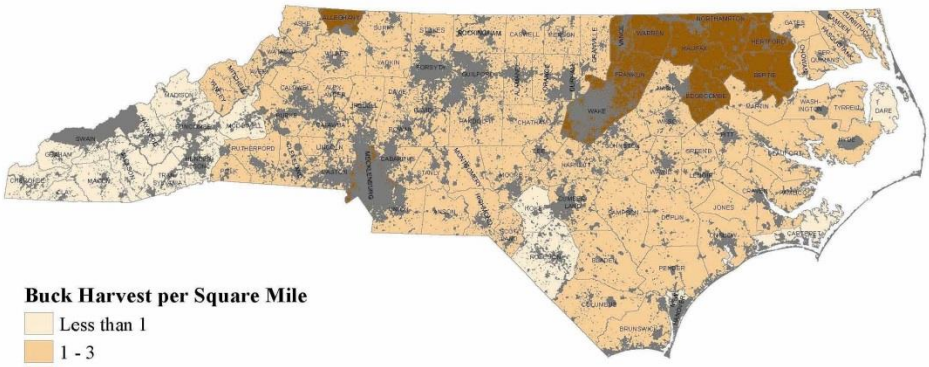
Justification: In general, a harvest of 1.0 antlered buck/mi^2 is indicative of a minimum deer density consistent with our stated deer management goal.

Data Reliability: While reported harvest may not exactly reflect actual harvest, reporting rates and associated biases are relatively consistent over time. This is our most useful information with respect to relative deer abundance at this time.

Current Status of Herd: Currently, all counties within the state exhibit an antlered buck kill of >1 antlered buck/mi^2, except for a few low productivity areas (Figure 1). However, in these areas antlered buck harvest remains stable or is slowly increasing.

Figure 1. Reported Antlered Buck Harvest per Huntable Square Mile

(3-Year Average, 2007-2009)



Buck Harvest per Square Mile

- Less than 1
- 1 - 3
- Greater than 3
- Unhuntable Areas

Where conventional hunting may be limited or prohibited:
Federal and State Parks, Municipal Boundaries,
Water Bodies, Human Density greater than 1 person per 2 acres

Population modeling indicates the following relationship:

-Less than 1 buck/sq mi corresponds to an average of 10 deer/sq mi
-Between 1 and 3 bucks/sq mi corresponds to an average of 30 deer/sq mi
-Greater than 3 bucks/sq mi corresponds to an average of 50 deer/sq mi

Biological Objective #2: Total adult doe harvest (excluding fawns) is comprised of 30 - 35% does that are 1.5 years old.

Justification: The percentage of yearling does (1.5 years old) in the adult doe harvest is a good indicator of the harvest pressure placed on the doe segment of the population and is indicative of expected future population trends. Populations are expected to remain relatively stable at a density consistent with our stated deer management goal when yearling does comprise 1/3 of adult doe harvest. Conversely, in areas of low productivity where a population increase is desired, the percentage should remain below 30% (Downing and Guynn 1985).

Data Reliability: Current data is limited in some areas because of low sample size and distribution of samples.

Current Status of Herd: Although data are somewhat limited, harvest pressure on the doe segment across the state appears to be approaching the lower end of the desired range.

Table 1. Yearling Representation in Total Adult Doe Harvest (3-year average, 2007-2009).

Season Framework	Percentage of Yearling Does in Total Adult Doe Harvest
Western	30
Northwestern	29
Central	26
Eastern	29

Biological Objective #3: Total buck harvest (excluding button bucks) is comprised of no more than 30% yearling bucks (1.5 years old).

Justification: The percentage of yearling males (1.5 years old) in the antlered male harvest is a good indicator of harvest pressure placed on adult males within the hunting season (Downing and Guynn 1985). Regulations and management techniques aimed at creating a more biologically balanced male age structure should strive to minimize harvest pressure on yearling bucks when possible (Keyser et al. 2006).

Data Reliability: These data are very sensitive to bias in data collection methods and can be affected by hunter selectivity. For example, data collected via DMAP likely reflects a preference for harvesting older age class bucks. Much of the data in the Eastern framework comes from DMAP clubs, and therefore likely underestimates yearling harvest.

Current Status of Herd: Although data are somewhat limited, yearling buck harvest appears to be substantially higher than desired across the state.

Table 2. Yearling Representation in Total Antlered Buck Harvest (3-year average, 2007-2009).

Season Framework	Percentage of Yearling Bucks in Total Adult Buck Harvest
Western	45
Northwestern	49
Central	37
Eastern	35

Biological Objective #4: Total harvest is comprised of at least 50% does.

Justification: The percent of does in the total harvest is a good indicator of the effects of the annual harvest on population trends (Hayne and Gwynn 1977). Achieving this objective will also result in more balanced sex ratios. However, in areas of low productivity where a population increase is desired, the percentage should remain well below 50%.

Data Reliability: While reported harvest may not exactly reflect actual harvest, reporting rates and associated biases are relatively consistent over time. This parameter is heavily dependent on the actual number of bucks killed. The percentage of does in the harvest can vary substantially if buck harvest is impacted by changes in regulations, hunter selectivity, or other factors.

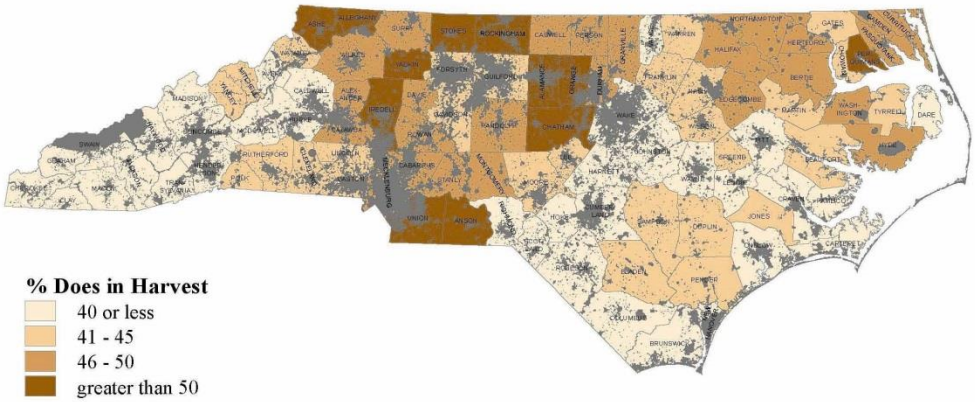
Current Status of Herd:
Current 3 year trends indicate that two of the four frameworks are approaching 50%. Limited either-sex opportunities in the Western Season account for lower numbers, which is appropriate in low productivity areas where a population increase is desired (Figure 2).

Table 3. Sex Composition of Total Harvest (3-year average, 2007-2009).

Season Framework	Percentage of Does in Total Harvest
Western	37
Northwestern	49
Central	49
Eastern	42

Figure 2. Percentage of Does in Total Reported Deer Harvest

(3-Year Average, 2007-2009)



% Does in Harvest

- 40 or less
- 41 - 45
- 46 - 50
- greater than 50

Unhuntable Areas

Where conventional hunting may be limited or prohibited:
Federal and State Parks, Municipal Boundaries,
Water Bodies, Human Density greater than 1 person per 2 acres

Biological Objective #5: Sex composition of harvest that occurs prior to peak breeding is at least 50% does.

Justification: Achieving this objective will ensure that does are not overrepresented in the population at peak breeding periods. This ensures adequate breeding of females during the first estrous period, fawn births occur during an optimal and relatively short span of time, and increases available food resources later in the season (Gruver et al. 1984).

Data Reliability: While reported harvest may not exactly reflect actual harvest, reporting rates and associated biases are relatively consistent over time. Peak breeding dates are approximate, and may differ somewhat across areas within deer season frameworks (Weber 1966).

Current Status of Herd: The percentage of does in the pre-breeding harvest falls short of the objective in all deer season frameworks. This is due to both a difference in when breeding occurs across the state and also a long standing tradition of hunting bucks early in the season and shooting does later. However, it should be noted that values for the Northwestern Season are close to meeting the objective.

Table 4. Sex Composition of Pre-Breeding Harvest (3-year average, 2007-2009).

Season Framework	Approximate Date of Peak Breeding	Percentage of Does in Harvest That Occurs Prior to Peak Breeding
Western	November 28	36
Northwestern	November 21	47
Central	November 15	42
Eastern	November 1	37

Biological Objective #6: No more than 20% of the total buck harvest (excluding button bucks) occurs before the time of peak breeding.

Justification: In areas with appropriate levels of buck harvest, achieving this objective will ensure that successful yearling buck dispersal is adequate (Rosenberry et al. 1999). This objective also ensures adequate breeding of females during the first estrous period and fawn births occur during an optimal and relatively short span of time (Gruver et al. 1984).

Data Reliability: While reported harvest may not exactly reflect actual harvest, reporting rates and associated biases are relatively consistent over time. Peak breeding dates are approximate, and may differ somewhat across areas within deer season frameworks. These numbers are greatly influenced by the amount and type of hunting opportunity before and after peak breeding.

Current Status of Herd: This parameter has not been met in any of the deer season frameworks.

Table 5. Buck Harvest in Relation to Date of Peak Breeding (3-year average, 2007-2009).

Season Framework	Approximate Date of Peak Breeding	Percentage of Total Antlered Buck Harvest That Occurs Prior to Peak Breading
Western	November 28	61
Northwestern	November 21	44
Central	November 15	38
Eastern	November 1	34

Biologic Objective #7: Deer are a naturally occurring product of the land, there is no genetic manipulation, and movements are not restricted.

Biologic Objective #8: The risk of disease transmission is reduced.

These final two biological objectives apply more appropriately when considering new or proposed regulation changes. Avoiding genetic manipulation by minimizing the potential impacts of selective harvest and ensuring natural genetic flow across the landscape is paramount to sound deer management (Strickland et al. 2001). Furthermore, protecting or minimizing the risk of disease introduction and/or spread remains a significant objective of the deer management program (Williams et al. 2002). In general, these objectives are met equally well across all season frameworks. Regulations regarding baiting, supplemental feeding, Chronic Wasting Disease, and captive cervids all impact these objectives.

Recommendations

Division of Wildlife Management staff recommends that:

- the NCWRC adopt the following goal statement:

  The NCWRC's goal for deer management and hunting is to use science-based decision making and biologically-sound management principles to assure long-term viability of deer populations at desirable levels of health, herd composition, and density with respect to land cover type and use, hunter satisfaction, and overall social acceptance;

- the NCWRC approve and implement the regulation change proposal evaluation process for deer management and hunting presented herein; and

- the Division of Wildlife Management

  - identify known data limitations and implement strategies for improvement,
  - assess habitat quality statewide and delineate appropriate deer management units, and
  - set specific biological objectives for deer management units and, if applicable, develop regulations to achieve those objectives.

Ad-hoc Deer Season Evaluation Committee

Christopher D. Kreh – District 7 Wildlife Biologist, **Committee Chair**
Scott Anderson – GIS Biologist
Joffrey Brooks – Management Biologist, Mountain Region
David Cobb, Ph.D. – Chief, Division of Wildlife Management
Brad Gunn – Administration and Planning Section Manager
Isaac Harrold – Public and Private Lands Section Manager
Brad Howard – Private Lands Program Coordinator
Tommy Hughes – Supervising Wildlife Biologist, Coastal Region
David Sawyer – Surveys and Research Program Coordinator
Jonathan Shaw, Ph.D. – District 6 Wildlife Biologist
Evin Stanford – Surveys and Research Biologist, Deer/Turkey/Wild Boar
Perry Sumner – Wildlife Diversity/Surveys and Research Programs Section Manager
Chris Turner – District 1 Wildlife Biologist
John Wooding, Ph.D. – Surveys and Research Biologist, Small Game

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Appendix XI.

Draft Wild Turkey Hunter Survey

2011-12 «Item_Name» (Item # «Item_Number») Survey

The North Carolina Wildlife Resources Commission requests that you complete this 2-page survey (front/back) and return it using the enclosed postage-paid envelope or submit your response online at www.ncwildlife.org. This survey provides an opportunity for you to let us know about hunting experiences you may or may not have had using the «Item_Name» permit. Your responses are used by the Commission to better manage and improve the quality of permit hunts. **We ask that you respond even if you did not hunt using this permit.**

Permit Number: «PermitID»

«CustomerID»

«First_Name» «Middle_Name» «Last_Name» «Suffix»

«Address_1»

«Address_2»

«City», «State» «Zip» «Zip4»

Submit your response online at www.ncwildlife.org

1. Did you hunt during at least one day using the «Item_Name» permit?

☐ Yes

☐ No **Indicate the reason(s) you did not hunt and return the survey in the postage-paid envelope:**

☑ **all that apply**

☐ Not enough turkeys or turkey sign

☐ Weather was poor for turkey hunting

☐ My hunting partner(s) could not go

☐ I had no more turkey tags left or was saving my last turkey tag

☐ I hunted somewhere else during the day(s) I had a permit for

☐ I could not afford to make the trip(s)

☐ Work or family obligations or health problems

☐ Other (please specify):_____

2. Please indicate which hunt(s) listed below you hunted using the permit. List the number of days and total number of hours hunted. (**Check the box if you did not hunt during a particular hunt choice date**)

Hunt Choice and Date	**Number of Days Hunted**	**Total Number of Hours Hunted**	**Did Not Hunt**
«HuntChoice_1»			☐
«HuntChoice_2»			☐

3. Please indicate the number of turkeys you *personally* harvested using the permit during the hunt(s) listed below. (**Check the box if you did not harvest any turkeys during a particular hunt choice date**)

Hunt Choice and Date	**Number of Turkeys Harvested**		**Did Not Harvest any Turkeys**
	Beard less than 7 inches	**Beard 7 inches or greater**	
«HuntChoice_1»			☐
«HuntChoice_2»			☐

CONTINUE ON REVERSE SIDE ➔

Permit Number: «PermitID»

4. Please indicate the number of gobblers you heard using the permit during the hunt(s) listed below.
(**Check the box if you did not hunt during a particular hunt choice date**)

Hunt Choice and Date	**Number of Gobblers Heard**	**Did Not Hunt**
«HuntChoice_1»		☐
«HuntChoice_2»		☐

5. Overall, how dissatisfied or satisfied were you with your hunt(s) using this permit? (☑ **one**)

Very Dissatisfied **Very Satisfied**

1 2 3 4 5

☐ ☐ ☐ ☐ ☐

6. Which of the following were important in determining how dissatisfied or satisfied you were with your hunts using this permit? (☑ **all that apply**)

☐ Accessibility of hunting area

☐ Quality of turkey habitat

☐ Number of turkeys seen or heard

☐ Whether or not I harvested a turkey(s)

☐ Weather

☐ Behavior or courtesy of other hunters

☐ Other (please specify):___

7. Do you think the number of other hunters during your hunt(s) using the permit was…. (☑ **one for each hunt choice date listed**)

Hunt Choice and Date	**Number of Other Hunters**			
	Too Few	**Just Enough**	**Too Many**	**Did Not Hunt**
«HuntChoice_1»	☐	☐	☐	☐
«HuntChoice_2»	☐	☐	☐	☐

8. How far did you travel (one way) for a hunt using the permit? (☑ **one**)

☐ 0 to 60 miles

☐ 61 to 120 miles

☐ 121 to 180 miles

☐ More than 180 miles

If you have any questions regarding this survey, please call us at (888) 248-6834. Thank you for your time and support of our wildlife programs.

Appendix XII

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?		
(i). Is the requesting entity a non-profit? (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*)		
. If the use was evaluated under previous administrative review and deemed inappropriate, have circumstances		

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
. Use will not interfere with or detract from fulfillment of Game Land program management objectives?			To be
. Use is compatible with the physical and natural resource characteristics of the property?			
. 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?			
. Infrastructure is present on the property to support the requested use?			
. Requested activity is not adequately provided for on other nearby public lands?			
. Use is manageable within available budget & staff?			
. Will the use be manageable in the future within existing resources?			
. Is the requesting entity capable of providing any maintenance support for the activity, if applicable?			

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: _____

Appendix XIII

Land Acquisition Investigation Phase I and II Forms

North Carolina Wildlife Resources Commission
Land Acquisition Investigation Form

-PHASE I: INITIAL INVESTIGATION-

WRC Staff Contact:

Date First Presented to WRC:

Tract Name:

Acreage:

County:

Estimated Value:

Property Owner or Representative:

Phone:

Address:

Status: ☐ High Interest ☐ Moderate Interest ☐ Low Interest ☐ No Interest

Grant Potential: ☐ NHTF ☐ CWMTF

☐ OTHER (explain):

Resources Assessment and Biological Benefits (brief):

Additional Comments:

Program Potential: ☐ Game Land ☐ Wildlife Conservation Area ☐ Fishing Access Area

☐ None

Potential Source(s) of Stewardship Funds (indicate federal:state match rates):

Relative Priority Evaluation Score (attach worksheet): ☐

Recommendation: ☐ Pursue Acquisition ☐ Defer ☐ Do not Pursue Acquisition

Map Attached: ☐ Yes ☐ No

North Carolina Wildlife Resources Commission
Land Acquisition Investigation Form

-PHASE II: FINAL ACQUISITION DETAILS-

WRC Action/Approval to Pursue (Date):

Acquisition Plan (specify total project cost, each source, and amount of OBLIGATED funds):

Based on Appraisal: ☐ Yes ☐ No

If Yes, Name of Appraiser:

Date of Appraisal:

Appraisal Handled by State Property Office: ☐ Yes ☐ No

Acquisition Plan Includes Bargain Sale: ☐ Yes ☐ No

If Yes, Explain Details:

Source(s) of Stewardship Funds (indicate federal:state match rates):

Five Year Stewardship Costs & Revenue Projection Evaluation (attach worksheet)

Five Year Estimate of Total Stewardship Expenditures:	$:	
Five Year Estimate of Total Projected Revenue:	$:	

Additional Comments:

Appendix XIV

Public Comment and Response

Question 1: What habitats do you think are most important to protcet and/or improve on the Goose Creek Game Land?	
Comments:	**NCWRC Response:**
Pamlico Point, Campbell's Creek, Spring Creek, and Hobucken impoundments need attention in improving habitat for waterfowl. I don't mean build more blinds like Spring Creek, I mean drain the impoundments and plant something in there to attract and hold ducks. The state takes plenty of $$$ from special hunt applicants here, but puts nothing back into the impoundments. If this doesn't change, the ducks will go elsewhere and noone will pay for the special hunt opportunities.	NCWRC puts at least $125,000.00 annually in Goose Creek's impoundment system. Many years additional funds are procured for projects critical to the management of these impoundments.
duck impoundments	Addressed in impoundment and acqusition sections.
wetlands for waterfowl, duck inpoundments, fishing structures	Addressed in impoundment, infrastructure, and acqusition sections.
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.	Addressed in habitat section. All reforestation wil follow the Annual Forestry Plan using site specific plantings.
The impoundments and a lot of the marsh habitat could be improved to provide better shelter and food sources for waterfowl than presently exist.	Impoundments and marsh are managed for multiple species. Concerns are addressed in Habitat and Information Needs Sections
Goose Creek Game Land includes brackish and freshwater marshes, the impoundments at Pamlico Point which support rare birds, the forested wetland remnant of eastern Gum Swamp, and some of the few remaining areas of the distinctive northern longleaf pine savannas.	Thank you. These points are addressed in habitat section.
Marshes, Creeks, River	Thank you. These points are addressed in habitat section.
Estuaries, Wetlands	Thank you. These points are addressed in habitat section.
Question 2: Considering those that live on land and in water, what species do you think are most important to protect and/or improve on the Goose Creek Game Land?	
Comment	**NCWRC Response**

Waterfowl are the real moneymakers for the state on Goose Creek GL and NOTHING is done in the impoundments to improve habitat for them. This gameland has significant waterfowl hunting history/heritage and should be better managed for those species and those who pursue them.	NCWRC puts at least $125,000.00 annually in Goose Creek's impoundment system. Many years additional funds are procured for projects critical to the management of these impoundments.
Ducks.	Included in Information Needs Section
trout, drum and flounder. Get the nets completely out of the creeks permanently!	The NCDMF, not NCWRC, regulates these activites.
ducks!	Included in Habitat and Information Needs Sections
Crustaceans, Fish are great indicators of health, ospreys and otters	Included in Habitat Section
Fish, shrimp, and crab nursery area	Included in Habitat Section
Question 3: How do you use the Goose Creek Game Land	
Comment	**NCWRC Response**
I hunt waterfowl in and around the impoundments, and fish near them in the summer.	Thank you for your comment.
duck hunt	Thank you for your comment.
waterfowl hunting and fishing	Thank you for your comment.
Waterfowl hunting and some turkey hunting.	Thank you for your comment.
kayaking and birding	Thank you for your comment.
kayaking and bird watching	Thank you for your comment.
Question 4: Please explain why you think the current level of access is, or is not, satisfactory on the Goose Creek Game Land?	
Comment	**NCWRC Response**
I will try again. My previous comment wasn't saved. I have hunted the goose creek game lands since 1968 and have seen a variety of changes from excellent hunting experiences to a low quality free for all. Through time the improvements in equipment have reduced limiting factors and the increasing number of hunters strained the resource. Now this demand and the reduced number of permits in the current system make obtaining a permit very difficult with maybee one draw every few years. Invariably there will be some conflicts where a permit holder elects not to use the permit. There is no opportunity for replacement and a high demand resource goes unutilized. See suggestions in following comment	Waterfowl hunting is likely more popular now than ever. Permit numbers remain at the current numbers to provide better quality hunts. Unused permits are utilized by the resource (waterfowl) as resting/loafing areas.
the waterfowl permit hunt system needs to be moved to a preference points system and all impoundments should go to a WRC built/maintained blinds like Spring Creek.	Wrc is currently reviewing the data from the second, of a three year, survey regarding overall satisfaction with blinds currently being used at Futch, North River, and Spring Creek.
It's very satisfactory.	Thank you for your comment.

good access...by boat...which if you are duck hunting required any ways. No problems.	Thank you for your comment.
Access to waterfowl impoundments on Goose Creek Gamelands is severely limited. The only state-maintained ramp is on Smith Creek / hwy 33. The other 5 ramps are private and three of those charge a launching fee. In the past year a wealthy person bought the land where Shirley's restaurant used to be at the end of Oyster Creek Road. This made me think: what if another wealthy person bought the Oyster Creek Seafood property and shut down "Scooter's Ramp"? If that happened, there would be no access to the Pamlico Point impoundments. Some of these ramps have 40+ boats putting in on certain days and if they were closed by the private owners, then so would access to gamelands.	WRC is always searching for lands. This is especially true for a Boating Access Area on Goose Creek Island.
Ok, could have better access for paddle craft, Launch to Campbell Creek	This is addressed in Infrastructure Section.
Currently good but could use increased access-A canal paddle access at Spring Creek	This is addressed in Infrastructure Section.

Question 5: What suggestions, if any, do you have for changing how the Goose Creek Game Land is managed and maintained?

Comment	**NCWRC Response**
keep access same and no new restrictions.	Addressed in plan.
Would like to see better management of the waterfowl impoundments. Better cover/shelter for ducks is needed in Campbells and Pamlico Point impoundments. Way too much open water, albeit plenty of SAV plants. Also would recommend not allowing impoundment access until one hour before LST (legal shooting time). Four am is too early and runs them way away from there.	NCWRC has mad e the same observations regarding Pamlico Point and Campbell Creek impoundments. We are looking into different ways to create vegetative baffles to reduce wave action and sediment drift within the impoundments. Any change in hunter access during permitted hunts on managed impoundments would be replicated on all areas. One hour doesn't provide sufficient time at all of our impoundments.

I believe that a check in system with replacement opportunity could be developed that was cost effective, fair, and allowed better utilization of the resource. A number of systems have been used in a variety of areas successfully and at minimum cost, often the cost being born by the permit holder. A potential hunter will know within 24 hours if they are going to make the hunt. If there were a required on line check in 24 hours prior to 3 or 4 AM the day of the hunt and a reassignment of permits at that time it would satisfy both the increased hunter opportunity and utilization of the available spots. As an alternative to an on line system, on the larger game lands such as goose creek or Futch with multiple hunting locations a manned check in and standby list could be utilized. Such a system is used by Florida on the Storm Water Treatment Areas. Completing check in by 4 AM at a central location on the Goose Creek game lands would allow enough time for a hunter to reach and be set u	At present the Commission does not have sufficient infrastructure or personnel needed to provide for this type of permit reallocation.
The waterfowl impoundments should be drained each Spring to allow for proper moist soil management. Its hard to understand how WRC is based at NCSU Centennial Campus yet seems to apply little to none of the expert knowledge coming from there in the management of these impoundments.	WRC manages for both moist soil and submerged aquatic vegetation in the Goose Creek impoundment. This management practice provides a diverse assemblage of waterbirds, and ensures that there is forage available if one fails to produce during a specific year.
No changes, but we would encourage continued prescribed burning, particularly in the longleaf pine areas, but also in the marshes and other communities present. The southern unit of the Eastern Gum Swamp Natural Area contains a good example of Nonriverine Swamp Forest, which is a rare natural community. We would recommend that it continue to mature to old growth.	Thank you, concerns addressed in plan.
Impoundment access needs to be increased to three day a week use, with one day open, without draw permit.	NCWRC is not willing to increase levels of disturbance to where they were in previous years.

The only management that I ever see on Goose Creek Gameland is the warden checking licenses and writing tickets. NOTHING is done to improve the gameland for waterfowl or hunters. This is surprising because of the large numbers who pay for special hunt opportunities and the history of the area. Drain the impoundments and plant something in there during the summer. Add to the gameland by buying more Pamlico County shoreline that is UNHUNTABLE due to the county's Safe Hunter Law (which needs to be repealed).	NCWRC puts at least $125,000.00 annually in Goose Creek's impoundment system. Many years additional funds are procured for projects critical to the management of these impoundments. Soils present in impoundments associated with Goose Creek Game Land are to saline for grains commonly planted for waterfowl. The moist soil vegetation, submerged aquatic vegetation, and invertebrates present in the impoundments are highly desirable by waterbirds, less expensive to produce, and are higher nutritional quality than commonly cultivated grains. WRC is continously searching for lands in this Region. The "Safe Hunter Law" is County Legislation which WRC has no authority to repeal.
Kayak/paddle launches, Spring Creek hunters, screened camping platfors, access trails for school groups-Marked!	Thank you, concerns addressed in plan.
More public access for water use	Thank you, concerns addressed in plan.
Question 6: What would encourage you to start using the Goose Creek Game Land, or to continue using it more actively?	
Comment	**NCWRC Response**
More and better waterfowl hunting opportunities.	NCWRC puts at least $125,000.00 annually in Goose Creek's impoundment system. Many years additional funds are procured for projects critical to the management of these impoundments.
The Safe Hunter Law in Pamlico County needs to be repealed. Miles and miles of shoreline are unhuntable because landowners put up 3 tomato stakes and some burlap; never intending to hunt the "ghost blinds". Because of this, the only huntable shorelines in the county are the edges of Goose Creek Gamelands which are crowded with hunters on every point. I know groups who leave the boatramp 4 hours before sunrise just to get a spot. Now I love to hunt ducks, but if this gameland continues to be crowded I will go elsewhere and spend my $$$ elsewhere.	The "Safe Hunter Law" is County Legislation which WRC has no authority to repeal.
Just stated bird watching in the area. I would like to ride my horses with a few friends when the area is closed to hunting. Would need access and parking turnaround for a trailer. Currently help maintain trails at Croatan National Forest for horses, but Goose Creek is in my backyard...	Currently, horseback riding is restricted to roads open to vehicular traffic. Goose Creek GL does not have sufficient road syastem to add the referenced infrastructure.
Kayak/paddle launches, Spring Creek hunters, screened camping platforms, access trails for school groups-Marked!	This is addressed in Infrastructure Section.
Water access for kayaking. Parking and trail for birdwatching	This is addressed in Infrastructure Section.
Question 7: What additional comments do you have about Goose Creek Game Land?	
Comment	**NCWRC Response**

I feel that the state of NC gets a lot of money through special hunt opportunities and GW tickets, and they put nothing back into the habitat for the resource that is raising the money.	NCWRC puts at least $125,000.00 annually in Goose Creek's impoundment system. Many years additional funds are procured for projects critical to the management of these impoundments.
If you are a user of the gamelands in any capacity (birders, hikers, etc.), you need to have a gamelands permit .....just like any hunter has to. As of now, hunters and fishermen are the only ones having to pay through fees to use.	This requirement is being explored at the statewide level.
Restrict waterfowl hunters inside posted waterfowl impoundments to 25 shotshells. Skybusting is a terrible problem on all NCWRC public impoundments. Skybusting causes more cripples and loss of birds by careless hunters. It lessens the quality of the experience for other hunters too. All hunters in these impoundments need to be restricted to 25 shells to help discourage this sloppy practice.	NCWRC will explore the effectiveness of limiting hunters to 25 rounds per person. It should be noted that this alone would not stop the practice referenced in comment.
Great resource for keeping waters clean, protecting wildlife, and for viewing wildlife.	Thank you for your comment.
Keep protecting our environment for future generations.	Thank you for your comment.

NC Natural Heritage Program Comment-

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 Goose Creek 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 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 distinctive outstanding features of Goose Creek Game Land include brackish and freshwater marshes, the impoundments at Pamlico Point which support rare birds, the forested wetland remnant of eastern Gum Swamp, and some of the few remaining areas of the distinctive northern longleaf pine savannas. We would encourage continued prescribed burning, particularly in the longleaf pine areas, but also in the marshes and other communities present. The southern unit of the Eastern Gum Swamp Natural Area contains a good example of Nonriverine Swamp Forest, which is a rare natural community. We would recommend that it continue to mature to old growth.

The Goose Creek 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.

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Comments Received From 1/6/2018-2/6/2018

NC DEPARTMENT OF
NATURAL AND CULTURAL RESOURCES

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

February 2, 2018

Richard Clark, Management Biologist
Goose Creek Game Land

Dear Mr. Clark:

The North Carolina Natural Heritage Program appreciates the opportunity to review the draft Goose Creek 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 emphasis on longleaf pine communities present on the game land and the recognition of their value. We support 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, and the intent of frequent prescribed burning in the longleaf pine habitats. We are also pleased that nonriverine swamp forests are recognized for their ecological importance to numerous wildlife species, and support the desired future condition of allowing these forest areas to naturally reach and maintain mature age structure.

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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