AN INVENTORY OF THE SIGNIFICANT NATURAL AREAS OF HOKE COUNTY, NORTH CAROLINA

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ABSTRACT

This inventory of the natural areas, biological communities, and rare species of Hoke County was funded by the North Carolina Natural Heritage Trust Fund and the US Fish and Wildlife Service. The inventory was co-sponsored by The Sandhills Area Land Trust. This inventory identifies the most significant natural areas in the county, describes their features, and documents all natural communities and rare species of plants and animals associated with them. Habitat conditions, natural processes, and threats are also described. The inventory is intended to provide guidance for land use decisions by the county government, conservation and land management organizations, and interested citizens. Field work was carried out by Bruce A. Sorrie of the North Carolina Natural Heritage Program during 2002 and 2003. The inventory identifies 48 areas of significance at the national, state, regional, and county level, as determined by criteria established by the North Carolina Natural Heritage Program.

ACKNOWLEDGMENTS

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INTRODUCTION

OBJECTIVES

The primary objective of the Hoke County natural areas inventory is to identify places of outstanding ecological significance. These areas contain the best remaining examples of natural habitats and/or locations of rare plants, animals, and natural communities in the county. Natural areas are resources that make the state and its counties attractive to live in and to visit. They also include wildlife corridors along streams and rivers, as well as corridors of intact natural habitat which link upland areas. These areas are critical for recreational, ecological, aesthetic, educational, scientific, cultural, and environmental health values. They can also play significant roles in ground water recharge and pollution abatement. Natural areas are reservoirs of biological diversity, sanctuaries for native plants and animals, and key resources for recreational and hunting/fishing activities. With increasing population growth and land development in all parts of North Carolina, it is urgent that areas of outstanding natural significance be identified, and that efforts be made to protect these sites for posterity through willing cooperation of landowners.

This report begins with a brief overview of how the inventory was conducted, a description of the county's environmental features, and a discussion of the natural communities, rare plants, and rare animals documented during the inventory. This is followed by a description and map of each natural area documented during the inventory. The natural area descriptions include all plant communities and rare species found at each site.

METHODS

The methods employed in this inventory follow guidelines established by the North Carolina Natural Heritage Program. NCNHP maintains the state's primary database for rare plants, rare animals, high quality plant communities, and outstanding natural areas. The focus of the current inventory is the identification and description of important natural areas and high quality plant communities in Hoke County. A comprehensive rare species and natural area inventory of Fort Bragg was conducted from 1991 to 1993 (TNC & NC NHP 1993, Sorrie et al. 1997) and the results of that inventory are summarized in this report. Much of the Lumber River was inventoried from 1990 to 1991 (Ash 1990 and 1992); the results are summarized in this report with additions by the author. Many of the county's Carolina bays were inventoried from 1979-1981 (Nifong 1982) and this information has been incorporated in the present report with additions by the author.

Animal surveys were not conducted as an integral part of the Hoke County inventory. However, data from recent and prior surveys have been included (Beane 2002, NCNHP 2002, NC Museum of Natural Sciences 2002) along with sightings made by the Steve Hall, Harry LeGrand, and others. Collectively, these make a great contribution towards knowledge of the county's animal life.

The natural area inventory is designed to identify the highest quality natural areas and plant communities in Hoke County. A natural area, while not necessarily undisturbed, substantially retains the natural character it would have without human alteration. It is also an area of biological interest, usually because of exemplary plant communities, the presence of rare species, or both. Natural area boundaries are drawn to encompass the features of primary interest, plus the areas that influence them the most (in an ecological sense). In some cases the boundaries follow natural contours or margins; in others, an artificial buffer has been included. Criteria used to determine natural areas are the quality and significance of the natural features within the site and the ecological integrity of the site. All natural plant communities and rare species known to occur within a site are documented, with detailed descriptions made of each exemplary natural community type. Low quality examples of plant communities that are present in a site are mentioned but not described in detail. All identified sites are then ranked according to biological importance, using criteria developed by NCNHP and The Nature Conservancy (TNC). Depending on the global or statewide rarity of the species and natural features of a site, it is ranked as having global, statewide, regional (e.g., Sandhills, northeastern Piedmont, etc.), or county significance. Even at the county level of significance, a site needs to possess better than average natural features to be included. This report describes sites at all significance levels, but places more emphasis on those in the national and statewide levels.

The inventory utilizes existing data on plant communities and rare species maintained by NCNHP and other agencies. These data provide a framework or background that suggest where to look for these and other flora and fauna. Other resources that are heavily used are US Geological Survey topographic maps, Natural Resources Conservation Service soil survey maps, and false-color infrared aerial photos available from the US Geological Survey. Individuals knowledgeable within specific disciplines are also consulted. Report formats developed by NCNHP are utilized for documenting rare species and significant natural areas.

For several reasons, this inventory and report cannot provide a complete account of all the potential natural areas of Hoke County. No land was surveyed without the owner's permission. A number of areas were targeted for survey, because of their unusual soils, their "signature" on a topo map or aerial photo, or their appearance from an adjacent river, stream, or road. Whenever possible, these landowners were contacted, but some could not be located and some denied access. In most cases these properties are not included in this report, but in a few cases they are - due to their *likelihood* as natural areas, based on adjacent lands that were surveyed. There is no doubt that new high quality natural areas will be found over time as formerly inaccessible or unknown sites become available for study.

DESCRIPTION OF THE STUDY AREA

HOKE COUNTY

Hoke County is located in south-central North Carolina; it is bounded by Cumberland, Moore, Robeson, and Scotland counties (Figure 1). Lumber River/Drowning Creek forms the entire western boundary of the county, along with Scotland County. At 391 square miles (244,000 acres), Hoke is the 66th largest of the state's 100 counties. The 2000 population count was 33,646 people, roughly 4800 (14%) of which live in the county seat Raeford (Figure 2).

CLIMATE

Hoke County experiences four distinct seasons each year. The county lies in a region dominated by humid southwestern airflows during spring and summer and northwesterly cold fronts alternating with easterly rainy spells during late fall and winter. Fall and spring are the driest seasons. The average winter temperature is about 44.5 degrees, while the average summer temperature is about 78.8 degrees. Average yearly rainfall is 46 inches, plus 3 inches of snow. There are about 175 frost-free days per year.

TOPOGRAPHY AND PHYSIOGRAPHY

Hoke County lies astride a major boundary within the Coastal Plain: the rolling Sandhills region and the flat Middle Coastal Plain, notable for its abundant Carolina bays. The first is named for the deep deposits of sandy soils, often underlain by clay. Throughout the Sandhills the landscape is hilly, with abundant creeks and small rivers draining these hills. The northern two thirds of the county - roughly north of a line connecting the mouth of Buffalo Creek to Lake Upchurch - lies within the Sandhills. The Middle Coastal Plain occupies the southern third of the county and has very little relief, except for low slopes along rivers and creeks. However, it has one outstanding and characteristic natural feature - the presence of hundreds of elliptical depressions that are oriented in a northwest-southeast axis. These depressions are called Carolina bays and, depending on soil and hydrology, support various natural communities from cypress savannas to cypress-gum swamps to dense loblolly pine-oak forests (Nifong 1982).

Elevations in Hoke County range from 120 feet at Lake Upchurch (on Rockfish Creek) to 550 feet at McCain (by NC route 211). Several knobs on Ft. Bragg exceed 500 feet, the highest being McPherson Hill at 543 feet. The elevation of the Lumber River at the Robeson County line is 200 feet.

One major river occurs in the county: the Lumber, which originates as Drowning Creek in Montgomery County and empties into the Great Pee Dee River in South Carolina. It is a slow-moving river with a broad floodplain that supports cypress-gum-maple-loblolly pine swamps. Two smaller rivers, Little River (also called Lower Little River) and Rockfish Creek drain into the Cape Fear River and are ecologically very significant, due to the presence of a

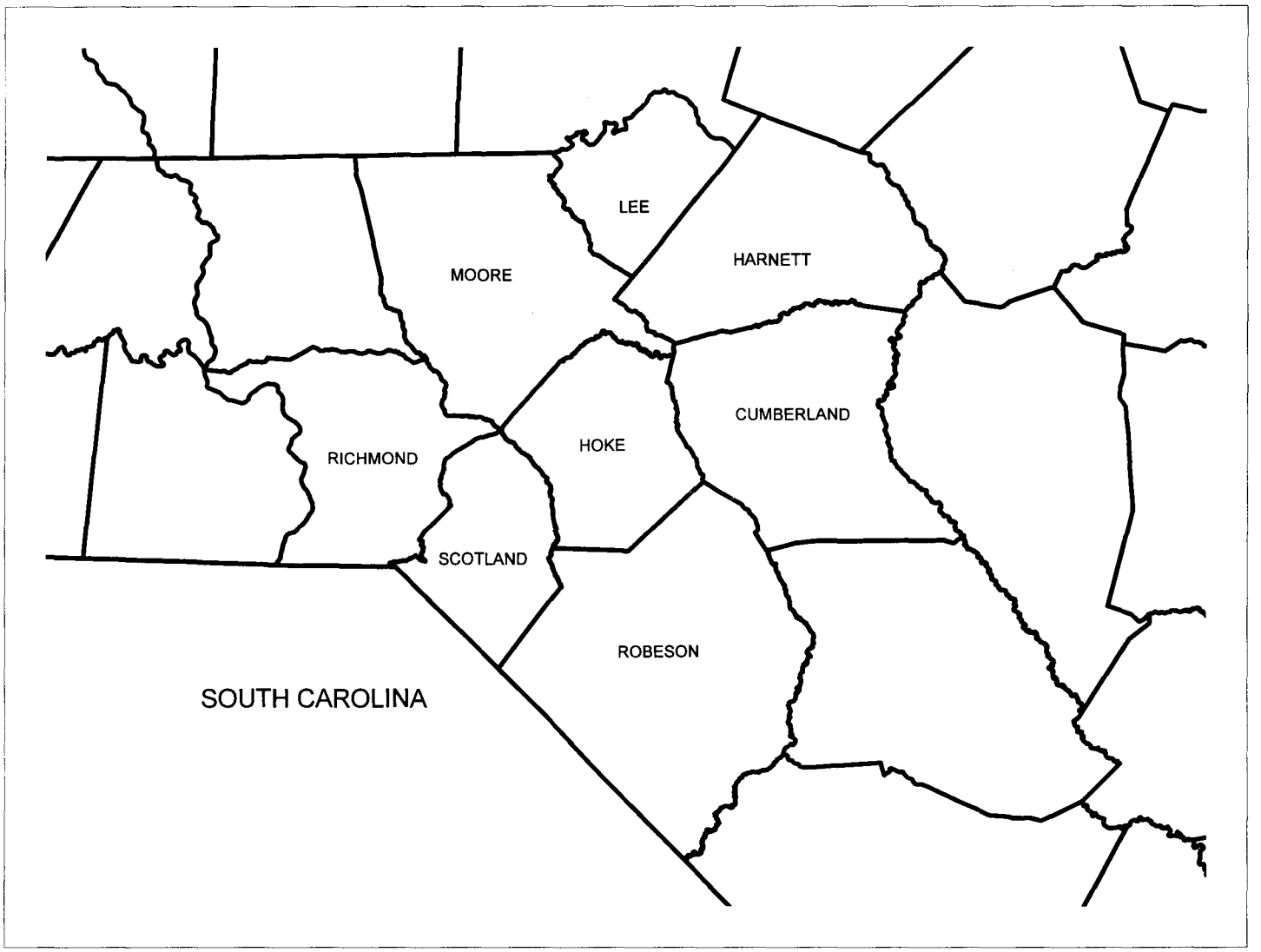


Figure 1. Hoke and surrounding counties, North Carolina.

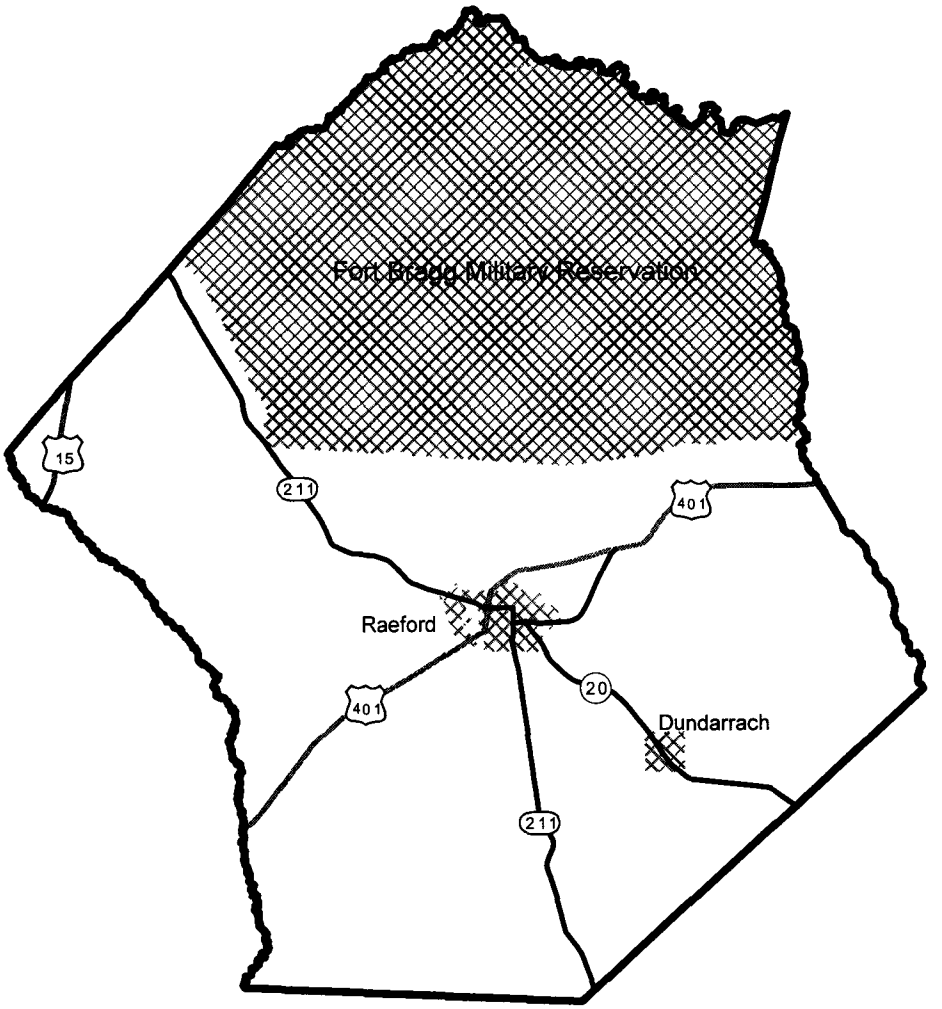


Figure 2. Towns and roads in Hoke County, North Carolina.

mixture of piedmont and coastal plain flora. Raft Swamp originates at Timberland and crosses into Robeson County northeast of Red Springs; it drains much of the southern portion of Hoke County. All of the rivers and creeks in Hoke County are "blackwater" streams, meaning that their waters are naturally dark reddish brown from the high tannin content leached from leaves, needles, and bark by the very acidic water.

GENERAL VEGETATION

The Middle Coastal Plain and Sandhills region of North Carolina together form a very biologically diverse area - one of the most important, ecologically, in the mid Atlantic coast region. Hoke County is critical to this area geographically and biologically, as it forms a direct link between the ecosystems of the Sandhills and those of the Middle and Outer Coastal Plain. The county hosts a high diversity of natural communities and native plants and animals because of the diversity of habitats found within its two distinctive areas.

The Sandhills region extends as a narrow band along the inner Coastal Plain from Harnett and Cumberland counties southwest into South Carolina and Georgia. The Sandhills region contains the largest concentration of longleaf pine forests remaining in North Carolina, a significance that is underscored by the loss of over 33% of the original range of longleaf pine forests in the state (Frost 1993). Under natural conditions, the dry rolling ridges and hills of this region are covered by forest communities with a longleaf pine (*Pinus palustris*) canopy over a scrub oak (*Quercus* spp.) understory and a sparse to diverse ground layer of grasses, low shrubs and herbs. The natural structure and composition of these pine/oak communities is directly linked to recurring fire, with infrequent or no fire resulting in increased density of woody vegetation and significant loss of native herbaceous plants. Drainages support a wetland community called Streamhead Pocosin, which has affinities with the true pocosin communities found in the Middle and Outer Coastal Plain; both pocosin types support pond pines (*P. serotina*) over a dense shrub layer. Transition areas between the dry sandy uplands and wet drainages support longleaf pine communities that are similar to the flatwoods and savannas of the Outer Coastal Plain, and like them feature fire-dependent and fire-tolerant species such as pitcher-plants (*Sarracenia* spp.), orchids, and meadow-beauties (*Rhexia* spp.). Isolated seepage communities - Sandhill Seeps - form where ground water is forced to the surface by an underlying layer of clay; these support numerous colorful herbs. Blackwater swamps are found in the floodplains of larger streams. As is characteristic of areas with high species diversity, the Sandhills region is home to a large number of rare species.

South of the Sandhills region in Hoke County the terrain is essentially flat. From Raeford eastward, Rockfish Creek runs right along the boundary between the rolling hills and the flat country. The southern part of the county is a series broad flat terraces between blackwater creeks -- Raft Swamp, Little Raft Swamp, Big Marsh Swamp, and Little Marsh Swamp. As their names suggest, these creeks have wide floodplains which support swamp forest, mostly swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), pond cypress (*Taxodium ascendens*), and loblolly pine (*Pinus taeda*). The terraces support one of the most unusual landscapes in the eastern United States: they are pockmarked with hundreds of elliptical depressions called

Carolina bays. Depending on the amount of clay in the subsoil, these bays vary considerably in their water-holding capability. This in turn affects the natural community that grows, be it a Cypress Savanna, a Nonriverine Swamp Forest, or a loblolly pine-oak-maple-sweetgum forest. A Cypress Savanna in a Carolina bay, filled with thousands of colorful wildflowers and ringing with the mating calls of many frogs and toads, is one of Nature's wonders. Unfortunately, very few survive intact today due to draining, filling, logging, and fire-suppression. Adjacent bay rims once supported a thin growth of longleaf pine and turkey oak (*Quercus laevis*) over bare white sand - miniature deserts - but these rims are now virtually all gone in Hoke County, having succumbed to the plow, to the chainsaw, and to fire-suppression. Although the Middle Coastal Plain portion of Hoke County does not have as much plant and animal diversity as the Sandhills region, it contains many species not found elsewhere in the county.

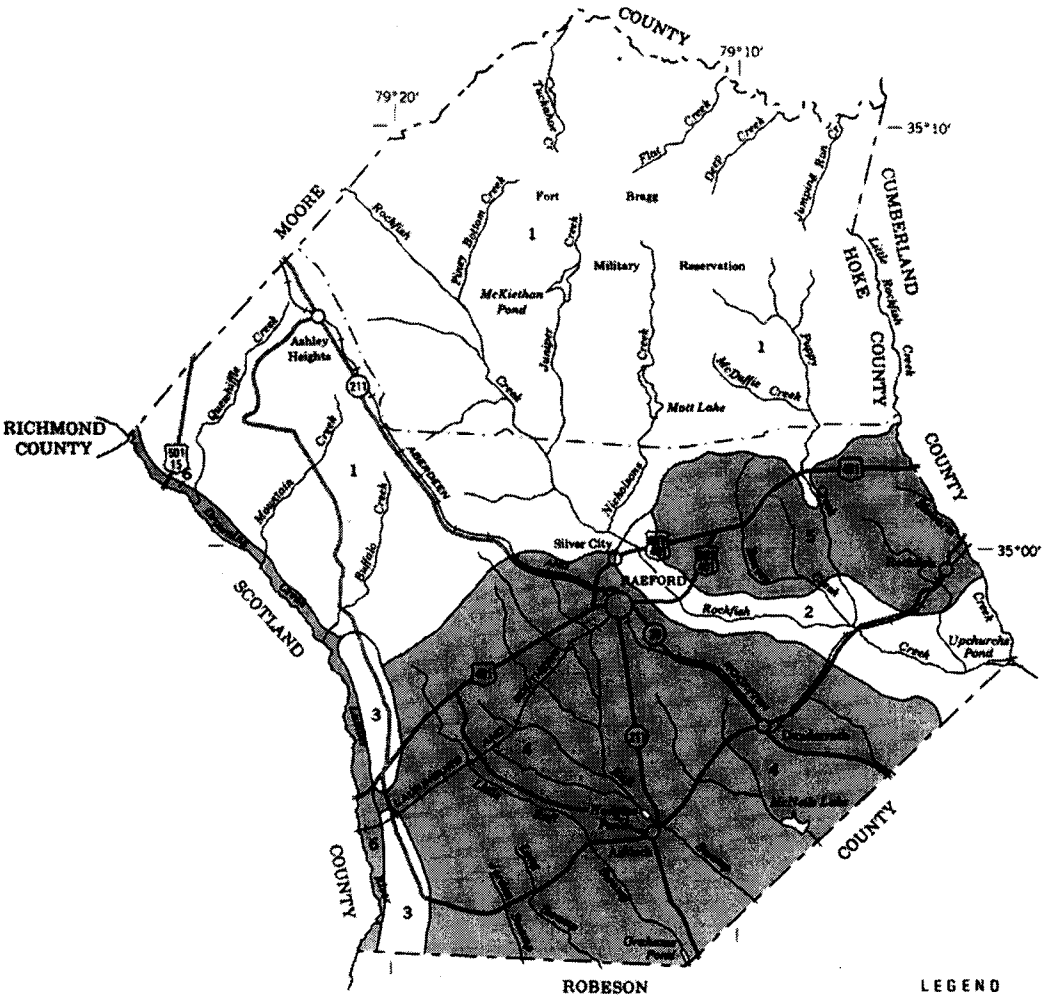
GEOLOGY AND SOILS

The Sandhills represent the innermost advances of the ocean onto the Coastal Plain over the past 100 million years, advances which left deep deposits of sand, clay, and sandstone on top of the underlying bedrock. Following a major retreat of the ocean 40-50 million years ago, the Sandhills region has remained above sea-level, thus allowing plants and animals to colonize the area permanently (Beyer 1991). In Hoke County the Sandhills portion comprises the northern two thirds of the county (Figure 3).

Due to its low elevation and low relief, the southern third of the county was covered by the sea until more recently. Although the Middle Coastal Plain was inundated and exposed numerous times during the past 40 million years, it was not until about 1.7 million years ago that the ocean finally retreated. What was once sea floor became exposed to erosional forces of wind, rainwater, stream building, etc. Within the last 100,000 years or so the depressions known as Carolina bays formed. Just how they formed is still debated, but they became a prominant aspect of the landscape (Beyer 1991, Sharitz and Gibbons 1982).

Soils of the county have been divided into six basic units or types (Hudson 1984; Figure 3). Those of the Sandhills uplands are sands and loamy sands, acidic to very acidic, droughty, and nutrient-poor. They originally supported vast woodlands and savannas of longleaf pine, scrub oaks, and wiregrass that were perpetuated by recurring fires. At variable distances below the surface, clay layers exist that force rainwater to the surface to form streamheads, which are such a characteristic feature of the Sandhills region. Southern portions of the county support less well-drained, more loamy soils. Original forests varied from longleaf pine-oak-wiregrass to loblolly pine-oak-hickory-dogwood, depending on soil characters and fire frequency. Floodplains along rivers and creeks support swamp forests on poorly drained soils with high organic content.

Figure 3. Soils and waterways of Hoke County, North Carolina; from Hudson (1984).



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES
AND COMMUNITY DEVELOPMENT
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE
UNITED STATES ARMY
HOKE COUNTY BOARD OF COMMISSIONERS

GENERAL SOIL MAP
HOKE COUNTY, NORTH CAROLINA

LEGEND

AREAS DOMINATED BY EXCESSIVELY DRAINED TO MODERATELY WELL DRAINED SOILS ON HIGHLY DISSECTED UPLANDS

1 Blaney-Gilead-Lakeland: Nearly level to strongly sloping, well drained, moderately well drained, and excessively drained soils that have a brittle, loamy or clayey subsoil or that are sandy throughout; on uplands

2 Lakeland-Candor-Blaney: Nearly level to strongly sloping, excessively drained to well drained soils which are sandy throughout or have a loamy subsoil that may be brittle; on uplands

3 Autryville-Candor: Nearly level to strongly sloping, well drained and somewhat excessively drained soils that have a loamy subsoil or that are sandy throughout; on uplands

AREAS DOMINATED BY WELL DRAINED AND POORLY DRAINED SOILS ON BROAD, SMOOTH UPLANDS

4 Norfolk-Wagram-Rains: Nearly level to gently sloping, well drained and poorly drained soils that have a loamy subsoil; on uplands

5 Wagram-Faceville-Norfolk: Nearly level to gently sloping, well drained soils that have a loamy or clayey subsoil; on uplands

AREAS DOMINATED BY VERY POORLY DRAINED SOILS ON FLOOD PLAINS

6 Johnston: Nearly level, very poorly drained soils that are loamy or sandy throughout; on flood plains

Compiled 1982

LAND USE

Out of the 244,000 acres of Hoke County, about 39,000 acres (16%) are in farmland, including grazing. Major crops are cotton, soybeans, grains, hay, corn, and tobacco. Important livestock are poultry, hogs, and cattle. Roughly 163,000 acres (67%) are considered forested, half of which lies within Fort Bragg. Much of the county's forested land is intensively managed for commercial production, largely loblolly pine for poles, wood chips, and paper, and longleaf pine for pinestraw and wood products.

By far the largest single landowner in the county is the US Department of Defense; Fort Bragg Military Reservation occupies the northern third of Hoke County. Fort Bragg, aside from providing critical military training, protects one of the finest examples of the longleaf pine ecosystem remaining in the country.

SUMMARY OF RESULTS

NATURAL AREAS

A natural area is defined as an area containing one-to-several exemplary plant communities that function in a natural manner and that form a distinct geographical unit, the boundary of which can be natural (a watershed) or artificial (a road or a property line). In this report natural areas are termed "standard sites", "macrosites", and "megasites". Standard sites range from a few to hundreds of acres and tend to have good natural integrity throughout. Some sites occur in clusters with strong geographical connections and ecological relationships. Such clusters of standard sites are designated as macrosites. A macrosite may also be linear in shape, such as a river corridor. A macrosite may be a composite of high quality sites interspersed with lesser quality areas. Alternatively, a macrosite may contain only lower quality lands that are not included in standard sites but which provide ecologically important buffers and wildlife corridors. A megasite is a cluster of sites on a large, landscape scale. Typically, a megasite may contain one or more macrosites. Most of the natural areas in northern Hoke County occur within the Central Fort Bragg Macrosite, which in turn is part of the Fort Bragg Megasite.

Each natural area has been assigned a significance level: national, state, regional, or county. Nationally significant areas possess outstanding ecological values and rank with the best of their kind anywhere within the United States. Areas of statewide significance have high ecological value and are among the best of their kind in North Carolina. Regionally significant areas have good ecological value and are among the best of their kind in a multi-county region, such as the Sandhills region. Areas of countywide significance generally contain common habitat types that are not exemplary, or uncommon habitats that need restoration.

Figure 4. Location of Significant Natural Heritage Areas in Hoke County, North Carolina.

1. Fort Bragg Little River Bends
2. Fort Bragg Little River Trillium Slopes
3. Fort Bragg Little River Oak/Heath Bluff
4. Fort Bragg Salinas Point Terraces
5. Fort Bragg Sicily Bog
6. Fort Bragg Johnsons Millpond Bog
7. Fort Bragg Rockfish Creek Headwaters
8. Fort Bragg Piney Bottom Creek
9. Fort Bragg Calf Branch
10. Fort Bragg Juniper Creek Headwaters
11. Fort Bragg Blues Mountain
12. Fort Bragg Nicholson Creek Headwaters
13. Fort Bragg Puppy Creek Headwaters
14. Fort Bragg Little Rockfish Creek
15. Fort Bragg JSOC Bluffs
16. Fort Bragg Wolf Pit Creek
17. Fort Bragg Central Rockfish Creek
18. Fort Bragg Gum Branch
19. Fort Bragg Southern Rockfish Creek
20. Fort Bragg Mot Commel Restoration
21. Fort Bragg Mott Lake
22. Fort Bragg McDuffie Creek
23. Fort Bragg Puppy Creek
24. Quewhiffle Creek Sandhills
25. McCain Sandhills
26. Fort Bragg Cabin Branch
27. Calloway Sandhills
28. Redwing Pond Seeps
29. Rockfish Creek at Raeford
30. Arabia Bay
31. Rockfish Creek Ravines
32. Camp Rockfish
33. Troutman Farm
34. Camp Mackall-Drowning Creek
35. McFarland Sandhills
36. Drowning Creek/Lumber River Confluence
37. Walters Sandhills
38. Lumber River Chalk Banks Floodplain
39. Lumber River/Bear Swamp Aquatic Habitat
40. Spring Branch Church Swamp
41. Sarvis Bay
42. Hodgins Pond
43. Blueberry Bay
44. Hidden Bay
45. Singletons Bay
46. Lake McNeill
47. Hamby's Bay Complex
48. Antioch Bay Complex

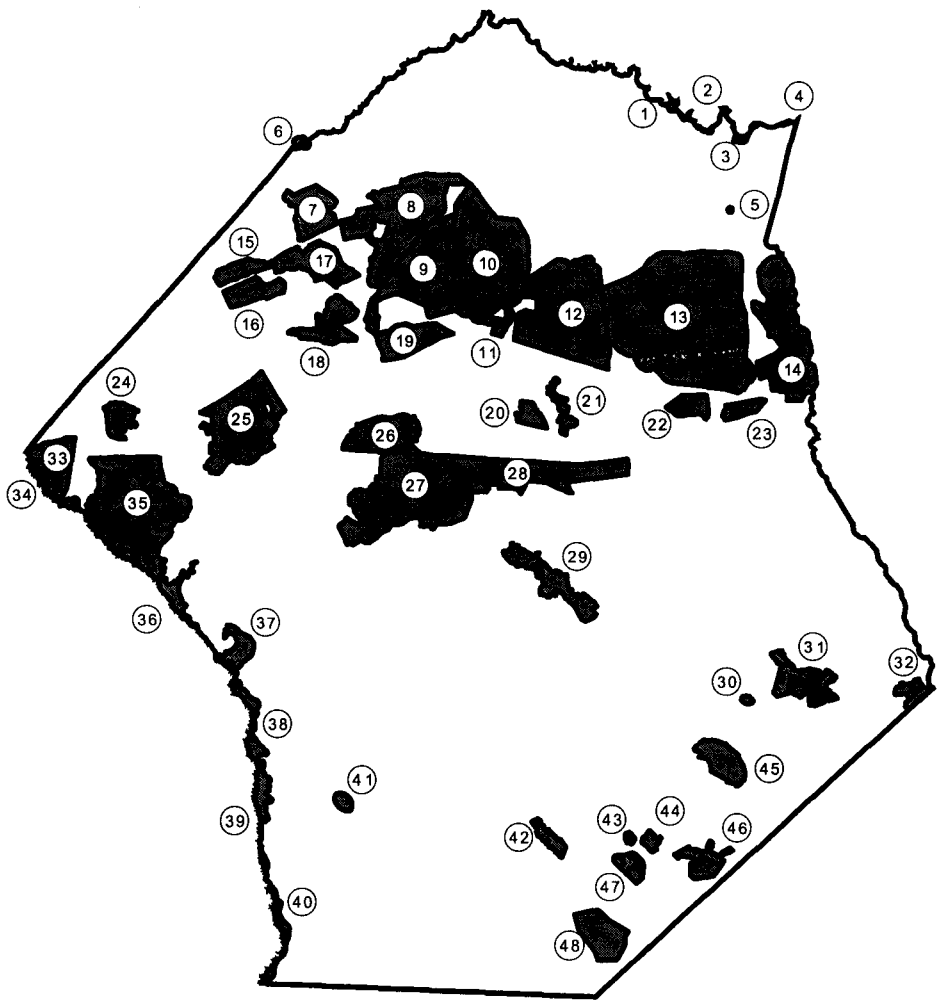


Figure 4. Locations of Significant Natural Heritage Areas in Hoke County, North Carolina.

A total of 1 megasite, 6 macrosites, and 48 standard sites have been identified in Hoke County during the current inventory (Table 1; Figure 4). The author relied heavily on previous inventory work on Fort Bragg (TNC & NC NHP 1993), the Lumber River (Ash 1990, 1992), and other areas in compiling and assessing the ecological value of the county's natural areas. Of the 48 total natural areas (not counting macrosites and megasites), 11 are considered to be nationally significant, 12 sites have been determined to be of statewide significance, 18 sites have been determined to be of regional significance, and 7 sites have been determined to be of countywide significance. A total of 24 natural areas occur within Fort Bragg, while 24 occur offbase. Each of these sites is described in the "Site Description" section of this report.

A few of the natural areas described in this report extend beyond the boundaries of Hoke County. For example, the Lumber River Macrosite is shared with Scotland and Robeson counties. It is important to view all natural areas not just as isolated pieces of quality habitat, but pieces within a larger landscape mosaic. By taking a regional perspective, one realizes that each piece has a role to play as habitat for animals and plants, as stepping stones for animal movements, as safety valves when other pieces of land have been altered, and as reservoirs of genetic diversity so important to the long-term viability of species.

Scattered across the county are forested tracts that to the casual observer might seem suitable as natural areas. In most cases aerial photos show that they are managed for timber production, with tell-tale rows of loblolly pine trees and with patches of clearcuts. If intensively site-prepped, such areas lack the diverse herb and shrub component of natural forests; instead, they tend to support weedy species. Where not intensively site-prepped, such areas usually support a mix of regenerating hardwoods beneath the pines and may develop good herb and shrub layers over time. While timber lands provide habitat for a wide variety of`wildlife, the limited time available for the Hoke County inventory meant that priorities had to be made and that altered habitats received less survey work than more natural habitats.

NATURAL COMMUNITIES

A natural community is defined as a distinct and recurring assemblage of populations of plants, animals, bacteria, and fungi naturally associated with each other and their physical environment. A natural community therefore combines biological and habitat elements. Only lands in an approximately natural state are classified as natural communities. For example, loblolly pine plantations are not regarded as natural communities, as they are very different from the communities that would occur under natural conditions. Pine plantations may support some of the elements normally associated with natural forests - for example pine warblers and deer - but many elements are missing. In this report, natural community names and classification follow Schafale and Weakley (1990) and Schafale (1994).

Table 1. Natural Areas in Hoke County, North Carolina, Arranged by Megasite, Macrosite, and Stand-alone Sites.

Rank Codes
A = National significance
B = State significance
C = Regional significance (Sandhills region)
D = County significance

Site Name	Rank
Fort Bragg Megasite	A
Central Fort Bragg Macrosite	A
Fort Bragg Blues Mountain	B
Fort Bragg Cabin Branch	C
Fort Bragg Calf Branch	A
Fort Bragg Central Rockfish Creek	A
Fort Bragg Gum Branch	A
Fort Bragg Johnsons Mill Pond Bog	B
Fort Bragg JSOC Bluffs	B
Fort Bragg Juniper Creek Headwaters	A
Fort Bragg Little Rockfish Creek	A
Fort Bragg McDuffie Creek	C
Fort Bragg MOT COMMEL	C
Fort Bragg Mott Lake	C
Fort Bragg Nicholson Creek Headwaters	A
Fort Bragg Piney Bottom Creek	A
Fort Bragg Puppy Creek	C
Fort Bragg Puppy Creek Headwaters	A
Fort Bragg Rockfish Creek Headwaters	A
Fort Bragg Sicily Bog	B
Fort Bragg Southern Rockfish Creek	B
Fort Bragg Wolf Pit Creek	B
Calloway Sandhills	C
McCain Sandhills	C
Redwing Pond Seeps	C
Fort Bragg Little River Macrosite	A
Fort Bragg Little River Bends	A
Fort Bragg Little River Oak/Heath Bluff	B
Fort Bragg Salinas Point Terraces	B
Fort Bragg Little River Trillium Slopes	C
McFarland Sandhills	C

Quewhiffle Creek Sandhills	C
Troutman Farm	C
Walters Sandhills	C
Drowning Creek Macrosite	B
Camp Mackall Drowning Creek	B
Drowning Creek/Lumber River Confluence	C
Upper Lumber River Macrosite	B
Lumber River/Chalk Banks Floodplain	C
Lumber River/Bear Swamp Aquatic Habitat	B
Spring Branch Church Swamp	C
Raft Swamp Macrosite	C
Hodgins Pond	D
Lower Rockfish Creek Macrosite	B
Camp Rockfish	D
Rockfish Creek at Raeford	D
Rockfish Creek Ravines	D
Stand-alone Standard Sites (not within macrosites or megasites)	
Antioch Bay Complex	A
Arabia Bay	B
Blueberry Bay	C
Hamby's Bay Complex	B
Hidden Bay	C
Lake McNeill	D
Sarvis Bay	D
Singletons Bay	D

A total of 21 natural community types and 8 variants were documented during this natural area inventory (Table 2). Among these are several which are among the best of their kind anywhere, notably Pine/Scrub Oak Sandhill, Xeric Sandhill Scrub, Streamhead Pocosin, and other longleaf pine communities on and adjacent to Fort Bragg, and the Cypress Savanna community at Antioch Bay. So far as is known, the Little River Variant of Mesic Pine Flatwoods occurs only in a few locations along Lower Little River, while Little River Seepage Bank and Little River Bluff communities occur only along Lower Little River, Rockfish Creek, and a few small tributaries of Cape Fear River. These rare community types occur nowhere else in the world.

Below is a summary description of the natural communities occurring in Hoke County, with the communities listed in the same order as in Table 2, which follows. Additional information pertaining to individual occurrences of each community type can be found in the site descriptions found elsewhere in this report.

Natural Community Type Descriptions

Pine/Scrub Oak Sandhill (Mixed Oak Variant) occurs on well drained sands on rolling hills and elevated upland flats. It is characterized by an open to moderate pine canopy and oak subcanopy over a moderate to dense shrub layer and sparse to moderate herb layer. Longleaf pine **(***Pinus palustris*) is the canopy dominant, while turkey oak (*Quercus laevis*), sand post oak (*Q. margarettiae*), and bluejack oak (*Quercus incana*) dominate the subcanopy, along with mockernut hickory (*Carya alba*) and sassafras (*Sassafras albidum*). Dwarf huckleberry (*Gaylussacia dumosa*), sparkleberry (*Vaccinium arboreum*), and southern blueberry (*V. tenellum*) are prominent shrubs, and wiregrass (*Aristida stricta*) is the dominant herb. Pine/Scrub Oak Sandhill (Mixed Oak Variant) is distinguished from the Mesic Transition Variant by a lower species diversity, particularly in the herb layer. In drier areas, the Mixed Oak Variant is transitional to Xeric Sandhill Scrub.

Pine/Scrub Oak Sandhill (Blackjack Oak Variant) occurs in similar situations, but usually where clay is near the surface. It is characterized by an open to moderate pine canopy and oak subcanopy over a moderate to dense shrub layer and moderate herb layer. Longleaf pine **(***Pinus palustris*) is the canopy dominant, while blackjack oak (*Quercus marilandica*), turkey oak (*Quercus laevis*), sand post oak (*Q. margarettiae*), and bluejack oak (*Quercus incana*) dominate the subcanopy, along with mockernut hickory (*Carya alba*) and sassafras (*Sassafras albidum*). Dwarf huckleberry (*Gaylussacia dumosa*), dangleberry (*G. frondosa*), southern blueberry (*V. tenellum*), and box huckleberry (*Lyonia mariana*) are prominent shrubs, and wiregrass (*Aristida stricta*) is the dominant herb.

Pine/Scrub Oak Sandhill (Mesic Transition Variant) is best developed in shallow dry swales, mesic flats, and bases of relatively steep slopes. In this variant the soils are markedly loamy and more fertile, producing a very diverse herb layer notable for high numbers of legumes, grasses, and composites. It is characterized by a moderately open longleaf pine (*Pinus palustris*) canopy over an open to patchy oak subcanopy, and a moderate to dense ground layer. Bluejack oak (*Quercus incana*) and blackjack oak (*Q. marilandica*) are the dominant subcanopy oaks. Other

important subcanopy trees include flowering dogwood (*Cornus florida*) and sand post oak (*Q. margarettiae*). Prominent among the shrubs are poison oak (*Toxicodendron pubescens*) and New Jersey tea (*Ceanothus americanus*). Wiregrass (*Aristida stricta*) is the dominant herb, but a wide variety of other grasses and herbaceous species are important. The Mesic Transition Variant is distinguished from the Mixed Oak Variant by the presence of a denser and more diverse herb layer.

Pine/Scrub Oak Sandhill (Clay/Rock Hilltop Variant) occurs on high hilltops or ridges with sandstone outcrops or hardened clay at the surface and with relatively little sand in the soil. Although appearing dry outwardly, the soil retains moisture. These unusual conditions support a sparse scrub oak component and several shrubs requiring moist soils, such as sweet pepperbush (*Clethra alnifolia*), box huckleberry (*Lyonia mariana*), horse sugar (*Symplocos tinctoria*), gallberry *(Ilex glabra*), and creeping blueberry (*Vaccinium crassifolium*). Longleaf pine **(***Pinus palustris*) forms a sparse to moderately dense canopy; wiregrass (*Aristida stricta*) is the dominant herb.

Xeric Sandhill Scrub (Sandhills Variant) occurs on excessively drained sandy soil, usually on the upper parts of rolling hills and on upland terraces. It is characterized by an open to moderate pine canopy over an oak subcanopy, and a sparse to moderate ground layer. Longleaf pine (*Pinus palustris*) is the dominant canopy tree, and turkey oak (*Quercus laevis*) is the dominant subcanopy oak, often accompanied by sand post oak (*Q. margarettiae*), sassafras (*Sassafras albidum*), and persimmon (*Diospyros virginiana*). Dwarf huckleberry (*Gaylussacia dumosa*), sparkleberry (*Vaccinium arboreum*), and southern blueberry (*V. tenellum*) are the most common shrubs. Wiregrass (*Aristida stricta*) is the dominant herb but interspersed with patches of bare sand and lichens. This community is distinguished from Pine/Scrub Oak Sandhill by the increased dominance of turkey oak in the subcanopy, and by a lower herb diversity. Among rare flora, pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*) is virtually restricted to this habitat.

Xeric Sandhill Scrub (Sand Barren Variant) is the most arid natural community in Hoke County and is typified by low vegetation cover in all strata and by a suite of dry soil specialists growing in coarse sandy soil. It occurs in our region only on terraces along Little River. Longleaf pine (*Pinus palustris*) is sparse, turkey oak (*Quercus laevis*) is sparse to common, often accompanied by sand post oak (*Q. margarettiae*) and persimmon (*Diospyros virginiana*). Dwarf huckleberry (*Gaylussacia dumosa*) and sparkleberry (*Vaccinium arboreum*) are the most common shrubs. Wiregrass (*Aristida stricta*) is usually sparse, interspersed with abundant patches of bare sand and lichens. This or a related community (Xeric Sandhill Scrub Coastal Plain Variant) apparently used to be common on xeric sand rims beside Carolina bays and on sand deposits along Lumber River, but only a few degraded remnants were found during this inventory.

Mesic Pine Flatwoods (Sandhills Variant) occurs on mesic loamy sands on broad low upland flats or stream terraces. Dominants are similar to those found in Pine/Scrub Oak Sandhill, but with far fewer oaks, giving the community an open understory. Scattered blackjack oak (*Quercus marilandica*) or dogwood (*Cornus florida*) may be present, but is generally sparse.

There usually is much bracken fern (*Pteridium aquilinum* var. *pseudocaudatum*) and abundant low shrubs, such as gallberry (*Ilex glabra*), box huckleberry (*Lyonia mariana*), dangleberry (*Gaylussacia frondosa*), and southern blueberry (*V. tenellum*). Wiregrass (*Aristida stricta*) is dominant in the moderately dense herb layer. Mesic Pine Flatwoods differ from Wet Pine Flatwoods by the relative absence of wetland plants in the ground layer, and by the presence of many mesic-associated species, such as colic-root (*Aletris farinosa*).

Mesic Pine Flatwoods (Little River Variant) is a globally rare community type that, as far as known, occurs only on terraces along Little River. Loblolly pine (*Pinus taeda*) and longleaf pine (*P. palustris*) are co-dominants, with water oak (*Quercus nigra*), southern red oak (*Q. falcata*), sweetgum (*Liquidambar styraciflua*) and other hardwoods forming a moderate to sparse subcanopy. Due to occasional flooding, soils are mesic and relatively nutrient-rich and support a very high diversity of herbaceous and shrubby species - the highest in the entire Sandhills region. Among rare species, Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*) is restricted to this habitat.

Wet Pine Flatwoods (Wet Ultisol Variant) occurs on poorly to moderately drained, wet to seasonally dry terraces along Little River and Rockfish Creek. It is characterized by a multi pine canopy over a patchy (but dense) shrub layer and moderately dense herb layer. Longleaf pine (*Pinus palustris*), pond pine (*P. serotina*), and loblolly pine (*P. taeda*) are the dominant canopy trees. Subcanopy hardwoods are scarce but may include sweetgum. Inkberry (*Ilex glabra*), sweetbay (*Magnolia virginiana*), fetterbush (*Lyonia lucida),* switchcane (*Arundinaria tecta*), creeping blueberry (*Vaccinium crassifolium*), Carolina sheep-laurel (*Kalmia carolina*), and dangleberry (*Gaylussacia frondosa*) are prominent shrubs.

Dry Oak-Hickory Forest is uncommon and is restricted to relatively fire-protected areas, such as steep slopes near creeks. Some examples may originally have been Pine/Scrub Oak Sandhill communities that have been severely fire-suppressed. Soil nutrients and minerals build up over time to support a mix of southern red oak (*Quercus falcata*), white oak (*Q. alba*), post oak (*Q. stellata*), black oak (*Q. velutina*), blackjack oak (*Q. marilandica*), mockernut hickory (*Carya alba*), sand hickory (*C. pallida*), longleaf pine (*Pinus palustris*), loblolly pine (*P. taeda*), dogwood (*Cornus florida*), and witch hazel (*Hamamelis virginiana*). Wiregrass is sparse or even absent, and herb diversity is generally low, but may be quite high in mesic soils on lower slopes and on flats. A number of fire-intolerant species occur in this habitat, and one rare orchid is restricted to it, crested coralroot (*Hexalectris spicata*).

Piedmont/Coastal Plain Heath Bluff is among the rarest of community types in Hoke County, with a single well-developed example and a few poorly developed ones restricted to exceptionally steep north-facing slopes along Little River. The community is characterized by a moderately open canopy of white oak (*Quercus alba*), chestnut oak (*Q. montana*), sourwood (*Oxydendrum arboreum*), red maple (*Acer rubrum*), loblolly pine (*Pinus taeda*), and longleaf pine (*P. palustris*) over a dense shrub layer of mountain laurel (*Kalmia latifolia*), pink azalea (*Rhododendron periclymenoides*), horse sugar (*Symplocos tinctoria*), witch hazel (*Hamamelis*

virginiana), and blueberries (*Vaccinium spp.*). Small grassy openings support several piedmont herbs, while galax (*Galax urceolata)* hides under shrubs.

Little River Bluff is highly restricted globally, known only from slopes fronting Little River, Rockfish Creek, Little Rockfish Creek, and Willis Creek, all tributaries of Cape Fear River and all embedded within the Cape Fear Formation (Mid Cretaceous Period). This anomalous community mixes piedmont and coastal plain species indiscriminately, as well as upland and wetland species. It is characterized by an abundance of woody plants: over 70 species have been recorded. They include loblolly pine (*Pinus taeda*), sweetgum (*Liqudambar styraciflua*), mockernut hickory (*Carya alba*), yellow poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), Atlantic white cedar (*Chamaecyparis thyoides*), dogwood (*Cornus florida*), American holly (*Ilex opaca*), and up to seven species of oak. The shrub layer is generally dense and includes a similar mix of disparate species, such as titi (*Cyrilla racemiflora*), Elliott's blueberry (*Vaccinium elliottii*), nestronia (*Nestronia umbellula*), and fringe-tree (*Chionanthus virginicus*). Vines are common, especially sawbrier (*Smilax glauca*), greenbrier (*S. rotundifolia*), bayvine (*S. laurifolia*), muscadine grape (*Vitis rotundifolia*), yellow jessamine (*Gelsemium sempervirens*), and crossvine (*Bignonia capreolata*). Herbs include calico aster (*Symphyotrichum lateriflorum*), perennial bentgrass (*Agrostis perennans*), climbing fern (*Lygodium palmatum*), and Solomon's-seal (*Polygonatum biflorum*).

Little River Seepage Bank, another globally rare community, occurs on vertical, moist to dripping, hard clay walls of the Cape Fear Formation along Little River and Rockfish Creek. Dense clay deposits force water to the surface, which over time forms vertical walls up to 25 feet high and 150 feet long (most are much smaller). Slumping is a recurring phenomenon, caused both by seepage and stream flooding. Some seepage banks seem to always be wet ot dripping, others merely moist to the touch. What passes for a canopy are overhanging trees from adjacent communities. Shrubs are always present around the edges of the community and ordinarily absent on the open wet face. They include yellowroot (*Xanthorrhiza simplicissima*), titi (*Cyrilla racemiflora*), tag alder (*Alnus serrulata*), mountain laurel (*Kalmia latifolia*), and fetterbush (*Lyonia lucida*). Mosses and liverworts cling to the open face, with small rosette plants like pink sundew (*Drosera capillaris*), roundleaf sundew (*D. rotundifolia*, disjunct from the mountains), spring fleabane (*Erigeron vernus*), and primrose-leaved violet (*Viola primulifolia*).

Streamhead Pocosin (Normal Variant) is found on wet to saturated mineral soils with an organic surface layer in the headwaters of streams. It is characterized by an open to moderately dense canopy over a dense shrub layer. Pond pine (*Pinus serotina*), swamp black gum (*Nyssa biflora*), yellow poplar (*Liriodendron tulipifera*), and red maple (*Acer rubrum*) are canopy dominants. Subcanopy species include sweetbay (*Magnolia virginiana*), red bay (*Persea palustris*), titi (*Cyrilla racemiflora*), and Atlantic white cedar (*Chamaecyparis thyoides*). Dominant shrubs include toothed gallberry (*Ilex coriacea*), fetterbush (*Lyonia lucida*), swamp azalea (*Rhododendron viscosum*), and horse-sugar (*Symplocos tinctoria*). The interior supports netted chain fern (*Woodwardia areolata*), sedges, briers (*Smilax spp.*), and sphagnum moss. Several rare species inhabit only this habitat, including bog spicebush (*Lindera subcoriacea*).

A usually well-developed savanna-like association occurs in the ecotone between the pocosin and the adjacent upland. Shrubs, grasses, ferns, and colorful forbs predominate and include dangleberry (*Gaylussacia frondosa*), inkberry (*Ilex glabra*), sweet pepperbush (*Clethra alnifolia*), Carolina sheeplaurel (*Kalmia carolina*), cinnamon fern (*Osmunda cinnamomea*), pitcher-plants, sundews, meadow-beauties, orchids, switchcane (*Arundinartia tecta*), toothache-grass (*Ctenium aromaticum*) and many others (see list of genera under Sandhill Seep). Well-burned ecotones are critical to a wide variety of rare flora and fauna in the Sandhills region.

Streamhead Pocosin (Canebrake Variant) occurs where fires are very frequent and intense, resulting in a marked decrease in shrubs and trees. Switchcane (*Arundinartia tecta*) becomes dominant, with various shrubs and herbs scattered throughout; in some cases the dense cane may exclude most other plants. Canebrakes are now one of the rarest natural communities in the entire range of the longleaf pine ecosystem (Virginia to Florida and Texas). Within Hoke County they are best developed within artillery impact areas on Fort Bragg, where they range up to many acres in size.

Sandhill Seeps are a characteristic feature of the inner coastal plain (e.g., Sandhills region), although reduced in number through fire suppression and land conversion. They occur on side slopes of ridges and hills, where water is forced to the surface by a clay layer, often forming a sharp break in the slope. Unlike Streamhead Pocosins, Sandhill Seeps are isolated from streams, but they share most of the same species. Pond pine (*Pinus serotina*) and longleaf pine (*P. palustris*) form a sparse canopy, with various ericaceous shrubs and switchcane (*Arundinartia tecta*) below. Fires burn completely through most Sandhill Seeps, keeping shrub cover low and promoting grasses, sedges, and herbs. Prominent are members of the following genera: *Andropogon, Aristida, Arundinaria, Calopogon, Dichanthelium, Drosera, Eupatorium, Liatris, Lycopodiella, Polygala, Rhexia, Rhynchospora, Platanthera, Sarracenia, Scleria, Tofieldia, Xyris,* and *Zigadenus*.

Streamhead Atlantic White Cedar Forest is found only in the Sandhills region of the state. This community develops in wet swales where *Chamaecyparis thyoides* is a dominant (>50% cover), with or without yellow poplar (*Liriodendron tulipifera*), pond pine (*Pinus serotina*), and red maple (*Acer rubrum*). Shrubs and small understory trees are variably dense and are a subset of those found in Streamhead Pocosins. Herbs are sparse, but sphagnum moss is abundant. In Hoke County this community is restricted to terraces along Little River.

Small Depression Pocosin is a shrub-dominated community found on saturated to seasonally flooded peaty sand in small depressions (less than 10 acres in size), such as small Carolina bays. Structure is quite variable, although all are characterized by a dense shrub layer. The dominant shrubs at most sites are titi (*Cyrilla racemiflora*), toothed gallberry (*Ilex coriacea*), and fetterbush (*Lyonia lucida*), along with honeycups (*Zenobia pulverulenta*). A few examples occur near the Lumber River in swales on the upper terrace; these have an open canopy of pond pine (*Pinus serotina*) and loblolly bay (*Gordonia lasianthus*) - the only places in Hoke for this species.

Vernal Pool occurs in shallow depressions that experience very short hydroperiods, which promotes graminoids rather than shrubs as dominants. Vernal pools usually are ponded in winter, but invariably dry out in summer and are therefore periodically burned. Shrubs, if present, must be able to tolerate seasonally dry soils; examples are dangleberry (*Gaylussacia frondosa*), gallberry (*Ilex glabra*), and box huckleberry (*Lyonia mariana*). Sawbrier (*Smilax glauca*) and/or greenbrier (*S. rotundifolia*) may form a marginal zone. Common graminoids and herbs include switchgrass (*Panicum virgatum* var. *cubense*), warty panic-grass (*P. verrucosum*), giant plumegrass (*Saccharum giganteum*), beaksedges (*Rhynchospora spp.*), and meadow-beauties (*Rhexia mariana* var. *mariana* and var. *exalbida*). Vernal Pools are important breeding sites for amphibians.

Cypress Savanna used to occur in many clay-based Carolina bays in the county, but most have been drained and converted to agriculture or pine production. Antioch and Hamby's Bays are the best of the remainder. During typical years, the depressions are shallowly flooded during winter and spring, and exposed during summer and fall. The Cypress Savanna community is characterized by an open to moderate canopy of pond cypress (*Taxodium ascendens*) and widely scattered swamp black gum (*Nyssa biflora*). Shrubs are usually scarce internally, but are abundant around the bay margin, usually with hardwood trees. A well-developed and diverse grass-sedge-herb layer dominates the floor of the bay, giving it a savanna-like appearance. Dominant to patch dominant herbaceous plants include witch-grasses (*Dichanthelium erectifolium* and others), panic-grasses (*Panicum spp.*), glaucescent sedge (*Carex glaucescens*), beaksedges (*Rhynchospora filifolia*, *R. perplexa*, and *R. careyana*), meadow-beauties (*Rhexia spp.*, including the rare *R. aristosa*), lanceleaf sabatia (*Sabatia difformis*), and marsh fleabanes (*Pluchea rosea* and *P. foetida*). Many rare plants and animals are dependent on this community for survival.

In more acidic bays, sphagnum moss and shrubs become prevalent throughout the bay and the savanna aspect is diminished. Shrubs include titi (*Cyrilla racemiflora*), highbush blueberries (*Vaccinium spp.*), fetterbush (*Lyonia lucida*), and sweet pepperbush (*Clethra alnifolia*). A few Hoke County bays appear to support this community variant.

Nonriverine Swamp Forest occurs in saturated to shallowly flooded depressions isolated from stream flooding. The best examples are characterized by large old trees, particularly swamp black gum (*Nyssa biflora*), pond cypress (*Taxodium ascendens*), and red maple (*Acer rubrum*), with scattered Atlantic white cedar (*Chamaecyparis thyoides*) and water oak (*Quercus nigra*). American holly (*Ilex opaca*) and sweetbay (*Magnolia virginiana*) are frequent understory trees. Ericaceous shrubs are dense, most notably fetterbush (*Lyonia lucida*) and toothed gallberry (*Ilex coriacea*), interlaced with bayvine (*Smilax laurifolia*). Herbs are practically absent. Examples found in Carolina bays have a much less dense shrub layer and a moderate herb layer.

Coastal Plain Small Stream Swamp (Blackwater Subtype) occupies the intermittently inundated floodplain of blackwater streams on poorly drained loamy to mucky soils. The closed canopy is dominated by a mix of swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*),

yellow poplar (*Liriodendron tulipifera*), and loblolly pine (*Pinus taeda*). Atlantic white cedar (*Chamaecyparis thyoides*) and pond cypress (*Taxodium ascendens*) are often present. Ironwood (*Carpinus caroliniana*), American holly (*Ilex opaca*), and sweetbay (*Magnolia virginiana*) are frequent in the subcanopy. Ericaceous shrubs and briers are common. Ferns are numerous in the ground layer, with switchcane (*Arundinaria tecta*) locally abundant. Because of the low velocity of flood waters, the vegetation is little disturbed by flooding, and the floodplain tends to be flat and featureless except for overflow channels.

Cypress-Gum Swamp (Blackwater Subtype) develops on the wettest areas of floodplains on frequently flooded and poorly drained mucks. The canopy is dominated by pond cypress (*Taxodium ascendens*) and swamp black gum (*Nyssa biflora*), with red maple (*Acer rubrum*), sweetbay (*Magnolia virginiana*), redbay (*Persea palustris*), and water ash (*Fraxinus caroliniana*, Little River only) in the understory. Ericaceous shrubs, buttonbush (*Cephalanthus occidentalis*), and switchcane (*Arundinaria tecta*) are sparse to dense. Coral greenbrier (*Smilax walteri*) is a common vine. Common herbs of the wet floor are swamp dewflower (*Murdannia keisak*) and smartweeds (*Polygonum punctatum* and *P. setaceum*). Several impoundment lakes have replaced former swamps.

Coastal Plain Bottomland Hardwoods (Blackwater Subtype) occurs on the infrequently flooded higher portions of floodplains away from the main river or stream channel. The canopy is variously dominated by combinations of moisture-loving hardwoods and conifers; they include trees listed in the previous two communities, plus laurel oak (*Quercus laurifolia*), water oak (*Quercus nigra*), and sweet gum (*Liquidambar styraciflua*). Underestory trees and shrubs are like those of Small Stream Swamps, but the herb layer is better developed. Because this community occupies upper zones of the floodplain, it often has been cut for timber, and high quality examples are scarce.

Coastal Plain Levee Forest (Blackwater Subtype) occurs as small examples scattered along Little River shores and islands, and along Lumber River. Flooding events deposit sand and debris, eventually building up a low linear mound. Along Little River, river birch (*Betula nigra*) and water ash (*Fraxinus caroliniana*) are dominant, with water oak (*Quercus nigra*), overcup oak (*Q. lyrata*), and sweetgum (*Liquidambar styraciflua*), far less numerous. American holly (*Ilex opaca*) is common, ironwood (*Carpinus caroliniana*) uncommon. Climbing vines in the genera *Vitis, Bignonia, Campsis, Mikania, Smilax,* and *Trachelospermum* are common. The shrub layer ranges from sparse to dense. Several specialized herb and grasses occur here. Along Lumber River, loblolly pine (*Pinus taeda*), sweetgum, red maple, and swamp black gum replace river birch and water ash, and ironwood is common; otherwise the communities are much alike.

Sand and Mud Bar The many bends of Little River and Lumber River allow deposition of small sand bars and mud bars that are exposed during low rainfall cycles. Vegetation structure of these bars is variable, ranging from largely unvegetated to mostly covered. Along Little River, seedlings and saplings of river birch (*Betula nigra*) and water ash (*Fraxinus caroliniana*) are prominent. Shrubs include tag alder (*Alnus serrulata*), buttonbush (*Cephalanthus occidentalis*), and elderberry (*Sambucus canadensis*). Herbs include various grasses (*Panicum*

spp., Paspalum spp., Saccharum baldwinii, Steinchisma hians), flatsedges (*Cyperus spp*.), smartweeds (*Persicaria spp.*), and Virginia buttonweed (*Diodia virginiana*). Along Lumber River, possum-haw (*Ilex decidua*) and sarvis holly (*Ilex amelanchier*) are prominent shrubs, with maidencane (*Panicum hemitomon*), panic-grasses (*Panicum spp*.), rice cutgrass (*Leersia oryzoides*), false nettle (*Boehmeria cylindrica*), climbing hempweed (*Mikania scandens*), and swamp smartweed (*Polygonum setaceum*).

Coastal Plain Semipermanent Impoundment occurs where streams are dammed by beavers or humans. The importance of this community to aquatic flora and fauna is very high, including many rare species, since there are no permanent ponds or lakes within Hoke County. Typically, the downstream portion is open water (often with standing dead trees), while the upstream end grades into Coastal Plain Small Stream Swamp or Cypress-Gum Swamp. White water-lily (*Nymphaea odorata*), cow-lilies (*Nuphar advena* and *N. sagittifolia*), water-shield (*Brasenia schreberi*), variable pondweed (*Potamogeton diversifolius*), and bladderworts (*Utricularia spp.*) occur in open water, while shallows and coves support emergent sedges (species of *Eleocharis, Rhynchospora, Schoenoplectus*, and *Scirpus*), southern blueflag (*Iris virginica*), golden-club (*Orontium aquaticum*), pickerelweed (*Pontederia cordata*), and arrowheads (*Sagittaria spp*.). The margins are usually dominated by a narrow zone of sphagnum mosses, wetland shrubs, graminoids, and herbs, including pitcher-plants: (*Sarracenia spp*.). Many of these also occur as epiphytes on stumps and on trunks of living swamp black gum (*Nyssa biflora*) and pond cypress (*Taxodium ascendens*). Several human-made impoundments in the county are largely covered with picturesque pond cypress.

Coastal Plain Semipermanent Impoundment (Bog Variant) is a very rare community type in North Carolina, restricted to a few sites where hillside seepage strongly influences hydrology. It is best developed in the years following the departure of beavers. Typically the canopy is regenerating and open, shrubs are patchy interspersed with herbaceous openings. Sphagnum moss abounds, as do pitcher-plants, sedges, grasses, orchids, sundews, and colorful herbs. Biodiversity is high and includes numerous rare species.

Coastal Plain Semipermanent Impoundment (Floating Peat Variant) is also very rare in the state, and known from just one site in Hoke County, Johnsons Mill Pond Bog. This pre-Revolutionary impoundment features extensive peat/mud mats and harbors the sole extant population in North Carolina of peelbark St.-Johnswort (*Hypericum fasciculatum*). These mats are dominated by sphagnum mosses and sedges (species of *Carex, Eleocharis, Fuirena, Rhynchospora, Scleria*), with water-willow (*Decodon verticillatus*), seedboxes (*Ludwigia spp*.), meadow-beauties (*Rhexia spp*.), Engelmann arrowhead (*Sagittaria engelmanniana*), yellow-eyed grasses (*Xyris spp*.), and water-spider orchid (*Habenaria repens*).

Table 2. Natural Plant Community Types Occurring in Hoke County, North Carolina, with Natural Areas for Each. An explanation of community rank codes found below table.

ECOLOGICAL GROUPING Community Name	GLOBAL RANK	N.C. RANK

Longleaf Pine Communities

Pine/Scrub Oak Sandhill (Mixed Oak Variant)	G3?	S3
Calloway Sandhills		
Drowning Creek/Quewhiffle Creek Confluence		
Fort Bragg Cabin Branch		
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg Gum Branch		
Fort Bragg JSOC Bluffs		
Fort Bragg Juniper Creek Headwaters		
Fort Bragg Little River Bends		
Fort Bragg Little River Trillium Slopes		
Fort Bragg McDuffie Creek		
Fort Bragg MOT COMMEL		
Fort Bragg Mott Lake		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek		
Fort Bragg Puppy Creek Headwaters		
Fort Bragg Rockfish Creek Headwaters		
Fort Bragg Southern Rockfish Creek		
Fort Bragg Wolf Pit Creek		
McCain Natural Areas		
McFarland Sandhills		
Redwing Pond Seeps		
Rockfish Creek Raeford		
Rockfish Creek Ravines		
Troutman Farm		
Walters Sandhills		
Pine/Scrub Oak Sandhill (Blackjack Oak Variant)	G2G3	S2
Fort Bragg Central Rockfish Creek		
Fort Bragg Gum Branch		
Fort Bragg Juniper Creek Headwaters		
Fort Bragg Little Rockfish Creek		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Southern Rockfish Creek		
Pine/Scrub Oak Sandhill (Mesic Transition Variant)	G2G3	S2
Fort Bragg Blues Mountain		
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg Gum Branch		
Fort Bragg JSOC Bluffs		

Fort Bragg Juniper Creek Headwaters		
Fort Bragg Little Rockfish Creek		
Fort Bragg MOT COMMEL		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek		
Fort Bragg Puppy Creek Headwaters		
Fort Bragg Rockfish Creek Headwaters		
Fort Bragg Southern Rockfish Creek		
Quewhiffle Creek Preserve		
Troutman Farm		
Pine/Scrub Oak Sandhill (Clay/Rock Hilltop Variant)	G2?	S2
Fort Bragg Blues Mountain		
Fort Bragg Cabin Branch		
Fort Bragg Gum Branch		
Fort Bragg JSOC Bluffs		
Fort Bragg Piney Bottom Creek		
Xeric Sandhill Scrub (Sandhills Variant)	G3?	S3
Calloway Sandhills		
Fort Bragg Cabin Branch		
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg Gum Branch		
Fort Bragg JSOC Bluffs		
Fort Bragg Juniper Creek Headwaters		
Fort Bragg McDuffie Creek		
Fort Bragg MOT COMMEL		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek		
Fort Bragg Puppy Creek Headwaters		
Fort Bragg Rockfish Creek Headwaters		
Fort Bragg Southern Rockfish Creek		
Fort Bragg Wolf Pit Creek		
Hidden Bay		
McCain Natural Areas		
McFarland Sandhills		
Quewhiffle Creek Preserve		
Redwing Pond Seeps		
Rockfish Creek Ravines		
Singletons Bay		
Walters Sandhills		
Xeric Sandhill Scrub (Sand Barren Variant)	G2	S2
Fort Bragg Little River Bends		

Fort Bragg Little River Oak/Heath Bluff		
Mesic Pine Flatwoods (Sandhills Variant)	G2G3	S2
Camp Rockfish		
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg Little Rockfish Creek		
Fort Bragg McDuffie Creek		
Fort Bragg Rockfish Creek Headwaters		
Redwing Pond Seeps		
Rockfish Creek Ravines		
Walters Sandhills		
Mesic Pine Flatwoods (Little River Variant)	G1	S1
Fort Bragg Little River Bends		
Fort Bragg Little River Oak/Heath Bluff		
Fort Bragg Little River Trillium Slopes		
Fort Bragg Salinas Point Terraces		
Wet Pine Flatwoods	G3G4	S3
Rockfish Creek Ravines		
<u>Upland Hardwoods</u>		
Dry Oak-Hickory Forest	G5	S4
Antioch Bay Complex		
Fort Bragg Blues Mountain		
Fort Bragg Calf Branch		
Fort Bragg Puppy Creek Headwaters		
Hamby's Bay Complex		
McCain Natural Areas		
McFarland Sandhills		
Rockfish Creek Raeford		
Rockfish Creek Ravines		
Troutman Farm		
<u>Cliff and Bluff Communities</u>		
Piedmont/Coastal Plain Heath Bluff	G4?	S3
Fort Bragg Little River Oak/Heath Bluff		
Little River Bluff	G2	S2
Fort Bragg Little River Bends		
Fort Bragg Little River Oak/Heath Bluff		
Fort Bragg Little River Trillium Slopes		
Fort Bragg Salinas Point Terraces		
Little River Seepage Bank	G2	S2
Camp Rockfish		
Fort Bragg Little River Bends		
Fort Bragg Little River Oak/Heath Bluff		
Fort Bragg Little River Trillium Slopes		
Fort Bragg Salinas Point Terraces		

Streamhead Pocosin Communities

Streamhead Pocosin (Normal Variant)	G4	S3
Calloway Sandhills		
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg Gum Branch		
Fort Bragg JSOC Bluffs		
Fort Bragg Little River Trillium Slopes		
Fort Bragg Little Rockfish Creek		
Fort Bragg McDuffie Creek		
Fort Bragg Mott Lake		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek Headwaters		
Fort Bragg Rockfish Creek Headwaters		
Fort Bragg Sicily Bog		
Fort Bragg Southern Rockfish Creek		
Fort Bragg Wolf Pit Creek		
McCain Natural Areas		
McFarland Sandhills		
Quewhiffle Creek Preserve		
Redwing Pond Seeps		
Rockfish Creek Raeford		
Rockfish Creek Ravines		
Troutman Farm		
Streamhead Pocosin (Canebrake Variant)	G2	S1S2
Fort Bragg Little Rockfish Creek		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek		
Fort Bragg Puppy Creek Headwaters		
Sandhill Seep	G3?	S2S3
Calloway Sandhills		
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg Gum Branch		
Fort Bragg JSOC Bluffs		
Fort Bragg Little Rockfish Creek		
Fort Bragg MOT COMMEL		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek Headwaters		
Fort Bragg Rockfish Creek Headwaters		
Fort Bragg Sicily Bog		

Fort Bragg Southern Rockfish Creek		
Fort Bragg Wolf Pit Creek		
McCain Natural Areas		
McFarland Sandhills		
Redwing Pond Seeps		
Streamhead Atlantic White Cedar Forest	G3?	S2
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg McDuffie Creek		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek		
Small Isolated Depression Wetlands		
Small Depression Pocosin	G2G3	S1S2
Fort Bragg Juniper Creek Headwaters		
Fort Bragg MOT COMMEL		
Vernal Pool	G2?	S2
Fort Bragg Cabin Branch		
Fort Bragg Little River Bends		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek		
Fort Bragg Puppy Creek Headwaters		
Fort Bragg Southern Rockfish Creek		
Carolina Bays		
Cypress Savanna	G2G3	S2
Antioch Bay Complex		
Arabia Bay		
Blueberry Bay		
Hamby's Bay Complex		
Hidden Bay		
Sarvis Bay		
Nonriverine Swamps		
Nonriverine Swamp Forest	G2G3	S2S3
Arabia Bay		
Blueberry Bay		
Camp Rockfish		
Hamby's Bay Complex		
McCain Natural Areas		
Sarvis Bay		
Blackwater Stream Floodplains and Impoundments		
Coastal Plain Small Stream Swamp (Blackwater Subtype)	G5	S5
Calloway Sandhills		
Camp Mackall Drowning Creek		
Camp Rockfish		
Fort Bragg Cabin Branch		

Fort Bragg Central Rockfish Creek		
Fort Bragg JSOC Bluffs		
Fort Bragg Juniper Creek Headwaters		
Fort Bragg McDuffie Creek		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Piney Bottom Creek		
Fort Bragg Puppy Creek		
Fort Bragg Puppy Creek Headwaters		
Fort Bragg Rockfish Creek Headwaters		
Fort Bragg Southern Rockfish Creek		
Fort Bragg Wolf Pit Creek		
McCain Natural Areas		
McFarland Sandhills		
Quewhiffle Creek Preserve		
Redwing Pond Seeps		
Rockfish Creek Raeford		
Rockfish Creek Ravines		
Troutman Farm		
Walters Sandhills		
Cypress-Gum Swamp (Blackwater Subtype)	G3G4	S3
Camp Mackall Drowning Creek		
Drowning Creek/Lumber River Confluence		
Fort Bragg Central Rockfish Creek		
Fort Bragg Little Rockfish Creek		
Hodgins Pond		
Lake McNeill		
Lumber River/Bear Swamp Aquatic Habitat		
Lumber River/Chalk Banks Floodplain		
Spring Branch Church Swamp		
Coastal Plain Bottomland Hardwoods (Blackwater Subtype)	G3G4	S3
Camp Mackall Drowning Creek		
Drowning Creek/Lumber River Confluence		
Lumber River/Chalk Banks Floodplain		
Spring Branch Church Swamp		
Troutman Farm		
Coastal Plain Levee Forest (Blackwater Subtype)	G5T4	S3
Fort Bragg Little River Bends		
Fort Bragg Little River Oak/Heath Bluff		
Fort Bragg Little River Trillium Slopes		
Spring Branch Church Swamp		
Sand and Mud Bar	G5	S5
Camp Rockfish		
Drowning Creek/Lumber River Confluence		
Fort Bragg Little River Bends		

Fort Bragg Little River Oak/Heath Bluff		
Lumber River/Bear Swamp Aquatic Habitat		
Lumber River/Chalk Banks Floodplain		
Spring Branch Church Swamp		
Coastal Plain Semipermanent Impoundment (Normal)	G5	S4
Camp Rockfish		
Fort Bragg Calf Branch		
Fort Bragg Central Rockfish Creek		
Fort Bragg Juniper Creek Headwaters		
Fort Bragg Mott Lake		
Fort Bragg Nicholson Creek Headwaters		
Fort Bragg Puppy Creek		
Hodgins Pond		
Lake McNeill		
McCain Natural Areas		
McFarland Sandhills		
Redwing Pond Seeps		
Troutman Farm		
Walters Sandhills		
Coastal Plain Semipermanent Impoundment (Bog Variant)	G1	S1
Fort Bragg Gum Branch		
Fort Bragg Sicily Bog		
Coastal Plain Semipermanent Impoundment (Floating Peat)	G1?	S1
Fort Bragg Johnsons Mill Pond Bog		
Fort Bragg Nicholson Creek Headwaters		

EXPLANATION OF RANK CODES FOR NATURAL COMMUNITIES

N.C. Rank

S1 = Critically imperiled in North Carolina because of extreme rarity or because of some factor making it especially vulnerable to extirpation from the state. Typically 1-5 occurrences and/or less than 2,000 acres cover in the state.

S2 = Imperiled in North Carolina because of rarity or because of some factor making it very vulnerable to extirpation from the state. Typically 6-20 occurrences and/or 2,000-10,000 acres cover in the state.

S3 = Rare or uncommon in North Carolina. Typically 21-100 occurrences and/or 10,000-50,000 acres cover in the state.

S4 = Apparently secure in North Carolina, though it may be rare in parts of the state.

S5 = Demonstrably secure in North Carolina, though it may be rare in parts of the state.

SH = Of historical occurrence in North Carolina, not having been verified in more than 20 years, and suspected to be still extant.

S? = unranked, or rank uncertain.

Global Rank

G1 = Critically imperiled globally because of extreme rarity or because of some factor making it especially vulnerable to extirpation throughout its range. Typically 5 or fewer occurrences and/or less than 2,000 acres cover globally.

G2 = Imperiled globally because of rarity or because of some factor making it very vulnerable to extirpation throughout its range. Typically 6-20 occurrences and/or 2,000-10,000 acres cover globally.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extirpation throughout its range. Typically 21-100 occurrences and/or 10,000-50,000 acres cover globally.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

T = The rank of a community subtype. As an example, G4T1 would apply to a community with an overall rank of G4, with the subtype warranting a rank of G1.

G? = unranked, or rank uncertain.

An S or G rank involving two numbers indicates uncertainty of rank. For instance, a G2G3 rank indicates that the community appears to warrant either a G2 or a G3 ranking, but that existing data do not allow that determination to be made.

FLORA AND FAUNA

Hoke County's total of 128 rare species ranks high compared to other North Carolina counties, especially those in the lower piedmont and inner coastal plain. It is a well-known fact among biologists that the counties at either end of the state - the mountains and the coast - support higher biological diversity than the middle sector, including rare flora and fauna. Between the mountain counties and those fronting the ocean, very few have more rare species within their borders than Hoke.

Fort Bragg accounts for most of the documented rare plants and animals. It also contains some of the most significant natural areas in the entire range of the longleaf pine ecosystem (Virginia to Texas). Fort Bragg supports many plant community types that are superb examples of their kind: pine-oak-wiregrass uplands, high diversity loamy swales, shrub-switchcane streamheads, and seepage bogs. In turn, these provide habitat for many rare plants and animals, including robust populations of five federally endangered species: red-cockaded woodpecker (*Picoides borealis*), St. Francis' satyr butterfly (*Neonympha mitchellii francisci*), Michaux's sumac (*Rhus michauxii*), chaffseed (*Schwalbea americana*), and roughleaf loosestrife (*Lysimachia asperulifolia*).

Two globally rare plant communities, the Little River Seepage Bank and the Little River Bluff, occur only along Little River, Rockfish Creek, and a couple of other tributaries of the Cape Fear River. A third, Mesic Pine Flatwoods (Little River Variant), occurs only in the Fort Bragg section of Little River. The only current North Carolina populations of three rare plants occur in the Hoke County portion of Fort Bragg: peelbark St. John'swort (*Hypericum fasciculatum*), spiked medusa orchid (*Pteroglossaspis ecristata*), Carolina pineland-cress (*Warea cuneifolia*). Similarly, three moth species have not been found in the state away from the base, and the broad-winged sedge grasshopper (*Stethophyma celata*) is known from fewer than five sites in the state. Lark sparrows (*Chondestes grammacus*) breed in North Carolina only on Fort Bragg and Camp Mackall. Remarkably, the entire range of St. Francis' satyr is within Fort Bragg.

Outside of Fort Bragg, Hoke County also harbors high quality examples of natural communities. Antioch Bay is the finest example of a Cypress Savanna in the state and supports populations of eight rare plant species and nine rare animals. The Lumber River is a state designated Natural and Scenic River; its floodplain supports high quality cypress-gum and bottomland hardwoods communities. Drowning Creek also features excellent floodplain communities and is a state-designated High Quality Water. One of the state's two currently known populations of twistleaf goldenrod (*Solidago tortifolia*) occurs at Quewhiffle Creek Sandhills, and one of the state's three populations of Florida peanut-grass (*Amphicarpum muehlenbergianum*) occurs at Antioch Bay. The sole population of Carolina sunrose (*Helianthemum carolinianum*) in the Sandhills region occurs at Calloway Sandhills, and two of the three known Sandhills populations of crested coralroot (an orchid, *Hexalectris spicata*) occur at McCain Sandhills and at Titi Bay. The population of sarvis holly (*Ilex amelanchier*) that extends along Drowning Creek and Lumber River is the state's largest.

Table 3. Rare Plants Documented from Hoke County, North Carolina. An explanation of status and rank codes appears at the end of the table.

SCIENTIFIC NAME COMMON NAME	STATUS N.C.	 U.S.	RANK N.C.	 GLOBAL
VASCULAR PLANTS				
Agalinis aphylla scale-leaf gerardia	SR		S3	G3G4
Amorpha georgiana var. georgiana Georgia indigo-bush	E	FSC	S2	G3T2
Amphicarpum muehlenbergianum Florida peanut-grass	SR-P		S1	G4
Aristida condensata barrens three-awn	SR		S1	G4?
Astragalus michauxii Sandhills milkvetch	T	FSC	S3	G3
Carex canescens ssp. disjuncta silvery sedge	SR		S1	G5T4?
Carex exilis coastal sedge	T		S1	G5
Carex sp. 4 a sedge	SR		S2	G2G3
Cladium mariscoides twig-rush	SR		S2	G5
Danthonia epilis bog oatgrass	SR	FSC	S2?	G3?
Desmodium fernaldii Fernald's tick-trefoil	SR		S1	G4
Dichanthelium sp. 9 a panic-grass	SR		S2	G2G3
Dionaea muscipula Venus flytrap	SR SC	FSC	S3	G3
Eleocharis robbinsii Robbins' spikerush	SR		S2	G4G5
Eriocaulon aquaticum seven-angled pipewort	SR		S2	G5
Eupatorium resinosum resinous boneset	T-SC		S3	G3
Gaillardia aestivalis Sandhills blanketflower	SR		S1	G5
Galactia mollis soft milkpea	SR		S2	G4G5

Gnaphalium helleri var. helleri Heller's rabbit tobacco	SR		S2?	G4G5T3?
Gratiola ramosa branched hedge-hyssop	SR		S1	G4G5
Helianthemum carolinianum Carolina sunrose	SR		S1	G4
Helianthemum rosmarinifolium rosemary sunrosa	SR		S2	G4
Hexalectris spicata crested coralroot	SR		S2	G5
Hypericum fasciculatum peelbark St. John'swort	SR		S1	G5
Hypoxis rigida stiff-leaved yellow stargrass	SR		S2	G4
Ilex amelanchier sarvis holly	SR		S3	G4
Kalmia cuneata white wicky	SR		S3	G3
Liatris squarrulosa Earle's blazing-star	SR		S2	G4G5
Lilium pyrophilum Sandhills lily	E-SC	FSC	S2	G2
Lindera subcoriacea bog spicebush	T	FSC	S2	G2
Litsea aestivalis pondspice	SR	FSC	S2	G3
Lobelia boykinii Boykin's lobelia	T	FSC	S1	G2G3
Ludwigia sphaerocarpa globe-fruit seedbox	SR		S1	G5
Lysimachia asperulifolia roughleaf loosestrife	E	E	S3	G3
Muhlenbergia torreyana pinebarren smokegrass	E		S1	G3
Myriophyllum laxum loose watermilfoil	T	FSC	S1	G3
Oldenlandia boscii Bosc's bluet	SR		S1	G5
Parnassia caroliniana Carolina Grass-of-Parnassus	E		S2	G3
Platanthera nivea snowy orchis	T		S1	G5
Polygala grandiflora showy milkwort	SR		S2	G5?

Potamogeton confervoides conferva pondweed	SR	FSC	S2	G4
Pteroglossaspis ecristata spiked medusa	E	FSC	S1	G2
Pyxidanthera barbulata var. brevifolia Sandhills pyxie-moss	E	FSC	S3	G4T3
Rhexia aristosa awned meadow-beauty	T	FSC	S3	G3
Rhus michauxii Michaux's sumac	E-SC	E	S2	G2
Rhynchospora crinipes Alabama beaksedge	E	FSC	S1	G2
Rhynchospora macra southern white beaksedge	E		S1	G3
Rhynchospora oligantha feather-bristle beaksedge	SR		S2S3	G4
Rhynchospora scirpoides longbeak baldsedge	SR		S2	G4
Ruellia ciliosa Sandhills wild-petunia	SR		S1	G3G4Q
Sagittaria isoetiformis quillwort arrowhead	SR		S1	G3G4
Salvia azurea azure or blue sage	SR		S1	G4G5
Schoenoplectus etuberculatus Canby's bulrush	SR		S3	G3G4
Schoenoplectus subterminalis swaying bulrush	SR		S3	G4G5
Schwalbea americana chaffseed	E	E	S1	G2
Scleria georgiana Georgia nutrush	SR		S2	G4
Scleria reticularis netted nutrush	SR		S2	G4
Solidago tortifolia twistleaf goldenrod	SR		S1	G4G5
Solidago verna spring-flowering goldenrod	T	FSC	S3	G3
Stylisma pickeringii var. pickeringii Pickering's dawnflower	E	FSC	S3	G4T3
Tridens carolinianus Carolina triodia	SR		S3	G3
Tridens chapmanii Chapman's redtop	SR		S1?	G3

Tridens strictus spike triodia	SR		SH	G5
Utricularia cornuta horned bladderwort	SR		S1	G5
Utricularia geminiscapa two-flowered bladderwort	SR		S1	G4G5
Utricularia olivacea dwarf bladderwort	T		S2	G4
Vaccinium virgatum small-flower blueberry	SR		S1	G4
Warea cuneifolia Carolina pineland-cress	SR		S1	G4
Xyris chapmanii Chapman’s yellow-eyed-grass	SR		S2	G3
Xyris scabrifolia Harper’s yellow-eyed-grass	SR	FSC	S2	G3

EXPLANATION OF STATUS AND RANK CODES FOR PLANTS

N.C. Status:

E = Endangered
T = Threatened
SC = Special Concern
SR = Significantly Rare.

Plant statuses are determined by the Plant Conservation Program (N.C. Department of Agriculture) and the N.C. Natural Heritage Program. Collection from the wild of Endangered, Threatened, and Special Concern species is regulated by state law. The Significantly Rare statuse is a NHP designation indicating the need for population monitoring and possible conservation action for species not currently listed as Endangered, Threatened or Special Concern.

U.S. Status:

E = Endangered. A plant that is in danger of extinction throughout all or a significant portion of its range.

T = Threatened. A plant that is likely to become and endangered species within the foreseeable future throughout all or a significant portion of its range.

FSC = Federal Species of Concern. This status replaces the former “Category 2" Candidate status used by the U.S. Fish and Wildlife Service. Category 2 plants were those for which there was some evidence of vulnerability, but for which there were not enought data to support listing as Endangered or Threatened. The FSC code has no official status.

N.C. Rank:

S1 = Critically imperiled in North Carolina because of extreme rarity or because of some factor making it especially vulnerable to extirpation from the state. Typically 1-5 populations.

S2 = Imperiled in North Carolina because of rarity or because of some factor making it very vulnerable to extirpation from the state. Typically 6-20 populations.

S3 = Rare or uncommon in North Carolina. Typically 21-100 populations.

SH = Of historical occurrence in North Carolina, not having been verified in more than 20 years, and suspected to be still extant.

U.S. Rank:

G1 = Critically imperiled globally because of extreme rarity or because of some factor making it especially vulnerable to extinction throughout its range. Typically 5 or fewer occurrences globally.

G2 = Imperiled globally becasue of rarity or because of some factor making it very vulnerable to extinction throughout its range. Typically 6-20 occurrences globally.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout its range. Typically 21-100 occurrences.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q = questionable taxonomic assignment.

T = The rank of a subspecies or variety. As an example, G4T1 would apply to a subspecies or variety of a species with an overall rank of G4, with the subspecies or variety warranting a rank of G1.

? = unranked, or rank uncertain.

An S or G rank involving two numbers indicates uncertainty of rank. For instance, a G2G3 rank indicates that the species appears to warrant either a G2 or a G3 ranking, but that existing data do not allow that determination to be made.

Table 4. Rare Animals Documented from Hoke County, North Carolina. An explanation of status and rank codes appears at the end of the table.

SCIENTIFIC NAME COMMON NAME	STATUS N.C.	 U.S.	RANK N.C.	 GLOBAL
	MAMMALS			
Condylura cristata star-nosed mole - coastal plain population	SC		S2	G5T2Q
Corynorhinus rafinesquii macrotis Rafinesque's big-eared bat coastal plain population	T	FSC	S3	G3G4
Sciurus niger eastern fox squirrel	SR		S3	G5
	BIRDS			
Aimophila aestivalis Bachman's sparrow	SC	FSC	S3B,S2N	G3
Anhinga anhinga anhinga	SR		S2B,SZN	G5
Chondestes grammacus lark sparrow	SR		S1B,SZN	G5
Lanius ludivicianus ludovicianus loggerhead shrike	SC		S3B,S3N	G4T4
Picoides borealis red-cockaded woodpecker	E	E	S2	G3
	REPTILES			
Crotalus horridus timber (canebrake) rattlesnake	SR	PSC	S3	G4
Deirochelys reticularia chicken turtle	SR		S3	G5
Heterodon simus southern hognose snake	SR	FSC	S2	G2
Masticophis flagellum coachwhip	SR		S3	G5
Micrurus fulvius eastern coral snake	E		S1	G5
Pituophis melanoleucus melanoleucus northern pine snake	SC	FSC	S3	G4T4
Regina rigida glossy crayfish snake	SR		S2S3	G5

Sistrurus miliarius pigmy rattlesnake	SC		S3	G5
AMPHIBIANS				
Ambystoma mabeei Mabee's salamander	SR		S3	G4
Ambystoma tigrinum eastern tiger salamander	T		S2	G5
Eurycea quadridigitata dwarf salamander - silver morph	SC		S2	G5T2Q
Pseudacris ornata ornate chorus frog	SR		S3	G5
Rana capito Carolina gopher frog	T	FSC	S2	G3T3
FISHES				
Cyprinella sp. 1 (formerly considered part of C. zanema) thinlip chub	SC		S2	GUQ
Etheostema mariae pinewoods darter	SC	FSC	S3	G3
Semotilus lumbee Sandhills chub	SC	FSC	S3	G3
CRUSTACEANS				
Cambarus hystricosus Sandhills spiny crayfish	SR		S2	G2
INSECTS - MOTHS				
Agnorisma bollii a moth	SR		S1	G?
Agrotis sp. nov. a dart moth	SR	FSC	S2S3	G2G3
Amphipyrinae, new genus and species a canebrake moth	SR		S2S3	G?
Anacamptodes cypressaria an inchworm moth	SR		SU	G2G4
Apamea mixta an owlet moth	SR		S2?	GU
Callosamia securifera sweetbay silkmoth	SR		S2S3	G4

Catocala jair Jair underwing	SR		S2?	G4
Exyra semicrocea a pitcher plant moth	SR		S2S3	G3G4
Grammia placentia placentia tiger moth	SR		S2S3	G4
Heliomata infulata rare spring moth	SR		S2S3	G2G4
Hemeroplanis sp. nov. an owlet moth	SR		S2S3	G?
Heterocampa varia a prominent moth	SR		S1	G3G4
Hypagyrtis brendae Brenda's Hypagyrtis	SR		S2S3	G4
Macrochilo louisiana Louisiana owlet moth	SR		S2S3	G4
Macrochilo sp. nov. a noctuid moth	SR		S1S2	G3
Metarranthis sp. nov. an inchworm moth	SR		S2S3	G3
Nematocampa baggetaria Baggett's Namatocampa	SR		SU	G2G4
Papaipema appassionata pitcher-plant borer moth	SR		S2?	G4
Ptichodis bistrigata southern Ptichodis	SR		S2S3	G3
Pygarctia abdominalis yellow-edged Pygarctia	SR		S2S3	G3G4
Spartiniphaga carterae Carter's noctuid moth	SR	FSC	S2S3	G2G3
Tornos cinctarius a gray	SR		S2?	G?
INSECTS - BUTTERFLIES				
Amblyscirtes reversa reversed roadside-skipper	SR		S3	G3G4
Callophrys hesseli Hessel's hairstreak	SR		S2S3	G3G4
Fixsenia favonius ontario northern oak hairstreak	SR		S3?	G4T4
Hesperia attalus slossonae dotted skipper	SR		S2S3	G3G4T3

Hesperia meskei Meske's skipper	SR		S3	G2G4
Neonympha mitchellii francisci St. Francis' satyr	SR	E	S1	G1G2T1
Satyrium edwardsii Edwards' haristreak	SR		S2?	G4
Satyrium kingi King's hairstreak	SR		S2S3	G3G4
INSECTS - GRASSHOPPERS				
Eotettix pusillus little eastern grasshopper	SR		S2?	G2G3
Melanoplus nubilus a short-winged grasshopper	SR		S2S3	G2G3
Stethophyma celata broad-winged sedge grasshopper	SR		S1S2	G4

EXPLANATION OF STATUS AND RANK CODES FOR ANIMALS

N.C. Status:

E = Endangered
T = Threatened
SC = Special Concern
SR = Significantly Rare
P = Proposed.

Animal statuses are determined by the N.C. Wlidlife Resources Commission and the N.C. Natural Heritage Program. Endangered, Threatened, and Special Concern species are afforded some protection by state law (the Endangered and Threatened Wildlife and Wildlife Species of Special Concern act, 1987). The Significantly Rare status is a NHP designation and indicates rarity and the need for population monitoring and conservation action for species not currently listed as Endangered, Threatened or Special Concern.

U.S. Status:

E = Endangered. An animal that is in danger of extinction throughout all or a significant portion of its range.

T = Threatened. An animal that is likely to become and endangered species within the foreseeable future throughout all or a significant portion of its range.

FSC = Federal Species of Concern. This status replaces the former "Category 2" Candidate status used by the U.S. Fish and Wildlife Service. Category 2 animals were those for which there was some evidence of vulnerability, but for which there were not enought data to support listing as Endangered or Threatened. The FSC code has no official status.

N.C. Rank:

S1 = Critically imperiled in North Carolina because of extreme rarity or because of some factor making it especially vulnerable to extirpation from the state. Typically 1-5 populations.

S2 = Imperiled in North Carolina because of rarity or because of some factor making it very vulnerable to extirpation from the state. Typically 6-20 populations.

S3 = Rare or uncommon in North Carolina. Typically 21-100 populations.

SA = Accidental or casual; one to several records for North Carolina, but the state is outside the normal range of the species.

SH = Of historical occurrence in North Carolina, not having been verified in more than 20 years, and suspected to be still extant.

S_B (e.g., S2B) = Rank of the breeding population in the state (for migratory species only). In the example provided, "S2B," the breeding population has a state rank of S2, regardless of the rank of the non-breeding population.

S_N = Rank of the non-breeding population in the state (for migratory species only).

_Z_ (e.g., SZN) = Population is not of significant conservation concern. In the example provided, "SZN," the non-breeding population is not of significant conservation concern.

U.S. Rank:

G1 = Critically imperiled globally because of extreme rarity or because of some factor making it especially vulnerable to extinction throughout its range. Typically 5 or fewer occurrences globally.

G2 = Imperiled globally becasue of rarity or because of some factor making it very vulnerable to extinction throughout its range. Typically 6-20 occurrences globally.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout its range. Typically 21-100 occurrences.

G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q = questionable taxonomic assignment.

T = The rank of a subspecies or variety. As an example, G4T1 would apply to a subspecies or variety of a species with an overall rank of G4, with the subspecies or variety warranting a rank of G1.

GH or TH = Historical occurrences only throughout its range, with the expectation that it may be rediscovered (GH for a species, TH for a subspecies or variety).

GU = Possibly in peril range-wide, but status uncertain; more information is needed.

? = unranked, or rank uncertain.

An S or G rank involving two numbers indicates uncertainty of rank. For instance, a G2G3 rank indicates that the species appears to warrant either a G2 or a G3 ranking, but that existing data do not allow that determination to be made.

The Hoke County inventory has produced a number of important discoveries. Ongoing moth trapping on Fort Bragg has yielded several species new to North Carolina, two of which are undescribed species previously unknown to science (S. Hall, NCNHP). Puppy Creek is the type location for the newly described Sandhills spiny crayfish (*Cambarus hystricosus*), an animal known only from tributaries of the Cape Fear River (Cooper and Cooper 2003). A new and rare lily (Sandhills lily, *Lilium pyrophilum*) was described in 2002; several populations occur in Hoke County streamheads (Skinner and Sorrie 2002). Another new streamhead plant is an undescribed species of arrowhead (*Sagittaria*), so far known only from the Carolinas (B. Sorrie, NCNHP).

PROTECTION PRIORITIES

A variety of options exist for protecting natural areas and endangered species, ranging from private landowner initiatives to acquisition by private or public conservation agencies. In all cases, conservation works best when citizens are well-informed about the value of natural habitat and take an active role in its protection. Because land use decisions usually cross property and political boundaries, planning and land-use regulations can play an important protection role if supported by local citizens.

Ideally, conservation efforts should focus on those areas that are the most ecologically significant (Table 1). In Hoke County, the highest priority area outside of Fort Bragg Military Reservation is the nationally significant Antioch Bay and neighboring Dial Bay/Plum Thicket. The Nature Conservancy owns most of Antioch Bay, but the whole bay and a surrounding buffer needs to be protected to ensure that the amphibians and reptiles have sufficient area in which to breed and forage. Today, the extreme rarity of clay-based Carolina bays makes it imperative to protect as many as possible, even if they require considerable restoration effort. Arabia, Blueberry, Hidden, and Titi Bays are excellent candidates.

Properties adjacent to Fort Bragg -- Calloway Sandhills, McCain Sandhills, and Redwing Pond Seeps -- provide an important reservoir of longleaf pine natural communities, support numerous rare species, provide a non-development buffer around the base, and form a vital link to the longleaf ecosystem at Camp Mackall and the Sandhills Game Land. McFarland Sandhills, Quewhiffle Sandhills, and Troutman Farm also are critical links in the chain, especially due to their size and ecological diversity.

The magnificent floodplain forests along Drowning Creek and Lumber River are an under-appreciated natural resource in the region. The river provides excellent recreational opportunities, as well as providing habitat for rare fauna, while the forests support breeding and feeding habitat for abundant wildlife.

LANDOWNER PROTECTION INITIATIVES

Many of the natural areas in Hoke County are privately owned. This includes sites ranked as state, regional, or county significant in this inventory. Protection of these sites will require not only the good will but the active participation of landowners. Although in many cases the sites have remained in a natural state because of landowner actions to protect their values, owners may not be aware of the many options that can make conservation management more effective and less of a financial burden. This includes the continued management of forests for timber value.

One state program that offers assistance in achieving forest management goals is the Forest Stewardship Program sponsored by the North Carolina Division of Forest Resources. Examples of the management practices that this program encourages include controlled burning, re-forestation in natural vegetation, and maintenance of buffer strips along watercourses. For more information, write to: Forest Stewardship Coordinator, Division of Forest Resources, 1616 MSC, Raleigh, NC 27699-1616.

For owners who wish to preserve high quality lands in a natural state, another option is to register the site under the North Carolina Registry of Natural Areas, administered by the North Carolina Natural Heritage Program. The Registry relies on volunteer agreements. Benefits include management information, some degree of statutory protection from pipelines and transmission lines, and public recognition (if desired). For more information, write to: North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, 1601 MSC, Raleigh, NC 27699-1601.

The Safe Harbor program creates a cooperative agreement between a landowner and the US Fish and Wildlife Service. The landowner agrees to do something potentially beneficial for red-cockaded woodpeckers, such as habitat enhancement or restoration, in exchange for a guarantee that no new restrictions will apply to the land. Once a “baseline” condition has been set (i.e., the existing woodpecker population and condition of the habitat) no new regulations will be imposed, even if birds take up residence in the restored portion of the property. The landowner is free to develop the land, such as cutting timber, without violating the Endangered Species Act. For additional information, write to: USFWS, 140 Southwest Broad Street, Southern Pines, NC 28388.

Another flexible but permanent option -- one that becomes fixed to the property deed -- is the conservation easement. This option allows the owner to retain title of the property and to exercise certain property rights, including control of access. Other rights, such as the right to develop the site, are deeded over to a recognized conservation organization established to preserve such land in a natural state. Conservation easements can be sold or donated, and can confer state and federal tax benefits to the owner. For more information, write to: Sandhills Area Land Trust, P.O. Box 1032, Southern Pines, NC 28388; or to Lumber River Conservancy, P.O. Box 1087, Lumberton, NC 28359-1087.

When an owner of a high quality natural area does not wish to maintain an active involvement in the management and is willing to part with the site, transfer of ownership through sale or donation to a conservation organization or agency is the simplest way of assuring permanent protection. As with the conservation easement, there may be state and federal tax benefits associated with the transfer of property. Three private organizations that acquire natural areas either by donation or purchase are: The Nature Conservancy, 140 Southwest Broad Street, Southern Pines, NC 28388; Sandhills Area Land Trust, P.O. Box 1032, Southern Pines, NC 28388; Lumber River Conservancy, P.O. Box 1087, Lumberton, NC 28359-1087.

BIOLOGICAL SURVEYS AND ENDANGERED SPECIES LAWS

Obtaining landowner permission to survey is an integral part of biological inventory. Occasionally, however, permission to survey on private lands is not granted due to a belief that if a rare species is discovered, restrictions and land-use limitations will be imposed. Clearly, when this occurs the search for scientific information is hindered. A secondary effect of not granting permission to survey is that owners of biologically significant lands do not learn about the conservation options and tax incentives that are available to them. Those who grant permission and are found to own significant lands are given results from the biological survey and, if they wish, are put in contact with an appropriate conservation organization, or are made aware of other management or protection options.

In reality, there is very little reason for landowners to have concerns about the presence of rare species on their land. A summary of federal and state endangered species laws relevant to private landowners was recently prepared by Mark A. Cantrell of the US Fish & Wildlife Service and Kenneth A. Bridle of the Piedmont Land Conservancy in Greensboro, NC. Some of that information is presented below to help dispel concerns that landowners may have about rare species and to provide clarification on potential land-use restrictions.

FEDERAL LAW

1. The Endangered Species Act (ESA) protects only plants and animals that are federally listed as endangered or threatened. Since federally listed species are by definition very rare, the likelihood of any occurring on a given tract of private land is very small.

2. The ESA protects federally listed animal species from the potentially harmful actions of private landowners. Because this may lead to restrictions on their use of lands, Congress, the US Fish & Wildlife Service (USFWS), and other partners have worked to develop flexible tools for resolving conflicts. These tools include Section 10 permits, such as habitat conservation plans, safe harbor agreements, and candidate conservation agreements. Federal funds are also available to assist landowners with management and conservation of listed and candidate species (rare federally but not officially listed) on their land. Plants on private land are not subject to provisions of the ESA, unless federal funding or permitting is involved.

3. Engaging in interstate or foreign trade of a federally listed species without a permit is illegal for plants and animals. "Taking" (i.e., harassing, harming, pursuing, hunting, killing, trapping) or possessing illegally taken animals is a violation of the ESA. Removing, digging up, cutting, damaging, or destroying a federally listed plant is illegal on federal lands.

4. Through the habitat conservation planning process, the USFWS may issue a permit so that private landowners may lawfully "take" a federally listed animal species if it is "incidental to and not the purpose of carrying out otherwise lawful activities." These permits are available as long as the landowner implements an approved habitat conservation plan, and the "taking" does not jeopardize the continued existence of the species. A private landowner is not required to prepare a conservation plan for the "taking" of listed plant species as long as the activity does not involve federal funding or permitting, or is not in violation of other laws.

5. Under the ESA, private developers can obtain permits to legally harm or even kill federally listed species on their property provided that they show that attempts were made to minimize impacts on the species in other ways.

6. The existence of a federally listed plant species on private property has no legal effect on the landowner unless a project requires a federal permit or uses federal funds and will clearly result in adverse impacts to the listed plant. Landowners, individuals, and agencies are prohibited from taking listed animals without authorization, whether the action is private or federally funded.

7. When critical habitat is designated for federally listed species, it applies only to federal actions, not to state or local projects, and not to the actions of private landowners unless there is federal funding or permitting involved.

STATE LAW

1. North Carolina endangered species laws apply to species listed by the state as endangered or threatened.

2. The state plant and animal endangered species laws are modelled after the ESA, in that they prohibit illegal trafficking or poaching of listed species.

3. The state endangered animal species law states that “no rule may be adopted that restricts use or development of private property.”

4. The state endangered plant species law states that “the incidental disturbance of protected plants during agricultural, forestry, or development operations is not illegal so long as the plants are not collected for sale or commercial use.” Collection of federal or state listed plants from public or private land can only be done with the landowner’s written permission and a permit from the NC Department of Agriculture’s Plant Conservation Program.

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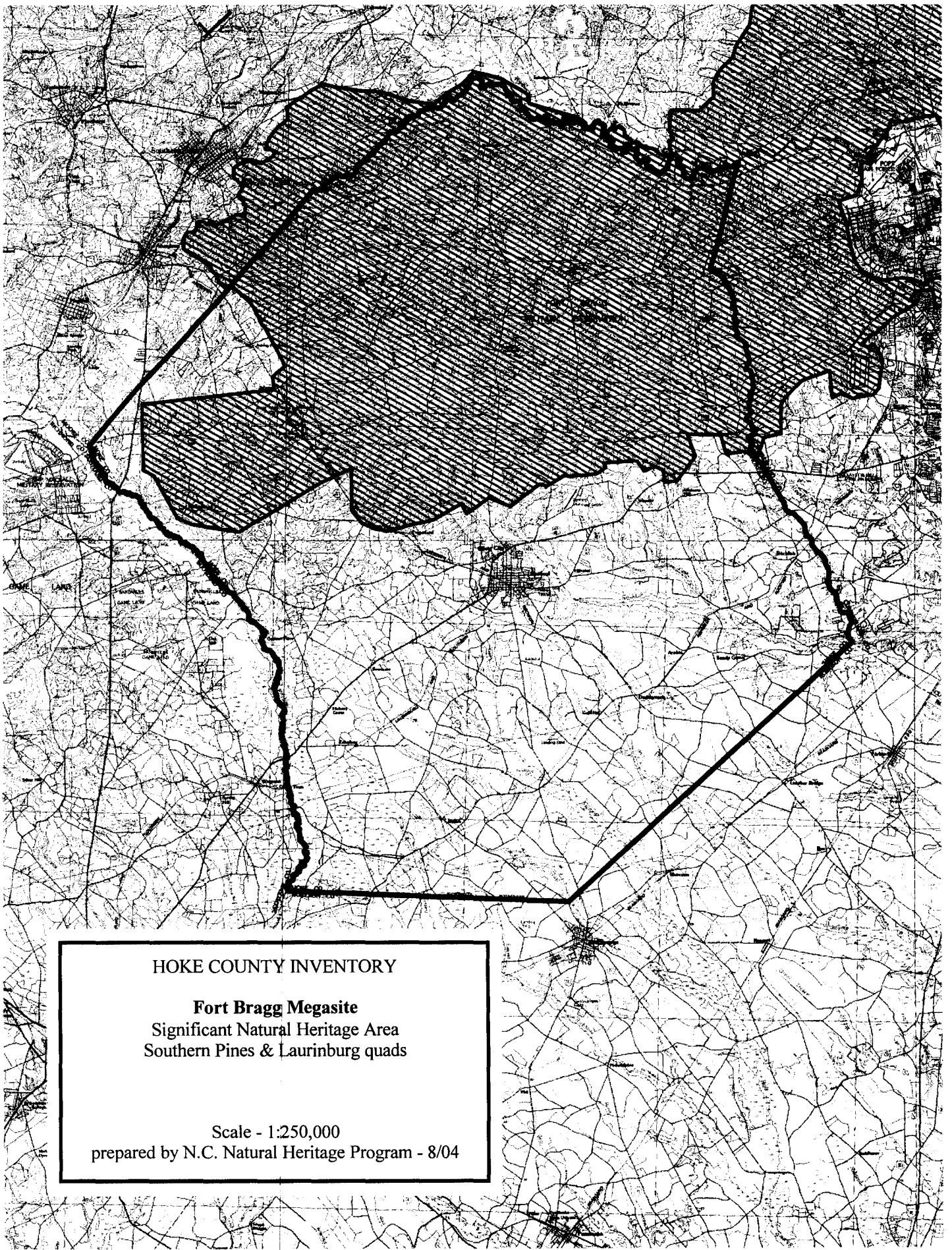
SITE DESCRIPTIONS



HOKE COUNTY INVENTORY

Fort Bragg Megasite
Significant Natural Heritage Area
Southern Pines & Laurinburg quads

Scale - 1:250,000
prepared by N.C. Natural Heritage Program - 8/04

Hoke County Natural Area Inventory

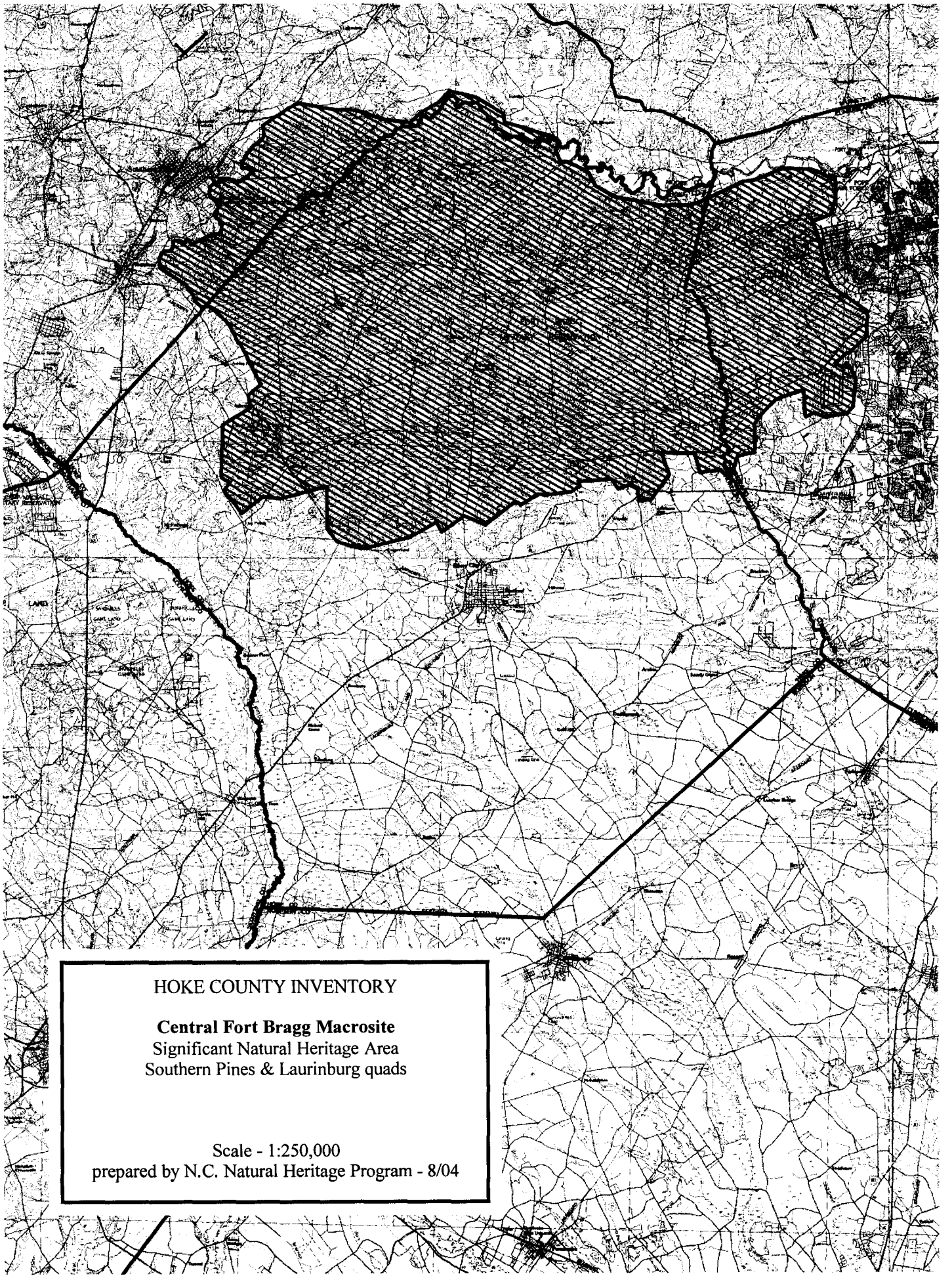
FORT BRAGG MEGASITE

The Fort Bragg Megasite occupies a large portion of Fort Bragg and adjacent properties southwest to Drowning Creek. It includes more than 50 identified natural areas in Cumberland, Harnett, Hoke, and Moore Counties. Within Hoke County, 2 macrosites and 25 standard sites are included within the Megasite, stretching from the county's eastern boundary along Little Rockfish Creek north to Lower Little River and west along the Moore County line. The Megasite lies within the Sandhills geological region of the coastal plain and is composed mostly of rolling hilly terrain dissected by numerous small streams and one major stream, Lower Little River. The headwaters of several important streams occur here; examples are Rockfish Creek, Juniper Creek, Nicholson Creek, Puppy Creek, and Little Rockfish Creek.

Ecologically the Fort Bragg Megasite is one of the foremost natural landscapes in the United States coastal plain. It easily rates national significance because it contains one of the largest and most important longleaf pine (*Pinus palustris*) ecosystems anywhere. The longleaf ecosystem once ranged from Virginia to Texas, but has been highly fragmented such that less than 3% remains in good natural condition. The Megasite is noted for its diversity and high quality of plant community types: longleaf pine-oak-hickory-wiregrass (varying from xeric scrubby sandhills to moist flatwoods and savannas), streamhead pocosins and seepage ecotones, canebrakes (a community type nearly extinct elsewhere), seepage bogs, cypress-gum swamps, beaver ponds and impoundments, Atlantic white cedar forests (*Chamaecyparis thyoides*), and globally rare riverine seepage banks and bluffs along Little River. The megasite is also noted for its extraordinary species diversity - over 1200 different kinds of plants have been documented on Fort Bragg and adjacent Weymouth Woods State Nature Preserve, one of the highest totals documented for any site in the US coastal plain. To promote this diversity and to maintain the ecological integrity of the natural communities, all of the uplands and streamheads are managed with prescribed burns on a three year rotation to reduce shrub and hardwood growth and to promote wiregrass (*Aristida stricta*) and native flora and fauna.

Over 80 rare plant and animal species occur within the megasite (roughly 70% of the total for Hoke County), including five Federally Endangered species: red-cockaded woodpecker (*Picoides borealis*), St. Francis' satyr (*Neonympha mitchellii francisci*, a butterfly found only on Fort Bragg), chaffseed (*Schwalbea americana*), roughleaf loosestrife (*Lysimachia asperulifolia*), and Michaux's sumac (*Rhus michauxii*). Rare plants include the newly-described and globally rare Sandhills lily (*Lilium pyrophilum*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, nearly confined to the Fort Bragg region), Venus flytrap (*Dionaea muscipula*, extirpated from the rest of the Sandhills), resinous boneset (*Eupatorium resinosum*), and the state's only current populations of spiked medusa orchid (*Pteroglossaspis ecristata*), pineland-cress (*Warea cuneata*), peelbark St. John's-wort (*Hypericum fasciculatum*), and wire sedge (*Carex tenax*). Rare animals include the newly-described and globally rare Sandhills spiny crayfish (*Cambarus hystricosus*), star-nosed mole (*Condylura cristata*), lark sparrow

(*Chondestes grammacus*), southern hognose snake (*Heterodon simus*), Carolina gopher frog (*Rana capito*), tiger salamander (*Ambystoma tigrinum*), and more than twenty species of butterflies, moths, and grasshoppers, several of which are unknown elsewhere in the state. Due to a general lack of fire management programs outside the Megasite, many of the 80 rare species found on Fort Bragg cannot now be found in the rest of the county.



HOKE COUNTY INVENTORY

Central Fort Bragg Macrosite
Significant Natural Heritage Area
Southern Pines & Laurinburg quads

Scale - 1:250,000
prepared by N.C. Natural Heritage Program - 8/04

Hoke County Natural Area Inventory

CENTRAL FORT BRAGG MACROSITE

Central Fort Bragg Macrosite occupies the western portion of Fort Bragg (U.S. Army) and contains the majority of the post's natural longleaf ecosystem. Within Hoke County, a total of 23 standard sites are included within the Macrosite, stretching from Little Rockfish Creek (in MacRidge Artillery Impact Area) westward to the western boundary of Fort Bragg. Also included are natural areas on adjacent private land: Calloway Sandhills, McCain Natural Areas, and Redwing Pond Seeps. The Macrosite lies within the Sandhills geological region of the coastal plain and is therefore composed mostly of rolling hilly terrain dissected my numerous small streams. The headwaters of several important streams occur here: Rockfish Creek, Juniper Creek, Nicholson Creek, Puppy Creek, and Little Rockfish Creek.

Ecologically the Macrosite is of national significance because it contains one of the largest and most important blocks of longleaf pine (*Pinus palustris*) ecosystem remaining anywhere. This ecosystem once ranged from Virginia to Texas, but has been highly fragmented such that less than 3% remains in good natural condition. The Macrosite is notable for its diversity and high quality of plant community types, including longleaf pine-oak-wiregrass types that vary from xeric scrubby sandhills to moist flatwoods. Within the Central Atlantic Coastal Plain, no area can match the Macrosite in the number or quality of streamhead pocosins, seepage bogs, and ecotonal communities. The largest cypress swamps in the northern part of Hoke County occur here. Johnson's Millpond, a unique wetland with floating peat mats, is also here. All of the upland communities are managed with prescribed burns on a three year rotation to reduce shrub and hardwood growth and to promote wiregrass (*Aristida stricta*) and native wildflowers. Within the artillery impact areas, additional fires from flares and shells produce a more frequent burn regime - generally annual - which has produced ecological conditions thought to have occurred only historically within the longleaf pine ecosystem. Such conditions favor herbaceous plants over woody species, and have kept alive a nearly extinct plant community - the canebrake.

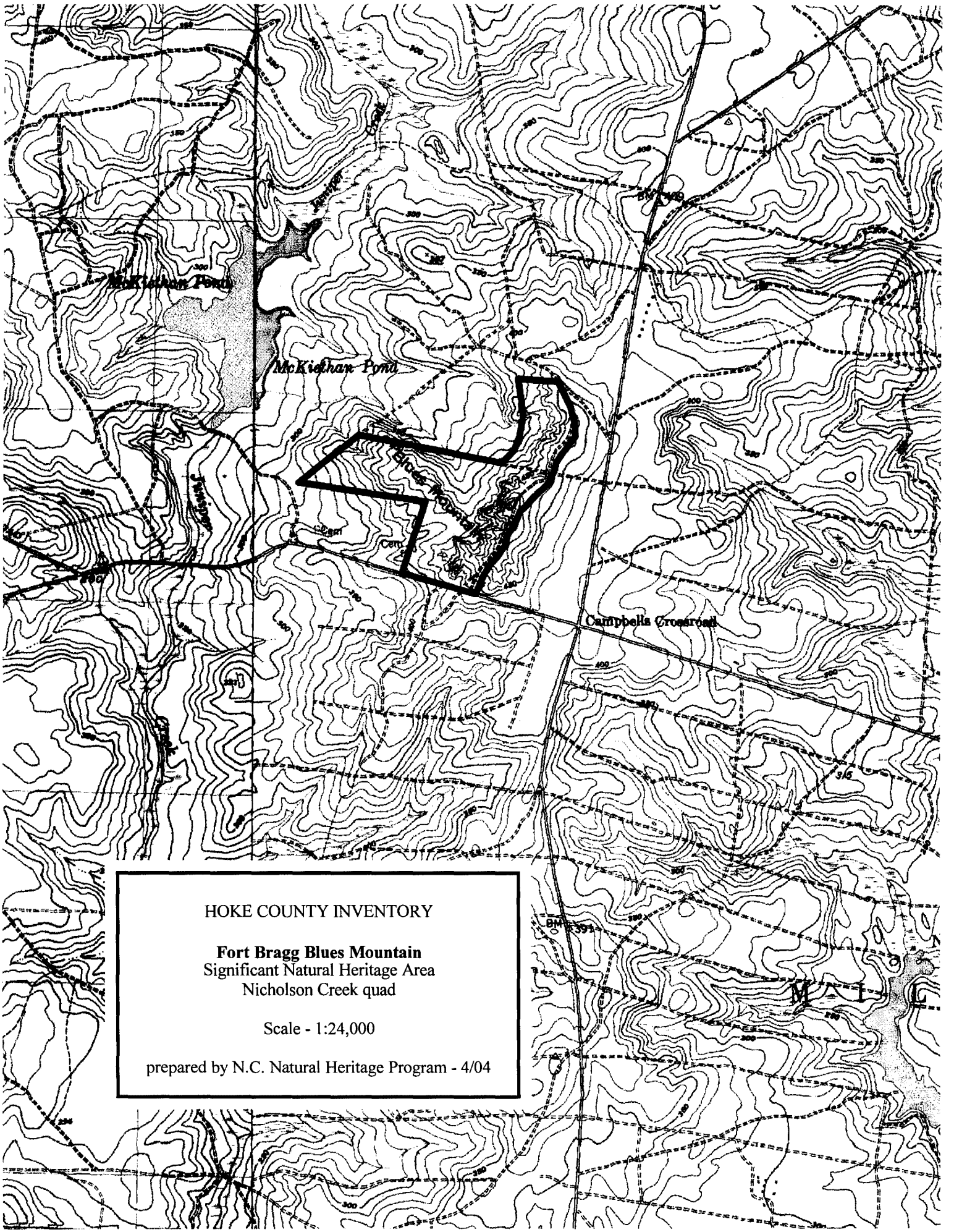
From a management standpoint, there are two major concerns. First, miles of old fire plowlines around the edges of the wetlands have degraded most natural areas by preventing fires from burning into Streamhead Pocosins and Sandhills Small Stream Swamps, which historically was part of the natural process within the longleaf pine ecosystem. Some plowlines are revegetating on their own, while others need to be filled in and planted in order to speed up the rehabilitation process. Second, soil erosion is severe across Fort Bragg, notably where firebreak roads cut across wetlands and seepage slopes. Great strides have been made by the Army in the past ten years to revegetate parachute drop zones and major roadways, but there needs to be more effort along minor roads and firebreaks.

Many rare species occur within the Macrosite, including five which are Federally Endangered: red-cockaded woodpecker (*Picoides borealis*), St. Francis satyr (*Neonympha mitchellii francisci*,

a butterfly found only on Fort Bragg), chaffseed (*Schwalbea americana*), Michaux's sumac (*Rhus michauxii*), and roughleaf loosestrife (*Lysimachia asperulifolia*). Other rarities include the newly-described and globally rare Sandhills lily (*Lilium pyrophilum*), the newly-described and globally rare Sandhills spiny crayfish (*Cambarus hystricosus*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, nearly confined to the Fort Bragg region), and the state's only current populations of spiked medusa orchid (*Pteroglossaspis ecristata*), Carolina pineland-cress (*Warea cuneifolia*), and peelbark St. John's-wort (*Hypericum fasciculatum*). For 26 rare plant species, the only current Hoke population(s) occurs in the Macrosite: scale-leaf gerardia (*Agalinis aphylla*), Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), Sandhills milkvetch (*Astragalus michauxii*), coastal sedge (*Carex exilis*), twig-rush (*Cladium mariscoides*), Venus flytrap (*Dionaea muscipula),* Robbins's spikerush (*Eleocharis robbinsii*), seven-angled pipewort *(Eriocaulon aquaticum*), resinous boneset (*Eupatorium resinosum*), Sandhills blanket flower (*Gaillardia aestivalis*), soft milkpea (*Galactia mollis*), Heller's rabbit-tobacco (*Gnaphalium helleri* var. *helleri*), roughleaf loosestrife, pinebarren smokegrass (*Muhlenbergia torreyana*), loose watermilfoil (*Myriophyllum laxum*), Carolina Grass-of-Parnassus (*Parnassia caroliniana*), Alabama beaksedge (*Rhynchospora crinipes*), southern white beaksedge (*Rhynchospora macra*), featherbristle beaksedge (*Rhynchospora oligantha*), Sandhills wild petunia (*Ruellia ciliosa*), chaffseed (*Schwalbea americana*), Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*), two-flowered bladderwort (*Utricularia geminiscapa*), dwarf bladderwort (*Utricularia olivacea*), Chapman's yellow-eyed-grass (*Xyris chapmanii*), and Harper's yellow-eyed-grass (*Xyris scabrifolia*).

The same is true for rare animal species not found elsewhere in Hoke County: lark sparrow (*Chondestes grammacus*), canebrake rattlesnake (*Crotalus horridus*), Pine Barrens treefrog *(Hyla andersonii*), gopher frog (*Rana capito*), and at least ten butterflies, moths, and grasshoppers.

The importance of Fort Bragg to the biodiversity of Hoke County cannot be overstated. The high quality fire-maintained habitats and the semi-protected status afforded the flora and fauna have created a defacto wildlife refuge out of the northern third of the county.



HOKE COUNTY INVENTORY

Fort Bragg Blues Mountain
Significant Natural Heritage Area
Nicholson Creek quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG BLUES MOUNTAIN

Site Significance: state
Size: 150 acres
USGS Quadrangle: Nicholson Creek
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Blues Mountain is one of Fort Bragg's most significant geologic sites. The rare sandstone formation which defines the area was formed by sediments deposited over 40 million years ago, during a period when the ocean covered much of what is now called the Sandhills region. Formations such as these are known in North Carolina only from eastern Moore County and western Hoke County; all other areas that were once covered by the formation have apparently eroded away. The mountain laurel (*Kalmia latifolia*) community which dominates the western slopes and ravines of Blues Mountain is a very unusual community type for upland areas in the Sandhills, and it is the highest quality example in the region. The site also contains an excellent example of a Pine/Scrub Oak Sandhill (Clay/Rock Hilltop Subtype) community.

LANDSCAPE RELATIONSHIPS: Blues Mountain Natural Area is located in the southeastern corner of McPherson Artillery Impact Area, north of Chicken Road. It lies on the southeast side of Juniper Creek Headwaters NA, two miles northwest of Mott Lake NA, and 1.6 miles north of MOT Commel NA.

SITE DESCRIPTION: The central feature of the natural area is a high-elevation (500 feet), north/south-trending ridge with steep, west-facing slopes that are sharply dissected by narrow, dry to slightly seepage-fed ravines. Boulders and large slabs of ironstone are scattered along the ravines, as well as small ironstone pebbles which can be found along the narrow, secondary ridges which separate the ravines. Although much of the ridgetop has been cleared and degraded by troop activity and a roadbed, the western slopes are relatively intact and support an unusual longleaf pine/oak/mountain laurel community, the only example of its type known from an upland site in the Sandhills region. Immediately to the west of the mountain laurel slopes a slightly degraded oak-hickory forest occurs. Farther to the west an unusual example of Pine/Scrub Oak Sandhill (Mesic Transition Variant) dominates the moderately rolling terrain.

MANAGEMENT AND PROTECTION: Several steps need to be taken to ensure that the unique community present along the western slopes of Blues Mountain remains intact. 1) Erosion should be controlled along denuded areas of the ridgetop road and also along the firebreaks which cross the slopes. These roadbeds need to be stabilized and revegetated. Restoration of these areas would also help to restore the natural hydrologic regime. 2) Prescribed fires should be carefully used to periodically remove dense shrub layers along the slopes and to reduce and maintain open understories in the plant communities to the west of the slopes. 3) Heavy foot and all vehicle traffic should be restricted from the slopes.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Clay/Rock Hilltop Variant), Pine/Scrub Oak Sandhill (Mesic Transition Variant), Dry Oak-Hickory Forest.

RARE PLANTS: Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), but this population shows intermediacy to common pyxie-moss (*P. barbulata* var. *barbulata*).

RARE ANIMALS: None known.

REFERENCES:

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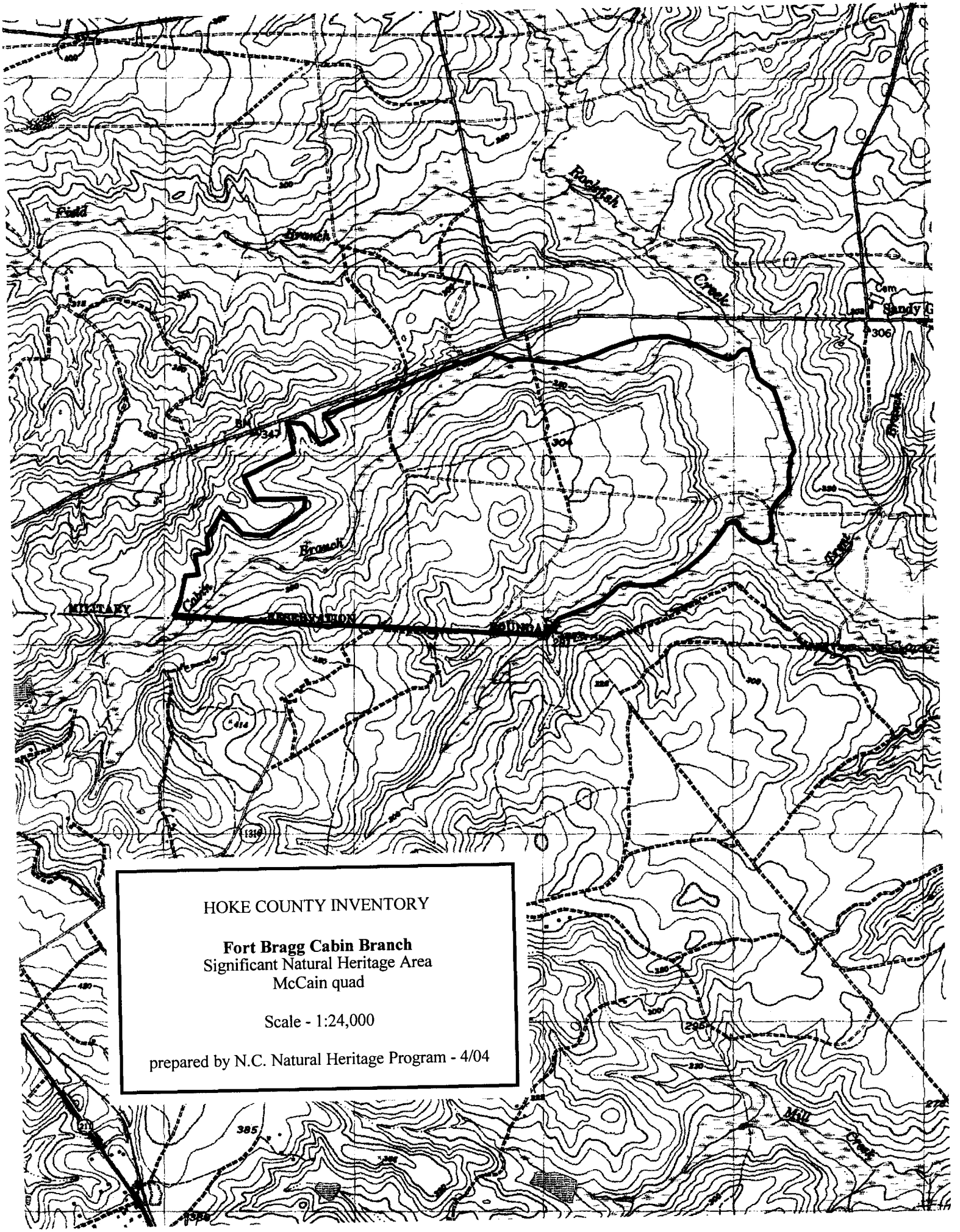


HOKE COUNTY INVENTORY

Fort Bragg Cabin Branch
Significant Natural Heritage Area
McCain quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG CABIN BRANCH

Site Significance: regional
Size: 677 acres
USGS Quadrangle: McCain
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Cabin Branch Natural Area contains a diversity of plant communities in good to excellent condition, several of which are rare or uncommon in the North Carolina Sandhills, such as the Clay/Rock Hilltop Variant of Pine/Scrub Oak Sandhill, a Vernal Pool, and an unusual shortleaf pine community. The Small Stream Swamp community along Cabin Branch and the extensive Xeric Sandhill Scrub communities in the natural area represent some of the best examples of these types in Hoke County.

LANDSCAPE RELATIONSHIPS: The Cabin Branch Natural Area is located in the southwest section of Fort Bragg, between Cabin Branch and Rockfish Creek. The base boundary road serves as the southern border. It lies 1.4 miles south of Fort Bragg Southern Rockfish Creek Significant Natural Heritage Area and lies adjacent to Calloway Sandhills SNHA.

SITE DESCRIPTION: The site is a horseshoe-shaped area, containing a broad central ridge that is surrounded to the west, north, and east by floodplain communities of Cabin Branch and Rockfish Creek. A diversity of community types occurs on the ridge: Pine/Scrub Oak Sandhill (Mixed Oak Variant) occurs in swales and along the moderate to steep slopes above Cabin Branch and Rockfish Creek, Xeric Sandhill Scrub dominates most of the northern and eastern sections of the ridge, and Pine/Scrub Oak Sandhill (Rock/Clay Hilltop Variant) is located in the southwest section of the ridge. Also present along the ridge is an unusual shortleaf pine community, located north and south of Firebreak 2 and just east of the clay/rock hilltop community, and a small Vernal Pool, located south of Firebreak 3 and roughly 900 meters east of Cabin Branch. These communities are in good to excellent condition, due to frequent burns in this area and moderately low levels of soil disturbance. Several areas along the ridge are quite scenic, with sparse scrub layers, moderate to dense covers of wiregrass (*Aristida stricta*), and extensive, park-like stands of longleaf pine (*Pinus palustris*). The floodplain of Cabin Branch is dominated by Small Stream Swamp vegetation and, in one local area, by a grove of Atlantic white cedar (*Chamaecyparis thyoides*). Coastal Plain Small Stream Swamp is the dominant community along Rockfish Creek.

MANAGEMENT AND PROTECTION: Portions of the natural area have been impacted by disturbances such as thinning cuts, fire suppression, pinestraw raking, and soil erosion; these should be addressed. The major threat to the natural area is soil erosion: gullies and siltation are severe along several firebreaks.

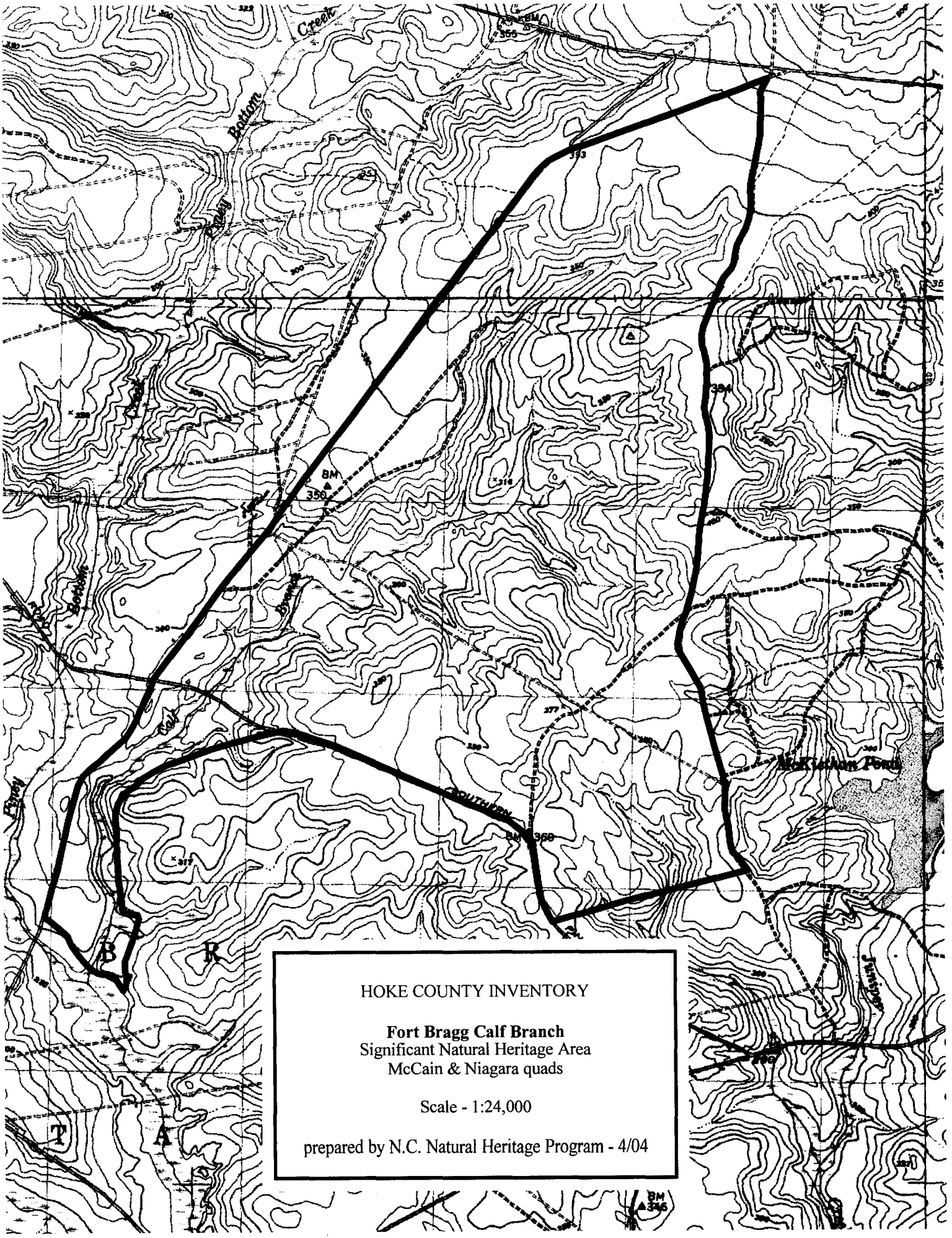
NATURAL COMMUNITIES: Coastal Plain Small Stream Swamp (Blackwater Subtype), Vernal Pool, Pine/Scrub Oak Sandhill (Mixed Oak and Clay/Rock Hilltop Variants), Xeric Sandhill Scrub (Sandhills Variant).

RARE PLANTS: Resinous boneset (*Eupatorium resinosum*), Heller's rabbit-tobacco (*Gnaphalium helleri* var. *helleri*), bog spicebush (*Lindera subcoriacea,* FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia,* FSC*).*

RARE ANIMALS: None known.

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Calf Branch
Significant Natural Heritage Area
McCain & Niagara quads

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG CALF BRANCH

Site Significance: national
USGS Quadrangle: McCain
Size: 1909 acres
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Calf Branch contains an outstanding cluster of community, plant, and animal elements of the Sandhill Region, with excellent examples of Streamhead Atlantic White Cedar Forest, Sandhill Seep, Mesic Pine Flatwoods, and Pine/Scrub Oak Sandhill (Mesic Transition Variant) as well as more common communities. The impressive suite of rare plants includes large populations of two Federally Endangered plants: chaffseed (*Schwalbea americana*) and roughleaf loosestrife (*Lysimachia asperulifolia*), as well as three Federal Species of Concern plants: bog spicebush (*Lindera subcoriacea*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*), and spring-flowering goldenrod (*Solidago verna*). Several family groups of Federally Endangered red-cockaded woodpeckers inhabit the natural area, as does the Federal Species of Concern southern hognose snake (*Heterodon simus*). The ecological, floral, and animal diversity of this Significant Natural Heritage Area is impressive.

LANDSCAPE RELATIONSHIPS: The natural area lies partly within and partly outside of MacPherson Artillery Impact Area and extends to the confluence of Calf Branch and Rockfish Creek. It abuts the west side of Juniper Creek SNHA and the south side of Piney Bottom Creek SNHA.

SITE DESCRIPTION: Two outstanding areas are contained within the Calf Branch Natural Area. 1) The western area includes natural communities found along the Calf Branch floodplain (Streamhead Atlantic White Cedar Forest and Coastal Plain Semipermanent Impoundment), the numerous Streamhead Pocosins and Sandhill Seeps which feed into the floodplain, and the adjacent upland communities [Mesic Pine Flatwoods, Pine/Scrub Oak Sandhill (Mixed Oak, Mesic Transition, and Loamy Soil Variants), and Xeric Sandhill Scrub] which are located on the broad terraces and long slopes to the southeast of Calf Branch. 2) The eastern area of uplands and streamheads. The central feature here is a moderately high ridge, located north of Firebreak 4, which is capped by Xeric Sandhill Scrub and Pine/Scrub Oak Sandhill (Mesic Transition Variant). The gentle slopes below the ridge are dominated by Pine/Scrub Oak Sandhill (Mixed Oak Variant), Dry Oak-Hickory Forest, and in one small area by a Sandhill Seep. Several good Pine/Scrub Oak Sandhill communities and Mesic Pine Flatwoods inclusions occur across the eastern area.

MANAGEMENT AND PROTECTION: Erosion of sand roads causes locally severe sedimentation of Calf Branch and its tributaries. Most is from vehicle use, but some is from heavy foot traffic. The problem needs to be addressed by shutting down selected sand roads and firebreaks, and by re-vegetating the roadsides.

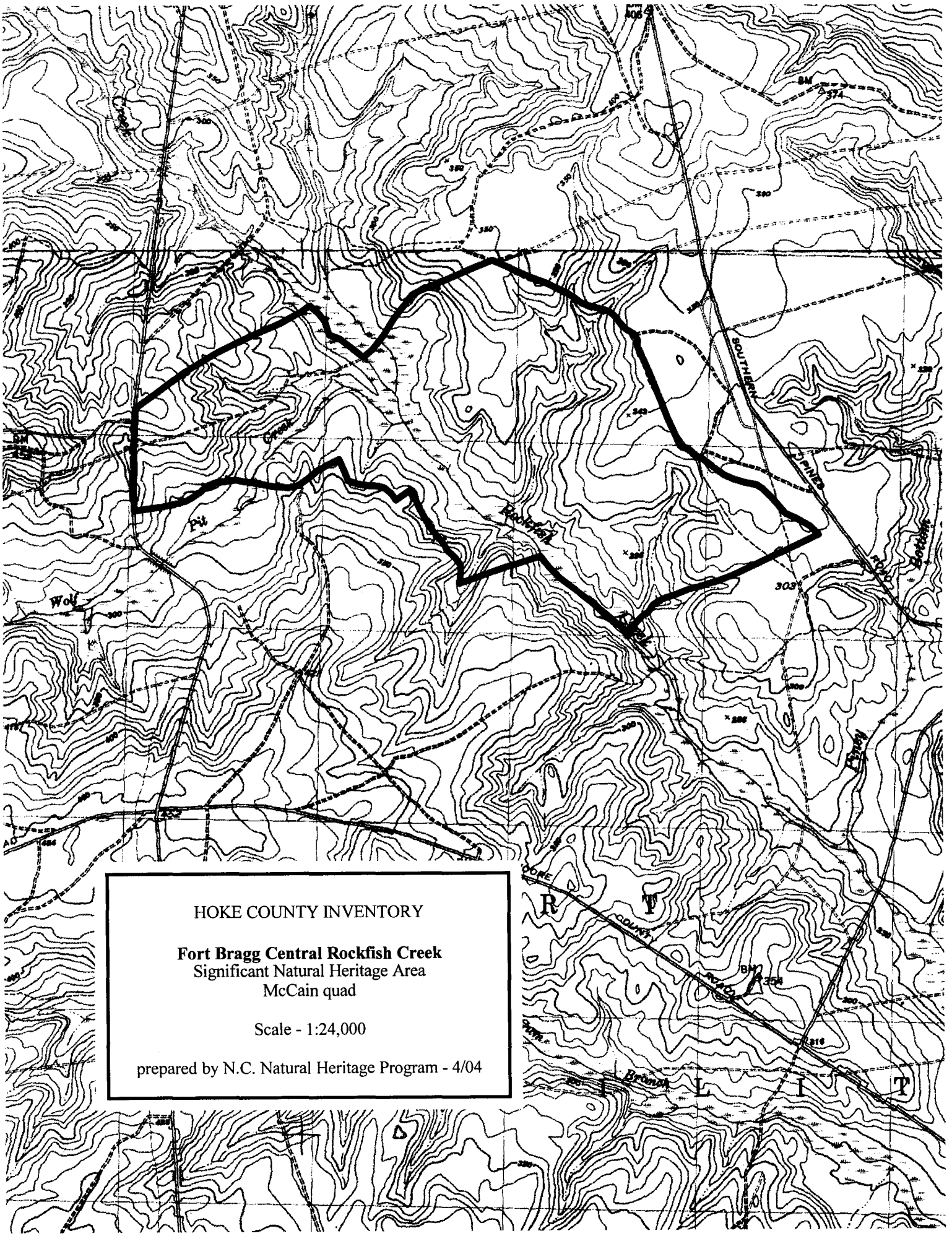
NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mixed Oak and Mesic Transition Variants), Xeric Sandhill Scrub (Sandhills Variant), Mesic Pine Flatwoods, Dry Oak-Hickory Forest, Streamhead Pocosin, Sandhill Seep, Streamhead Atlantic White Cedar Forest, and Coastal Plain Semipermanent Impoundment.

RARE PLANTS: Resinous boneset (*Eupatorium resinosum*), Heller's rabbit-tobacco (*Gnaphalium helleri* var. *helleri*), white wicky (*Kalmia cuneata*), bog spicebush (*Lindera subcoriacea*, FSC), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), southern white beaksedge (*Rhynchospora macra*), Canby's bulrush (*Schoenoplectus etuberculatus*), swaying bulrush (*Schoenoplectus subterminalis*), chaffseed (*Schwalbea americana*, FE), and spring-flowering goldenrod (*Solidago verna*, FSC).

RARE ANIMALS: Red-cockaded woodpecker (*Picoides borealis*, FE), Bachman's Sparrow (*Aimophila aestivalis*, FSC), and southern hognose snake (*Heterodon simus*, FSC).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Central Rockfish Creek
Significant Natural Heritage Area
McCain quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG CENTRAL ROCKFISH CREEK

Site Significance: national
Size: 830 acres
USGS Quadrangle: McCain
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Central Rockfish Creek Natural Area is one of the largest and most diverse natural areas on Fort Bragg. This Significant Natural Heritage Area contains an outstanding cluster of Sandhills region rare plants and rare natural communities, including Streamhead Atlantic White Cedar Forest, Mesic Pine Flatwoods, and Sandhill Seep, as well as more common communities. There are few other large-scale, high-quality, intact areas like this in the Carolina Sandhills. Central Rockfish Creek NA is the central unit of six SNHAs, an area large enough to be managed on a landscape basis. It supports a wide diversity of flora and fauna, including two Federally Endangered plants: chaffseed (*Schwalbea americana*) and roughleaf loosestrife (*Lysimachia asperulifolia*), as well as four Federal Species of Concern plants: bog spicebush (*Lindera subcoriacea*), Sandhills lily (*Lilium pyrophilum*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*), and spring-flowering goldenrod (*Solidago verna*). At least one family group of Federally Endangered red-cockaded woodpeckers inhabits the SNHA, as do numerous Pine Barrens treefrogs (*Hyla andersonii*), and Bachman's sparrow (*Aimophila aestivalis,* FSC).

LANDSCAPE RELATIONSHIPS: The site lies between MacPherson Artillery Impact Area and JSOC Training Area (at the very western edge of Ft. Bragg), about 1 mile north of Nijmegen Drop Zone. It includes the confluence of Wolf Pit Creek and Rockfish Creek. It lies west of Calf Branch SNHA, east of JSOC Bluffs SNHA, south of Rockfish Creek Headwaters SNHA, north of Gum Branch SNHA, and abuts Wolf Pit Creek SNHA.

SITE DESCRIPTION: The natural area contains examples of nine different plant communities, plus several community variants. The site can basically be divided into four sections: 1) Wolf Pit Creek lies to the west of Rockfish Creek between Firebreaks 13 and 15 and includes Streamhead Atlantic White Cedar Forest and Small Stream Swamp communities along Wolf Pit Creek. Good quality upland communities adjoin the stream and include a high seepage slope and a species-rich loamy soil variant site at its base. 2) Rockfish Creek includes Cypress-Gum Swamp and Small Stream Swamp communities along the creek, as well as broad, pond pine-dominated Sandhill Seeps bordering the floodplain communities. 3) Eastern Rockfish Creek uplands are located between Rockfish Creek and the eastern tributary between Firebreaks 14 and 17. This section includes typical xeric to mesic communities across flat to gently rolling uplands and is dissected along its edges at many points by small Streamhead Pocosins which drain into the eastern tributary or to Rockfish Creek itself. 4) Southern Rockfish Creek uplands include all of the area between Firebreaks 17 and 21, east of Rockfish Creek, and is defined by a very large, excellent Pine Scrub Oak (Mesic Transition Variant) community located between Firebreaks 18 and 21, on the ridge between Rockfish Creek and a south-flowing Streamhead Pocosin to the east. Numerous, high-quality Streamhead Pocosins and Sandhill Seeps drain from

this ridge into Rockfish Creek. The slopes to the east of the eastern Streamhead Pocosin are dominated by rather typical but good quality mesic to dry upland communities.

MANAGEMENT AND PROTECTION: Erosion of sand roads causes locally severe sedimentation of Rockfish Creek and its tributaries, which threatens aquatic animals and plants. Most erosion is from vehicle use, but some is from heavy foot traffic. The problem needs to be addressed by shutting down selected sand roads and firebreaks, and by re-vegetating the roadsides. The deeply eroded roadbeds are also disrupting the water and nutrient dynamics of the Sandhill Seeps and Mesic Pine Flatwoods which they dissect. Roadbeds adjacent to these wetlands act as drainage ditches (if the roadbeds lie below the seep or flatwoods area), drawing water and nutrients out of the sites. Some areas along Rockfish and Wolf Pit Creeks are fire-suppressed and need restorative fires. Heavy vehicles and foot traffic, bivouacking, foxhole construction, and sand and gravel extraction should be restricted from all areas. This information is from 1993 and needs updating.

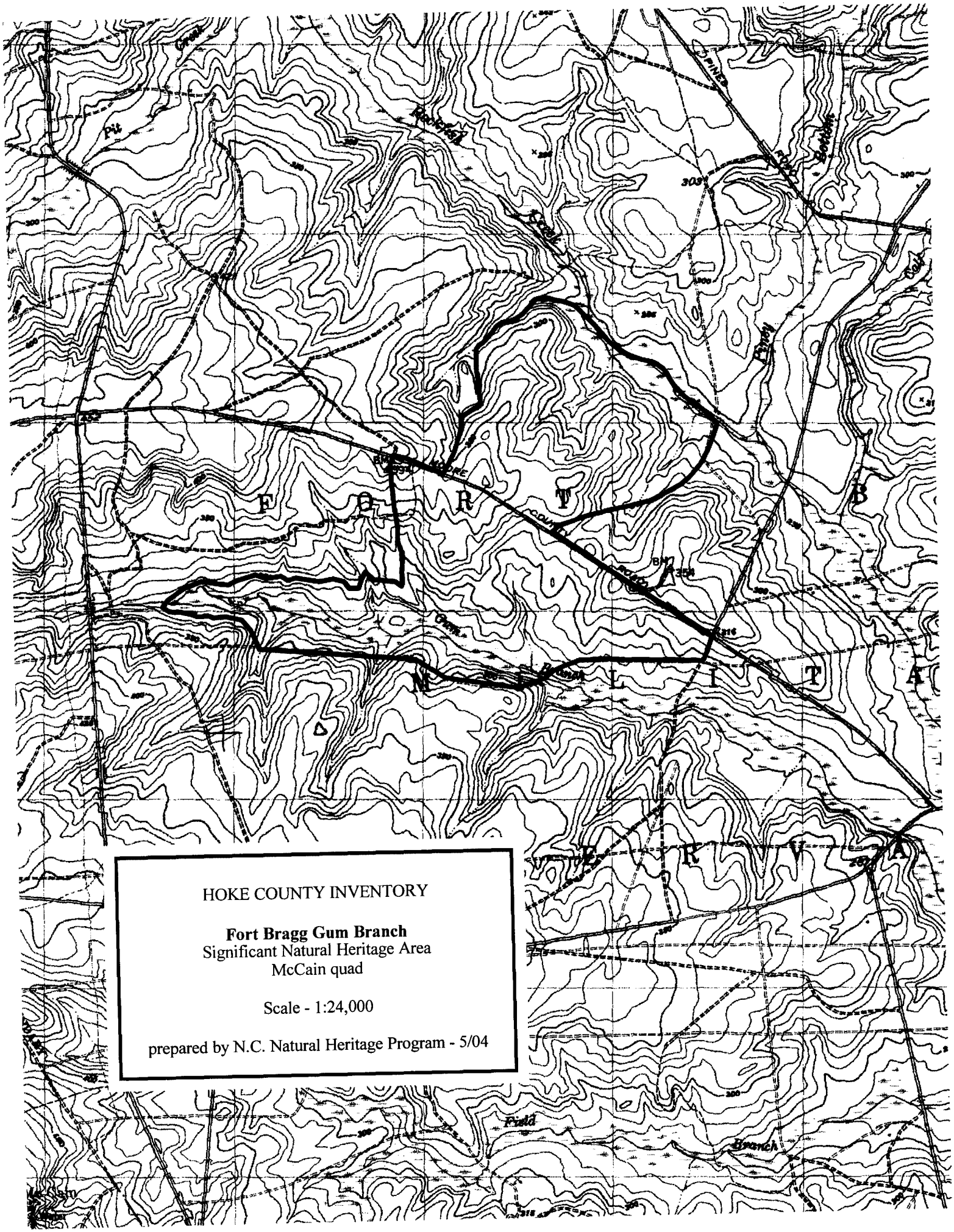
NATURAL COMMUNITIES: Streamhead Pocosin, Sandhill Seep, Streamhead Atlantic White Cedar Forest, Coastal Plain Small Stream Swamp (Blackwater Subtype), Cypress-Gum Swamp (Blackwater Subtype), Coastal Plain Semipermanent Impoundment, Mesic Pine Flatwoods, Pine/Scrub Oak Sandhill (Mesic Transition, Blackjack Oak, and Mixed Oak Variants), Xeric Sandhill Scrub (Sandhills Variant).

RARE PLANTS: Seven-angle pipewort (*Eriocaulon septangulare*), white wicky (*Kalmia cuneata*), Sandhills lily (*Lilium pyrophilum*, FSC), bog spicebush (*Lindera subcoriacea*, FSC), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), Canby's bulrush (*Schoenoplectus etuberculatus*), chaffseed (*Schwalbea americana*, FE), and spring-flowering goldenrod (*Solidago verna*, FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*, FSC), red-cockaded woodpecker (*Picoides borealis*, FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Gum Branch
Significant Natural Heritage Area
McCain quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

FORT BRAGG GUM BRANCH

Site Significance: national
USGS Quadrangle: McCain
Size: 517 acres
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Gum Branch Significant Natural Heritage Area contains an assemblage of rare plants and high quality natural communities, including Pine/Scrub Oak Sandhill (Clay/Rock Hilltop Variant) and the very rare Bog Variant of Coastal Plain Semipermanent Impoundment, as well as more common communities. The site is at the southern edge of a group of six SNHAs along Rockfish Creek and tributaries, which form an area large enough to be managed on a landscape basis. There are few other large-scale, high-quality, intact areas like this in the Sandhills region. Gum Branch SHNA supports a good diversity of flora and fauna, including two Federally Endangered plants: roughleaf loosestrife (*Lysimachia asperulifolia*) and Michaux's sumac (*Rhus michauxii*), as well as two Federal Species of Concern plants: Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*), and Harper's yellow-eyed-grass (*Xyris scabrifolia*). Bachman's sparrows (*Aimophila aestivalis*, FSC) breed here. A remarkable colony of yellow pitcher plants (*Sarracenia flava*) and other bog species occur in a beaver impacted portion of Gum Branch.

LANDSCAPE RELATIONSHIPS: Gum Branch SNHA is located in the western section of Fort Bragg, adjacent to Nijmegen Drop Zone, between Rockfish Creek and Gum Branch. Moore County Road roughly divides the site in half and runs along a high ridge between the two creeks. It lies just south of Central Rockfish Creek SNHA and west of Southern Rockfish Creek SNHA.

SITE DESCRIPTION: The site is dominated by gently rolling, longleaf pine-forested terrain with Xeric Sandhill Scrub and Pine/Scrub Oak Sandhill communities on the ridge and upland areas and Streamhead Pocosin and Sandhill Seep vegetation scattered across lower slopes. Unusual features in the natural area include: 1) a Pine/Scrub Oak Sandhill (Clay/Rock Hilltop Variant) with an outcrop of ironstone located just south of Moore County Road between Firebreaks 25 and 26; 2) a Pine/Scrub Oak Sandhill (Mesic Transition Variant) community associated with the sandstone outcrop; 3) broad Sandhill Seeps on the slopes above Rockfish Creek; 4) broad ecotones along the well-burned northern edges of Gum Branch; 5) a Coastal Plain Semipermanent Impoundment (Bog Variant) community along Gum Branch north of Firebreak 33 which is full of pitcher plants; and 6) Pine/Scrub Oak Sandhill (Mesic Transition Variant) communities in minor swales and depressions south of Moore County Road. The area is in good to excellent ecological condition.

MANAGEMENT AND PROTECTION: Localized areas of severe ground disturbance occur along the firebreaks and Moore County Road. Siltation fans along the road have penetrated up to 30 meters into the adjacent woodlands at several points. Troop activity in the area appears to be moderately light, despite its proximity to the frequently used Nijmegen Drop Zone. Bivouac sites and infrequently used footpaths are scattered through the upland areas, but in general, soil

disturbance appears to be moderately low. The communities along Rockfish Creek and Gum Branch have been significantly altered by siltation and logging disturbances in the past but are recovering well. All wildlife foodplots in the site should be abandoned and replanted with longleaf pine.

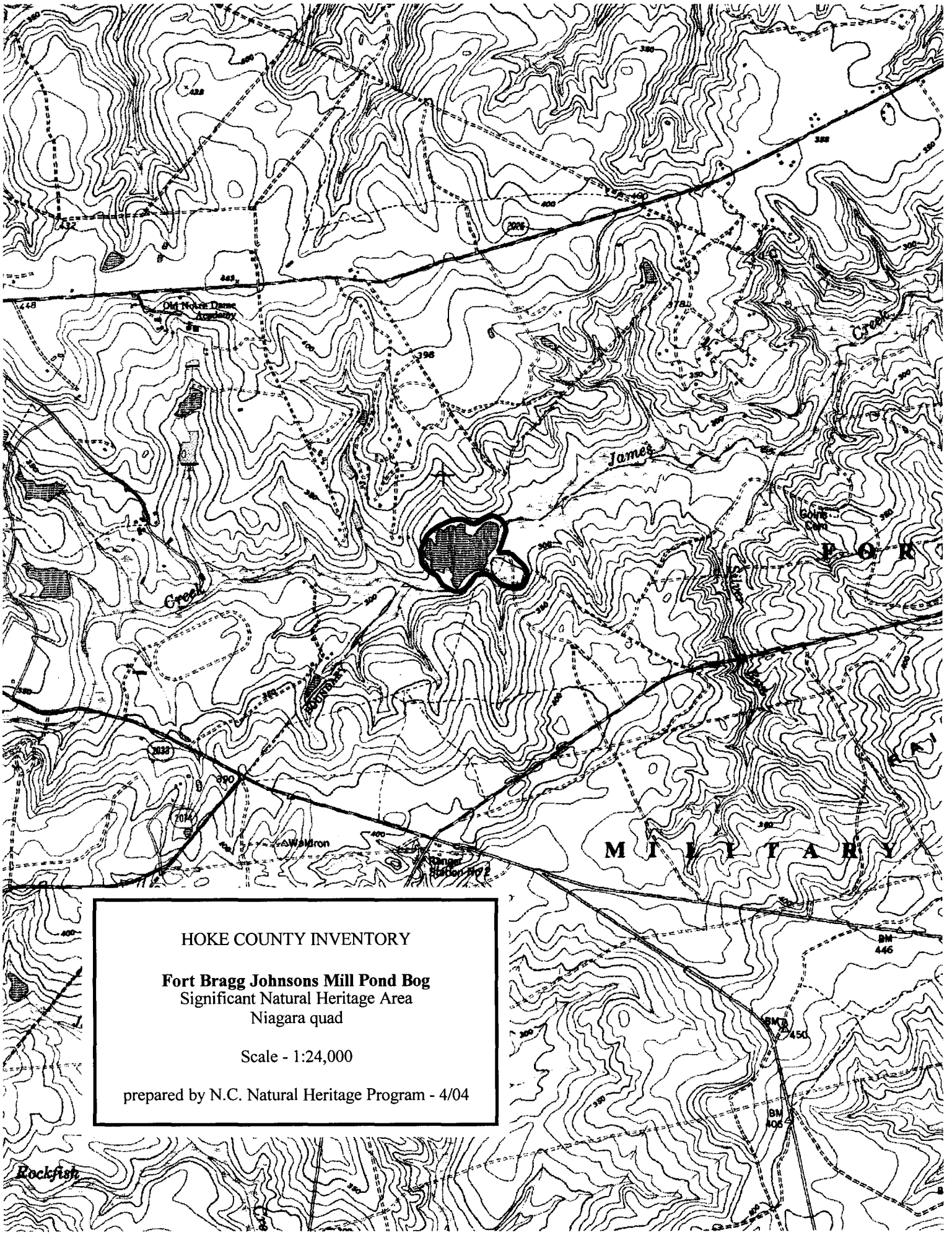
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mixed Oak, Clay/Rock Hilltop, Mesic Transition, and Blackjack Oak Variants), Sandhill Seep, Streamhead Pocosin, Coastal Plain Small Stream Swamp, Coastal Plain Semipermanent Impoundment (Bog Variant).

RARE PLANTS: Resinous boneset (*Eupatorium resinosum*), white wicky (*Kalmia cuneata*), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), Michaux's sumac (*Rhus michauxii*, FE), southern white beaksedge (*Rhynchospora macra*), swaying bulrush (*Schoenoplectus subterminalis*), Chapman's yellow-eyed-grass (*Xyris chapmanii*), and Harper's yellow-eyed-grass (*Xyris scabrifolia*, FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*, FSC).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Johnsons Mill Pond Bog
Significant Natural Heritage Area
Niagara quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG JOHNSONS MILL POND BOG

Site Significance: state
USGS Quadrangle: Niagara
Size: 36 acres
Ownership: US Dept. of Defense and private

SIGNIFICANT FEATURES: Johnson's Mill Pond Bog Natural Area contains the largest example of a floating peat community in the North Carolina Sandhills and one of the best in the state. The extensive floating mats of peat and vegetation are much like a northern quaking bog. Johnson's Mill Pond supports eight state-rare plant species, including one of only four occurrences in North Carolina of two-flowered bladderwort (*Utricularia geminiscapa*), here at its southern range limit; a large occurrence of resinous boneset (*Eupatorium resinosum*); the state's largest occurrence of Robbins' spikerush (*Eleocharis robbinsii*); and the state's only extant occurrence of peelbark St. John's-wort (*Hypericum fasciculatum*). The pond provides breeding or foraging habitat for numerous bird, amphibian, and insect species. An undescribed and apparently rare species of arrowhead (*Sagittaria*) occurs here.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area lies on the northwest boundary of Ft. Bragg, one mile northeast of the junction of Connecticut Avenue and Fort Bragg Road, three miles east of downtown Southern Pines. It lies just over a mile west of Holland Drop Zone and a mile north of Rockfish Creek Headwaters SNHA.

SITE DESCRIPTION: Johnson's Mill Pond is a pre-Revolutionary War impoundment on Mill Creek, a tributary of James Creek and Lower Little River. Although the origin of the impoundment is artificial, it supports a more mature plant community than occurs in the beaver ponds that have been created since beavers were reintroduced in North Carolina. Ironically, beavers now maintain the dam and the ecosystem integrity. The pond is dominated by many floating peat islands, which support species characteristic of bogs and marshes, such as sundews (*Drosera*), meadow-beauties (*Rhexia*), yellow-eyed-grasses (*Xyris*), sedges (especially *Eleocharis* and *Rhynchospora*), rushes (*Juncus*), woolgrass (*Scirpus cyperinus*), St. John's-worts (*Hypericum* and *Triadenum*), and seedboxes (*Ludwigia*). Open water is restricted to relatively small openings, passageways, and stream channels, and supports floating aquatics: water-lilies (*Nymphaea odorata*), watershield (*Brasenia schreberi*), bladderworts (*Utricularia spp.*), and golden club (*Orontium aquaticum*), as well as emergents like Robbins's spikerush and bulrushes (*Scirpus*). With the exception of the deepest water, stunted swamp black gum (*Nyssa biflora*) trees are scattered throughout, remnants of the swamp forest that once covered this floodplain. Narrow to broad sphagnous margins of the pond are inhabited by many of the same plants, as well as species more typical of exposed pondshores and seepage slopes, including soft pipewort (*Eriocaulon compressum*), yellow pitcher plant (*Sarracenia flava*), redroot (*Lachnanthes caroliniana*), threeway sedge (*Dulichium arundinaceum*), umbrella sedge (*Fuirena squarrosa*), and clubmosses (*Lycopodiella spp.*). Many species of shrubs crowd the shores, most typical of Streamhed Pocosins. Peelbark St. John's-wort, a showy flowering shrub at the north edge of its

range, occurs in scattered groups. The shrub zone is bordered by loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*) and swamp black gum.

MANAGEMENT AND PROTECTION: Its remote location and boggy condition has kept Johnson's Mill Pond Bog relatively undisturbed, and it is expected to remain that way into the future. However, to ensure long-term protection from disturbances such as upstream pollution, Fort Bragg and adjacent landowners should implement a conservation plan for the site. The shrub zone and the adjacent pine/hardwoods are fire-suppressed and would benefit from prescribed burns every five years or so.

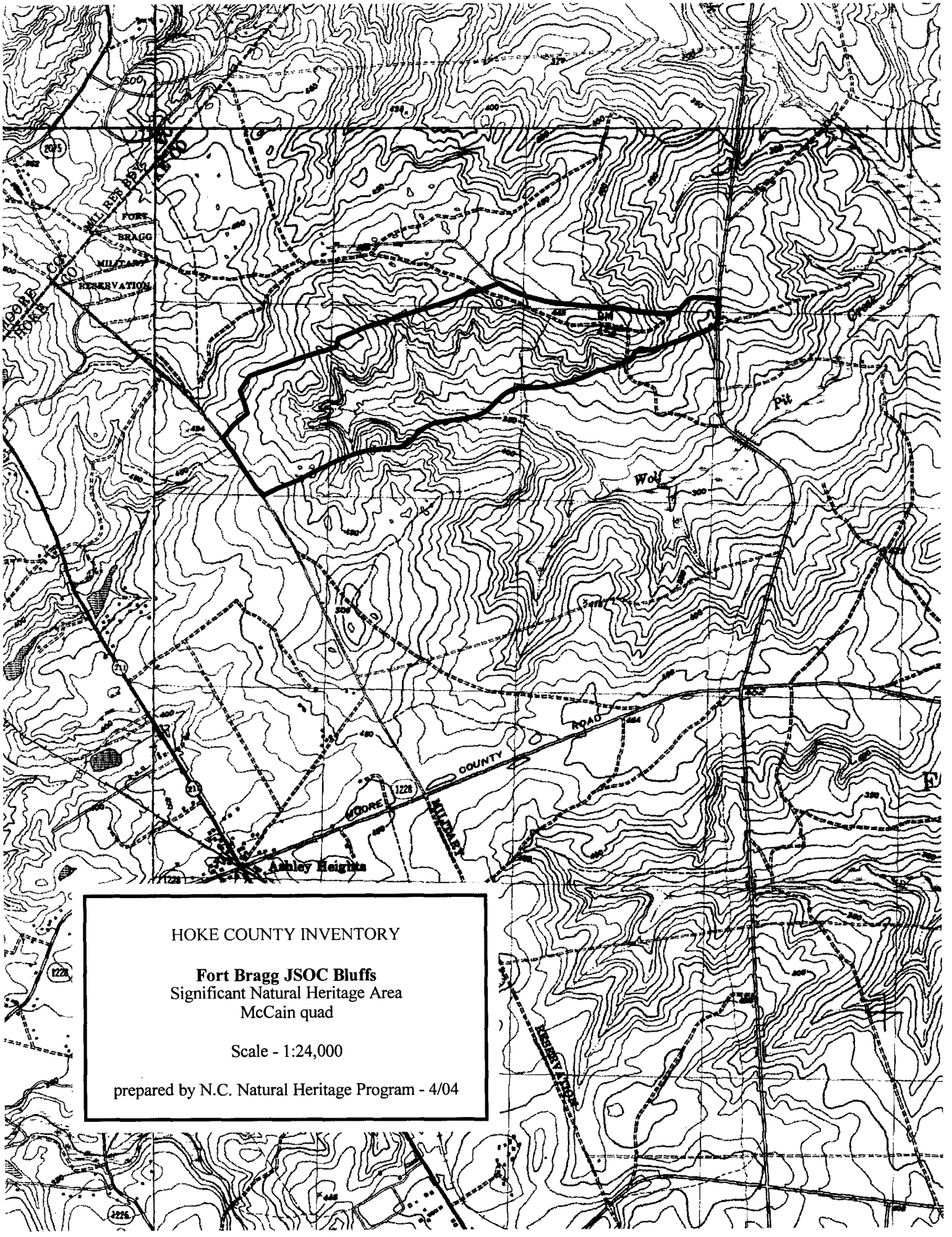
NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment (Floating Peat Variant).

RARE PLANTS: Twigrush (*Cladium mariscoides*), Robbins's spikerush (*Eleocharis robbinsii*), resinous boneset (*Eupatorium resinosum*), peelbark St. John's-wort (*Hypericum fasciculatum*), southern white beaksedge (*Rhynchospora macra*), longbeak baldsedge (*Rhynchospora scirpoides*), Canby's bulrush (*Schoenoplectus etuberculatus*), two-flowered bladderwort (*Utricularia geminiscapa*).

RARE ANIMALS: Pine Barrens treefrog (*Hyla andersonii*), NC Watch List.

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg JSOC Bluffs
Significant Natural Heritage Area
McCain quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG JSOC BLUFFS

Site Significance: state
Size: 300 acres
USGS Quadrangle: McCain
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: The JSOC Bluff Natural Area contains some of the most striking terrain in the North Carolina Sandhills region, including sandstone outcrops, low bluffs, creek ravines, and steep seepage slopes. The site contains one of the state's highest quality examples of a rare community: Pine/Scrub Oak Sandhill (Clay/Rock Hilltop Variant). A few colonies of the Federally Endangered red-cockaded woodpecker (*Picoides borealis*) occur here. One Federal Species of Concern plant occurs here, Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*). This Significant Natural Heritage Area is one of six which form a cluster in the Rockfish Creek drainage and which constitute one of the premier natural landscapes in the Sandhills.

LANDSCAPE RELATIONSHIPS: The JSOC training area lies immediately to the north, King Road to the east, and the Ft. Bragg boundary to the west. The Central Rockfish Creek SNHA lies just to the east and Wolf Pit Creek SNHA lies just south.

SITE DESCRIPTION: This natural area contains most of the sandstone outcrops and bluff/ravine areas in the northern reaches of the Wolf Pit Creek watershed, all within a matrix of longleaf pine communities. The majority of the bluffs and ravines occur in the western section of the natural area, where tributaries to Wolf Pit Creek have become deeply entrenched and form narrow, steep-sided mini-gorges vegetated with unusual longleaf pine-hardwood communities. Extensive shrub and herb seepage communities are scattered across some of the wetter ravine slopes. Seepage communities also occur within the sandstone outcrop areas. The ridges above the ravines and sandstone outcrops are dominated by somewhat mesic Pine/Scrub Oak Sandhill, or in some areas by Clay/Rock Hilltop Variant communities. A large area of Xeric Sandhill Scrub is also present, located south of the JSOC entrance road. After leaving the ravine area in the western section of the natural area, Wolf Pit Creek widens out to form a broad Small Stream Swamp community.

MANAGEMENT AND PROTECTION: Severe erosion occurs in the natural area along most of the firebreaks and trails which cut across steep slopes. Areas that are in critical need of erosion control include the high clay/rock hilltop ridge in the eastern section and along Firebreaks 13 and 14 in the western section. Erosion in these areas is leading to sedimentation problems in the streams below. Other disturbed areas include several wildlife foodplots, which should be restored to longleaf pine communities.

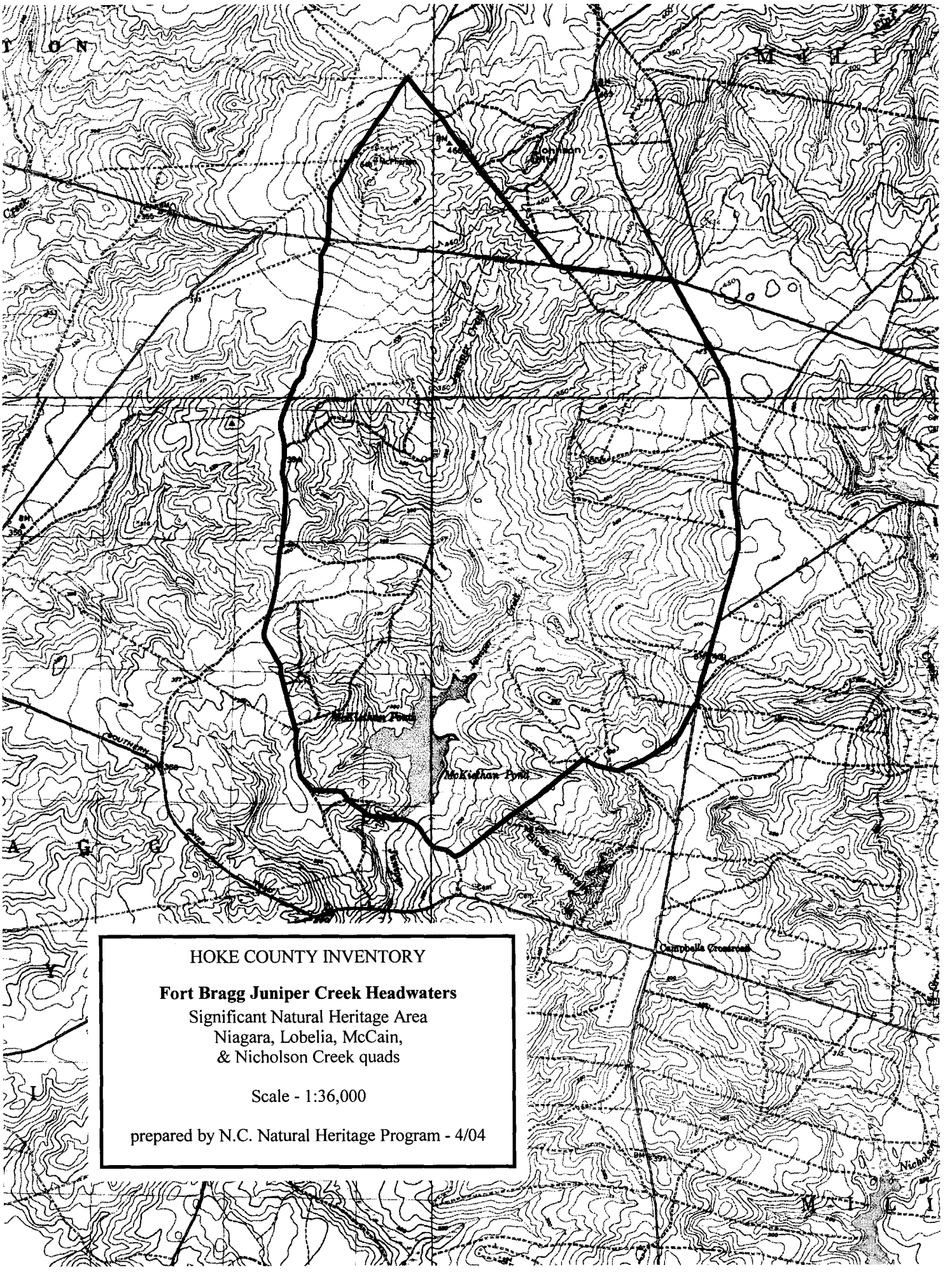
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mixed Oak, Mesic Transition, and Clay/Rock Hilltop Variants), Sandhill Seep, Streamhead Pocosin, Coastal Plain Small Stream Swamp (Blackwater Subtype).

RARE PLANTS: Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC).

RARE ANIMALS: Red-cockaded woodpecker (*Picoides borealis*, FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Juniper Creek Headwaters

Significant Natural Heritage Area
Niagara, Lobelia, McCain,
& Nicholson Creek quads

Scale - 1:36,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG JUNIPER CREEK HEADWATERS

Site Significance: national
Size: 3545 acres
USGS Quadrangle: Lobelia, McCain, Niagara, Nicholson Creek
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Juniper Creek Headwaters Natural Area supports a major cluster of rare plant and animal species and forms part of one of the best collections of fire-dependent sandhill species in the nation. Two Federally Endangered animals occur here: red-cockaded woodpecker (*Picoides borealis,* ten family groups) and a population of St. Francis satyr (*Neonympha mitchellii francisci,* a butterfly found only on Fort Bragg). Also here are two Federally Endangered plants: chaffseed (*Schwalbea americana*) and roughleaf loosestrife (*Lysimachia asperulifolia*), plus two plants that are Federal Specis of Concern: conferva pondweed (*Potamogeton confervoides*) and Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*). Eight additional state-rare plants and one state-rare animal also occur here, along with a number of high quality natural communities.

LANDSCAPE RELATIONSHIPS: This natural area includes the eastern half of the McPherson Artillery Impact Area, east to Raeford-Vass Road. It includes McKiethan Pond and the headwaters of Juniper Creek. Calf Branch NA and Piney Bottom Creek NA adjoin to the west. Blues Mountain NA adjoins to the southeast. Nicholson Creek Headwaters NA adjoins across a road to the east, within the Coleman Artillery Impact Area.

SITE DESCRIPTION: This site encompasses the interior of the McPherson Artillery Impact Area, the westernmost artillery range on Fort Bragg. The central portion is moderately disturbed by cratering, but the margins are little disturbed. The area is subject to frequent fire, and is one of the few areas in the state that have had a long-term regime of fire at or greater than the natural frequency (every three years). The area has been off limits most of the time and has not been well explored biologically or ecologically. Limited surveys have found a large number of rare species within a landscape of high quality plant communities, including a Small Depression Pocosin which is rare in the Sandhills region. The wetlands and waters of McKiethan Pond support several rare aquatic and seepage bog plants. The natural communities here have not been well studied and need further inventory and description. There is high potential for discovery of additional rare flora and fauna.

MANAGEMENT AND PROTECTION: The current prescribed burning program should be continued.

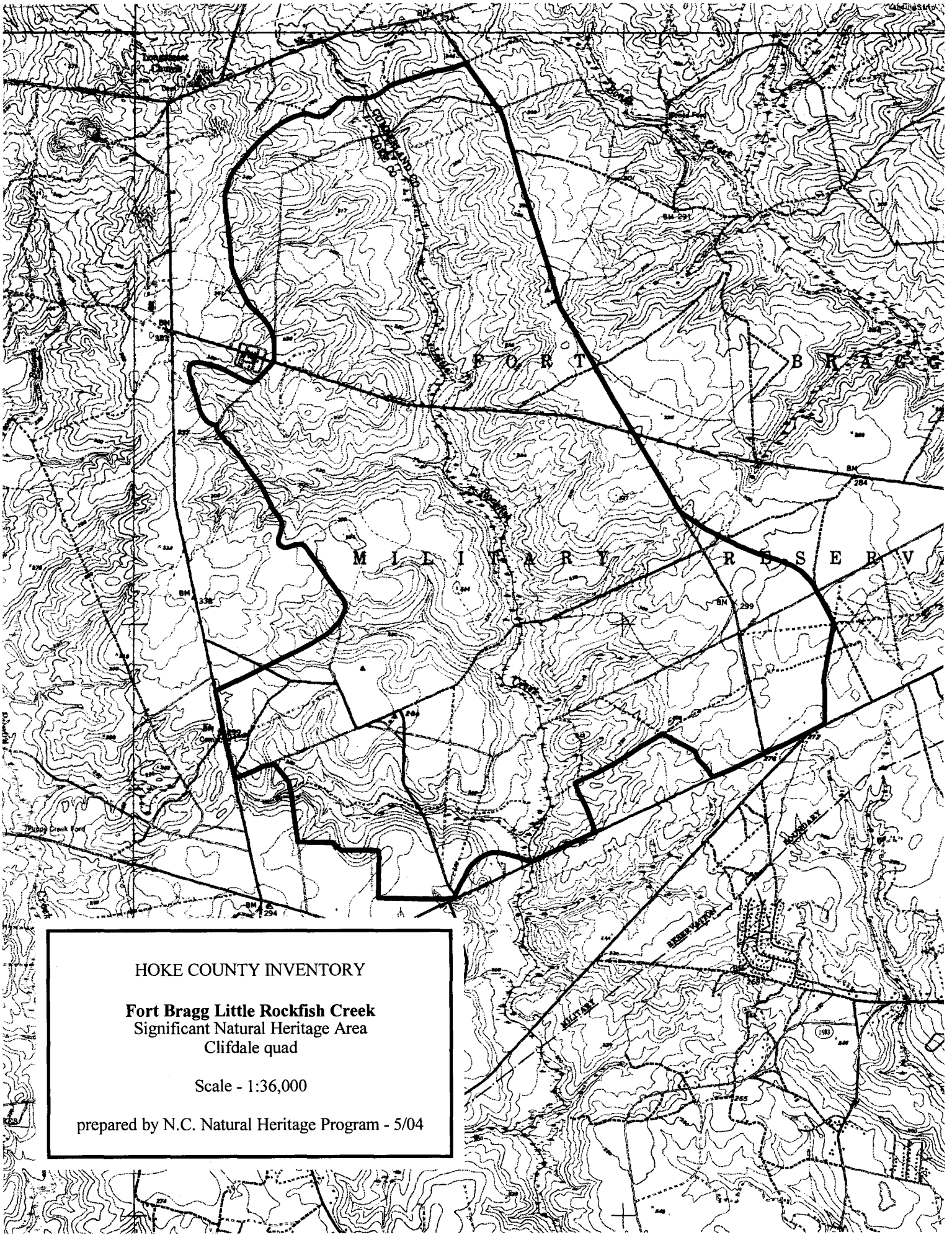
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (with Variants), Small Depression Pocosin, Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Semipermanent Impoundment.

RARE PLANTS: Coastal sedge (*Carex exilis*), Robbins' spikerush (*Eleocharis robbinsii*), resinous boneset (*Eupatorium resinosum*), white wicky (*Kalmia cuneata*), roughleaf loosestrife (*Lysimachia asperulifolia,* FE), conferva pondweed (*Potamogeton confervoides,* FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia,* FSC), southern white beaksedge (*Rhynchospora macra*), feather-bristle beaksedge (*Rhynchospora oligantha*), swaying bulrush (*Schoenoplectus subterminalis*), chaffseed (*Schwalbea americana,* FE), and Carolina triodia (*Tridens carolinianus*, a grass).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis,* FSC), St. Francis satyr (*Neonympha mitchellii francisci,* FE*),* red-cockaded woodpecker (*Picoides borealis,* FE), and Sandhills chub (a fish, *Semotilus lumbee,* FSC).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Little Rockfish Creek
Significant Natural Heritage Area
Clifdale quad

Scale - 1:36,000

prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

FORT BRAGG LITTLE ROCKFISH CREEK

Site Significance: national
Size: 4478 acres (2430 in Hoke County)
USGS Quadrangle: Clifdale
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Little Rockfish Creek Significant Natural Heritage Area contains a diverse assemblage of many high-quality plant communities, some of which are uncommon to rare in other areas of Fort Bragg and Hoke County, such Pine/Scrub Oak Sandhill (Mesic Transition Variant), the Cypress-Gum Swamp along Little Rockfish Creek, several canebrake communities*, and Pine Savanna/upland depression complexes*. Seventeen rare plants occur in the natural area, including one of the largest roughleaf loosestrife (*Lysimachia asperulifolia*, Federally Endangered) concentrations outside artillery impact areas, several chaffseed (*Schwalbea americana*, FE) occurrences, one population of Venus flytrap (*Dionaea muscipula,* Federal Species of Concern), Sandhills lily (*Lilium pyrophilum,* FSC), and the only extant population of spiked medusa orchid (*Pteroglossaspis ecristata*, FSC) in North Carolina. More than a dozen family groups of the FE red-cockaded woodpecker (*Picoides borealis*) occur here, as well as the FE St. Francis' satyr butterfly (*Neonympha mitchellii francisci*).

LANDSCAPE RELATIONSHIPS: The natural area includes the western half of MacRidge Artillery Impact Area, except for a few poor quality areas near firing ranges. Preachers Road forms the western boundary, Chicken Road the southern, and Longstreet Road the northern. Just to the west is Puppy Creek Headwaters SNHA and shortly east lies Bones Creek SNHA*. Little Rockfish Creek eventually drains into Rockfish Creek at Hope Mills, thence flows to the Cape Fear River.

SITE DESCRIPTION: Little Rockfish Creek SNHA is a topographically diverse area containing a complex array of both typical and unusual Sandhills plant communities. The main stem of Little Rockfish Creek supports high quality swamp forest, while branches support high quality streamhead pocosins. The dominant landscape feature is the broad Cypress-Gum Swamp floodplain of Little Rockfish Creek, which roughly divides the natural area into eastern and western sections. Dominant trees are swamp black gum (*Nyssa biflora*) and pond cypress (*Taxodium ascendens*), which are impressively large near Chicken Road. Several beaver impoundments occur along the creek and its lower tributaries. The western section, which is dominated by Xeric Sandhill Scrub along its north and south edges and by a major tributary to Little Rockfish Creek through its center, contains excellent examples of a variety of community types, including Sandhill Seeps, Streamhead Pocosins, and wetland ecotone complexes. Low rolling hills support variants of Pine/Scrub Oak Sandhill, while a mosaic of mesic and wet pine flatwoods is located along the terraces west of Little Rockfish Creek. The eastern section, which is also dominated by Xeric Sandhill Scrub in its upland areas, contains examples of several other community types, including a Small Depression Pocosin*, a Vernal Pool*, and several large canebrake communities*. These latter support dense cane (*Arundinaria tecta*) under longleaf pine (*Pinus palustris*) and pond pine (*Pinus serotina*). Several unusual Pine Savannas* also

occur in the eastern section. Remarkable is a small but naturally ponded depression*, isolated and entirely dependent on rainfall, that provides habitat for many specialist plants that tolerate fluctuating water levels. Near Preachers Road are natural and artificial depressions which harbor Carolina gopher frogs, eastern tiger and Mabee's salamanders, and ornate chorus frogs. The whole natural area is noted for its high biodiversity, with well over 400 plant species documented overall and 110 species within a 20x50 meter vegetation sampling plot.

MANAGEMENT AND PROTECTION: The whole area needs to be periodically revisited to verify that current prescribed fire management is adequate. Erosion and siltation are moderately severe in the western section along the roads that drop down to the main east-west tributary, as well as along the slopes crossed by Board Road and the impact area boundary road.

NATURAL COMMUNITIES: Cypress-Gum Swamp (Blackwater Subtype), Streamhead Pocosin (Normal and Canebrake Variants), Small Depression Pocosin*, Pine Savanna (Wet Ultisol Variant)*, Sandhill Seep, Vernal Pool*, Small Depression Pond*, Mesic Pine Flatwoods, Pine/Scrub Oak Sandhill (Mesic Transition Variant and Blackjack Variant).

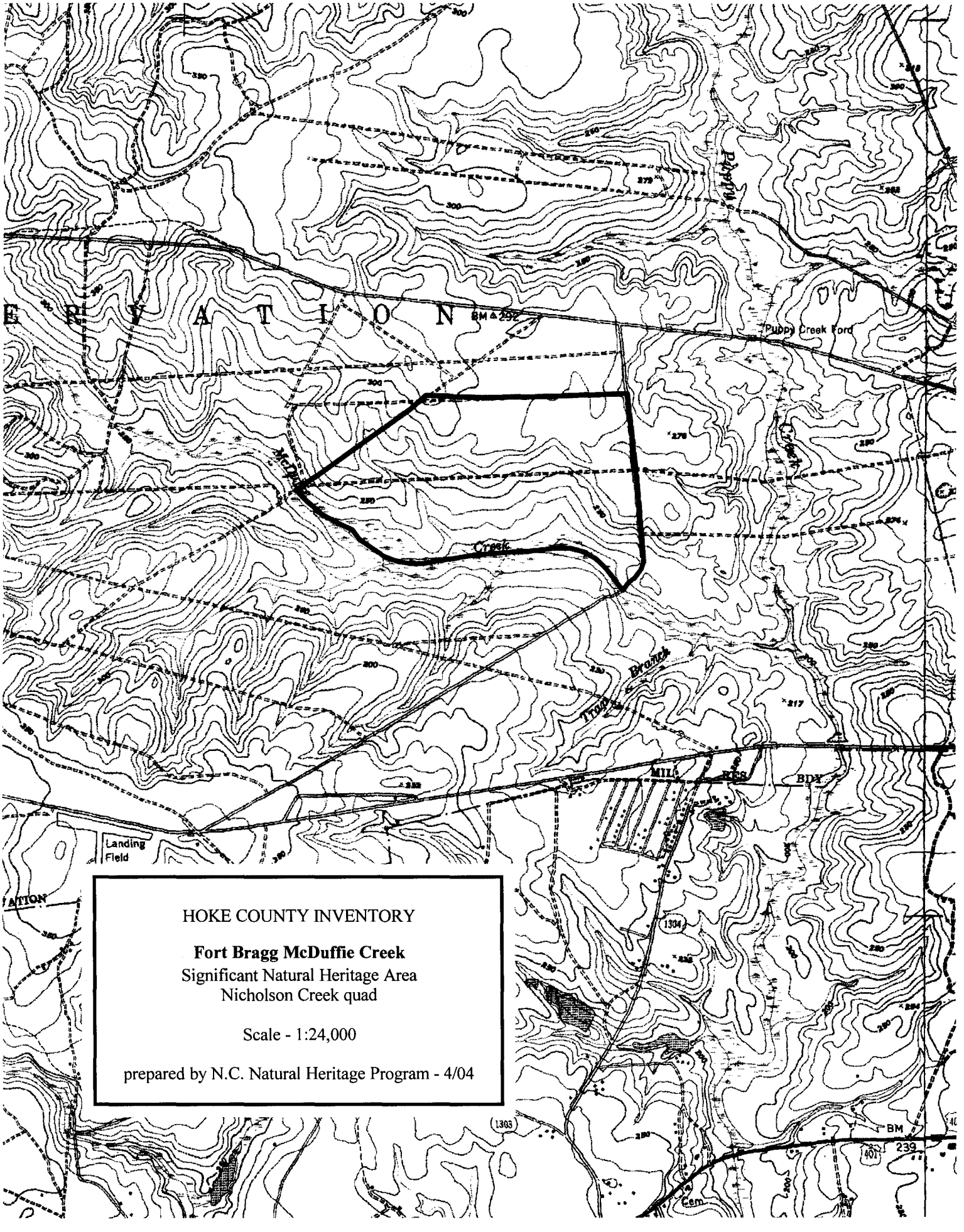
RARE PLANTS: Sandhills milkvetch (*Astralagus michauxii,* FSC), Venus flytrap (*Dionaea muscipula,* FSC), resinous boneset (*Eupatorium resinosum*), soft milkpea (*Galactia mollis*), Sandhills lily (*Lilium pyrophilum,* FSC), bog spicebush (*Lindera subcoriacea,* FSC), Boykin's lobelia (*Lobelia boykinii,* FSC)*, roughleaf loosestrife (*Lysimachia asperulifolia,* FE), southeastern panic-grass (*Panicum tenerum*)*, spiked medusa orchid (*Pteroglossaspis ecristata,* FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia,* FSC), quillwort arrowhead (*Sagittaria isoetiformis*)*, Canby's bulrush (*Schoenoplectus etuberculatus*), chaffseed (*Schwalbea americana*, FE), netted nutrush (*Scleria reticularis*)*, Carolina triodia grass (*Tridens carolinianus*), Chapman's yellow-eyed-grass (*Xyris chapmanii*).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*, FSC), red-cockaded woodpecker (*Picoides borealis*, FE), Carolina gopher frog (*Rana capito*), ornate chorus frog (*Pseudacris ornata*), Mabee's salamander (*Ambystoma mabeei*), eastern tiger salamander (*Ambystoma tigrinum*), St. Francis' satyr (*Neonympha mitchellii francisci,* FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.

* = occurs only in the Cumberland County portion of the SNHA.



HOKE COUNTY INVENTORY

Fort Bragg McDuffie Creek

Significant Natural Heritage Area

Nicholson Creek quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG MCDUFFIE CREEK

Site Significance: regional
Size: 301 acres
USGS Quadrangle: Nicholson Creek
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: McDuffie Creek Significant Natural Heritage Area is significant for its collection of plant communities, including an uncommon Mesic Pine Flatwoods swale and an isolated Sandhill Seep. The broad Pine/Scrub Oak Sandhill and Xeric Sandhill Scrub woodlands found here also represent some of the best examples of these community types in this section of Fort Bragg and Hoke County. Three family groups of red-cockaded woodpeckers (*Picoides borealis,* Federally Endangered) occur here.

LANDSCAPE RELATIONSHIPS: The natural area is located in the south-central section of Fort Bragg, north of McDuffie Creek and west of Plank Cutoff Road. Firebreak 20 serves as the northern boundary for the area; the western boundary follows a major northeast-southwest firebreak which runs from Chicken Road to Firebreak 24 (south of McDuffie Creek). Just to the east lies Puppy Creek SNHA and to the north and northeast lies Puppy Creek Headwaters SNHA.

SITE DESCRIPTION: The bulk of the natural area lies along long, gradual slopes north of McDuffie Creek, which are dominated by Pine/Scrub Oak Sandhill and Xeric Sandhill Scrub. A broad xeric upland area lies above these slopes to the north. Two interesting depressions, one a Mesic Pine Flatwoods swale and the other a Sandhill Seep/Streamhead Pocosin, occur in this upland area south of Firebreak 20. Other high quality natural communities include: (1) a Streamhead Pocosin in the western section that dissects the slope and drains into McDuffie Creek; (2) a Streamhead Atlantic White Cedar Forest community located near the area where Firebreak 4 dead-ends into the McDuffie Creek floodplain; and (3) a Sandhills Small Stream Swamp community along McDuffie Creek.

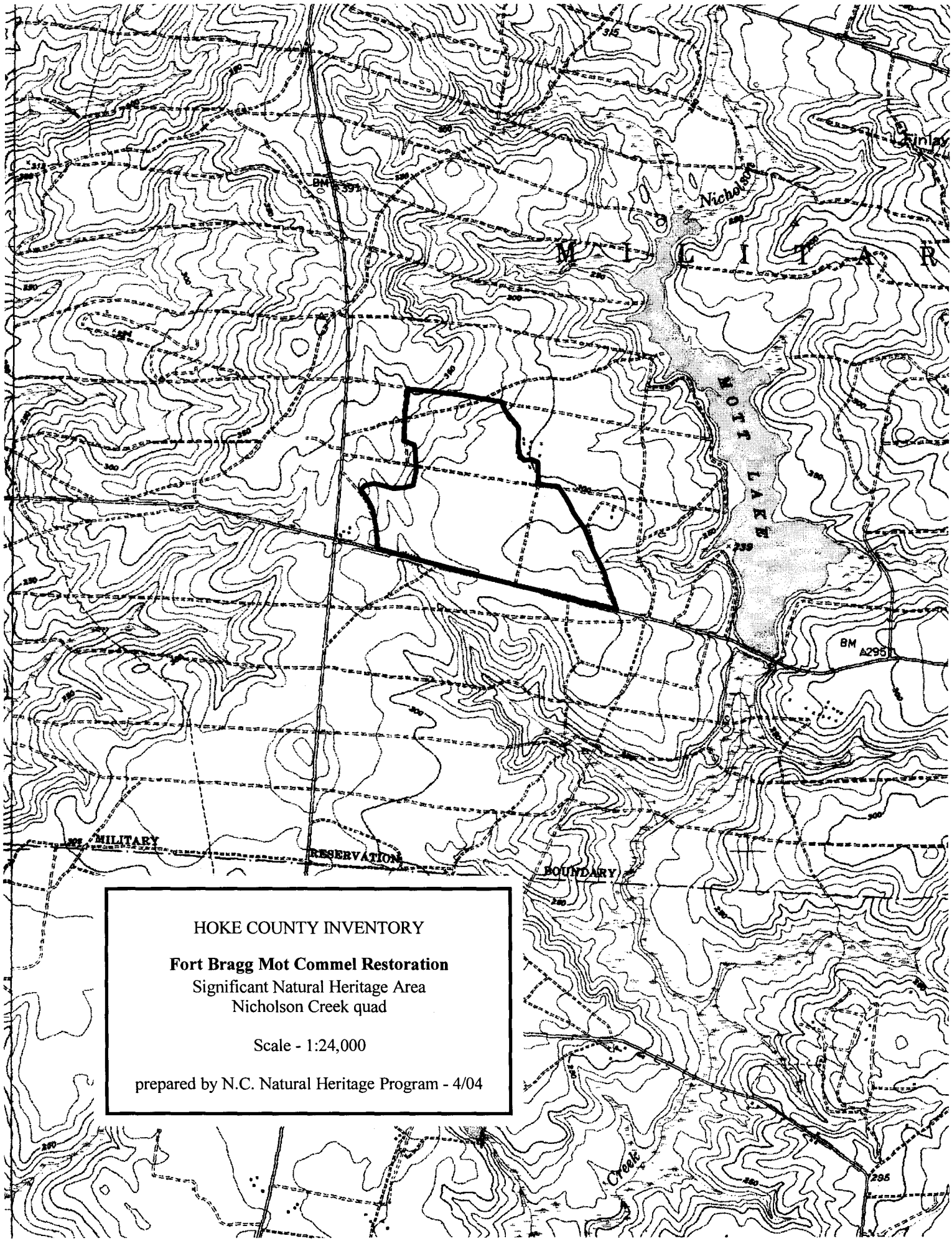
MANAGEMENT AND PROTECTION: The area has been degraded by various disturbances such as secondary firebreaks, trails through the woods, wildlife foodplots, erosion, fire suppression, and over-stocked canopies (this information 1993). Land protection and fire management efforts in place as of 1993 ought to restore these woodlands to an overall fine condition. Vehicle and heavy foot traffic should be restricted from the natural area. Erosion control and roadbed stabilization should be a top management priority, as well as burning or clearing sites with dense oak understories. If possible, sites with dense canopies should be thinned to allow light to reach the ground layer. Wildlife foodplots in the area should be evaluated and unnecessary ones replanted with longleaf pine (*Pinus palustris*).

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mixed Oak Variant), Xeric Sandhill Scrub (Sandhills Variant), Mesic Pine Flatwoods, Streamhead Pocosin, Streamhead Atlantic White Cedar Forest, Coastal Plain Small Stream Swamp (Blackwater Subtype).
RARE PLANTS: Carolina triodia grass (*Tridens carolinianus*).

RARE ANIMALS: Red-cockaded woodpecker (*Picoides borealis*, FE), Sandhills chub (a fish, *Semotilus lumbee*, FSC).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Mot Commel Restoration

Significant Natural Heritage Area

Nicholson Creek quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG MOT COMMEL RESTORATION

Site Significance: regional
Size: 197 acres
USGS Quadrangle: Nicholson Creek
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Despite extensive disturbance in the past, this area contains one of the most significant collections of rare upland plant species on Fort Bragg and in Hoke County. This Significant Natural Heritage Area supports the Federally Endangered Michaux's sumac (*Rhus michauxii*) and red-cockaded woodpecker (*Picoides borealis*), as well as the only Hoke County occurrences of Sandhills blanket-flower (*Gaillardia aestivalis*) and Sandhills wild-petunia (*Ruellia ciliosa*). Also here are two Federal Species of Concern plants: Sandhills milkvetch (*Astragalus michauxii*) and Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*). Other significant features within the special management area include a seepage slope, a seasonally flooded depression, and a mature longleaf pine community.

LANDSCAPE RELATIONSHIPS: MOT Commel SNHA is located in the south-central section of Fort Bragg, north of Plank Road and between Mott Lake and Raeford-Vass Road. It lies adjacent to (west of) Mott Lake and Uplands SNHA and about 1.8 miles southeast of Blues Mountain SNHA.

SITE DESCRIPTION: The natural area is a flat to gently rolling landscape with forested woodlands surrounding a 25 acre cleared area dominated by low (1- to 2-meter tall), regenerating oaks and a moderately dense ground layer dominated by wiregrass and herbs. The central feature of the site is a species-rich Pine/Scrub Oak Sandhill (Mesic Transition Variant) community which occurs in the center of the cleared area south of Firebreak 23. Mature Pine/Scrub Oak Sandhill (Mixed Oak Variant) woodlands surround the cleared area to the south and east; similar woodlands with younger stands of longleaf pine (*Pinus palustris*) border the cleared area to the north. Xeric Sandhill Scrub dominates the northwest section of the SNHA, with several Sandhill Seep and Small Depression Pocosin communities also scattered through this section. A 10 acre abandoned military compound borders the cleared area to the northeast. Most of the rare plant populations are robust, the plants apparently thriving in the open canopy and more-or-less full sun. The area was cleared in the 1950s and used as a communications facility until the late 1980s; hence the regenerating aspect of some of the natural communities. This description was valid as of 1993; it needs updating.

MANAGEMENT AND PROTECTION: The site provides an excellent opportunity for research into the biology and ecology of rare plants and the effects of longleaf pine community restoration upon them. The area needs an updated inventory to assess current conditions. Wildlife foodplots should be abandoned and replanted with longleaf pine.

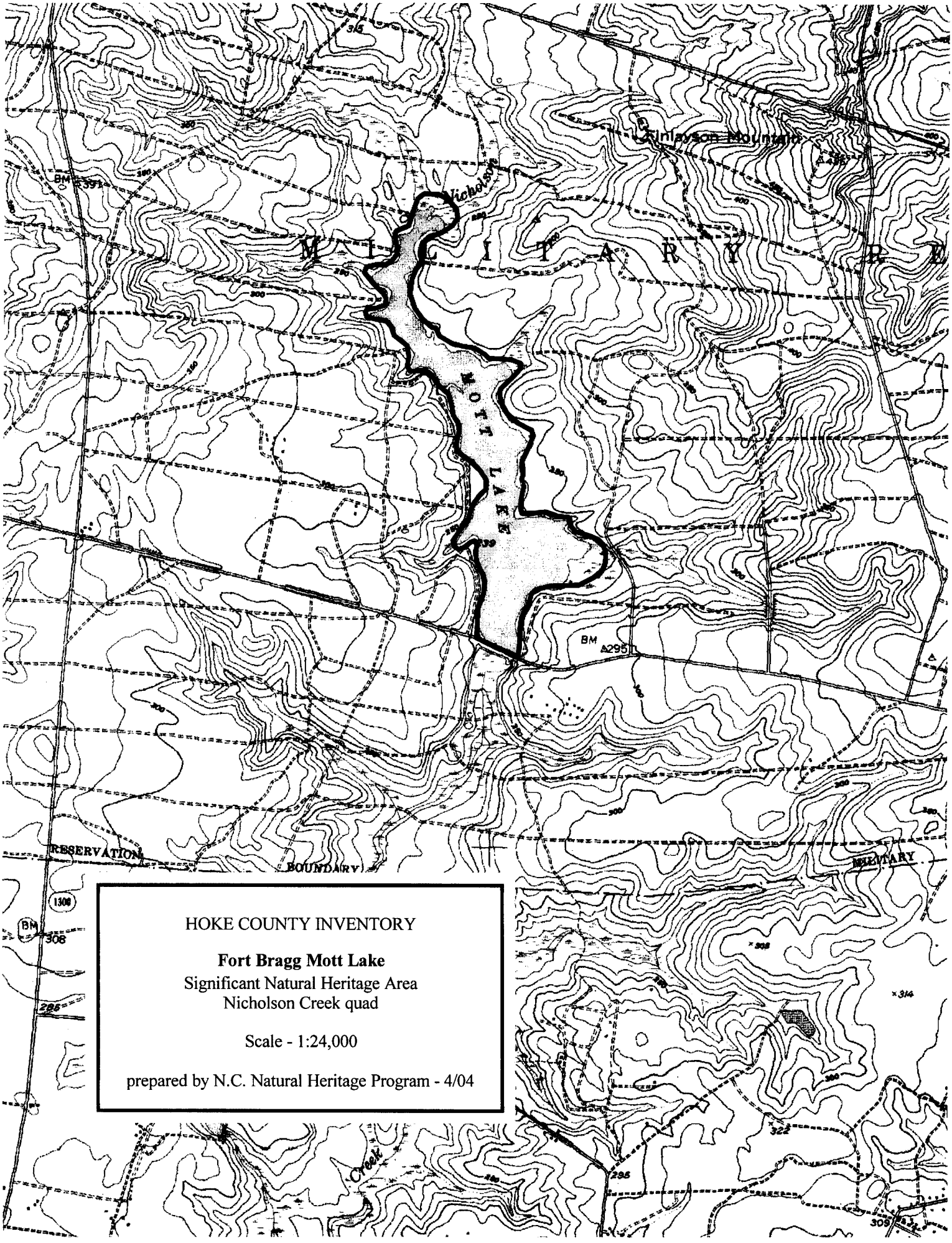
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mesic Transition and Mixed Oak Variants), Sandhill Seep, Small Depression Pocosin.

RARE PLANTS: Sandhills milkvetch (*Astragalus michauxii,* FSC), Sandhills blanket-flower (*Gaillardia aestivalis*), soft milkpea (*Galactia mollis*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia,* FSC), Michaux's sumac (*Rhus michauxi*i, FE), Sandhills wild-petunia (*Ruellia ciliosa*).

RARE ANIMALS: Red-cockaded woodpecker (*Picoides borealis,* FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Mott Lake

Significant Natural Heritage Area

Nicholson Creek quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG MOTT LAKE

Site Significance: regional
Size: 184 acres
USGS Quadrangle: Nicholson Creek
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Mott Lake Significant Natural Heritage Area contains large populations of five state-rare plant species, including the largest occurrence of Canby's bulrush (*Schoenoplectus etuberculatus*) in Hoke County. Mott Lake is one of the highest quality impoundments on Fort Bragg and supports a diverse aquatic flora, including Robbins' spikerush (*Eleocharis robbinsii*) and resinous boneset (*Eupatorium resinosum*).

LANDSCAPE RELATIONSHIPS: Mott Lake is located in the south-central section of Fort Bragg, between Plank Road and Firebreak 16 (south of Chicken Road). It lies adjacent (east) to MOT Commel SNHA and shortly south of Nicholson Creek Headwaters SNHA (in Coleman Artillery Impact Area).

SITE DESCRIPTION: Mott Lake is a narrow 1.5 mile long man-made reservoir, formed over the old stream channel and floodplain of Nicholson Creek, which flows in from the north. As with all streams that originate in the coastal plain, the water is dark tea colored from tannins leached from leaves, bark, etc. A nearly continuous zone of floating and emergent aquatic plants occurs in a band along the shoreline (this band greatly expands in more protected, shallower coves). Species here include water shield (*Brasenia schreberi*), golden club (*Orontium aquaticum*), Canby's bulrush, Robbins' spikerush (*Eleocharis robbinsii*), four-angled spikerush (*E. quadrangulata*), soft pipewort (*Eriocaulon compressum*), southern blue-flag (*Iris virginica*), and bogmoss (*Mayaca fluviatilis*). The abrupt shorelines around the lake are dominated by a generally narrow band of wet pocosin-like vegetation and include many Atlantic white cedars (*Chamaecyparis thyoides*) and pond pines (*Pinus serotina*). The shores receive considerable seepage water from uplands and support rarities such as pinebarren sedge (*Carex turgescens*), resinous boneset and Coker's bugleweed (*Lycopus cokeri*). At points where tributary branches enter the lake, elongate Streamhead Pocosins occur; these are well-burned and support a high diversity of shrubs in the pocosins and herbs and graminoids in the ecotones, such as Pine Barrens reedgrass (*Calamovilfa brevipilis*) and savanna cowbane (*Oxypolis ternata*). The northern tip of the lake is dominated by a dense stand of young swamp black gum (*Nyssa biflora*) and red maple (*Acer rubrum*).

MANAGEMENT AND PROTECTION: As of 1993, the northern section of the lake was severely impacted by siltation deposited by the highly disturbed Nicholson Creek stream channel, as a result of construction around Firing Ranges 78 and 79 along the western side of Coleman Impact Area. Silt also washes into the stream from the several firebreaks north of the lake which cross the stream channel. Several of the firebreaks that lead down to the lake deposit large amounts of silt into the water. However, the vegetation along the lake's shoreline is relatively undisturbed. Military activity and recreational use of the lake are confined to deeper

water and appear to cause little harm to the aquatic plant community. This natural area needs a visit to obtain updated information.

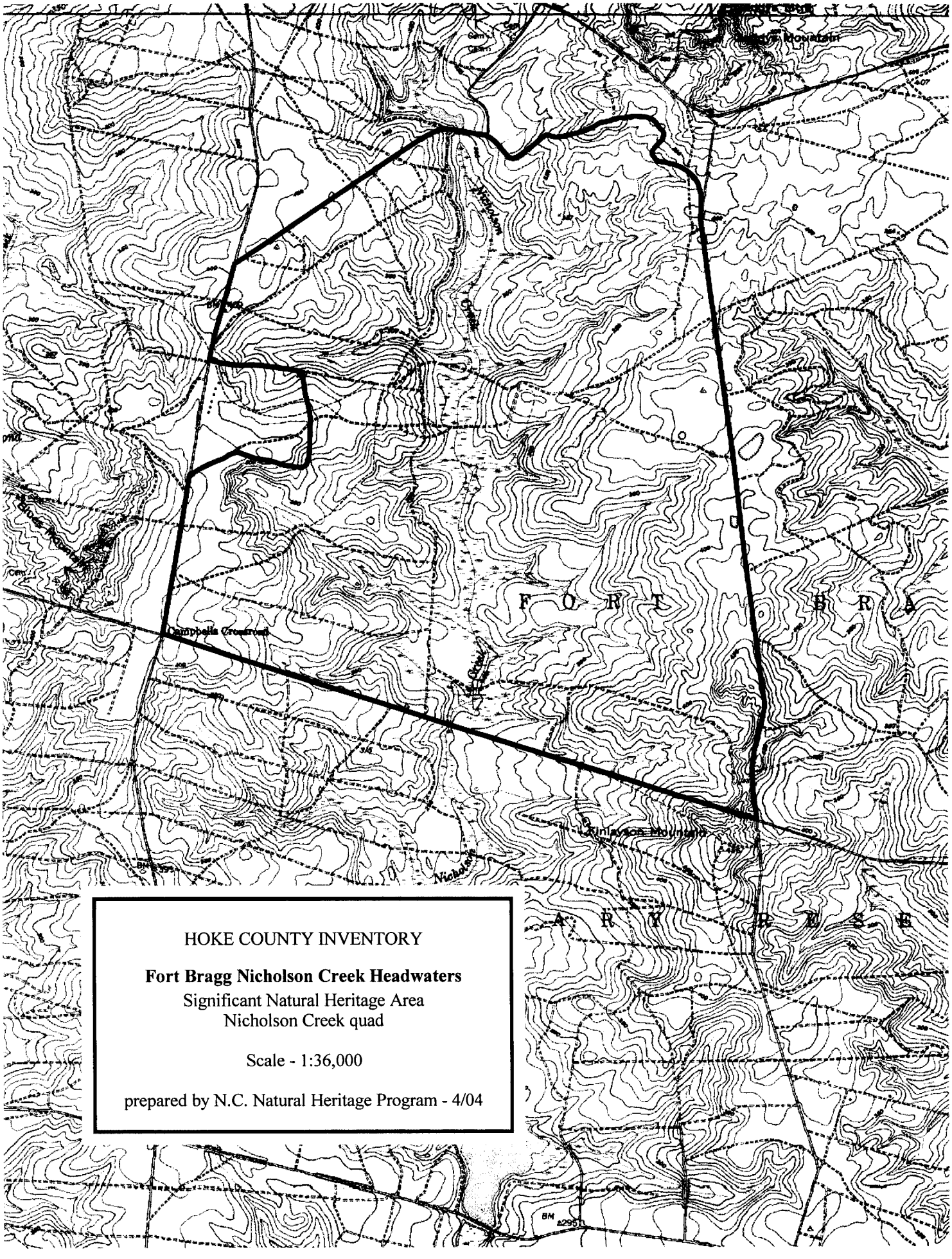
NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment, Streamhead Pocosin.

RARE PLANTS: Robbins' spikerush (*Eleocharis robbinsii*), resinous boneset (*Eupatorium resinosum*), longbeak baldsedge (*Rhynchospora scirpoides*), Canby's bulrush (*Schoenoplectus etuberculatus*).

RARE ANIMALS: None documented.

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Nicholson Creek Headwaters

Significant Natural Heritage Area
Nicholson Creek quad

Scale - 1:36,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG NICHOLSON CREEK HEADWATERS

Site Significance: national
Size: 3300 acres
USGS Quadrangle: Nicholson Creek
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Nicholson Creek Headwaters features an exemplary cluster of rare plants and animals, plus high quality natural communities. This Significant Natural Heritage Area is part of the large complex of contiguous nationally significant areas on Fort Bragg. Onsite are at least seven family groups of the Federally Endangered red-cockaded woodpecker (*Picoides borealis*) and five Federal Species of Concern plants: Sandhills milkvetch (*Astragalus michauxii*), Venus flytrap (*Dionaea muscipula*), Sandhills lily (*Lilium pyrophilum*), bog spicebush (*Lindera subcoriacea*), and Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*). There is no doubt that additional significant species and communities occur in this little-explored area.

LANDSCAPE RELATIONSHIPS: This natural area occupies the western sector of Coleman Artillery Impact Area, between Blues Road on the north, Raeford-Vass Road on the west, Chicken Road on the south, and Mail Route Road on the east. The uppermost reaches of Nicholson Creek occur just outside of the Impact Area. Puppy Creek Headwaters SNHA lies adjacent to the east, Juniper Creek Headwaters SNHA adjacent to the west, and Mott Lake SNHA shortly to the south.

SITE DESCRIPTION: Nicholson Creek Headwaters encompasses the western part of the Coleman Impact Area, the largest artillery range on Fort Bragg. There is some disturbance by shelling and excessive fires, but most of the area is in natural condition with excellent examples of a number of community types. The SNHA is subject to frequent fire, and is one of the few areas in the state that have had a long term regime of fire at or greater than the natural frequency (every three years) and at a landscape level. One result of high fire frequency is the presence of several canebrakes, a community now highly endangered in North Carolina. At the very head end of Nicholson Creek is a series of small impoundments and beaver ponds (Green Springs Ponds), which support excellent quality aquatic and emergent floras, a floating peat mat community (only two are known to exist in Hoke County, both on Ft. Bragg), and high quality seepage slopes. This area has been off limits to biologists except for brief periods of time and has not been well inventoried. Limited exploration has found a large number of rare species, including seven clusters of red-cockaded woodpeckers and eight species of rare plants.

MANAGEMENT AND PROTECTION: The entire area needs more exploration for natural communities and rare species; there is very high potential for additional discoveries.

NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (three Variants), Stramhead Pocosin (including Canebrake Variant), Sandhill Seep,

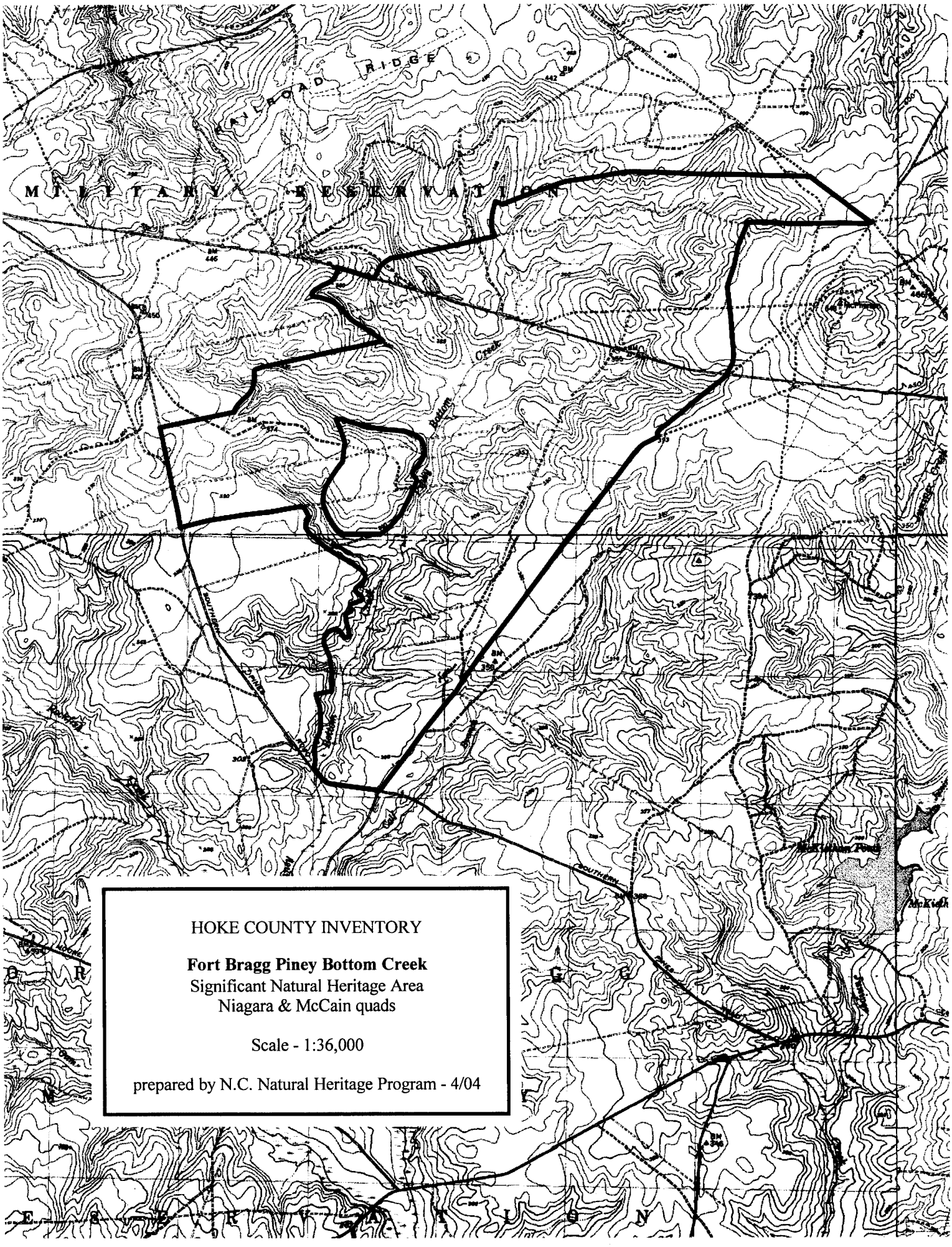
Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Semipermanent Impoundment.

RARE PLANTS: Sandhills milkvetch (*Astragalus michauxii,* FSC), Venus flytrap (*Dionaea muscipula,* FSC), Sandhills lily (*Lilium pyrophilum,* FSC), bog spicebush (*Lindera subcoriacea,* FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia,* FSC), Carolina triodia grass (*Tridens carolinianus*), dwarf bladderwort (*Utricularia olivacea*), Chapman's yellow-eyed-grass (*Xyris chapmanii*).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis,* FSC), red-cockaded woodpecker (*Picoides borealis,* FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.


RAILROAD RIDGE
MILITARY RESERVATION
Creek
Bottom
Creek
SOUTHERN
Creek
Rockfish
Creek
SOUTHERN
McKellar Pond
McKeith
HOKE COUNTY INVENTORY
Fort Bragg Piney Bottom Creek
Significant Natural Heritage Area
Niagara & McCain quads
Scale - 1:36,000
prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG PINEY BOTTOM CREEK

Site Significance: national
Size: 2517 acres
USGS Quadrangle: Niagara, McCain
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Piney Bottom Creek Significant Natural Heritage Area is considered to be one of the largest and best examples of the longleaf pine ecosystem in the entire Sandhills region of the Carolinas. Unlike the majority of land on Fort Bragg, this area has been protected over the years from serious soil and plant community disturbance and, more crucially, has been maintained by recurring growing-season wildfires and prescribed burns. It is one of the best remaining examples of the presettlement Sandhills landscape, and includes the largest remaining example of the endangered canebrake community. This area features one of the world's largest populations of the fire-dependent Federally Endangered chaffseed (*Schwalbea americana*), as well as FE Michaux's sumac (*Rhus michauxii*) and FE roughleaf loosestrife (*Lysimachia asperulifolia*). The westernmost population anywhere of Venus flytrap (*Dionaea muscipula*) is located along Piney Bottom Creek. In all, this SNHA supports large populations of 18 state or federal rare plant species. Ten red-cockaded woodpecker (*Picoides borealis*, Federally Endangered) colonies also occur here. An impressively broad assemblage of over a dozen natural plant communities occur here, most of very high quality.

LANDSCAPE RELATIONSHIPS: Piney Bottom Creek SNHA includes the western margin of McPherson Artillery Impact Area, plus adjacent land from near Holland Drop Zone south and west to Southern Pines Road. It lies just east of Rockfish Creek Headwaters SNHA and Central Rockfish Creek SNHA, and north of Calf Branch SNHA.

SITE DESCRIPTION: For discussion purposes the SNHA is divided in thirds. 1) Piney Bottom Creek floodplain corridor includes all the natural plant communities found along Piney Bottom Creek and its immediate floodplain from its headwaters near Firebreak 20 south to where it crosses Southern Pines Road. Prominent here are Small Stream Swamp and Streamhead Atlantic White Cedar Forest communities and a broad, half-mile long canebrake which is composed of widely scattered pond pine (*Pinus serotina*) and swamp black gum (*Nyssa biflora*) over a sea of switchcane (*Arundinaria tecta*). 2) The northern section includes a large portion of the upper Piney Bottom Creek watershed, bounded to the south by Morganton Road and by Firebreaks 19 and 20 to the north. Both of the main branches of the creek, as well as many of their tributaries, are included in this section. Broad upland areas are also included. This section contains an excellent example of typical ridge and swale Sandhills terrain along the southern side of the eastern Piney Bottom branch. The numerous minor Streamhead Pocosins that drain into the branch in this area flow through relatively narrow ravines that are separated by high xeric to dry ridges. Another prominent site, located in the northeastern corner between Firebreaks 19 and 20, is a large loamy soil swale containing a large Michaux's sumac population. 3) The central section includes all areas between Morganton Road, the Permanent Impact Boundary Road, and Southern Pines Road. Numerous Streamhead Pocosins, each fed by several minor tributaries, cut

through the rolling terrain of this section and drain into the wide floodplain of Piney Bottom Creek. Most of the pocosins have wide mesic areas located above their heads; many also have Sandhill Seeps scattered along adjacent slopes. Upland habitat between the pocosins varies from mesic to xeric. Typical dry upland vegetation occurs between the mesic and xeric zones. Other significant features in this section are several isolated Sandhill Seeps.

MANAGEMENT AND PROTECTION: Firebreak sand roads are the major disturbance in the area. Erosion of the roadbeds has caused serious siltation problems at several points along Piney Bottom Creek. Long-term conservation of this natural area will require protection and management not only within these boundaries but in adjacent sites as well. This information was current as of 1993; it needs updating.

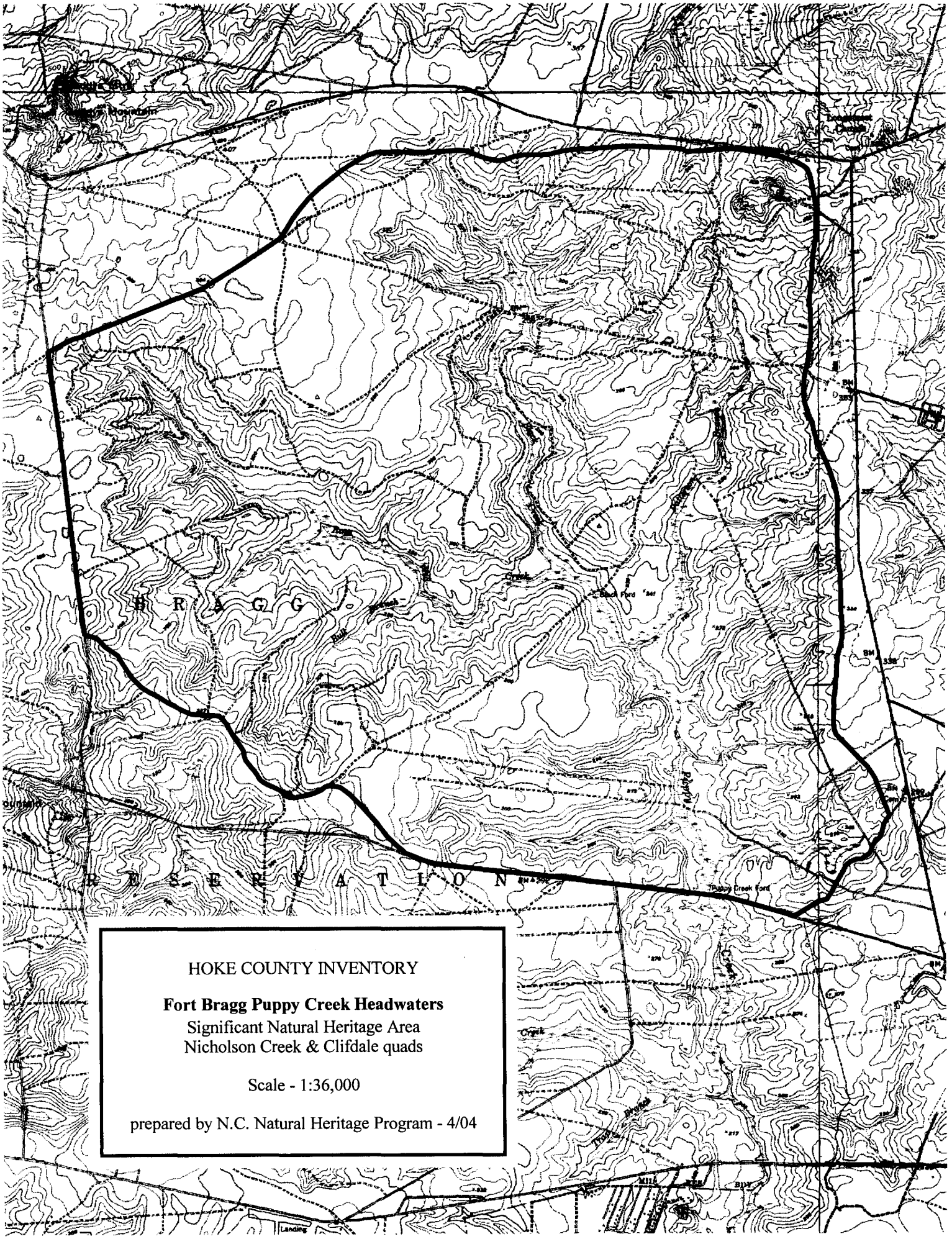
NATURAL COMMUNITIES: Coastal Plain Small Stream Swamp (Blackwater Subtype), Streamhead Atlantic White Cedar Forest, Streamhead Pocosin (including Canebrake Variant), Sandhill Seep, Vernal Pool, Pine/Scrub Oak Sandhill (Mesic Transition, Clay/Rock Hilltop, Mixed Oak, and Blackjack Oak Variants), Xeric Sandhill Scrub (Sandhills Variant).

RARE PLANTS: Venus flytrap (*Dionaea muscipula*, FSC), resinous boneset (*Eupatorium resinosum*), Heller's rabbit-tobacco (*Gnaphalium helleri* var. *helleri*), white wicky (*Kalmia cuneata*), Sandhills lily (*Lilium pyrophilum*, FSC), bog spicebush (*Lindera subcoriacea*, FSC), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Carolina grass-of-Parnassus (*Parnassia caroliniana*), Sandhills pyxie-moss (*Pyxidanthera barbulata var. brevifolia*, FSC), Michaux's sumac (*Rhus michauxii*, FE), southern white beaksedge (*Rhynchospora macra*), few-flowered beaksedge (*R. oligantha*), Canby's bulrush (*Schoenoplectus etuberculatus*), swaying bulrush (*S. subterminalis*), chaffseed (*Schwalbea americana*, FE), spring-flowering goldenrod (*Solidago verna*, FSC), Carolina triodia grass (*Tridens carolinianus*), Harper's yellow-eyed-grass *(Xyris scabrifolia*, FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*, FSC), red-cockaded woodpecker (*Picoides borealis*, FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Puppy Creek Headwaters
Significant Natural Heritage Area
Nicholson Creek & Clifdale quads

Scale - 1:36,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG PUPPY CREEK

Site Significance: regional
USGS Quadrangle: Nicholson Creek, Clifdale
Size: 204 acres
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Puppy Creek Significant Natural Heritage Area contains a collection of several good quality plant communities, including Xeric Sandhill Scrub, Streamhead Atlantic White Cedar Forest, several beaver ponds, and an isolated swale that is intermittently ponded. This swale harbors a breeding population of eastern tiger salamanders (*Ambystoma tigrinum*). The SNHA contains one of the largest occurrences of bog spicebush (*Lindera subcoriacea*) known in the state, and a robust occurrence of Sandhills milkvetch (*Astragalus michauxii*), both Federal Species of Concern, and a colony of Federally Endangered red-cockaded woodpeckers (*Picoides borealis*).

LANDSCAPE RELATIONSHIPS: Puppy Creek SNHA is located in the south-central section of Fort Bragg, north of St. Mere Eglise Drop Zone, east of Puppy Creek, and south of Chicken Road. Shortly to the west lies McDuffie Creek SNHA, while to the north lies the very large Puppy Creek Headwaters SNHA.

SITE DESCRIPTION: The eastern section of the Puppy Creek Natural Area lies over a broad, dry, upland flat, which is dominated by an unusual community with a widely scattered canopy of flat-topped longleaf pine (many of which are red-cockaded woodpecker cavity trees) and dense patches of regenerating pines. A small, species-rich loamy depression occurs in this area, located approximately 100 meters south of Firebreak 5 and approximately 900 meters east of Puppy Creek. To the west, the upland flat gradually drops off on a long slope down to Puppy Creek. Typical longleaf pine (*Pinus palustris*) communities occur along the slope, as well as one seepage slope and a Streamhead Pocosin. Although much of the Puppy Creek floodplain has been flooded by beaver impoundments, a relatively wide band of Small Stream Swamp and Streamhead Atlantic White Cedar Forest is still present along the east side of the creek between Firebreaks 4 and 5.

MANAGEMENT AND PROTECTION: Vehicles moving between Chicken Road and St. Mere Eglise Drop Zone have cut numerous trails across the ridge and slope areas, and much of these upland areas have seen moderately high levels of soil disturbance. Puppy Creek has been severely degraded by the large volume of silt from firebreak crossings and from Range 63 in the southwestern corner of Coleman Artillery Impact Area. The numerous beaver dams along the length of the creek, serving as sedimentation pools, may be helping to reduce siltation impacts. This natural area would benefit from additional survey work.

NATURAL COMMUNITIES: Coastal Plain Small Stream Swamp (Blackwater Subtype), Streamhead Atlantic White Cedar Forest, Coastal Plain Semipermanent Impoundment,

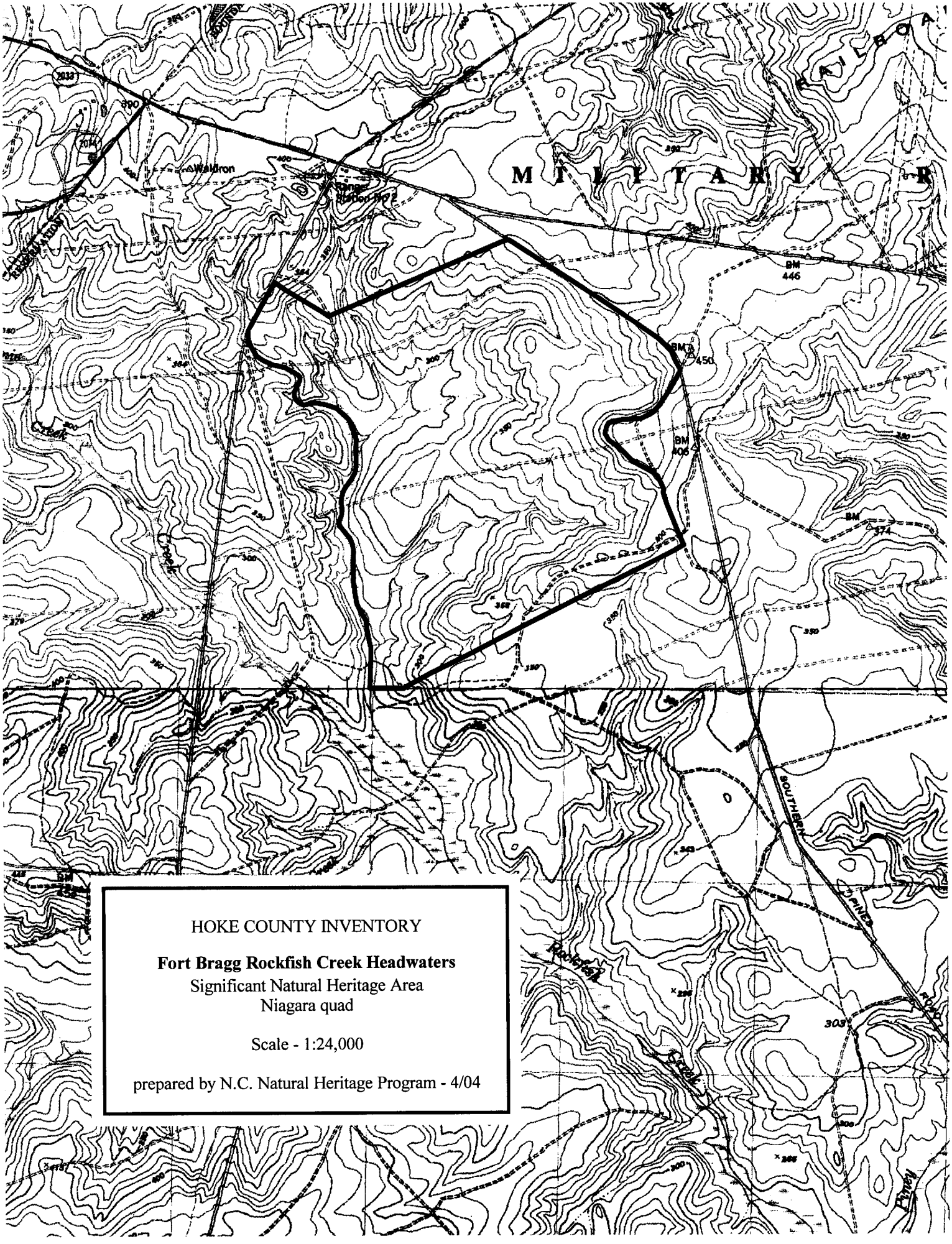
Streamhead Pocosin, Vernal Pool, Pine/Scrub Oak Sandhill (including Mesic Transition Variant), Xeric Sandhill Scrub (Sandhills Variant).

RARE PLANTS: Sandhills milkvetch (*Astragalus michauxii*, FSC), bog spicebush (*Lindera subcoriacea*, FSC), Canby's bulrush (*Schoenoplectus etuberculatus*), Carolina triodia grass (*Tridens carolinianus*).

RARE ANIMALS: Eastern tiger salamander (*Ambystoma tigrinum*), dotted skipper (*Hesperia attalus slossonae*), red-cockaded woodpecker (*Picoides borealis*, FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Rockfish Creek Headwaters

Significant Natural Heritage Area

Niagara quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG PUPPY CREEK HEADWATERS

Site Significance: national
Size: 7159 acres
USGS Quadrangle: Nicholson Creek
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Puppy Creek Headwaters is one of the premier longleaf pine landscapes in the country, an area where one can walk for miles in a virtual primeval setting. Its outstanding cluster of plant, animal, and community elements would be nationally significant in isolation, but is even more significant as part of a much larger system of natural areas on Fort Bragg. This Significant Natural Heritage Area contains excellent quality examples of Sandhill Seep, Streamhead Pocosin, canebrake, savanna, and Pine/Scrub Oak Sandhill communities, some of which are among the finest in the state if not the nation. Federally Endangered species include 13 colonies of red-cockaded woodpecker (*Picoides borealis*), Mitchell's satyr butterfly (*Neonympha mitchellii francisci*, found only on Fort Bragg), chaffseed (*Schwalbea americana*), and roughleaf loosestrife (*Lysimachia asperulifolia*). Federal Species of Concern include Venus flytrap (*Dionaea muscipula*), Sandhills lily (*Lilium pyrophilum*), bog spicebush (*Lindera subcoriacea*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*), Harper's yellow-eyed-grass (*Xyris scabrifolia*), and Bachman's sparrow (*Aimophila aestivalis*). The Mitchell's satyr, yellow pitcher-plant (*Sarracenia flava*), Venus flytrap, and roughleaf loosestrife colonies here are the largest in the entire Sandhills region.

LANDSCAPE RELATIONSHIPS: This SNHA is located in the eastern two thirds of Coleman Artillery Impact Area on Fort Bragg. It includes the entire upper Puppy Creek drainage and tributaries: Patterson Branch, Ray's Mill Creek, Bull Branch, and Black Creek. Nicholson Creek Headwaters SNHA adjoins to the west, and Little Rockfish Creek Headwaters SNHA lies just to the east. McDuffie Creek SNHA and Puppy Creek SNHA lie within 1/2 mile to the south, beyond Chicken Road.

SITE DESCRIPTION: Puppy Creek Headwaters is a large expanse of Sandhills terrain making up over half of Coleman Artillery Impact Area. Although the canopy and ground are locally disturbed by shell craters, exceedingly high quality natural communities occur throughout. The unusually large size of Streamhead Pocosins, pocosin ecotones, Sandhill Seeps, and canebrakes is a feature of this SNHA. One can literally walk for miles along Black Creek and its tributaries and be within a nearly continuous pocosin ecotone, seldom out of sight of pitcher-plants, orchids, and rare species. One canebrake on Bull Branch is more than half a mile long and lacks a single tree, because of the frequent bouts of fire from exploding artillery. Several Streamhead Pocosins extend for a quarter mile of more. Excellent quality natural communities also include Vernal Pool, Dry Oak-Hickory Forest, and Pine/Scrub Oak Sandhill (Mesic Transition Variant). Despite only incidental and incomplete inventory, this natural area supports extraordinary biodiversity: over 260 plant species have been documented. This information dates from 1994.

MANAGEMENT AND PROTECTION: An updated inventory is urgently needed to ensure that this natural area still maintains its high quality. Additional high quality communities and rare plant and animal elements are sure to be found. Meanwhile, the prescribed burning program should be continued.

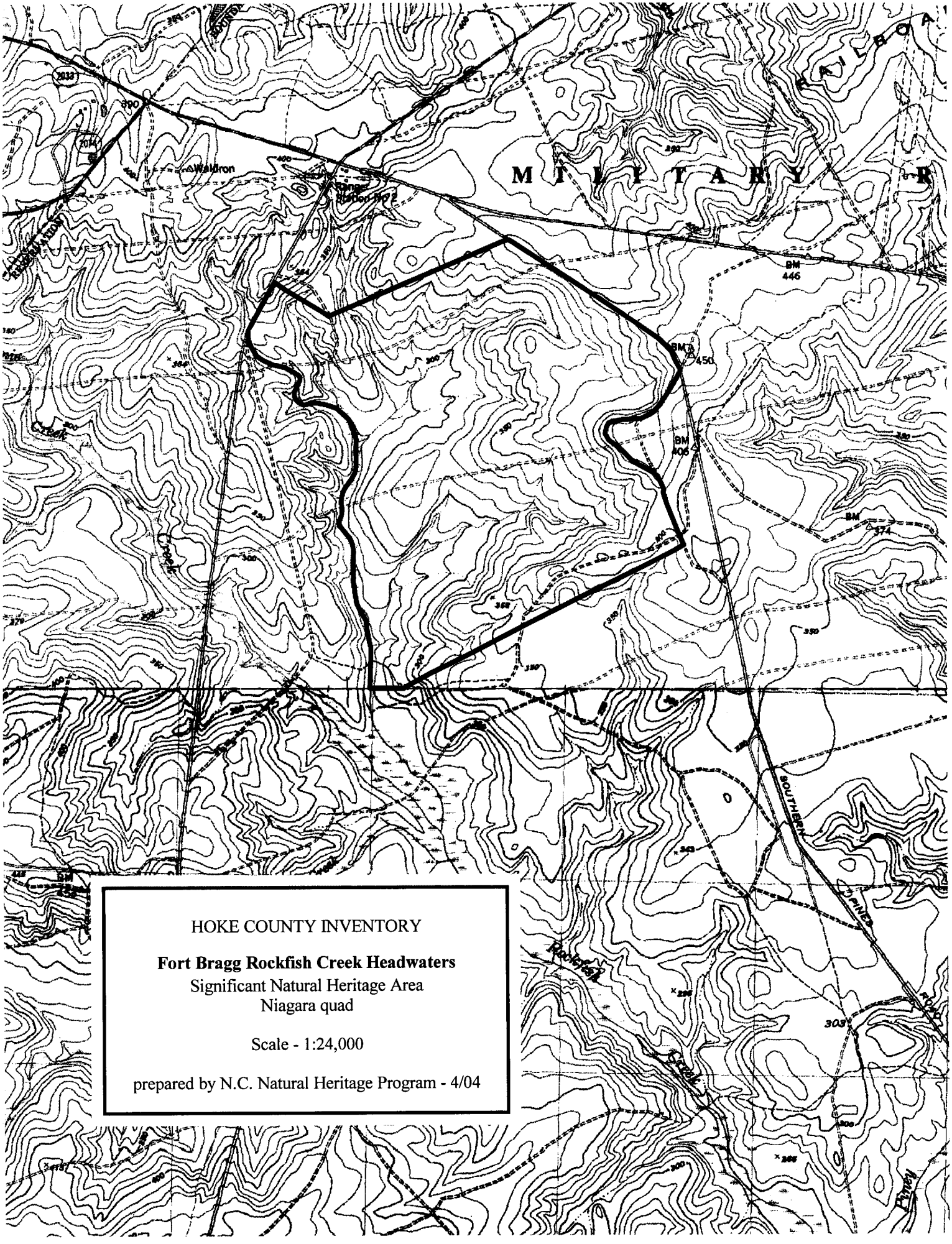
NATURAL COMMUNITIES: Coastal Plain Small Stream Swamp (Blackwater Subtype), Streamhead Pocosin (including Canebrake Variant), Sandhill Seep, Vernal Pool, Dry Oak-Hickory Forest, Pine/Scrub Oak Sandhill (Mixed Oak and Mesic Transition Variants), Xeric Sandhill Scrub (Sandhills Variant).

RARE PLANTS: Venus flytrap (*Dionaea muscipula*, FSC), resinous boneset (*Eupatorium resinosum*), soft milkpea (*Galactia mollis*), Sandhills lily (*Lilium pyrophilum,* FSC), bog spicebush (*Lindera subcoriacea,* FSC), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Carolina grass-of-Parnassus (*Parnassia caroliniana*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia,* FSC), southern beaksedge (*Rhynchospora macra*), few-flowered beaksedge (*R. oligantha*), chaffseed (*Schwalbea americana*, FE), Chapman's yellow-eyed-grass (*Xyris chapmanii*), Harper's yellow-eyed-grass (*Xyris scabrifolia,* FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis,* FSC), dotted skipper (*Hesperia attalus slossonae*), Mitchell's satyr butterfly (*Neonympha mitchellii francisc*i, FE), red-cockaded woodpecker (*Picoides borealis*, FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Rockfish Creek Headwaters

Significant Natural Heritage Area

Niagara quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG ROCKFISH CREEK HEADWATERS

Site Significance: national
Size: 769 acres
USGS Quadrangle: Niagara
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Rockfish Creek Headwaters features an outstanding assemblage of high quality communities, rare plants, and rare animals, including Pine/Scrub Oak Sandhill (Mesic Transition Variant) and Mesic Pine Flatwoods, both uncommon and local in the Sandhills Region. Excellent examples of typical Sandhills plant communities occur throughout this Significant Natural Heritage Area. The well-burned, rolling, longleaf pine (*Pinus palustris*) woodlands in the center of this natural area are some of the most extensive and highest quality longleaf in the state. This area, combined with the cluster of outstanding natural areas to the south (Central Rockfish Creek SNHA, etc.), constitutes a landscape mosaic of great significance. Two Federally Endangered plants - roughleaf loosestrife (*Lysimachia asperulifolia*) and chaffseed (*Schwalbea americana*) - occur here as do four Federal Species of Concern - Sandhills lily (*Lilium pyrophilum*), bog spicebush (*Lindera subcoriacea*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*), and Harper's yellow-eyed-grass (*Xyris scabrifolia*). Eleven colonies of the Federally Endangered red-cockaded woodpecker *(Picoides borealis*) and a large population of Bachman's sparrows (*Aimophila aestivalis*) occur here.

LANDSCAPE RELATIONSHIPS: Rockfish Creek Headwaters SNHA is located in the western section of Fort Bragg, between Rockfish Creek and Southern Pines Road and roughly between Firebreaks 3 and 13. It lies immediately north of Central Rockfish Creek SNHA and abuts the west side of Piney Bottom Creek SNHA.

SITE DESCRIPTION: The gently rolling, mostly even-aged longleaf pine woodlands in this large natural area are dissected by numerous Streamhead Pocosins and Sandhill Seeps, which drain via small tributaries into Rockfish Creek. Pine/Scrub Oak Sandhill (Mixed Oak Variant), with numerous mesic inclusions, dominates many upland sites in the area. A large Mesic Pine Flatwoods community, rare in the Sandhills region, is located between Firebreaks 5 and 6 just east of Rockfish Creek. Xeric Sandhill Scrub occurs along higher ridges through the natural area. Rockfish Creek is dominated by Small Stream Swamp through most of its length within the natural area. In general, plant communities here exhibit excellent ecological integrity and high species diversity.

MANAGEMENT AND PROTECTION: The most serious threats to the natural area are soil erosion and siltation. Each of the firebreaks which passes through the natural area channels large amounts of silt into the Streamhead Pocosins and creeks that they cross. It is likely that most of the aquatic plant communities which once occurred along the streams no longer exist because of this disturbance. The deeply eroded roadbeds also disrupt the water and nutrient dynamics of Sandhill Seeps and even mesic sites that they dissect. This information is from 1993 and needs updating.

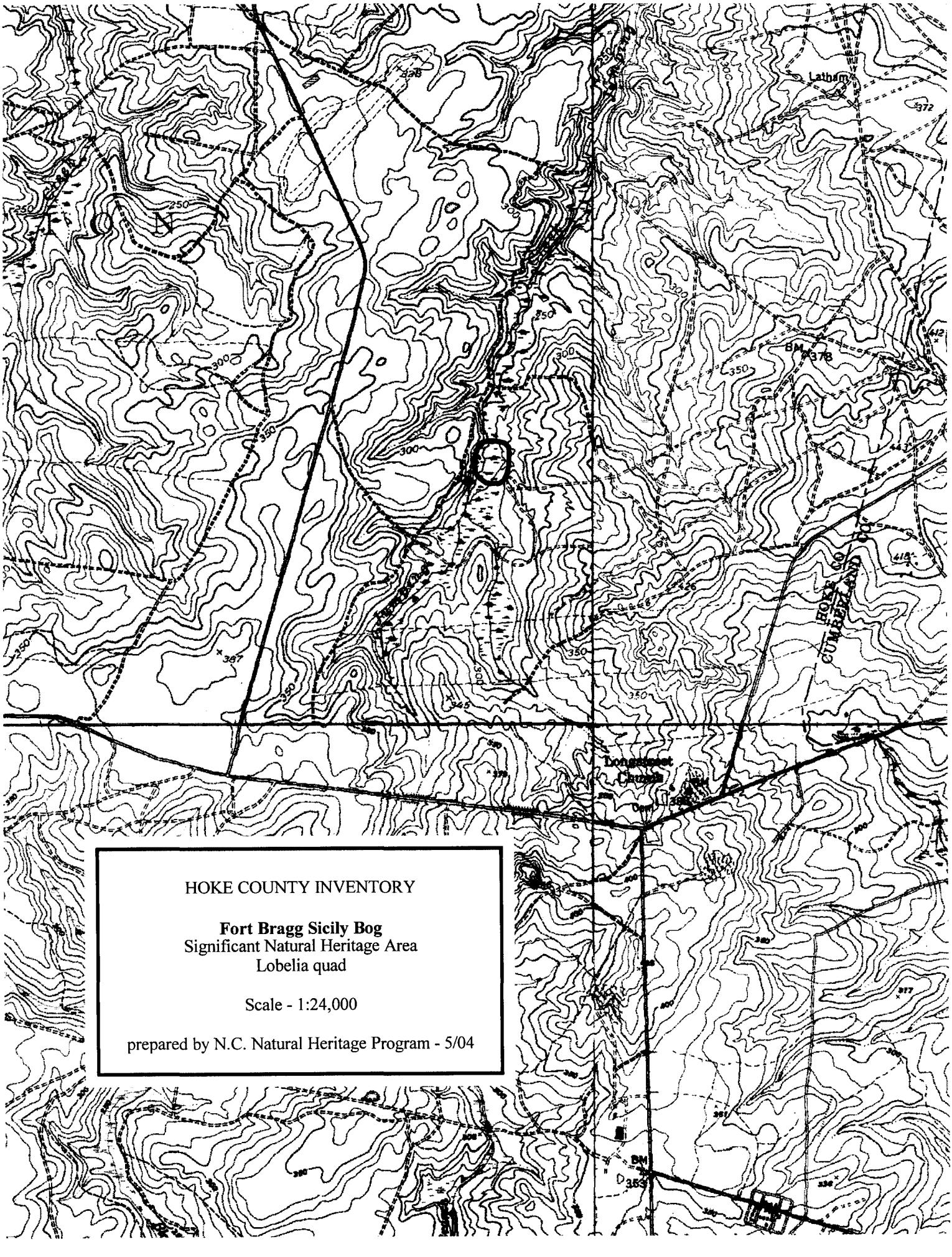
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mesic Transition and Mixed Oak Variants), Mesic Pine Flatwoods, Sandhill Seep, Streamhead Pocosin, Coastal Plain Small Stream Swamp (Blackwater Subtype).

RARE PLANTS: Heller's rabbit-tobacco (*Gnaphalium helleri* var. *helleri*), Sandhills lily (*Lilium pyrophilum,* FSC), bog spicebush (*Lindera subcoriacea,* FSC), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia,* FSC), chaffseed (*Schwalbea americana*, FE), Carolina triodia grass (*Tridens carolinianus*), Harper's yellow-eyed-grass (*Xyris scabrifolia*, FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis,* FSC), red-cockaded woodpecker *(Picoides borealis*, FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Sicily Bog
Significant Natural Heritage Area
Lobelia quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

FORT BRAGG SICILY BOG

Site Significance: state
Size: 8.4 acres
USGS Quadrangle: Lobelia
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Although small, Sicily Bog contains a high-quality sphagnum bog community, one of only a small number of intact bogs known in the North Carolina Sandhills. It also contains a species-rich Sandhill Seep community. Portions of the bog are dominated by tussock sedge (*Carex stricta*), a northern plant rare in the Sandhills region. Six state rare plants occur here, including two Federal Species of Concern: bog spicebush (*Lindera subcoriacea*), and Harper's yellow-eyed-grass (*Xyris scabrifolia*).

LANDSCAPE RELATIONSHIPS: Sicily Bog Significant Natural Heritage Area is located on the east side of Jumping Run Creek, just east of Sicily Drop Zone, between Firebreaks 6 and 7. It lies about 1.4 miles north of Puppy Creek Headwaters SNHA.

SITE DESCRIPTION: The natural area is a broad, open-canopied boggy site vegetated by dense shrub and tree patches interspersed with herbaceous openings. Sphagnum moss abounds. The bog occurs along the wet, very gently sloped margins of a meandering blackwater stream and appears to have been beaver-impounded in the past. Small streamlets which flow from adjacent seepage slopes and minor Streamhead Pocosins to the east feed into the bog. Bog vegetation extends along saturated to inundated areas between the streamlets, forming a complex mosaic of bog, Sandhill Seep, and Streamhead Pocosin communities. This site could be expanded to the north of Firebreak 6 to include good quality pond pine (*Pinus serotina*) slopes.

MANAGEMENT AND PROTECTION: The extent of the bog and Sandhill Seep communities here was perhaps much greater prior to the creation of Firebreak 6. This road has dissected the north-south seepage slope along the east side of Jumping Run Creek and has most likely altered the water and nutrient dynamics of the bog. Erosion along all sections of Jumping Run Creek needs to be controlled where crossed by firebreak roads.

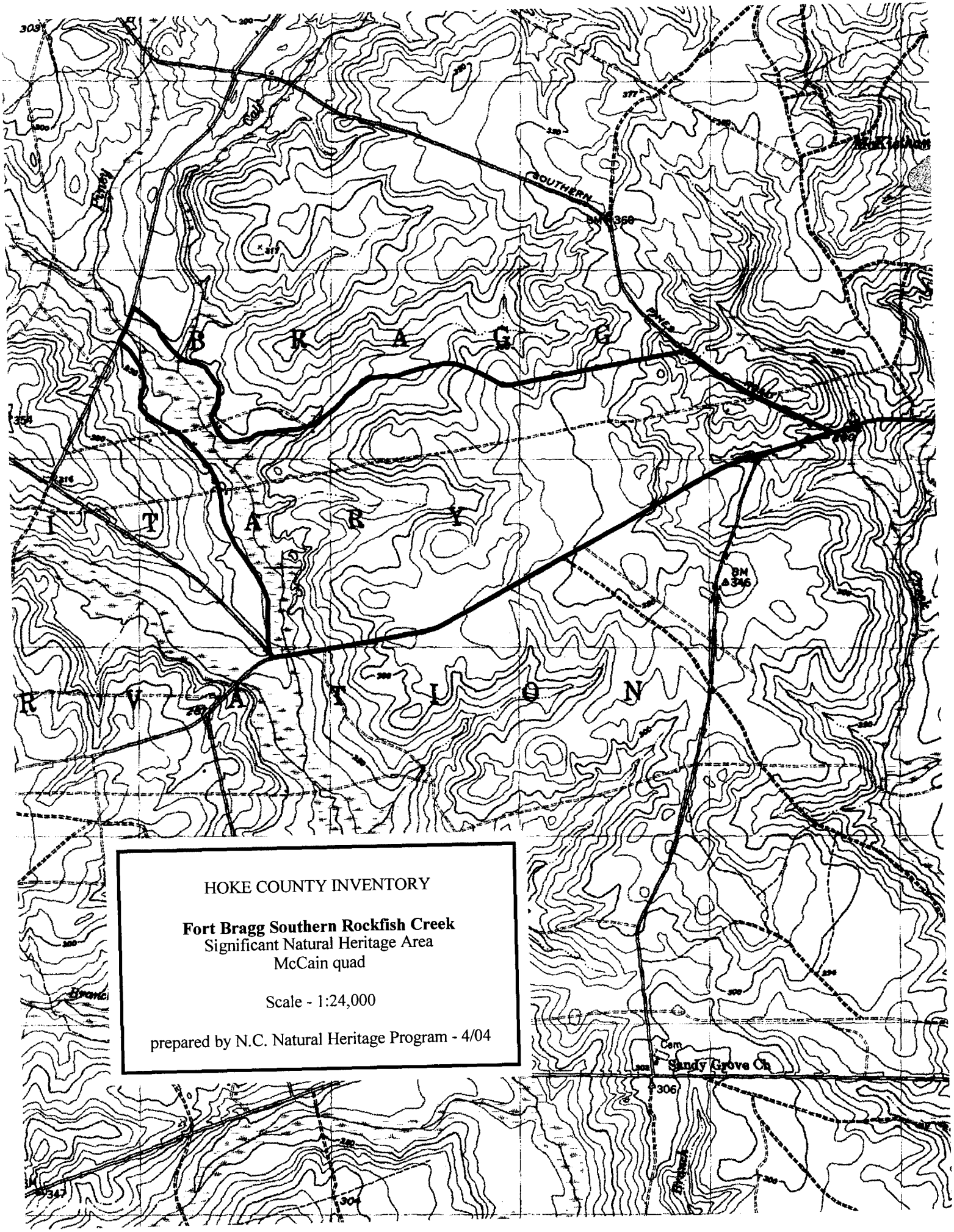
NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment (Bog Variant), Sandhill Seep, Streamhead Pocosin.

RARE PLANTS: Coastal sedge (*Carex exilis*), twig-rush (*Cladium mariscoides*), resinous boneset (*Eupatorium resinosum*), bog spicebush (*Lindera subcoriacea*, FSC), southern white beaksedge (*Rhynchospora macra*), Harper's yellow-eyed-grass (*Xyris scabrifolia*, FSC).

RARE ANIMALS: None recorded.

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Southern Rockfish Creek
Significant Natural Heritage Area
McCain quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG SOUTHERN ROCKFISH CREEK

Site Significance: state
Size: 763 acres
USGS Quadrangle: McCain
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Southern Rockfish Creek contains an unusual concentration of rare species and natural communities. It includes expansive Pine/Scrub Oak Sandhill (Blackjack Variant and Mesic Transition Variant), Vernal Pools, and Coastal Plain Small Stream Swamp along a lengthy section of Rockfish Creek. Seven rare plant species are present; three are Federally Endangered: roughleaf loosestrife (*Lysimachia asperulifolia*), Michaux's sumac (*Rhus michauxii*), and chaffseed (*Schwalbea americana*); and one is a Federal Species of Concern: bog spicebush (*Lindera subcoriacea*). In conjunction with other natural areas to the northwest, Southern Rockfish Creek Significant Natural Heritage Area forms a landscape mosaic of national significance.

LANDSCAPE RELATIONSHIPS: Southern Rockfish Creek SNHA is located roughly between Firebreak 31 and Chicken Road, west of Southern Pines Road. To the northwest are several other SNHAs associated with Rockfish Creek. Calf Branch SNHA lies just to the north, Juniper Creek SNHA to the northeast, and Gum Branch SNHA to the west.

SITE DESCRIPTION: The bulk of the natural area is dominated by an expansive, flat to gently rolling, longleaf pine (*Pinus palustris*) woodland. A variety of soil types and local topographic features, such as swales and minor rises, has produced a mosaic of communities and variants across this upland flat. Pine Scrub/Oak Sandhill (Blackjack Oak Variant) is the most abundant type, easily recognized by the abundance of blackjack oak (*Quercus marilandica*) in its scrubby subcanopy layer. Embedded within the pine/oak are numerous small to large Mesic Transition Variant patches, which are characterized by dense wiregrass layers and the presence of mesophytic herbs. There are also a few Vernal Pool inclusions, which form seasonally ponded depressional areas. Also present as small to large inclusions across the upland flat are Xeric Sandhill Scrub areas and swales with Pine Scrub/Oak Sandhill (Mesic Transition Variant). Frequent burns have helped to maintain sparse scrub oak layers through most of the SNHA, creating a scenic park-like appearance to the woodland. Several creek tributaries, dominated by typical Streamhead Pocosin vegetation, dissect the upland flat and drain away to Rockfish Creek. Rockfish Creek is a large blackwater stream and the major drainage on the western side of Fort Bragg. Most of its floodplain is dominated by Small Stream Swamp vegetation. Mesic to wet slopes that lie above the floodplain support extensive shrub-dominated Sandhill Seep communities.

MANAGEMENT AND PROTECTION: The uplands of the natural area are moderately intact but patchily degraded and fragmented by the creation of firebreak roads. Erosion and siltation from the firebreaks have degraded many of the streams. The present fire management regime should be continued.

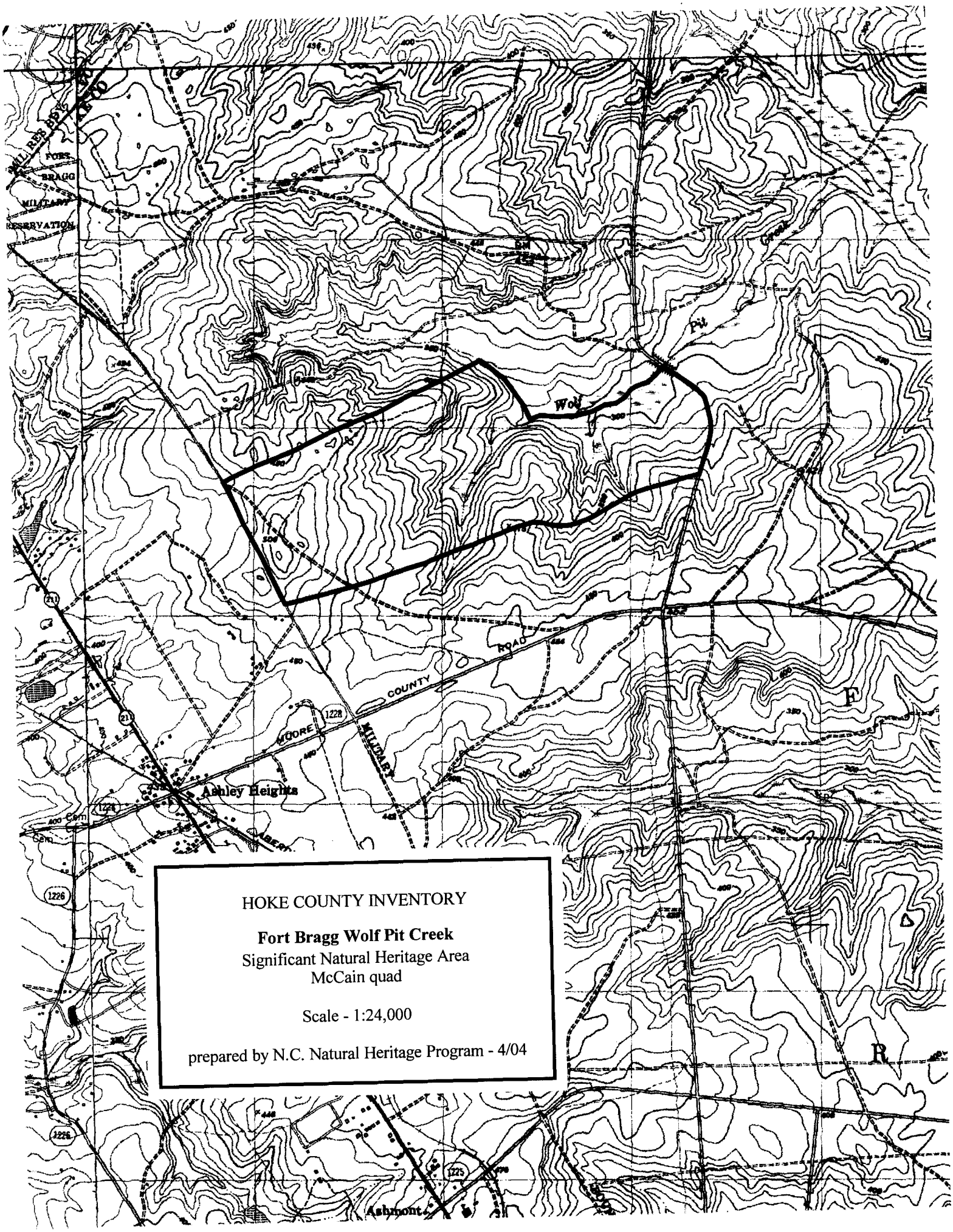
NATURAL COMMUNITIES: Pine Scrub/Oak Sandhill (Blackjack Oak, Mesic Transition, and Mixed Oak Variants), Xeric Sandhill Scrub (Sandhills Variant), Vernal Pool, Streamhead Pocosin, Sandhill Seep, Coastal Plain Small Stream Swamp (Blackwater Subtype).

RARE PLANTS: Heller's rabbit-tobacco (*Gnaphalium helleri* var. *helleri*), white wicky (*Kalmia cuneata*), bog spicebush (*Lindera subcoriacea,* FSC), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Michaux's sumac (*Rhus michauxii*, FE), chaffseed (*Schwalbea americana*, FE), Canby's bulrush (*Schoenoplectus etuberculatus*).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis,* FSC).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Wolf Pit Creek

Significant Natural Heritage Area

McCain quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG WOLF PIT CREEK

Site Significance: state
Size: 440 acres
USGS Quadrangle: McCain
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Wolf Pit Creek supports an excellent collection of Sandhills natural communities, including high quality Sandhill Seep, Pine/Scrub Oak Sandhill, and Xeric Sandhill Scrub. Two Federally Endangered species occur here: red-cockaded woodpecker (*Picoides borealis*) and roughleaf loosestrife (*Lysimachia asperulifolia*). Two other plants are Federal Species of Concern: bog spicebush (*Lindera subcoriacea*), and Sandhills pyxie-moss *(Pyxidanthera barbulata* var. *brevifolia*).

LANDSCAPE RELATIONSHIPS: Wolf Pit Creek Significant Natural Heritage Area is located at the western edge of Fort Bragg, between Firebreaks 15 and 18. King Road is the eastern boundary and the Bragg property line is the western. Nijmegan Drop Zone lies just to the southeast, JSOC Bluffs SNHA just to the north, and Central Rockfish Creek SNHA just to the northeast.

SITE DESCRIPTION: Most of the eastern half of the natural area occurs along moderately steep slopes located between Wolf Pit Creek and a high xeric ridge to the south. The slopes are dissected at several points by steep narrow Streamhead Pocosins which drain to the north into the broad Small Stream Swamp community along Wolf Pit Creek. Typical dry upland Sandhills vegetation dominates the slopes between the Streamhead Pocosins. Xeric Sandhill Scrub dominates the western half of the natural area, between Firebreaks 15 and 17 eastward to Wolf Pit Creek. Much of this section was clearcut sometime in the last twenty years, but it still supports an intact xeric herb community, including a large population of Sandhills pyxie-moss. A sandstone outcrop/Sandhill Seep community, located to the north of Firebreak 17 and slightly west of Wolf Pit Creek, is also included in this area. This SNHA could be expanded to the east if the Streamhead Atlantic White Cedar Forest community along Wolf Pit Creek east of King Road improves in quality.

MANAGEMENT AND PROTECTION: Severe roadbed erosion occurs along the long and steep sections of the firebreak roads in the western section of the natural area. This erosion causes siltation in tributaries of Wolf Pit Creek. Many Streamhead Pocosins have fire plowlines along their perimeters, causing some erosion along the slopes and disrupting the nutrient and water dynamics of the ecotonal areas. Plowlines should be revegetated.

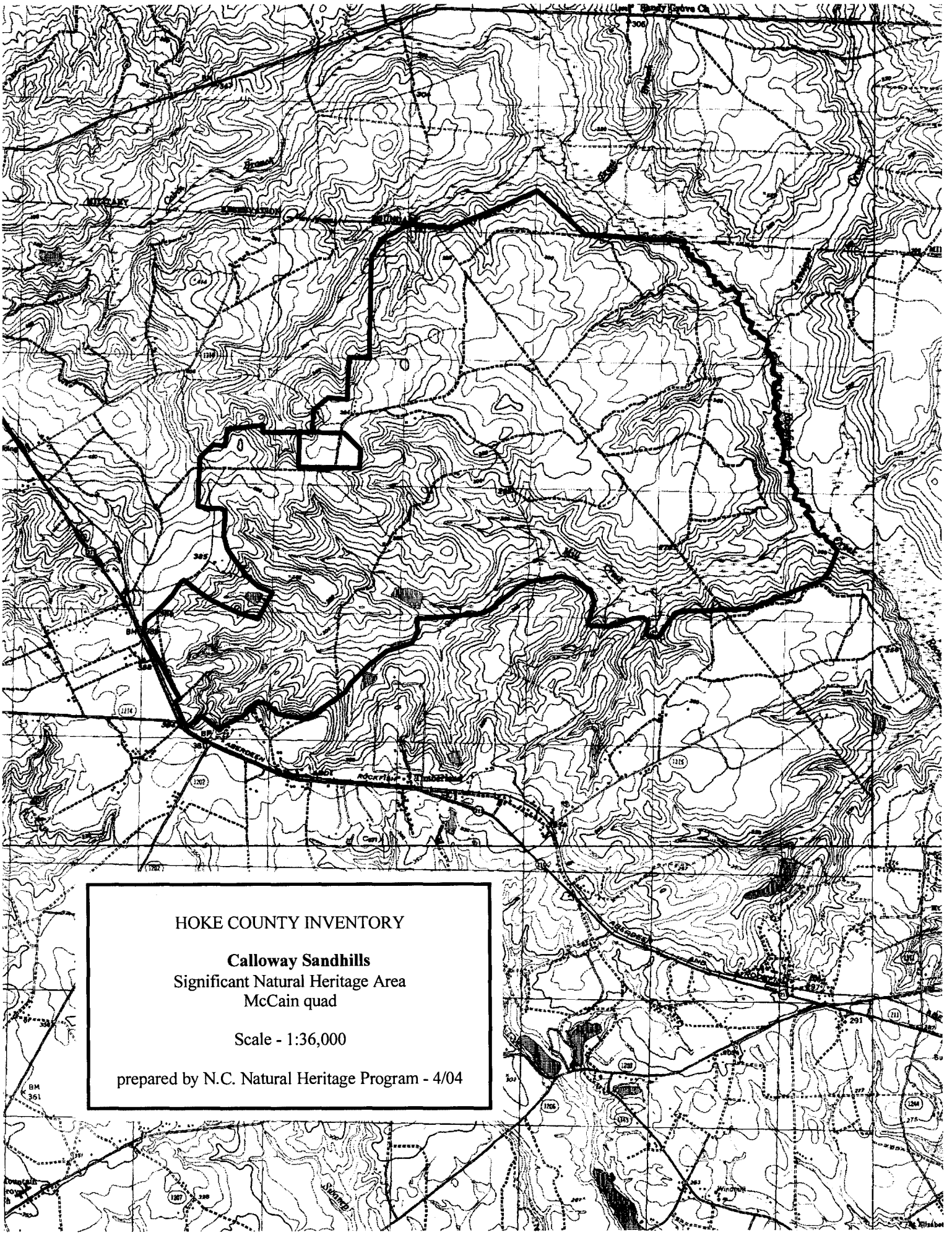
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mixed Oak Variant), Streamhead Pocosin, Sandhill Seep, Coastal Plain Small Stream Swamp (Blackwater Subtype).

RARE PLANTS: White wicky (*Kalmia cuneata*), bog spicebush (*Lindera subcoriacea*, FSC), roughleaf loosestrife (*Lysimachia asperulifolia*, FE), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC).

RARE ANIMALS: Red-cockaded woodpecker (*Picoides borealis*, FE).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.


HOKE COUNTY INVENTORY
Calloway Sandhills
Significant Natural Heritage Area
McCain quad
Scale - 1:36,000
prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

CALLOWAY SANDHILLS

Site Significance: regional
Size: 3103 acres
USGS Quadrangle: McCain, Nicholson Creek
Ownership: The Nature Conservancy, private

SIGNIFICANT FEATURES: Calloway Sandhills is important primarily for its large expanse of longleaf pine ecosystem. It occupies a strategic position at the southwest corner of Fort Bragg by providing one of the links between the Army base and Camp Mackall/Sandhills Game Land. Although degraded by fire-suppression, pinestraw raking, and pine plantations, Calloway supports several family groups of the Federally Endangered red-cockaded woodpecker (*Picoides borealis*), Federal Species of Concern Bachman's sparrow (*Aimophila aestivalis*), three state-rare animals, and five rare plants. Three of the plant species are Federal Species of Concern, including Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*). Through an aggressive program of prescribed fire, the ecosystem is being restored and several plant community types will eventually be excellent examples of their kind.

LANDSCAPE RELATIONSHIPS: Calloway abuts the southwest corner of Fort Bragg, just northeast of NC route 211 and west of Rockfish Creek. To the east it abuts Redwing Pond Seeps Significant Natural Heritage Area, and lies three miles east-southeast of McCain Sandhills SNHA.

SITE DESCRIPTION: The site is near the transition zone between the Sandhills Ecoregion, with its rolling hills, and the Middle Coastal Plain, with its flat terrain and Carolina bays. Slopes on Calloway are generally moderate to gentle, but steeper slopes occur along Mill Creek and its tributaries, and along portions of Rockfish Creek. An extensive system of streamheads dissects the uplands, but are fire-suppressed and difficult to pass through. Uplands are mostly in natural longleaf pine (*Pinus palustris*) and partly in planted longleaf and loblolly pine (*Pinus taeda*); subcanopy hardwoods have been removed. The herbaceous layer has suffered from pinestraw raking (reduced species diversity), but has responded well to fire (even in plantations) and will fully recover over time. A couple of areas were cleared for agriculture and support abundant alien and native weeds.

The main upland plant communities are Pine/Scrub Oak Sandhill and Xeric Sandhill Scrub. In the former, wiregrass (*Aristida stricta*) is reasonably abundant, but hardwoods have been mostly removed to facilitate straw raking. At least a few areas have loamy sand soils and support good herbaceous diversity. The creeks support typical Coastal Plain Small Stream Swamp communities of swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), and sweetgum (*Liquidambar styraciflua*), with tulip poplar (*Liriodendron tulipifera*) at the upper reaches. Atlantic white cedar (*Chamaecyparis thyoides*) is frequent on steep slopes with seepage along Rockfish Creek. A number of the tributaries support Streamhead Pocosin communites, but are severely fire-suppressed. A couple of Sandhill Seeps were burned in 2002; these support longleaf and pond pine (*Pinus serotina*) and various wetland shrubs and grasses.

MANAGEMENT AND PROTECTION: Calloway was purchased by the NC Department of Transportation for mitigation purposes. Since transfer to The Nature Conservancy, a program of prescribed burning has been put into action and much of the property has shown a rapid improvement in the herbaceous component. Photo-monitoring plots have been established. Fire must be continued on a recurring basis, including down into the streamheads and seeps. Loblolly timber is being cut and replaced with longleaf. Pinestraw raking has been terminated. The TNC portion of the natural area is protected as a conservation area but the private portion is not.

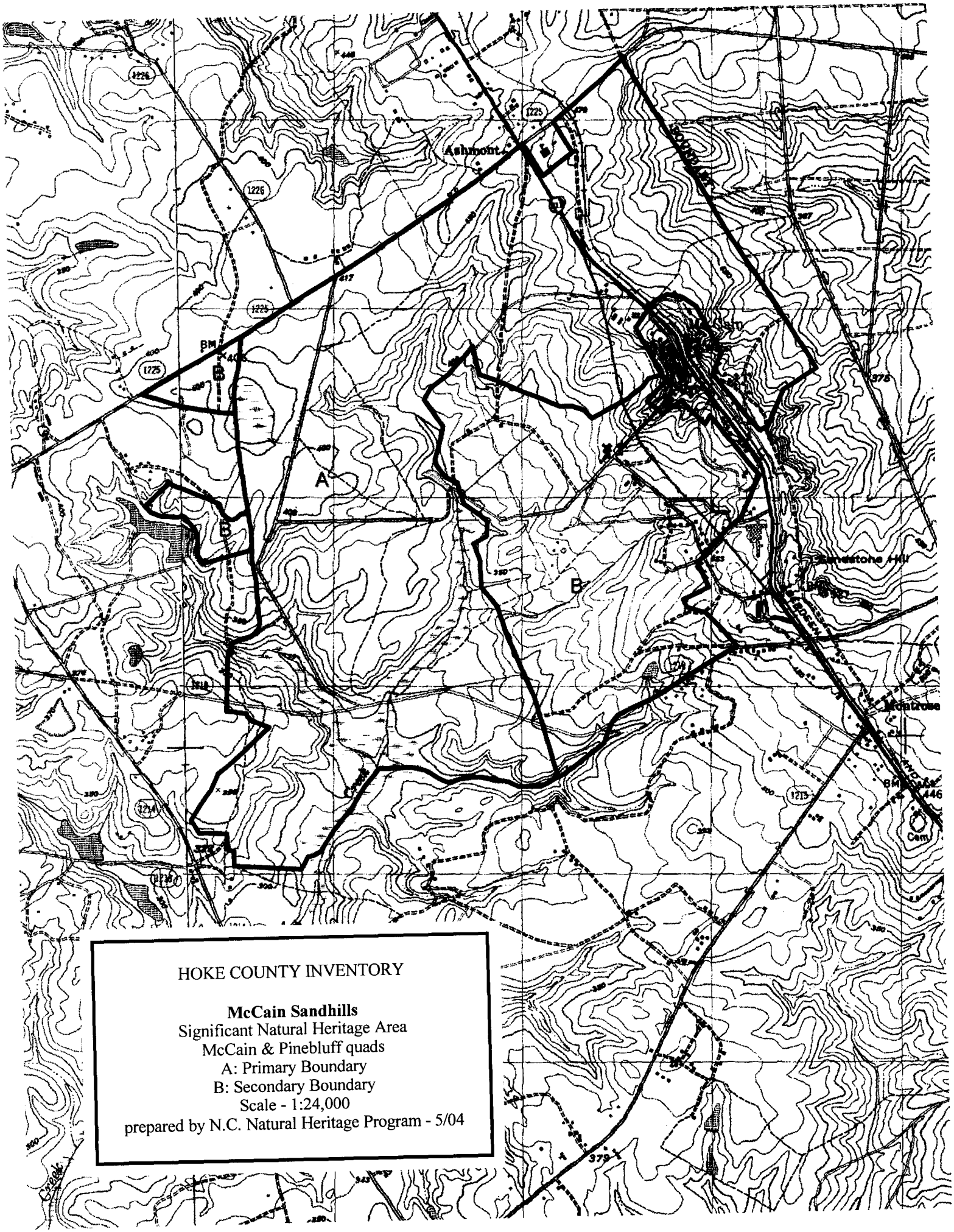
NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mixed Oak Variant), Xeric Sandhill Scrub (Sandhills Variant), Streamhead Pocosin, Sandhill Seep, Coastal Plain Small Stream Swamp (Blackwater Subtype).

RARE PLANTS: Carolina rockrose (*Helianthemum carolinianum*), bog spicebush (*Lindera subcoriacea*, FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), conferva pondweed (*Potamogeton confervoides*, FSC), Carolina triodia grass (*Tridens carolinianus*).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*, FSC), red-cockaded woodpecker (*Picoides borealis*, FE), eastern fox squirrel (*Sciurus niger*), coachwhip snake (*Masticophis flagellum*), pigmy rattlesnake (*Sistrurus miliaris*). Meske's skipper (*Hesperia meskei*, a butterfly) and northern pine snake (*Pituophis melanoleucus melanoleucus*, FSC) have been found just off the property and may occur here.

REFERENCES:

Sorrie, B.A. 2003. Site Survey Report: Calloway Preserve. NC Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh, NC.



HOKE COUNTY INVENTORY

McCain Sandhills
Significant Natural Heritage Area
McCain & Pinebluff quads
A: Primary Boundary
B: Secondary Boundary
Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

MCCAIN SANDHILLS

Site Significance: regional
Size: 2010 acres
USGS Quadrangle: McCain
Ownership: NC Department of Agriculture

SIGNIFICANT FEATURES: This site features an excellent assemblage representing the Sandhills region ecology: eight natural communities, at least seven rare plants, and at least five rare animals. These include the Federally Endangered red-cockaded woodpecker (*Picoides borealis*), the Federal Species of Concern bog spicebush (*Lindera subcoriacea*), Pine/Scrub Oak Sandhill, Sandhill Seep, and a unique Nonriverine Swamp Forest community. McCain plays a crucial role in connecting the nationally significant ecological landscapes on Fort Bragg and the Sandhills Game Land.

LANDSCAPE RELATIONSHIPS: McCain Sandhills Significant Natural Heritage Area abuts the southwestern corner of Fort Bragg, a mile and a half west of Calloway Sandhills SNHA. It lies adjacent to the McCain Correctional Facility, which sits atop the county's highest point (550 feet).

SITE DESCRIPTION: This 2000 acre site supports extensive longleaf ecosystem plant communities, ranging from xeric longleaf pine-oak scrub to beaver ponds and a very unusual Carolina bay. Within the property are low quality woodlands which are regenerating from past clearcutting and agriculture, as well as a large area where a loblolly pine (*Pinus taeda*) plantation was recently harvested and reseeded to longleaf pine (*Pinus palustris*); these disturbed areas will not be discussed further. Uplands are dominated by longleaf pine-oak-wiregrass communities, mostly dry to xeric, but with local inclusions of mesic soils where hardwoods such as oaks, hickories, and dogwood are prominent. One northeast-facing slope supports an oak-hickory forest to the exclusion of pines; here grows the state-rare crested coralroot orchid (*Hexalectris spicata*). The north end of the property features a seepage rim - a sudden drop-off from a plateau down to a streamhead - which is dominated by pocosin shrubs beneath longleaf pines and hardwoods. The headwaters of Mountain Creek provide a range of wetland communities, from streamhead shrub-tree pocosins to swamp forest, punctuated by a beaver pond and a human-created impoundment. The most unusual natural feature at McCain is a small Carolina bay with a unique community of pond cypress-swamp black gum-red maple (*Taxodium ascendens-Nyssa biflora-Acer rubrum*) in the canopy, a dense shrub layer of titi-sarvis holly-fetterbush (*Cyrilla racemiflora-Ilex amelanchier-Lyonia lucida*), and abundant sphagnum moss beneath.

MANAGEMENT AND PROTECTION: Fire has been part of the management of most of the SNHA for some time and needs to continue so as to fully restore the ecosystem. A very hot fire in 2002 burned right through the Carolina bay, killing many canopy trees and creating a huge opening; it remains to be seen if long-term ecological damage was done. Those portions of the

SNHA that are being restored to longleaf pine need to be periodically monitored and brought into fire management.

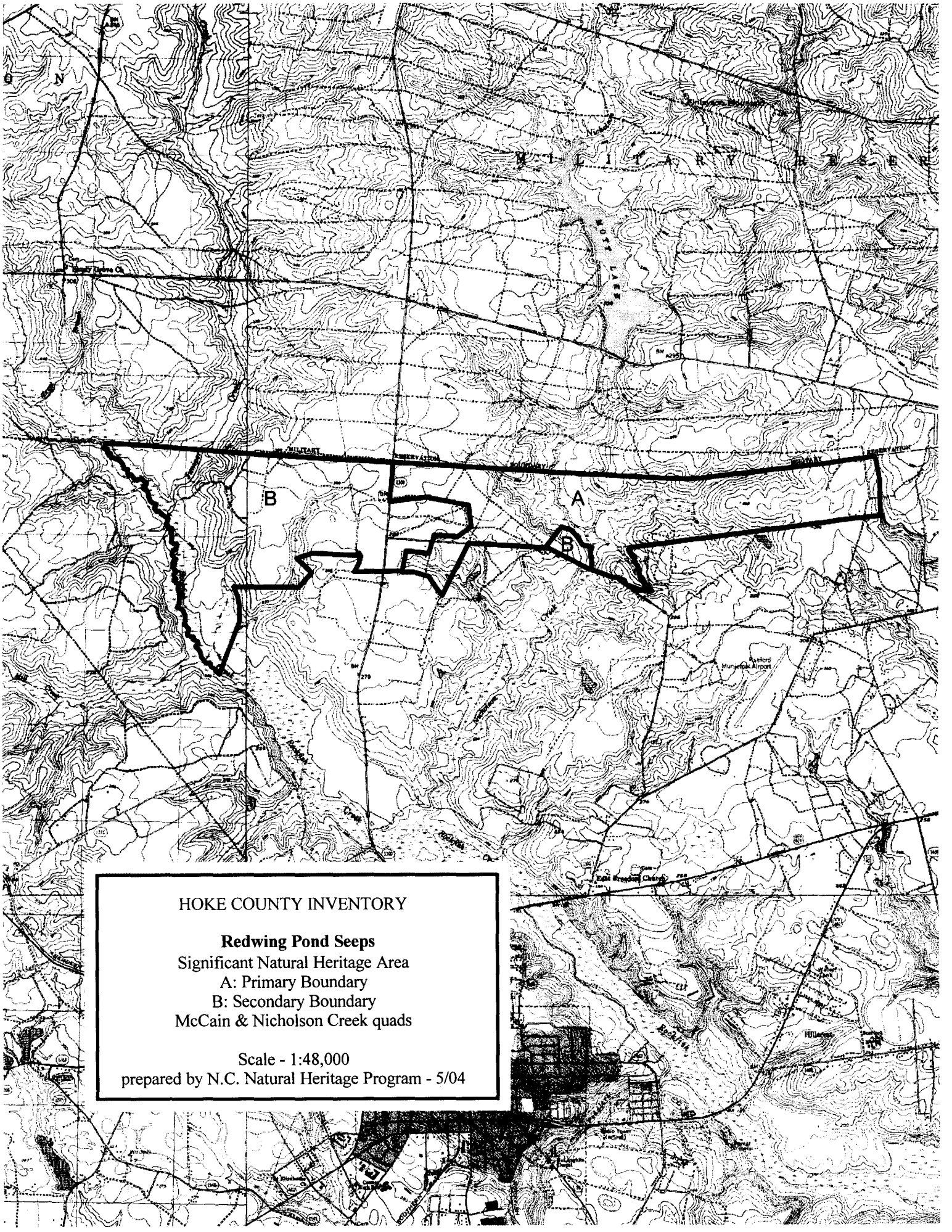
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mixed Oak Variant), Dry Oak-Hickory Forest, Sandhill Seep, Streamhead Pocosin, Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Semipermanent Impoundment, Nonriverine Swamp Forest.

RARE PLANTS: Silvery sedge (*Carex canescens* ssp. *disjuncta*), crested coralroot (*Hexalectris spicata*), sarvis holly (*Ilex amelanchier*), white wicky (*Kalmia cuneata*), bog spicebush (*Lindera subcoriacea*, FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), chaffseed (*Schwalbea americana*, FE, 1957-59 records possibly from this site), Carolina triodia grass (*Tridens carolinianus*).

RARE ANIMALS: Eastern fox squirrel (*Sciurus niger*), star-nosed mole - coastal plain population (*Condylura cristata*), red-cockaded woodpecker (*Picoides borealis*, FE), northern pine snake (*Pituophis melanoleucus melanoleucus*, FSC), pygmy rattlesnake (*Sistrurus miliaris* - 1940). Carolina gopher frog (*Rana capito*) was introduced to the impoundment in 1991 but breeding has not been verified.

REFERENCES:

Sorrie, B.A. 2004. Site Survey Report: McCain Natural Area. NC Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh.



HOKE COUNTY INVENTORY

Redwing Pond Seeps
Significant Natural Heritage Area
A: Primary Boundary
B: Secondary Boundary
McCain & Nicholson Creek quads

Scale - 1:48,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

REDWING POND SEEPS

Site Significance: regional
USGS Quadrangle: McCain, Nicholson Creek
Size: 1899 acres
Ownership: private

SIGNIFICANT FEATURES: This site has high quality seepage slopes and remnant longleaf pine (*Pinus palustris*) communities, which support two rare plants and six rare animals. Among these are the Federally Endangered red-cockaded woodpecker (*Picoides borealis*), Bachman's sparrow (*Aimophila aestivalis*), Sandhills lily (*Lilium pyrophilum*), and spring-flowering goldenrod (*Solidago verna*), all Federal Species of Concern. A number of other uncommon to rare (but not state-listed) plants and animals occur here, such as blue butterwort (*Pinguicula caerulea*, a carnivorous plant) and elfin skimmer (*Nannothemis bella*, a tiny dragonfly). The overall biodiversity is high due to habitat complexity and recurring prescribed burns.

LANDSCAPE RELATIONSHIPS: Redwing Pond Seeps Significant Natural Heritage Area lies adjacent to Fort Bragg's southern boundary, about a mile south of the Fort Bragg Mott Lake SNHA and just east of Calloway Sandhills SNHA.

SITE DESCRIPTION: Rolling uplands characterize the eastern and western portions of the site, with flat hilltops in the middle. East of Nicholson Creek, much of the site retains its natural character, despite the impoundment (Redwing Pond, which acts like a large beaver pond). Several streamhead pocosins run down to the pond beneath abundant pond pines (*Pinus serotina*); they support three species of pitcher plants, plus colorful milkworts, meadow beauties, and asters. Near the pond there are a few seepages open to full sun, which support diminutive sundews, yellow-eyed-grasses, pipeworts, and clubmosses. The streamheads are separated by low rises with mesic to dry longleaf pine (*Pinus palustris*), oaks, and wiregrass (*Aristida stricta*). A grove of Atlantic white cedar (*Chamaecyparis thyoides*) crowds the northeastern edge of the pond. The area north of the pond is frequently burned and supports relatively high plant and animal diversity. To the southwest lies a swamp forest along Nicholson Creek, a small area of mesic flatwoods, and a small ridge with longleaf pine. To the east of the pond is a broad knoll dominated by xeric longleaf pine-oak, which, due to local areas of moisture-holding clay soil near the surface, harbors patches of shrub species usually found in pocosins. Lower slopes support a more mesic forest and the south side of the knoll is a loblolly pine plantation. Southward of the pond are extensive areas of open fields and scattered groves of fire-suppressed hardwoods.

Between Nicholson Creek and Vass Road are a few areas of good quality mature longleaf pine adjacent to cultivated fields and pastures. These pinelandss havew a sparse understory and a moderately diverse herb layer; they support fox squirrels and a colony of red-cockaded woodpeckers. Both pine stands are raked for straw. Tributaries of Nicholson Creek support small man-made impoundments and remnant Streamhead Pocosins. The latter are open seepage

communities on steep slopes, dominated by diverse herbs, grasses, and sedges, and associated with purple and red pitcher plants (*Sarracenia purpurea* and *S. rubra*).

Between Vass Road and Rockfish Creek, the landscape becomes more diverse again. The driest uplands support Xeric Sandhill Scrub in which turkey and bluejack oaks (*Quercus laevis* and *Q. incana*) are common beneath moderately dense longleaf pine. Where thinning has occurred, adult pines are widely scattered among abundant planted longleaf and abundant oak sprouts. Wiregrass forms a dense ground cover. In one location, an outcropping of rock caps a steep slope and provides an impressive vista. A good quality Pine Scrub Oak Sandhill community ocurs on a flat to the west, with tall mature pines. Hardwoods have been controlled to facilitate pinestraw raking, but the herb layer is in good condition. A family group of red-cockaded woodpeckers occurs here, as well as bobwhite, turkey, and common nighthawk. Just to the southwest a fifteen acre piece was clearcut some years ago to control pine beetles; now it is growing back with longleaf pine and four species of oak. Lower slopes give way to a very good quality Streamhead Pocosin notable for its wide variety of shrubs (20+ species). Where this stream hits the southern property boundary, there is a large flat dominated by tall pond pines over shrubs. The narrow floodplain of Rockfish Creek supports a Coastal Plain Small Stream Swamp community, with tall swamp black gum (*Nyssa biflora*), loblolly pine, red maple, and scattered pond cypress (*Taxodium ascendens*).

MANAGEMENT AND PROTECTION: Some of the property was cleared for agriculture in the past, some was planted to loblolly pine (*Pinus taeda*), and some raked for pinestraw. Recently, much of the plantations have been put back into longleaf pine. The area around Redwing Pond gets burned every three years or so, but the longleaf habitat to the east has not burned as often and needs to be restored. Continued burning of the flatwoods and longleaf ridge to the southwest is recommended. The site is unprotected and under single ownership.

NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill, Dry Oak-Hickory Forest, Mesic Pine Flatwoods, Coastal Plain Small Stream Swamp (Blackwater Subtype), Streamhead Pocosin, Sandhill Seep, Coastal Plain Semipermanent Impoundment.

RARE PLANTS: Sandhills lily (*Lilium pyrophilum,* FSC), spring-flowering goldenrod (*Solidago verna,* FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis,* FSC), reversed roadside-skipper (*Amblyscirtes reversa*), Meske's skipper (*Hesperia meskei*), diminutive clubtail (*Gomphus diminutus,* a dragonfly), red-cockaded woodpecker (*Picoides borealis,* FE), eastern fox squirrel (*Sciurus niger*).

REFERENCES:

LeGrand, H. 2001-2002. Site Reports. North Carolina Natural Heritage Program, DENR, Raleigh, NC.

Sorrie, B.A. 2004. Site Survey Report: Redwing Pond Seeps. NC Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh.

HOKE COUNTY INVENTORY

Fort Bragg Little River Macrosite
Significant Natural Heritage Area
Southern Pines quad

Scale - 1:100,000
prepared by N.C. Natural Heritage Program - 8/04

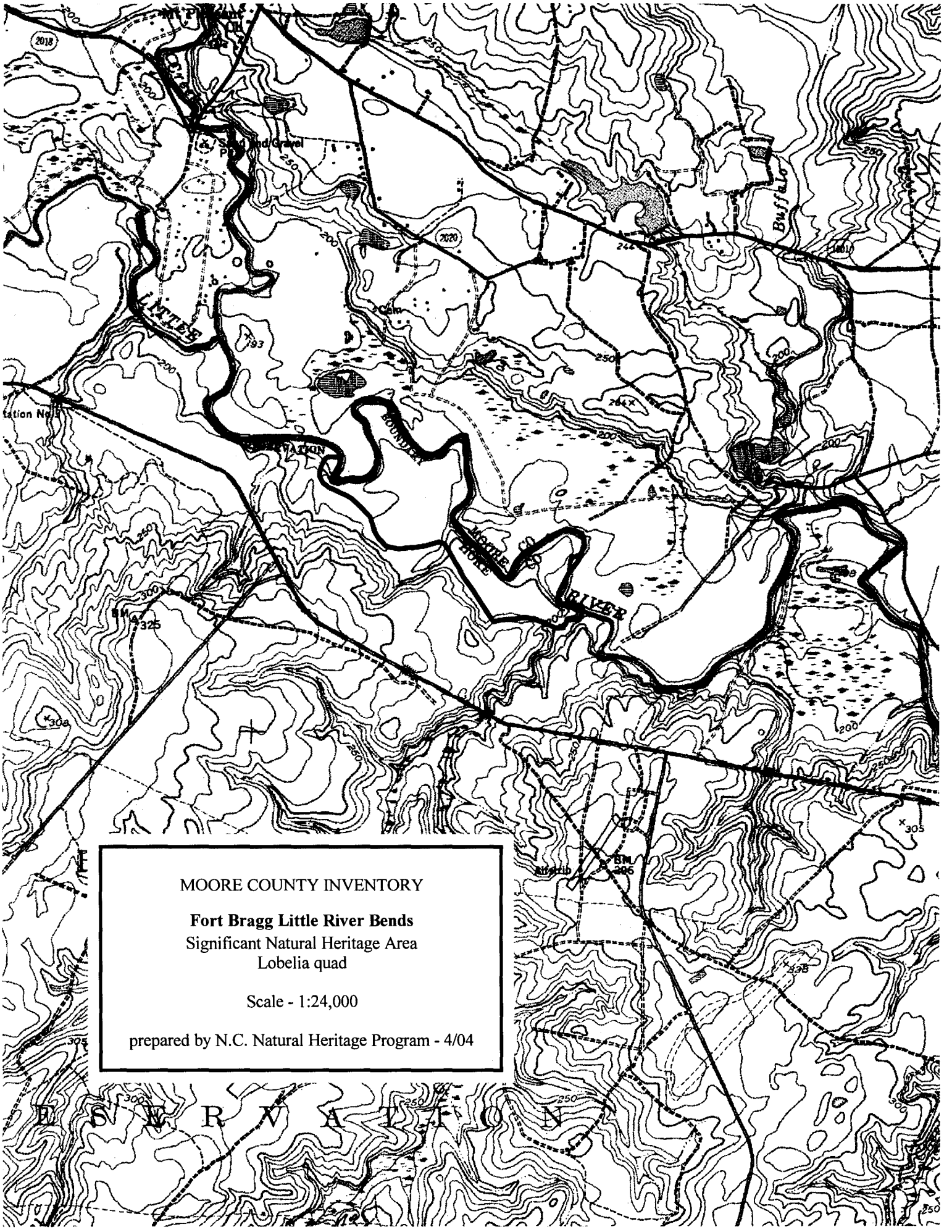
Hoke County Natural Area Inventory

FORT BRAGG LITTLE RIVER MACROSITE

Fort Bragg Little River Macrosite occurs along an eight mile stretch of the Little River (also known as Lower Little River), 2.5 miles of which are in Hoke County. It lies between NC route 690 and Manchester Road, south of the Overhills Sandhills Macrosite and north of the Central Fort Bragg Macrosite. The Macrosite lies within the Sandhills geological region of the coastal plain, but the Little River has cut deeply into hardened clay sediments (Cape Fear Formation) to form an impressive gorge-like aspect with slopes up to 80 feet high. The macrosite supports a very diverse array of plant community types, ranging from xeric river terraces to several kinds of longleaf pine (*Pinus palustris*) uplands, loblolly pine (*P. taeda*) flatwoods, cypress-gum swamps, floodplain forests, Atlantic white cedar (*Chamaecyparis thyoides*) groves, semi-open shrub-tree bluffs, extensive thickets of mountain laurel (*Kalmia latifolia*), streamheads, vertical seepage walls, and ponded depressions. Per unit area, this macrosite is ecologically the most diverse in Hoke County. Nearly 600 species of plants have been documented here. Within this setting occur many species of plants that, although not rare in North Carolina, are unusual or rare in the county. Notable are several species normally associated with the mountains, such as galax (*Galax urceolata*), Catesby's trillium (*Trillium catesbaei*), and roundleaf sundew (*Drosera rotundifolia*).

There are seven standard sites within the Macrosite, but only three and part of a fourth occur within Hoke County. Much of the uplands have been disturbed in the past and parts of the river terraces were converted to pine plantations. However, in recent decades fire has been restored to the landscape and non-native pines are being harvested and replaced with native species. The core areas immediately along the Little River and its banks and bluffs remain in a natural state.

Among the notable features in the Macrosite are three rare plant community types. Little River Bluff and Little River Seepage Bank are globally rare and nearly restricted to Little River and Rockfish Creek (the Little River Seepage Bank community also occurs at Willis Creek in extreme southern Cumberland County). Mesic Pine Flatwoods (Little River Variant) occurs only at scattered sites along Little River, so far as is known. Many rare animal and plant species have been documented within the Hoke portion of the Macrosite. Federally Endangered species include red-cockaded woodpecker (*Picoides borealis*), roughleaf loosestrife (*Lysimachia asperulifolia*), and Michaux's sumac (*Rhus michauxii*). Among the many state rare speies are Bachman's sparrow (*Aimophila aestivalis*), Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), resinous boneset (*Eupatorium resinosum*), Alabama beaksedge (*Rhynchospora crinipes*), and Carolina pineland-cress (*Warea cuneifolia*). The indigo-bush, the beaksedge, and the pineland-cress occur nowhere else in Hoke County.



MOORE COUNTY INVENTORY

Fort Bragg Little River Bends

Significant Natural Heritage Area

Lobelia quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG LITTLE RIVER BENDS

Site Significance: national
Size: 133 acres
USGS Quadrangle: Lobelia
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: This natural area contains an outstanding cluster of rare elements associated with the terraces of Lower Little River. Included are two of the best examples of Mesic Pine Flatwoods (Little River Variant), a community restricted to this river; a large population of Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*); and a large population of Alabama beaksedge (*Rhynchospora crinipes*). A concentration of five Federal Species of Concern plant species and one FSC animal occur here: Georgia indigo-bush, Alabama beaksedge, Sandhills milk-vetch (*Astragalus michauxii*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*), Pickering's morning-glory (*Stylisma pickeringii* var. *pickeringii*), and Bachman's Sparrow (*Aimophila aestivalis*). The xeric terrace supports a Sand Barren community (rare in the North Carolina Sandhills) and the state's only extant population of Carolina pineland-cress (*Warea cuneifolia*). This is an excellent stretch of blackwater river, with intact shore vegetation, seepage banks, levee forest, and small islands. Mesic terraces support the highest species diversity of any plant community on Fort Bragg and possibly the state - 142 species have been documented within a 20x50 meter plot.

LANDSCAPE RELATIONSHIPS: Little River Bends is located within Fort Bragg's Northern Training Area along the south side of Little River, 1.4 miles east of Raeford-Vass Road, north of Manchester Road, and bounded on the east side by Deep Creek. It lies adjacent to the Little River Trillium Slopes Significant Natural Heritage Area and a mile west-southwest of Turkey Creek SNHA.

SITE DESCRIPTION: This natural area consists of wet to xeric, nearly flat terraces occupying three loops of Lower Little River. The southwestern portion is elevated slightly (6-9 feet), possesses xeric soil, and has been planted with longleaf pine. Wiregrass (*Aristida stricta*) is abundant and the community supports many dry soil specialist plants. Towards the river this xeric upper terrace gives way to lower terraces characterized by more mesic soil, locally with small seasonally wet depressions. These mesic terraces have been logged but otherwise not much disturbed and support a plant community unique to this river: the Little River Variant of Mesic Pine Flatwoods. The xeric terrace descends gradually westward to a Wet Pine Flatwoods with an ill-defined streamhead in which are found a few small Vernal Pools (seasonally inundated depressions). The river itself is characterized by low, steep to vertical clay banks covered with Atlantic white cedar (*Chamaecyparis thyoides*), loblolly pine (*Pinus taeda*), hardwoods, and diverse shrubs. Thick deposits of claystone (Cape Fear Formation) form several shelves that are dry during summer droughts. Four elongated islands within the river channel support a mix of levee forest and sandbar vegetation. Where vertical, the riverbanks are perennially wet with seepage.

MANAGEMENT AND PROTECTION: The northern banks of this stretch of river are in private ownership. To preserve the integrity of the river ecosystem, they should be placed under conservation easement or some other form of protection. The prescribed burning program should be continued on the Fort Bragg portion.

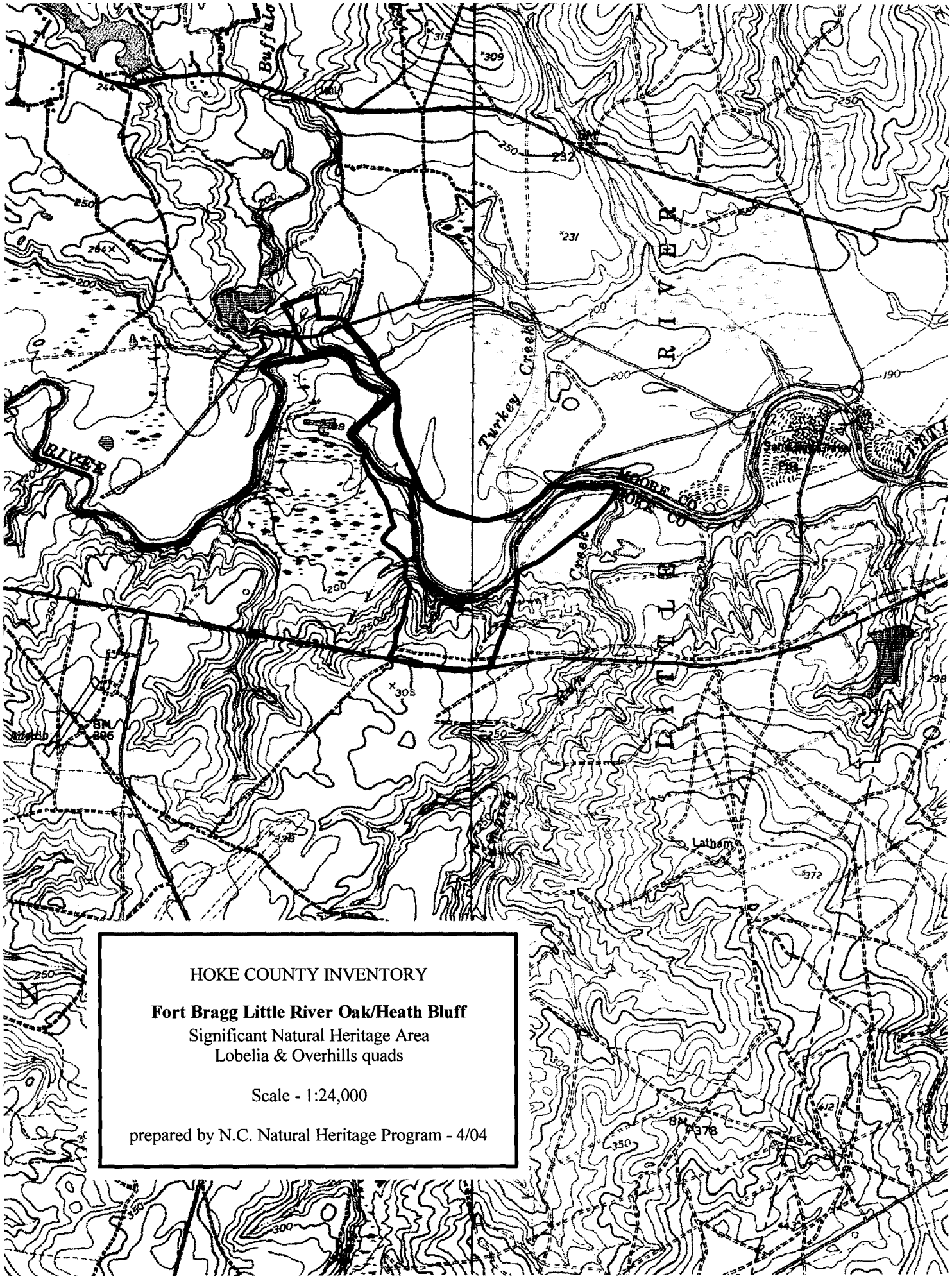
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sand Barren Variant), Pine/Scrub Oak Sandhill, Mesic Pine Flatwoods (Little River Variant), Vernal Pool, Little River Bluff, Little River Seepage Bank, Coastal Plain Levee Forest (Blackwater Variant), Sand and Mud Bar.

RARE PLANTS: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*, FSC), Sandhills milk-vetch (*Astragalus michauxii*, FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), Alabama beaksedge (*Rhynchospora crinipes*, FSC), Pickering's morning-glory (*Stylisma pickeringii* var. *pickeringii*, FSC), Carolina pineland-cress (*Warea cuneifolia*).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*, FSC).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Little River Oak/Heath Bluff
Significant Natural Heritage Area
Lobelia & Overhills quads

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG LITTLE RIVER OAK/HEATH BLUFF

Site Significance: state
Size: 188 acres
USGS Quadrangle: Lobelia, Overhills
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: This natural area has the most extreme topography in Hoke County: steep slopes that rise 80 feet from Little River to the top. It contains the best example of Piedmont/ Coastal Plain Heath Bluff on Fort Bragg (and in Hoke County), a globally rare plant community which combines elements of both the piedmont and coastal plain floristic regions. Three other rare plant communities occur here, all restricted to the Sandhills region: Little River Bluff, Little River Seepage Bank, and Mesic Pine Flatwoods (Little River Variant). The site supports four Federal Species of Concern plants: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), Sandhills milkvetch (*Astragalus michauxii*), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia),* and spring-flowering goldenrod (*Solidago verna*). The unique ecology of this area provides for several plants that occur nowhere else in Hoke County, such as chestnut oak (*Quercus prinus*), starved witchgrass (*Dichanthelium depauperatum*), and checkerberry (*Gaultheria procumbens*, also called wintergreen). Finally, there is an occurrence of roundleaf sundew (*Drosera rotundifolia*), disjunct from the North Carolina mountains.

LANDSCAPE RELATIONSHIPS: The Oak/Heath Bluff Significant Natural Heritage Area is located in Fort Bragg's Northern Training Area, between Manchester Road and Lower River Road, extending from Jumping Run Creek westward almost to Buffalo Creek. It lies just downstream from Little River Trillium Slopes SNHA, immediately south of Turkey Creek SNHA, and north of Sicily Drop Zone.

SITE DESCRIPTION: The natural area is comprised of a steep riverside bluff within a U-shaped bend, vertical seepage banks, mesic river terraces, a xeric terrace, a floodplain forest, and scattered sand/mud bars. The riverside bluff is very steep and rises 80 feet directly from Little River on the southern side of a U- shaped bend. It descends northeast and northwest to flat terraces. The elevation differential here from river to top of bluff is the most extreme of any section of the entire Little River. Slopes are densely clothed with a wide diversity of shrubs, overtopped by a moderately open hardwood canopy (especially oaks) mixed with scattered loblolly pines (*Pinus taeda*). Wintergreen and abundant galax (*Galax urceolata*) occur under the shrubs. A few slumps expose wet clay soil and support Atlantic white cedar (*Chamaecyparis thyoides*). Near the crest of the bluff is an open shrub/grass zone under sparse pines; such an opening is unique among Heath Bluff communities on Fort Bragg. On the west side of the river bend, the bluff rapidly decreases in height and forms a vertical seepage bank, dark from overhanging Atlantic white cedar and supporting roundleaf sundew. Farther to the northwest is a mesic to dry terrace with a sparse canopy of pines and a mix of low shrub thickets and grassy clearings. To the northeast, the bluff diminishes to a flat mesic river terrace of longleaf (*P. palustris*) and loblolly pines over shrubs and wiregrass (*Aristida stricta*), which merges northward with a narrow strip of levee forest along the river's next bend. To the east of the

mesic terrace and levee, a large xeric terrace stands in stark contrast to the well-watered communities surrounding it. This Sand Barren community is dominated by dense wiregrass and moderately spaced turkey oak (*Quercus laevis*) and longleaf pine, all growing in coarse white sand. The eastern boundary of the SNHA is formed by Jumping Run Creek, which is lined with pond pines (*Pinus serotina*), hardwoods, and shrubs. On the north side of the river, the big U-shaped bend is completely occupied by a crescent-shaped levee forest (a type of floodplain forest) about 650 yards long in which floods create elongated pools or backup channels. Dominants here are river birch (*Betula nigra*), pond cypress (*Taxodium ascendens*), red maple (*Acer rubrum*), loblolly pine, and pop ash (*Fraxinus carolinianus*). To the north occur mesic and xeric terraces degraded from extensive timbering operations. At the northwest end of the levee forest is a large and undisturbed example of a Sand and Mud Bar community.

MANAGEMENT AND PROTECTION: Jumping Run Creek used to carry (early 1990s) a high sand/silt burden, the result of siltation from Sicily Drop Zone. It should be monitored now that the drop zone has been revegetated. The clearcut north of the levee forest should be allowed to regenerate naturally. Fort Bragg staff should maintain the current prescribed burning program.

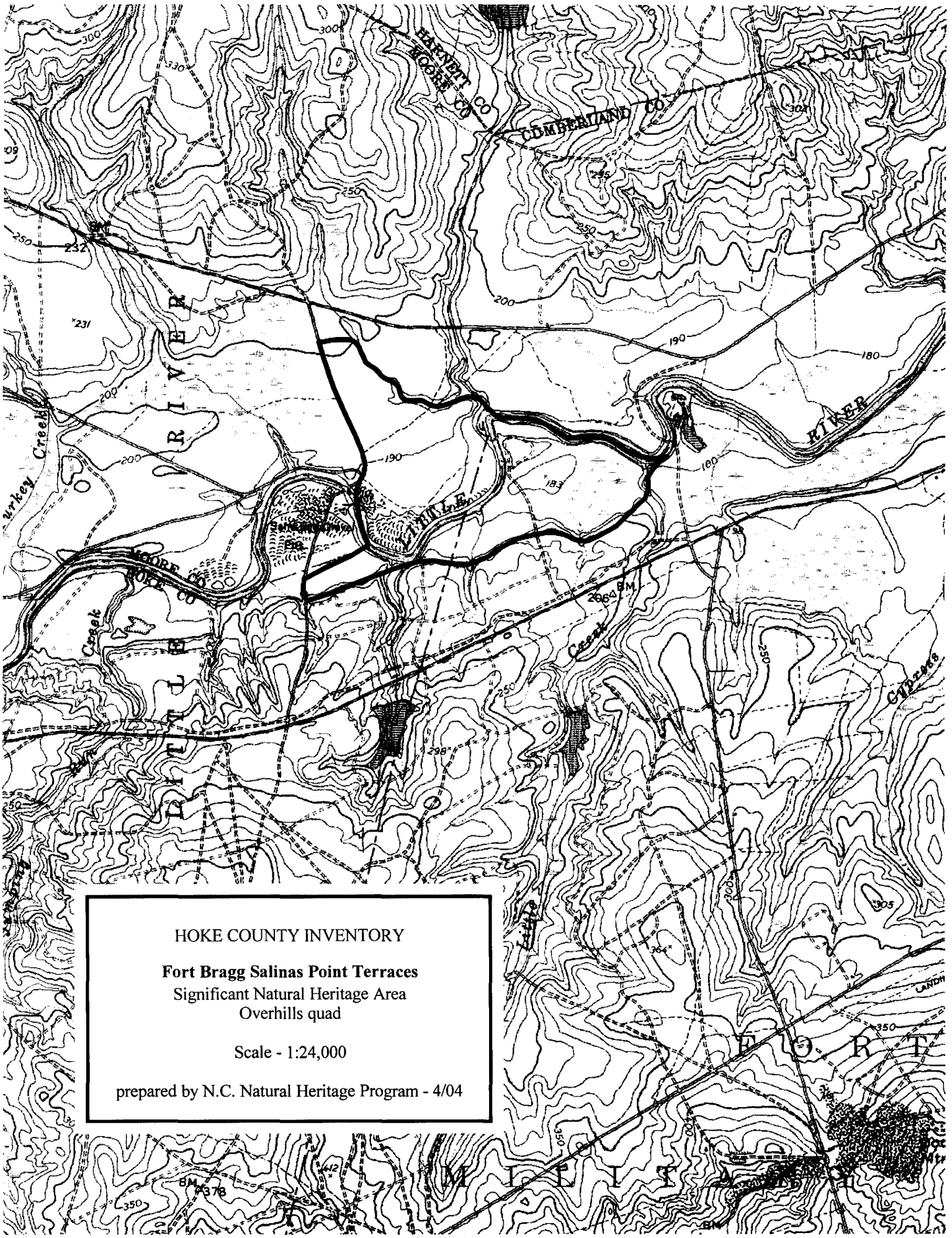
NATURAL COMMUNITIES: Piedmont/ Coastal Plain Heath Bluff, Little River Bluff, Little River Seepage Bank, Coastal Plain Levee Forest (Blackwater Variant), Sand and Mud Bar, Mesic Pine Flatwoods (Little River Variant), Xeric Sandhill Scrub (Sand Barren Variant).

RARE PLANTS: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*, FSC), Sandhills milkvetch (*Astragalus michauxii*, FSC), Sandhills pyxie-moss (*Pyxidanthera barbulata* var. *brevifolia*, FSC), and spring-flowering goldenrod (*Solidago verna*, FSC).

RARE ANIMALS: none documented.

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Fort Bragg Salinas Point Terraces

Significant Natural Heritage Area

Overhills quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG SALINAS POINT TERRACES

Site Significance: state
Size: 283 acres (28 in Hoke)
USGS Quadrangle: Overhills
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: Fort Bragg Salinas Point Terraces contains six state-rare plant species, including three that are also Federal Species of Concern: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), Sandhills milkvetch (*Astragalus michauxii*), and Pickering's morning-glory (*Stylisma pickeringii* var. *pickeringii*). The population of wire sedge (*Carex tenax*) is the only one extant in the state and the northernmost in the species' range. A variety of good to high quality natural communities are found here, plus borrow ponds and scrapes which are reverting to natural vegetation and which harbor a number of unusual species. Among the rare community types are Little River Bluff* and Little River Seepage Bank*, both restricted to a few tributaries of the Cape Fear River. A third rare community, Mesic Pine Flatwoods (Little River Terrace Variant)*, occurs only along this river.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area flanks Lower Little River between Manchester Road and NC route 690, northwest of the Manchester Artillery Impact Area. It lies west of the Eastern Little River Complex SHNA and just east of the Little River Oak/Heath Bluff SNHA. The very large Central Fort Bragg Macrosite occurs shortly to the south. About half of the natural area lies within Moore County and a third in Cumberland County; only the southwestern portion is in Hoke County.

SITE DESCRIPTION: Salinas Point Terraces consists of flat to gently sloping terraces bordering an entrenched, rapidly flowing blackwater river (Lower Little River). An extensive terrace north of the river supports xeric to mesic longleaf pine (*Pinus palustris*) communities and is bisected by a Streamhead Pocosin which drains into an old oxbow; the whole area is floristically diverse. Northward the terrace merges with moist pine flatwoods. The strip along the river is partly natural; but in the area of former gravel extraction it has been converted to low gravel ridges and intervening boggy pools. These latter support an interesting assemblage of native wetland species. Much of the area was previously altered by gravel operations and silviculture, and largely replanted to slash and loblolly pines (*Pinus elliottii* and *P. taeda*); these pines are being replaced with longleaf. South of the river an Atlantic white cedar (*Chamaecyparis thyoides*) swamp occupies a shallow basin bordered by a dry to mesic terrace. The natural area contains a Wet Pine Flatwoods community with abundant cane (*Arundinaria tecta*) to the southwest and a mesic terrace at the west end. Several small creeks flow northward and dissect these terraces. The south margin of the natural area is formed by hills containing large amounts of quartzite pebbles that abruptly rise to 35 feet. Along the river, extensive clay soils create many areas of seepage and shrub-dominated slump banks, which support two globally rare natural communities: Little River Bluff and Little River Seepage Bank.

MANAGEMENT AND PROTECTION: Current management practices appear to be appropriate for the long term. The area receives only very limited troop activity. The wire sedge population, the only one currently known in North Carolina, needs to be monitored.

NATURAL COMMUNITIES: Mesic Pine Flatwoods (Little River Variant)*, Little River Bluff*, Little River Seepage Bank*, Xeric Sandhill Scrub (Sand Barren Variant), Streamhead Pocosin, Wet Pine Flatwoods, Streamhead Atlantic White Cedar Forest.

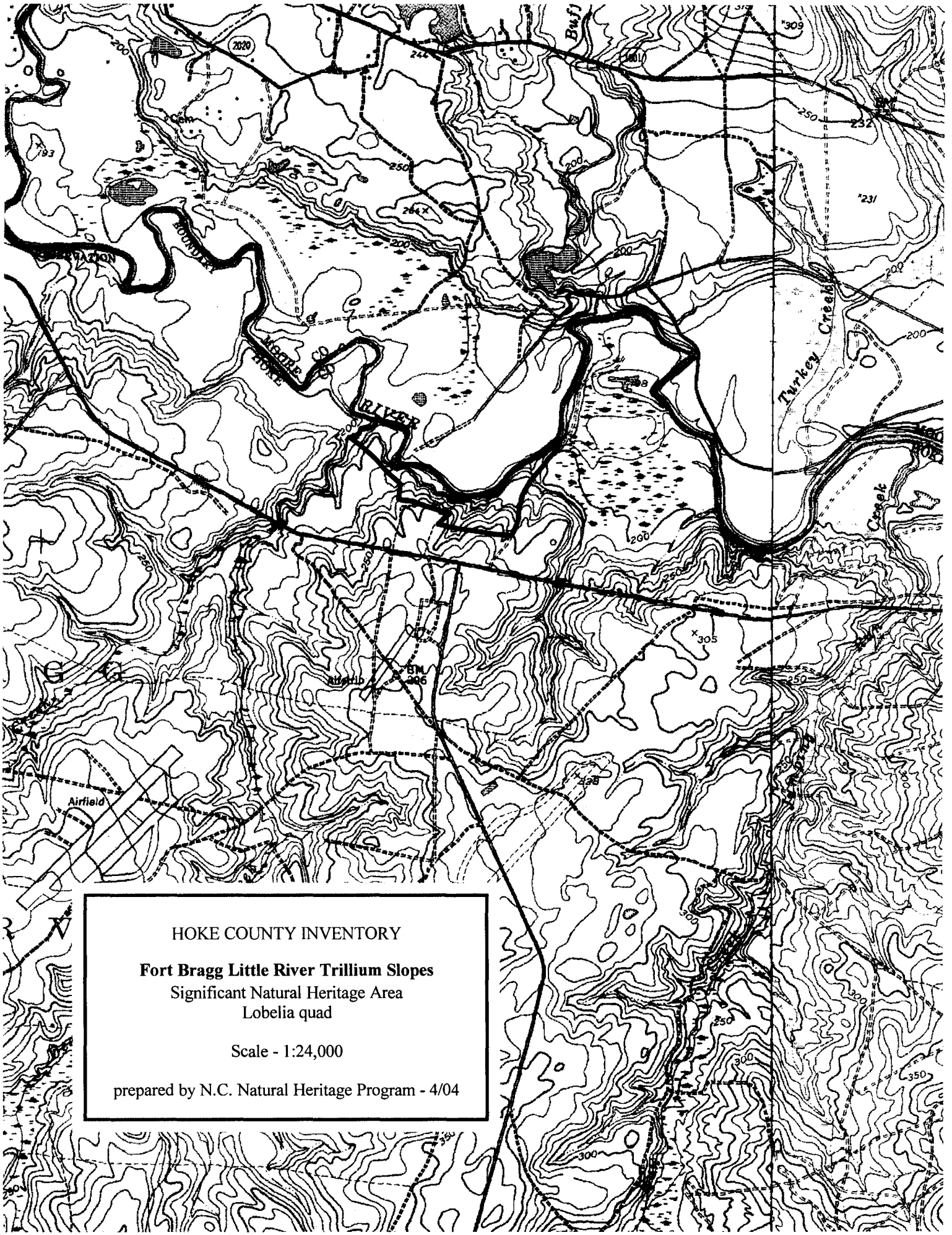
RARE PLANTS: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*, FSC), Sandhills milkvetch (*Astragalus michauxii*, FSC), wire sedge (*Carex tenax)*, resinous boneset (*Eupatorium resinosum*), Pickering's morning-glory (*Stylisma pickeringii* var. *pickeringii*, FSC), Chapman's yellow-eyed-grass (*Xyris chapmanii*). None of these occur within the Hoke County portion.

RARE ANIMALS: None documented, but likely.

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.

* = found within the Hoke County portion of the site.



HOKE COUNTY INVENTORY

Fort Bragg Little River Trillium Slopes
Significant Natural Heritage Area
Lobelia quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

FORT BRAGG LITTLE RIVER TRILLIUM SLOPES

Site Significance: regional
Size: 50 acres
USGS Quadrangle: Lobelia
Ownership: US Dept. of Defense

SIGNIFICANT FEATURES: This natural area contains one of the most concentrated assemblages of woody species in the state - over 50 kinds of trees, shrubs, and vines. Steep north-facing slopes harbor many species characteristic of the Piedmont region, intermingling with Coastal Plain species and creating new communities. It supports an excellent example of the globally rare Little River Seepage Bank, on which grows a large population of roundleaf sundew (*Drosera rotundifolia*), disjunct from the North Carolina mountains. Other globally rare communities here are Little River Bluff and Little River Terrace Variant of Mesic Pine Flatwoods. The slopes harbor several species unknown elsewhere in Hoke County, notably Catesby's trillium (*Trillium catesbaei*, one of only three known North Carolina Coastal Plain occurrences) and false Solomon's-seal (*Maianthemum racemosum*). The site includes small populations of Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*), a Federal Species of Concern.

LANDSCAPE RELATIONSHIPS: Little River Trillium Slopes Significant Natural Heritage Area is located in the Northern Training Area of Fort Bragg, between Manchester Road and the Little River, east of Deep Creek and northwest of Sicily Drop Zone. It lies adjacent to Little River Bends SNHA and southwest of Turkey Creek SNHA.

SITE DESCRIPTION: The natural area consists of very steep riverside bluffs up to 50 feet high, clothed in a wide diversity of woody plants. In a few places, lower slopes are vertical clay seepage walls up to 18 feet high, supporting small herbaceous plants and bordered by Atlantic white cedar (*Chamaecyparis thyoides*). The area grades northeastward to a narrow riverside terrace and westward to a mesic hardwood slope and levee (floodplain deposit) forests associated with meander bends. The north-facing aspect, cool microclimate, and relatively fertile soil of the central slopes support a flora that is Piedmont-like in character and includes dwarf chinquapin (*Castanea pumila*), Catesby's trillium, smooth false-foxglove (*Aureolaria flava*), galax (*Galax urceolata*), and others. The steep bluffs are very rich in shrub, tree, and vine species (over 50 different kinds), one of the richest concentrations in North Carolina. A few short Streamhead Pocosins dissect the area. Longleaf pine/oak/wiregrass (Pine/Scrub Oak Sandhill community) covers slopes south to Manchester Road.

MANAGEMENT AND PROTECTION: A large erosion gully appears to have been formed by downcutting across the bluff by a steep-gradient storm-runoff channel that is fed by a long firebreak road; the firebreak should be closed or re-vegetated.

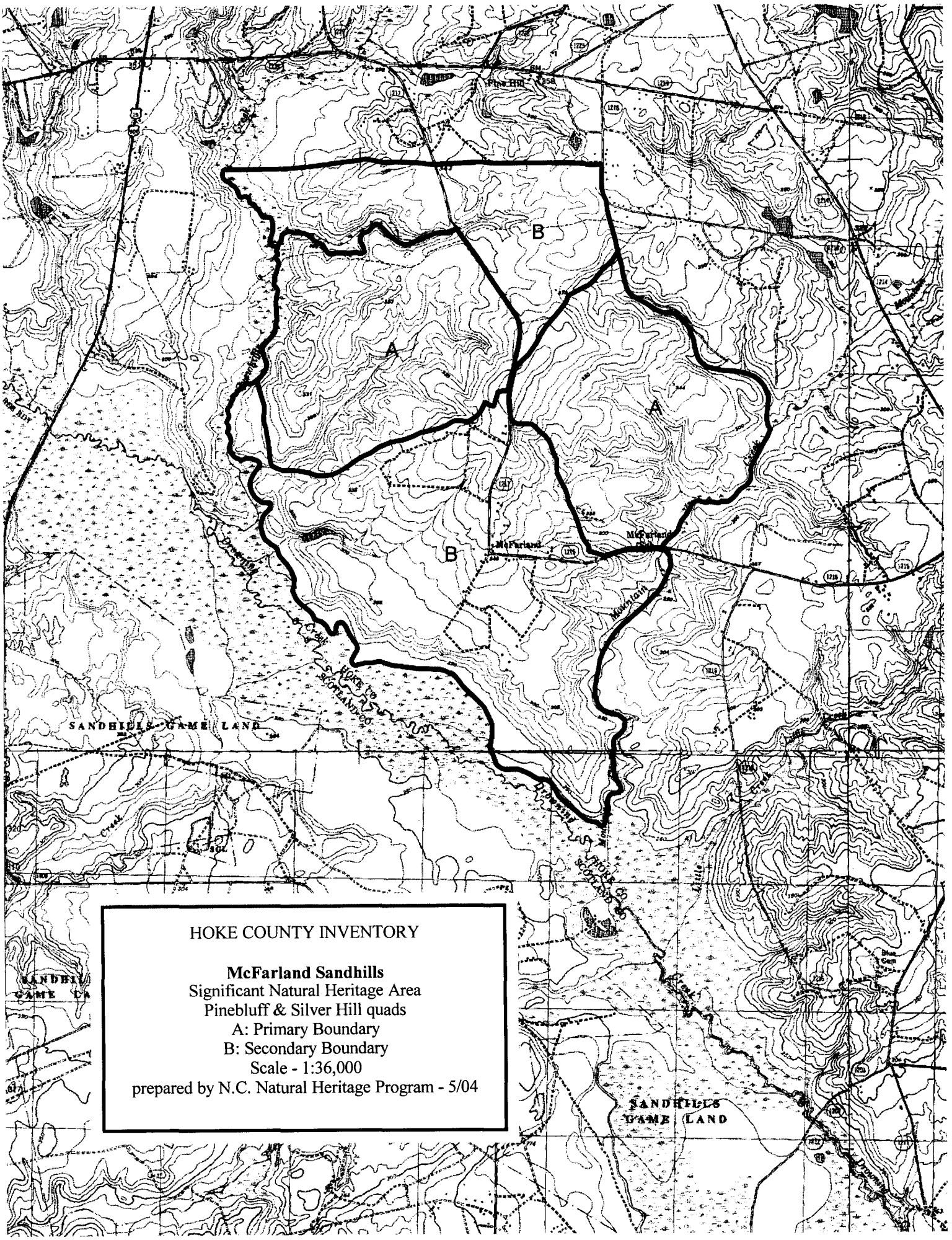
NATURAL COMMUNITIES: Little River Seepage Bank, Little River Bluff, Coastal Plain Levee Forest (Blackwater Subtype), Streamhead Pocosin, Mesic Pine Flatwoods (Little River Variant), Pine/Scrub Oak Sandhill (Mixed Oak Variant).

RARE PLANTS: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*, FSC).

RARE ANIMALS: None recorded, but likely present.

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

McFarland Sandhills
Significant Natural Heritage Area
Pinebluff & Silver Hill quads
A: Primary Boundary
B: Secondary Boundary
Scale - 1:36,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

MCFARLAND SANDHILLS

Site Significance: regional
Size: 3285 acres
USGS Quadrangle: Pinebluff
Ownership: private

SIGNIFICANT FEATURES: This is the largest natural area in private ownership in Hoke County. It contains a broad diversity of Sandhills region plant communities, five rare animal species, and two rare plants. Ten colonies of the Federally Endangered red-cockaded woodpecker (*Picoides borealis*) have been documented. McFarland Sandhills also plays an important role as a link for fauna and flora between the Fort Bragg Megasite and Sandhills Game Land Megasite. The site has high potential for discovery of additional significant species.

LANDSCAPE RELATIONSHIPS: McFarland Sandhills borders Drowning Creek just two miles southeast of the US 15-501 bridge. Drowning Creek/Lumber River Confluence SNHA occupies the floodplain adjacent to McFarland Sandhills, Quewhiffle Creek SNHA is a mile to the north, and McCain SNHA is less than a mile to the east. Camp Mackall Military Reservation lies two miles west, the Sandhills Game Land less than a mile southwest.

SITE DESCRIPTION: This Significant Natural Heritage Area features an extensive tract of longleaf pine (*Pinus palustris*) communities, primarily Pine/Scrub Oak Sandhill, with some Xeric Sandhill Scrub on the highest ridges. Good quality Streamhead Pocosins and fair quality Sandhill Seeps are also present. The uplands are managed for pinestraw raking and therefore the understory and shrub layers are reduced over most of the uplands. Wiregrass (*Aristida stricta*) has been reduced by raking, but overall coverage is good. The open condition has attracted ten red-cockaded woodpecker colonies to this middle aged longleaf stand. McFarland Sandhills serves an important landscape role for red-cockaded woodpeckers, providing a connection with the large populations on Fort Bragg and on the Sandhills Game Land. The western half of the property supports two lengthy Streamhead Pocosins which drain into Quewhiffle Creek. They support the typical complement of Sandhills trees, shrubs, and herbs. Streamhead ecotones, so important for rare species, lack high diversity now but perhaps will recover over time. Near the west end of one of these streamheads lies an impoundment with narrow but boggy margins. Here grows the state-rare silvery sedge (*Carex canescens* ssp. *disjuncta*) and roundleaf sundew (*Drosera rotundifolia*), a northern species rare in the Sandhills, where it is disjunct from the mountains.

Quewhiffle Creek forms much of the western boundary of the natural area. While its floodplain mostly supports typical Small Stream Swamp vegatation, including plentiful shrubs, portions are open beneath the tree canopy and glade-like, due to the dominance of grasses. This unusual community variant needs further study.

The eastern half of the property supports additional Streamhead Pocosins and a few Sandhill Seeps on steeper slopes facing Mountain Creek. Pond pine (*Pinus serotina*) forms an open

canopy over shrubs, bracken fern (*Pteridium aquilinum*), and herbs. Recent prescribed burns have begun to restore herb diversity.

MANAGEMENT AND PROTECTION: While there are some negative impacts from fire suppression, pinestraw raking, and logging, the communities remain in good condition. Recurring prescribed burns should be an integral part of management. This includes filling in of fire plowlines near Mountain Creek to allow burning of the shrub ecotone. The site is not under conservation protection, but is in the Safe Harbor program.

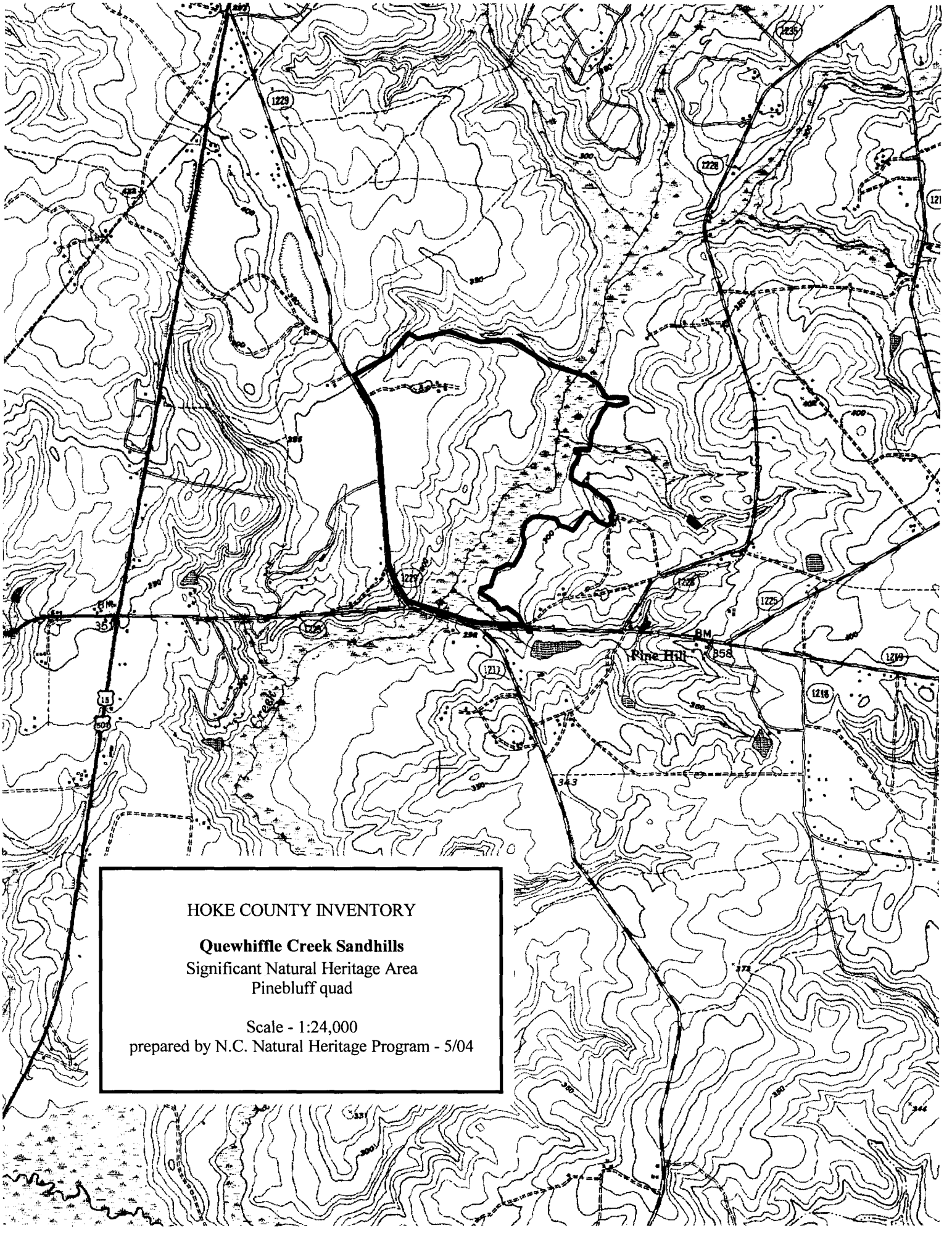
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mixed Oak Variant), Dry Oak-Hickory Forest, Streamhead Pocosin, Sandhill Seep, Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Semipermanent Impoundment.

RARE PLANTS: Silvery sedge (*Carex canescens* ssp. *disjuncta*), spring-flowering goldenrod (*Solidago verna*, FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis*, FSC), pinewoods darter (*Etheostoma mariae*, FSC), red-cockaded woodpecker (*Picoides borealis*, FE), eastern fox squirrel (*Sciurus niger*), Sandhills chub (*Semotilus lumbee*, FSC).

REFERENCES:

Sorrie, B.A. 2004. Site Survey Report: McFarland Sandhills. NC Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh.



HOKE COUNTY INVENTORY

Quewhiffle Creek Sandhills

Significant Natural Heritage Area

Pinebluff quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

QUEWHIFFLE CREEK SANDHILLS

Site Significance: regional
USGS Quadrangle: Pinebluff
Size: 328 acres
Ownership: The Nature Conservancy, private

SIGNIFICANT FEATURES: Quewhiffle Creek Sandhills is a longleaf pine restoration site, yet field work there has documented seven rare animals, three rare plants, and good quality examples of two natural communities. Until its rediscovery in Hoke County in 2002, twistleaf goldenrod (*Solidago tortifolia*) was last seen in North Carolina in 1973. At least three Federal Species of Concern animals occur here.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area lies along Quewhiffle Creek, north of Ashemont Road (SR 1225). McFarland Sandhills SNHA lies a mile to the south, McCain Sandhills SNHA lies 2.5 miles east, and Troutman Farm SNHA lies two miles to the southwest.

SITE DESCRIPTION: The high western side of the property was formerly in cultivation, but now planted to longleaf pines. It is part of an extensive ridgetop that orginally supported Xeric Sandhill Scrub, composed primarily of longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), and wiregrass (*Aristida stricta*). On the preserve this community is slowly reclaiming its former acreage, aided by fire management and control of hardwood scrub. Wiregrass is abundant and herbaceous growth very good, providing nectar sources for butterflies. Eastward the slope drops off quickly through a narrow transition zone and onto a flat with better soils, which supports an uncommon community: the Mesic Transition Variant of Pine/Scrub Oak Sandhill. Currently this community is in a stage of recovery and most future canopy trees are saplings or sprouts. They include longleaf pine, blackjack oak (*Q. marilandica*), post oak (*Q. stellata*), and mockernut hickory (*Cary alba*). The herbaceous layer is rich with grasses, legumes, and composites (asters, goldenrods, etc.). New Jersey tea (*Ceanothus americanus*) is especially numerous and twistleaf goldenrod locally common. This flat is pinched off to the south by a series of streamheads which extend upslope. Recent controlled burns have reduced the tree canopy in these streamheads, but ericaceous shrubs remain abundant. A population of white wicky (*Kalmia cuneata*) occurs here. The ecotone between dry uplands and wet streamheads is very narrow and supports modest herb diversity. Along the eastern edge of the preserve, swamp forest flanks Quewhiffle Creek. Dominants are swamp black gum (*Nyssa biflora*) and red maple (*Acer rubrum*), with scattered yellow poplar (*Liriodendron tulipifera*) and Atlantic white cedar (*Chamaecyparis thyoides*). Shrubs and thorny vines form dense patches, interspersed with small openings supporting typical swamp ferns.

MANAGEMENT AND PROTECTION: The return of fire to the land has invigorated the herbaceous layer and has promoted regeneration of longleaf pine. It needs to be continued, tempered by the knowledge that a sparse to moderate subcanopy of oaks and hickories is

desirable as wildlife food and cover. The portion of the Quewhiffle Creek floodplain east of the creek is unprotected private land.

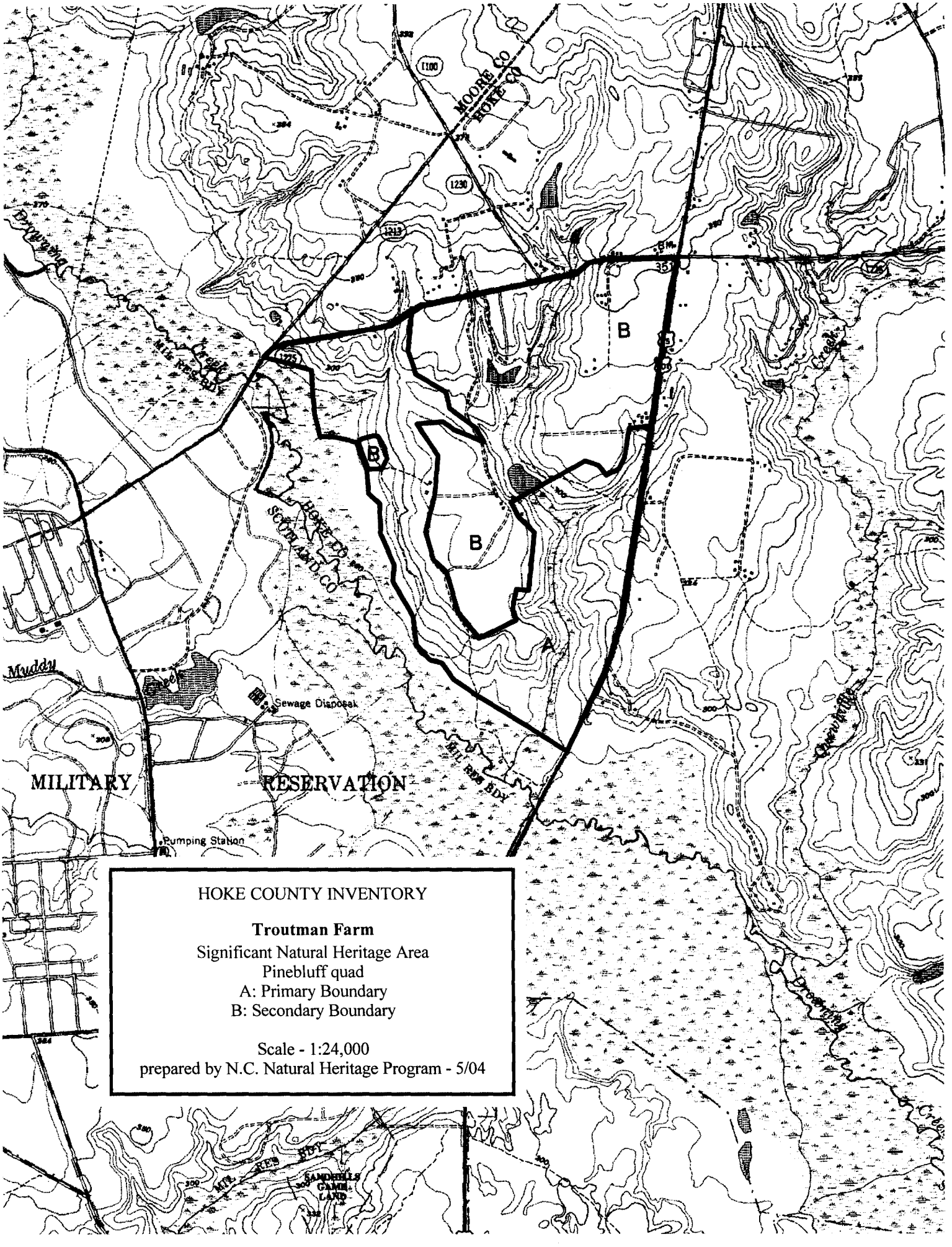
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhill Variant), Pine/Scrub Oak Sandhill (Mesic Transition Variant), Streamhead Pocosin, Coastal Plain Small Stream Swamp (Blackwater Subtype).

RARE PLANTS: White wicky (*Kalmia cuneata*), twistleaf goldenrod (*Solidago tortifolia*), spring goldenrod (*Solidago verna,* FSC).

RARE ANIMALS: Bachman's sparrow (*Aimophila aestivalis,* FSC), pinewoods darter (*Etheostoma mariae,* FSC), Sandhills chub (*Semotilus lumbee,* FSC*),* oak hairstreak (*Fixsenia favonius ontario*), dotted skipper (*Hesperia attalus slossonae*), Meske's skipper (*Hesperia meskei*), and Edwards' hairstreak (*Satyrium edwardsii*). Northern pine snakes (*Pituophis melanoleucus melanoleucus,* FSC) have been found nearby and likely occur onsite.

REFERENCES:

Sorrie, B.A. 2004. Site Survey Report: Quewhiffle Preserve. North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.



HOKE COUNTY INVENTORY

Troutman Farm

Significant Natural Heritage Area
Pinebluff quad
A: Primary Boundary
B: Secondary Boundary

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

TROUTMAN FARM

Site Significance: regional
Size: 756 acres
USGS Quadrangle: Pinebluff
Ownership: private

SIGNIFICANT FEATURES: Troutman Farm has one of the most extensive blocks of oak-hickory-pine forest in the Sandhills region. Troutman Farm also features a good quality Sandhill Stream Swamp, a beaver pond, and well-burned dry to mesic longleaf pine (*Pinus palustris*) uplands. One rare plant and one rare animal have been documented.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area lies between US 15-501 and Drowning Creek, due east of Camp Mackall Military Reservation. It lies just northwest of Drowning Creek/Lumber River Confluence SNHA and a mile west of McFarland Sandhills SNHA.

SITE DESCRIPTION: The natural portion of Troutman Farm forms a broad U-shape, with cropfields and a loblolly pine (*Pinus taeda*) plantation in the middle. Longleaf pine dominates the dry uplands between US 15-501 and the cropfields; trees are medium aged to mature. Pinestraw is regularly harvested, so the mixed scrub oak understory has been cut and/or burned down to sprouts. The wiregrass-herb layer is generally in good condition. One small area of loamy sand soil at the south end of the cropfields supports a high quality stand of well-spaced longleaf, several species of oaks, mockernut hickory (*Carya alba*), and several herbs not found elsewhere on the property. One of these is Earle's blazing-star (*Liatris squarrulosa*), primarily a piedmont species and rare in North Carolina. A rare butterfly, dotted skipper (*Hesperia attalus slossonae*), was documented nectaring on these herbs.

Bisecting the pine uplands east of the fields is a small creek that flows south to Drowning Creek. Canopy dominants are swamp black gum (*Nyssa biflora*), yellow poplar (*Liriodendron tulipifera*), and red maple (*Acer rubrum*), with Atlantic white cedar (*Chamaecyparis thyoides*), sweetgum (*Liquidambar styraciflua*), sweetbay magnolia (*Magnolia virginiana*), pond pine (*Pinus serotina*), and redbay (*Persea palustris*) in the understory.

West of the cropfields the land slopes down to Drowning Creek swamp. For half a mile (north to south) the upper and mid slopes are dominated by Pine/Scrub Oak Sandhill, which grades on lower slopes to an extensive oak-hickory-pine community. Dominants there are southern red oak (*Quercus falcata*), post oak (*Q. stellata*), water oak (*Q. nigra*), sand hickory (*Carya pallida*), mockernut hickory, and loblolly pine, with scattered longleaf pine, shortleaf pine (*P. echinata*), and black oak (*Q. velutina*). Dogwood (*Cornus florida*), persimmon (*Diospyros virginiana*), and sparkleberry (*Vaccinium arboreum*) are common understory species. A number of herbs and grasses associated with mesic soils occur here and form an intersting mix of piedmont and coastal plain species. This oak-hickory forest is impressive for its extent and ecological integrity; it is one of the finest in the North Carolina Sandhills region.

At the northeastern edge of the cropfields is a man-made pond with open water. On its north side is a beaver pond with dead and dying swamp black gums and many emergent and floating aquatic plants. One common plant here is water-spider orchid (*Habenaria repens*), a beaver pond specialist and on the state's Watch List.

MANAGEMENT AND PROTECTION: Continue fire management of the uplands and streamheads. The oak-hickory slope may require a longer fire interval than the longleaf pine communities; experimentation will help find the right fire interval. The longleaf pine uplands on the property are very suitable for red-cockaded woodpeckers (*Picoides borealis*), although none are known to nest there. The property is not currently under conservation protection but is in the Safe Harbor program.

NATURAL COMMUNITIES: Pine/Scrub Oak Sandhill (Mixed Oak and Mesic Transition Variants), Dry Oak-Hickory Forest, Streamhead Pocosin, Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Bottomland Hardwoods (Blackwater Subtype), Coastal Plain Semipermanent Impoundment.

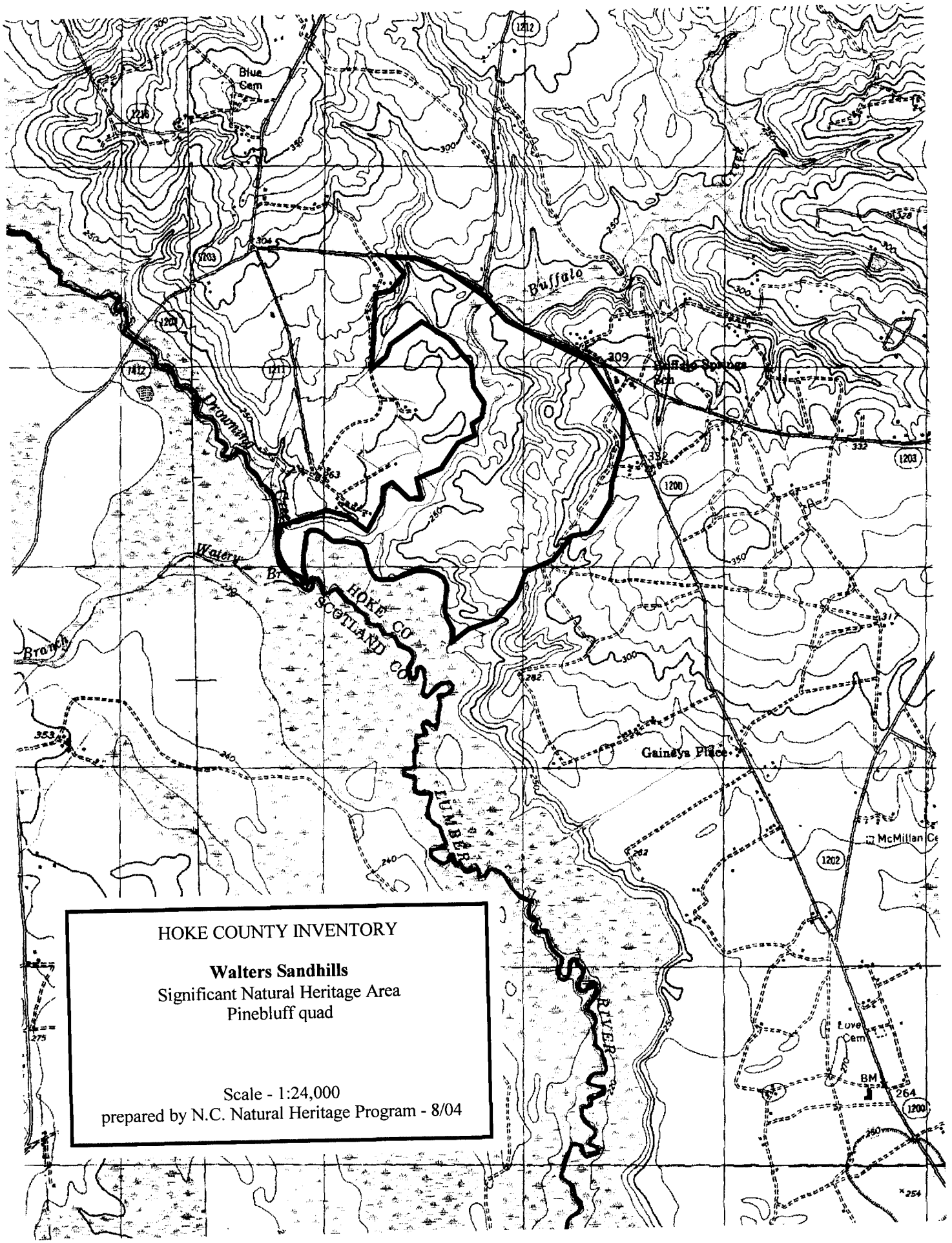
RARE PLANTS: Earle's blazing-star (*Liatris squarrulosa*).

RARE ANIMALS: Dotted skipper (a butterfly, *Hesperia attalus slossonae*).

REFERENCES:

LeGrand, H. 2002. Troutman Farm. Site Survey Report. North Carolina Natural Heritage Program, DENR, Raleigh, NC.

Sorrie, B.A. 2004. Site Survey Report: Troutman Farm. North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.



HOKE COUNTY INVENTORY

Walters Sandhills

Significant Natural Heritage Area

Pinebluff quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 8/04

Hoke County Natural Area Inventory

WALTERS SANDHILLS

Site Significance: regional
Size: 331 acres
USGS Quadrangle: Pinebluff
Ownership: private

SIGNIFICANT FEATURES: Walters Sandhills features excellent longleaf pine (*Pinus palustris*) uplands and a high quality blackwater creek. It is the southernmost large tract of longleaf pine remaining in Hoke County. The property is situated at the divide between the hilly Sandhills region and the flat Carolina bay region.

LANDSCAPE RELATIONSHIPS: Walters Sandhills Significant Natural Heritage Area is situated at the confluence of Buffalo Creek and Lumber River. It abuts Lumber River Macrosite and Chalk Banks Floodplain SNHA. A piece of the Sandhills Game Land is only a quarter mile to the west, Calloway Sandhills SNHA is about four miles northeast, and McCain Sandhills is five miles north. To the northwest is farmland; to the south is a pine plantation.

SITE DESCRIPTION: Rolling uplands are covered with longleaf pine, wiregrass (*Aristida stricta*), and sprouting oaks of several kinds. The pines show a broad range of ages, with many reaching 15 inches dbh, and with excellent regeneration. Hardwoods have been reduced to favor pinestraw raking. Several knolls and one ridge support a xeric longleaf-oak-wiregrass community where soils are coarse with gravel and stones. These stones vary from quartzite to sandstone and are unusually abundant at the surface. One knoll lies apart from the others, right at the edge of Lumber River, where the cooler microclimate allows mountain laurel (*Kalmia latifolia*) to grow beneath the pines. Lower slopes of Walters Sandhills generally support a band of mixed oak-hickory-dogwood (*Cornus florida*)-loblolly pine (*Pinus taeda*). At the base of one slope a streamhead spreads out onto a large flat area forming an amorphous community of loblolly pine, pond pine (*Pinus serotina*), southern red oak (*Quercus falcata*), water oak (*Q. nigra*), red maple (*Acer rubrum*), dogwood, and sweetbay magnolia (*Magnolia virginiana*). Shrubs form dense patches alternating with grassy openings. Originally, this community probably was a Mesic Pine Flatwoods, but has suffered from fire suppression. The narrow floodplain of Buffalo Creek supports typical blackwater swamp forest of red maple, swamp black gum (*Nyssa biflora*), pond cypress (*Taxodium ascendens*), with shrubs, and climbing vines below. Trees here reach 90 or more feet tall. A couple of breached beaver dams are evidence of recent activity; departure of the rodents has left exposed muddy areas full of aquatic and semi-aquatic herbs and shrubs. A few small groves of Atlantic white cedar (*Chamacyparis thyoides*) dot the seepy ecotones. The swamp forest along Lumber River is described in the Lumber River/Chalk Banks SNHA.

MANAGEMENT AND PROTECTION: Uplands are utilized for pinestraw raking and selective timber harvesting. Prescribed burning has maintained a diverse ground layer under the longleaf pines and should be continued there; it also should be applied to the flatwoods community. The property is enrolled in the Safe Harbor Program.

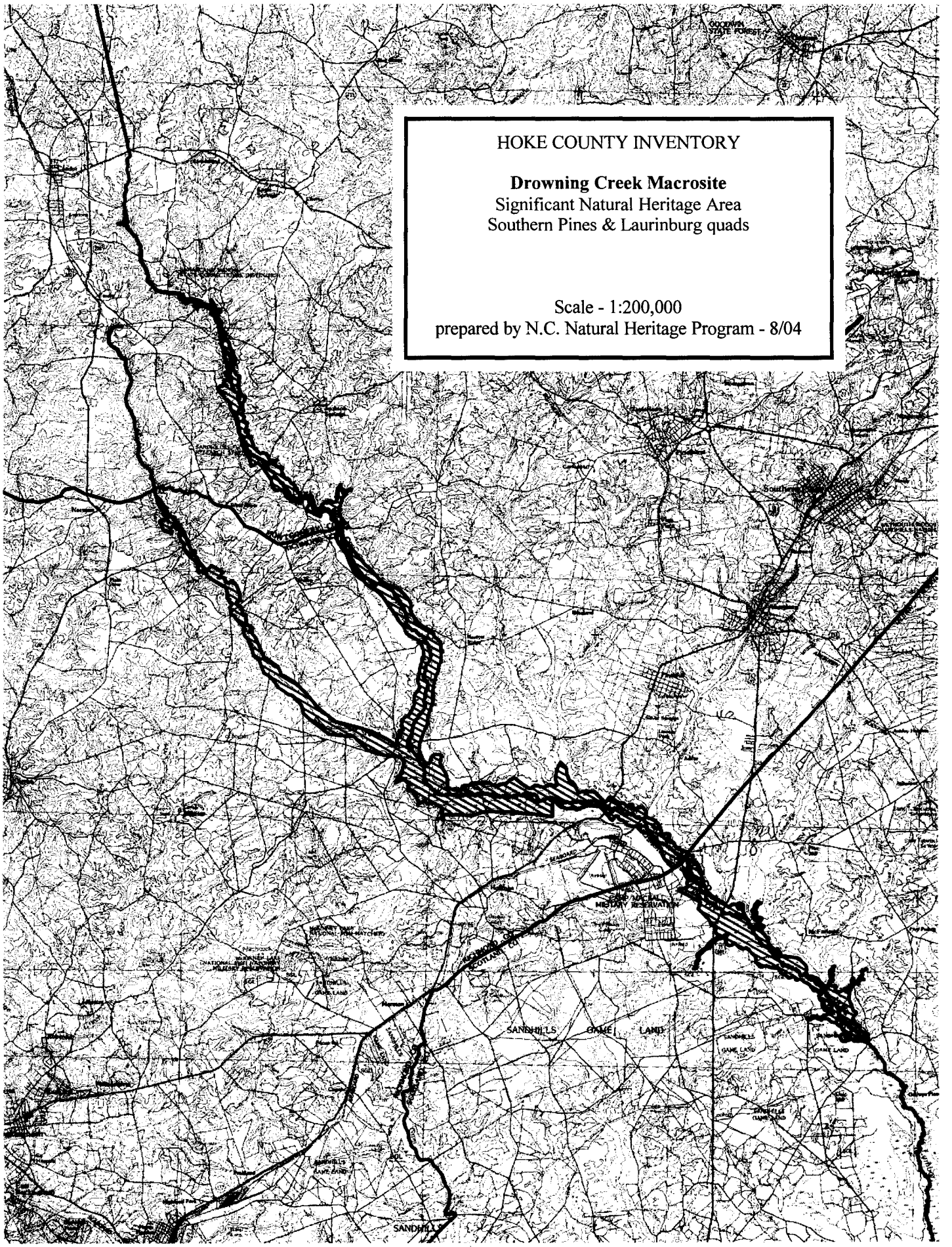
NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine/Scrub Oak Sandhill (Mixed Oak Variant), Dry Oak-Hickory Forest, Mesic Pine Flatwoods (Sandhills Variant), Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Semipermanent Impoundment.

RARE PLANTS: None documented, but likely.

RARE ANIMALS: None documented, but likely.

REFERENCES:

Sorrie, B.A. 2004. Site Survey Report: Walters Sandhills. North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.


HOKE COUNTY INVENTORY
Drowning Creek Macrosite
Significant Natural Heritage Area
Southern Pines & Laurinburg quads
Scale - 1:200,000
prepared by N.C. Natural Heritage Program - 8/04
SANDHILLS GAME LAND
SANDHILLS

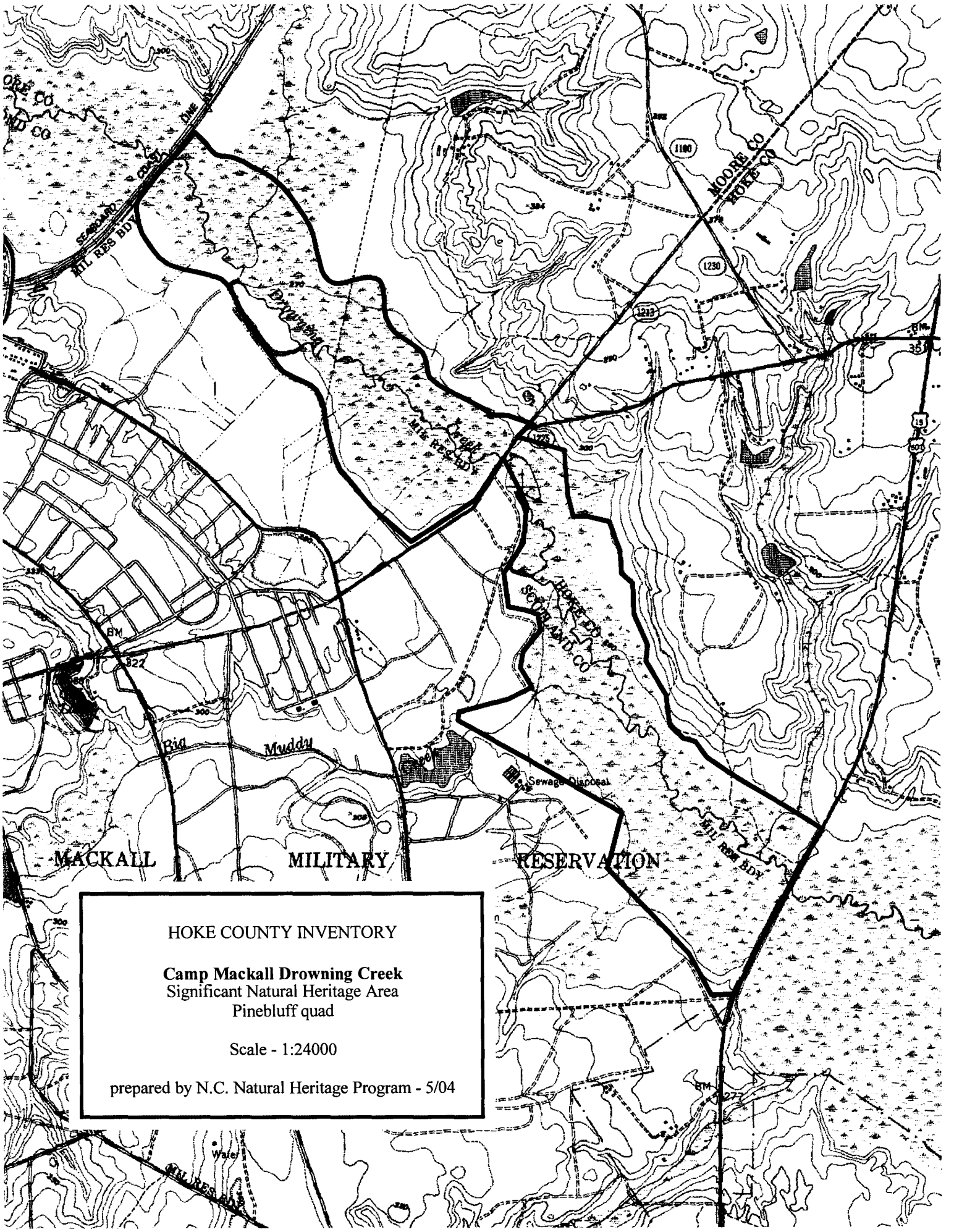
Hoke County Natural Area Inventory

DROWNING CREEK MACROSITE

Drowning Creek Macrosite is located along a 22-mile stretch of river, extending from Montgomery County down to the bridge at Turnpike Road (SR 1412/SR 1203 at the Scotland/Hoke County line), where Drowning Creek becomes the Lumber River. All or portions of seven Significant Natural Heritage Areas are included, three within or bordering Hoke County: Camp Mackall Drowning Creek, Drowning Creek/Lumber River Confluence, and Sandhills Game Land. In addition, a portion of Drowning Creek has been designated as a state Outstanding Resource Water. Although not a state designated Natural and Scenic River, as the Lumber River is, Drowning Creek does provide excellent blackwater river canoeing.

The Macrosite contains extensive blackwater river swamp forests, complete with natural levees, frequently flooded cypress-gum depressions, small sandbars, and bottomland hardwoods. These forests form the largest remaining hardwood and hardwood-conifer wetlands in the Sandhills region. The Macrosite provides habitat for three state-rare fishes, two rare mayflies, three rare caddisflies, two rare stoneflies, and three rare plants. The population of sarvis holly (*Ilex amelanchier*) begins near Double Bridge (Thunder Road at the Moore/Richmond County line) and continues as scattered plants and clusters for the length of the Macrosite (and continues along Lumber River); it is undoubtedly the state's largest occurrence. The Cypress-Gum Swamp and Coastal Plain Bottomland Hardwoods natural communities contain many impressively large trees, notably pond cypress (*Taxodium ascendens*), loblolly pine (*Pinus taeda*), swamp black gum (*Nyssa biflora*), laurel oak (*Quercus laurifolia*), and pond pine (*Pinus serotina*).

A disturbing sign is the clearcutting of floodplain forest during drought years. Hopefully these areas will be allowed to regenerate naturally and not be planted to offsite trees. From an ecological perspective it is recommended that selective cutting be a management priority.



HOKE COUNTY INVENTORY

Camp Mackall Drowning Creek
Significant Natural Heritage Area
Pinebluff quad

Scale - 1:24000

prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

CAMP MACKALL DROWNING CREEK

Site Significance: state
Size: 830 acres
USGS Quadrangle: Pinebluff
Ownership: US Dept. of Defense, private

SIGNIFICANT FEATURES: Camp Mackall Drowning Creek features high quality floodplain swamp communities; they are mature, in excellent ecological condition, and support some very old cypress and pine trees. Two rare fish, both Federal Species of Concern, and one rare plant have been documented from the tract; other rarities are very likely.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area extends from the CSX Railroad bridge downstream to US highway 15-501. Most of it lies within Camp Mackall Military Reservation, known for its high quality longleaf pine ecosystem and for its Special Forces training facilities. The Sandhills Game Land is about a mile south. Troutman Farm SNHA adjoins on the southeast side, Quewhiffle Creek Sandhills SNHA is two miles east-northeast, and McFarland Sandhills SNHA is a mile and a half east-southeast.

SITE DESCRIPTION: Camp Mackall Drowning Creek encompasses a three mile stretch of Drowning Creek and its floodplain. The floodplain near the main channel supports Coastal Plain Small Stream Swamp community, dominated by swamp black gum (*Nyssa biflora*), pond cypress (*Taxodium ascendens*), red maple (*Acer rubrum*), loblolly pine (*Pinus taeda*), and sweetgum (*Liquidambar styraciflua*). Trees are 90 or more feet tall and 1.5-2 feet dbh; the largest individuals reach 3-4 feet dbh. Downstream of General Ridgway Road, cypress is more plentiful and laurel oaks (*Quercus laurifolia*) are frequent; here the community is classified as Cypress-Gum Swamp (Blackwater Subtype). Throughout, understory trees include sweetbay magnolia (*Magnolia virginiana*), American holly (*Ilex opaca*), and titi (*Cyrilla racemiflora*, also shrubby). Bayvine (*Smilax laurifolia*) and crossvine (*Bignonia capreolata*) are common climbing vines. Fetterbush (*Lyonia lucida*) and switchcane (*Arundinaria tecta*) are common in the shrub layer (especially upstream and away from the creek); titi, tag alder (*Alnus serrulata*), and sarvis holly *(Ilex amelanchier*) occur along the creek channel. Herbs are sparse except for a few species of ferns and sedges. Loblolly pine, red maple, sweetgum, water oak (*Quercus nigra*), laurel oak, and swamp black gum are co-dominant away from the creek on less wet soils to form a Coastal Plain Bottomland Hardwoods community. Shrubs, switchcane, and bayvine form dense thickets unless burned.

MANAGEMENT AND PROTECTION: This section of Drowning Creek floodplain has been impacted very little in the past fifty years, with the exception of occasional prescribed fires within the Camp Mackall. One of the strengths of this natural area is the maturity of the forest and large size of many trees. If logging is deemed necessary, selective cutting should be done rather than clearcutting. The Camp Mackall portion is not used for training and so is *de facto* protected; the private portion is part of a Safe Harbor tract (US Fish & Wildlife Service).

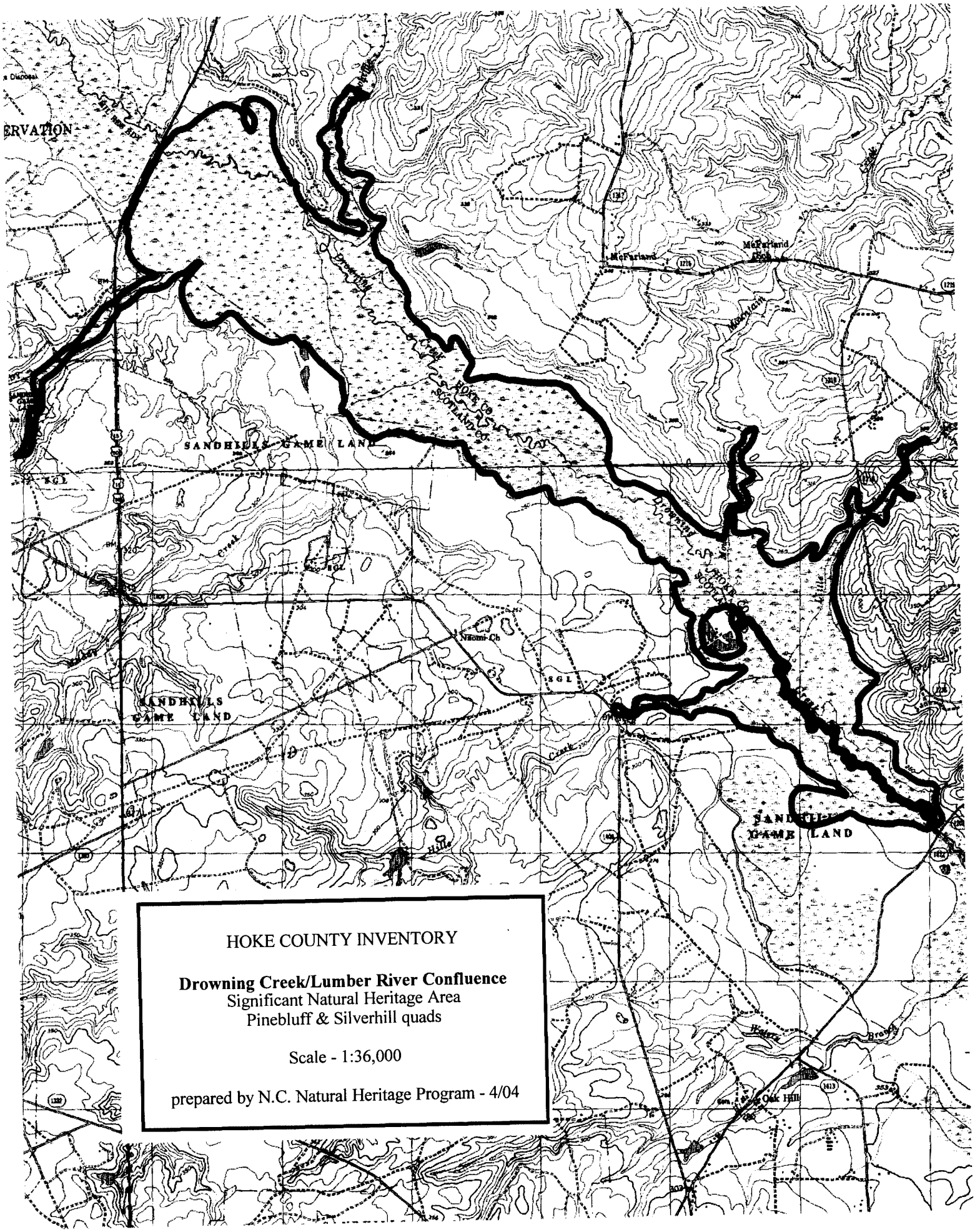
NATURAL COMMUNITIES: Coastal Plain Small Stream Swamp (Blackwater Subtype), Coastal Plain Bottomland Hardwoods (Blackwater Subtype), Cypress-Gum Swamp (Blackwater Subtype).

RARE PLANTS: Sarvis holly *(Ilex amelanchier*).

RARE ANIMALS: Pinewoods darter (*Etheostoma mariae*, FSC) and Sandhills chub (*Semotilus lumbee*, FSC).

REFERENCES:

The Nature Conservancy and North Carolina Natural Heritage Program. 1993. Rare and Endangered Plant Survey and Natural Area Inventory for Fort Bragg and Camp Mackall Military Reservations, North Carolina. Carrboro & Raleigh, NC.



HOKE COUNTY INVENTORY

Drowning Creek/Lumber River Confluence
Significant Natural Heritage Area
Pinebluff & Silverhill quads

Scale - 1:36,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

DROWNING CREEK/LUMBER RIVER CONFLUENCE

Site Significance: regional
Size: 1735 acres
USGS Quadrangle: Pinebluff, Silver Hill
Ownership: private

SIGNIFICANT FEATURES: This Significant Natural Heritage Area and neighboring uplands form the largest contiguous block of natural habitat in Hoke County outside of Fort Bragg. It contains some of the most extensive and highest quality floodplain forest along Drowning Creek, featuring high quality Cypress-Gum Swamp community along the main channel and excellent Coastal Plain Bottomland Hardwoods on the broad floodplain. Also present are two Federal Species of Concern fish, pinewoods darter (*Etheostoma mariae*) and Sandhills chub (*Semotilus lumbee*), and a large population of sarvis holly (*Ilex amelanchier*).

LANDSCAPE RELATIONSHIPS: Drowning Creek/Lumber River Confluence extends from US 15-501 down to Turnpike Road (SR 1203), where it becomes the Lumber River. It adjoins the southwestern boundary of McFarland Sandhills SNHA, and borders the Sandhills Game Land on the Scotland County side. Troutman Farm SNHA lies just to the north.

SITE DESCRIPTION: The site consists of a five mile segment of the Drowning Creek floodplain. Most of the floodplain supports a mature Coastal Plain Bottomland Hardwoods (Blackwater Subtype) community, dominated by laurel oak (*Quercus laurifolia*), red maple (*Acer rubrum*), loblolly pine (*Pinus taeda*), swamp black gum (*Nyssa biflora*), and sweetgum (*Liquidambar styraciflua*) over various shrubs, vines, and ferns. Bayvine (*Smilax laurifolia*) and crossvine (*Bignonia capreolata*) are common climbers. Fetterbush (*Lyonia lucida*) and switchcane (*Arundinaria tecta*) are common in the shrub layer. Ferns include netted and Virginia chain fern (*Woodwardia areolata, W. virginica*), cinnamon fern (*Osmunda cinnamomea*), and royal fern (*O. regalis* var. *spectabilis*). Cypress-Gum Swamp forest is present only along the river channel and in backup areas. Dominants are swamp black gum, red maple, pond cypress (*Taxodium ascendens*), and sweetgum. Trees of both community types are 100 or more feet tall and roughly 18-24 inches dbh; the largest individuals reach 3 feet dbh. Understory trees include sweetbay magnolia (*Magnolia virginiana*), American holly (*Ilex opaca*), and titi (*Cyrilla racemiflora*). Small sandbars and mudbars occur at creek bends. A large population of sarvis holly (*Ilex amelanchier*) is present, primarily on the river banks but also extending into the forest.

MANAGEMENT AND PROTECTION: The forest is in excellent condition and needs no special management. If timber cutting is necessary, it should be done selectively rather than by clearcutting. The SNHA is not under conservation protection.

NATURAL COMMUNITIES: Coastal Plain Bottomland Hardwoods (Blackwater Subtype), Cypress-Gum Swamp (Blackwater Subtype), Sand and Mud Bar.

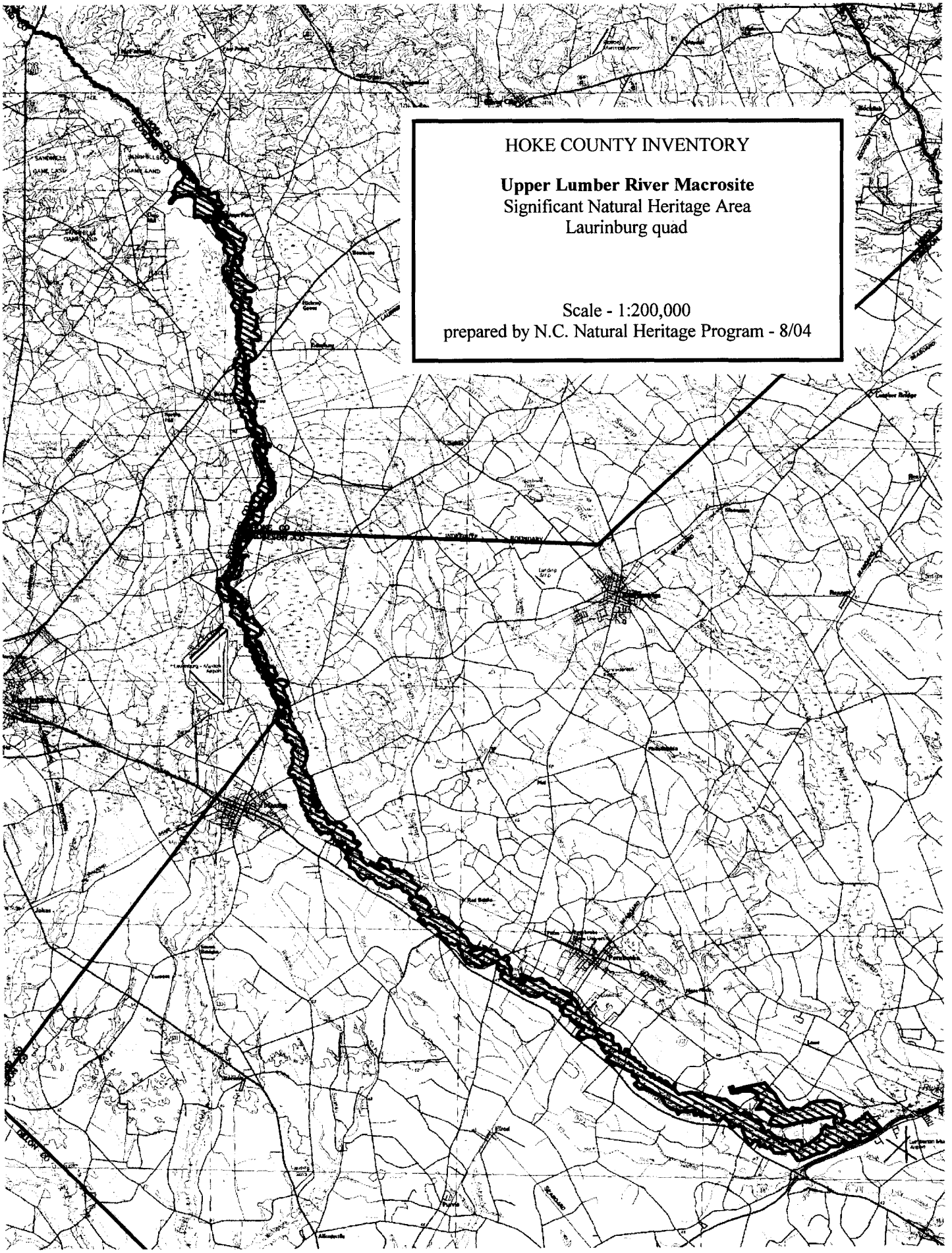
RARE PLANTS: Sarvis holly (*Ilex amelanchier*)

RARE ANIMALS: Two rare fishes: pinewoods darter (*Etheostoma mariae*, FSC) and Sandhills chub (*Semotilus lumbee*, FSC).

REFERENCES:

Ash, A.N. 1992. A preliminary natural areas inventory of the Lumber River Floodplain. Year II - 1991. Report to NC Natural Heritage Program, Division of Parks and Recreation, Raleigh.

Sorrie, B.A. 2004. Site Survey Report: Drowning Creek. NC Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.


HOKE COUNTY INVENTORY
Upper Lumber River Macrosite
Significant Natural Heritage Area
Laurinburg quad
Scale - 1:200,000
prepared by N.C. Natural Heritage Program - 8/04

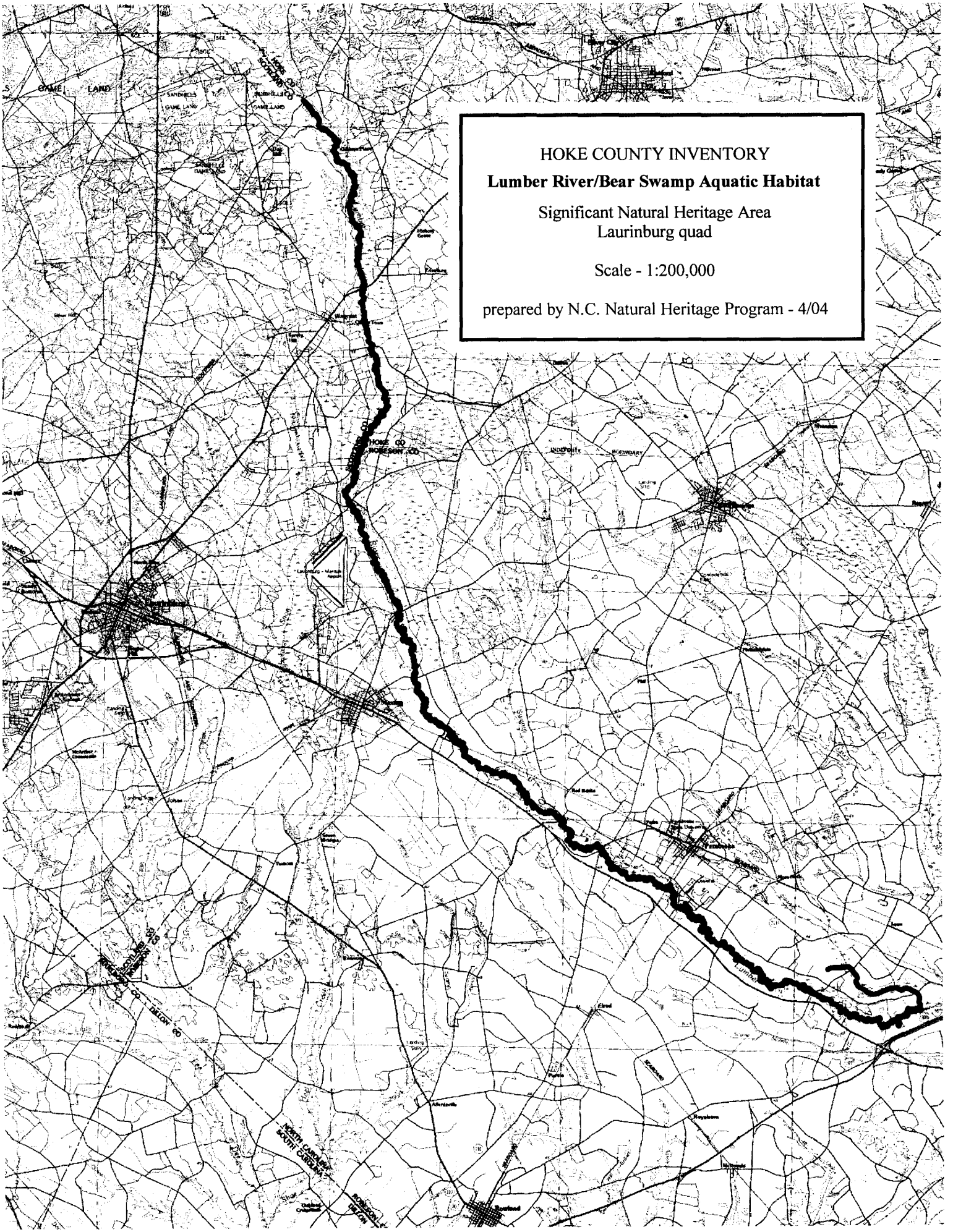
Hoke County Natural Area Inventory

UPPER LUMBER RIVER MACROSITE

Upper Lumber River Macrosite is located along a 30-mile stretch of the river, extending from the bridge at Turnpike Road (SR 1412/1203 at the Scotland/Hoke County line) downstream to Bear Swamp. Included within the macrosite is the Lumber River/Bear Swamp Aquatic Habitat, which recognizes the ecological importance of this aquatic resource. Two Significant Natural Heritage Areas occur along the Hoke portion of the river: Lumber River/Chalk Banks Floodplain and Spring Branch Church Swamp. The Scotland County portion of Chalk Banks is a unit of Lumber River State Park, which has several other holdings within Robeson and Columbus Counties. In addition, the Lumber River is a state designated Natural and Scenic River which provides excellent blackwater river canoeing.

The Macrosite contains extensive blackwater river swamp forests, complete with small levees, frequently flooded depressions, small oxbows, sandbars, occasional high forested banks, and xeric fluvial ridges. It provides habitat for at least two rare bats, three rare fishes, one rare mayfly, two rare caddisflies, and five rare plants. The population of sarvis holly (*Ilex amelanchier*) begins well upstream on Drowning Creek and continues as scattered plants and clusters for the length of the Macrosite (including Hoke County); it is undoubtedly the state's largest occurrence. One Federal Species of Concern plant occurs in the Robeson County section: Carolina birds-in-a-nest (*Macbridea caroliniana,* also called Carolina bogmint); another occurs at Chalk Banks: Georgia indigo-bush (*Amorpha georgiana* var. *georgiana*). One of only four North Carolina populations of woody goldenrod (*Chrysoma pauciflosculosa*) occurs on a xeric sand ridge in the Robeson County section. The Cypress-Gum Swamp natural community contains many impressively large trees.

A disturbing sign is the recent and rapid expansion of alligator-weed (*Alternanthera philoxeroides*) in the lower portions of the river. This aggressive alien aquatic weed forms large dense monocultures and threatens to displace native vegetation. Its control should be a management priority.


HOKE COUNTY INVENTORY
Lumber River/Bear Swamp Aquatic Habitat
Significant Natural Heritage Area
Laurinburg quad
Scale - 1:200,000
prepared by N.C. Natural Heritage Program - 4/04
GAME LAND
HOKE CO
ROBESON CO
NORTH CAROLINA
SOUTH CAROLINA

Hoke County Natural Area Inventory

LUMBER RIVER/BEAR SWAMP AQUATIC HABITAT

Site Significance: state **Size:** 453 acres
USGS Quadrangle: Wagram, Wakulla, Maxton, Pembroke, MacDonald, Northwest Lumberton, Southwest Lumberton **Ownership:** state public waters

SIGNIFICANT FEATURES: The Lumber River is a state designated Natural and Scenic River, enjoyed by many canoeists and kayakers. This section of the river supports three rare and geographically restricted fishes -- broadtail madtom (*Noturus sp.*), pinewoods darter (*Etheostoma mariae*), and thinlip chub (*Cyprinella sp. 1*) -- a rare mayfly, a rare caddisfly, and a rare plant. However, it is uncertain whether all of the animals occur in the Hoke County segment of the river. The water is relatively clean and free of pollutants.

LANDSCAPE RELATIONSHIPS: The Aquatic Habitat occurs from Turnpike Road (SR 1203) south to the confluence with Bear Swamp west of Lumberton. The North Carolina Division of Parks and Recreation owns scattered parcels from Chalk Banks (north of US 401) downstream nearly to the South Carolina border, as the Lumber River State Park.

SITE DESCRIPTION: As with other designated Aquatic Habitats, this one includes just the run of the river. Lumber River and Bear Swamp are both blackwater streams, due to their origin in the coastal plain and to high tannin content of the water. Acidic coastal plain waters are unable to break down tannins rapidly, resulting in “tea colored” water. Within this Aquatic Habitat, Lumber River meanders for about 30 miles until it meets Bear Swamp. Major canopy trees along the banks are pond cypress (*Taxodium ascendens*), swamp black gum (*Nyssa biflora*), and red maple (*Acer rubrum*). Slight rises support loblolly pine (*Pinus taeda*), laurel oak (*Quercus laurifolia*), and American holly (*Ilex opaca*). Sandbars and mudbars occur here-and-there and support late-season grasses and herbs, as well as possum-haw (*Ilex decidua*) and sarvis holly (*Ilex amelanchier*) shrubs. Mudbars are more densely vegetated with grasses, sedges, and coarse herbs. The water column is largely free of vegetation, except where shallow and slow-moving; there it supports emergent aquatic plants such as bur-reed (*Sparganium americanum*).

MANAGEMENT AND PROTECTION: The relatively broad floodplain provides a buffer from adjacent agricultural activities (cotton, soybeans, corn). However, in places the floodplain forest itself is being clearcut, leaving only a few seed trees. Opening up the floodplain to greatly increased evaporation may dry up pools where rare insects and amphibians breed. Aside from the State Park, the river and floodplain are not under conservation protection.

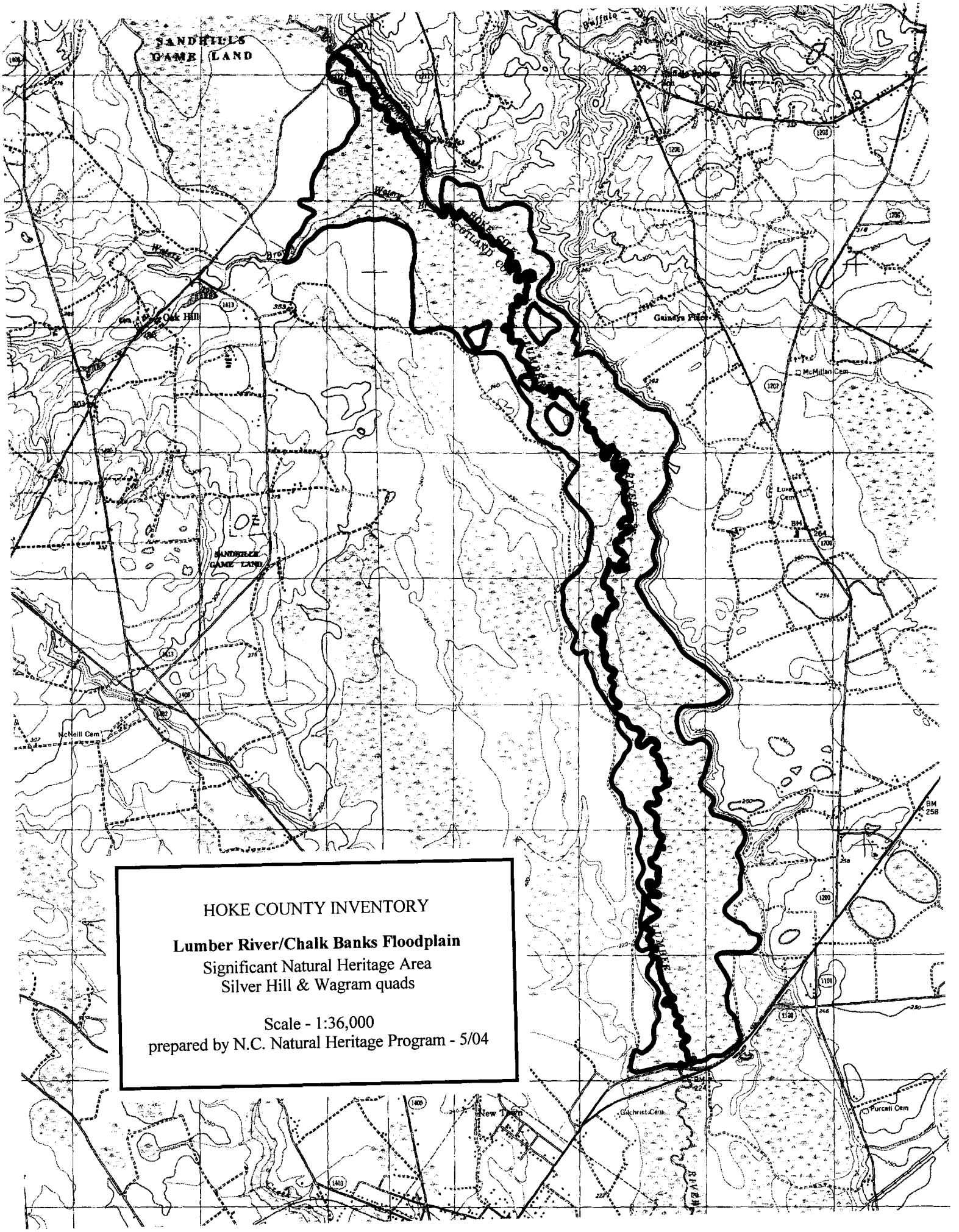
NATURAL COMMUNITIES: Cypress-Gum Swamp (Blackwater Subtype), Sand and Mud Bar.

RARE PLANTS: Sarvis holly (*Ilex amelanchier*).

RARE ANIMALS: Broadtail madtom (*Noturus sp.*, Federal Species of Concern), pinewoods darter (*Etheostoma mariae*, FSC), and thinlip chub (*Cyprinella sp. 1*) - all fishes; Argo ephemerellan mayfly (*Ephemerella argo*), a Triaenode caddisfly (*Triaenodes marginata*).

REFERENCES:

Sorrie, B.A. 2003. Site Survey Report: Lumber River/Bear Swamp Aquatic Habitat. North Carolina Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.



HOKE COUNTY INVENTORY

Lumber River/Chalk Banks Floodplain

Significant Natural Heritage Area
Silver Hill & Wagram quads

Scale - 1:36,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

LUMBER RIVER/CHALK BANKS FLOODPLAIN

Site Significance: state
Size: 1449 acres
USGS Quadrangle: Silver Hill, Wagram
Ownership: State (DENR) and private

SIGNIFICANT FEATURES: This Significant Natural Heritage Area includes a number of natural community types, ranging from dry pine-oak scrub to wet floodplain forest. High quality bottomland forest is a feature of the Drowning Creek/Lumber River system, the largest continuous floodplain ecosystem in the Sandhills and Middle Coastal Plain regions. One rare plant species has been documented here, sarvis holly (*Ilex amelanchier*). The Lumber River is a state designated Natural and Scenic River which provides excellent blackwater river canoeing. Many neotropical migrant birds nest here.

LANDSCAPE RELATIONSHIPS: Lumber River/Chalk Banks Floodplain extends from US 401 (northeast of Wagram) northward along Lumber River to Turnpike Road. It is part of the Upper Lumber River Macrosite, which extends many miles downstream. Walters Sandhills SNHA lies on the east side of the river at the confluence with Buffalo Creek. Some uplands on the Scotland County side are part of Lumber River State Park.

SITE DESCRIPTION: This stretch of the Lumber River features a meandering river channel, small sandy point bars, small natural levees, small backwater sloughs, and a broad floodplain. The floodplain is covered by Coastal Plain Bottomland Hardwoods, with Cypress-Gum Swamp along the river and in backup channels. At the inland margin the swamp forest quickly gives way to a mixed hardwood-pine forest on abrupt slopes.

The Cypress-Gum Swamp community is composed of tall pond cypress (*Taxodium ascendens*), swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), and scattered loblolly pine (*Pinus taeda*). Old cypresses measure 3.5-4 feet dbh and extend above the general canopy. Titi (*Cyrilla racemiflora*), sweet pepperbush (*Clethra alnifolia*), swamp sweetbells (*Leucothoe racemosa*), and sweetspire (*Itea virginica*) are common shrubs; sarvis holly (*Ilex amelanchier*) is frequent here and on levees. Poison ivy (*Toxicodendron radicans*) and crossvine (*Bignonia capreolata*) are common vines, while hempvine (*Mikania scandens*) and native wisteria (*Wisteria frutescens*) sprawl over shrubs. Wetland herbs, ferns, and sphagnum moss are common, but replaced in depressions by dense mats of an invasive alien (marsh dewflower, *Murdannia keisak*). Spanish moss (*Tillandsia usneoides*), rare this far inland, decorates some of the trees.

The bulk of the floodplain supports bottomland hardwoods, dominated by swamp black gum, laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), loblolly pine, red maple, and sweetgum (*Liquidambar styraciflua*) over American holly (*Ilex opaca*), sweetbay magnolia (*Magnolia virginiana*), redbay (*Persea palustris*), sweet pepperbush, greenbrier (*Smilax rotundifolia*) and bayvine (*Smilax laurifolia*). Herbs are generally sparse, but locally common at tree blowdowns.

Inland portions of the hardwood forest become increasingly shrubby in response to seepage from adjacent uplands. Much of the floodplain has been cut over the years and is in various stages of regeneration.

Sandbars and mudbars vary from largely unvegetated to mostly covered. Prominent species include maidencane (*Panicum hemitomon*), panic-grasses, rice cutgrass (*Leersia oryzoides*), false nettle (*Boehmeria cylindrica*), climbing hempweed, and swamp smartweed (*Polygonum setaceum*).

MANAGEMENT AND PROTECTION: The floodplain forest in Hoke County is generally in good to excellent condition, but local clearcutting jeopardizes the ecological integrity by increasing light levels, increasing interior forest temperatures, and reducing humidity. A change to selective cutting is recommended. State Parks is actively developing the Chalk Banks unit of Lumber River State Park for public access and camping, and is looking to add acreage; the Hoke portion of the natural area offers excellent opportunities. Currently the Hoke portion is not under conservation protection.

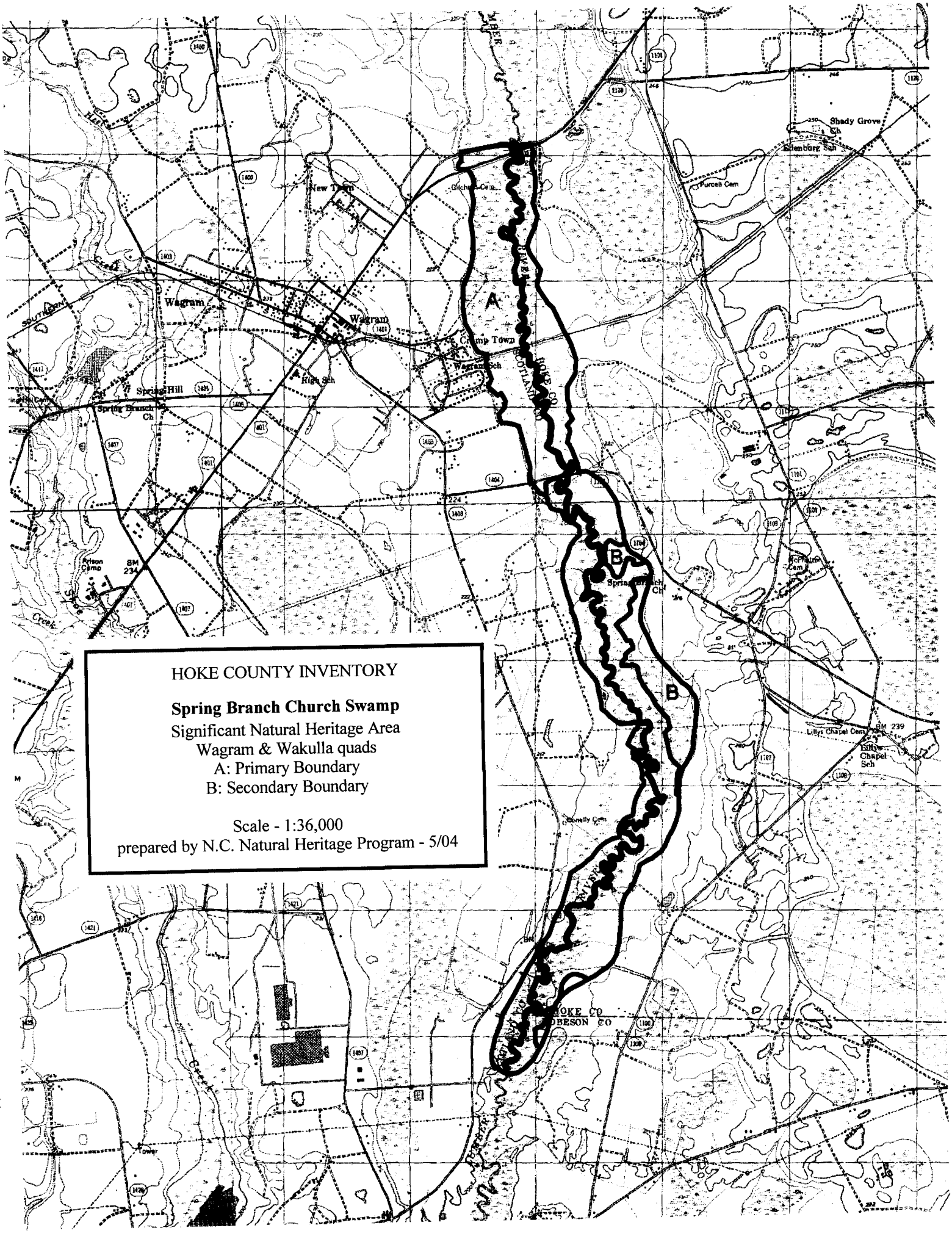
NATURAL COMMUNITIES: Coastal Plain Bottomland Hardwoods (Blackwater Subtype), Cypress-Gum Swamp (Blackwater Subtype), Sand and Mud Bar.

RARE PLANTS: Sarvis holly (*Ilex amelanchier*).

RARE ANIMALS: Two rare fish are very likely to occur, but have not yet been verified: thinlip chub (*Cyprinella sp. 1*) and pinewoods darter (*Etheostoma mariae*, Federal Species of Concern).

REFERENCES:

LeGrand, H. 2003. Chalk Banks. Site Visits. North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.



HOKE COUNTY INVENTORY

Spring Branch Church Swamp

Significant Natural Heritage Area

Wagram & Wakulla quads

A: Primary Boundary

B: Secondary Boundary

Scale - 1:36,000

prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

SPRING BRANCH CHURCH SWAMP

Site Significance: regional
Size: 897 acres
USGS Quadrangle: Wakulla, Wagram
Ownership: private

SIGNIFICANT FEATURES: Spring Branch Church Swamp provides very good quality floodplain forest along a four mile stretch of Lumber River, a designated State Natural and Scenic River. Scattered clumps of a state-rare shrub, sarvis holly (*Ilex amelanchier*), occur here. This forest provides nesting habitat for many neotropical migrant birds. The river channel is part of the state-designated Lumber River/Bear Swamp Aquatic Habitat.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area flanks Lumber River from US 401 downstream to just past the Hoke-Robeson County line. It lies just downstream from Lumber River/Chalk Banks Floodplain SNHA.

SITE DESCRIPTION: Spring Branch Church Swamp is typical of the middle portion of the Lumber River, with a meandering river channel, sandy point bars, small natural levees, backwater sloughs, and a low floodplain terrace. Habitats present are typical blackwater river communities, mostly middle-aged to mature, and in good ecological condition. Wetter parts of the floodplain, including sloughs where water backs up, support Cypress-Gum Swamp community, composed of pond cypress (*Taxodium ascendens*), swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*) and scattered loblolly pine (*Pinus taeda*). Titi (*Cyrilla racemiflora*), sweet pepperbush (*Clethra alnifolia*), swamp sweetbells (*Leucothoe racemosa*), and sweetspire (*Itea virginica*) are common shrubs; sarvis holly is frequent here and on levees. Poison ivy (*Toxicodendron radicans*) and crossvine (*Bignonia capreolata*) are common tree climbers, while hempvine (*Mikania scandens*) and native wisteria (*Wisteria frutescens*) sprawl over shrubs on levees. Wetland herbs, ferns, and sphagnum moss are numerous, but replaced in many back-up channels by dense mats of an invasive alien (marsh dewflower, *Murdannia keisak*).

Slight rises support bottomland hardwoods, dominated by laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), loblolly pine, red maple, and sweetgum (*Liquidambar styraciflua*) over American holly (*Ilex opaca*), sweetbay magnolia (*Magnolia virginiana*), redbay (*Persea palustris*), sweet pepperbush, and greenbrier (*Smilax rotundifolia*). Herbs are sparse. Inland portions of the hardwood forest have been cut and are in various stages of regeneration. Here and there are low ridges of ancient, river-deposited sand which support remnant pine-oak-wiregrass flatwoods with creeping blueberry (*Vaccinium crassifolium*). More research is needed to delineate and characterize this last community.

MANAGEMENT AND PROTECTION: Selective cutting of the floodplain forest, rather than clearcutting, will benefit migrant songbird populations. Although the Lumber River is a designated State Natural and Scenic River, the forests are privately owned and not protected.

NATURAL COMMUNITIES: Sand and Mud Bar, Coastal Plain Levee Forest (Blackwater Subtype), Cypress-Gum Swamp (Blackwater Subtype), Coastal Plain Bottomland Hardwoods (Blackwater Subtype).

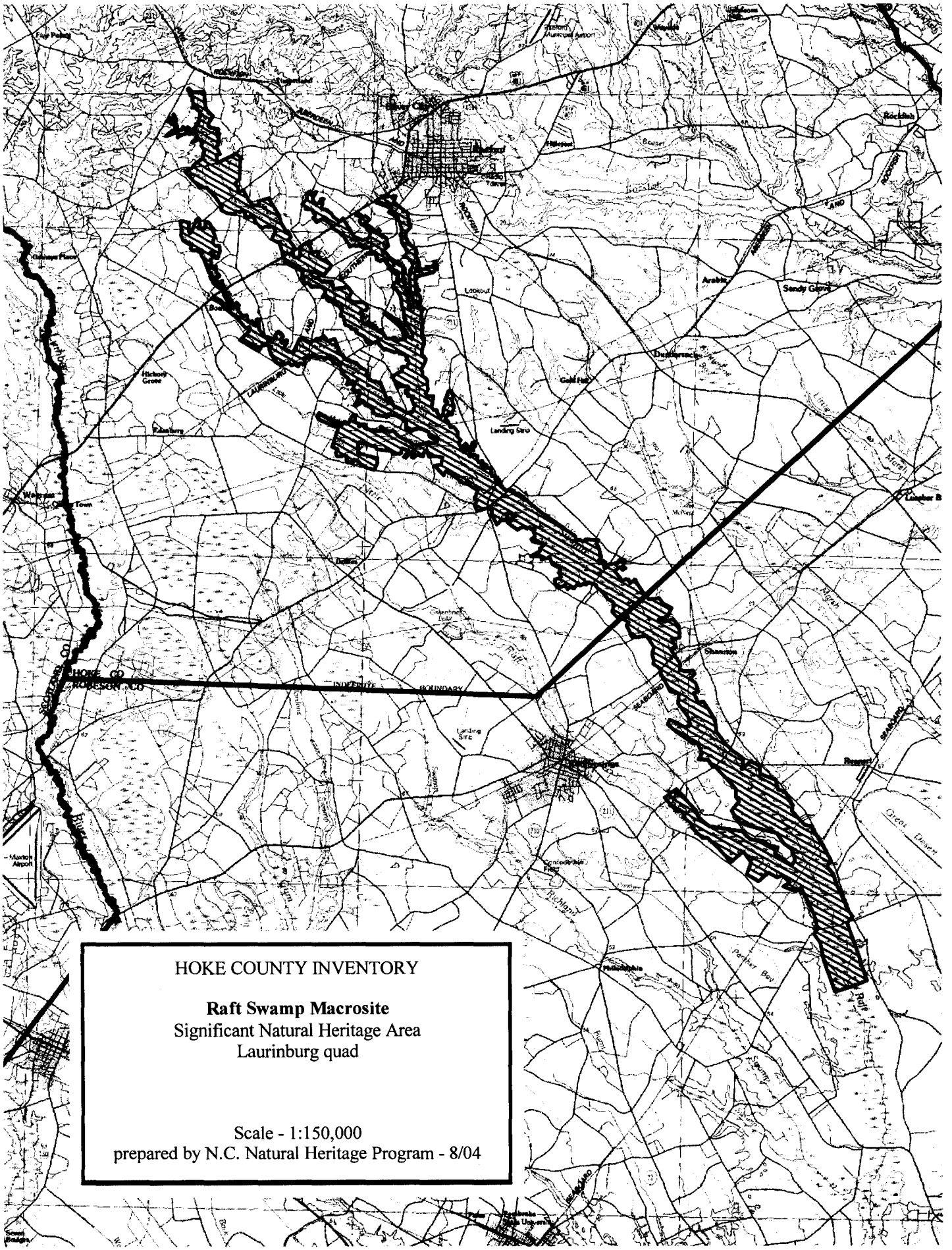
RARE PLANTS: Sarvis holly (*Ilex amelanchier*).

RARE ANIMALS: None known, but two rare fish are likely to occur: thinlip chub (*Cyprinella sp. 1*) and pinewoods darter (*Etheostoma mariae*, FSC).

REFERENCES:

Ash, A.N. 1990. A Preliminary Natural Areas Inventory of the Lumber River Floodplain. Report to North Carolina Natural Heritage Program, Raleigh, and The Nature Conservancy, Durham.

Sorrie, B.A. 2004. Site Survey Report: Spring Branch Church Swamp. North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.



HOKE COUNTY INVENTORY

Raft Swamp Macrosite
Significant Natural Heritage Area
Laurinburg quad

Scale - 1:150,000
prepared by N.C. Natural Heritage Program - 8/04

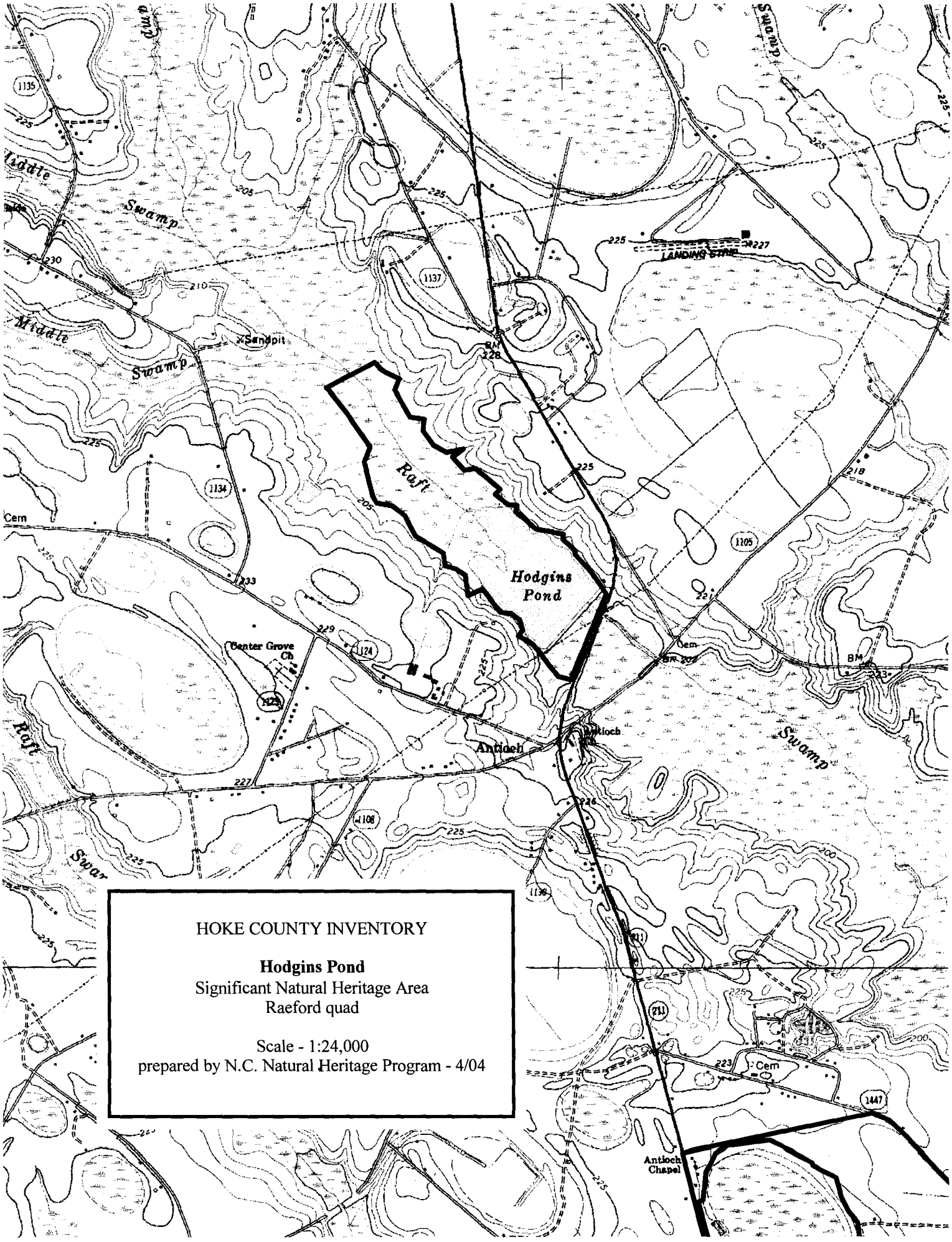
Hoke County Natural Area Inventory

RAFT SWAMP MACROSITE

This natural area features many miles of blackwater stream and high quality floodplain forest. It forms an important corridor for the movement of animals and plants, as well as nesting and feeding habitat for resident and migrant birds. One of these, the anhinga (*Anhinga anhinga*) nests at Hodgins Pond.

Raft Swamp begins west of Raeford in Hoke County and merges with the Lumber River at Lumberton in Robeson County. It is a major tributary of Lumber River. Within Hoke County, Raft Swamp extends some twelve miles in a northwest-southeast direction. The headwaters form several branches, notably Toneys Creek, Raft Swamp, and Big Middle Swamp. These tributaries support swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), and loblolly pine (*Pinus taeda*) to form a Coastal Plain Small Stream Swamp community. Downstream, the main creek supports Cypress-Gum Swamp where frequently flooded, dominated by swamp black gum and pond cypress (*Taxodium ascendens*). Coastal Plain Bottomland Hardwoods occur on slightly higher elevations; laurel oak (*Quercus laurifolia*) and yellow poplar (*Liriodendron tulipifera*) occur there along with loblolly pine and above-mentioned hardwoods. Canopy trees often reach 2 feet dbh and 90 feet tall. Small sandbars and mudbars occur at intervals along the stream.

Within the Macrosite, Hodgins Pond Significant Natural Heritage Area lies just upstream of the NC 211 crossing. Antioch Bay SNHA occurs southward, between NC 211 and Raft Swamp, and includes a piece of the swamp. Just over the line in Robeson County is the Shannon SNHA. Portions of the floodplain have been clearcut in the past, but will recover over time; selective cutting is a less drastic alternative. The Nature Conservancy owns a small piece of Raft Swamp; otherwise it is not under conservation protection.



HOKE COUNTY INVENTORY

Hodgins Pond
Significant Natural Heritage Area
Raeford quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

HODGINS POND

Site Significance: county
Size: 612 acres
USGS Quadrangle: Raeford
Ownership: private

SIGNIFICANT FEATURES: Hodgins Pond Significant Natural Heritage Area is an old millpond that now supports abundant, picturesque pond cypress trees (*Taxodium ascendens*). It is a nesting area for anhingas (*Anhinga anhinga,* also called water turkey), a rare breeding bird in North Carolina, plus wood ducks and several neotropical migrant songbirds. The pond also provides foraging habitat for migrant waterfowl and cormorants.

LANDSCAPE RELATIONSHIPS: Hodgins Pond lies immediately west of route 211, a third of a mile north of Antioch Church. It is an impounded portion of Raft Swamp, the second-largest stream in the county. The Hamby's-Titi-Blueberry-Hidden Bay complex lies 1.5 miles east; Antioch Bay SNHA lies 1.5 miles south.

SITE DESCRIPTION: The natural area is a former millpond in the broad floodplain of a blackwater creek. Pond cypress dominates the upstream portion of the pond, largely replaced by open water towards the dam. Aerial photos show that swamp black gum (*Nyssa biflora*) is co-dominant in the upper reaches, especially where Raft Swamp creek enters, and upstream in the floodplain, forming a Cypress-Gum Swamp. Aquatic plants include spatterdock (*Nuphar advena*), variable water-milfoil (*Myriophyllum heterophyllum*), swamp pennywort (*Hydrocotyle ranunculoides*), mosquito fern (*Azolla caroliniana*), and duckweed (*Landoltia punctata*). A number of herb and shrub species perch on cypress stumps, floating logs, and at the bases of living trunks. Where open to the sun, margins of the pond support dense grasses, sedges, and coarse herbs, including Americn cupscale (an uncommon grass, *Sacciolepis striata*) and swamp smartweed (*Polygonum setaceum*).

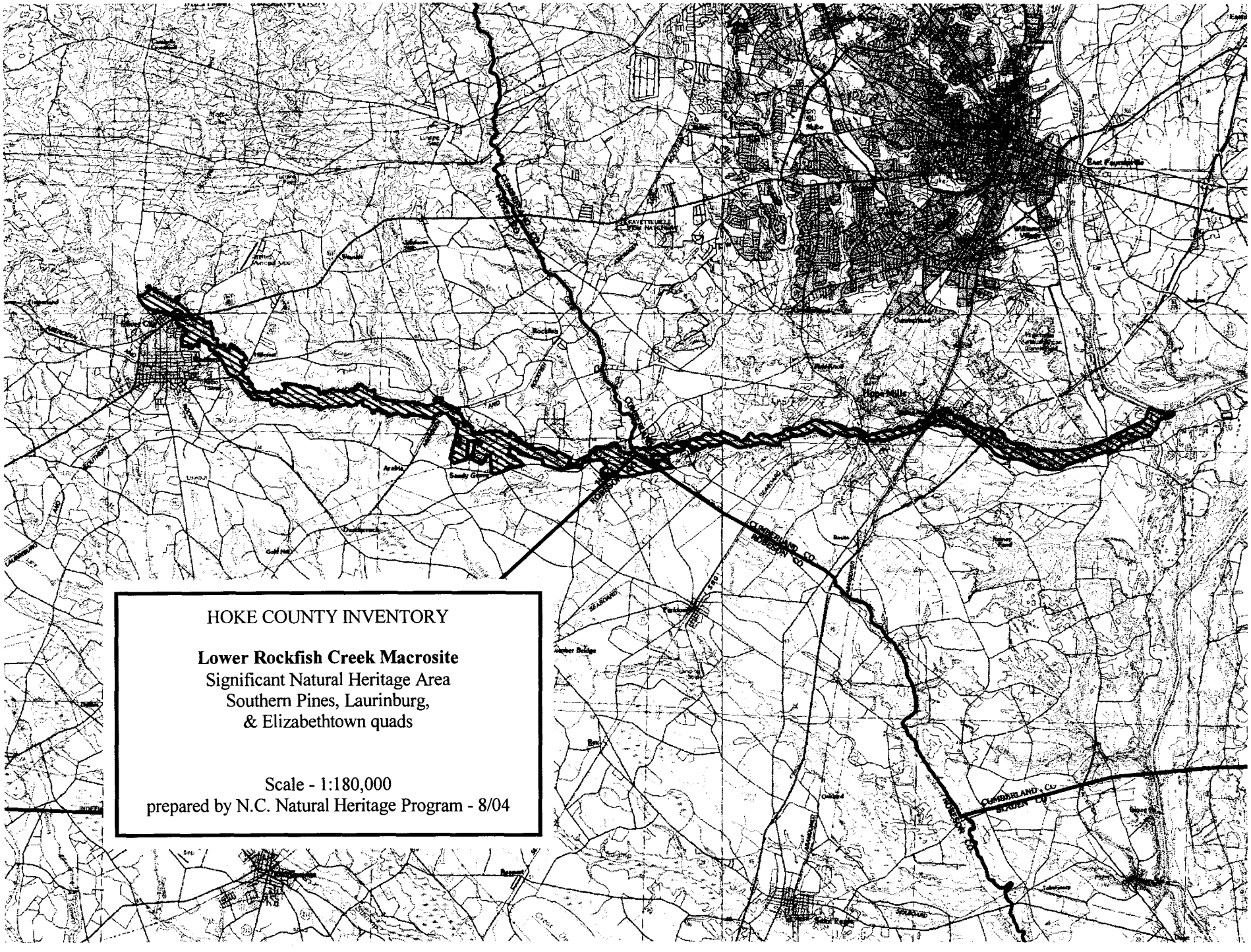
MANAGEMENT AND PROTECTION: The adjacent uplands are currently being sold for residential development; it is crucial to provide sufficient setbacks and adequate sewage treatment to protect the water quality of the pond. This natural area is currently unprotected.

NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment, Cypress-Gum Swamp (Blackwater Subtype).

RARE PLANTS: None documented.

RARE ANIMALS: Anhinga (*Anhinga anhinga*).

REFERENCES: Sorrie, B.A. 2004. Site Survey Report: Hodgins Pond. NC Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.


HOKE COUNTY INVENTORY
Lower Rockfish Creek Macrosite
Significant Natural Heritage Area
Southern Pines, Laurinburg,
& Elizabethtown quads
Scale - 1:180,000
prepared by N.C. Natural Heritage Program - 8/04

Hoke County Natural Area Inventory

LOWER ROCKFISH CREEK MACROSITE

The Macrosite extends from Raeford downstream to the Cape Fear River, traveling across Hoke and Cumberland Counties. Rockfish Creek forms a vital link between the high diversity longleaf pine ecosystem of western Fort Bragg and the Cape Fear River's hardwood slopes, with its mix of piedmont and coastal plain species. Rockfish Creek forms the main east-west wetland corridor in Hoke County and is critical to the movements of fauna and flora. Except for local timber cutting, the floodplain forest is intact throughout the Hoke County portion. The Macrosite features a wide variety of rare animals, plants, and natural communities, some of which are unknown outside of the Sandhills region of the state. For example, the newly discovered Sandhills spiny crayfish (*Cambarus hystricosus*) has been documented from Rockfish Creek and its tributaries. Within Fort Bragg, ten Significant Natural Heritage Areas occur along the creek and its tributaries; offbase natural areas include Calloway Sandhills, Redwing Pond Seeps, Rockfish Creek at Raeford, Rockfish Creek Ravines, and Camp Rockfish.

Rockfish Creek originates in Southern Pines in Moore County and empties into the Cape Fear River several miles southeast of Fayetteville in Cumberland County. Ecologically, there are three sections to this blackwater creek. The Fort Bragg section is comprised of a network of streamheads and small tributaries within a longleaf pine (*Pinus palustris*) matrix. Varied topography, abundant seepage, and recurring fire yield remarkably high plant, animal, and natural community diversity, as reported in this Inventory. Most of Hoke County's rare flora and fauna occur within this headwaters area of Rockfish Creek. Wetland species include Pine Barrens treefrog (*Hyla andersonii*), thinlip chub (a fish, *Cyprinella sp. 1*), bog spicebush (*Lindera subcoriacea*), and seven-angled pipewort (*Eriocaulon aquaticum*).

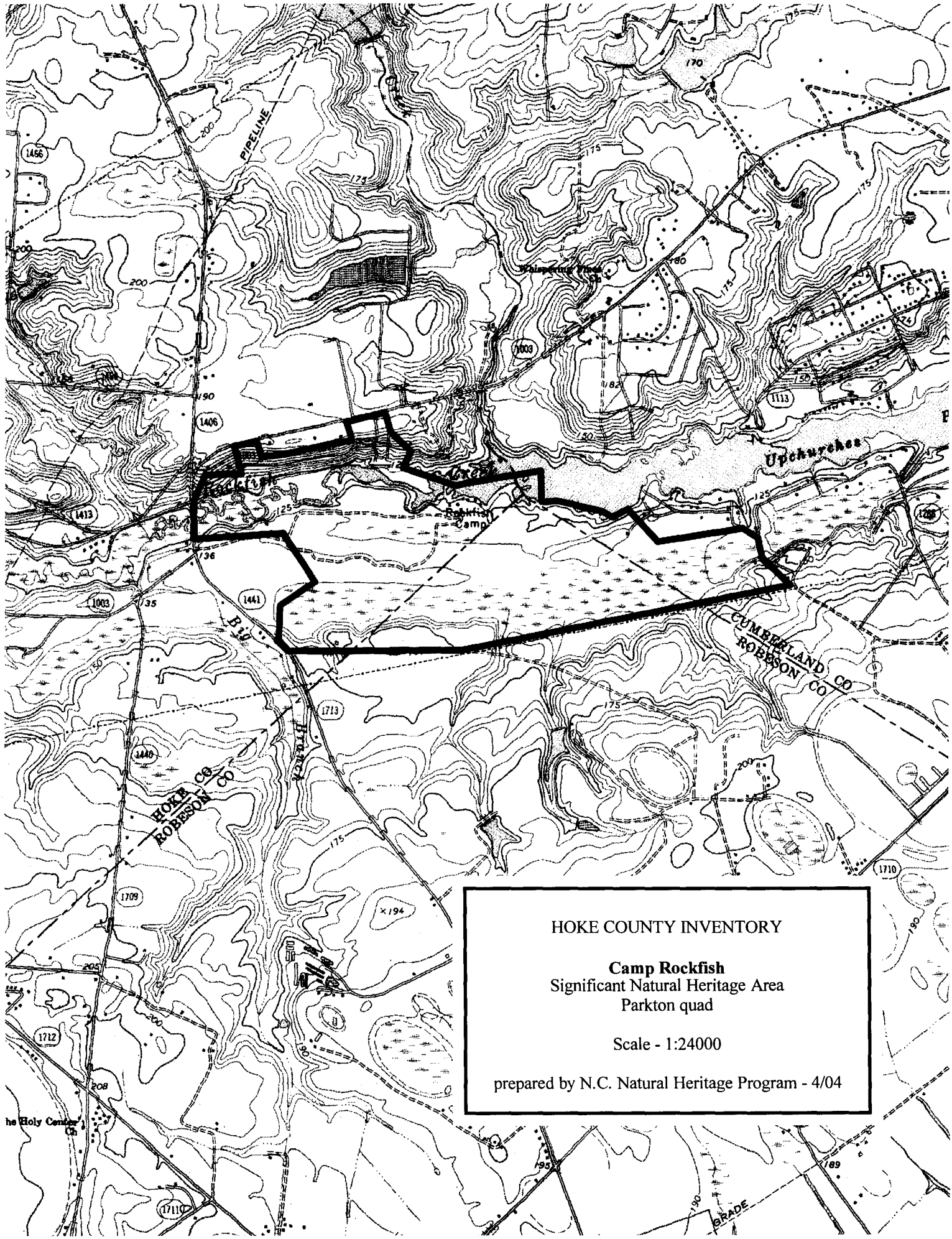
The middle section of the creek -- from the Fort Bragg boundary to Lake Upchurch -- is characterized by a narrow floodplain supporting swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), pond cypress (*Taxodium ascendens*), sweetgum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), and American holly (*Ilex opaca*). The rare conferva pondweed (*Potamogeton confervoides*) and Canby's bulrush (*Schoenoplectus etuberculatus*) occur in this stretch. Adjacent slopes vary from relatively steep to very shallow and are clothed with mixed hardwoods and pine. This section provides nesting habitat for many neotropical migrant birds and for resident wood ducks, pileated woodpeckers, and others. Since heavy rains broke the dam at Lake Upchurch in 2003, the lake is empty but has produced an abundant crop of grasses, sedges, and rushes.

The final section of Rockfish Creek, below Lake Upchurch, twists and turns as the creek bumps against hardened clays of the Cape Fear geological formation. Rockfish Creek has slowly cut down through the clays and sands and has become deeply entrenched, a most unusual feature for a river in the North Carolina coastal plain. Banks range up to 50 feet high and are steep. They are forested with a wide assortment of hardwoods and conifers, under which are abundant shrubs of many species, forming the globally rare Little River Bluff plant community. Lower portions

of hard clay walls are largely bare and constantly wet from seepage water, thus forming a second globally rare community, the Little River Seepage Bank. Sand myrtle (*Leiophyllum buxifolium*) and climbing fern (*Lygodium palmatum*), very localized plants in the state, are common along this stretch. This section has been described in detail in the Natural Area Inventory of Cumberland County (LeBlond and Sorrie 2002).

REFERENCES:

LeBlond, R.J. and B.A. Sorrie. 2002. Natural Area Inventory of Cumberland County, North Carolina. North Carolina Natural Heritage Program, Division of Parks and Recreation, Raleigh, NC.



HOKE COUNTY INVENTORY

Camp Rockfish
Significant Natural Heritage Area
Parkton quad

Scale - 1:24000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

CAMP ROCKFISH

Site Significance: county
Size: 497 acres
USGS Quadrangle: Parkton
Ownership: private

SIGNIFICANT FEATURES: Camp Rockfish is notable for the presence of two unusual natural communities: Nonriverine Swamp Forest and Little River Seepage Bank. The latter is a globally restricted community confined to Lower Little River and Rockfish Creek. Bog spicebush (*Lindera subcoriacea*), a Federal Species of Concern, occurs on the property. Sand myrtle (*Leiophyllum buxifolium*), very localized in North Carolina, is common along Rockfish Creek, but occurs nowhere else in the county. At least twenty sassafras trees (*Sassafras albidum*) produce leaves with four or five lobes, rather than the usual two or three. The state's largest swamp black gum (*Nyssa biflora*) - "Big Bertha" - is found here.

LANDSCAPE RELATIONSHIPS: The natural area occurs at the west end of Upchurch Lake at the junction of Hoke, Robeson, and Cumberland Counties and east of Davis Bridge Road (SR 1441). It lies two miles downstream of Rockfish Creek Ravines Significant Natural Heritage Area.

SITE DESCRIPTION: Camp Rockfish SNHA occupies a broad flat terrace on the south side of Rockfish Creek, at the upper end of a three mile long impoundment (Lake Upchurch). Upstream the ponding effects of the dam diminish, but still are evident at Davis Bridge Road as a very wide creek. The creek flows through a typical blackwater Coastal Plain Small Stream Swamp dominated by swamp black gum, pond cypress (*Taxodium ascendens*), and red maple (*Acer rubrum*). There is a strong shrub component. Old meander bends now form cypress-gum "pooches" utilized as foraging areas by herons and kingfishers. At the edge of the immediate floodplain, creek banks are steep and at two places form vertical clay walls wet with seepage water - the Little River Seepage Bank community. Drier portions of the terrace support a mixed pine-oak flatwoods community with lots of sand myrtle and narrowleaf blueberry (*Vaccinium tenellum*). Although fire-suppressed, this community still has remnant longleaf pine (*Pinus palustris*) and wiregrass (*Aristida stricta*) scattered throughout. Very large, elongate depressions in the terrace support Nonriverine Swamp Forest, dominated by swamp black gum, red maple, water oak (*Quercus nigra*), and loblolly pine (*Pinus taeda*) over small understory hardwoods, shrubs, and bayvine (*Smilax laurifolia*). These depression swamps have small outlets leading to Rockfish Creek, but are rarely or never flooded by stream overflow. One ancient gum ("Big Bertha") measures 256 inches in circumference.

In early 2003 the dam of Lake Upchurch failed in heavy rains, draining the lake completely. The bottom now is dominated by coarse grasses, sedges, and semi-aquatic herbs: maidencane (*Panicum hemitomon*), American cupscale grass (*Sacciolepis striata*), Baldwin's spikesedge (*Eleocharis baldwinii*), water pimpernel (*Lindernia dubia*), and smartweeds (*Polygonum spp*.). This community can be considered a giant version of Sand and Mud Bar.

MANAGEMENT AND PROTECTION: The Rockfish Outdoor Center runs a day camp and conference facility near the creek; the rest of the property is left in a natural state. The pine flatwoods would benefit from occasional prescribed fire to arrest succession to dense hardwoods/loblolly pine. The property is not under specific conservation protection.

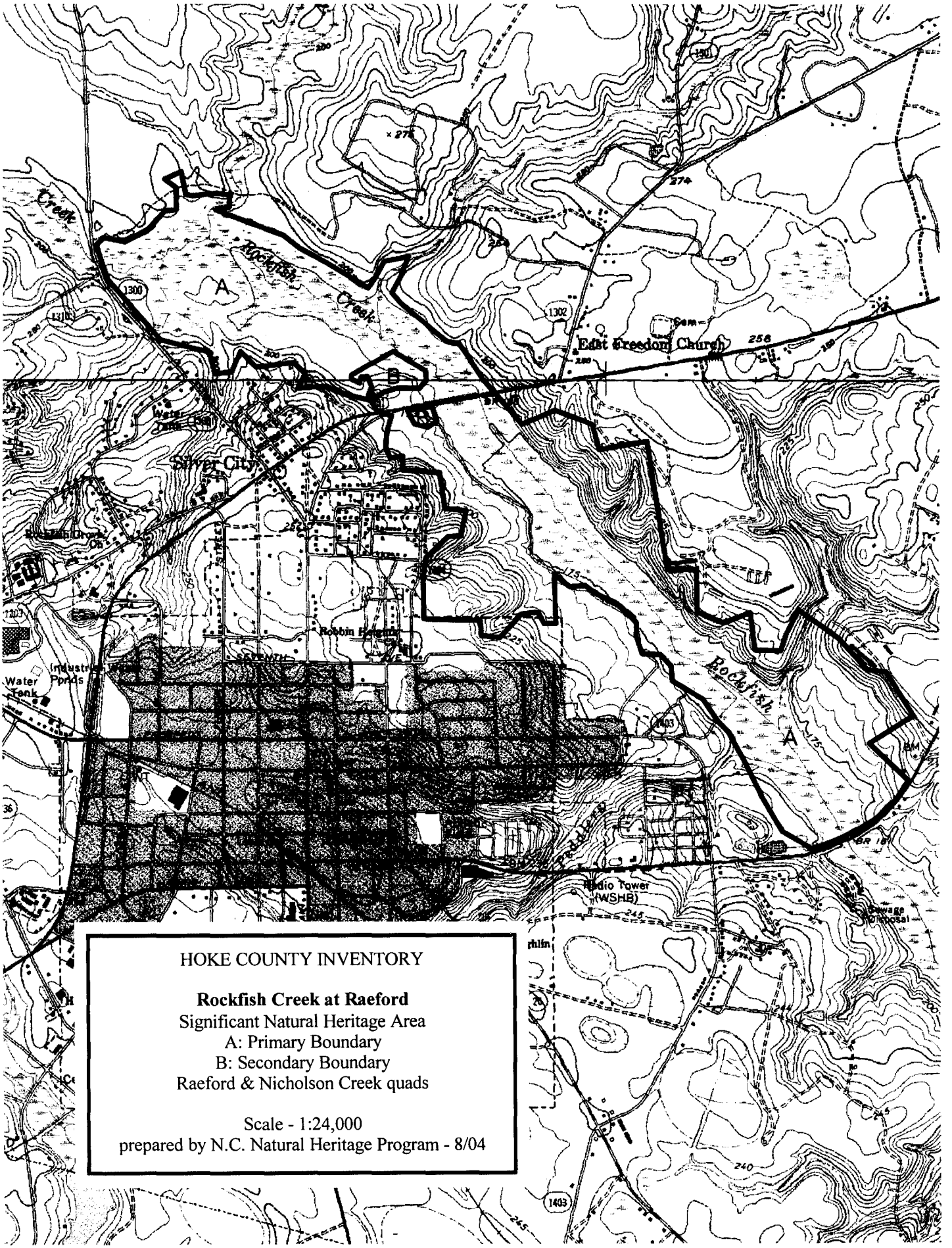
NATURAL COMMUNITIES: Mesic Pine Flatwoods, Nonriverine Swamp Forest, Little River Seepage Bank, Coastal Plain Small Stream Swamp (Blackwater Subtype), Sand and Mud Bar, Coastal Plain Semipermanent Impoundment.

RARE PLANTS: Bog spicebush (*Lindera subcoriacea*, FSC) has been documented from the Robeson portion of the Nonriverine Swamp Forest.

RARE ANIMALS: None documented.

REFERENCES:

Sorrie, B.A. 2003. Site Survey Report: Camp Rockfish. NC Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh, NC.



HOKE COUNTY INVENTORY

Rockfish Creek at Raeford
Significant Natural Heritage Area
A: Primary Boundary
B: Secondary Boundary
Raeford & Nicholson Creek quads

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 8/04

Hoke County Natural Area Inventory

ROCKFISH CREEK AT RAEFORD

Site Significance: county
Size: 745 acres
USGS Quadrangle: Raeford, Nicholson Creek
Ownership: private

SIGNIFICANT FEATURES: Rockfish Creek is an important wildlife corridor extending across two counties. This stretch of the creek provides a secluded and wild setting that is only a mile from downtown Raeford, and includes ancient cypress, juniper, and gum trees in the floodplain. Adjacent slopes support a varied assortment of natural communities, from xeric pine-oak to mesic oak-hickory-pine to wet shrubby streamheads. Two state-rare plant species have been documented from the creek near Vass Road.

LANDSCAPE RELATIONSHIPS: Rockfish Creek at Raeford is situated one mile northeast of Raeford, extending from Vass Road (SR 1300) to US 401. It lies 2 miles south of Redwing Pond Seeps SNHA.

SITE DESCRIPTION: The site extends 2.5 miles along Rockfish Creek, a typical coastal plain blackwater stream. The creek winds through a floodplain that supports Coastal Plain Small Stream Swamp. Swamp black gum (*Nyssa biflora*) and red maple (*Acer rubrum*) dominate, pond cypress (*Taxodium ascendens*) and Atlantic white cedar ("juniper", *Chamaecyparis thyoides*) are frequent, while yellow poplar (*Liriodendron tulipifera*) and loblolly pine (*Pinus taeda*) are scattered. American holly (*Ilex opaca*) is a common understory tree, and greenbrier (*Smilax rotundifolia*) forms extensive thickets. Canopy trees often exceed 100 feet; several cypress exceed 3 feet dbh. Adjacent slopes support oak-hickory-pine-dogwood forest on mesic soil, and Streamhead Pocosins along short tributary branches. The latter community has some red pitcher-plants (*Sarracenia rubra*), rare in the county outside of Fort Bragg. Higher up the soils become droughty and support longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), blackjack oak (*Q. marilandica*), mockernut hickory (*Carya alba*), wiregrass (*Aristida stricta*), and dwarf azalea (*Rhododendron atlanticum*). A sand road follows a sewer line along the west side of the floodplain; US 401 bypass crosses the floodplain about midway.

MANAGEMENT AND PROTECTION: Recent selective cutting has occurred on the west side. This has benefitted the longleaf and pocosin communities by reducing hardwood shade. Restoring fire to these communities will promote wildflowers and grasses, as well as improving ecological integrity. The SNHA is currently not under conservation protection.

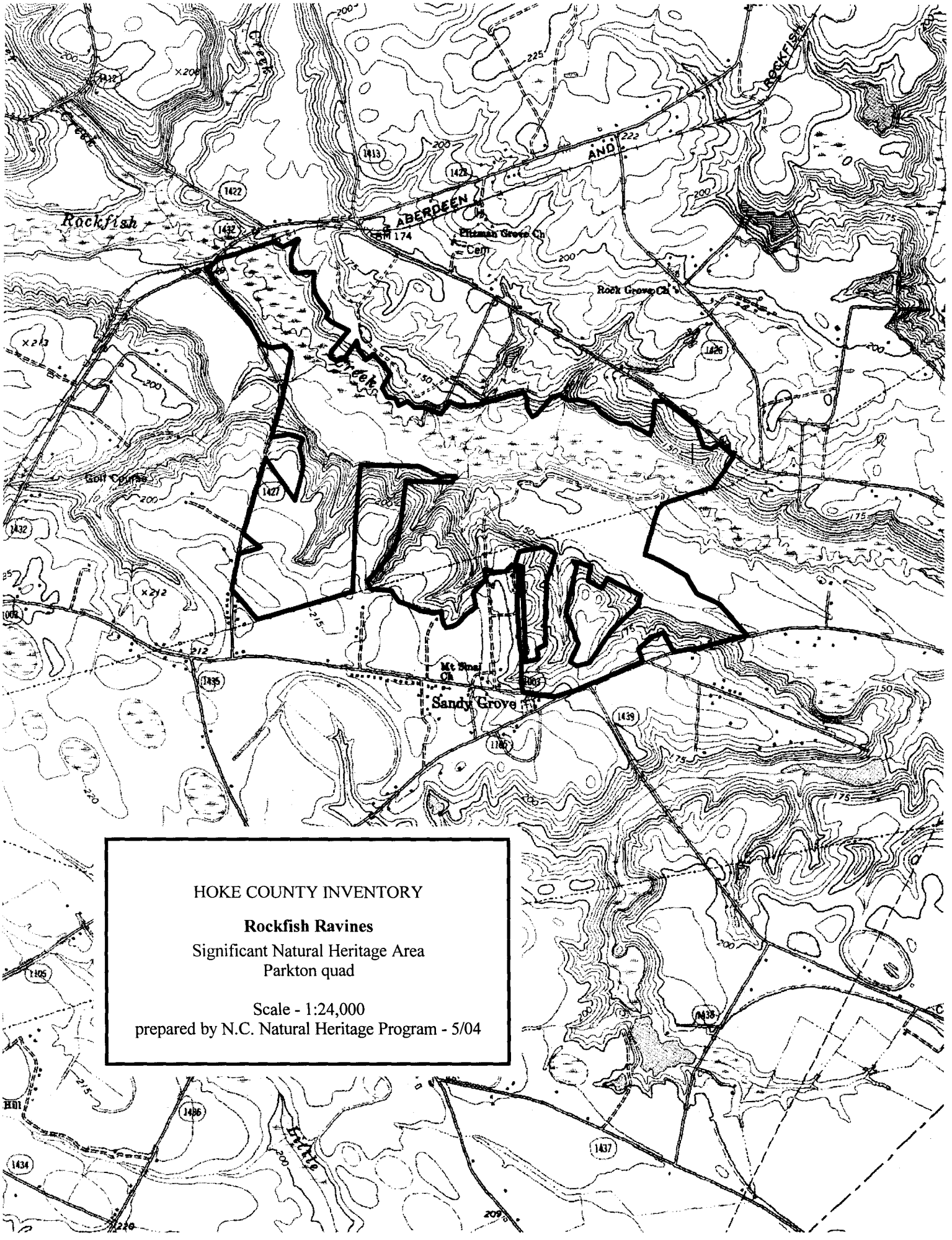
NATURAL COMMUNITIES: Coastal Plain Small Stream Swamp (Blackwater Subtype), Dry Oak-Hickory Forest, Streamhead Pocosin, Pine/Scrub Oak Sandhill (Mixed Oak Variant).

RARE PLANTS: Conferva pondweed (*Potamogeton confervoides,* FSC), Canby's bulrush (*Schoenoplectus etuberculatus*).

RARE ANIMALS: None documented, but likely.

REFERENCES:

Sorrie, B.A. 2004. Site Survey Report: Rockfish Creek at Raeford. North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.



HOKE COUNTY INVENTORY

Rockfish Ravines

Significant Natural Heritage Area
Parkton quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

ROCKFISH CREEK RAVINES

Site Significance: county
USGS Quadrangle: Parkton
Size: 742 acres
Ownership: private

SIGNIFICANT FEATURES: This Significant Natural Heritage Area features a series of half a dozen short but fairly deep ravines, extensive floodplain forest, steep riverside bluffs, wet flatwoods, and remnant longleaf pine uplands. The close proximity of these community types has resulted in high plant and animal diversity, including many breeding neotropical songbirds. The county's only population of Fernald's tick-trefoil (*Desmodium fernaldii*) occurs here.

LANDSCAPE RELATIONSHIPS: Rockfish Creek Ravines lies east of Ellis Road (SR 1427), downstream from Golf Course Road bridge (SR 1432). It occurs three miles upstream from Camp Rockfish SNHA and a mile northeast of Arabia Bay SNHA.

SITE DESCRIPTION: From Raeford eastward to the Cape Fear River, Rockfish Creek forms an ecological boundary between the rolling Sandhills of the inner coastal plain and the flat, Carolina bay country of the middle coastal plain. For most of this stretch, Rockfish Creek lies 50-100 feet below the surrounding hilltops and, as a result, tributary creeks have cut down into sediments to reach it. Some six north-facing ravines form the centerpiece of this natural area. In them are typical Streamhead Pocosin communities, dominated by swamp black gum (*Nyssa biflora*), yellow poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), pond pine (*Pinus serotina*), and loblolly pine (*P. taeda*). Shrubs and climbing briers form a dense layer, interrupted by patches of switchcane (*Arundinaria tecta*) and ferns. Bordering the ravines is a narrow strip of Dry Oak-Hickory Forest supporting six species of oak, mockernut hickory (*Carya alba*), loblolly pine, and black gum (*Nyssa sylvatica*) over dogwood (*Cornus florida*), American holly (*Ilex opaca*), witch hazel (*Hamamelis virginiana*), and muscadine grape (*Vitis rotundifolia*). Several herbaceous plants occur here which are uncommon in the county, including Solomon's-seal (*Polygonatum biflorum*), downy rattlesnake-plantain (an orchid, *Goodyera pubescens*), and green adder's-mouth (an orchid, *Malaxis unifolia*). Upslope, dry ridges support a pine-oak-wiregrass (*Aristida stricta*) community which, although fire-suppressed, still has plenty of longleaf pine (*P. palustris*), turkey oak (*Quercus laevis*), dwarf post oak (*Q. margarettiae*), and blackjack oak (*Q. marilandica*). Herbs are now sparse, but will recover if fire is brought back - the adjacent powerline is a source for many species. This same powerline crosses one of the streamheads where active seepage supports sphagnum moss and many characteristic ecotone plants, such as sundew (*Drosera capillaris*), meadow-beauties (*Rhexia spp.*), and yellow-eyed-grasses (*Xyris spp.*).

At the base of the slope is a narrow to broad floodplain terrace with tall forest similar in composition to the Streamhead Pocosin, but with more loblolly pine, plus sweetgum (*Liquidambar styraciflua*) and laurel oak (*Quercus laurifolia*); some of this has been cut in recent years. Along Rockfish Creek grows a Coastal Plain Small Stream Swamp community, in

which pond cypress (*Taxodium ascendens*) and swamp black gum are prominent along with previously mentioned wetland trees. At one stretch the river has cut across the floodplain to the slope, forming a vertical cut-bank; mountain laurel (*Kalmia latifolia*) shrubs thrive here in the cool microclimate. To the east a broad and elevated terrace supports a remnant longleaf pine-oak-wiregrass community in dry to xeric sandy soil. Away from the river, drainage is slow and has allowed growth of a wet to mesic pine flatwoods community, dominated by pond pine, loblolly pine, water oak (*Quercus nigra*), southern red oak (*Q. falcata*), and numerous shrub species.

MANAGEMENT AND PROTECTION: Upland areas, including the dry terrace, the upper ends of streamheads, and portions of the powerline, need fire management to restore the longleaf pine communities. Selective cutting of the floodplain forest, rather than clearcutting, would benefit migrant bird populations. The natural area is not under conservation protection.

NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant), Pine Scrub Oak Sandhill (Mixed Oak Variant), Dry Oak-Hickory Forest, Streamhead Pocosin, Wet Pine Flatwoods (Wet Ultisol Variant), Mesic Pine Flatwoods (Sandhills Variant), Coastal Plain Small Stream Swamp (Blackwater Subtype).

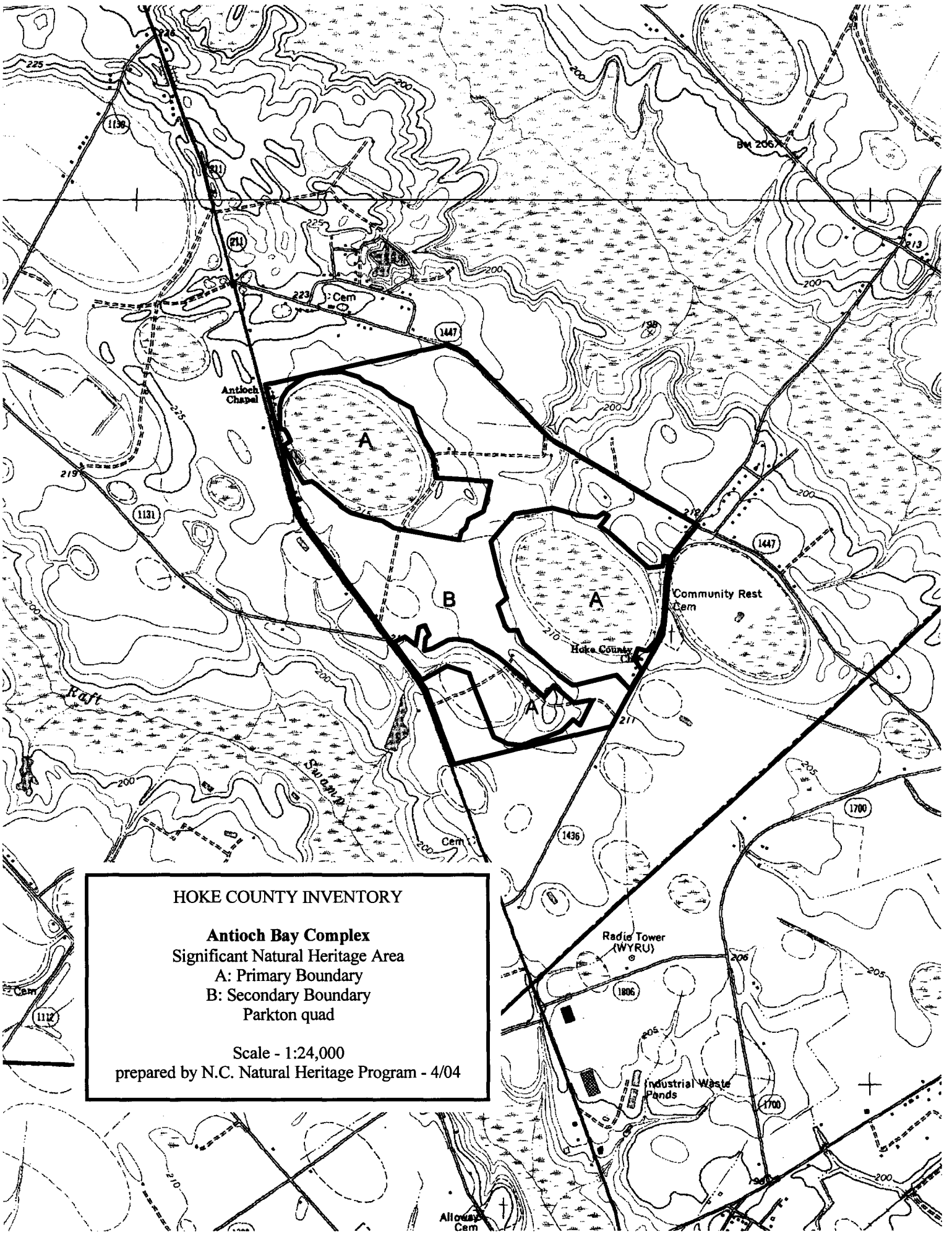
RARE PLANTS: Fernald's tick-trefoil (*Desmodium fernaldii*).

RARE ANIMALS: None documented.

REFERENCES:

Sorrie, B.A. 2004. Site Survey Report: Rockfish Creek Ravines. North Carolina Natural Heritage Program, Office of Conservation and Community Affairs, Raleigh, NC.

STAND-ALONE SITES



HOKE COUNTY INVENTORY

Antioch Bay Complex
Significant Natural Heritage Area
A: Primary Boundary
B: Secondary Boundary
Parkton quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

ANTIOCH BAY COMPLEX

Site Significance: national
USGS Quadrangle: Red Springs
Size: 772 acres
Ownership: The Nature Conservancy, private

SIGNIFICANT FEATURES: Antioch Bay is the best example of a clay-based Carolina bay in the state and one of the best in the country. It combines large size, excellent quality natural community, and high ranked populations of numerous rare plants and animals. In all, ten rare plants and seven rare animals have been documented, including one Federally Endangered (FE), Michaux's sumac (*Rhus michauxii*), and two Federal Species of Concern (FSC), Boykin's lobelia (*Lobelia boykinii*) and awned meadow-beauty (*Rhexia aristosa*). At least sixteen species of amphibians breed here. The Cypress Savanna natural community in Antioch Bay is considered the finest example of this rare habitat in North Carolina. Antioch Bay, Dial Bay, and Plum Thicket form a complex that is critical to long-term viability of flora and fauna, especially for amphibians which require wetlands for breeding and uplands for the non-breeding months.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area (SNHA) is located in southern Hoke County, in the triangle formed by NC route 211, Cope Road (SR 1447), and Balfour Road (SR 1436). Antioch Bay, Dial Bay, a small area known as Plum Thicket, and a small un-named bay are included within this SNHA. The site lies on a low upland flat, midway between Raft Swamp and Little Raft Swamp. Hamby's Bay SNHA lies 1.8 miles to the northeast.

SITE DESCRIPTION: Antioch Bay is a superb example of a clay-based Carolina bay and is one of only a handful of high quality clay-based bays remaining in the state. It is an elliptical depression oriented along a northwest-southeast axis and with a low sand rim at the southeast end and along the east side. A clay substrate perches water, resulting in periodic ponding. During inundations, the plant community is dominated by coarse emergent sedges, particularly Carey's beaksedge (*Rhynchospora careyana)*. In dry years, grasses, sedges, and colorful wildflowers are patch dominants. At all times, an open canopy of pond cypress (*Taxodium ascendens*) dominates, with scattered swamp black gum (*Nyssa biflora*). Beneath the cypress are flowering stands of marsh fleabane (*Pluchea rosea*), yellow polygala (*Polygala cymosa*), awned meadow-beauty, lanceleaf sabatia (*Sabatia difformis*), and flaxleaf gerardia (*Agalinis linifolia*). Florida peanut-grass (*Amphicarpum muehlenbergianum*), one of only three populations in North Carolina, reaches its northern range limit here. The margins of the bay have an abrupt zone of hardwood trees, shrubs, and loblolly pine (*Pinus taeda*); pines invade the bay during dry years. The sand rim is fire-suppressed and supports a low diversity Dry Oak-Hickory Forest mixed with loblolly pines. Adjacent uplands support farmland, pastures, and some houses.

Dial Bay naturally holds less water than most clay-based bays and has a higher proportion of loam in the soil. As a result, the plant community over most of the bay is a mix of hardwoods and pines with scattered pond cypress (*Taxodium ascendens*), over a shrub layer. This

community appears to be an extreme variant of Cypress Savanna in which cypress is a minor component, further modified by logging and fire. Hardwoods include swamp black gum, red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), and sweetbay (*Magnolia virginiana*); pines are loblolly and pond pine (*Pinus serotina*). Shrubs form patches with grassy openings; they include fetterbush (*Lyonia lucida*), sweet pepperbush (*Clethra alnifolia*), gallberry (*Ilex glabra*), black highbush blueberry (*Vaccinium fuscatum*), and horse sugar (*Symplocos tinctoria*). Throughout, greenbrier (*Smilax rotundifolia*) and sawbrier (*S. glauca*) are common. Herbs are sparse except in openings. One unusual species here is pinebarren peanut-grass (*Amphicarpum purshii*), a curious species which produces underground as well as above-ground spikelets; this is the only known Hoke County population and the inland-most in the state. The southern three quarters of the bay was selectively logged about seven years ago. The northern quarter of the bay is completely open as a result of a hot fire following recent cutting. Just a few pond cypress remain. Warty panic-grass (*Panicum verrucosum*) is dominant. Wet depressions support wool-sedge (*Scirpus cyperinus*), broadleaf cattail (*Typha latifolia*), redroot (*Lachnanthes caroliniana*), meadow-beauties (*Rhexia spp.*), glaucescent sedge (*Carex glaucescens*), beaksedges (*Rhynchospora spp.*), and Virginia chain-fern (*Woodwardia virginica*). In these depressions also grow three rare plants, including one of only two populations of Georgia nutsedge (*Scleria georgiana*) in Hoke. The sand rim along the southwestern side of the bay is fire-suppressed oak-hickory-loblolly pine, but still retains a number of pyrophytic herbs and grasses.

Plum Thicket is primarly a second-growth loblolly pine woodland with oaks, dogwood (*Cornus florida*), and sassafras (*Sassafras albidum*) in the understory. A large population of Michaux's sumac occurs here. Japanese honeysuckle (*Lonicera japonica*) forms dense tangles to the detriment of some sumac, yet most of the sumac plants are robust and this continues to be one of the most viable populations in existence.

MANAGEMENT AND PROTECTION: Measures need to be in place to ensure that runoff from adjacent agricultural fields does not enter the bays, since agrochemicals and nutrients pose a threat to the natural plant communities. Over the long-term, it may be wise to purchase some of the cropland and take it out of cultivation. The small pond located at the west edge of Antioch Bay was a serious threat to the amphibian community, since residents in the neighboring area occasionally stocked it with fish; in autumn of 2002 the pond was filled in. Dial Bay needs active management to fill a drainage ditch. Occasional prescribed fire in the bays will eliminate most loblolly pine and sweetgum, thus maintaining herbaceous diversity. Antioch Bay is owned and protected by The Nature Conservancy, but Dial Bay and Plum Thicket are privately owned and not specifically protected for conservation.

NATURAL COMMUNITIES: Cypress Savanna, Dry Oak-Hickory Forest.

RARE PLANTS: Florida peanut-grass (*Amphicarpum muehlenbergianum*), branched hedge-hyssop (*Gratiola ramosa*), sarvis holly (*Ilex amelanchier*), Boykin's lobelia (*Lobelia boykinii*, FSC), Bosc's bluet (*Oldenlandia boscii*), awned meadow-beauty (*Rhexia aristosa*,

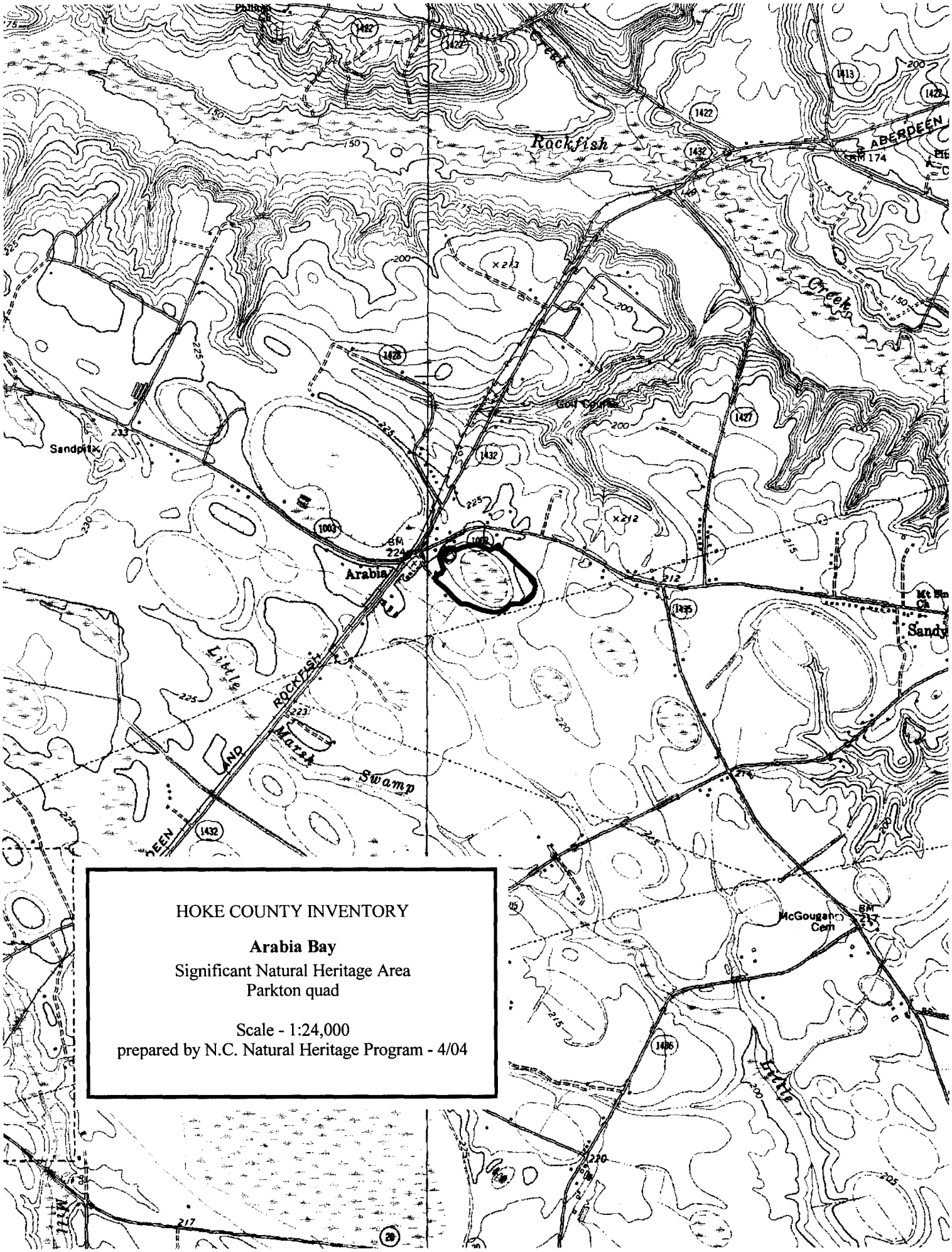
FSC), Michaux's sumac (*Rhus michauxii*, FE), quillwort arrowhead (*Sagittaria isoetiformis*), Georgia nutsedge (*Scleria georgiana*), netted nutsedge (*Scleria reticularis*).

RARE ANIMALS: Mabee's salamander (*Ambystoma mabeei*), tiger salamander (*Ambystoma tigrinum*), chicken turtle (*Deirochelys reticularia*), dwarf salamander (silver morph, *Eurycea quadridigitata*), ornate chorus frog (*Pseudacris ornata*), glossy crayfish snake (*Regina rigida*). Carolina gopher frogs (*Rana capito*, FSC) were introduced here in 1989, but there is no evidence of breeding.

REFERENCES:

Nifong, T. 1982. The "Clay Subsoil" Carolina Bays of North Carolina. Dept. of Botany, UNC Chapel Hill and The Nature Conservancy, NC Chapter.

Sorrie, B.A. 2003. Site Survey Report: Antioch Bay. NC Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh, NC.



HOKE COUNTY INVENTORY

Arabia Bay

Significant Natural Heritage Area
Parkton quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

ARABIA BAY

Site Significance: state
Size: 30 acres
USGS Quadrangle: Parkton
Ownership: private

SIGNIFICANT FEATURES: Arabia Bay has a good quality example of a rare community type, Cypress Savanna, with an excellent herbaceous component. It supports populations of three rare plant species, one of which is awned meadow-beauty (*Rhexia aristosa*), a Federal Species of Concern. The bay also serves as a breeding site for amphibians and a feeding area for songbirds and wood ducks.

LANDSCAPE RELATIONSHIPS: The bay lies on the south side of Arabia Road, 1/4 mile east of Golf Course Road. It lies 1.1 mile southwest of Rockfish Ravines Natural Area.

SITE DESCRIPTION: Arabia Bay is one of only a handful of clay-based Carolina bays remaining in the state. Most of it supports a Cypress Savanna community, but the naturally deeper southeastern portion is a Nonriverine Swamp Forest. The canopy is composed of a mix of pond cypress (*Taxodium ascendens*), loblolly pine (*Pinus taeda*), swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), and sweetgum (*Liquidambar styraciflua*). Logging over the years has removed most adult pines, maples, and sweetgums, and has opened the canopy considerably, but abundant sprouts and saplings are crowding the herb layer. Shrubs are common only around the bay margin; they include smooth highbush blueberry (*Vaccinium formosum*) and titi (*Cyrilla racemiflora*). Herbs are abundant, especially in canopy openings. They include glaucescent sedge (*Carex glaucescens*), Virginia chain-fern (*Woodwardia virginica*), redroot (*Lachnanthes caroliniana*), meadow-beauties (*Rhexia spp.*), wrinkled jointgrass (*Coelorachis rugosa*), beaksedges (*Rhynchospora spp.*) and panic-grasses (*Panicum* and *Dichanthelium*). Frogs are abundant, and no doubt other amphibians and reptiles occur. The Nonriverine Swamp Forest is dominated by swamp black gum and pond cypress with titi below.

Adjacent to the bay's east side is an elevated sand rim which supports a forest of loblolly pine, water oak (*Quercus nigra*) and mockernut hickory (*Carya alba*). Surrounding the natural area are residences, a plant nursery, disturbed oak-pine forest, a power transmission line, and cropland.

MANAGEMENT AND PROTECTION: The bay needs active management to reduce the density of sweetgums. Opening the canopy will maintain herbaceous growth and promote reproduction of the rare species. An occasional prescribed burn will also promote herbaceous plants and suppress sweetgums and pines. Currently the bay is not under conservation protection.

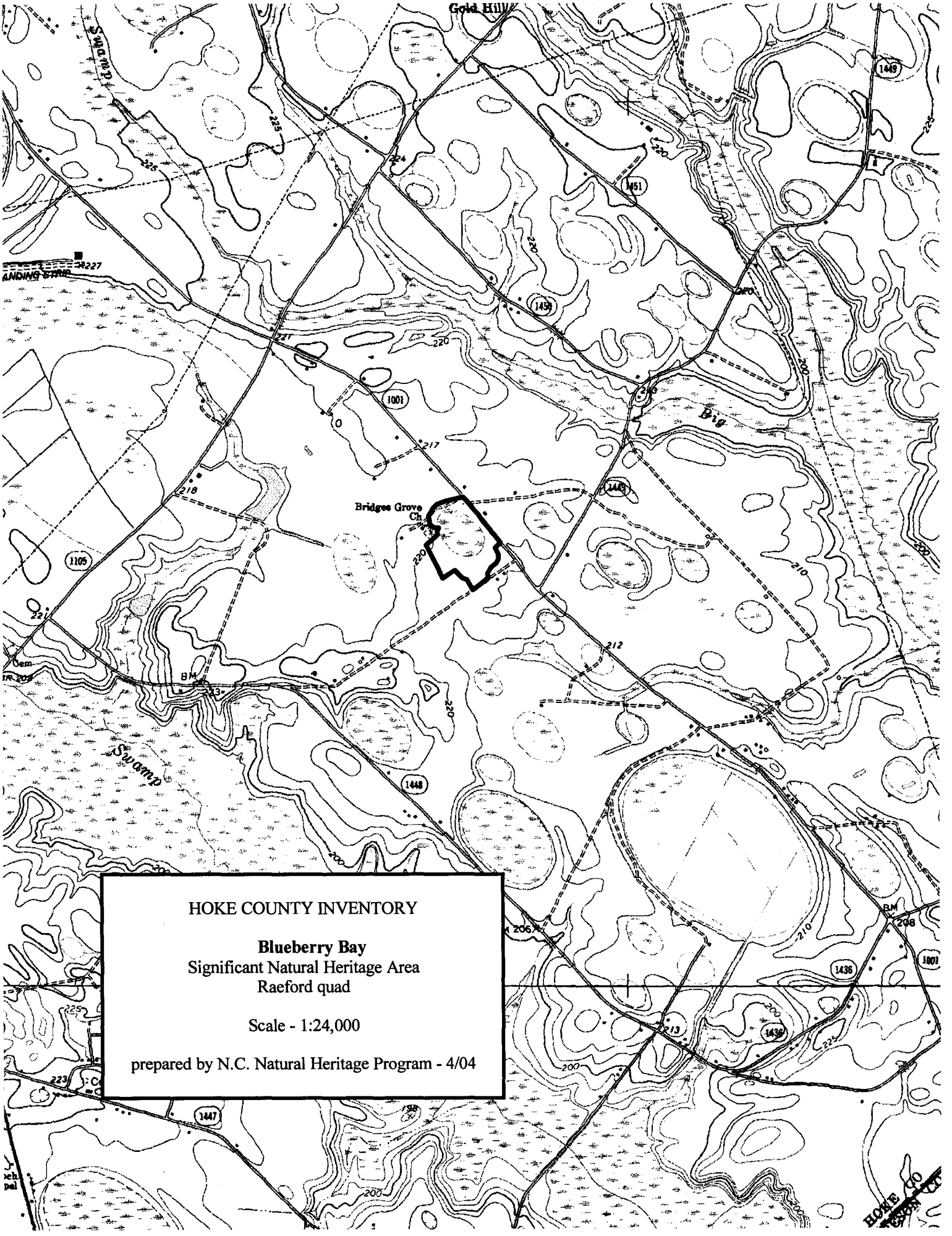
NATURAL COMMUNITIES: Cypress Savanna, Nonriverine Swamp Forest.

RARE PLANTS: Sarvis holly (*Ilex amelanchier*), awned meadow-beauty (*Rhexia aristosa*, FSC), netted nutsedge (*Scleria reticularis*).

RARE ANIMALS: None documented, but likely occur.

REFERENCES:

Nifong, T. 1982. The “Clay Subsoil” Carolina Bays of North Carolina. Dept. of Botany, UNC Chapel Hill and The Nature Conservancy, NC Chapter.



HOKE COUNTY INVENTORY

Blueberry Bay
Significant Natural Heritage Area
Raeford quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

BLUEBERRY BAY

Site Significance: regional
Size: 29 acres
USGS Quadrangle: Raeford
Ownership: private

SIGNIFICANT FEATURES: Blueberry Bay features one of the few remaining examples of a Cypress Savanna community in the state. It supports populations of three rare plant species, one of which is the sole record of pondspice (*Litsea aestivalis*, a shrub or small tree), in Hoke County Pondspice is a Federal Species of Concern. The bay also serves as a breeding site for amphibians and a feeding area for songbirds and wood ducks. Several other Carolina bays occur in the vicinity, forming a complex that is critical to long-term viability of flora and fauna.

LANDSCAPE RELATIONSHIPS: The bay lies on the west side of Shannon Road, shortly north of Hall Road. Hamby's Bay Significant Natural Heritage Area is 0.5 mile to the southwest and Hidden Bay SNHA is 0.5 mile east-southeast.

SITE DESCRIPTION: Blueberry Bay is one of only a handful of high quality clay-based Carolina bays remaining in the state. The abundant sphagnum moss and shrubs are reminiscent of Goose Pond Bay in Robeson County and very unlike nearby Antioch and Hamby's Bays in Hoke County. Thus the plant community represents the rare acidic variant of Cypress Savanna. The canopy is now (2003) closed almost throughout the bay and is composed of a mix of pond cypress (*Taxodium ascendens*), loblolly pine (*Pinus taeda*), swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), and sweetgum (*Liquidambar styraciflua*). Tall shrubs are common, especially black highbush blueberry (*Vaccinium fuscatum*) and fetterbush (*Lyonia lucida*). Herbs are sparse except locally at canopy openings. They include glaucescent sedge (*Carex glaucescens*), Virginia chain-fern (*Woodwardia virginica*), redroot (*Lachnanthes caroliniana*), and meadow-beauties (*Rhexia spp.*). Sphagnum moss is the dominant ground cover throughout the bay. The margins of the bay are densely shrubby. The bay is naturally deeper in the eastern half and supports Nonriverine Swamp Forest dominated by pond cypress and swamp black gum. Carpenter frogs (*Rana virgatipes*) are abundant, and no doubt other amphibians and reptiles breed in the bay. The surrounding upland includes a church, a cemetery, disturbed oak-pine forest, and cropland.

MANAGEMENT AND PROTECTION: The bay needs active management to reduce tree density, especially loblolly pines and sweetgums. Opening the canopy will increase herbaceous growth and promote reproduction of the rare species. An occasional prescribed burn will also promote herbaceous plants and suppress pines and sweetgums. Currently the bay is not under conservation protection.

NATURAL COMMUNITIES: Cypress Savanna, Nonriverine Swamp Forest.

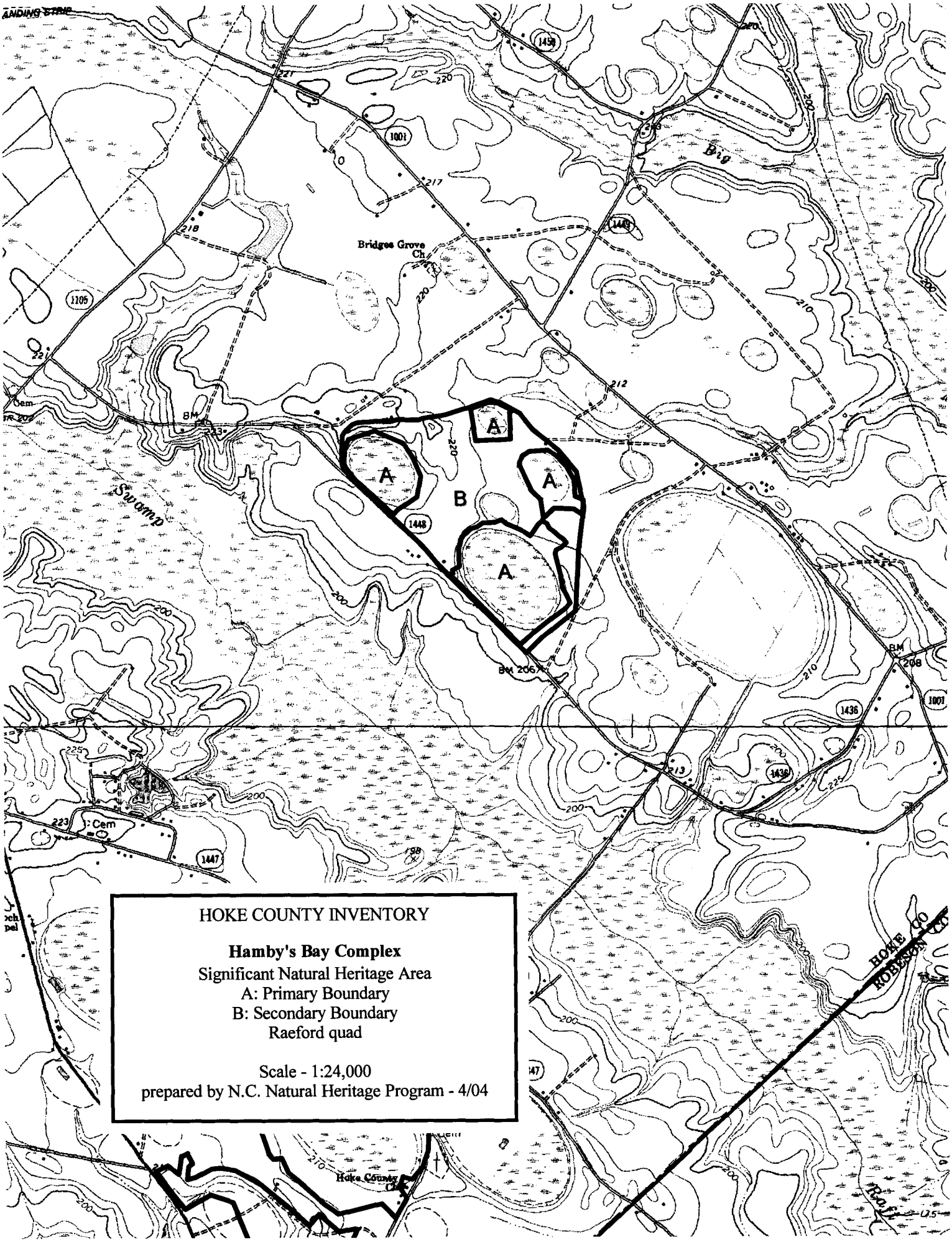
RARE PLANTS: Pondspice (*Litsea aestivalis*, FSC), awned meadow-beauty (*Rhexia aristosa*, FSC), netted nutsedge (*Scleria reticularis*).

RARE ANIMALS: None documented, but likely.

REFERENCES:

Nifong, T. 1982. The "Clay Subsoil" Carolina Bays of North Carolina. Dept. of Botany, UNC Chapel Hill and The Nature Conservancy, NC Chapter.

Sorrie, B.A. 2003. Site Survey Report: Blueberry Bay. NC Natural Heritage Program, Office of Conservation and Community Affairs, DENR, Raleigh, NC.



HOKE COUNTY INVENTORY

Hamby's Bay Complex

Significant Natural Heritage Area

A: Primary Boundary

B: Secondary Boundary

Raeford quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

HAMBY'S BAY COMPLEX

Site Significance: state
Size: 242 acres
USGS Quadrangle: Raeford
Ownership: TNC, private

SIGNIFICANT FEATURES: Hamby's Bay is one of the best examples of a clay-based Carolina bay in the state. It features a very good quality example of a rare natural community (Cypress Savanna) and populations of ten rare plants and animals, including the Federal Species of Concern awned meadow-beauty (*Rhexia aristosa*). At least a dozen species of amphibians breed here. The Cypress Savanna plant community has been degraded by grazing, but will recover over time. Nearby Titi Bay also supports rare plants and breeding amphibians. The intervening uplands are important for the movement of animals betwen the bays. These and several other Carolina bays in the vicinity form a complex that is critical to long-term viability of flora and fauna.

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area is located in southern Hoke County just east of John Road, 1.5 miles east of Antioch Church, and 4.5 miles north of the town of Red Springs. The bays lie on a low upland flat east of Raft Swamp. Blueberry Bay SNHA is one mile to the north, Hidden Bay SNHA is one mile north-northeast, and Antioch Bay SNHA is two miles to the southwest.

SITE DESCRIPTION: Hamby's and Titi Bays are two of only a handful of clay-based Carolina bays remaining in the state. Hamby's Bay is an elliptical depression oriented along a northwest-southeast axis and with a low sand rim at the southeast end and along the east side. An even higher elevation (but not a sand rim) occurs on the north side. A clay substrate perches water, resulting in periodic flooding. During inundations, the Cypress Savanna natural community supports coarse emergent sedges, particularly Carey's beaksedge (*Rhynchospora careyana*). In dry years, short grasses and dog fennel (*Eupatorium capillifolium*) are dominant, with small sedges and scattered colorful wildflowers. At all times, an open canopy of pond cypress (*Taxodium ascendens*) dominates, with scattered swamp black gum (*Nyssa biflora*). Seedling and sapling sweetgum (*Liquidambar styraciflua*) and loblolly pine (*Pinus taeda*) are frequent, indicating past disturbance. Beneath the trees are flowering stands of marsh fleabane (*Pluchea rosea* and *P. foetida*), sessile-leaved horehound (*Lycopus amplectens*), branched hedge-hyssop (*Gratiola ramosa*), dog fennel, scattered yellow polygala (*Polygala cymosa*), and lanceleaf sabatia (*Sabatia difformis*). The margins of the bay have a zone of hardwood trees and shrubs and loblolly pine; pines invade the bay during dry years. Adjacent uplands support crops and some houses.

Titi Bay (= Otter Bay) is about twice as large as Hamby's. Much of the bay has pond cypress, scattered swamp black gum, and red maple over a grass-sedge-shrub layer. Sphagnum moss is common, suggesting that the natural community here may be the rare acidic variant of Cypress Savanna. Titi Bay has been impacted by repeated logging, such that sweetgum, loblolly pine,

and blackberry (*Rubus arguta*) are invading and threaten to shade out the herb layer. One sector of the bay holds more water and supports pond cypress and swamp black gum in a Nonriverine Swamp Forest community. Cut logs and limbs left from logging are common in the bay. Despite a drainage ditch near the southwest corner, Titi Bay holds water well; restoring natural hydrology should not be difficult. Carpenter frogs (*Rana virgatipes*) are numerous and no doubt other amphibians and reptiles occur as breeders. However, the ditch has allowed small fish to migrate from Raft Swamp; they threaten amphibian breeding by devouring eggs and young. A narrow strip of Dry Oak-Hickory Forest occurs along the southwest margin of the bay, dominated by mockernut hickory (*Carya alba*) with scattered oaks, loblolly pines, and dogwood (*Cornus florida*). A number of plants characteristic of loamy sand soils occur here; two of them are state-rare: crested coralroot (an orchid, *Hexalectris spicata*) and Hoke County's only population of blue sage (*Salvia azurea*).

A small, shallow, unnamed bay lies 1/4 mile northeast of Titi Bay. It is surrounded by crop fields. Dominants are loblolly pine, oaks, sweetgum, and swamp black gum. Several willow oaks (*Quercus phellos*) occupy the wet southeastern portion. Beneath the canopy it is quite open and generally easy walking. This bay probably serves for amphibian breeding, and feeding during the non-breeding season.

MANAGEMENT AND PROTECTION: Hamby's Bay is owned and protected by The Nature Conservancy, but the other bays are unprotected. Measures need to be in place to ensure that runoff from adjacent agricultural fields does not enter the bays, since agrochemicals and nutrients pose a threat to the natural plant communities. Over the long term, it may be wise to purchase some of the cropland and take it out of cultivation. Occasional prescribed fire will eliminate loblolly pine and sweetgum saplings and maintain herbaceous diversity in the bays and in the oak-hickory forest. Hamby's Bay shows obvious signs of past grazing (weedy plants and fire ants are common in the northern 2/3 of the bay) and needs time to recover. Fire ants should be eradicated. The ditch draining Titi Bay should be closed to prevent fish from entering the bay.

NATURAL COMMUNITIES: Cypress Savanna, Nonriverine Swamp Forest, Dry Oak-Hickory Forest.

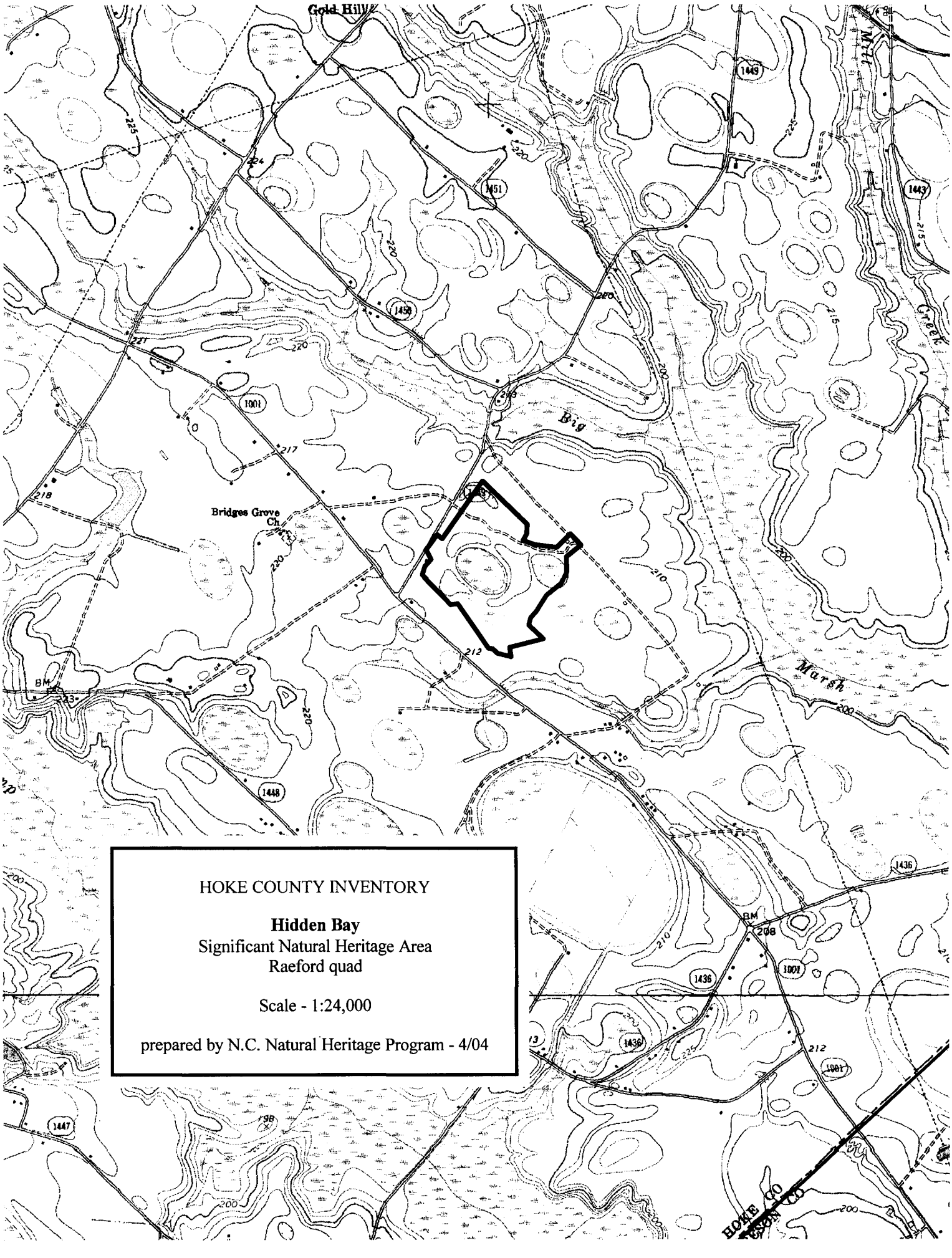
RARE PLANTS: Branched hedge-hyssop (*Gratiola ramosa*), crested coralroot (*Hexalectris spicata*), awned meadow-beauty (*Rhexia aristosa*, FSC), blue sage (*Salvia azurea*), netted nutsedge (*Scleria reticularis*).

RARE ANIMALS: Mabee's salamander (*Ambystoma mabeei*), tiger salamander (*Ambystoma tigrina*), chicken turtle (*Deirochelys reticularia*), dwarf salamander (silver morph, *Eurycea quadridigitata*), ornate chorus frog (*Pseudacris ornata*).

REFERENCES:

Nifong, T. 1982. The "Clay Subsoil" Carolina Bays of North Carolina. Dept. of Botany, UNC Chapel Hill and The Nature Conservancy, NC Chapter.

Sorrie, B.A. 2003. Site Survey Report: Hamby's Bay. NC Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.



HOKE COUNTY INVENTORY

Hidden Bay
Significant Natural Heritage Area
Raeford quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

HIDDEN BAY

Site Significance: regional
USGS Quadrangle: Raeford
Size: 89 acres
Ownership: private

SIGNIFICANT FEATURES: Hidden Bay is one of the very few examples in the state of a relatively undisturbed clay-based Carolina bay. It is highly unusual in having an elevated sandy rim that nearly encircles the bay. It supports a population of awned meadow-beauty (*Rhexia aristosa)*, a Federal Species of Concern. The population of the state-rare showy milkwort (*Polygala grandiflora*) that occurs nearby is the only one documented for Hoke County. The bay also serves as a breeding site for amphibians. Several other Carolina bays occur in the vicinity, forming a complex that is critical to longterm viability of flora and fauna.

LANDSCAPE RELATIONSHIPS: Hidden Bay Significant Natural Heritage Area occurs northeast of Shannon Road and southeast of Hall Road. Hamby's Bay SNHA is one mile to the southwest, and Blueberry Bay SNHA is 0.5 mile west.

SITE DESCRIPTION: Hidden Bay is one of only a handful of clay-based Carolina bays remaining in the state. Aerial photos indicate that the natural communities appear to be in good condition. Pond cypress (*Taxodium ascendens*) and hardwoods, probably swamp black gum (*Nyssa biflora*) and red maple (*Acer rubrum*), are dominants, with lesser amounts of loblolly pine (*Pinus taeda*). Panic-grass (*Panicum sp.*) is dominant in the herb layer; several other grasses and sedges are common. Black highbush blueberry (*Vaccinium fuscatum*) is frequent. Hidden Bay is nearly surrounded by a broad elevated sand rim - a very unusual condition for bays, which usually have a narrow rim at one end, or on one side only. The rim is fire-suppressed and supports loblolly pine, several species of oak, hickory, and scattered longleaf pine (*Pinus palustris*). The surrounding uplands include disturbed oak-pine forest and cropland. A small bay occurs just to the east.

MANAGEMENT AND PROTECTION: Information on Hidden Bay's ecology, flora, and fauna is now more than twenty years old; an update is urgently needed. Hidden Bay appears to need active management to reduce or eliminate the invading loblolly pines. Opening the canopy will increase herbaceous growth and promote reproduction of the rare meadow-beauty. An occasional prescribed burn will also promote herbaceous plants and suppress pines. Fire is also essential to maintain a natural and healthy sand rim community; this must be done soon, before herbaceous species are lost. This SNHA ia an excellent candidate for ecosystem restoration. Currently the bay is not under conservation protection.

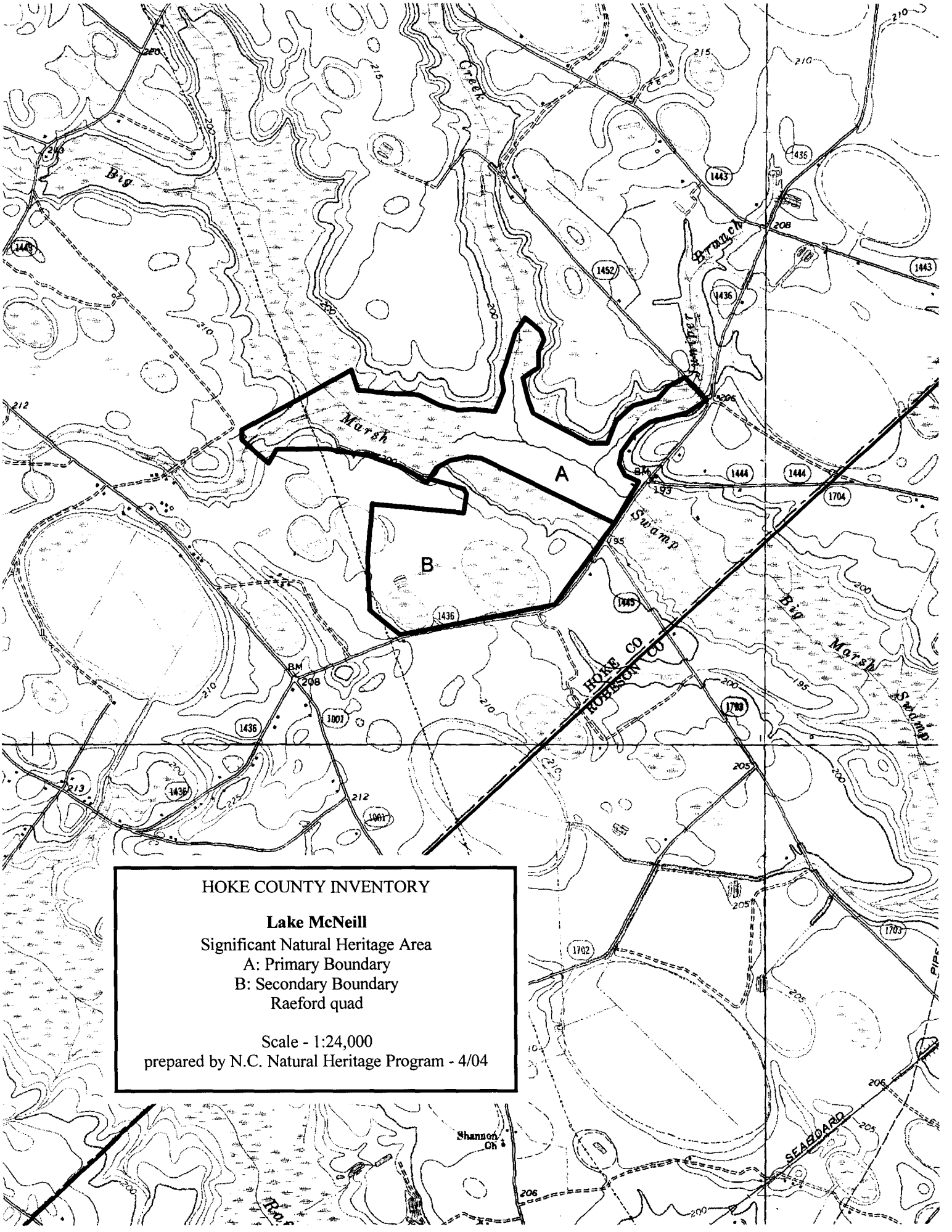
NATURAL COMMUNITIES: Cypress Savanna, Xeric Sandhill Scrub.

RARE PLANTS: Awned meadow-beauty (*Rhexia aristosa,* FSC) was documented in 1982.

RARE ANIMALS: None documented, but likely present.

REFERENCES:

Nifong, T. 1982. The “Clay Subsoil” Carolina Bays of North Carolina. Dept. of Botany, UNC Chapel Hill and The Nature Conservancy, NC Chapter.



HOKE COUNTY INVENTORY

Lake McNeill

Significant Natural Heritage Area
A: Primary Boundary
B: Secondary Boundary
Raeford quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 4/04

Hoke County Natural Area Inventory

LAKE McNEILL

Site Significance: county
USGS Quadrangle: Raeford
Size: 1163 acres
Ownership: private

SIGNIFICANT FEATURES: Lake McNeill is an old mill impoundment that is filled with cypress trees. At the back end of the lake, and along inlet creeks, there is a high quality Cypress-Gum Swamp community, with a number of ancient trees. Barred owls, red-shouldered hawks, wood ducks, and several neotropical migrant songbirds nest here. It is one of the few places in Hoke County where Spanish moss (*Tillandsia usneoides*) grows naturally. The Federal Species of Concern southern hognose snake (*Heterodon simus*) occurs here and the FSC loose watermilfoil (*Myriophyllum laxum*) was collected once. The natural area also includes a Carolina bay that formerly had a population of the FSC awned meadow-beauty (*Rhexia aristosa*).

LANDSCAPE RELATIONSHIPS: This Significant Natural Heritage Area lies on the northwest side of Balfour Road (SR 1436), a mile northeast of Shannon Road (SR 1001). It is two miles east of Hamby's, Blueberry, and Hidden Bay SNHAs. A three mile section of McNeills Mill Creek forms a connector to Singletons Bay SNHA.

SITE DESCRIPTION: Lake McNeill is a former millpond in the floodplain of a blackwater creek, Big Marsh Swamp. Pond cypress (*Taxodium ascendens*) dominates over most of the pond, but is replaced by open water near the dam. Common aquatic plants include white water-lily (*Nymphaea odorata*), spatterdock (*Nuphar advena*), and variable water-milfoil (*Myriophyllum heterophyllum*). This SNHA is notable for the large number of plants that occur as epiphytes on stumps, floating logs, and at the bases of living trees -- at least 35 species have been recorded. Lakeshores and marshy shallows support coarse grasses, sedges, and shrubs. Swamp black gum (*Nyssa biflora*) is co-dominant in the upper reaches and especially where tributary creeks enter, forming a Cypress-Gum Swamp community that features many old trees greater than 3 feet dbh and 100 feet tall.

Lake McNeill Bay is a small Carolina bay that formerly had an open canopy of pond cypress over dense grasses and forbs, but now is completely dominated by loblolly pine (*Pinus taeda*). The pines have withdrawn nearly all of the water and cast dense shade, so that the herbaceous layer now supports few species among the deep needle duff.

MANAGEMENT AND PROTECTION: The Carolina bay might be restored if the pines were removed and occasional fires were allowed. This natural area is not under conservation protection.

NATURAL COMMUNITIES: Coastal Plain Semipermanent Impoundment, Cypress-Gum Swamp (Blackwater Subtype), Cypress Savanna (formerly).

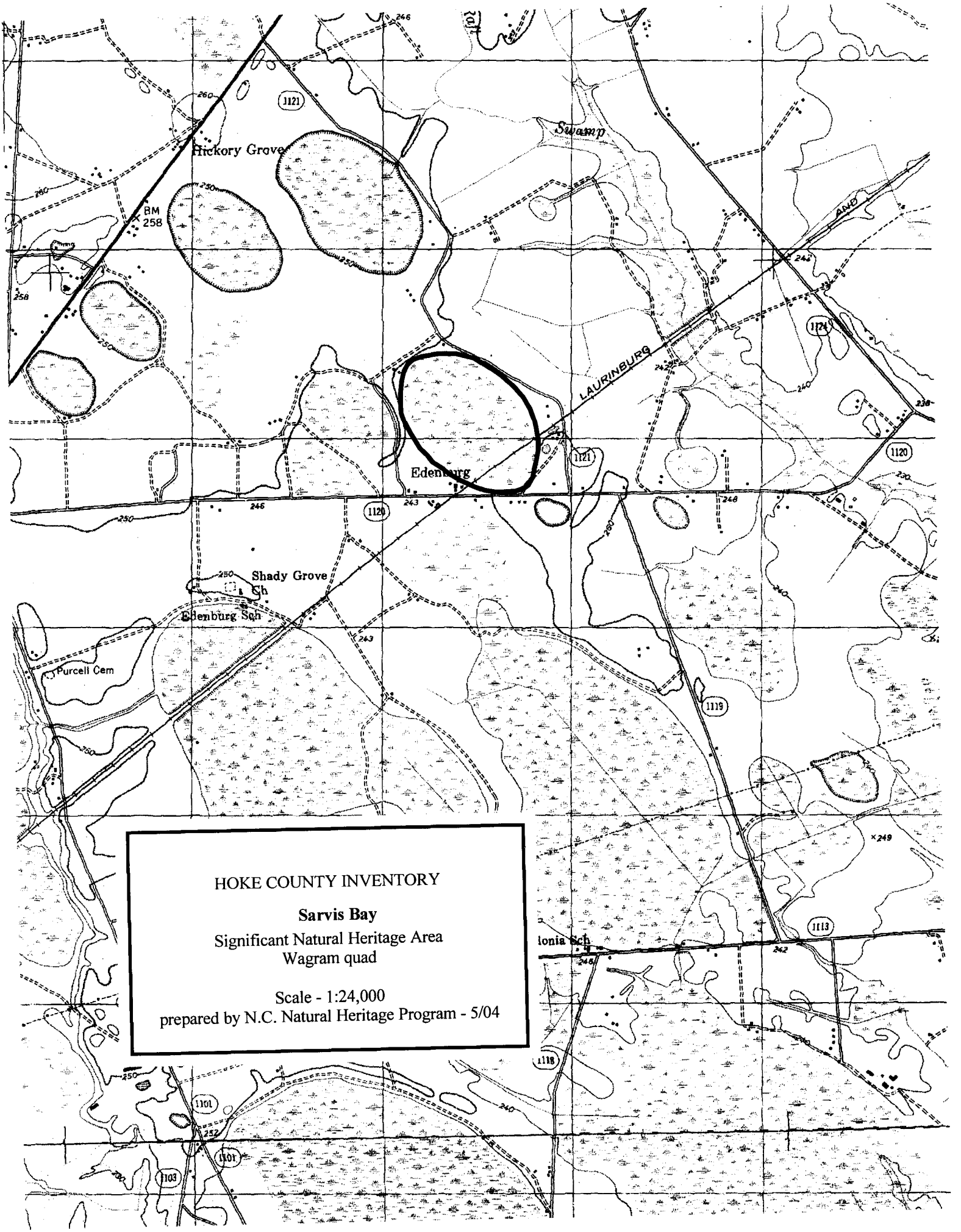
RARE PLANTS: Loose watermilfoil (*Myriophyllum laxum*, FSC) was documented from the lake in 1956; awned meadow-beauty (*Rhexia aristosa*, FSC) was documented from the bay in 1981; horned bladderwort (*Utricularia cornuta*) was documented from the bay in 1957.

RARE ANIMALS: Southern hognose snake (*Heterodon simus*, FSC) was recorded from beside Balfour Road in 1995.

REFERENCES:

Nifong, T. 1982. The "Clay Subsoil" Carolina Bays of North Carolina. Dept. of Botany, UNC Chapel Hill and The Nature Conservancy, NC Chapter.

Sorrie, B.A. 2003. Site Survey Report: Lake McNeill and McNeill's Bay. NC Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.



HOKE COUNTY INVENTORY

Sarvis Bay

Significant Natural Heritage Area
Wagram quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

SARVIS BAY

Site Significance: county
Size: 99 acres
USGS Quadrangle: Wagram
Ownership: private

SIGNIFICANT FEATURES: Sarvis Bay supports a large and vigorous population of the state-rare shrub called sarvis holly (*Ilex amelanchier*), a relative of the familiar American holly tree (*I. opaca*). The bay also supports a Nonriverine Swamp Forest community and populations of several plant species which are rare in Hoke County, such as bay blueflag (*Iris tridentata*), tall yellow milkwort (*Polygala cymosa*), and clasping water-horehound (*Lycopus amplectens*).

LANDSCAPE RELATIONSHIPS: Sarvis Bay lies a mile southeast of US 401 highway, west of SR 1121 and north of SR 1120. A railroad passes through the southeastern portion.

SITE DESCRIPTION: The bay sits in a slight depression and lacks an elevated sand rim. It appears to be driest is the southeastern portion, wettest in the central portion. Looking south from the railroad one can see loblolly pine (*Pinus taeda*), swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), and scattered pond cypress (*Taxodium ascendens*). Briers are common, whereas sarvis holly is uncommon. The forest floor appears to be littered with heavy pine needle duff. Just north of the railroad the trees were cut several years ago, which has allowed light to reach the ground, resulting in a flush of herbaceous growth among the bedded loblolly saplings. Sarvis holly is common and forms thickets with titi (*Cyrilla racemiflora*), other shrubs, and tree saplings. The natural community probably once was a Cypress Savanna, but has been degraded by logging and fire suppression. The central and northern portion of the bay have not been surveyed since 1982, when it was reported to support a pond cypress-black gum Nonriverine Swamp Forest community; as viewed from the railroad and from SR 1121, loblolly pines appear to be co-dominant now.

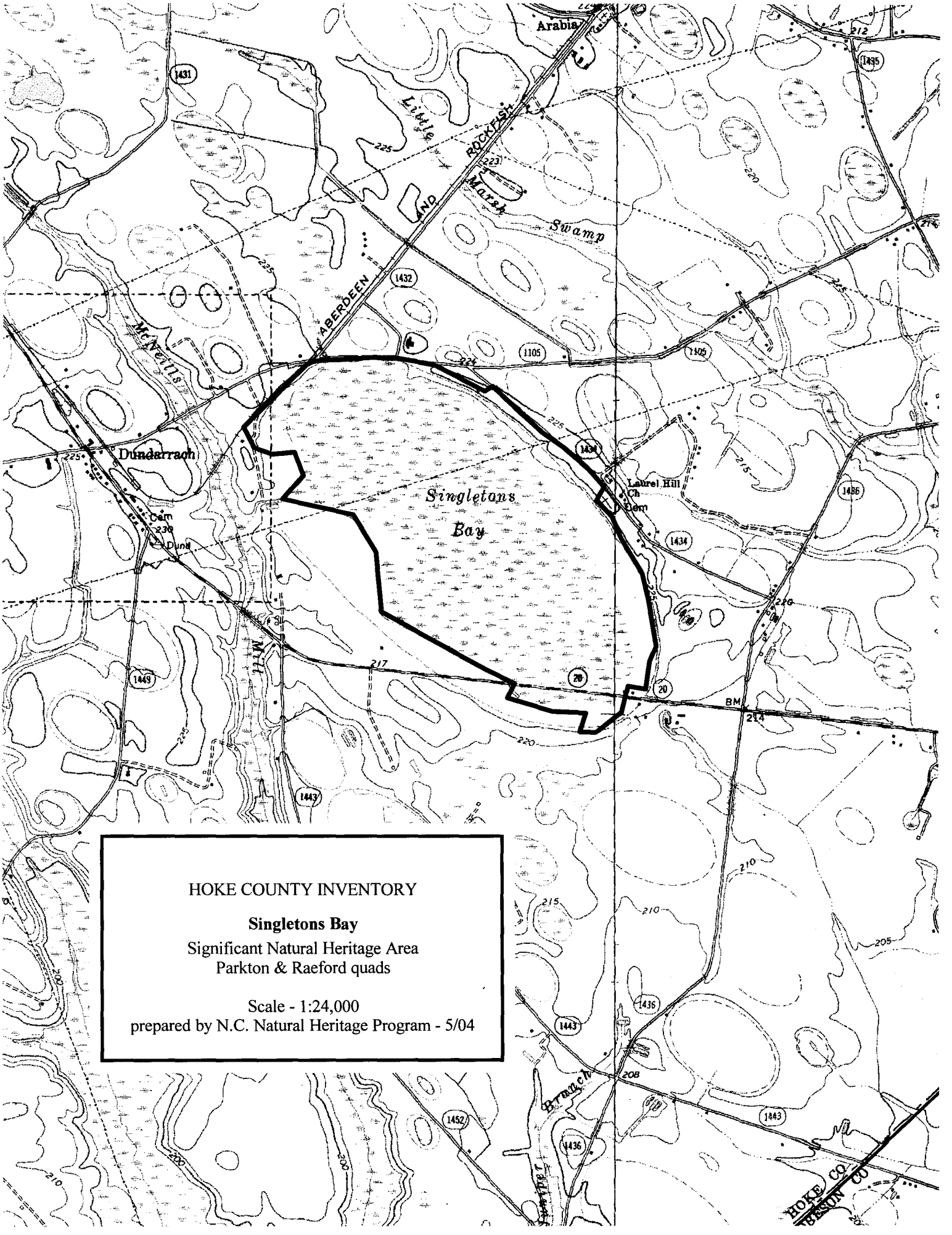
MANAGEMENT AND PROTECTION: The interior part of the bay needs an updated survey to assess its ecological value. Occasional fire would benefit the herbaceous layer. Original water levels may need to be restored. The bay is not currently under conservation protection.

NATURAL COMMUNITIES: Nonriverine Swamp Forest, Cypress Savanna?

RARE PLANTS: Sarvis holly (*Ilex amelanchier*).

RARE ANIMALS: None documented.

REFERENCES:
Nifong, T. 1982. The “Clay Subsoil” Carolina Bays of North Carolina. Dept. of Botany, UNC Chapel Hill and The Nature Conservancy, North Carolina Chapter.



HOKE COUNTY INVENTORY

Singletons Bay

Significant Natural Heritage Area
Parkton & Raeford quads

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 5/04

Hoke County Natural Area Inventory

SINGLETONS BAY

Site Significance: county
Size: 565 acres
USGS Quadrangle: Raeford
Ownership: Lumber River Conservancy

SIGNIFICANT FEATURES: At 1.5 miles long, Singletons Bay is the largest Carolina bay in Hoke County. It provides breeding and foraging habitat for a number of mammals and birds, including neotropical migrant songbirds.

LANDSCAPE RELATIONSHIPS: Singletons Bay Significant Natural Heritage Area lies a half mile east of Dundarrach; NC route 20 cuts through the southeastern end. McNeills Mill Creek forms a 2.5 mile link and wildlife corridor from the bay southward to Lake McNeill SNHA.

SITE DESCRIPTION: The bay is 1.5 miles long by 0.8 mile wide. The western side has been impacted by a drainage ditch, and cotton is grown in adjacent fields. A powerline runs across the bay north of its midpoint. Most of the bay supports a young to middle-aged forest of loblolly pine (*Pinus taeda*), pond pine (*P. serotina*), red maple (*Acer rubrum*), swamp black gum (*Nyssa biflora*), and sweetgum (*Liquidambar styraciflua*) over dense shrubs, saplings, and catbrier. The latter include titi (*Cyrilla racemiflora*), sweetleaf (*Symplocos tinctoria*), redbay (*Persea palustris*), and sweetbay magnolia (*Magnolia virginiana*). Scattered small wet openings support pond cypress (*Taxodium ascendens*) and swamp black gum. An elevated sand rim occurs along the whole eastern side. Once it supported an extensive xerophytic community of longleaf pine (*P. palustris*) and turkey oak (*Quercus laevis*), but fire suppression has allowed replacement by loblolly pines and water oak (*Q. nigra*). A remnant of this Xeric Sandhill Scrub community occurs south of a cemetery and features abundant grasses, legumes, composites, and lichens.

MANAGEMENT AND PROTECTION: Recommended management includes thinning the bay forest, especially of loblolly pine and sweetgum, and filling the drainage ditch. In 2004 the bay came under conservation protection.

NATURAL COMMUNITIES: Xeric Sandhill Scrub (Sandhills Variant). The loblolly pine-mixed hardwood forest of fire-suppressed bays is not currently recognized as a natural community type.

RARE PLANTS: None documented.

RARE ANIMALS: None documented.

REFERENCES: Sorrie, B.A. 2003. Site Report: Singletons Bay. North Carolina Natural Heritage Program, Division of Parks and Recreation, DENR, Raleigh, NC.