

**AN INVENTORY OF THE SIGNIFICANT NATURAL AREAS
OF STANLY COUNTY, NORTH CAROLINA**

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North Carolina Natural Heritage Program
Office of Conservation, Planning, and Community Affairs
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Funding provided by the North Carolina Natural Heritage Trust Fund

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ABSTRACT

This inventory of the natural areas, biological communities, and rare species of Stanly County was funded by the North Carolina Natural Heritage Trust Fund. 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 2007, 2008, and 2009. The inventory identifies 20 areas of significance at the national, state, regional, and county level, as determined by criteria established by the North Carolina Natural Heritage Program.

ACKNOWLEDGMENTS

Many individuals and agencies contributed to the planning, progress, and completion of this inventory. I am particularly indebted to the following public agencies and personnel: Linda Pearsall, Judy Ratcliffe, Kristen Sinclair, Steve Hall, Mike Schafale, Misty Buchanan, and Harry LeGrand of the NC Natural Heritage Program; Tim McCree and Brandy Belville of Morrow Mountain State Park; Kacy Cook and Jeff Marcus of the NC Wildlife Resources Commission; Laura Fogo of the US Fish and Wildlife Service; Jeff Beane of the NC Museum of Natural Sciences.

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Cover photograph: View from Jacobs Creek Ravines Significant Natural Heritage Area, Stanly County, N.C. Photo taken by the author.

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INTRODUCTION

Objectives

The primary objective of the Stanly 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). 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 natural communities in Stanly County.

In preparing this report I utilized several previous works treating the county's natural history. In 1962, Judy Tate Morgan produced "A Vascular Flora of Morrow Mountain State Park, Stanly County, North Carolina" as part of a master's degree program at UNC-Chapel Hill. In 1978, L.N. Hood produced "Description and Classification of Rocky River Morgan's Bluff Natural Area, Stanly County, North Carolina" as part of a master's degree program at UNC-Charlotte. In 1995, Shawn Oakley, Harry LeGrand, Jr., and Michael Schafale published "An Inventory of Mafic Areas in the North Carolina Piedmont", including Stanly County. Plants were identified by using Radford, Ahles, and Bell (1968) and Weakley (2007).

Limited animal surveys were also conducted as an integral part of the Stanly County inventory, primarily by Steve Hall of NCNHP (invertebrates), Bruce Sorrie (birds), and Jeff Humphries of the N.C. Wildlife Resources Commission. Data from prior field work have also been included (Jeff Beane of the N.C. Museum of Natural Sciences) along with verbal reports by local residents. Collectively, these make an important contribution towards knowledge of the county's animal life.

The natural area inventory is designed to identify the highest quality ecological areas and natural communities in Stanly 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 natural 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, a buffer zone 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 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 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 NatureServe. Depending on the global or statewide rarity of the species and natural features of a site, it is ranked as having national, statewide, regional (i.e., lower Piedmont), or county significance. Even at the county level of significance, a site needs to possess better than average natural features to be included in this Inventory. 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 natural 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 U.S. Geological Survey topographic maps, Natural Resources Conservation Service soil survey maps, and aerial photos available from various North Carolina agencies. 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 Stanly County. No land was surveyed without the owner's permission, and sometimes this was not granted. A number of areas were targeted for survey, because of their unusual soils, their "signature" on a topographic 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

Stanly County

Stanly County is located in south-central North Carolina; it is bounded by Anson, Cabarrus, Montgomery, Rowan, and Union counties (Figure 1). The Yadkin/Pee Dee River forms the county's eastern border. At 395 square miles, Stanly is the 64th largest of the state's 100 counties. The 2005 population census was 58,740 people; most live in the eastern and northern portions of the county in Albemarle, Norwood, New London, and Richfield. The county seat is Albemarle (Figure 2).

Climate

Stanly County experiences four distinct seasons each year. The county lies in a region dominated by humid southwestern airflows during spring and summer and dry 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 42 degrees, while the average summer temperature is about 78 degrees. Average yearly rainfall is 48 inches, plus 4 inches of snow. There are about 180 frost-free days per year.

Topography and Physiography

Stanly County is situated in the lower Piedmont, within the Carolina Slate Belt. This geologic zone of ancient rocks, primarily metamudstone and meta-argyllite but locally also metavolcanic, yields relatively fertile soils that have greatly influenced land settlement and land use patterns. Originally forested land, most of the county now is in agricultural crops and pasture. The topography is one of rolling hills, dissected by streams with rocky or bouldery bottoms. Stanly County's most notable natural feature is Morrow Mountain and a group of adjacent hills that are part of the Uwharrie Mountains, one of the oldest ranges in North America. Elevations in Stanly County range from 190 feet on the Pee Dee River at The Fork to 936 feet atop Morrow Mountain.

One major river occurs in the county: the Pee Dee, which originates as the Yadkin River near the Blue Ridge Parkway in Watauga County and becomes the Pee Dee when it merges with the Uwharrie River. Within Stanly, it is a moderate to slow-paced river that runs over rocky shoals alternating with long stretches that have been impounded for power production. Most of the Yadkin/Pee Dee corridor in Stanly is characterized by steep to moderate slopes, with only minor strips of floodplain. One stretch of the river flows through a rugged canyon between Narrows Dam and Falls Dam. Water levels are governed by power generation stations. Second in size is the Rocky River, which forms the southern boundary of Stanly County. It originates in Iredell County north of Charlotte and empties into the Pee Dee at The Fork. It is characterized by an abundantly rocky bottom and steep rocky slopes nearly throughout.



Figure 1. Stanly and surrounding counties, North Carolina.

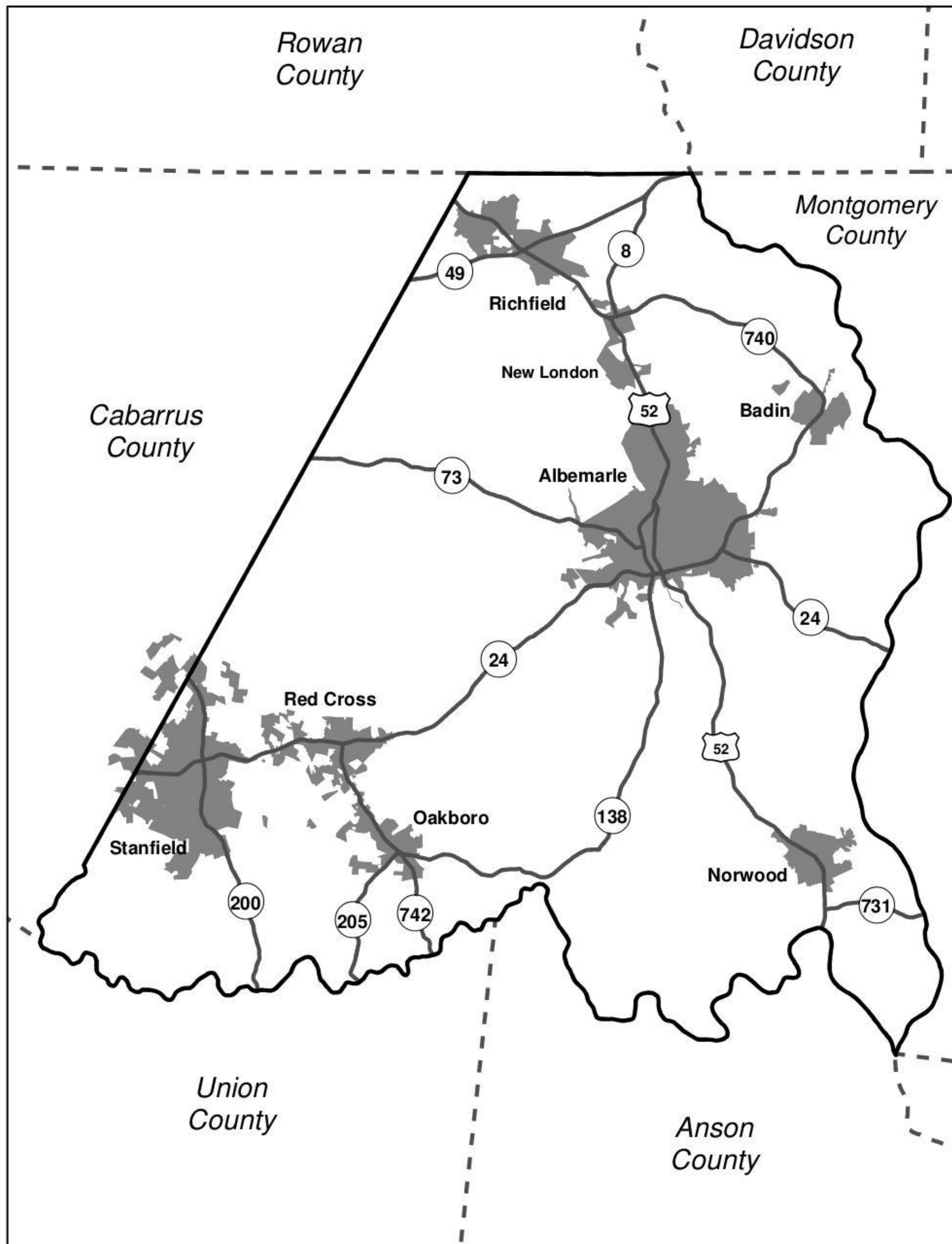


Figure 2. Towns and major Roads in Stanly County

General Vegetation

Stanly County's position in the lower Piedmont and within the Pee Dee River drainage encompasses a diverse area biologically. The Pee Dee is a natural corridor between the Piedmont and the Coastal Plain. It is a transition zone between these major areas, a meeting ground for plants and animals whose historical evolution and development lie in the Piedmont and Mountains on one hand, and in the Coastal Plain on the other. Although the Coastal Plain element in the county is relatively small today, it includes dangleberry (*Gaylussacia frondosa*), swamp sweetbells (*Eubotrys racemosa*), and streamside lobelia (*Lobelia elongata*), among others. In recent years anhingas (*Anhinga anhinga*), related to cormorants and traditionally restricted to Coastal Plain swamps, have begun nesting in Stanly County. Similarly, some montane plants find local conditions here to their liking. Tassel-rue (*Trautvetteria caroliniensis*) is a Mountains/upper Piedmont plant that jumps the rest of the Piedmont and occurs in Stanly, Randolph, and Richmond counties. Northern hairgrass (*Avenella flexuosa*) occurs in our Mountains region and also in several lower Piedmont counties; in Stanly it occurs on rock ledges along Rocky River. As detailed below under Natural Community Descriptions, Stanly County has a high diversity of habitats found within its borders. While the precise numbers are unknown, it is estimated that well over 1,100 kinds of plants occur in the county, about 1/4 of the total for the state.

The Piedmont is noted for hilly terrain and rocky, loamy, or clayey soils. Due to the general fertility of the soils, and the availability of water energy to power mills and factories, Stanly has mostly been converted to agricultural crops, grazing land, and timber production. A few large natural areas remain, notably Morrow Mountain State Park, which has high quality examples of nine natural community types.

Dry soils are covered with oaks and hickories, usually mixed with shortleaf pine (*P. echinata*). Sparkleberry (*Vaccinium arboreum*) is a common tall shrub. Mesic soils, especially on slopes above streams, produce a denser and taller forest of beech (*Fagus grandifolia*), oaks, tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), and other hardwoods, with dogwood (*Cornus florida*) and redbud (*Cercis canadensis*) beneath. Along the Pee Dee River, Rocky River and Mountain Creek, a different mesic soil forest occurs: bottomland hardwoods. Bottomland hardwoods are infrequently flooded and are comprised of oaks (different species than upslope), green ash (*Fraxinus pennsylvanica*), southern sugar maple (*Acer floridanum*), sweetgum (*Liquidambar styraciflua*), American elm (*Ulmus americana*), tulip poplar, and loblolly pine (*Pinus taeda*), with ironwood (*Carpinus caroliniana*) and painted buckeye (*Aesculus sylvatica*) beneath. Spring wildflowers are abundant, followed in summer and fall by grasses and sedges. Where a narrow floodplain has developed, levee or alluvial forest occurs along rivers and are frequently flooded; dominants include sycamore (*Platanus occidentalis*), hackberry (*Celtis laevigata*), river birch (*Betula nigra*), and boxelder (*Acer negundo* var. *negundo*).

Geology and Soils

Stanly County lies entirely within the Carolina Slate Belt, an area of very old, reworked volcanic rocks (Beyer 1991). The state geologic map of 1985 shows that most of the county is underlain by metamudstone and meta-argyllite. The Morrow Mountain-Badin region is underlain by mafic metavolcanic rocks. Each of these rock types varies in their mineral content, nutrients, and acidity; these attributes also vary with steepness of slope, aspect, and water availability. Plants and natural communities that grow on soils derived from these rocks reflect these differences. For example, Basic Oak-Hickory Forest develops only on mineral rich and circumneutral pH soils and supports southern shagbark hickory (*Carya carolinae-septentrionalis*) and chalk maple (*Acer leucoderme*). Cliffs and ledges along Rocky River support a community known as Piedmont Mafic Cliff, which features a mix of acidic and sweet soil plants, such as red cedar (*Juniperus virginiana*), chestnut oak (*Quercus montana*), and southern harebell (*Campanula divaricata*).

The word “mafic” has considerable significance in Stanly and surrounding counties. It refers to rocks of volcanic origin which contain high amounts of magnesium and iron and relatively high amounts of calcium, but low amounts of silica, sodium, and potassium. They weather to a brown color and to brown-colored soil (not red as in most of the Piedmont), a feature that is easily seen in the field. The pH is circumneutral, but may be acidic on ridgetops. Soils derived from mafic rocks often have a hard claypan and some also exhibit strong shrink-swell properties - - characteristics which limit plant growth to species adapted to those conditions. For these reasons, and because these high pH soils occupy only a small percentage of the state’s Piedmont, mafic soils often harbor unusual natural community types and rare plants. A survey of North Carolina Piedmont mafic areas was conducted in the early 1990’s (Oakley, LeGrand, and Schafale 1995), which identified many natural areas; the Stanly County Inventory expands on this previous work.

Soils of Stanly County have been divided into six general types (Stephens 1989). The great majority of the county has well-drained, loamy, strongly acidic soils derived from slate rocks. These are well-suited for agriculture and silviculture. One of the types, Misenheimer-Kirksey-Badin, has a firmer clay layer below surface which retards water percolation. The effect on vegetation is to limit root growth and therefore tree size. The “Flatwoods” area north of Locust is a prime example, and supports remnant patches of Hardpan Forest.

Around the eastern and northern periphery of the county, two other soil types occur. Enon soils are derived from mafic rocks, are circumneutral, and have a plastic clay layer below surface which shrinks and swells as water is reduced or added. Such shrink-swell soils make life rather difficult for plants, yet many native species have adapted to them. Also, the higher pH attracts plants that cannot tolerate acidic conditions. In Stanly, most Enon soils occur on rocky slopes and are not suitable for agriculture. Natural communities that occur on Enon soil are Xeric Hardpan Forest and Basic Oak-Hickory Forest. Finally, Uwharrie-Hiwassee-Tatum soil type occurs at Morrow Mountain SP and in the New London-Isenhour area. These rocky soils - stones and boulders cover up to 25% of the surface - are intermediate in acidity.

Land Use

Until recently, Stanly County has been largely rural, with the exception of the city of Albemarle. Major crops are tobacco, soybeans, corn, sweet potatoes, grains, and hay. Important livestock are poultry and cattle. Much of the county's forested land is managed for timber production, largely mixed hardwoods and loblolly pine for poles and wood chips. Morrow Mountain State Park, at the eastern edge of the county, is by far the largest recreational site in the county. With several access points and miles of water, the Yadkin and Pee Dee River corridor – Badin Lake and Lake Tillery - provides recreation and fishing for residents and visitors alike. City Lake, adjacent to Albemarle, provides some local recreation. Recently there has been a major influx of people moving here from the Charlotte metro area and so former farmland and forest is being converted to housing developments, schools, and shopping centers. Such development is occurring in the southwestern portion of the county and will likely continue to spread eastward.

SUMMARY OF RESULTS

Natural Areas

A natural area is defined as an area containing one to several exemplary natural 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 is a composite of high quality sites interspersed with lesser quality areas. These lower quality lands are not included in standard sites, but 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. There are no megasites within Stanly County.

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 lower piedmont region. Areas of countywide significance generally contain common habitat types that are not exemplary, or uncommon habitats that need restoration.

A total of one macrosite and 21 standard sites were identified in Stanly County during the current inventory (Figure 3; Table 1). The author relied on previous inventory work on mafic areas (Oakley, LeGrand & Schafale 1995), at Morrow Mountain State Park (Morgan 1962; park staff, pers. comm.), and at Morgan’s Bluff (Hood 1978; J. Matthews, pers. comm.) in compiling and assessing the ecological value of the county’s natural areas. Of the 21 natural areas (not counting the macrosite), one site has been determined to be of national significance, four sites have been determined to be of statewide significance, 14 sites have been determined to be of regional significance, and two sites have been determined to be of countywide significance. The one macrosite is state significant. Each of these sites is described in the “Site Description” section of this report.

The great majority of natural areas in Stanly County occur in the eastern part of the county and along Rocky River. These areas are associated with mafic or slate rocks and support plants and natural communities that are rare or uncommon in the state. These rocky hills and bluffs are critical to the survival of a distinct flora and fauna here in the lower Piedmont. A few of the natural areas described in this report extend beyond the boundaries of Stanly County. For example, the Pee Dee River Bald Eagle Foraging Habitat is shared with Montgomery County; Rocky River Corridor is shared with Anson and Union counties.

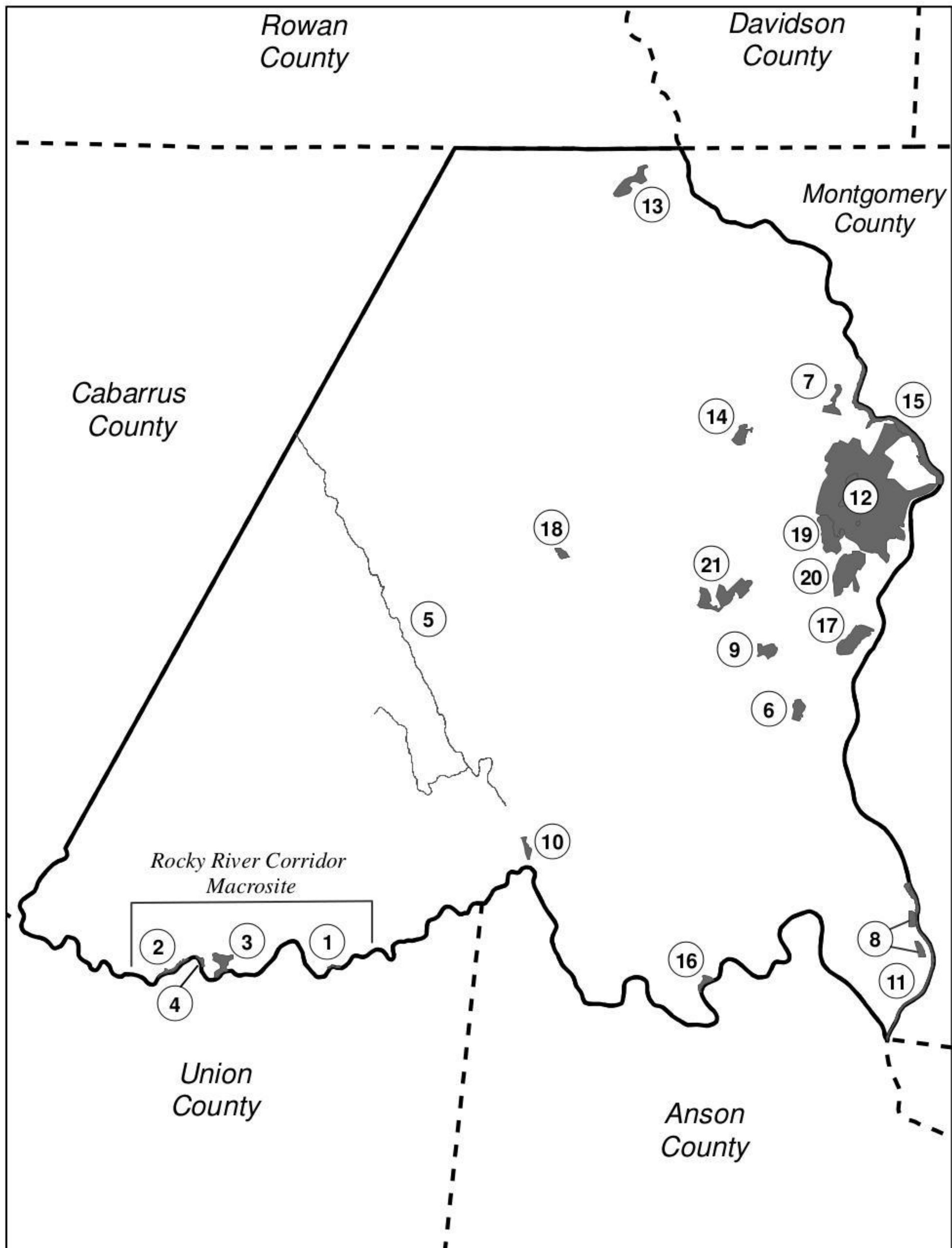


Figure 3. Location of Significant Natural Heritage Areas in Stanly County, North Carolina.

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

Significance Rank Codes
 A = National significance
 B = State significance
 C = Regional significance (lower Piedmont)
 D = County significance

<u>Number</u>	<u>Site Name</u>	<u>Significance Rank</u>
	<u>Rocky River Corridor Macrosite</u>	
1.	Baucom Bluff	B
2.	Kinza Slate Bluffs	C
3.	Rock Hole Creek	B
4.	Rocky River Morgans Bluff	C
	<u>Stand-alone Standard Sites (not within macrosites)</u>	
5.	Big Bear Creek Aquatic Habitat	B
6.	Dennis Road Ridge	C
7.	East Badin Basic Forest	D
8.	Fork Beaver Ponds	C
9.	Jacobs Creek Ravines	C
10.	Long Creek Slate Slopes	C
11.	Middle Pee Dee River Aquatic Habitat	C
12.	Morrow Mountain Natural Areas	A
13.	New London Ridges	C
14.	Palestine Rare Plant Site	B
15.	Pee Dee River Bald Eagle Foraging Habitat	C
16.	Plank Road Slate Knolls	C
17.	River Haven Ridge	C
18.	Stanly Community College Basic Forest	D
19.	Stony Hill Church Hardwoods	C
20.	Stony Mountain	C
21.	Union Chapel Enon Knolls	B

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 many cases aerial photos show that they are managed for timber production, with telltale rows of loblolly pine trees and with clearcut patches. 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 do provide habitat for a wide variety of wildlife, inventory priorities had to be made and altered habitats received much less survey work than 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, but many elements are missing. In this report, natural community names and classification follow Schafale & Weakley (1990) with a few updates from Schafale (2007).

A total of 15 natural community types were documented during this natural area inventory (Table 2). Among these are several which are among the best of their kind anywhere, notably Piedmont Mafic Cliff, Basic Oak-Hickory Forest, and Xeric Hardpan Forest. The Piedmont Alluvial Forests along Mountain Creek ranks among the best in the lower Piedmont region; these and several of the Basic Oak-Hickory Forests contain some impressively large and old trees, evidence of high ecological integrity.

Below is a summary description of the natural communities occurring in Stanly 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 Descriptions

Piedmont Monadnock Forest occurs on the highest hilltops where the soils are very acidic. This community has a simple structure of trees, scattered shrubs, and few or no herbs. Chestnut oak (*Quercus montana*), white oak (*Q. alba*), red maple (*Acer rubrum*), shortleaf pine (*Pinus echinata*) are common in the canopy. Understory trees include sourwood (*Oxydendrum arboreum*) and black gum (*Nyssa sylvatica*). Shrubs are sparse, partly due to excessive deer

browse. Herbaceous plants include black needle-grass (*Piptochaetium avenaceum*) and poverty-grass (*Danthonia spicata*). Muscadine grape (*Vitis rotundifolia*) usually scrambles over the ground.

Dry Oak-Hickory Forest (Piedmont Subtype) was formerly common in the county before conversion to cropland and pine timber. Canopy dominants are white oak (*Quercus alba*), southern red oak (*Q. falcata*), post oak (*Q. stellata*), chestnut oak (*Q. montana*), mockernut hickory (*Carya alba*), pignut hickory (*C. glabra*), and shortleaf pine (*Pinus echinata*). Understory trees include sourwood (*Oxydendrum arboreum*), witch hazel (*Hamamelis virginiana*), and some dogwood (*Cornus florida*). Shrubs vary from sparse to numerous and usually include sparkleberry (*Vaccinium arboreum*) and dangleberry (*Gaylussacia frondosa*). Forest floor wildflowers are uncommon. Muscadine grape (*Vitis rotundifolia*) may be common, scrambling over the ground.

Dry-Mesic Oak-Hickory Forest (Piedmont Subtype), as with Dry Oak-Hickory Forest, was formerly more common but now is generally confined to steep slopes. One major difference from Dry Oak-Hickory Forest is the presence of beech (*Fagus grandifolia*) in the canopy, lack of chestnut oak, and plenty of dogwood and some black gum (*Nyssa sylvatica*) in the understory. Hillside blueberry (*Vaccinium pallidum*) often forms dense patches. Forest floor wildflowers are uncommon, but muscadine grape (*Vitis rotundifolia*) often covers large areas.

Basic Oak-Hickory Forest occurs on the higher pH (more basic), mineral rich, and dryish rocky soils on the mafic hills of eastern Stanly County, and along Rocky River. In North Carolina it is restricted to the lower and middle Piedmont. Basic Oak-Hickory Forest has many of the same trees as the previous two communities, but is notable for Carolina shagbark hickory (*Carya carolinae-septentrionalis*) in the canopy and chalk maple (*Acer leucoderme*), redbud (*Cercis canadensis*), and hop hornbeam (*Ostrya virginiana*) in the understory. Shrubs are frequent, sometimes dense, and include black haw (*Viburnum prunifolium*), shiny black haw (*V. rufidulum*), and downy arrowwood (*V. rafinesquianum*). Brownish colored stones and boulders are common. The ground layer often has a mixture of grasses and sedges plus scattered wildflowers.

Xeric Hardpan Forest, like Basic Oak-Hickory Forest, is confined to the lower and middle Piedmont. It has many of the same rock and soil characteristics, but differs in its much higher clay content; in summer and fall the soil dries out and forms a hardened layer which resists plant roots. Trees are generally short and include species of Basic Oak-Hickory Forest, especially Carolina shagbark hickory, hop hornbeam, and winged elm (*Ulmus alata*). The herb layer is often dense with grasses and sedges, especially black needle-grass (*Piptochaetium avenaceum*) and few-flowered nut-sedge (*Scleria oligantha*). The very rare western rough goldenrod (*Solidago radula*) occurs at the margins.

Mesic Mixed Hardwood Forest (Piedmont Subtype) is found where soils are moister and richer than the previous two communities, often just downslope from them and also in ravines. This forest is generally tall, with a closed canopy of beech (*Fagus grandifolia*), red oak (*Quercus rubra*), white oak (*Q. alba*), tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), white ash (*Fraxinus americana*), and pignut hickory (*Carya glabra*). Understory trees include chalk maple

(*Acer leucoderme*), dogwood (*Cornus florida*), red mulberry (*Morus rubra*), and hop hornbeam (*Ostrya virginiana*). Painted buckeye (*Aesculus sylvatica*) is a frequent shrub. From March to mid May, many spring flowers poke through the leaf litter, notably dimpled trout lily (*Erythronium umbilicatum*), wild licorice (also called sweet chervil, *Osmorhiza longistylis*), star chickweed (*Stellaria pubera*), and crested dwarf iris (*Iris cristata*). Christmas fern (*Polystichum acrostichoides*) is common, joined at richer sites by broad beechfern (*Phegopteris hexagonoptera*).

Piedmont/Coastal Plain Acidic Cliff is similar to Heath Bluff (see next), but tree and shrub cover is reduced and herbaceous cover prevalent, along with mosses and lichens. The imposing cliffs at Jacobs Creek Ravines Significant Natural Heritage Area (SNHA) rise 100 feet and are exposed to the sun. Tree species include red cedar (*Juniperus virginiana*), shortleaf pine (*Pinus echinata*), scrub or Virginia pine (*P. virginiana*), and southern red oak (*Quercus falcata*). Sparkleberry (*Vaccinium arboreum*) is a common shrub. Little bluestem (*Schizachyrium scoparium*), silky oatgrass (*Danthonia sericea*), and a number of herbs are found throughout the openings. The lovely wildflower called southern harebell (*Campanula divaricata*) is frequent on ledges.

Piedmont/Coastal Plain Heath Bluff is found primarily on acidic soils on upper slopes within Morrow Mountain State Park. As its name implies, the community is dominated by members of the heath family, in this case mountain laurel (*Kalmia latifolia*); sweetleaf (*Symplocos tinctoria*) is quite common. Trees are well-spaced chestnut oak (*Quercus montana*) with some red maple (*Acer rubrum*). Trailing arbutus (*Epigaea repens*) and spotted wintergreen (*Chimaphila maculata*) are among the few wildflowers here.

Piedmont Mafic Cliff occurs on rock outcrops, ledges, and very steep slopes along Rocky River. It supports a short, open-canopy woodland mixed with blueberry shrubs and various sun-loving herbs. The slate bedrock decomposes slowly to form a circumneutral pH soil, while the orientation (south facing) tests the heat and drought tolerance of plants. Trees include red cedar (*Juniperus virginiana*), scrub pine (*Pinus virginiana*), winged elm (*Ulmus alata*), and some pignut hickory (*Carya glabra*) and black gum (*Nyssa sylvatica*). Chalk maple (*Acer leucoderme*), hop hornbeam (*Ostrya virginiana*), and dwarf hackberry (*Celtis tenuifolia*) form an irregular understory. Shrubs mostly consist of sparkleberry (*Vaccinium arboreum*). Herbs on the ledges include resurrection fern (*Pleopeltis polypodioides* ssp. *michauxiana*), woolly lipfern (*Cheilanthes lanosa*), rock dayflower (*Commelina erecta* var. *erecta*), rattlesnake hawkweed (*Hieracium venosum*), prickly-pear cactus (*Opuntia humifusa*), rock oregano (*Cunila origanoides*), little bluestem (*Schizachyrium scoparium*) and goldenrods. Several rare plants occur here, including Missouri rockcress (*Boechera missouriensis*).

Basic Piedmont Bluff Glade is similar to Piedmont Mafic Cliff, but occurs on slightly less steep slopes where rock outcrops are not as well developed. The community here is an open woodland of pignut hickory (*Carya glabra*), chestnut oak (*Quercus montana*), red cedar (*Juniperus virginiana*), red maple (*Acer rubrum*), and chalk maple (*Acer leucoderme*). There is a more-or-less continuous grassy herb layer, notably black needlegrass (*Piptochaetium avenaceum*) and little bluestem (*Schizachyrium scoparium*), and a good diversity of flowering plants. These include rock oregano (*Cunila origanoides*), nodding onion (*Allium cernuum*), feverfew

(*Parthenium integrifolium*), bracted skullcap (*Scutellaria ovata* ssp. *bracteata*), and rattlesnake hawkweed (*Hieracium venosum*).

Piedmont/Low Mountain Alluvial Forest occurs along larger streams and rivers throughout Stanly County, where flooding is of short duration. River-borne silt and nutrients provide an ideal medium for tree growth, with fully mature trees over 120 feet tall and 3-4 feet dbh. Dominants include hackberry (*Celtis laevigata*), cherrybark oak (*Quercus pagoda*), swamp chestnut oak (*Q. michauxii*), sweetgum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), bitternut hickory (*Carya cordiformis*), and loblolly pine (*Pinus taeda*). Understory trees include ironwood (*Carpinus caroliniana*), American holly (*Ilex opaca*), southern sugar maple (*Acer floridanum*), and pawpaw (*Asimina triloba*). Vines are usually common and include grapes, trumpetvine (*Campsis radicans*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), and crossvine (*Bignonia capreolata*). Shrubs consist of scattered possum-haw (*Ilex decidua*), painted buckeye (*Aesculus sylvatica*), and patches of cane (*Arundinaria*). In spring colorful wildflowers carpet the ground, such as violets, spring-beauty (*Claytonia virginica*), dimpled trout-lily (*Erythronium umbilicatum*), chickweeds, wild onions, and buttercups. This is the primary habitat for the globally rare ravine sedge (*Carex impressinervia*).

Piedmont/Mountain Levee Forest occurs in scattered places along the Pee Dee River in Stanly, where large water volume and high silt loads have deposited broad levees. Formerly this community type was more widespread, but damming of the river has greatly reduced it. Levee forests can be impressively tall - over 100 feet - and harbor many old trees. Dominants are hackberry (*Celtis laevigata*), sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), swamp chestnut oak (*Q. michauxii*), boxelder (*Acer negundo* var. *negundo*), and American elm (*Ulmus americana*). Understory trees include ironwood (*Carpinus caroliniana*), pawpaw (*Asimina triloba*), and southern sugar maple (*Acer floridanum*). Chinese privet (*Ligustrum sinense*) is an unwelcome alien shrub that may form dense thickets. Vines are common (same as in alluvial forest, plus greenbriers), some old grapes reaching stem diameters of six inches. Herbs tend to occur in large patches, especially Virginia wild-rye (*Elymus virginicus*), fish-on-a-string (*Chasmanthium latifolium*), Gray's sedge (*Carex grayi*), and many spring ephemeral flowers. Degraded examples are infested with Japanese stiltgrass (*Microstegium vimineum*).

Rocky Bar and Shore occurs in Stanly County along Big Bear Creek, Rocky River, and Yadkin River, associated with rocky riverbeds and cobbles. In winter and spring all but the highest boulders are inundated, but in summer much of the riverbeds are exposed. Several rock beds were augmented in the past by native Americans and early settlers for use as fords, fish wiers, and dams; evidence of these still exists. Sycamore (*Platanus occidentalis*), black willow (*Salix nigra*), river birch (*Betula nigra*), and silky dogwood (*Cornus amomum*) occupy river islands and shores, while water-willow (*Justicia americana*), threesquare rush (*Schoenoplectus pungens*), alligator-weed (*Alternanthera philoxeroides*), yerba-de-tajo (*Eclipta prostrata*), and mosses occur among rocks and cobbles. A globally rare dragonfly, Septima's clubtail (*Gomphus septima*), occurs only in this habitat.

Piedmont/Mountain Semipermanent Impoundment may be created by beavers or humans. In Stanly County, humans have built many farm ponds and yard ponds in the headwaters of creeks, while beavers have done their work downstream in floodplains. These wetlands are dynamic, turning from wet forests to marshes or ponds and back again as beaver populations wax and wane. Trees invariably include swamp black gum (*Nyssa biflora*), red maple (*Acer rubrum*), and black willow (*Salix nigra*). Shrubs may be dense or sparse; they include buttonbush (*Cephalanthus occidentalis*), swamp hibiscus (*Hibiscus moscheutos*), and tag alder (*Alnus serrulata*). White water-lily (*Nymphaea odorata*), cow-lily (*Nuphar advena*), and water-shield (*Brasenia schreberi*) occur in open water, while shallows support emergent sedges, bur-reed (*Sparganium americanum*), cattail (*Typha latifolia*), arrow arum (*Peltandra virginica*), southern blueflag (*Iris virginica*), pickerelweed (*Pontederia cordata*), and broad arrowleaf (*Sagittaria latifolia*). During droughts, or when dams are breached, the whole pond bottom may be exposed, allowing germination of dormant seeds of many species of smartweeds (*Persicaria* spp), grasses, sedges, etc. Impoundments are prime feeding places for wild animals of all sorts.

Upland Depression Swamp Forest occurs in scattered places in uplands, often in flats or saddles between hilltops. These are shallow depressions with no inlet or outlet. In winter and spring they may hold several inches of water, but in summer typically are dry. This rapid hydroperiod – plus the absence of predatory fish - is critical to successful breeding of amphibians. Willow oak (*Quercus phellos*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and black gum (*Nyssa sylvatica*) form a loose canopy over dense sedges (mostly *Carex jorii*) and various wetland herbs. Several fine examples occur at Morrow Mountain State Park.

Table 2. Natural Community Types Occurring in Stanly County, North Carolina, with Natural Areas for Each. An explanation of community rank codes is found after the table.

<u>ECOLOGICAL GROUPING</u> Community Name	<u>RANK</u>	
	<u>GLOBAL</u>	<u>N.C.</u>
<u>Piedmont Dry-Mesic Forests</u>		
Xeric Hardpan Forest	G3G4	S3
Morrow Mountain Natural Areas		
New London Ridges		
River Haven Ridge		
Stony Mountain		
Union Chapel Enon Knolls		
Piedmont Monadnock Forest	G5	S4
Jacobs Creek Ravines		
Morrow Mountain Natural Areas		
Union Chapel Enon Knolls		
Dry Oak-Hickory Forest (Piedmont Subtype)	G5	S4
Morrow Mountain Natural Areas		
Rocky River Morgans Bluff		
Stony Mountain		
Dry-Mesic Oak-Hickory Forest (Piedmont Subtype)	G5	S5
Jacobs Creek Ravines		
Morrow Mountain Natural Areas		
Basic Oak-Hickory Forest	G4	S3
Kinza Slate Bluffs		
Long Creek Slate Slopes		
Morrow Mountain Natural Areas		
New London Ridges		
Palestine Rare Plant Site		
Plank Road Slate Knolls		
River Haven Ridge		
Stanly Community College Basic Forest		
Stony Hill Church Hardwoods		
Stony Mountain		
Union Chapel Enon Knolls		
Mesic Mixed Hardwood Forest (Piedmont Subtype)	G5T5	S4
Jacobs Creek Ravines		
Morrow Mountain Natural Areas		
Rock Hole Creek		
Rocky River Morgans Bluff		
Stony Hill Church Hardwoods		
Union Chapel Enon Knolls		

Table 2. (Continued)

<u>ECOLOGICAL GROUPING</u> Community Name	<u>RANK</u>	
	<u>GLOBAL</u>	<u>N.C.</u>
<u>Piedmont Cliff and Bluff Communities</u>		
Piedmont/Coastal Plain Acidic Cliff	G4	S2?
Jacobs Creek Ravines		
Piedmont/Coastal Plain Heath Bluff	G4?	S3
Morrow Mountain Natural Areas		
Piedmont Mafic Cliff	G1G2	S1
Baucom Bluff		
Kinza Slate Bluffs		
Rock Hole Creek		
Rocky River Morgans Bluff		
Piedmont Basic Bluff Glade	G2?	S1?
Long Creek Slate Slopes		
Plank Road Slate Knolls		
<u>Brownwater River Floodplain Communities</u>		
Piedmont/Low Mountain Alluvial Forest	G5	S5
Fork Beaver Ponds		
Jacobs Creek Ravines		
Morrow Mountain Natural Areas		
Rock Hole Creek		
Stony Hill Church Hardwoods		
Union Chapel Enon Knolls		
Piedmont/Mountain Levee Forest	G5	S3?
Fork Beaver Ponds		
Rocky Bar and Shore	G5	S5
Big Bear Creek Aquatic Habitat		
Pee Dee River Bald Eagle Foraging Habitat		
Rocky River Corridor		
Piedmont/Mountain Semipermanent Impoundment	G5	S4
Fork Beaver Ponds		
<u>Isolated Upland Depressions</u>		
Upland Depression Swamp Forest	G3	S3
Morrow Mountain Natural Areas		
Palestine Rare Plant Site		

EXPLANATION OF RANK CODES FOR NATURAL COMMUNITIES

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.

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.

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

Although not extensively surveyed outside of the state park, Stanly County's flora and fauna are quite diverse and probably typical of counties in the lower Piedmont. The list of vascular plants estimated for the county is roughly 1,100 species, compared with 4,030 for the whole state (32%). Thus, more than 1/4 of North Carolina's plants occur in Stanly County.

Located in the central part of the state, Stanly County derives its vegetation from several sources. Without question, most of the plants here are generalists that are adapted to a broad variety of conditions, such as white oak (*Quercus alba*) and Virginia creeper (*Parthenocissus quinquefolia*). But a good number of plants are not so widespread and occur in North Carolina only in specific regions or in very limited habitat types. As mentioned above in General Vegetation, a number of species that are normally confined to the Coastal Plain reach their inner limits in the Sandhills region, but also have been documented from a few counties in the lower Piedmont. A good example is bottlebrush sedge (*Carex comosa*), common at the upper end of City Lake; there are only two locations for this sedge known in the Piedmont of North Carolina. Mountain plants also make their home here, generally in cool microhabitats. Maidenhair spleenwort (*Asplenium trichomanes*) occurs in Stanly on a shaded ledge in Morrow Mountain State Park. A good many plants occur only in the Piedmont, where they tend to occur on some of the specialized soils of the region. Georgia aster (*Symphyotrichum georgianum*), Piedmont aster (*Eurybia mirabilis*), Missouri rockcress (*Boechera missouriensis*), and Schweinitz's sunflower (*Helianthus schweinitzii*) are restricted to mafic and other high mineral soils, strictly within the Piedmont. All four are listed as rare in N.C. Piedmont aster and Schweinitz's sunflower are found only in North and South Carolina. Missouri rockcress occurs mostly in the northern Appalachians and westward, but occurs in North Carolina only on ledges along Rocky River.

Three plants must be mentioned with regard to their very special occurrences here in Stanly County. The first is western rough goldenrod (*Solidago radula*). Its normal range is midwestern, far west of the Appalachian Mountains. In 1891 it was discovered in Stanly "just west of the Falls of the Yadkin" and subsequently in one county in South Carolina and two in Georgia--hundreds of miles away from the rest of the range. Today there are four populations known in Stanly County and one in Montgomery County, all in mafic soils near the Yadkin. Second, Wright's cliffbrake (*Pellaea wrightiana*) ranges from Colorado south to Texas, Arizona and Mexico, with two amazingly disjunct occurrences in Alexander and Stanly counties, N.C. In Stanly the plants occupy a high, dry ledge by Rocky River. How did this fern get here? One can only speculate that spores, which are very tiny and weigh practically nothing, were carried by prevailing westerly winds. Third is the remarkable Yadkin River goldenrod (*Solidago plumosa*). It was originally discovered "in crevices of the rocks at the bottom of the canyon at the Falls of the Yadkin River, and at the Narrows" in 1894. It has never been found elsewhere and for a century it was thought lost due to dam construction, until two North Carolina botanists independently rediscovered it in the same week in 1994! Today, virtually all plants occur on the Montgomery County side of the river, but a few also occur in the Stanly side.

Animals also show strong tendencies to occur in one region of the state or another, despite the fact that animals are much more mobile than plants. Coachwhip snakes (*Masticophis flagellum*)

occur mainly in the Coastal Plain because their habitats (pinelands with a long fire history) and food requirements are not met in the Piedmont. In Stanly County, it has been documented just south of Norwood. Mole salamander (*Ambystoma talpoideum*) occurs in the Mountains and Piedmont and was recently discovered in Stanly. Black-throated green warbler (*Dendroica virens*) is a montane breeding bird with a distinct race that breeds in the Coastal Plain. Less well-known are local breeding pairs on high summits in the lower Piedmont, including Morrow Mountain State Park. Of course, many familiar animals are found throughout the state, such as the mockingbird, garter snake, gray fox, tiger swallowtail butterfly, and bullfrog; such animals are able to adapt to a wide variety of living conditions and are able to disperse widely. The total number of animals found in Stanly County is not known, due mostly to uncertainties in insects, spiders, and other inconspicuous groups.

Several animals deserve special mention. Bald eagles (*Haliaeetus leucocephalus*) were gone from our area for decades, as a result of habitat loss and pesticide poisoning that caused eggshell thinning. But in recent years they have taken up residence again and now are familiar sights as they forage and nest along the Yadkin/Pee Dee. Septima's clubtail (*Gomphus septima*), a rare dragonfly known only from the lower Piedmont, was discovered for the first time in Stanly County in 2008, along Rocky River. It is a Federal Species of Concern. Carolina darter (*Etheostoma collis* pop.1) and Carolina creekshell (*Villosa vaughaniana*) are a rare fish and a rare mussel, respectively. Both occur in Big Bear Creek, along with other rare mussels, and both are Federal Species of Concern. This designation means that they are not federally listed, but may become so in the future; their populations need monitoring. Most importantly, they need clean water free from contaminants and runoff.

To date, 32 plants and 19 animals that are rare in North Carolina have been documented from Stanly County (Table 3 and 4). One plant is federally listed: Schweinitz's sunflower (*Helianthus schweinitzii*). The bald eagle was Federally listed until several years ago, but has now been delisted. Two plants are candidates for federal listing: Yadkin River goldenrod (*Solidago plumosa*) and Georgia aster (*Symphyotrichum georgianum*).

Ten of Stanly's species are known in North Carolina from five or fewer populations; therefore the Stanly County occurrences are critical to their survival in the state. Yellow lampmussel (*Lampsilis cariosa*) and Roanoke slabshell (a mussel, *Elliptio roanokensis*) occur in the rocky bed of Big Bear Creek; Septima's clubtail (*Gomphus septima*) occurs at Rocky River. Virginia spiderwort (*Tradescantia virginiana*) occurs in hardwoods near Long Creek, rough blazing-star (*Liatris aspera*) occurs on a ledge by Stony Gap Road, and Bush's sedge (*Carex bushii*) currently occurs in NC at only two Stanly sites. Missouri rockcress, Yadkin River goldenrod, western rough goldenrod, and Wright's cliffbrake (*Pellaea wrightiana*) were mentioned in previous paragraphs.

Some species are naturally sporadic, such as eastern shooting-star (*Primula meadia*), found only in scattered locations in central and western parts of the state. In this case, its habitat of irregularly inundated, circumneutral streamsides is naturally sparse. Similarly, bald eagles are rare because their requirements rarely occur together: large bodies of water, adequate food supply, and secure nesting sites of large pine trees with a commanding view. The examples in this section point out some of the diversity of nature in Stanly County.

Table 3. Rare Plants Documented from Stanly County, North Carolina.

An explanation of status and rank codes appears at the end of the table. * = documented since 1990, but not seen during this inventory. # = historical, documentation more than 20 years old.

<u>SCIENTIFIC NAME</u> <u>COMMON NAME</u>	<u>STATUS</u>		<u>RANK</u>	
	<u>N.C.</u>	<u>U.S.</u>	<u>N.C.</u>	<u>GLOBAL</u>
VASCULAR PLANTS				
<i>Acmispon helleri</i> * Carolina birdfoot-trefoil	SC-V	FSC	S3	G3
<i>Amorpha schwerinii</i> piedmont indigo-bush	SR		S3	G3G4
<i>Anemone berlandieri</i> southern anemone	E		S2	G4?
<i>Anemone caroliniana</i> # prairie anemone	E		S1	G5
<i>Baptisia alba</i> thickpod white wild indigo	T		S2	G5
<i>Boechera missouriensis</i> Missouri rockcress	SC-V		S1	G5?Q
<i>Callitriche terrestris</i> terrestrial water-starwort	SR		S2?	G5
<i>Carex bushii</i> Bush's sedge	SR		S1	G4
<i>Carex impressinervia</i> ravine sedge	SR	FSC	S1	G2
<i>Dichanthelium annulum</i> ringed witchgrass	SR		S1	GNR
<i>Eurybia mirabilis</i> piedmont aster	SR	FSC	S2	G2G3
<i>Fothergilla major</i> large witch-alder	SR		S3	G3
<i>Helianthus laevigatus</i> smooth sunflower	SC-V		S2	G4
<i>Helianthus schweinitzii</i> Schweinitz's sunflower	E	E	S3	G3
<i>Hexalectris spicata</i> crested coralroot	SR		S2	G5
<i>Liatris aspera</i> rough blazing-star	T		S1	G4G5
<i>Lilium canadense</i> ssp. <i>editorum</i> # red Canada lily	E		S1	G5T4
<i>Matelea decipiens</i> glade milkvine	SR		S2	G5

Table 3. (Continued)

<u>SCIENTIFIC NAME</u> <u>COMMON NAME</u>	<u>STATUS</u>		<u>RANK</u>	
	<u>N.C.</u>	<u>U.S.</u>	<u>N.C.</u>	<u>GLOBAL</u>
<i>Parthenium auriculatum</i> Glade wild quinine	SR		S2	G3G4
<i>Pellaea wrightiana</i> Wright's cliffbrake	E		S1	G5
<i>Polygala senega</i> Seneca snakeroot	SR		S2	G4G5
<i>Primula meadia</i> eastern shooting-star	T		S2	G5
<i>Quercus prinoides</i> # dwarf chinquapin oak	E		S1	G5
<i>Ruellia purshiana</i> * Pursh's wild-petunia	SC-V		S2	G3
<i>Silphium terebinthinaceum</i> prairie dock	SR		S2	G4G5
<i>Solidago plumosa</i> Yadkin River goldenrod	T	C	S1	G1
<i>Solidago radula</i> western rough goldenrod	E		S1	G5?
<i>Symphyotrichum georgianum</i> Georgia aster	T	C	S2	G2G3
<i>Symphyotrichum laeve</i> var. <i>concinnum</i> * narrowleaf aster	T		S2	G5T4
<i>Tradescantia virginiana</i> Virginia spiderwort	T		S1	G5
<i>Viola walteri</i> var. <i>walteri</i> prostrate blue violet	SR		S1	G4G5

EXPLANATION OF STATUS AND RANK CODES FOR PLANTS

N.C. Status:

E = Endangered. Any species or higher taxon of plant whose continued existence as a viable component of the State's flora is determined to be in jeopardy" (GS 19B 106: 202.12). Endangered species may not be removed from the wild except when a permit is obtained for research, propagation, or rescue which will enhance the survival of the species.

T = Threatened. Any resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (GS 19B 106:202.12). Regulations are the same as for Endangered species.

SC = Special Concern. Any species of plant in North Carolina which requires monitoring but which may be collected and sold under regulations adopted under the provisions of [the Plant Protection and Conservation Act]" (GS 19B 106:202.12).

SC-V = Special Concern-Vulnerable. Any species or higher taxon of plant which is likely to become a threatened species within the foreseeable future (02 NCAC 48F .0401).

SC-H = Special Concern-Historical. Any species or higher taxon of plant that occurred in North Carolina at one time, but for which all known populations are currently considered to be either historical or extirpated (02 NCAC 48F .0401).

Plant statuses above are determined by the Plant Conservation Program, N.C. Department of Agriculture, revised December 1, 2010. The most current plant-related laws and regulations for North Carolina can be found at www.ncplant.com.

SR = Significantly Rare. Any species not listed by the N.C. Plant Conservation Program as Endangered, Threatened, or Candidate, which is rare in North Carolina, generally with 1-100 populations in the state, frequently substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). The Significantly Rare status is a NCNHP 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 an endangered species within the foreseeable future throughout all or a significant portion of its range.

FSC = Federal Species of Concern. A species under consideration for listing, for which there is insufficient information to support listing at this time. "...The Service remains concerned about these species but further biological research and field study are needed to resolve the

conservation status of these taxa. Many species of concern will be found not to warrant listing, either because they are not threatened or endangered or because they do not qualify as species under the definition in the [Endangered Species] Act. Others may be found to be in greater danger of extinction than some present candidate taxa. Such species are the pool from which future candidates for listing will be drawn.” (Federal Register, February 28, 1996).

U.S. Status is determined by the U.S. Fish and Wildlife Service. United States Status is designated by the U.S. Fish and Wildlife Service (USFWS) and the U.S. National Marine Fisheries Service in accordance with the U.S. Endangered Species Act of 1973, as amended (U.S. ESA). Plants and plant varieties, (including fungi and lichens), animal species and subspecies, and vertebrate populations are considered for Endangered or Threatened status according to the criteria established under the U.S. ESA. Consult the Asheville or Raleigh Ecological Services Field Offices for more information.

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 5 or fewer occurrences in NC.

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 in NC.

S3 = Vulnerable in North Carolina. Typically 21-100 occurrences in NC.

S_? = Rank uncertain.

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

G3 = Either vulnerable 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 = Secure globally, though it may be quite rare in parts of its range, especially at the periphery.

_Q = questionable taxonomic assignment.

STATUS AND RANK CODES FOR PLANTS (Continued)

Global Rank (continued):

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 example, 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.

Status and rank codes for plants are derived from the Natural Heritage Database (2010).

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

<u>SCIENTIFIC NAME</u> <u>COMMON NAME</u>	<u>STATUS</u>		<u>RANK</u>	
	<u>N.C.</u>	<u>U.S.</u>	<u>N.C.</u>	<u>GLOBAL</u>
BIRDS				
Haliaeetus leucocephalus bald eagle	T		S3B,S3N	G5
Lanius ludovicianus loggerhead shrike	SC		S3B,S3N	G4T4
REPTILES				
Crotalus horridus timber rattlesnake	SC		S3	G4
Masticophis flagellum coachwhip	SR		S3	G5
AMPHIBIANS				
Ambystoma talpoideum mole salamander	SC		S2	G5
FISHES				
Etheostoma collis pop. 1 Carolina darter - central piedmont population	SC	FSC	S3	G3T3Q
Moxostoma robustum robust redhorse	E	FSC	S1	G1
Moxostoma sp. 3 Carolina redhorse	T	FSC	S1	G1G2Q
MOLLUSKS - FRESHWATER BIVALVES				
Anodonta implicata Alewife floater	T		S1	G5
Elliptio roanokensis Roanoke slabshell	T		S1	G3
Lampsilis cariosa yellow lampmussel	E	FSC	S1	G3G4
Lampsilis radiata eastern lampmussel	E	FSC	S1S2	G5
Strophitus undulatus creeper	T		S2	G5
Toxolasma pullus Savannah lilliput	E	FSC	S1	G2

Table 4. (Continued)

<u>SCIENTIFIC NAME</u>	<u>STATUS</u>		<u>RANK</u>	
<u>COMMON NAME</u>	<u>N.C.</u>	<u>U.S.</u>	<u>N.C.</u>	<u>GLOBAL</u>
Villosa constricta notched rainbow	SC		S3	G3
Villosa delumbis eastern creekshell	SR		S3	G4
Villosa vaughaniana Carolina creekshell	E	FSC	S2	G2
INSECTS - DRAGONFLIES				
Gomphus fraternus midland clubtail	SR		S1?	G5
Gomphus septima Septima's clubtail	SR	FSC	S1S2	G2

EXPLANATION OF STATUS AND RANK CODES FOR ANIMALS

N.C. Status:

E = Endangered. Any native or once-native species of wild animal whose continued existence as a viable component of the State's fauna is determined by the Wildlife Resources Commission to be in jeopardy or any species of wild animal determined to be an 'endangered species' pursuant to the Endangered Species Act (Article 25 of Chapter 113 of the General Statutes; 1987).

T = Threatened. Any native or once-native species of wild animal which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as a threatened species pursuant to the Endangered Species Act (Article 25 of Chapter 113 of the General Statutes; 1987).

SC = Special Concern. Any species of wild animal native or once-native to North Carolina which is determined by the Wildlife Resources Commission to require monitoring but which may be taken under regulations adopted under the provisions of this Article (Article 25 of Chapter 113 of the General Statutes; 1987).

SR = Significantly Rare. Any species which has not been listed by the N.C. Wildlife Resources Commission as an Endangered, Threatened, or Special Concern species, but which exists in the state (or recently occurred in the state) in small numbers and has been determined by the N.C. Natural Heritage Program to need monitoring. (This is a N.C. Natural Heritage Program designation.) Significantly Rare species include "peripheral" species, whereby North Carolina lies at the periphery of the species' range (such as Hermit Thrush), as well as species of historical occurrence with some likelihood of re-discovery in the state. Species considered extirpated in the state, with little likelihood of re-discovery, are given no N.C. Status (unless already listed by the N.C. Wildlife Resources Commission as E, T, or SC).

U.S. Status:

[E = Endangered. An animal that is in danger of extinction throughout all or a significant portion of its range (Endangered Species Act, Section 3). None in Stanly County]

[T = Threatened. An animal that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (Endangered Species Act, Section 3. None in Stanly County]

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 enough data to support listing as Endangered or Threatened (*Federal Register*, February 28, 1996). The FSC code has no official status.

STATUS AND RANK CODES FOR ANIMALS (Continued)

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.

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).

Global 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. None in Stanly County]

G2 = Imperiled globally because 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.

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.

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 U.S. 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, or special concern.

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.

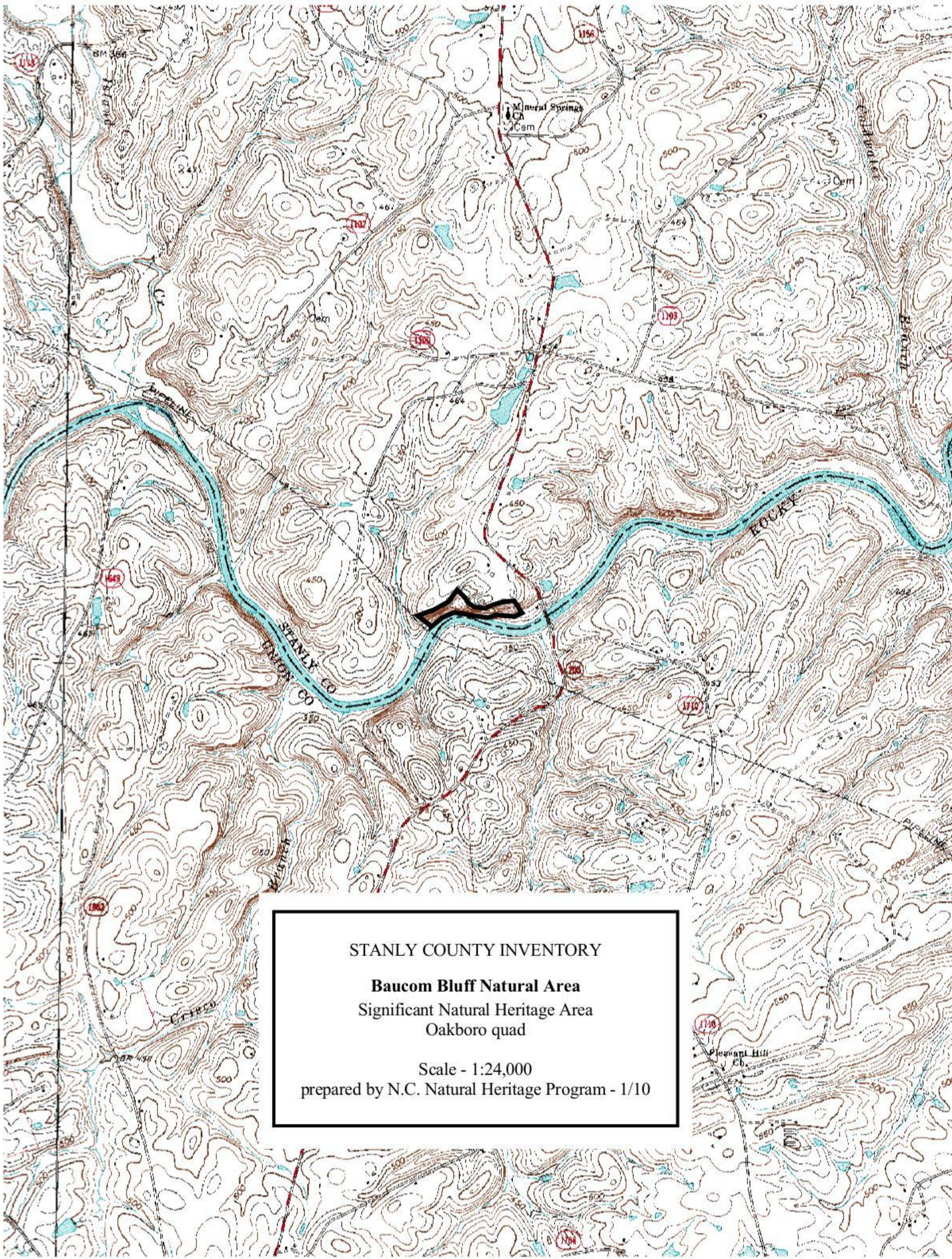
3. The state endangered animal species law states that "no rule may be adopted that restricts use or development of private property."

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 N.C. Department of Agriculture's Plant Conservation Program.

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- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
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SITE DESCRIPTIONS



STANLY COUNTY INVENTORY

Baucom Bluff Natural Area
Significant Natural Heritage Area
Oakboro quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

BAUCOM BLUFF Significant Natural Heritage Area

Site Number: 1

Site Significance: Regional

Quadrangle: Oakboro

Size: 10 acres

Ownership: private

SIGNIFICANT FEATURES: This site features a very good example of a Piedmont Mafic Cliff community, with two rare plant species: Missouri rockcress (*Boechera missouriensis*) and Piedmont aster (*Eurybia mirabilis*).

LANDSCAPE RELATIONSHIPS: Baucom Bluff occurs 1/4 mile west of the NC 205 bridge on the north side of Rocky River. Mixed hardwood/pine forest flanks the site to east and west; there are a couple of small homes by route 205. On the Union County side of the river there are extensive hayfields and, at the bridge, and a small park. There are no other Significant Natural Heritage Areas in the vicinity.

SITE DESCRIPTION: Steep slopes rise abruptly from near the river and extend up about 100 feet in elevation. Rock outcrops and ledges occur on middle and upper parts of the slope, and run laterally for about two hundred yards. The outcrops and steepest slopes support a short, open-canopy woodland mixed with blueberry shrubs and various sun-loving herbs. Trees include red cedar (*Juniperus virginiana*), scrub or Virginia pine (*Pinus virginiana*), winged elm (*Ulmus alata*), and some pignut hickory (*Carya glabra*). Chalk maple (*Acer leucoderme*), hop hornbeam (*Ostrya virginiana*), and dwarf hackberry (*Celtis tenuifolia*) form an irregular understory. Shrubs consist mostly of sparkleberry (*Vaccinium arboreum*). Herbs on the ledges include resurrection fern (*Pleopeltis polypodioides* ssp. *michauxiana*), woolly lipfern (*Cheilanthes lanosa*), rock dayflower (*Commelina erecta* var. *erecta*), rattlesnake hawkweed (*Hieracium venosum*), rock oregano (*Cunila origanoides*), little bluestem (*Schizachyrium scoparium*) and goldenrods (*Solidago* spp.).

Adjacent slopes away from the ledges support some of the same trees, plus white ash (*Fraxinus americana*), post oak (*Quercus stellata*), and black gum (*Nyssa sylvatica*), with redbud (*Cercis canadensis*), hop hornbeam, and chalk maple in the understory. Shrubs include possum haw (*Ilex decidua*) upslope, Chinese privet (*Ligustrum sinense*) downslope. Herbs include several kinds of grasses plus violet wood-sorrel (*Oxalis violacea*), goldenrods, and Missouri rockcress (*Boechera missouriensis*). Japanese honeysuckle (*Lonicera japonica*) is a locally dense ground cover. Piedmont aster (*Eurybia mirabilis*) is common at the base of the slopes, along the upper level of normal river flooding.

MANAGEMENT AND PROTECTION: Chinese privet and Japanese honeysuckle, both invasive exotic species, are abundant on mid and lower slopes at this site and should be controlled.

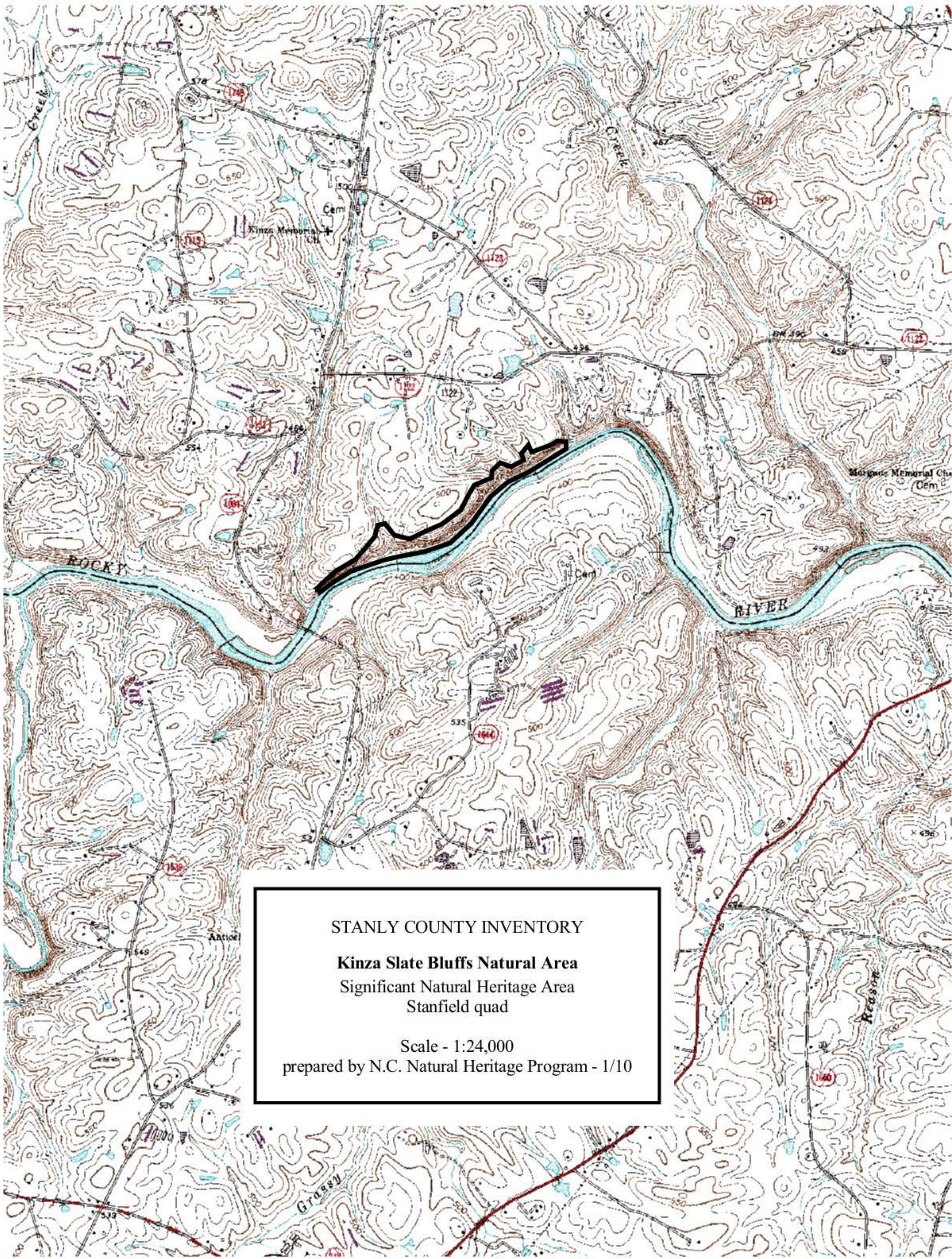
NATURAL COMMUNITIES: Piedmont Mafic Cliff.

RARE PLANTS: Missouri rockcress (*Boechea missouriensis*), Piedmont Aster (*Eurybia mirabilis*).

RARE ANIMALS: None documented.

REFERENCES:

Sorrie, B.A. 2009. Site Survey Report: Baucom Bluff. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



Stanly County Natural Area Inventory

KINZA SLATE BLUFFS Significant Natural Heritage Area

Site Number: 2

Site Significance: State

Quadrangle: Stanfield

Size: 36 acres

Ownership: Private

SIGNIFICANT FEATURES: Kinza Slate Bluffs has populations of two rare plants and has a rare natural community, the Piedmont Mafic Cliff. The population of Missouri rockcress (*Boechea missouriensis*) is the largest in the state.

LANDSCAPE RELATIONSHIPS: This site is located on the north side of Rocky River, east of SR 1001, extending for about a mile. Rocky River Morgans Bluff Significant Natural Heritage Area occurs 1/4 mile downstream.

SITE DESCRIPTION: Kinza Slate Bluffs extends about a mile along Rocky River, facing south and southeast. Ledges occur more-or-less throughout, with the highest (70 feet and vertical) at the west end. The primary community here is Piedmont Mafic Cliff, which has an open canopy, moderate shrub layer, and moderate herb density. Dominant trees are red cedar (*Juniperus virginiana*) and chestnut oak (*Quercus montana*), with lesser amounts of pignut hickory (*Carya glabra*), scrub pine (*Pinus virginiana*), and winged elm (*Ulmus alata*). Shrubs include sparkleberry (*Vaccinium arboreum*) and dwarf hackberry (*Celtis tenuifolia*). Herbs vary from sparse to dense; most important are two species of woolly lipferns (*Cheilanthes lanosa* and *C. tomentosa*), prickly-pear cactus (*Opuntia humifusa*), forest goldenrod (*Solidago arguta* var. *arguta*), wood-sorrels (*Oxalis violacea* and *O. stricta*), Missouri rockcress, little bluestem (*Schizachyrium scoparium*), two-flower melic (*Melica mutica*), and false garlic (*Nothoscordum bivalve*). Japanese honeysuckle (*Lonicera japonica*) commonly creeps up slopes from below.

On less steep, less rocky slopes where there is deeper soil, Basic Oak-Hickory Forest occurs. Dominants include red oak (*Quercus rubra*), white oak (*Q. alba*), chestnut oak, and pignut hickory, with an understory of hop hornbeam (*Ostrya virginiana*), chalk maple (*Acer leucoderme*), and red cedar. Painted buckeye (*Aesculus sylvatica*) is a frequent shrub. Herbs include two-flower melic, shining wedgescale (*Sphenopholis nitida*), fire pink (*Silene virginica*), common chickweed (*Stellaria media*), bedstraw (*Galium aparine*), and Japanese honeysuckle.

MANAGEMENT AND PROTECTION: Fence off the western end from cattle grazing and remove alien herbs there.

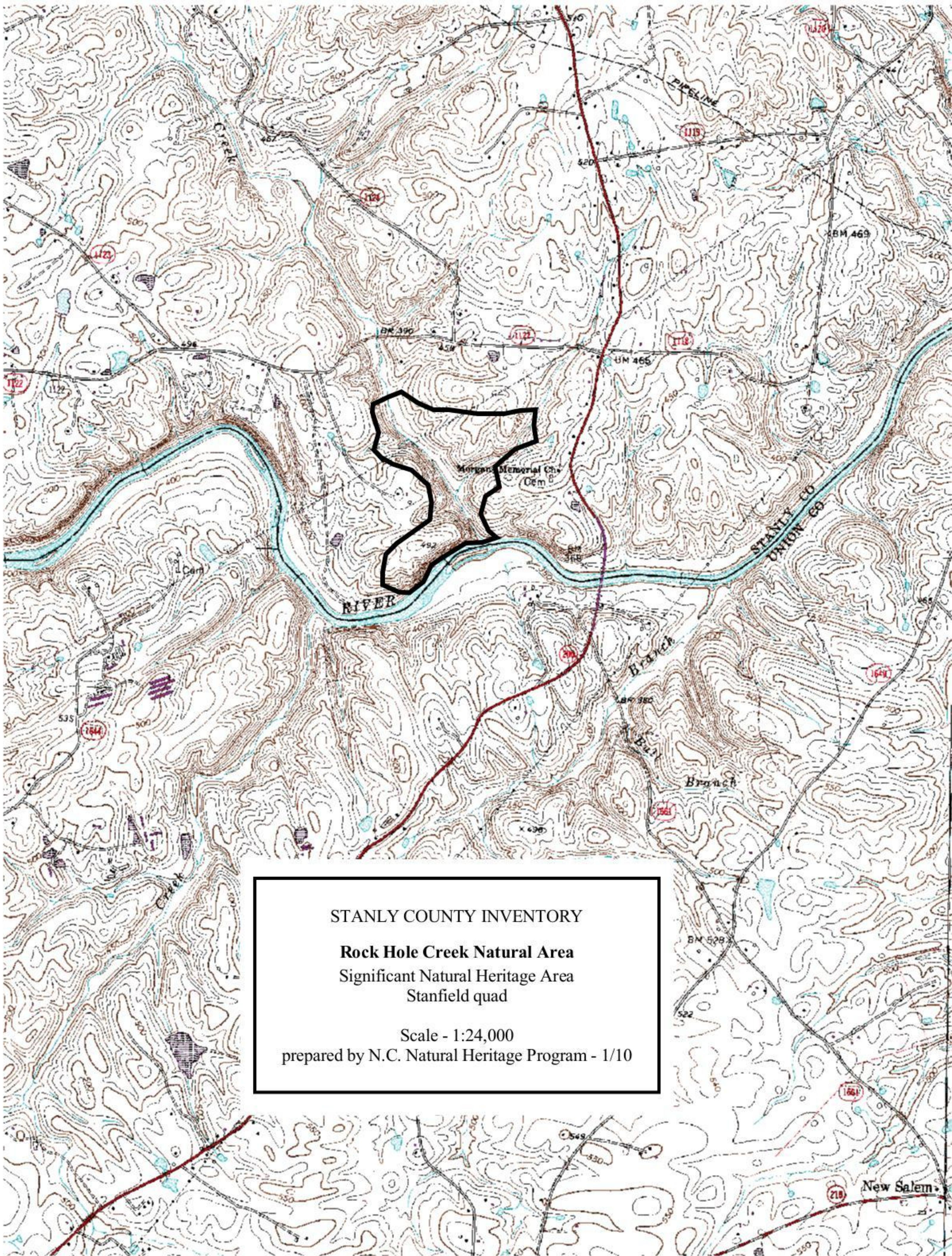
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Piedmont Mafic Cliff.

RARE PLANTS: Southern anemone (*Anemone berlandieri*), Missouri rockcress (*Boechea missouriensis*); Watch List: eastern false-aloe (*Manfreda virginica*).

RARE ANIMALS: None documented.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NCNHP, Raleigh.
- Sorrie, B.A. 2009. Site Survey Report: Kinza Slate Bluffs. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY

Rock Hole Creek Natural Area
Significant Natural Heritage Area
Stanfield quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

ROCK HOLE CREEK Significant Natural Heritage Area

Site Number: 3

Site Significance: Regional

Quadrangle: Stanfield

Size: 122 acres

Ownership: Private

SIGNIFICANT FEATURES: This natural area contains three rare plant species plus high quality Piedmont Mafic Cliff community. This is the sole site in Stanly County for the State Threatened eastern shooting-star (*Primula meadia*).

LANDSCAPE RELATIONSHIPS: The site occurs along Rock Hole Creek and tributaries, south of Rock Hole Road and west of NC 200, and fronts on Rocky River. Rocky River Morgans Bluff Significant Natural Heritage Area occurs less than a mile upstream.

SITE DESCRIPTION: Rock Hole Creek Significant Natural Heritage Area occupies steep slopes along the west side of Rock Hole Creek, shallower slopes and a narrow floodplain on the east side, and rocky bluffs facing Rocky River. The creek bed and the slopes have abundant slate boulders and rocks, which yield a relatively high soil pH. The narrow floodplain supports a Piedmont Alluvial Forest of tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), cherrybark oak (*Quercus pagoda*), water oak (*Q. nigra*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), and beech (*Fagus grandifolia*), with an understory of ironwood (*Carpinus caroliniana*), red mulberry (*Morus rubra*), chalk maple (*Acer leucoderme*), and holly (*Ilex opaca*). Shrubs include spicebush (*Lindera benzoin*), and dense patches of Chinese privet (*Ligustrum sinense*) and cane (*Arundinaria* sp). There are a few shallow depressions that hold pools of water after flooding. One rare plant, piedmont aster (*Eurybia mirabilis*), is numerous along creek banks, on the floodplain, and at bases of bluffs. A second rare plant, eastern shooting-star (*Primula meadia*), occurs along a tributary creek.

Slopes to the east of Rock Hole Creek support Mesic Mixed Hardwood Forest of white oak (*Quercus alba*), red oak (*Q. rubra*), beech, and tulip poplar, with an understory of hop hornbeam (*Ostrya virginiana*), witch hazel (*Hamamelis virginiana*), and some red cedar (*Juniperus virginiana*). This community continues along upper portions of tributary creeks. One Watch List plant occurs here, Carolina pink (*Silene caroliniana* var. *caroliniana*).

Steep rocky slopes west of the creek are covered with mountain laurel (*Kalmia latifolia*) shrubs, overtopped by red cedar, chestnut oak (*Quercus montana*), post oak (*Q. stellata*), pignut hickory (*Carya glabra*), scrub pine (*Pinus virginiana*), chalk maple, and hop hornbeam. So, too are rocky bluffs facing Rocky River, but here the dry rocky slopes of the Piedmont Mafic Cliff are subject to dessication in summer and support few laurels. Instead, openings among the trees allow grasses and flowering herbs to grow, notably little bluestem (*Schizachyrium scoparium*), poverty grass (*Danthonia spicata*), black needle-grass (*Piptochaetium avenaceum*), and prickly-pear (*Opuntia humifusa*). The rare Missouri rockcress (*Boechera missouriensis*) grows here.

MANAGEMENT AND PROTECTION: At this moment there are no pressing management issues. Protection might best be accomplished through easements with landowners.

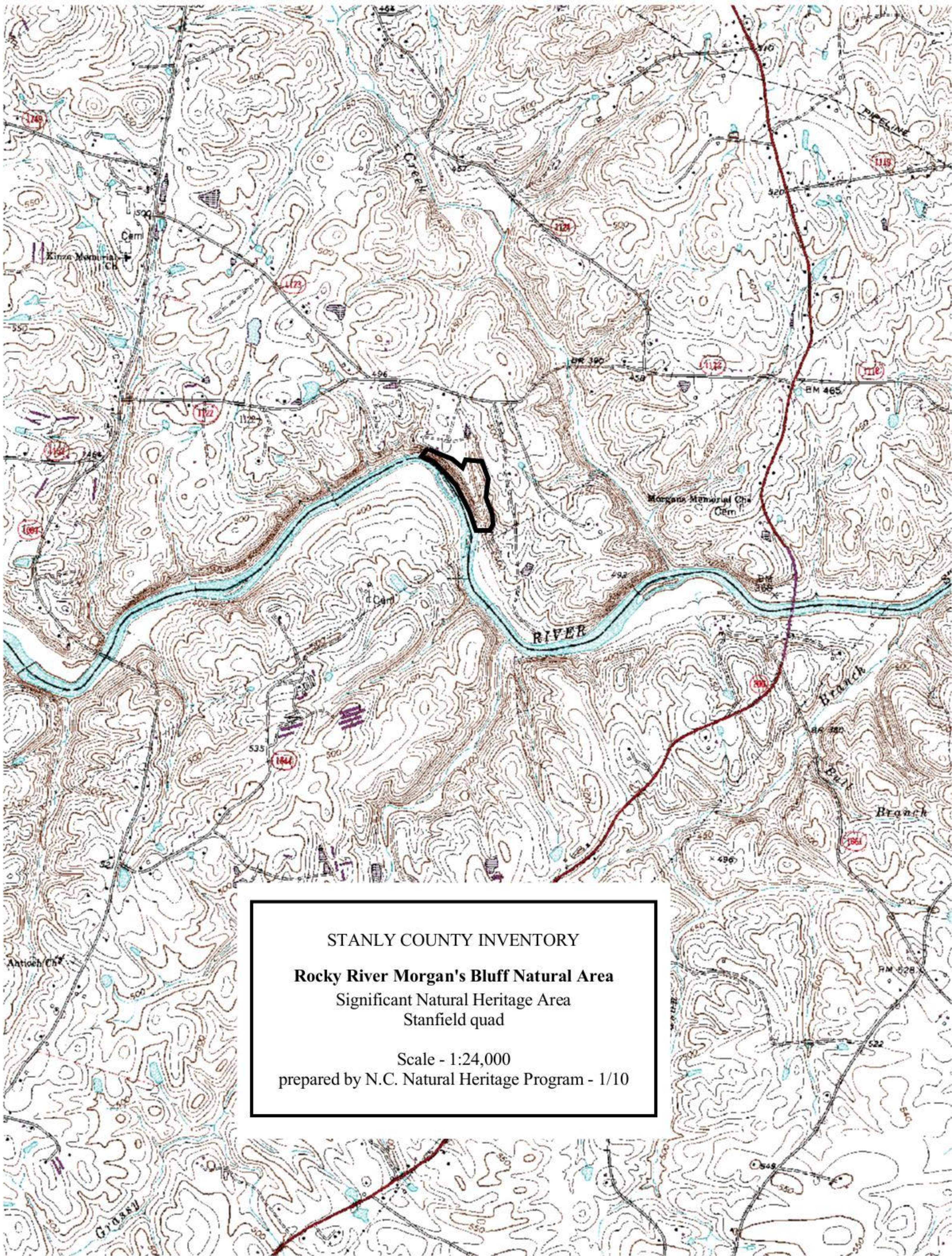
NATURAL COMMUNITIES: Mesic Mixed Hardwood Forest, Piedmont/Low Mountain Alluvial Forest, Piedmont Mafic Cliff.

RARE PLANTS: Missouri rockcress (*Boechea missouriensis*), eastern shooting-star (*Primula meadia*), piedmont aster (*Eurybia mirabilis*).

RARE ANIMALS: None documented.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: Rock Hole Creek. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



Stanly County Natural Area Inventory

ROCKY RIVER MORGAN'S BLUFF Significant Natural Heritage Area

Site Number: 4

Site Significance: State

Quadrangle: Stanfield

Size: 17 acres

Ownership: UNC-Charlotte, private

SIGNIFICANT FEATURES: Morgan's Bluff has five rare plant species plus one rare natural community type. The site has one of the best Piedmont Mafic Cliff communities in the state and it has one of the top three populations of Missouri rockcress (*Boechea missouriensis*) in the state. The population of Wright's cliffbrake (*Pellaea wrightiana*) is one of two in the state, both disjunct from Texas (these are the only known occurrences east of the Mississippi River).

LANDSCAPE RELATIONSHIPS: This site occurs just upstream from Rock Hole Creek Significant Natural Heritage Area (SNHA).

SITE DESCRIPTION: The site is dominated by a ¼ mile long, 75-foot tall ledge facing southwest on the Rocky River. In places the rock faces are sheer, but generally they consist of irregular outcrops. The southwest aspect and thin soil render the ledges permanently dry to xeric, placing a water stress on plantlife. Trees are short and the canopy is mostly open; dominant is eastern red cedar (*Juniperus virginiana*), with scattered pignut hickory (*Carya glabra*), water oak (*Quercus nigra*), and black gum (*Nyssa sylvatica*). Winged elm (*Ulmus alata*) is frequent in the understory, locally with invasive tree-of-heaven (*Ailanthus altissima*). Sparkleberry (*Vaccinium arboreum*) is a common shrub atop the ledges. Herbs occur mostly atop ledges and in crevices, with forest goldenrod (*Solidago arguta* var. *arguta*) and little bluestem (*Schizachyrium scoparium*) the most numerous. These ledges support small numbers of Wright's cliffbrake. Lower ledges are covered with the invasive Japanese honeysuckle (*Lonicera japonica*) and Chinese privet (*Ligustrum sinense*).

Just above the ledges, and on steep slopes to the east, is a Dry Oak-Hickory Forest of scrub pine (*Pinus virginiana*), chestnut oak (*Quercus montana*), white oak (*Q. alba*), and pignut hickory. Soil is less shallow here and supports more shrubs and herbs than the open ledges. Small numbers of southern anemone (*Anemone berlandieri*) are found here.

Farther east on lower slopes, and on slopes below the ledges, the soil is deeper and richer and supports a Mesic Mixed Hardwood Forest. Red oak (*Quercus rubra*), white oak, hop hornbeam (*Ostrya virginiana*), and chalk maple (*Acer leucoderme*) are the dominant canopy and understory trees. Painted buckeye (*Aesculus sylvatica*) is a common shrub. Herb diversity is good and individual species can be dense, especially vernal flora. Unfortunately, lower slopes are everywhere over-run by Japanese honeysuckle and Chinese privet.

The slender (0-5 yards) terrace along the river is frequently disturbed by flooding events and consequently supports an alluvial community that is not well developed in size. Ironwood

(*Carpinus caroliniana*) is common, mixed with privet. In this zone grows piedmont aster (*Eurybia mirabilis*), a rare plant in the state.

MANAGEMENT AND PROTECTION: Of immediate concern are the dense colonies of privet and honeysuckle on mid to lower slopes. If allowed to spread, they may shade out some Wright's cliffbrake, the primary rare element at this site. Also, tree-of-heaven is getting a foothold on top of the ledges and is a direct threat to some cliffbrake plants. All of these aggressive aliens need to be eliminated from the SNHA.

NATURAL COMMUNITIES: Piedmont Mafic Cliff, Dry Oak-Hickory Forest, Mesic Mixed Hardwood Forest.

RARE PLANTS: Piedmont indigo-bush (*Amorpha schwerinii*), southern anemone (*Anemone berlandieri*), Missouri rockcress (*Boechera missouriensis*), piedmont aster (*Eurybia mirabilis*), Wright's cliffbrake (*Pellaea wrightiana*).

RARE ANIMALS: None documented.

REFERENCES:

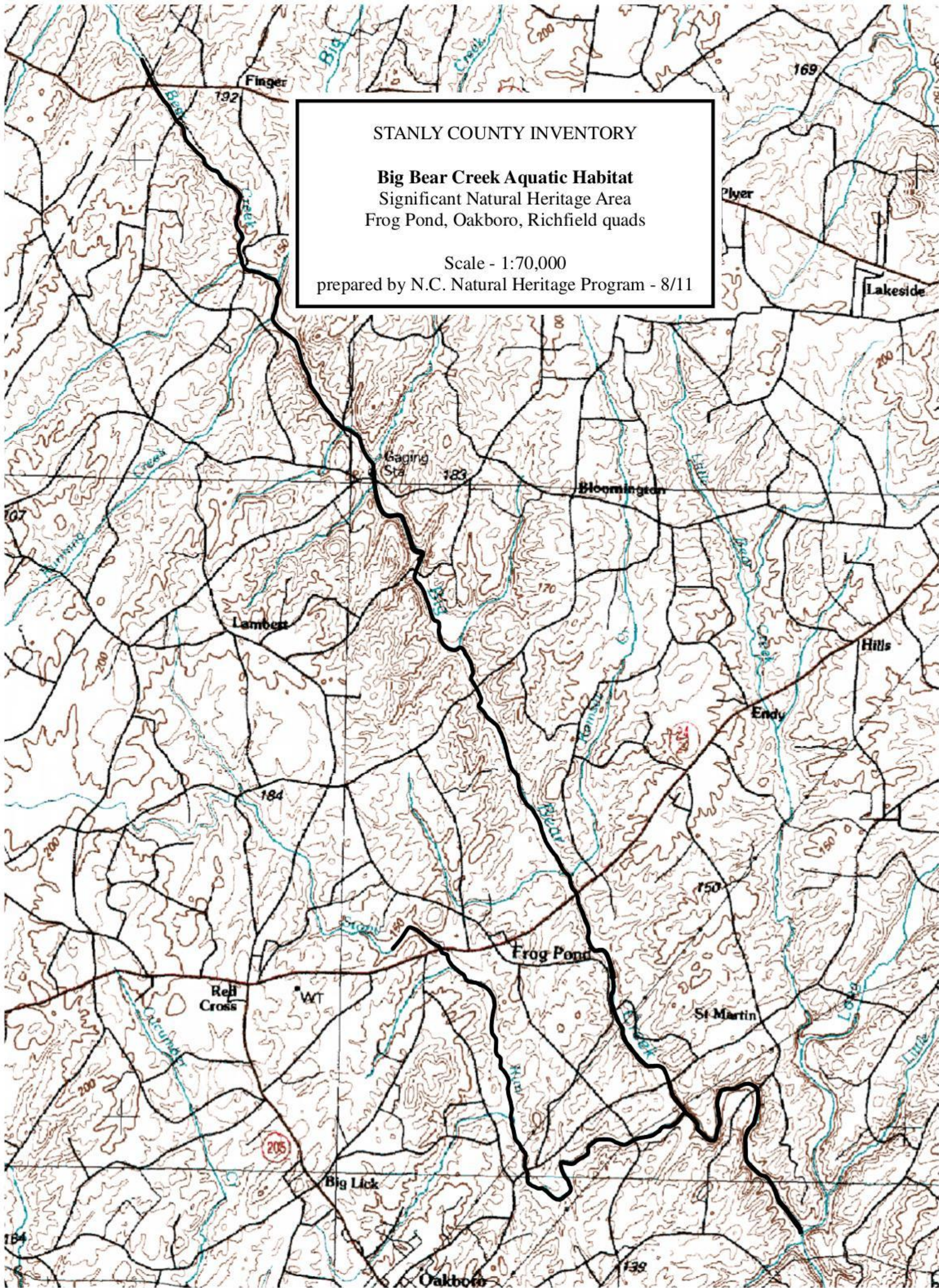
- Hood, L.N. 1978. Description and Classification of Rocky River Morgan's Bluff Natural Area, Stanly County, North Carolina. Master's degree thesis, UNC-Charlotte.
- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: Union Chapel Enon Knolls. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.

STANLY COUNTY INVENTORY

Big Bear Creek Aquatic Habitat
Significant Natural Heritage Area
Frog Pond, Oakboro, Richfield quads

Scale - 1:70,000

prepared by N.C. Natural Heritage Program - 8/11



Stanly County Natural Area Inventory

BIG BEAR CREEK AQUATIC HABITAT Significant Natural Heritage Area

Site Number: 5

Site Significance: Regional

Size: 17 river miles

Quadrangles: Frog Pond, Oakboro, Richfield

Ownership: North Carolina Public Waters

SIGNIFICANT FEATURES: Big Bear Creek Aquatic Habitat contains a diversity of aquatic species, including the State Endangered Carolina creekshell (*Villosa vaughaniana*), State Special Concern Carolina darter (*Etheostoma collis*), State Threatened creeper (*Strophitus undulatus*), State Special Concern notched rainbow (*Villosa constricta*), and State Significantly Rare eastern creekshell (*Villosa delumbis*). It also includes a State Threatened plant, thickpod white wild-indigo (*Baptisia alba*).

LANDSCAPE RELATIONSHIPS: Big Bear Creek, Little Bear Creek, and Stony Run are part of the Yadkin-Pee Dee River Basin. The Aquatic Habitat includes Little Bear Creek (3 river miles) and Stony Run (5 river miles), in addition to Big Bear Creek (9 river miles), due to the presence of rare species in these tributaries. Big Bear Creek Aquatic Habitat is completely contained within the Piedmont Ecoregion. Lentz Harness Shop Road Upland Depression Significant Natural Heritage Area is in the headwaters of Little Bear Creek. Land use in the watershed of the Aquatic Habitat is largely agriculture and pasture.

SITE DESCRIPTION: Big Bear Creek Aquatic Habitat comprises Big Bear Creek from its confluence with Little Bear Creek downstream to its confluence with Stony Run. It also includes Little Bear Creek just over the Stanly/Cabarrus County line near the Highway 73 crossing downstream to the confluence with Big Bear Creek. Additionally, it includes Stony Run from just upstream of the N.C. Highway 24 crossing down to the confluence with Big Bear Creek. Big Bear Creek and its tributaries contain a variety of aquatic habitats that support a diversity of organisms. Much of the habitat is typical of a Carolina Slate Belt stream with abundant cobble, boulders, and gravel bars in places. The surrounding landscape is hilly and there are few floodplain terraces.

In addition to the species noted above, Big Bear Creek and its tributaries support the following animals, collected during recent monitoring efforts by N.C. Division of Water Quality and N.C. Wildlife Resources Commission:

Fishes: yellow bullhead (*Ameiurus natalis*), flat bullhead (*A. platycephalus*), white sucker (*Catostomus commersonii*), rosyside dace (*Clinostomus funduloides*), creek chubsucker (*Erimyzon oblongus*), fantail darter (*Etheostoma flabellare*), tessellated darter (*E. olmstedii*), eastern mosquitofish (*Gambusia holbrooki*), redbreast (*Lepomis auritus*), green sunfish (*L. cyanellus*), largemouth bass (*Micropterus salmoides*), bluehead chub (*Nocomis leptcephalus*), whitemouth shiner (*Notropis alborus*), highfin shiner (*N. altipinnis*), redlip shiner (*N. chiliticus*), margined madtom (*Noturus insignis*), Piedmont darter (*Percina crassa*), creek chub (*Semotilus atromaculatus*).

Mussels: Carolina lance (*Elliptio angustata*), eastern Elliptio (*Elliptio complanata*), variable spike (*Elliptio icterina*).

Crayfishes: Rocky River crayfish (*Cambarus (Puncticambarus) hobbsorum*), White River crayfish (*Procambarus (Ortmannicus) acutus*).

Snails: pointed campeloma (*Campeloma decisum*), two-ridge rams-horn (*Helisoma anceps*).

Vegetation along Big Bear Creek consists of tall hardwood forest. Dominant trees are box elder (*Acer negundo* var. *negundo*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), and river birch (*Betula nigra*), with lesser amounts of black walnut (*Juglans nigra*), hackberry (*Celtis laevigata*), overcup oak (*Quercus lyrata*), sweetgum (*Liquidambar styraciflua*), and winged elm (*Ulmus alata*). Chinese privet (*Ligustrum sinense*), an invasive alien shrub, is common. A wide variety of other trees, shrubs and wildflowers occur in riparian areas and on adjacent slopes.

MANAGEMENT AND PROTECTION: All of Big Bear Creek watershed is in private ownership except for a few small conservation easements held by Land Trust for Central North Carolina. N.C. Division of Water Quality (2008) noted nutrient impacts in Big Bear Creek and Stony Run due to agriculture and pasture activities. N.C. DWQ fish sampling on Big Bear Creek in 2004 and on Stony Run in 2006 resulted in a Good-Fair rating. Additionally, benthic macro-invertebrate sampling on Big Bear Creek in 2006 resulted in a Good rating. Water quality within the Big Bear Creek watershed appears to be relatively good.

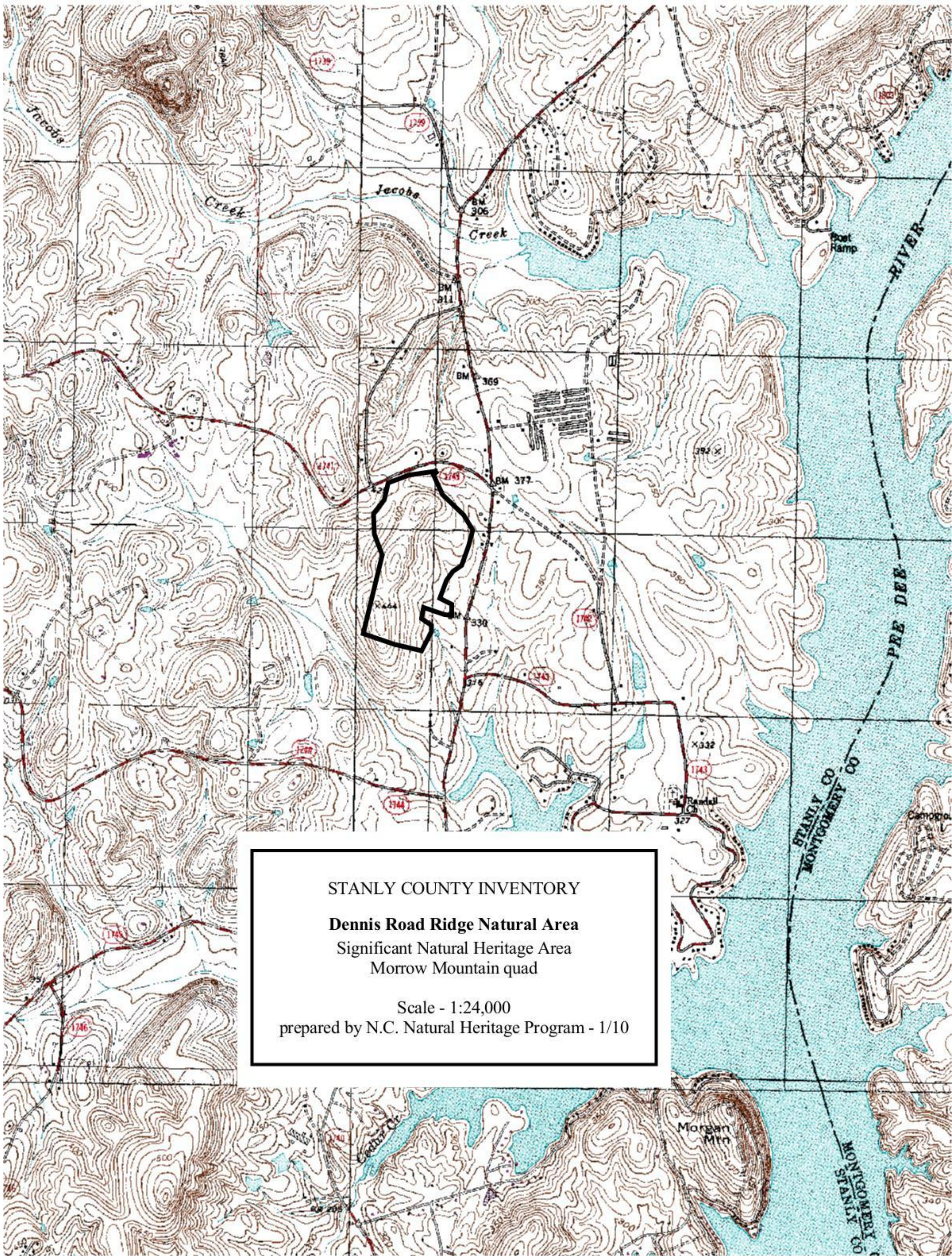
NATURAL COMMUNITIES: Mesic Mixed Hardwood Forest.

RARE PLANTS: Thickpod white wild-indigo (*Baptisia alba*).

RARE ANIMALS: Carolina darter (*Etheostoma collis*), creeper (*Strophitus undulatus*), notched rainbow (*Villosa constricta*), eastern creekshell (*V. delumbis*), Carolina creekshell (*V. vaughaniana*).

REFERENCES:

- North Carolina Division of Water Quality (NCDWQ). 2008. Yadkin-Pee Dee River Basinwide Water Quality Plan. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, NC.
- North Carolina Wildlife Resources Commission (NCWRC). Unpublished survey data in Aquatics Database.



STANLY COUNTY INVENTORY
Dennis Road Ridge Natural Area
Significant Natural Heritage Area
Morrow Mountain quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

DENNIS ROAD RIDGE Significant Natural Heritage Area

Site Number: 6

Site Significance: County

Size: 94 acres

Quadrangle: Morrow Mountain

Ownership: Private

SIGNIFICANT FEATURES: Dennis Road Ridge has good examples of two natural communities: Basic Oak-Hickory Forest and Mesic Mixed Hardwood Forest.

LANDSCAPE RELATIONSHIPS: The site lies about two miles southwest of River Haven Ridge Significant Natural Heritage Area (SNHA) and three miles south of Stony Mountain SNHA.

SITE DESCRIPTION: The site consists of Basic Oak-Hickory Forest on a ridge, with Mesic Mixed Hardwood Forest lower down along a drainage creek. The area was last cut about 45 years ago, but not clear-cut; most canopy trees are in the 60-80 year range. Brown mafic rocks are scattered but not common, whereas white quartzite rocks are locally numerous.

The Basic Oak-Hickory Forest is dominated by pignut hickory (*Carya glabra*), white oak (*Quercus alba*), southern red oak (*Q. falcata*), and northern red oak (*Q. rubra*), with frequent tulip poplar (*Liriodendron tulipifera* var. *tulipifera*) on slopes. Canopy height is about 80-90 feet and canopy cover is complete, without natural openings other than some treefall gaps. Pines are absent. Dogwood (*Cornus florida*), redbud (*Cercis canadensis*), black gum (*Nyssa sylvatica*), and sourwood (*Oxydendrum arboreum*) are major subcanopy trees, with some red cedar (*Juniperus virginiana*). The shrub layer is sparse; muscadine grape (*Vitis rotundifolia*) is rather common but mostly sprawling on the ground. The herb layer is sparse. This community is a good but not outstanding example of its type. It contains fewer southern shagbark hickory (*Carya carolinae-septentrionalis*) and chalk maple (*Acer leucoderme*) than one might expect, compared with other examples in the county, and therefore may indicate a transition to Dry Oak-Hickory Forest.

Downslope along one drain is a Mesic Mixed Hardwood Forest, occupying a narrow flat zone and adjacent slopes. Tulip poplar and northern red oak are dominants, with chalk maple and some red mulberry (*Morus rubra*) in the understory. The herb layer is dense and fairly diverse. One adjacent slope is carpeted with ground cedar (*Diphasiastrum digitatum*).

MANAGEMENT AND PROTECTION: Current management is adequate to ensure continued survival.

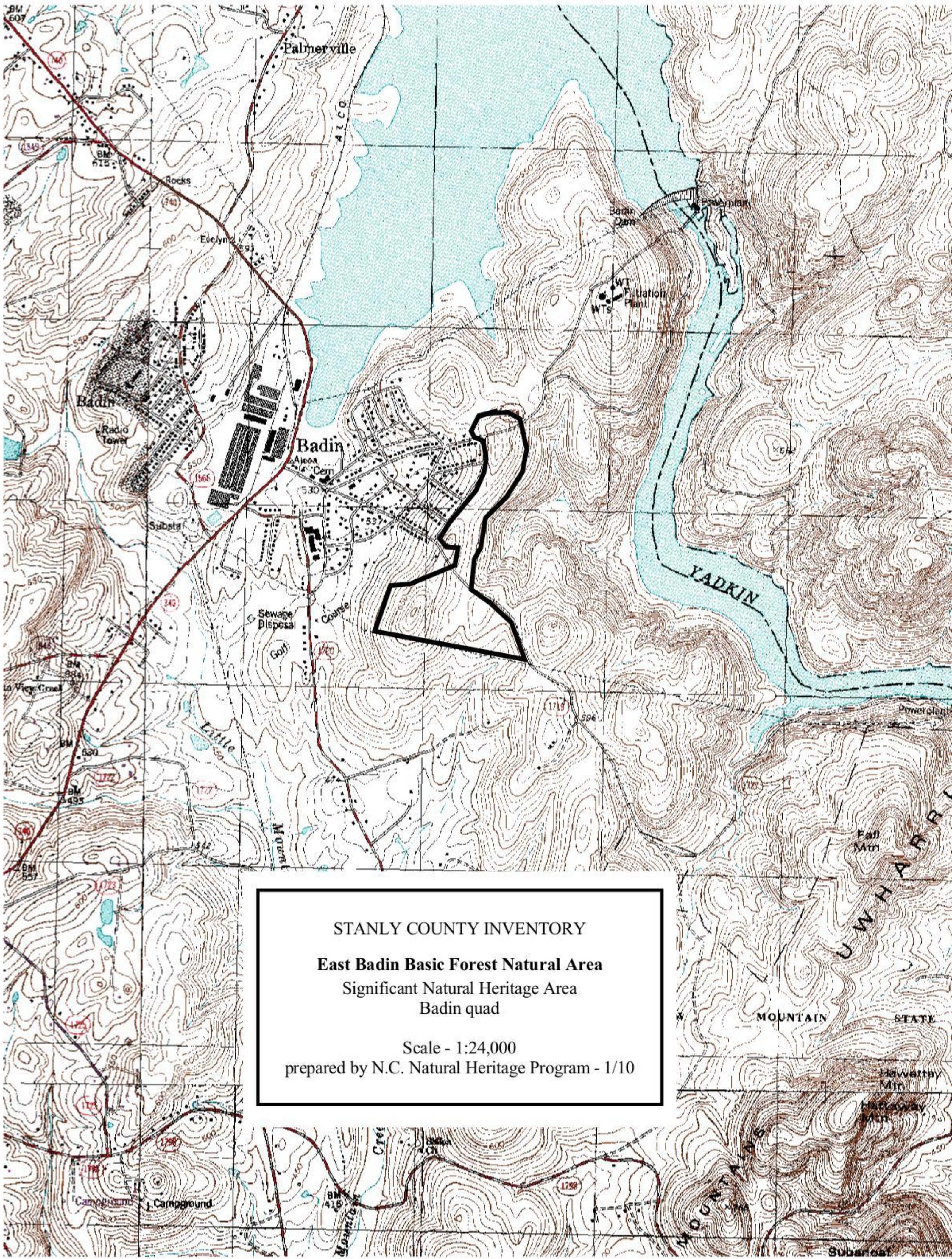
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Mesic Mixed Hardwood Forest.

RARE PLANTS: None documented.

RARE ANIMALS: None documented.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NCNHP, Raleigh.
- Sorrie, B.A. 2009. Site Survey Report: Dennis Road Ridge. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY
East Badin Basic Forest Natural Area
Significant Natural Heritage Area
Badin quad
Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

EAST BADIN BASIC FOREST Significant Natural Heritage Area

Site Number: 7

Site Significance: Regional

Quadrangle: Badin

Size: 102 acres

Ownership: ALCOA

SIGNIFICANT FEATURES: This site contains a very good quality oak-hickory hardwood forest, diverse powerline and roadside communities, and the presence of three rare plants: western rough goldenrod (*Solidago radula*), ringed witchgrass (*Dichanthelium annulum*), and crested coralroot orchid (*Hexalectris spicata*).

LANDSCAPE RELATIONSHIPS: East Badin Basic Forest lies at the east side of the town of Badin, a few miles northwest of Morrow Mountain State Park. Yadkin River Narrows Significant Natural Heritage Area, with several rare plants and animals, lies less than a mile eastward.

SITE DESCRIPTION: The site consists of middle aged hardwoods on rocky knolls and slopes, a mowed powerline along southern border, and two mowed roadsides. The main community is Basic Oak-Hickory Forest, dominated by pignut hickory (*Carya glabra*), southern shagbark hickory (*C. carolinae-septentrionalis*), northern red oak (*Quercus rubra*), and post oak (*Q. stellata*). The understory consists of various small hardwoods and chalk maple (*Acer leucoderme*). Shrubs are scattered and muscadine grape (*Vitis rotundifolia*) is common, mostly scrambling on the ground. Herbaceous wildflowers are relatively sparse, except in the powerline where a dense mix of native and introduced species is present. A small population of crested coralroot orchid (*Hexalectris spicata*) occurs in the woodland.

The top of one knoll supports a Piedmont Monadnock Forest of chestnut oak (*Quercus montana*) and white oak (*Q. alba*), with smaller hardwoods in the understory. The soil here is more acidic than the rest of the site.

The powerline clearing is perennially open (via mowing) and supports a dense mix of grasses and herbaceous plants, with numerous tree sprouts and shrubs. Sericea clover (*Lespedeza cuneata*) and velvet witchgrass (*Dichanthelium scoparium*) are very common. This habitat has populations of several species uncommon or rare in Stanly County, including snoutbean (*Rhynchosia tomentosa*), tall eupatorium (*Eupatorium altissimum*), two-toothed ragweed (*Ambrosia bidentata*), ringed witchgrass, few-flowered nutsedge (*Scleria pauciflora*), and Pursh's rattlebox (*Crotalaria purshii*). One open roadside has a population of the State Endangered western rough goldenrod (*Solidago radula*), known in North Carolina only from Stanly and Montgomery counties.

MANAGEMENT AND PROTECTION: In North Carolina western rough goldenrod is known from only a handful of populations, so every effort must be made to ensure its survival at this roadside site. Reduction/elimination of sericea in the powerline would enhance populations of

native herbs and shrubs, as would culling non-native fragrant honeysuckle (*Lonicera fragrantissima*) and autumn olive (*Elaeagnus umbellata*) in the woods.

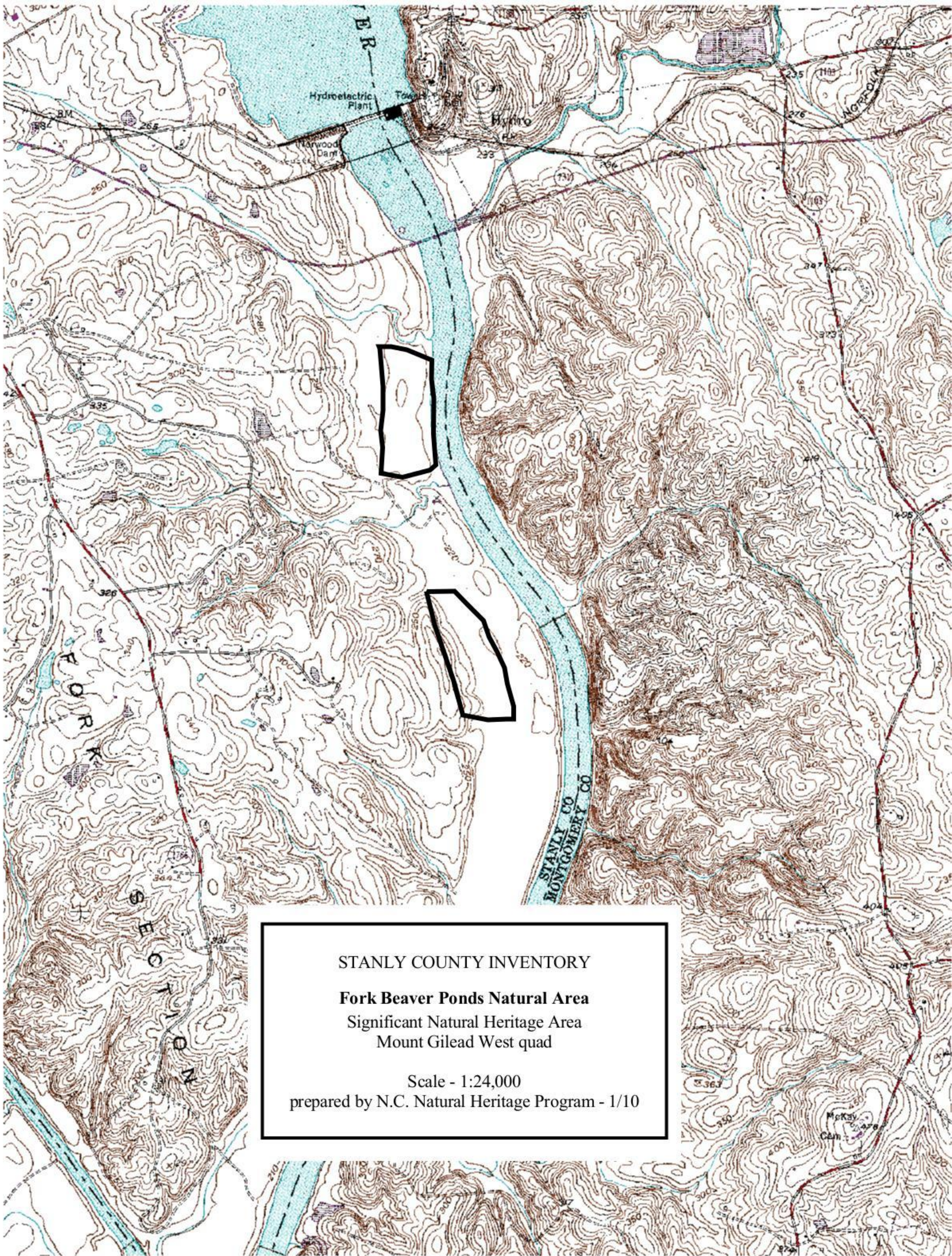
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Piedmont Monadnock Forest.

RARE PLANTS: Ringed witchgrass (*Dichanthelium annulum*), crested coralroot orchid (*Hexalectris spicata*), western rough goldenrod (*Solidago radula*).

RARE ANIMALS: None documented.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NCNHP, Raleigh.
- Sorrie, B.A. 2009. Site Survey Report: East Badin Basic Forest. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY
Fork Beaver Ponds Natural Area
Significant Natural Heritage Area
Mount Gilead West quad
Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

FORK BEAVER PONDS Significant Natural Heritage Area

Site Number: 8

Site Significance: Regional

Size: 94 acres

Quadrangle: Mount Gilead West

Ownership: Private

SIGNIFICANT FEATURES: This Significant Natural Heritage Area (SNHA) includes high quality beaver ponds in a floodplain setting. The ponds provide feeding and resting areas for waders, anhingas, and bald eagles.

LANDSCAPE RELATIONSHIPS: The site occurs ½-1 mile south of NC 731 on the west side of Pee Dee River. Bald Eagles nest just across the river in Montgomery County; they feed up and down the river and occasionally perch within the SNHA when resting.

SITE DESCRIPTION: Fork Beaver Ponds occur within the natural floodplain of the Pee Dee River. The river, however, is dammed immediately upstream (Lake Tillery Dam), and again some miles downstream (Blewett Falls Dam); water levels are regulated to provide electricity. The result is that the floodplain is now irregularly flooded.

A low but distinct levee has built up along the river and supports a narrow zone of Piedmont/Mountain Levee Forest. Dominants include cottonwood (*Populus deltoides*), now rare in the county, bitternut hickory (*Carya cordiformis*), box elder (*Acer negundo* var. *negundo*), river birch (*Betula nigra*), and hackberry (*Celtis laevigata*). Vines are numerous; river cane (*Arundinaria gigantea*) is common in patches.

Back from the levee forest are patches of disturbed Piedmont/Low Mountain Alluvial Forest, alternating with clearings and crop fields. Canopy species include tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), sweetgum (*Liquidambar styraciflua*), bitternut hickory, river birch, loblolly pine (*Pinus taeda*), and water oak (*Quercus nigra*). Vines are numerous and Chinese privet (*Ligustrum sinense*) forms thickets. Herbs are common but not particularly diverse.

In old river meanders (natural elongate depressions) beavers have built several dams. These impoundments fluctuate with rainfall (mostly dry in late summer of 2007) and support an impressive diversity of aquatic and emergent species of plants. These include swamp rose (*Rosa palustris*), sticky hedge-hyssop (*Gratiola viscidula*), waterpod (*Hydrolea quadrivalvis*), four seedboxes (*Ludwigia* spp.), yellow lotus (*Nelumbo lutea*), three smartweeds (*Persicaria* spp.), and New York Ironweed (*Vernonia noveboracensis*). At least six species of frogs breed here. Dead or dying trees have attracted great blue herons (*Ardea herodias*), great egrets (*A. alba*), and anhingas (*Anhinga anhinga*) for roosting and loafing; they also sometimes feed here. The herons nest just below the dam and are conspicuous as they forage in the riverbed north and south of NC 731.

MANAGEMENT AND PROTECTION: Care must be taken that enough water enters the wetlands to produce alternate flooding and drying; this will ensure that the beaver ponds attract the herons, anhingas, and other waterbirds.

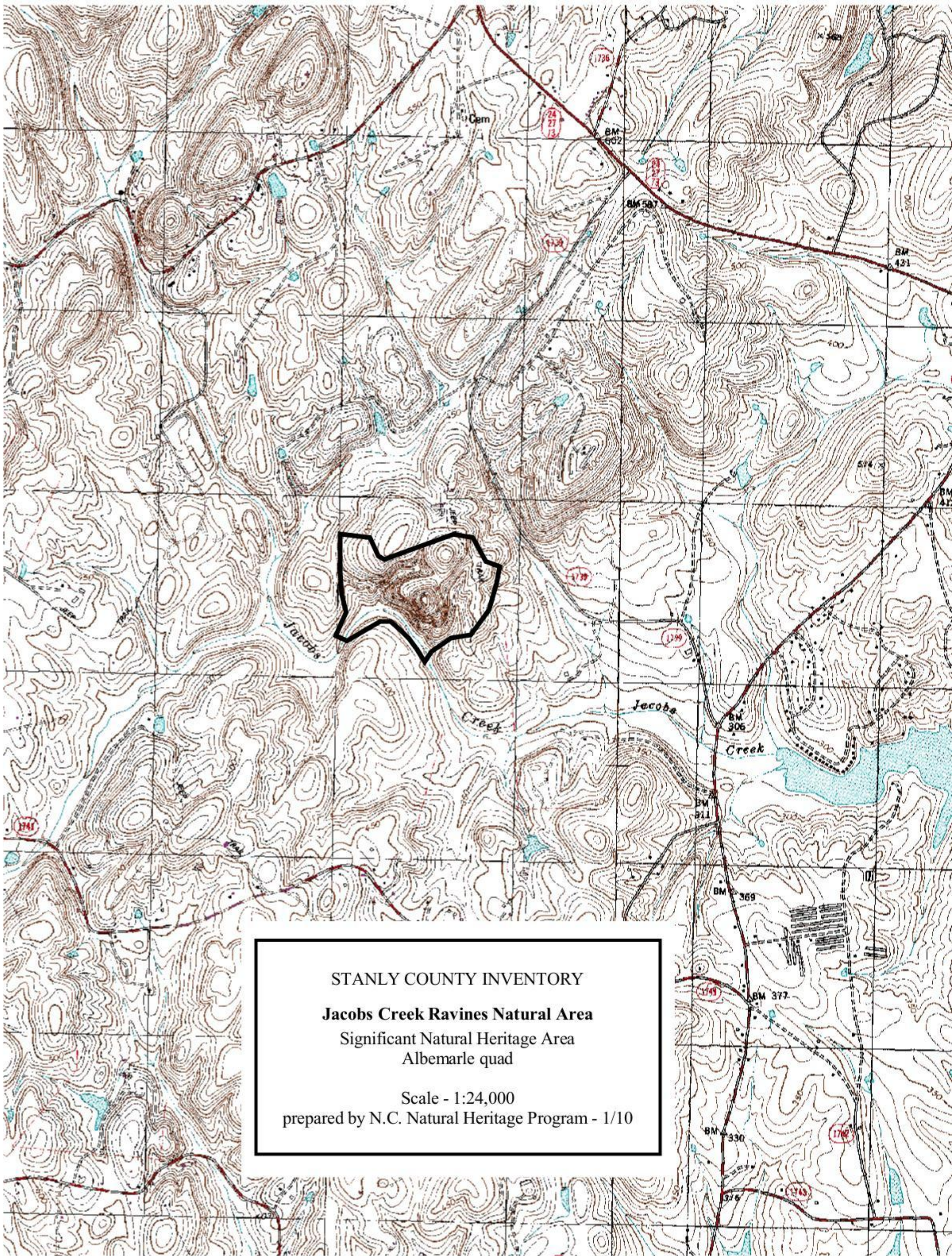
NATURAL COMMUNITIES: Piedmont/Mountain Levee Forest, Piedmont/Low Mountain Alluvial Forest, Piedmont/Mountain Semipermanent Impoundment.

RARE PLANTS: Watch List: yellow lotus (*Nelumbo lutea*).

RARE ANIMALS: Heron rookery near dam with great blue heron (*Ardea herodias*) and great egret (*Ardea alba*). Anhinga (*Anhinga anhinga*) nesting not yet confirmed but likely nearby. Bald eagles (*Haliaeetus leucocephalus*) nest across the river. All these birds feed and rest within the site boundary.

REFERENCES:

Sorrie, B.A. 2009. Site Survey Report: Fork Beaver Ponds. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY
Jacobs Creek Ravines Natural Area
Significant Natural Heritage Area
Albemarle quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

JACOBS CREEK RAVINES Significant Natural Heritage Area

Site Number: 9

Site Significance: County

Quadrangle: Albemarle

Size: 103 acres

Ownership: Private

SIGNIFICANT FEATURES: Within a small area, Jacobs Creek Ravines features a variety of upland and bottomland hardwood forests, two deep ravines, and near-vertical rock ledges. Two rare plants occur here.

LANDSCAPE RELATIONSHIPS: The site occurs on the northeast side of Jacobs Creek, a third of a mile west of McNeil Road. Via the creek and adjacent forests, there is a direct connection northwest to Union Chapel Enon Knolls Significant Natural Heritage Area.

SITE DESCRIPTION: Jacobs Creek Ravines consists of three high knolls and a ridge, divided by deep ravines. The entire south face of one of the knolls is a high rock ledge and near-vertical slope. At the base of the ledge is a rocky creek and narrow floodplain. Elevations range from 380-600 feet. While some large trees do occur, most of the forests here are middle aged to rather young.

Uppermost slopes and tops of knolls are clothed with Piedmont Monadnock Forest composed of chestnut oak (*Quercus montana*), white oak (*Q. alba*), red maple (*Acer rubrum*), and sourwood (*Oxydendrum arboreum*). Due to extensive deer browse, there are few shrubs and herbs.

The ravine slopes are largely covered with Dry-Mesic Oak-Hickory Forest, composed of white oak, red oak (*Quercus rubra*), pignut hickory (*Carya glabra*), and shortleaf pine (*Pinus echinata*) canopy; and witch hazel (*Hamamelis virginiana*) (very numerous), sourwood, and dogwood (*Cornus florida*) subcanopy. Grasses and herbs form moderate ground cover. On one side slope, large witch-alders (*Fothergilla major*) are present; this species is rare in NC.

Ravine lower slopes and creeksides have higher nutrient soils and support Mesic Mixed Hardwood Forest. Canopy trees include tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), white oak, red oak, and white ash (*Fraxinus americana*), with chalk maple (*Acer leucoderme*) and dogwood in the understory. Christmas fern (*Polystichum acrostichoides*) is common but other herbaceous species are uncommon.

The most significant habitat here is the Piedmont/Coastal Plain Acidic Cliff. It faces southwest and so gets hot sun during mid-day and afternoon. Shallow soil makes it difficult for woody plants to get a hold, and they are generally stunted. Dominant trees are shortleaf pine, scrub pine (*Pinus virginiana*), red cedar (*Juniperus virginiana*), and some southern red oak (*Quercus falcata*). The canopy is partially open to open, providing sunny areas around the ledges. Sparkleberry (*Vaccinium arboreum*) is a common shrub. Little bluestem (*Schizachyrium*

scoparium), silky oatgrass (*Danthonia sericea*), and a number of herbs are found throughout the openings. Southern harebell (*Campanula divaricata*) is frequent on ledges.

At the bottom of the ledges is Jacobs Creek and a narrow floodplain that gets wet following heavy rainfall. The forest here is Piedmont Alluvial Forest, composed of sweetgum (*Liquidambar styraciflua*), tulip poplar, sycamore (*Platanus occidentalis*), and red maple, with ironwood (*Carpinus caroliniana*) in the understory. Bladdernut (*Staphylea trifolia*), normally a scarce shrub or small tree, is numerous here. Chinese privet (*Ligustrum sinense*) is common but very short. On the forest floor are many spring-flowering plants, such as dimpled trout-lily (*Erythronium umbilicatum*).

MANAGEMENT AND PROTECTION: On mid to upper slopes there is overbrowsing by deer, such that one sees very few seedling trees, shrubs, and herbs. For the health of the forest it is necessary to cull deer on a regular basis.

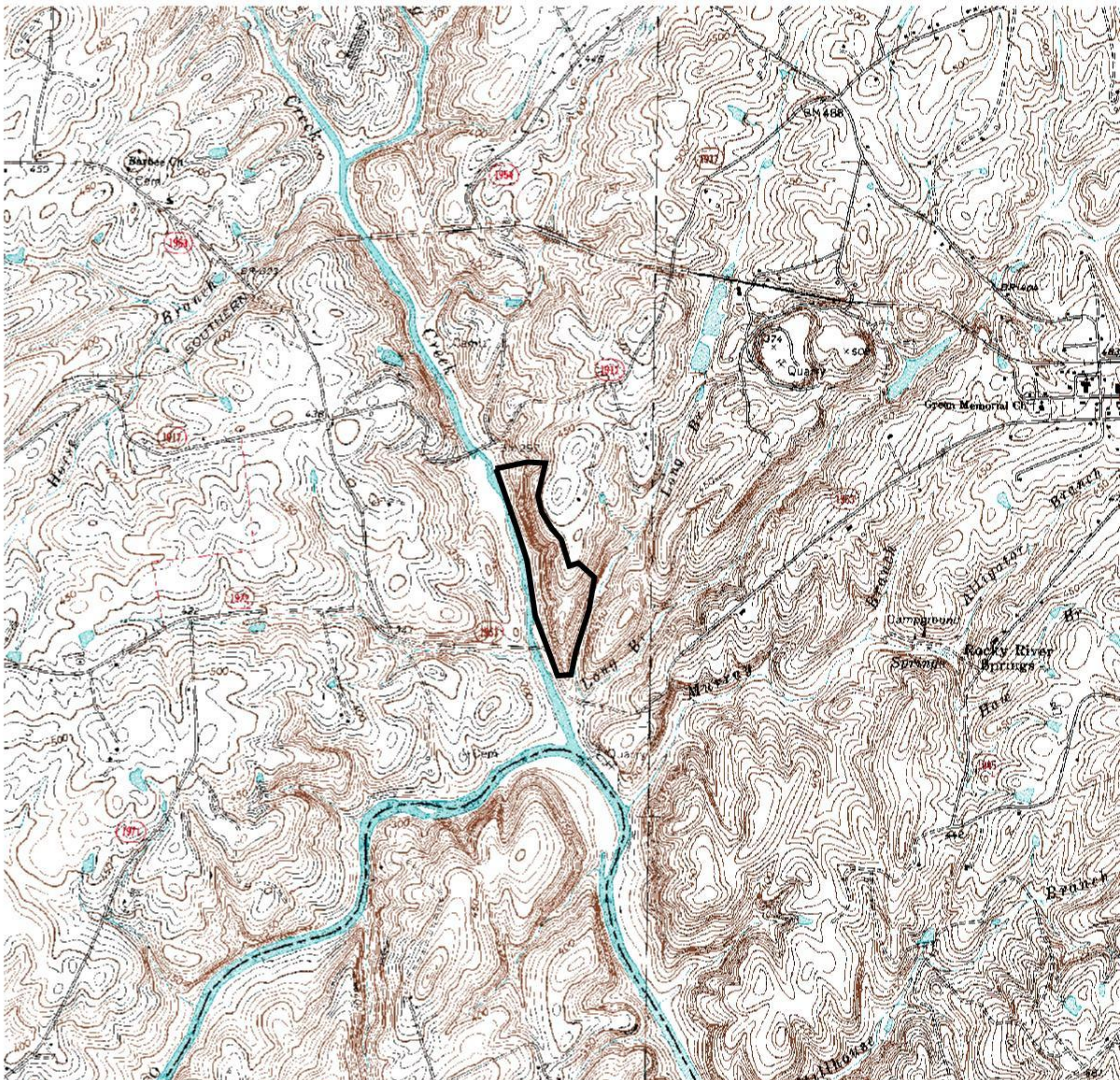
NATURAL COMMUNITIES: Dry-Mesic Oak-Hickory Forest, Mesic Mixed Hardwood Forest, Piedmont/Low Mountain Alluvial Forest, Piedmont/Coastal Plain Acidic Cliff, Piedmont Monadnock Forest.

RARE PLANTS: Ravine sedge (*Carex impressinervia*), large witch-alder (*Fothergilla major*).

RARE ANIMALS: None documented.

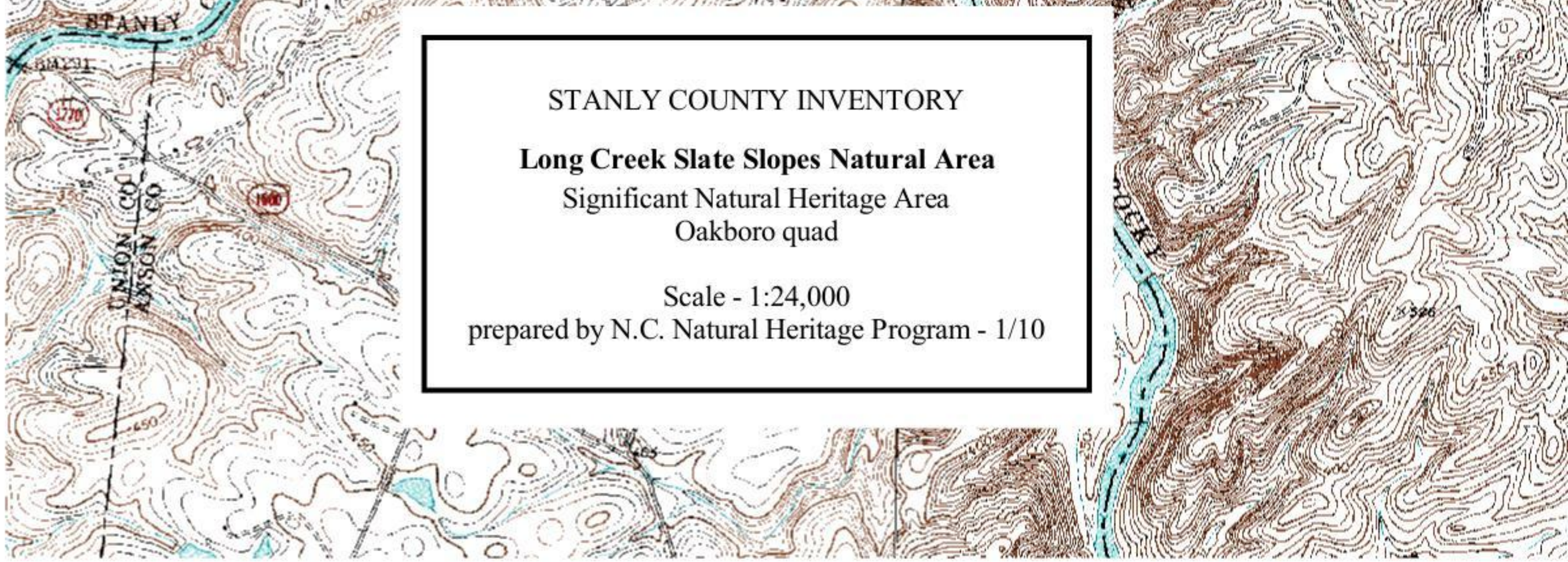
REFERENCES:

Sorrie, B.A. 2009. Site Survey Report: Jacobs Creek Ravines. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY
Long Creek Slate Slopes Natural Area
Significant Natural Heritage Area
Oakboro quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10



Stanly County Natural Area Inventory

LONG CREEK SLATE SLOPES Significant Natural Heritage Area

Site Number: 10

Site Significance: Regional

Quadrangle: Oakboro

Size: 47 acres

Ownership: Private

SIGNIFICANT FEATURES: This is one of only a handful of sites in North Carolina where Virginia spiderwort (*Tradescantia virginiana*) grows. It features a very good quality Basic Oak-Hickory community and Basic Piedmont Bluff Glade, a large population of piedmont aster (*Eurybia mirabilis*), plus two Watch List plant species.

LANDSCAPE RELATIONSHIPS: Long Creek Slate Slopes occurs on the east side of Long Creek, north of the confluence with Rocky River and south of Bethlehem Church Road. A former rock quarry lies just to the south.

SITE DESCRIPTION: The site consists of a west-facing slope about 0.7 mile long and about 150 feet high. Long Creek runs along the base; it is a rocky piedmont stream with a very narrow floodplain that supports typical alluvial forest. Soil on the slopes is derived from slate rock and has abundant small chips in it.

Slopes are forested mainly with Basic Oak-Hickory Forest community. Dominants in this middle aged forest are white oak (*Quercus alba*), red oak (*Q. rubra*), and pignut hickory (*Carya glabra*), with chestnut oak (*Q. montana*) and shortleaf pine (*Pinus echinata*) on mid to upper slopes. Understory trees include redbud (*Cercis canadensis*), red cedar (*Juniperus virginiana*), chalk maple (*Acer leucoderme*), and winged elm (*Ulmus alata*). Shrubs are relatively sparse except for painted buckeye (*Aesculus sylvatica*) downslope and sparkleberry (*Vaccinium arboreum*) upslope. The herb layer varies from sparse to dense; common species include violet wood-sorrel (*Oxalis violacea*), yellow wood-sorrel (*O. stricta*), little brown jugs (*Hexastylis arifolia*), and wild oregano (*Cunila origanoides*); rarer species include Catesby's trillium (*Trillium catesbaei*), black cohosh (*Actaea racemosa*), coralvine (*Lonicera sempervirens*), and State Threatened Virginia spiderwort (*Tradescantia virginiana*).

The southern end of the site forms a ridge that slopes southward. Since it receives direct sun for most of the day, it has drier soil that is able to support only a short, relatively open woodland of pignut hickory, chestnut oak, red cedar, red maple, and chalk maple. This Basic Piedmont Bluff Glade has a grassy herb layer throughout and a good diversity of flowering plants, including wild oregano, nodding onion (*Allium cernuum*), feverfew (*Parthenium integrifolium*), bracted skullcap (*Scutellaria ovata* ssp. *bracteata*, Watch List), rattlesnake hawkweed (*Hieracium venosum*), and black needlegrass (*Piptochaetium avenaceum*).

MANAGEMENT AND PROTECTION: Protection can be achieved through simple easement. For the moment, little management is needed except to eliminate ATV traffic.

NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Piedmont Basic Bluff Glade.

RARE PLANTS: Piedmont indigo-bush (*Amorpha schwerinii*, historical), Missouri rockcress (*Boechnera missouriensis*, historical), piedmont aster (*Eurybia mirabilis*), Virginia spiderwort (*Tradescantia virginiana*); Watch List: bracted skullcap (*Scutellaria ovata* ssp. *bracteata*), Carolina pink (*Silene caroliniana* var. *caroliniana*).

RARE ANIMALS: None documented.

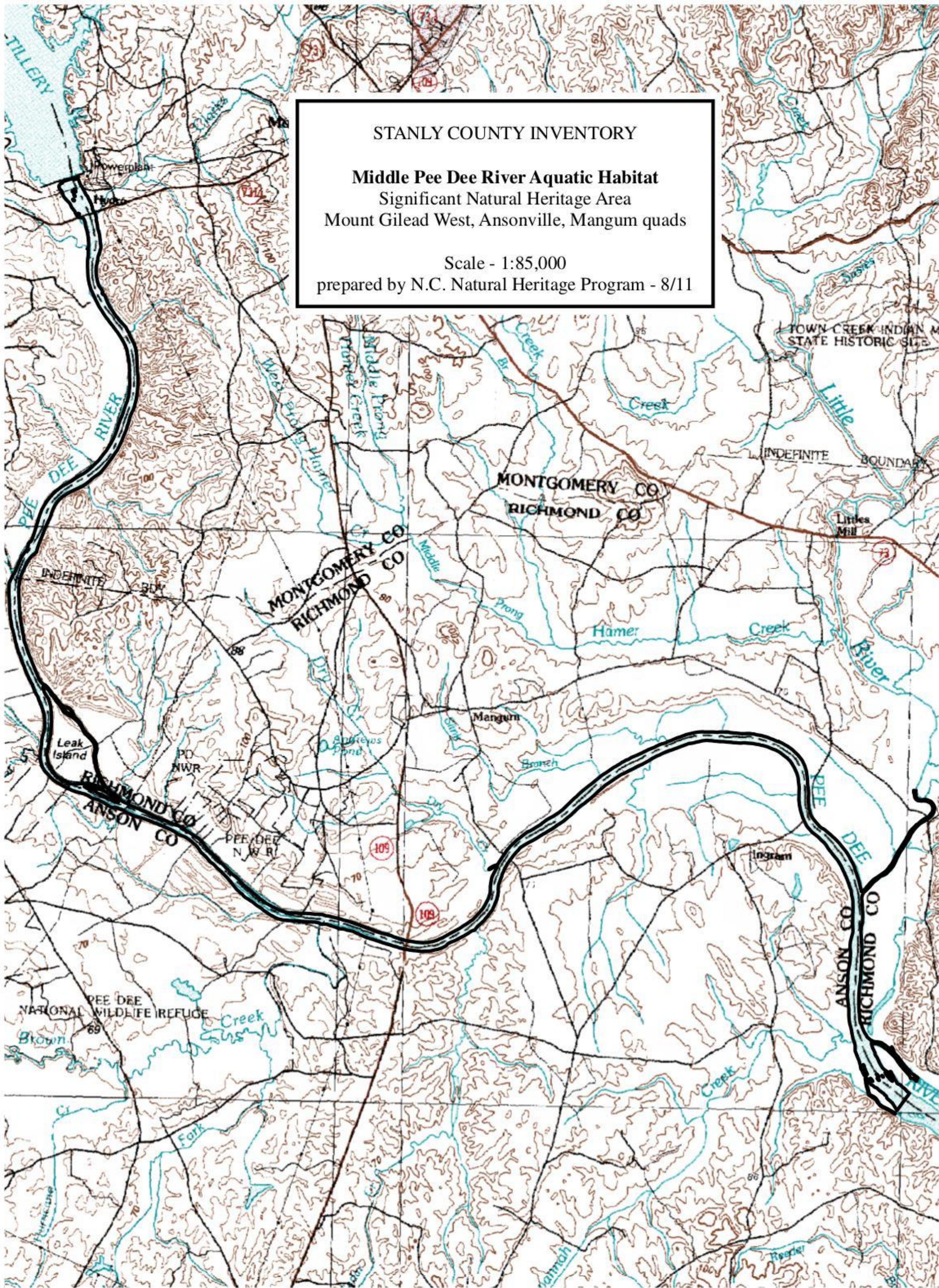
REFERENCES:

Sorrie, B.A. 2009. Site Survey Report: Long Creek Slate Slopes. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.

STANLY COUNTY INVENTORY

Middle Pee Dee River Aquatic Habitat
Significant Natural Heritage Area
Mount Gilead West, Ansonville, Mangum quads

Scale - 1:85,000
prepared by N.C. Natural Heritage Program - 8/11



Stanly County Natural Area Inventory

MIDDLE PEE DEE RIVER AQUATIC HABITAT Significant Natural Heritage Area

Site Number: 11

Site Significance: Regional

Size: 22.5 river miles

Quadrangle: Mount Gilead West,
Ansonville, Mangum

Ownership: North Carolina Public Waters

SIGNIFICANT FEATURES: Middle Pee Dee River Aquatic Habitat contains a diversity of rare aquatic species, including the State Endangered yellow lampmussel (*Lampsilis cariosa*) and Carolina creekshell (*Villosa vaughaniana*); State Threatened Carolina redhorse (*Moxostoma sp.*); State Threatened alewife floater (*Anodonta implicata*), Roanoke slabshell (*Elliptio roanokensis*), eastern lampmussel (*Lampsilis radiata*), eastern pondmussel (*Ligumia nasuta*), and creeper (*Strophitus undulatus*); State Special Concern pod lance (*Elliptio folliculata*); Significantly Rare eastern creekshell (*Villosa delumbis*) and a valvatid snail (*Valvata sincera*).

LANDSCAPE RELATIONSHIPS: The Aquatic Habitat begins on the mainstem Pee Dee River at Norwood Dam (impounds Lake Tillery) and extends 21 river miles downstream to the backwaters of Blewett Falls Lake. It also includes the lower approximately 1.5 river miles of Little River, due to the presence of rare species in this tributary. The Aquatic Habitat is part of the Yadkin-Pee Dee River Basin and entirely within the Piedmont Ecoregion. The following Significant Natural Heritage Areas (SNHAs) are located adjacent: Grassy Islands/Smith Lake, Lower Little River (Richmond) Corridor, Lower Little River (Montgomery) Aquatic Habitat, Pee Dee National Wildlife Refuge (includes 4 SNHAs). The Aquatic Habitat watershed supports a mixture of agriculture and forest.

SITE DESCRIPTION: The habitats within the Pee Dee River are varied, complex, and consist of many boulders, cobble, and gravel shoals. The Pee Dee River and its tributaries contain a variety of aquatic habitats that support a large diversity of organisms. In addition to the species noted above, the waters support the following animals, collected during recent monitoring efforts by N.C. Division of Water Quality and N.C. Wildlife Resources Commission:

Fishes: (based on 1999 sampling in Little River only) rosieside dace (*Clinostomus funduloides*), whitefin shiner (*Cyprinella nivea*), gizzard shad (*Dorosoma cepedianum*), fantail darter (*Etheostoma flabellare*), tessellated darter (*E. olmstedii*), highback chub (*Hybopsis hypsinotus*), redbreast sunfish (*Lepomis auritus*), warmouth (*L. gulosus*), bluegill (*L. macrochirus*), largemouth bass (*Micropterus salmoides*), bluehead chub (*Nocomis leptcephalus*), Piedmont darter (*Percina crassa*).

Mussels: Carolina lance (*Elliptio angustata*), eastern Elliptio (*Elliptio complanata*), variable spike (*E. icterina*), Atlantic spike (*E. producta*), lanceolate Elliptio, eastern floater (*Pyganodon cataracta*), Florida pondhorn (*Uniomereus carolinianus*), paper pondshell (*Utterbackia imbecillis*).

Crayfishes: *Cambarus (Puncticambarus) sp. C.*

Snails: mud amnicola (*Amnicola limosa*), *Physella sp.*, mossy valvata (*Valvata sp. cf. sincera*), bugle sprite (*Micromenetus dilatatus*), Japanese mysterysnail (*Cipangopaludina japonica*) (invasive exotic species).

MANAGEMENT AND PROTECTION: There is a mixture of private and public lands surrounding this SNHA. The Land Trust for Central North Carolina holds an easement (over 150 acres) on the Anson County side of the river, approximately one mile below Norwood Dam. Additionally, the Pee Dee National Wildlife Refuge is a nationally significant public land holding that consists of over 8,500 acres on both the Anson and Richmond sides of the River. The Pee Dee River is highly regulated due to numerous hydroelectric dams in the watershed. Flows in the river have historically experienced significant fluctuations, even on a daily basis. Through the Federal Energy Regulatory Commission process, the hydroelectric facility at Norwood dam, will establish higher minimum flows and spawning flows in the spring to more closely mimic natural conditions.

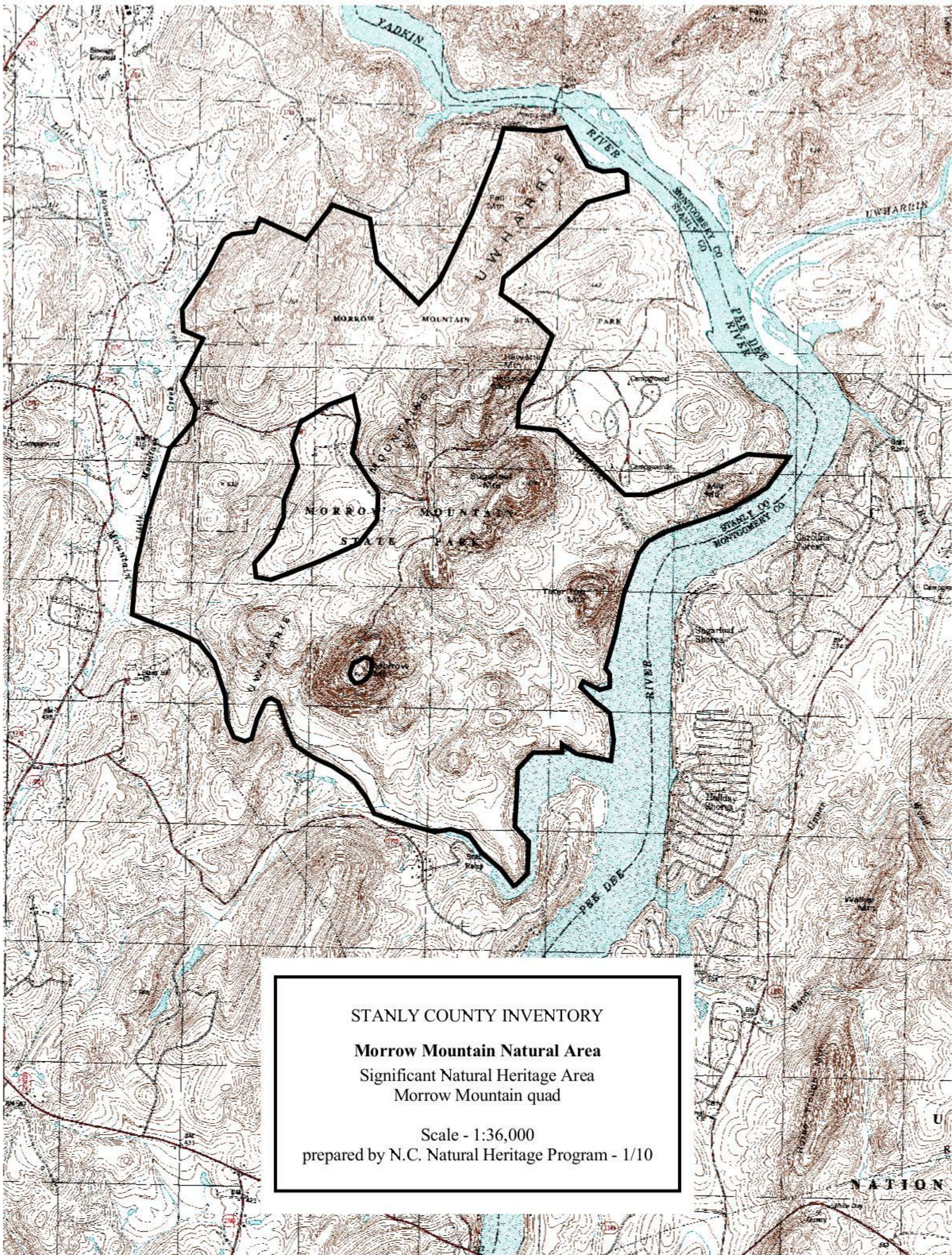
NATURAL COMMUNITIES: Several types of floodplain and bottomland forest communities occur on adjacent river terraces.

RARE PLANTS: None documented from within the Aquatic Habitat. Several species occur on adjacent river terraces and slopes.

RARE ANIMALS: Carolina redbreast (*Moxostoma sp.*), Alewife floater (*Anodonta implicata*), pod lance (*Elliptio folliculata*), Roanoke slabshell (*E. roanokensis*), yellow lampmussel (*Lampsilis cariosa*), eastern lampmussel (*L. radiata*), eastern pondmussel (*Ligumia nasuta*), creeper (*Strophitus undulatus*), eastern creekshell (*Villosa delumbis*), Carolina creekshell (*V. vaughaniana*), a valvatid snail (*Valvata sincera*).

REFERENCES:

- LeGrand, H.E., S.P. Hall, S.E. McRae, and J.T. Finnegan. 2008. Natural Heritage Program List of the Rare Animal Species of North Carolina. North Carolina Department of Environment and Natural Resources, Natural Heritage Program, Raleigh, NC.
- North Carolina Division of Water Quality (NCDWQ). 2007. Basinwide Assessment Report, Yadkin River Basin. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, NC.
- North Carolina Division of Water Quality (NCDWQ). 2008. Yadkin-Pee Dee River Basinwide Water Quality Plan. North Carolina Department of Environment and Natural Resources, Division of Water Quality, Raleigh, NC.
- North Carolina Wildlife Resources Commission (NCWRC). Unpublished survey data in Aquatics Database.



STANLY COUNTY INVENTORY
Morrow Mountain Natural Area
Significant Natural Heritage Area
Morrow Mountain quad

Scale - 1:36,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

MORROW MOUNTAIN NATURAL AREA Significant Natural Heritage Area

Site Number: 12

Site Significance: National

Quadrangle: Morrow Mountain, Badin

Size: 3761 acres

Ownership: N.C. Division of Parks and
Recreation, private

SIGNIFICANT FEATURES: Morrow Mountain Significant Natural Heritage Area (SNHA) ranks high due to a combination of features: bald eagle nesting and foraging habitat; high quality examples of rare communities (8 community types are tracked by NCNHP); 9 N.C. rare plant species including the Federal Candidate and State Threatened Yadkin River goldenrod (*Solidago plumosa*); and Federal Species of Concern ravine sedge (*Carex impressinervia*), one of the two largest populations known. Also, the SNHA contains highly significant archeological sites and Indian stone quarries.

LANDSCAPE RELATIONSHIPS: This section of the Yadkin/Pee Dee River is an important foraging habitat for bald eagles (*Haliaeetus leucocephalus*) (see Pee Dee River Bald Eagle Habitat SNHA description). Across the river from the State Park lies the Uwharrie National Forest, also nationally significant. South and southwest are other Significant Natural Heritage Areas: Stony Hill Church Hardwoods, Stony Mountain, River Haven Ridge, and Union Chapel Enon Knolls. Together these areas form a landscape of very high biodiversity and importance.

SITE DESCRIPTION: This SNHA includes much of the State Park plus some adjacent private land. It lies within the Uwharrie Mountains region immediately west of Yadkin/Pee Dee River. The Yadkin becomes the Pee Dee where the former joins the Uwharrie River, opposite the Park boat launch. The Park is mountainous, with rounded peaks and ridges that rise 500-600 feet above surrounding lowlands. At 936 feet Morrow Mountain is the highest point. A major stream, Mountain Creek, drains the west and south sides of the Park and has created a narrow floodplain south of Morrow Mountain. Sugarloaf Creek and several other seasonal creeks drain the uplands. The geology of the Park is volcanic in origin; eastern mountains and ridges generally produce acidic soils, whereas Biles Mountain to the west produces circumneutral soils. Rocks and boulders are a prominent feature of the land surface.

Forests of the uplands are mostly dry oak-hickory, usually with a significant pine component. White oak (*Quercus alba*), post oak (*Q. stellata*), pignut hickory (*Carya glabra*), red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), shortleaf pine (*Pinus echinata*), and Virginia pine (*P. virginiana*) are dominant. North-facing slopes and ravines are usually clothed with dense thickets of mountain laurel (*Kalmia latifolia*). Most summits support a Piedmont Monadnock Forest of chestnut oak (*Quercus montana*), white oak, pignut hickory, sourwood (*Oxydendrum arboreum*), red maple, and scattered pines. Sparkleberry (*Vaccinium arboreum*) and hillside blueberry (*V. pallidum*) are common shrubs. However, the shrub and the herb layers have been severely depleted by deer overbrowsing; there is a sharp browse line about 6-7 feet above ground throughout the Park. Small inter-mountain flats and depressions in saddles collect water and

support Upland Depression Swamp Forest communities; five have been documented to date. Willow oak (*Quercus phellos*) and some red maple form a loose canopy over dense sedges (*Carex jorii* and other species) and various wetland herbs.

In the higher pH soils of Biles Mountain (which is 2/3 within the Park, 1/3 out), the oak-hickory forest is modified by having less post oak, red maple, and fewer pines (sometimes none), but instead has southern shagbark hickory (*Carya carolinae-septentrionalis*) in the canopy and chalk maple (*Acer leucoderme*), hop hornbeam (*Ostrya virginiana*), and redbud (*Cercis canadensis*) in the understory. Herbs, especially grasses, are locally plentiful where they are not overbrowsed. Natural communities here include Basic Oak-Hickory Forest and Xeric Hardpan Forest. The Xeric Hardpan Forest on Biles is the largest such community in the state and one of the best.

Lower slopes and lowlands tend to have somewhat more nutrient-rich soils and produce Dry-Mesic Oak-Hickory Forest or, locally along creeks, Mesic Mixed Hardwood Forest. These are notable in having large populations of an uncommon grass, longleaf spikegrass (*Chasmanthium sessiliflorum*). Red oak (*Quercus rubra*), ironwood (*Carpinus caroliniana*), and other species of mesic or moist soils are prominent. Good examples are along Kron Creek and tributaries of Mountain Creek. Mountain Creek overflows on occasion and has a well-developed but narrow floodplain forest of green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), and tulip poplar (*Liriodendron tulipifera* var. *tulipifera*). It grades into the mesic hardwoods community, producing a diverse woody canopy and a subcanopy of ironwood and scattered cucumber magnolia (*Magnolia acuminata*). Herbs and sedges and grasses tend to form dense carpets, notably ravine sedge.

MANAGEMENT AND PROTECTION: Deer pose the greatest threat to the ecology of the area. 1) There is practically no tree recruitment, and a sharp browse line extends to 6-7 feet over the Park. 2) There is a very large tick population, which may present a threat of tick-borne diseases. 3) Herb diversity is severely suppressed over most of the SNHA but especially within it.

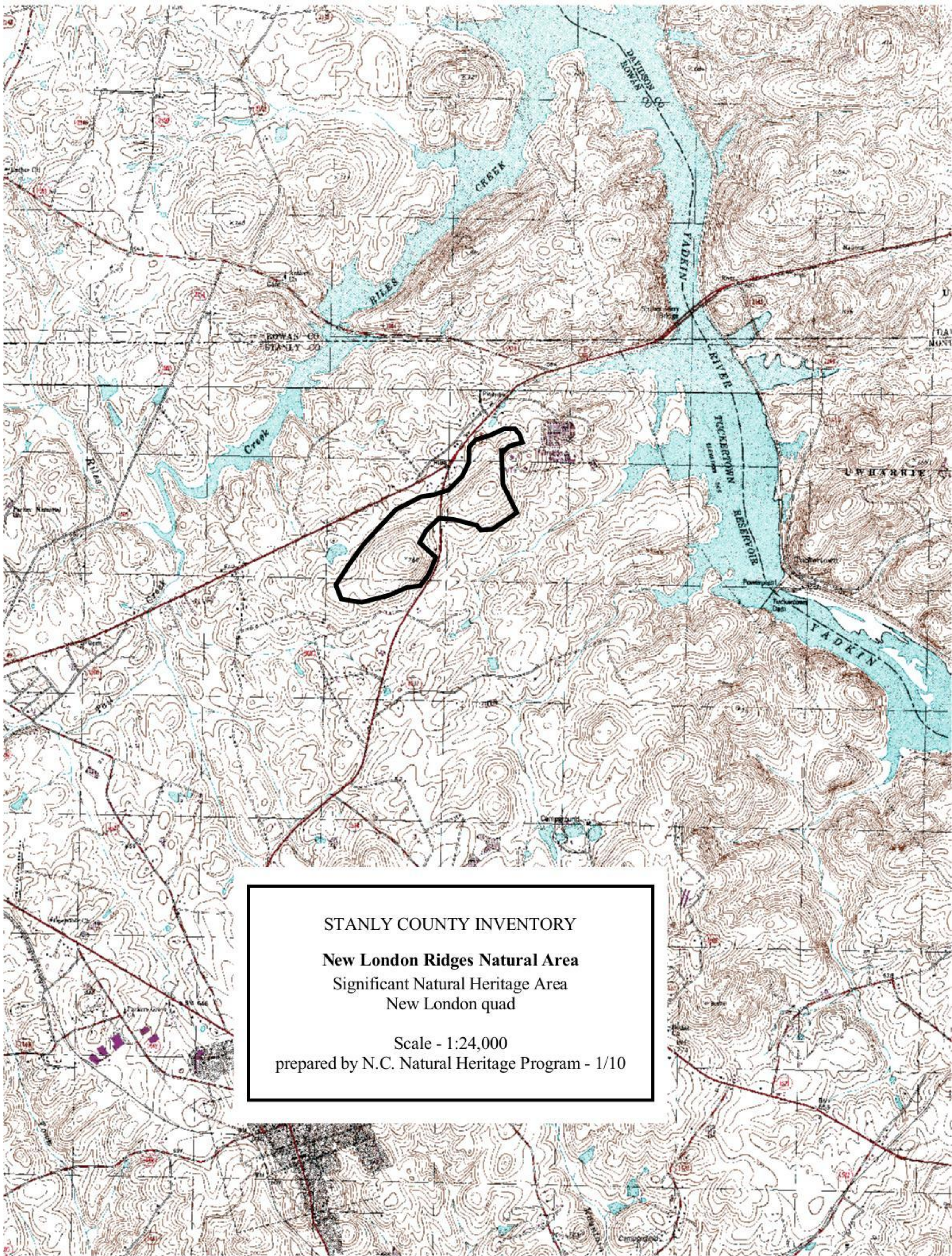
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Dry Oak-Hickory Forest, Dry-Mesic Oak-Hickory Forest, Mesic Mixed Hardwood Forest, Piedmont/Low Mountain Alluvial Forest, Piedmont/Coastal Plain Heath Bluff, Piedmont Monadnock Forest, Upland Depression Swamp Forest, Xeric Hardpan Forest.

RARE PLANTS: Carolina birdfoot-trefoil (*Acmispon helleri*), piedmont indigo-bush (*Amorpha schwerinii*), terrestrial starwort (*Callitriche terrestris*), Bush's sedge (*Carex bushii*), ravine sedge (*C. impressinervia*), ringed witchgrass (*Dichanthelium annulum*), crested coralroot (*Hexalectris spicata*), glade milkvine (*Matelea decipiens*), Yadkin River goldenrod (*Solidago plumosa*).

RARE ANIMALS: Timber rattlesnake (*Crotalus horridus*), bald eagle (*Haliaeetus leucocephalus*).

REFERENCES:

- Morgan, J.T. 1962. A Vascular Flora of Morrow Mountain State Park, Stanly County, North Carolina. Master's degree thesis, UNC-Chapel Hill.
- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: Morrow Mountain Natural Areas. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY

New London Ridges Natural Area
Significant Natural Heritage Area
New London quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

NEW LONDON RIDGES Significant Natural Heritage Area

Site Number: 13

Site Significance: Regional

Quadrangle: New London

Size: 187 acres

Ownership: Private

SIGNIFICANT FEATURES: New London Ridges Significant Natural Heritage Area has the second-largest example of Xeric Hardpan Forest in Stanly County. The site contains populations of three rare plants. One of these, western rough goldenrod (*Solidago radula*), occurs in N.C. only in Stanly and Montgomery counties, hundreds of miles distant from the next nearest populations west of the Appalachians.

LANDSCAPE RELATIONSHIPS: This site occurs one mile west of Tuckertown Reservoir, an impoundment of the Yadkin River.

SITE DESCRIPTION: Two rocky ridges occur on either side of NC 8, just south of NC 49. The generally shallow rocky soils and lack of soil moisture restrict forest height and density. Summit ridges produce Xeric Hardpan Forest (XHF), so-called because the soil becomes dry and very firm during periods of drought. Dominants include southern shagbark hickory (*Carya carolinae-septentrionalis*), pignut hickory (*C. glabra*), and post oak (*Quercus stellata*). Chalk maple (*Acer leucoderme*) forms a loose understory, while shrubs are sparse. Black needlegrass (*Piptochaetium avenaceum*) forms a dense ground layer, along with scattered flowering herbs and other grasses. XHF occupies most of the upper slopes and summit of the eastern ridge, but only a small shelf on the western ridge.

The rest of the slopes of both ridges support Basic Oak-Hickory Forest, composed of many of the same species as XHF, but also with white oak (*Q. alba*), red oak (*Q. rubra*), and white ash (*Fraxinus americana*). Chalk maple, dogwood (*Cornus florida*), and redbud (*Cercis canadensis*) form a well-defined subcanopy layer. Shrubs are more numerous than in XHF and muscadine grape (*Vitis rotundifolia*) is abundant.

MANAGEMENT AND PROTECTION: Much of the southern slope of the eastern ridge was cut some years ago, leaving a patchwork of saplings, brier thickets, and grassy openings. It would be very interesting to conduct a controlled burn to restore flowering herbs and grasses. All of the forests could benefit from reducing the abundance of muscadine grape.

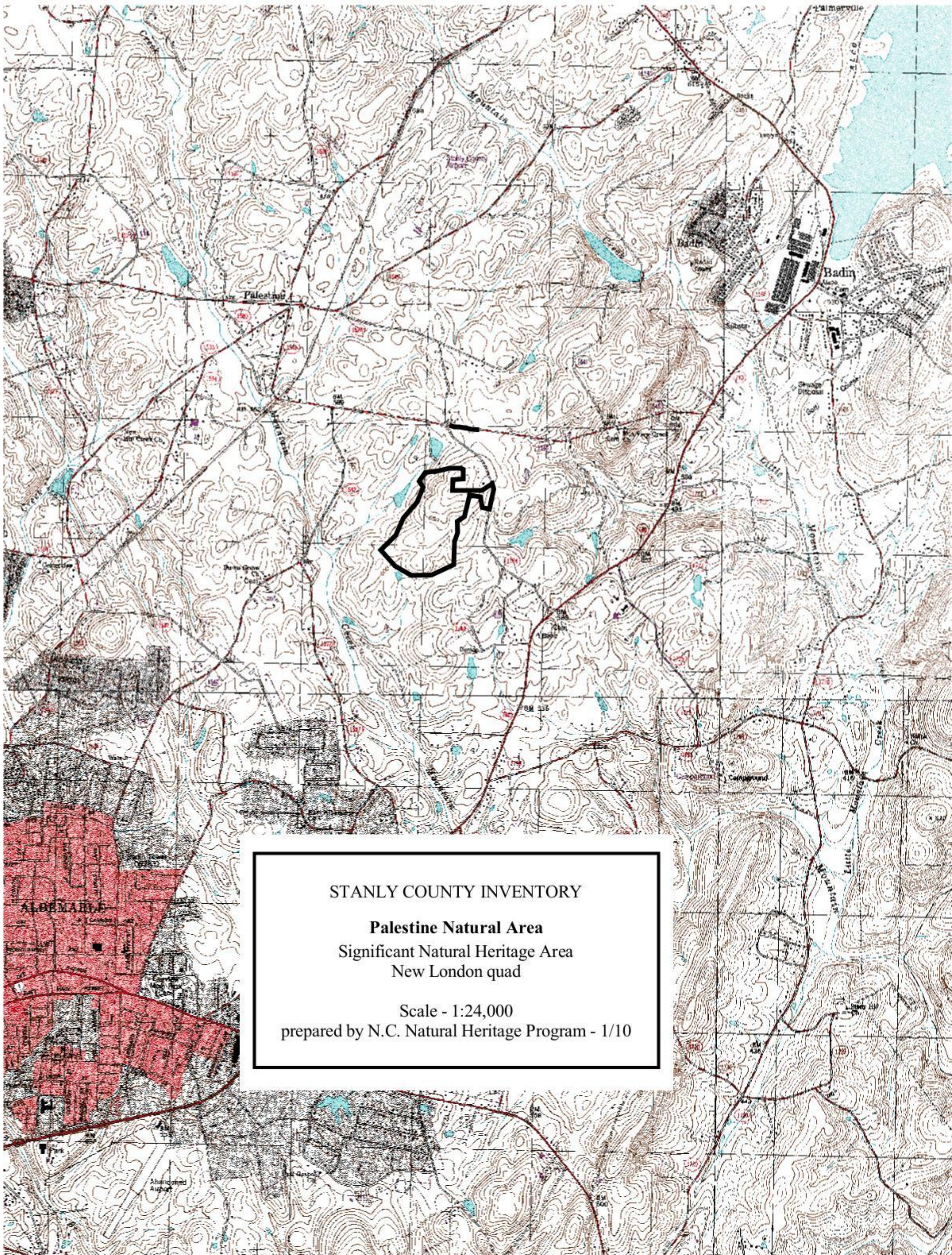
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Xeric Hardpan Forest.

RARE PLANTS: Piedmont indigo-bush (*Amorpha schwerinii*), western rough goldenrod (*Solidago radula*), narrowleaf aster (*Symphotrichum laeve* var. *concinnum*, historical).

RARE ANIMALS: Timber rattlesnake (*Crotalus horridus*), historical.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: New London Ridges. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY

Palestine Natural Area
Significant Natural Heritage Area
New London quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

PALESTINE RARE PLANT SITE Significant Natural Heritage Area

Site Number: 14

Site Significance: State

Quadrangle: New London

Size: 100 acres

Ownership: Private

SIGNIFICANT FEATURES: Palestine Rare Plant Site has a population of the federally endangered Schweinitz's sunflower (*Helianthus schweinitzii*), plus populations of two other state rare plants. It supports the only known remaining population of Indian paintbrush (*Castilleja coccinea*) in Stanly County.

LANDSCAPE RELATIONSHIPS: The site occurs about one mile southeast of Palestine and two to three miles northeast of Albemarle; southwest of the intersection Mountain View Church Road and Kirk Road.

SITE DESCRIPTION: This Significant Natural Heritage Area is a mostly forested patch located in a pastoral landscape. The topography is flat upland and gentle south-facing slopes. The mature hardwood canopy covers the entire site except for an artificially created opening that is about five acres in size. Schweinitz's sunflower, a federally endangered plant species, grows in this opening and along Kirk and Mountain View Church Roads. The artificial opening provides restoration potential for the Schweinitz's sunflower population and could serve as a U.S. Fish and Wildlife Service recovery site located on private property.

Most of the site supports a Basic Oak-Hickory Forest and numerous plant species that are characteristic of mafic geology (volcanic rocks high in certain minerals such as magnesium and manganese). The mature, hardwood canopy is dominated by white oak (*Quercus alba*), pignut hickory (*Carya glabra*), and Carolina shagbark hickory (*Carya carolinae-septentrionalis*). Downy arrow-wood (*Viburnum rafinesquianum*) is the dominant shrub in the understory, along with fragrant sumac (*Rhus aromatica*).

Two natural depressions are located here. These seasonally inundated pools support an Upland Depression Swamp Forest, dominated by willow oak (*Quercus phellos*). Sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and black gum (*Nyssa sylvatica*) are common in the canopy and subcanopy. The shrub layer is very sparse. A species of sedge (*Carex jorii*) is dominant in the herb layer.

MANAGEMENT AND PROTECTION: Control the invasive plant species in the opening where some Schweinitz's sunflowers are located. Restore the opening with seeds collected along Kirk or Mountain View Church Roads. Seek technical advice and determine if it is feasible to conduct prescribed burns in this area.

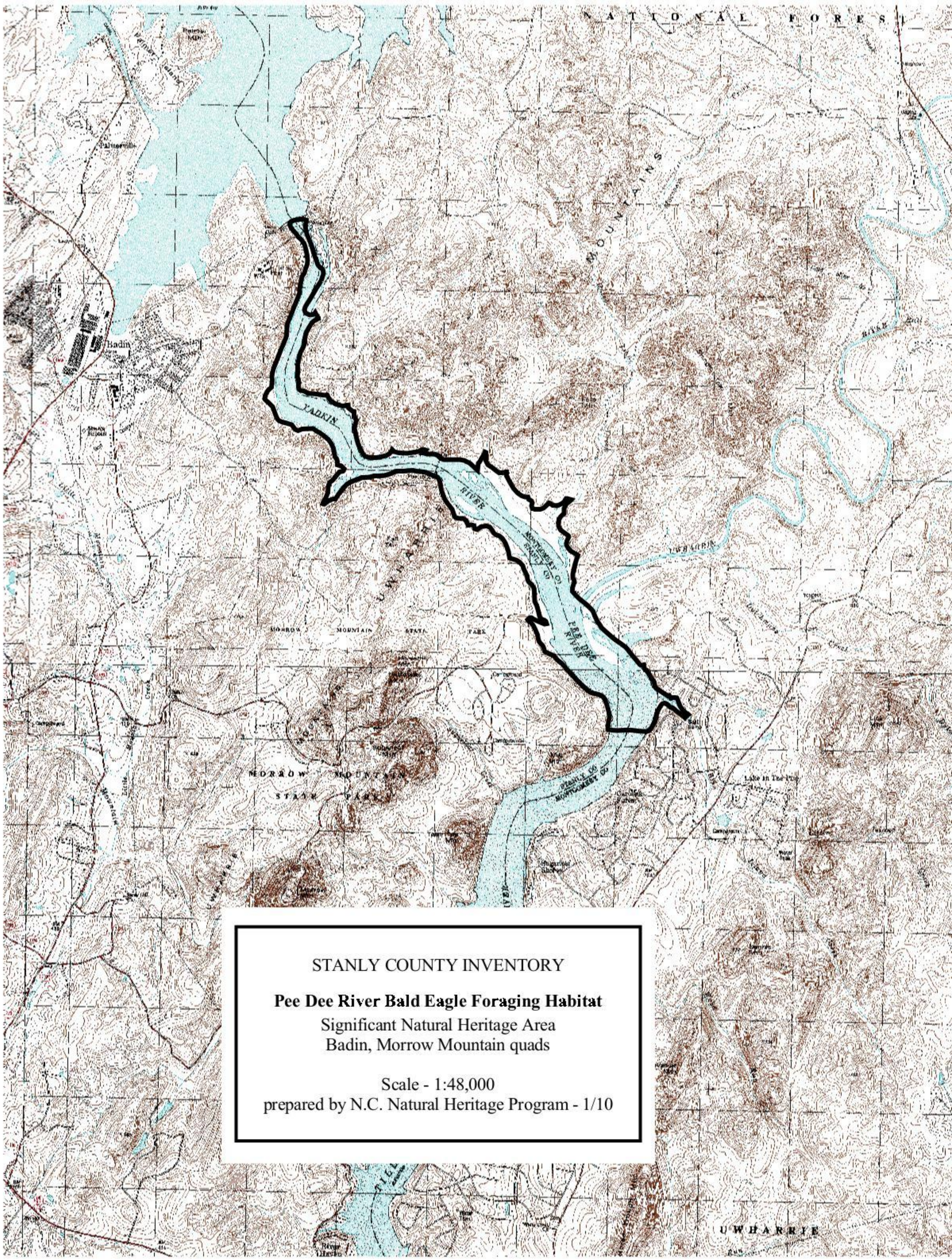
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Upland Depression Swamp Forest.

RARE PLANTS: Bush's sedge (*Carex bushii*), terrestrial starwort (*Callitriche terrestris*), Schweinitz's sunflower (*Helianthus schweinitzii*).

RARE ANIMALS: None documented.

REFERENCES:

Bates, M. 2006. Site Survey Report: Palestine Rare Plant Site. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY

Pee Dee River Bald Eagle Foraging Habitat
 Significant Natural Heritage Area
 Badin, Morrow Mountain quads

Scale - 1:48,000
 prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

PEE DEE RIVER BALD EAGLE FORAGING HABITAT Significant Natural Heritage Area

Site Number: 15

Site Significance: Regional

Size: 809 acres

Quadrangle: Badin, Morrow Mountain

Ownership: ALCOA, N.C. Division of
Parks and Recreation, private

SIGNIFICANT FEATURES: As its name implies, this is an important bald eagle feeding and wintering area. Also, eagles have nested along this stretch of river for nearly a decade. The Rocky Bar and Shore community, which is alternately flooded and exposed, supports a few populations of Yadkin River goldenrod (*Solidago plumosa*), which occurs nowhere else in the world but in this canyon.

LANDSCAPE RELATIONSHIPS: Flanking this Significant Natural Heritage Area are two nationally significant reserves: Uwharrie Mountains National Forest and Morrow Mountain State Park. Within these larger areas are many important designated natural areas, such as the Yadkin River Scour Banks on the Montgomery County side and the Morrow Mountain Natural Areas on the Stanly side.

SITE DESCRIPTION: Pee Dee River Bald Eagle Foraging Habitat encompasses the width of the Yadkin and Pee Dee Rivers from Narrows Dam down to Mill Mountain. Adjacent slopes are thickly forested, providing the eagles with a measure of security. Bald eagles are year-round residents here and numbers have sometimes reached 10-12 birds. They feed on fish, and occasional carrion, throughout this zone. They utilize tall pines for perching and roosting.

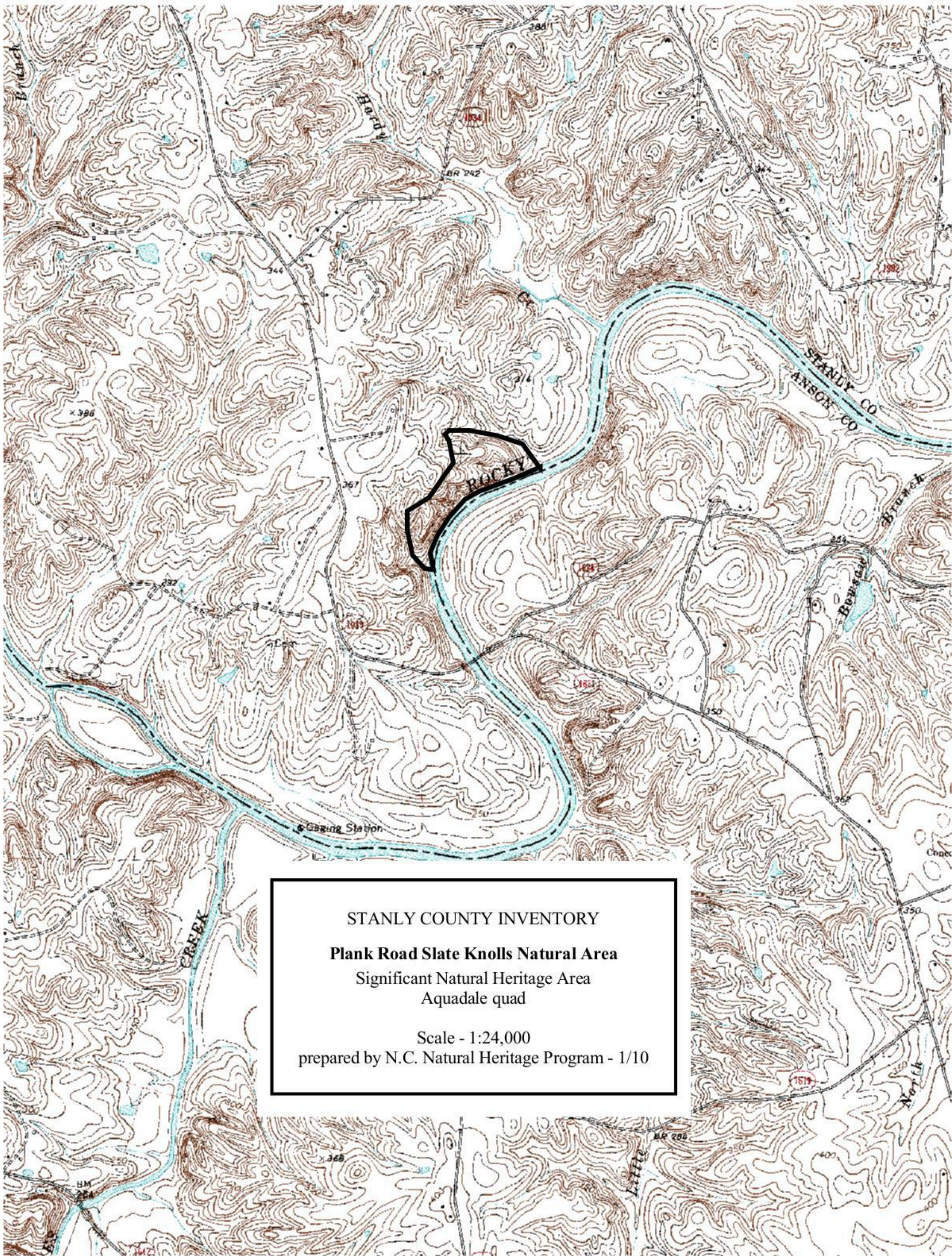
MANAGEMENT AND PROTECTION: For the health of the whole aquatic ecosystem, it is imperative to maintain at least minimal water flow. As part of the federal relicensing process, power production companies at the two dams must ensure this minimal flow. People who recreate on the water should be watchful for invasive aquatic plants.

NATURAL COMMUNITIES: Rocky Bar and Shore.

RARE PLANTS: Yadkin River goldenrod (*Solidago plumosa*), littleleaf sneezeweed (*Helenium brevifolium*, Montgomery side).

RARE ANIMALS: Bald eagle (*Haliaeetus leucocephalus*).

REFERENCES: NC Natural Heritage Program Database, 2009.



STANLY COUNTY INVENTORY
Plank Road Slate Knolls Natural Area
Significant Natural Heritage Area
Aquadale quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

PLANK ROAD SLATE KNOLLS Significant Natural Heritage Area

Site Number: 16

Site Significance: Regional

Quadrangle: Aquadale

Size: 46 acres

Ownership: Private

SIGNIFICANT FEATURES: This site has populations of two rare plants and one rare natural community, Basic Piedmont Bluff Glade.

LANDSCAPE RELATIONSHIPS: Plank Road Slate Knolls occurs on the northwest side of Rocky River, north of Plank Road (SR 1935). No other Significant Natural Heritage Areas occur nearby.

SITE DESCRIPTION: The site features a series of high bluff-like slopes along a brownwater river, broken by seasonal streams that have cut down to form small ravines. The slopes lack ledges and have only minor rock outcrops. Nonetheless, the slopes are steep enough to prevent complete canopy cover, and have some openings higher up where the rare Missouri rockcress (*Boechera missouriensis*) grows. Most of the site supports Basic Oak-Hickory Forest, dominated by white oak (*Quercus alba*), mockernut hickory (*Carya alba*), pignut hickory (*C. glabra*), and red maple (*Acer rubrum*), with an understory of winged elm (*Ulmus alata*), red cedar (*Juniperus virginiana*), hop hornbeam (*Ostrya virginiana*), and chalk maple (*Acer leucoderme*). Shrubs vary widely in abundance. Flowering herbs and grasses are fairly diverse.

Openings high upslope support a Basic Piedmont Bluff Glade community, with shorter trees and with much sunlight reaching the ground. There is a dense ground layer composed of grasses and wildflowers, including black needlegrass (*Piptochaetium avenaceum*), little bluestem (*Schizachyrium scoparium*), asters, and goldenrods.

Lower slopes have complete canopy cover of the same trees plus red oak (*Q. rubra*) and dogwood (*Cornus florida*), and with painted buckeye shrubs (*Aesculus sylvatica*). Like the narrow floodplain just below, this forest is choked with non-native Chinese privet (*Ligustrum sinense*) and Japanese honeysuckle (*Lonicera japonica*).

MANAGEMENT AND PROTECTION: Chinese privet and Japanese honeysuckle are invasive plants that out-compete native species; they should be eliminated if possible.

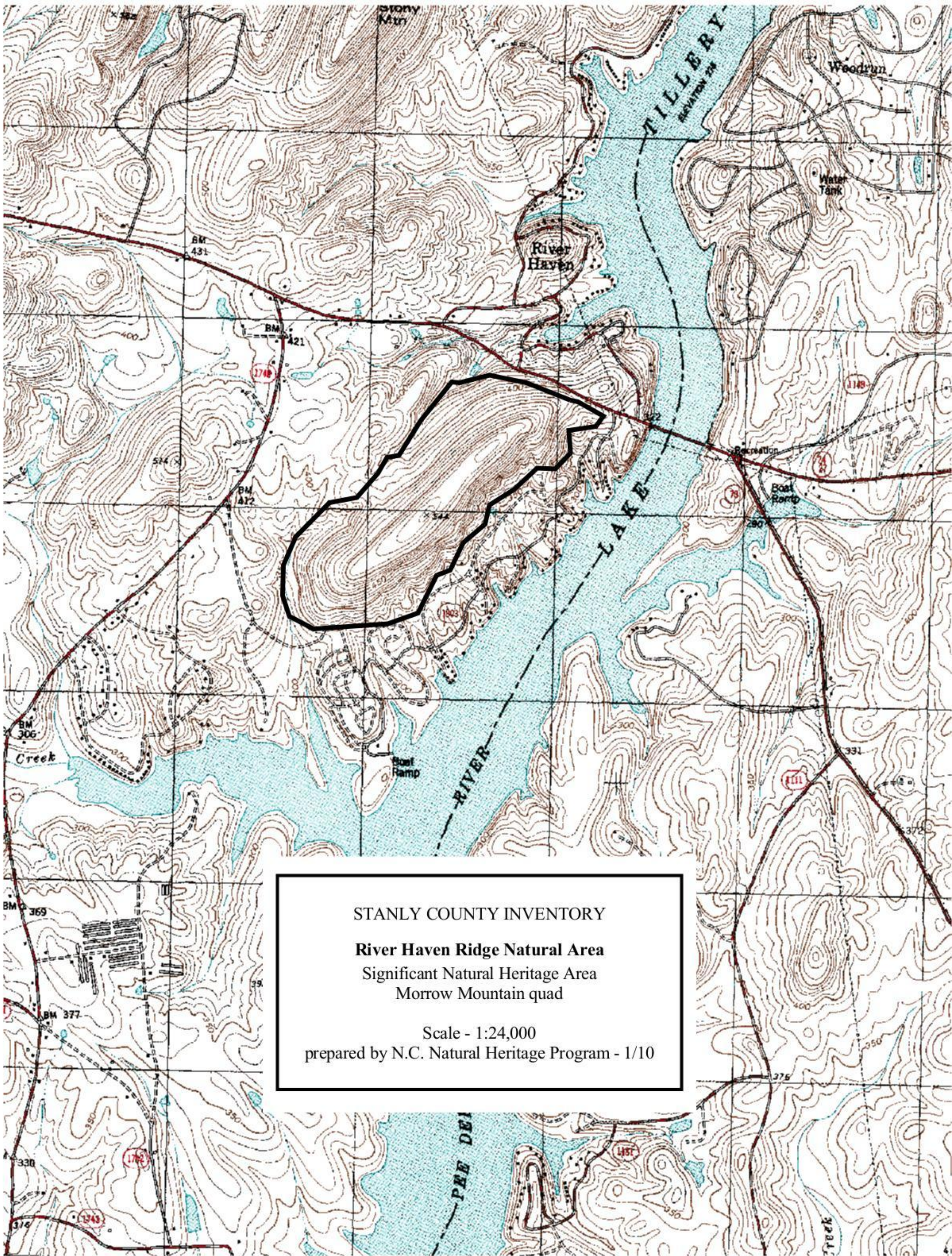
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Basic Piedmont Bluff Glade.

RARE PLANTS: Missouri rockcress (*Boechera missouriensis*), piedmont aster (*Eurybia mirabilis*, historical), Walter's violet (*Viola walteri* var. *walteri*); Watch List: bracted skullcap (*Scutellaria ovata* ssp. *bracteata*)

RARE ANIMALS: None documented.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: Plank Road Slate Knolls. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



Stanly County Natural Area Inventory

RIVER HAVEN RIDGE Significant Natural Heritage Area

Site Number: 17

Site Significance: Regional

Size: 263 acres

Quadrangle: Morrow Mountain

Ownership: Private

SIGNIFICANT FEATURES: River Haven Ridge holds the largest expanse of Basic Oak-Hickory Forest in Stanly County outside of Morrow Mountain State Park and Stony Mountain.

LANDSCAPE RELATIONSHIPS: The site lies just south of NC 24/27, just west of Lake Tillery. Stony Mountain Significant Natural Heritage Area is two miles to the northwest.

SITE DESCRIPTION: River Haven Ridge rises 150-200 feet from the surrounding land and extends about a mile from northeast to southwest. Rocks and boulders are prominent features, especially on the ridgetop. The main natural community is Basic Oak-Hickory Forest, which occupies most of the mid to upper slopes and some of the ridgetop. Trees average 12-15 inches dbh; several reach 20-24 inches. Dominants are pignut hickory (*Carya glabra*) and post oak (*Quercus stellata*), with lesser amounts of white ash (*Fraxinus americana*), southern shagbark hickory (*C. carolinae-septentrionalis*), red cedar (*Juniperus virginiana*), and southern red oak (*Q. falcata*). Understory trees include abundant chalk maple (*Acer leucoderme*) plus redbud (*Cercis canadensis*), winged elm (*Ulmus alata*), and red mulberry (*Morus rubra*). Shrubs are scarce, save for deerberry (*Vaccinium stamineum*) and sparkleberry (*V. arboreum*). Grasses are the most common herbaceous plants, notably poverty grass (*Danthonia spicata*).

The ridgetop is rockier than the rest of the site and soils there tend to harden in drought periods. A few such spots support Xeric Hardpan Forest, noted for its relatively short stature and spaced out trees. Canopy trees here are post oak, pignut hickory, and blackjack oak (*Q. marilandica*), with the same understory trees as before. Once again, grasses dominate the ground layer.

The forest was last logged (but not clearcut) in the 1960s and has recovered well. However, there is a deer browse line 4-5 feet above the ground, such that shrubs and flowering plants are scarce.

MANAGEMENT AND PROTECTION: Cull deer to eliminate the browse line and to improve ground layer plants and shrubs. A conservation easement is an excellent tool for protection here.

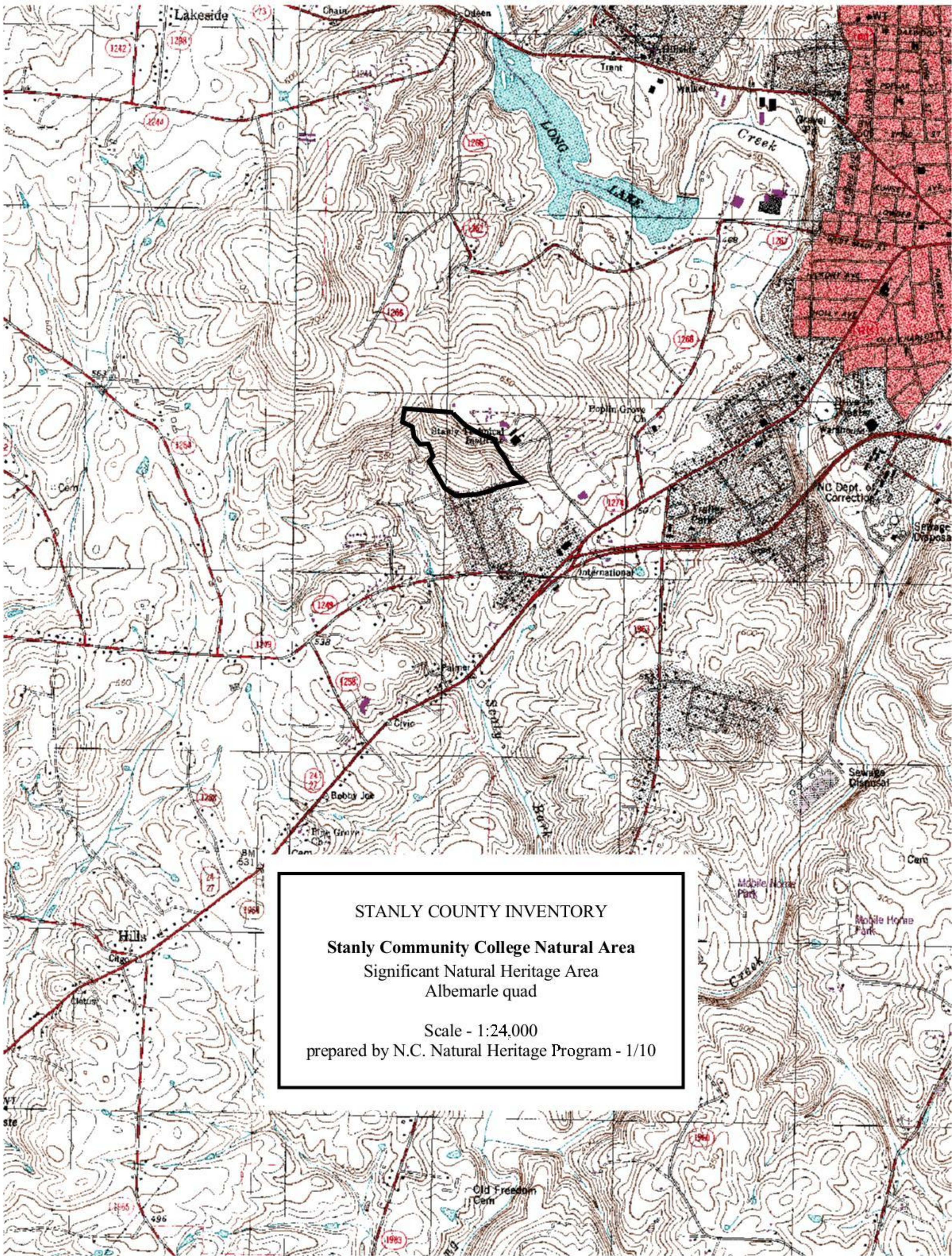
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Xeric Hardpan Forest.

RARE PLANTS: None documented.

RARE ANIMALS: None currently documented, but the owner states that timber rattlesnakes (*Crotalus horridus*) used to occur 30 years ago.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: River Haven Ridge. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY

Stanly Community College Natural Area
Significant Natural Heritage Area
Albemarle quad

Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

STANLY COMMUNITY COLLEGE BASIC FOREST Significant Natural Heritage Area

Site Number: 18

Site Significance: County

Size: 42 acres

Quadrangle: Albemarle

Ownership: Stanly Community College

SIGNIFICANT FEATURES: The forest's main significance is its maturity, with many trees about two feet dbh. Basic Oak-Hickory Forest was once a common forest type in the lower Piedmont of North Carolina, but now occupies just a fraction of the area it once dominated.

LANDSCAPE RELATIONSHIPS: Isolated from other natural areas.

SITE DESCRIPTION: This site consists of a single community type: Basic Oak-Hickory Forest. The forest used to be more extensive but has been shaved away by housing development and school expansion. It occurs on a fairly steep slope facing south and southwest and includes a few wet weather streamheads. Dominant canopy trees are southern shagbark hickory (*Carya carolinae-septentrionalis*), pignut hickory (*C. glabra*), red oak (*Quercus rubra*), white oak (*Q. alba*), with chalk maple (*Acer leucoderme*), redbud (*Cercis canadensis*), and winged elm (*Ulmus alata*) in the understory. Red cedar (*Juniperus virginiana*) is frequent, but overtopped by the hardwoods and may be shaded out in the future. This forest is older than others of its type in the county (canopy trees reach two feet dbh) and appears to be fully mature. There are no openings from treefalls or other disturbances. It has the highest percentage of southern shagbark hickory and fragrant sumac (*Rhus aromatica*) of any site seen in the 2007-09 Stanly and Anson county inventories. Despite the dense canopy, the herb layer is of normal diversity.

MANAGEMENT AND PROTECTION: No management is essential at this time. Removing a few canopy trees may benefit the herb layer. As yet there is no formal protection for this forest.

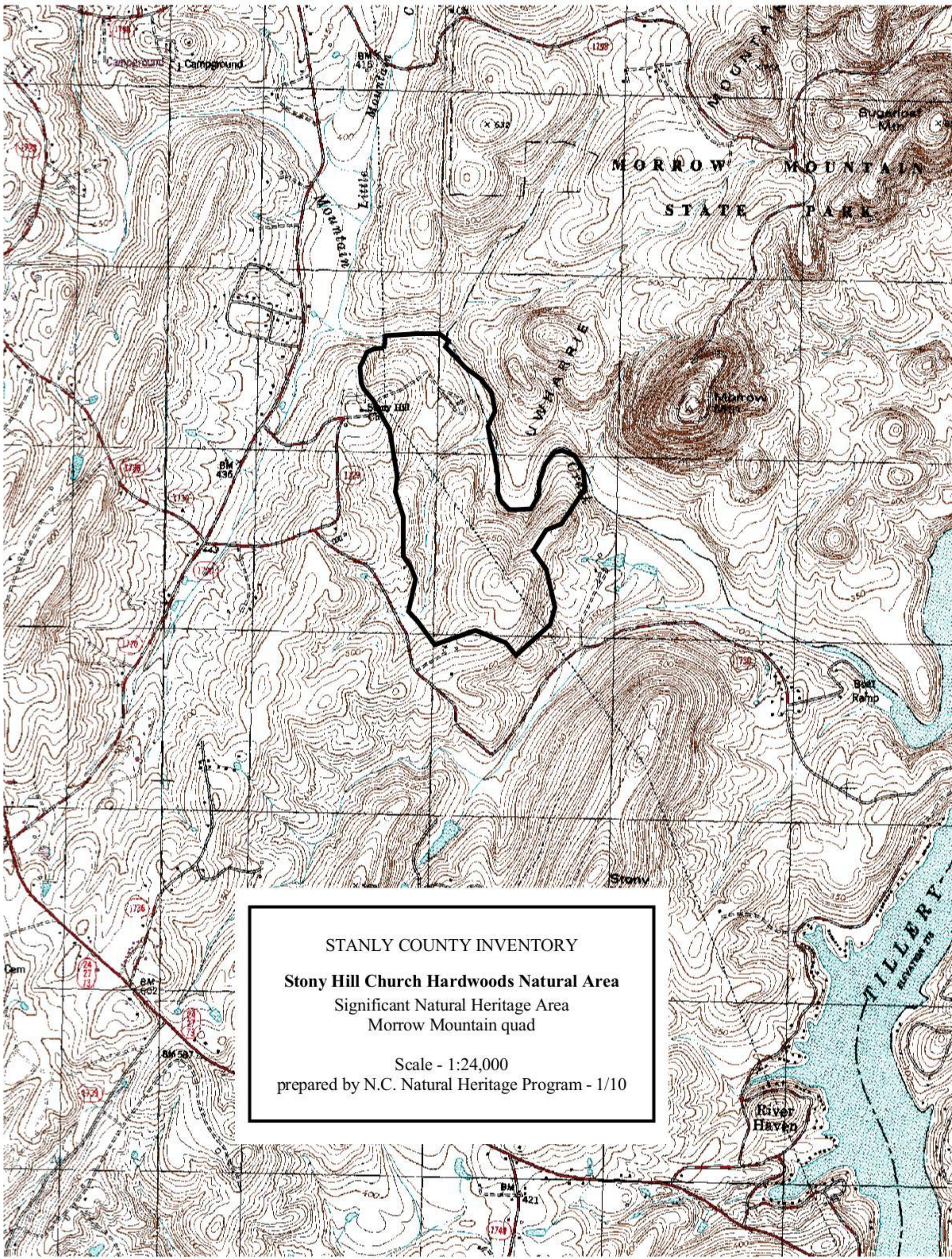
NATURAL COMMUNITIES: Basic Oak-Hickory Forest.

RARE PLANTS: None documented

RARE ANIMALS: None documented

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: Rock Hole Creek. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY
Stony Hill Church Hardwoods Natural Area
Significant Natural Heritage Area
Morrow Mountain quad
Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

STONY HILL CHURCH HARDWOODS Significant Natural Heritage Area

Site Number: 19

Site Significance: County

Size: 288 acres

Quadrangle: Morrow Mountain

Ownership: Private

SIGNIFICANT FEATURES: Stony Hill Church Hardwoods Significant Natural Heritage Area (SNHA) has very good quality hardwood forests on slopes and stream terrace, and three state-rare plant species. Also here are other plants rare in the county or region.

LANDSCAPE RELATIONSHIPS: The site occurs between Stony Hill Church and Mountain Creek, running southeast towards Clodfelter Road. Morrow Mountain State Park occurs just to the northeast. Private land on Biles Mountain just to the north has the same habitats and is part of the overall Morrow Mountain Natural Areas SNHA.

SITE DESCRIPTION: This site consists of hardwood forests of several types, crossed by a broad powerline full of grasses and herbaceous plants. The site is underlain by ancient volcanic rock that breaks down into a type of mineral-rich, moderately high pH soil named Enon. This mafic rock and soil support a number of uncommon plants, some rare in Stanly County and three rare in North Carolina.

The most widespread forest type here is Basic Oak-Hickory Forest, composed of pignut and southern shagbark hickories (*Carya glabra*, *C. carolinae-septentrionalis*), white and red oaks (*Quercus alba*, *Q. rubra*), with chalk maple (*Acer leucoderme*), redbud (*Cercis canadensis*), and dogwood (*Cornus florida*) in the understory. The lack of a shrub layer makes walking easy. Brown-colored surface rocks are numerous. On a couple of very steep east-facing slopes are examples of Mesic Mixed Hardwood Forest, with tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), red oak, pignut hickory, white ash (*Fraxinus americana*), and beech (*Fagus grandifolia*). The moist ground is covered with evergreen Christmas ferns (*Polystichum acrostichoides*). Along Mountain Creek and its tributaries is a Bottomland Forest composed of stately swamp chestnut and cherrybark oaks (*Q. michauxii*, *Q. pagoda*), tulip poplar, with ironwood (*Carpinus caroliniana*) in the understory. The forest floor is carpeted with grasses and sedges.

The powerline swath is dense with grasses and flowering plants of many kinds and adds greatly to the overall biodiversity of the site. A state-rare grass occurs here, as well as other plants rare in the county or region.

MANAGEMENT AND PROTECTION: No special management of the forests needs to be done other than to prevent clear-cutting. The powerline would benefit from reducing the non-native species that occur there.

NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Mesic Mixed Hardwood Forest,

Piedmont/Mountain Bottomland Forest.

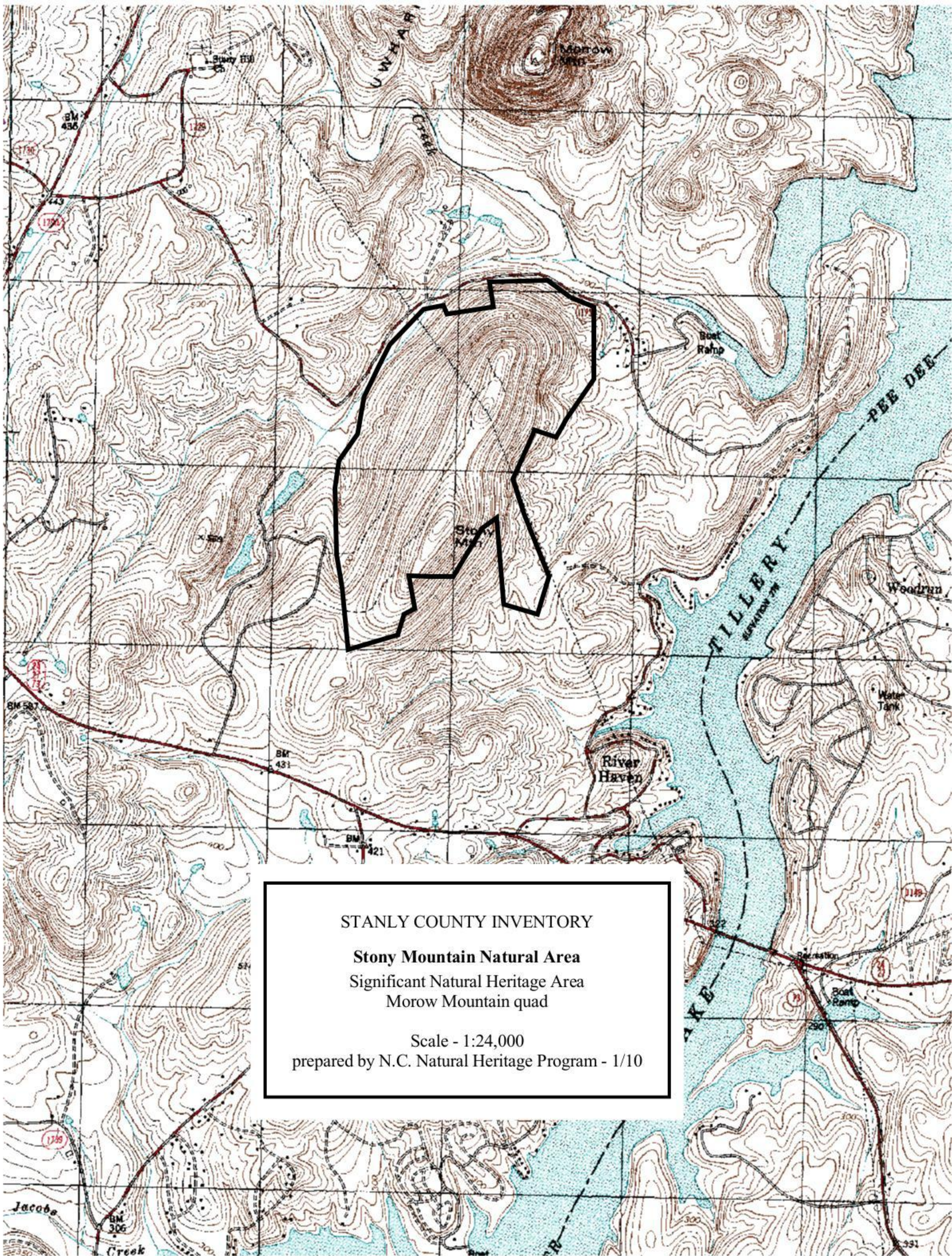
RARE PLANTS: Ravine sedge (*Carex impressinervia*), ringed panic-grass (*Dichanthelium annulum*), glade milkvine (*Matelea decipiens*).

RARE ANIMALS: None documented.

REFERENCES:

Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.

Sorrie, B.A. 2009. Site Survey Report: Stony Hill Church Hardwoods. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



Stanly County Natural Area Inventory

STONY MOUNTAIN Significant Natural Heritage Area

Site Number: 20

Site Significance: Regional

Size: 442 acres

Quadrangle: Morrow Mountain

Ownership: Private

SIGNIFICANT FEATURES: This site contains one of the most extensive single blocks of Basic Oak-Hickory Forest in the state. It also has populations of state-rare ringed witchgrass (*Dichanthelium annulum*) and Virginia wingstem (*Verbesina virginica*, Watch List).

LANDSCAPE RELATIONSHIPS: Stony Mountain occurs south of Clodfelter Road, a mile south of Morrow Mountain State Park and two miles northwest of River Haven Ridge Significant Natural Heritage Area.

SITE DESCRIPTION: Stony Mountain is a 1.7 mile long ridge reaching 730 feet elevation, just a mile west of Lake Tillery (Pee Dee River). Well named, the upper slopes and ridgetop are heavily strewn with boulders, some over ten feet high. Upper slopes and summit ridge support Basic Oak-Hickory Forest, composed of white oak (*Quercus alba*), red oak (*Q. rubra*), and pignut hickory (*Carya glabra*), with lesser amounts of white ash (*Fraxinus americana*) and post oak (*Q. stellata*). Chalk maple (*Acer leucoderme*) is a common understory tree, along with dogwood (*Cornus florida*) and winged elm (*Ulmus alata*). Shrubs and flowering herbs are sparse. In scattered small places the forest composition shifts to white oak, post oak, and southern shagbark hickory (*Carya carolinae-septentrionalis*), with an open understory and a well developed herb layer. This is Xeric Hardpan Forest, but is not well developed on Stony Mountain.

On middle and lower slopes, the soil type shifts to one that is more acidic and with no boulders. This Dry Oak-Hickory Forest is dominated by white oak, chestnut oak (*Quercus montana*), and red maple (*Acer rubrum*), with sparse shrubs and herbs. The lack of surficial and deep soil water must be a harshly limiting factor to all of these communities during droughts.

A broad powerline crosses the mountain's northern part and creates an extended opening that supports two rare plant species: ringed witchgrass (*Dichanthelium annulum*) and Virginia wingstem (*Verbesina virginica*).

MANAGEMENT AND PROTECTION: No management needs to be done here, except to let the forests grow. Protection may best be accomplished through easements on the largest parcels.

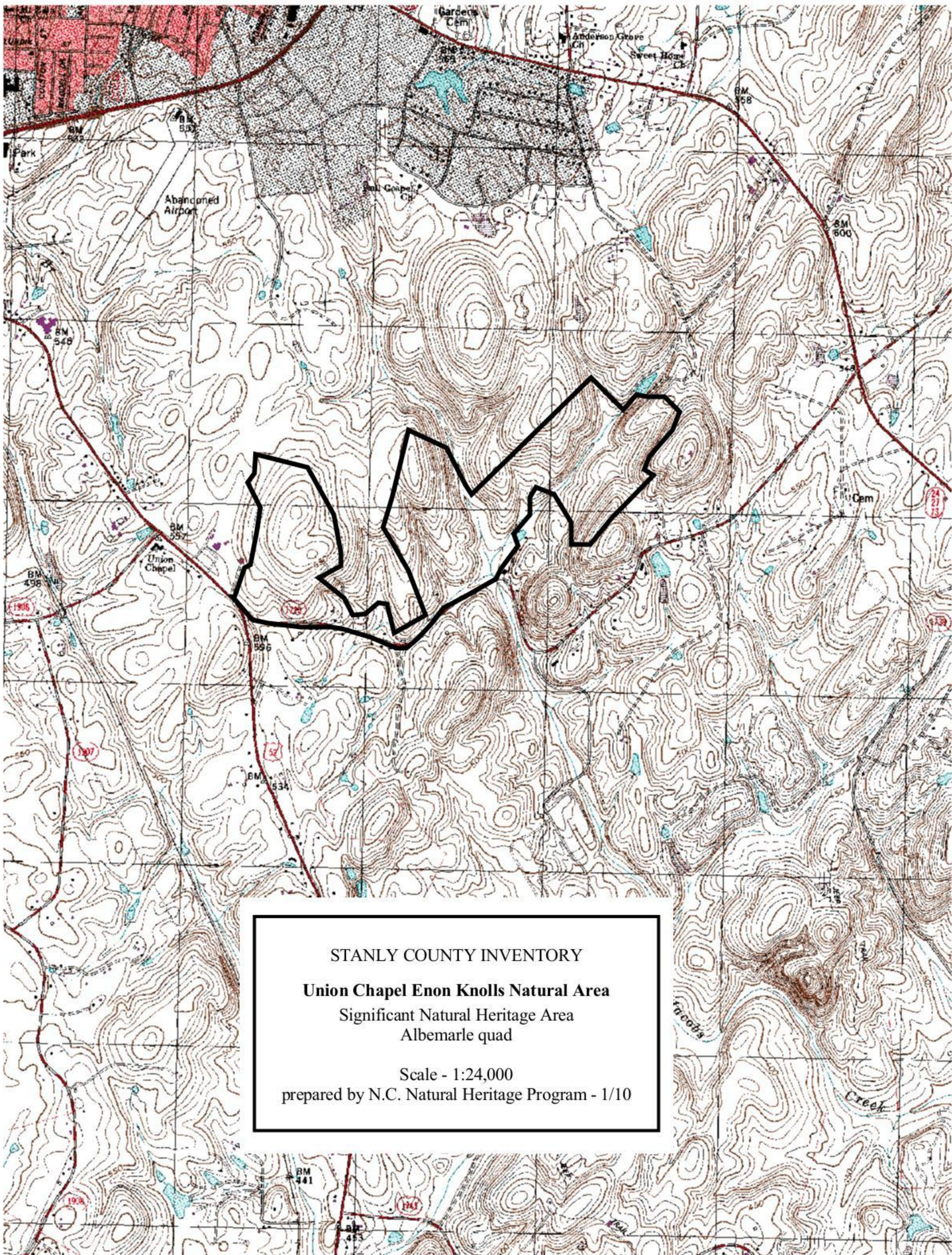
NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Dry Oak-Hickory Forest, Xeric Hardpan Forest.

RARE PLANTS: Ringed witchgrass (*Dichanthelium annulum*), Pursh's wild-petunia (*Ruellia purshiana*); Watch List: Virginia wingstem (*Verbesina virginica*).

RARE ANIMALS: None documented.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: Stony Mountain. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.



STANLY COUNTY INVENTORY
Union Chapel Enon Knolls Natural Area
Significant Natural Heritage Area
Albemarle quad
Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 1/10

Stanly County Natural Area Inventory

UNION CHAPEL ENON KNOLLS Significant Natural Heritage Area

Site Number: 21

Site Significance: State

Quadrangle: Albemarle

Size: 352 acres

Ownership: Private

SIGNIFICANT FEATURES: Union Chapel Enon Knolls contains the largest concentration of rare plants and rare natural communities in Stanly County. To date, 13 rare plants and two rare communities have been documented. For five of these plants, there are no other populations known in the county. One of the plants, western rough goldenrod (*Solidago radula*) is among the rarest plants in the state, found in North Carolina only in Stanly and Montgomery counties where it is disjunct hundreds of miles from the next occurrence. Schweinitz's sunflower (*Helianthus schweinitzii*) is federally listed as endangered. Nearly 50 kinds of birds nest here, including year-round residents and migrants from the tropics.

LANDSCAPE RELATIONSHIPS: Continuous forest connects along Jacobs Creek via the county landfill to Jacobs Creek Ravines Significant Natural Heritage Area (SNHA). Intermittent forest connects east and northeast to Stony Mountain SNHA and Morrow Mountain State Park.

SITE DESCRIPTION: The site consists of a series of steep rocky hills at the headwaters of Jacobs Creek, at the western edge of the Uwharrie Mountains. Hilltops rise up to 200 feet from creeks below. The volcanic geology has yielded Enon soils that are high in mineral content and which vary from acidic to basic. There is a great variation in soil moisture, soil pH, and in slope orientation, which has produced many microhabitats and thus a diverse plant and animal life.

The most prominent natural community is Basic Oak-Hickory Forest, which covers middle and upper slopes. Several species of oaks (*Quercus*) and hickories (*Carya*) dominate, especially white oak (*Q. alba*). Understory trees include dogwood (*Cornus florida*), chalk maple (*Acer leucoderme*), and redbud (*Cercis canadensis*). Small to moderate size shrubs are frequent to quite sparse; herbs are fairly diverse.

In scattered locations, mostly near hilltops, the soil forms a hardpan layer just beneath the surface, which restricts woody plant growth and favors grasses. Trees are relatively short and spaced out, shrubs are few, and grasses dominate the herb layer. This is the Xeric Hardpan Forest. One dominant here is southern shagbark hickory (*C. carolinae-septentrionalis*), a tree of restricted range. The dominant grass is black needle grass (*Piptochaetium avenaceum*). Western rough goldenrod (*Solidago radula*), very rare in North Carolina, occurs here.

Hilltops with very acidic soil support Piedmont Monadnock Forest of chestnut oak (*Q. montana*), sourwood (*Oxydendrum arboreum*) and red maple (*Acer rubrum*). Blueberry bushes (*Vaccinium* spp.) are numerous; flowering herbs are sparse.

Below the oak-hickory forests, on richer soil of lower slopes facing creeks and streamheads, is Mesic Mixed Hardwood Forest. Trees here include red oak (*Q. rubra*), white oak, tulip poplar (*Liriodendron tulipifera* var. *tulipifera*), and white ash (*Fraxinus americana*), with a chalk maple understory. Painted buckeye (*Aesculus sylvatica*) is frequent as a tall shrub. Herbs are numerous and diverse.

Along creeks there is a narrow but distinct zone where irregular flooding occurs; this area supports Piedmont Alluvial Forest. Dominants include tulip poplar and sweetgum (*Liquidambar styraciflua*), with an ironwood (*Carpinus caroliniana*) understory. The herb layer is dense and diverse, especially with spring-flowering plants like crested dwarf iris (*Iris cristata*). A very large population of a globally rare sedge (*Carex impressinervia*) occurs along Jacobs Creek.

Finally, roadsides along US 52 and Stony Gap Road are kept open by mowing and cutting, which provides the sunny conditions needed by several rare plant species. Most notable is Schweinitz's sunflower (*Helianthus schweinitzii*), federally listed as endangered.

MANAGEMENT AND PROTECTION: It is imperative to contact owners and discuss protection and management options. This includes owners of adjacent land that was cut in recent past, to see if they are willing to allow natural forest growth. As for management, the roadsides need to be periodically mowed. Selected thinning of trees will allow more light to reach the ground and benefit herbaceous plants.

NATURAL COMMUNITIES: Basic Oak-Hickory Forest, Xeric Hardpan Forest, Piedmont Monadnock Forest, Mesic Mixed Hardwood Forest, Piedmont/Low Mountain Alluvial Forest.

RARE PLANTS: Thickpod white wild-indigo (*Baptisia alba*), ravine sedge (*Carex impressinervia*), ringed witchgrass (*Dichanthelium annulum*), large witch-alder (*Fothergilla major*), smooth sunflower (*Helianthus laevigatus*), Schweinitz's sunflower (*H. schweinitzii*), rough blazingstar (*Liatris aspera*), glade milkvine (*Matelea decipiens*), glade wild-quinine (*Parthenium auriculatum*), Seneca snakeroot (*Polygala senega*), prairie dock (*Silphium terebinthinaceum*), western rough goldenrod (*Solidago radula*), Georgia aster (*Symphyotrichum georgianum*).

RARE ANIMALS: None documented.

REFERENCES:

- Oakley, S.C., H.E. LeGrand, Jr., and M.P. Schafale. 1995. An Inventory of Mafic Areas in the North Carolina Piedmont. NC Natural Heritage Program, Raleigh, NC.
- Sorrie, B.A. 2009. Site Survey Report: Union Chapel Enon Knolls. North Carolina Natural Heritage Program, Division of Natural Resources Planning and Conservation, DENR, Raleigh, NC.

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