R. Wayne Bailey-Caswell Game Land Management Plan

2015 – 2025

NC WILDLIFE'S CROWN JEWELS

North Carolina's game land system is based on science-driven management practices and is an exceptional asset for the people of the State of North Carolina. The 2 million acres of NCWRC owned and managed land create HIGH Ecosystem value in flood protection with positive effects on property values and air and water quality, while helping to prevent additional restrictive environmental regulations.

The primary purpose of our game lands is the conservation of North Carolina wildlife species and the provision of public hunting, trapping and fishing opportunities. Our game lands are important players in the preservation of rare, threatened and endangered species. Prescribed burning and early successional habitat management allow for healthy habitats for thriving wildlife. Fields left fallow and disked on alternating years promote natural herbaceous regeneration. Water levels of impounded wetlands are drawn down at appropriate times to create conditions beneficial to waterfowl. Protection of stream buffers ensures that precious fish species are protected and encouraged along with thriving game fishes. Heritage forest land is worked and preserved and rare forestlands are protected.

The game lands also provide broad expanses of public recreational opportunities. North Carolina has more acreage of managed game lands than all states east of the Mississippi, with the exceptions of Florida and Michigan, both of which include lake and ocean frontage as managed land. There is overwhelming public endorsement of conserving the land along with documentation of the economic benefits of doing so. According to the outdoor recreation industry, over $3.3 billion is spent annually on wildlife related recreation in our state alone. As North Carolina transitions from a traditional economy based on tobacco, furniture and textiles to a global economy driven by knowledge-based enterprises, our managed public game lands help preserve our economy and our way of life.

Game lands include:

- A great treasure in the largest intact and least disturbed bottomland forest ecosystem in the mid-Atlantic Region and some of the oldest cypress-tupelo trees on the East Coast, many at least 800 years old;
- One of the largest, most intact remnants of longleaf pine ecosystems in North Carolina, a high priority wildlife habitat in the Lands Management program. Among the species dependent upon this type of habitat are bobwhite quail, a variety of songbirds, fox squirrels and the federally endangered red-cockaded woodpecker;
- The densest populations of black bear, white-tailed deer and turkey, and the highest density of nesting birds in the state. Most of our 32 black bear sanctuaries are on game lands;
- A system of floating waterfowl blinds, 19 public hunting blinds for disabled sportsmen, 32 public boating access areas, 33 public fishing areas, six wildlife observation platforms, four public WRC shooting ranges with plans to build and manage many more as opportunities occur;
- And some of the finest examples of multiple conservation collaborations in the country.

As in the past, it is anticipated that future projected expenditures will be funded by North Carolina's apportionment of Pittman Robertson Federal Assistance in Wildlife Restoration funding and license receipts, as well as from contributions from various conservation partners. The opportunity provided by these managed public game lands to our mission of conserving North Carolina's wildlife and habitat for future generations is priceless.

North Carolina Wildlife Resources Commission staff have contributed extensively to the development and preparation of this plan through their various fields of professional expertise. All content, management strategies, recommendations, goals, and needs were developed using the best available science and professional working knowledge of the habitats and species of the R. Wayne Bailey-Caswell Game Land. Careful consideration has been given to all input received from external agencies, organizations, and private individuals that have an interest in or use the game land to ensure a that comprehensive management program is administered. The conservation, protection, enhancement, restoration, and accessibility of game land resources are obligatory. The successful implementation of this plan will depend on the continued input and support from all interested parties.

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GAME LAND PROGRAM MISSION STATEMENT

Consistent with the original establishment legislation (G.S. 143-239) for the North Carolina Wildlife Resources Commission (NCWRC, WRC, or Commission), the mission of the game lands program is to enhance, facilitate, and augment delivery of comprehensive and sound wildlife conservation programs. Inherent in delivery of a land conservation program consistent with this mission is the feasibility and desirability of multiple uses on lands owned by the state within the system. In addition to hunting, fishing, trapping, and wildlife viewing as primary uses, we recognize the desirability of providing opportunities for other activities on state-owned game lands that are feasible and consistent with the Agency's mission, and compatible with these traditional uses.

GAME LAND PROGRAM MANAGEMENT OBJECTIVES

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

GAME LAND PROGRAM HISTORY

Prior to 1971 game lands in North Carolina were limited to designated and tightly controlled Wildlife Management Areas (WMA's). In 1971 the current Game Lands Program was established. This change involved the expansion of game lands from about 700,000 acres to 1.5 million acres, changes in regulations, and reductions in fees to hunters and fishermen (Dean, 1971). The old WMA's were incorporated into the new Game Lands Program, but the new program also allowed the Commission to lease/incorporate additional lands as game lands to expand the land base. Beginning in the 1980s, landowners (both corporate and private) realized they could lease their properties for a higher rate to hunting clubs and private individuals and began to do so. These properties were subsequently removed from the Game Lands Program. Fortunately, the Natural Heritage Trust Fund was established in 1987 and the Clean Water Management Trust Fund in 1996. These funds provided money for the fee simple acquisition of select properties, many of which have been incorporated into the Game Lands Program. These acquisitions have greatly compensated for the loss of

game lands leased from the private sector. Acquisition of state owned lands has been a major accomplishment of the NCWRC.

Significant game land acreage leased to the state of North Carolina is owned by the United States Forest Service (USFS), North Carolina Forest Service (NCFS), North Carolina Department of Agriculture (NCDOA), North Carolina Department of Environment and Natural Resources (NCDENR), U.S. Army Corp of Engineers (USACOE), The Nature Conservancy (TNC), major power and utility companies, and other land trusts, associations, and corporate and private entities. Currently, almost two million acres are enrolled in the Game Lands Program.

With the old Wildlife Management Area system, Commission staff were housed on each management area. These personnel were assigned both law enforcement and habitat management duties on their respective areas. Administration of the new Game Lands Program was assigned to the Division of Wildlife Management. Depot locations with equipment and habitat development crews were established and strategically located in the vicinity of all game lands. Law enforcement on these properties was assigned to the Division of Law Enforcement. With some minor organizational changes this system remained intact until 2012. In 2012, land management staff in the Division of Wildlife Management and certain similar positions in the Division of Inland Fisheries were merged with Division of Engineering staff into the Division of Engineering and Lands Management. This organizational change was made to deliver a more comprehensive and efficient wildlife and fisheries management program on all public lands and waters across the state. Depots remained at former locations and new depots/crews were established at additional locations to improve Agency efficiency.

PURPOSE AND NEED FOR A PLAN

A comprehensive Game Land Management Plan is needed for the R. Wayne Bailey-Caswell Game Land (hereafter RWB-Caswell) to implement the NCWRC Strategic Plan and accomplish game land program objectives in a timely and efficient manner. A comprehensive Game Land Management Plan has never been written, therefore, it is important to develop and implement thorough and specific plans for the management of this game land and its resources. (Long since outdated, a Forest Management Plan was prepared for the Caswell Game Land in 1976 by Michael Seamster.) Many new tracts have been added to the game land since the acquisition of the original tracts. Precise biological, forestry, and environmental data are outdated or lacking in some areas. With the creation of the North Carolina Wildlife Action Plan (NCWAP) in 2005, emphasis on the protection, conservation, and management for non-game species (terrestrial and aquatic) and their unique habitats have been addressed. With these changes it is time to address new challenges with a new Game Land Management Plan.

The plan will identify goals and objectives for managing and conserving the wildlife and other natural resources on RWB-Caswell Game Land by using current scientific knowledge and management techniques. The Management Plan will guide game land

staff as they develop specific management strategies for identified feature species while integrating a sustainable yield forest and open land management program that creates, enhances, and maintains quality habitat for native wildlife and plant communities. The plan will also incorporate the recreational needs of the game land users into its management goals and objectives. The NCWAP states five goals as part of its core plan. These goals have been modified and adapted to assist with the development of RWB-Caswell Game Land Management Plan. The five goals are: 1) Identify key species in the Upper/Northern Piedmont EcoRegion used to base conservation and management decisions on, 2) Identify, conserve, and enhance habitats and the communities they support, 3) Identify and state conservation priorities and list challenges and conservation threats for RWB-Caswell, 4) Support educational efforts to improve understandings of wildlife resources among general public and conservation stake holders, and 5) Support and improve existing regulations and programs aimed at conserving habitats and communities.

This plan was developed with input from NCWRC staff as well as input from external agencies, organizations, and other stakeholders that have an interest in or use the game land, to ensure a comprehensive management program is administered on RWB-Caswell Game Land. The successful implementation of the plan will depend on the continued input and support from all interested parties. A ten year planning horizon was used in development of the plan. Review of and amendments to the plan will be made as needed.

REGIONAL CONTEXT

RWB-Caswell Game Land lies within the NCWRC Piedmont EcoRegion and the Northern Piedmont Work Area. It includes 19 counties in the northern half of North Carolina's Piedmont. There are 17 game lands (~168,000 acres) within the work area. The State of North Carolina, with the NCWRC as the primary custodian, owns in fee simple ~44,000 acres of these lands. Approximately 124,000 acres of game lands within the work area are owned by other governmental agencies and private sector companies and managed as game lands under cooperative lease agreements. Partial ownership by the NCWRC occurs on certain game lands.

The Northern Piedmont Work Area contains 26 public Boating Access Areas (BAA's) and 13 Public Fishing Access areas (PFA's). Management Depots are located at Caswell, Butner, Jordan, Lake Rogers, Tillery, and Weldon. In the Division of Engineering and Lands Management, nineteen permanent staff and four seasonal temporary positions are stationed in the Northern Piedmont. Under the direction of an EcoRegion Supervisor; a Management Biologist, two Wildlife Forest Managers, an Assistant Wildlife Forest Manager, a Conservation Technician Supervisor, and 14 Conservation Technicians (Tech. I's and II's) work on public lands and waterways.

REGIONAL CONSERVATION PARTNERSHIPS

Past and current partnerships for activities occurring on and around RWB-Caswell Game Land have included collaborative agreements and projects with a variety of entities. Land acquisition activities have been supported by the Natural Heritage Trust Fund (NHTF) and the Clean Water Management Trust Fund (CWMTF). Technical assistance and funding has been given by the National Wild Turkey Federation (NWTF) and Ducks Unlimited (DU). Local Quail Unlimited (QU; non-extant) and NWTF chapters have provided funding and volunteer work efforts for infrastructure and habitat improvements. The North Carolina Forest Service (NCFS) maintains a RAWS station (Remote Automated Weather Station) serving as an invaluable meteorological tool to public and professional users, particularly prescribed burning practitioners in the region. Grants from the Arbor Day Foundation have funded recent reforestation of shortleaf pine and in the future as momentum gains with the restoration efforts of shortleaf pine across its native range, it is expected that there will be much collaboration with the Shortleaf Pine Initiative.

GENERAL GAME LAND INFORMATION

LOCATION

Caswell County is in the Piedmont Physiographic Province of North Carolina. It lies on the transitional boundary between the Northern Inner Piedmont and the Southern Outer Piedmont Ecoregions as defined by the U.S. Geological Survey (Griffith et. al., 2012). Caswell County is located in the north central Piedmont and shares the northern border with Virginia's Pittsylvania and Halifax Counties. In North Carolina, Rockingham County lies to the west, Person County to the east, and Alamance and Orange Counties to the south. Caswell County has a total area of 428 sq. mi. In 2010, the population was 23,719 with a population density of 56/sq. mi. (US Census Bureau, 2012). The county seat is Yanceyville (formerly Leasburg) and the only other incorporated community is Milton. The county is divided into nine townships; Pelham, Dan River, Milton, Locust Hill, Yanceyville, Leasburg, Stoney Creek, Anderson, and Hightowers (Wikipedia – Caswell Co., NC).

(**Appendix I**, Ecoregions of NC Map & **Appendix II**, Caswell County Location and Townships Maps)

CLIMATE

The climate of the southeastern United States is classified as humid subtropical and characterized by hot, humid summers and mild to cool winters (Köppen-Geiger Climate Zones, 2013). The Northern Piedmont of NC experiences a range of normal mean monthly temperature from slightly above freezing in the coldest month (January), to the normal mean monthly temperature in the upper 70's in warmest month (July). Extremes in variation occur occasionally, but seasonal trends are fairly well-defined and constant. In Yanceyville, NC, the average annual temperature maximum is 70.5 degrees F and the minimum is 46.8 degrees F. The average minimum monthly temperature ranges from 27.3 degrees F in January, to the average maximum monthly temperature of 87.9 degrees F in July. (State Climate Office of NC)

In Yanceyville, precipitation annually averages 41.5 inches, ranging from 30.0 inches to 55.8 inches. Average annual snowfall is 10.2 inches with a record of 41.7 inches. (Southeast Regional Climate Center) The USDA Plant Hardiness Zone for the Northern Inner Piedmont region of NC is '7b'. The average first frost is October 21st to 31st and the average last frost is from April 11th to 20th. (USDA Plant Hardiness Zone Map, 2012)

PHYSIOGRAPHY AND HYDROLOGY

The general topography of Caswell County consists of an upland plateau that has been highly dissected and eroded creating a hilly landscape with irregular ridgetops, moderately steep side-slopes, and narrow floodplains. This rolling topography allows for excellent surface drainage. The Roanoke River Basin drains the majority of the county (85%), while the southwestern corner (15%) flows into the Cape Fear River Basin. The major tributaries flowing northeast into the Dan River are Hogans Creek, Moon Creek, Rattlesnake Creek, Country Line Creek, and Hyco Creek. The Roanoke River Basin (over 60% in Virginia) occupies only 3,493 square miles or 6.4% of North Carolina. Basin-wide water quality is generally good, with only 9% of the streams impaired, though 27% of the streams are threatened by polluted runoff and sedimentation. (NSCU Water Quality Programs)

On RWB-Caswell Game Land, elevations range from 390 to 746 feet above sea level. The western portions of the game land are overall more rugged than those towards the east (Frogsboro) and north (High Rock). The main drainages through the game land are Country Line Creek, South Country Line Creek, and North Hyco Creek. Significant impounded waters include the Rabbit Shuffle Pond and High Rock Pond (both PFA's) and numerous other small "farm ponds". On the Boy Scouts of America property, at the Cherokee Scout Reservation, there is a small lake. Seasonally flooded waterfowl impoundments (Caswell and Brumley) are also managed and maintained.

(**Appendix III**, Hydrologic Features Map & **Appendix IV**, Topographic Map)

GEOLOGY AND SOILS

Two geologic regions are present in Caswell County. The northern 55% of the county lies in the Milton Belt and is underlain by metamorphic rocks of mainly igneous origin. Most of these rocks are felsic (biotite gneiss and schist) and weather to yield acidic soils, but some are mafic (amphibolite) and produce high pH (circumneutral to basic) soils. The southern 45% of the county is also underlain by metamorphosed igneous rocks and is part of the Carolina Slate Belt. Some of these rocks are felsic (granite), but there are mafic and ultramafic rocks (diorite and gabbro) that produce very basic soils. (Carpenter, 1982)

A modern comprehensive soil survey has not been fully completed for Caswell County. The most detailed published account of soil types and mapping occurred in 1908 by the USDA and NCDA. Except for alluvial and colluvial deposits along streams and lower slopes, the soils are residual in origin and derived from underlying lithic formations. "On account of the various rocks, their complicated arrangement, and the topography of the country, the soils in many places are badly mixed up and change from type to type so frequently and yet so gradually that it was often difficult to draw an exact boundary line between them" (Hearn and Drane,1908). Recent field work for a Soil Survey of Caswell County has been completed but not yet published.

Gneiss, schist, and granite have weathered deeply to produce the Cecil clay, Cecil sandy loam, Caswell sandy loam, and Durham coarse sandy loam. The Iredell sandy loam is derived from shallowly weathered diorite. Meadow soils have been deposited adjacent to the major drainages. Soils series typed as sandy loam (Cecil, Caswell, and Iredell) account for 76.6% of the county, Durham coarse sandy loam, 10.7%, Cecil clay, 5.9%, Meadow, 5.3%, and other (Herndon stony loam and Congaree loam), only 1.5%. Sandy loams and variants are highly susceptible to erosion. (Hearn and Drane, 1908)

(**Appendix V**, Geologic Map & **Appendix VI**, Soils Map)

HABITATS

RWB-Caswell Game Land has a diversity of habitats and natural community types. With less than 5% of open lands, developed areas, and aquatic habitats, the game land is mostly forested. Though often regarded as roughly half pine and half hardwood, this notion is somewhat misleading and inaccurate. Terrestrial natural community types as described by Schafale and Weakley (1990), list 15 natural community types for Caswell County with 12 of these occurring on the game land. These are: Basic Oak-Hickory Forest, Basic Mesic Forest (Piedmont subtype), Dry Oak-Hickory Forest (Piedmont subtype), Dry-Mesic Oak-Hickory Forest (Piedmont subtype), Floodplain Pool, Mesic Mixed Hardwood Forest (Piedmont subtype), Piedmont/Coastal Plain Heath Bluff, Piedmont/Low Mountain Alluvial Forest, Piedmont/Mountain Swamp Forest, Piedmont/Mountain Semi-permanent Impoundment, Upland Depression Swamp Forest, and Xeric Hardpan Forest.

For the purposes of this plan, these individual distinctions will not be addressed and a more basic grouping will be used to describe the game land habitat types and species assemblages in the 'Fish and Wildlife Communities Section'. Many of these obscurely distinct natural communities will be grouped into the basic categories of Upland Pine Forest, Mesic Forest, Floodplain Forest, Oak-Hickory Forest, Xeric Hardpan/Upland Depression Swamp Forest, Early Successional Habitats/Open Land, and Aquatic and Riparian Habitats.

NATURAL HERITAGE AREAS AND LISTED SPECIES

The North Carolina NHTF conducted an inventory of the natural areas, rare species, and biological communities of Caswell County during 2009 and 2010 (LeGrand, 2011). This inventory identifies and describes the most significant natural areas, documents all the natural communities and rare plant and animal species associated with them, and provides guidance for future land use decisions. Of the 27 natural areas identified in the county, five are of state significance, and three of these are located on RWB-Caswell Game Land. Also on the game land, the Frogsboro Flats is considered to be of national significance.

Known and potential occurrences of state-listed terrestrial animal species include one amphibian, three butterflies, and two dragonfly species on or adjacent to the game land. The northern gray treefrog (*Hyla versicolor*) [State Status SR, S1?] has been documented at several locations. The golden banded skipper (*Autochton cellus*) [State Status SR, S2] and the northern oak hairstreak (*Satyrium favonius ontario*) [State Status SR, S3?] are two butterfly species that may very likely occur on the game land and are documented from the Yanceyville Quadrangle. The golden banded skipper inhabits damp, wooded ravines near permanent water sources and the northern oak hairstreak occurs in association with dry oak forests. The mottled duskywing (*Erynnis martialis*) [State Status SR, S2] has been recently documented. The two dragonfly species, both considered obscure occurrences in Caswell County, are the spine-crowned clubtail (*Gomphus abbreviates*) [State Status SR, S3?] and the skillet clubtail (*Gomphus ventricosus*) [State Status SR, S1S2].

State-listed aquatic species include three (possibly four) mussels, two (possibly three) fish, and one crayfish. The Triangle floater (*Alasmidonta undulata*) [State Status T, S2], creeper (*Strophitus undulatus*) [State Status T, S2], and notched rainbow (*Villosa constricta*) [State Status SC, S3] are known to occur in nearby creeks. The Atlantic pigtoe (*Fusconia masoni*) [State Status E, S1] is not confirmed with certainty in Caswell County. The riverweed darter (*Etheostoma podostemone*) [State Status SC, S3] and the Roanoke hogsucker (*Hypentelium roanokense*) [State Status SR, S3] are known to occur in creeks in the region, and the occurrence potential exists for the Roanoke logperch, (*Percina rex*) [Federally Endangered] though it has never been found. The Carolina ladle crayfish, (*Cambarus davidi*) [State Status SR, S2S3] has been documented. Future aquatic surveys may be needed to update the distribution or abundance of the aquatic fauna in Caswell County.

Forty-six rare plant species are known from Caswell County. Surveys on the game land have documented several significantly rare, threatened, special concern, and watch list plant species. A partial list includes: James' sedge (*Carex jamesii*), American bittersweet (*Celastrus scandens*), Leatherwood (*Dirca palustris*), eastern wahoo (*Euonymus atropurpureus*), Godfrey's thoroughwort (*Eupatorium godfreyanum*), southern loosestrife (*Lysimachia tonsa*), Virginia bluebells (*Mertensia virginica*), ginseng (*Panax quinquefolius*), dwarf ginseng (*Panax trifolius*), glade wild quinine (*Parthenium auriculatum*), Torrey's mountain-mint (*Pycnanthemum torreyi*), Virginia mountain-mint (*Pycnanthemum viginianum*), American shinleaf (*Pyrola americana*), rock buttercup (*Ranunculus micranthus*), Pursh's wild petunia (*Ruellia purshiana*), Virginia spiderwort (*Tradescantia viginiana*), buffalo clover (*Trifolium reflexum*), and yellow horse-gentian (*Triosteum angustifolium*). (**Appendix VII**, Caswell County Rare Species List)

RWB-Caswell Game Land Significant Natural Heritage Areas (SNHA's)

Majority protected by NCWRC ownership, with some small private parcels

- Bigelow Road Slopes (316 ac.)
- Brumley Impoundment Mafic Slopes (37 ac.)
- Caswell Upland Hardwood Forest (3,133 ac.) **State Significant**
- Country Line Creek Aquatic Habitat (~25 miles/149 ac.)**
- Country Line Creek Bluffs (61 ac.)
- Country Line Creek Natural Area (2,310 ac.) **State Significant**
- Long Road Mafic Uplands (64 ac.)
- Frogsboro Flats (463 ac.) **Nationally Significant**
- Griers Church Road Ultramafic Forest (988 ac.) **State Significant**

Total: 7,521 acres

** North Carolina Public Waters

(**Appendix VIII**, Significant Natural Heritage Areas Map)
(**Appendix A**, Caswell Game Land Dedicated Nature Preserve (2012 Dedication))

LANDSCAPE CONTEXT AND ACQUISITION HISTORY

The Caswell Game Land was purchased by the North Carolina Wildlife Resources Commission from the U.S. Forest Service in 1959, with Federal assistance under the Pittman Robertson Act. At that time, it contained 14,047 acres. By utilizing grant monies from sources such as the CWMTF and the NHTF to purchase additional land, the Caswell Game Land now contains 17,788 acres. Future land acquisitions will continue to increase the total acreage. In 2008 the official name of this game land was changed to the R. Wayne Bailey-Caswell Game Land in honor and recognition of R. Wayne Bailey who is considered the founding father of modern wild turkey management and restoration.

The land in this area has been heavily used in the past. Most of this land at one time or another, has been cleared, farmed, abandoned, and then left to grow up successionally to woodlands. The majority of the farm land, that divided the countryside into a mosaic of small family farms, was found on the broad ridge-tops that make up this part of Caswell County. After many decades, row crops (especially tobacco) and other poor management practices had severely depleted the soil nutrients and promoted constant erosion. Much of the land was abandoned by the early 1900's and by the 1930's it was no longer productive for farming. This coupled with the economic downturn of The Great Depression resulted in the sale to the Federal Government under several programs enacted by Congress during this period to deal with economic and conservation problems of the time. This past land use history can be seen today in the highly eroded landscape, poor soils, second growth forests, low site indices (SI), and silted streams, found on much of RWB-Caswell Game Land.

SURROUNDING LAND USE

An analysis of SEGAP data (Southeast Gap Analysis Project) indicates the following conditions within the boundaries of Caswell County: forested – 63.0%, agricultural, pasture, other herbaceous – 31.9%, developed – 4.2%, and open water – 0.9%. (SE Online Gap Data Explorer Tool) Caswell County is a very rural county that is economically depressed compared to more urbanized and metropolitan counties to the south. Commercialized industry (manufacturing and technological) is lacking and intensely developed areas are small and few. Many residents of Caswell County seek work elsewhere. Most of the population of Caswell County resides in single family dwellings distributed across the landscape on small to sizeable private properties. Many of these properties are long-time family farms, though they no longer serve for large scale agricultural production. However, livestock production, small grain farming, pasturing, and haying are still widely practiced. This mosaic of individual properties also contains large amounts of forested acres, and therefore timber harvesting operations are economically important in the region. In recent decades, forest management on private lands has occurred on an enormous percentage of the county. (**Appendix IX**, Game Land Vicinity Aerial Photo)

CULTURAL AND HISTORICAL IMPORTANCE

The historical and cultural significance of Caswell County is well-documented. The surrounding region is rich in Native American history and artifacts. Paleo-Indian Period stone artifacts (>8000 BC) are rare (as expected), but Archaic Period (0 BC/AD – 8000 BC) and Woodland Period (~1700 AD – 0 AD/BC) stone artifacts, particularly projectile points, are quite numerous and encountered frequently as surface finds. The Occaneechi and Siouan Indians were the most recent tribes inhabiting the area, but upon western colonization in the middle 1700's, English and German settlers began populating the region. (Caswell County Historical Association)

During the Civil War many Confederate soldiers had roots in Caswell County and the county produced its share of troops, including the Yanceyville Grays, the Milton Blues, the Leasburg Grays, the Caswell Rifles, the Caswell Rangers, and the Caswell Boys. The Bank of Yanceyville, at the time one of the best capitalized banks in North Carolina, financed Confederate war efforts. Troops from Caswell County fought in every major engagement of the war. (Caswell County Historical Association)

Small cemeteries, known and unknown, marked and unmarked, dot the landscape of Caswell County and an unknown number exist on game lands. A few are presently maintained (by private individuals); though many are only evidenced by simple stone markers and oblong soil depressions. Old homesteads abound on the hilltops, though very few structures remain today. Small outbuildings, stone foundations, abandoned wells, tobacco barns, and derelict farm equipment are often encountered across the game land, but most are too far gone to protect or restore.

Note: Cultural and prehistoric artifacts should not be disturbed, tampered with, or removed from state property. These resources should be left in situ for the enjoyment of others and the future information they may provide to historians and researchers.

TRACT DISTRIBUTION AND DIVISION

The heart of RWB-Caswell Game Land is centered south of Yanceyville, west of NC Hwy. 86 and bisected by NC Hwy. 62. Parcels occur on a southwest to northeast axis for roughly fourteen miles. Two large, non-contiguous tracts are located at the farthest extent northeast and southeast of the main blocks, High Rock (near Hamer) and Frogsboro (near Leasburg). Individual areas are associated with other local place names such as Topnot, Russell Ridge, Stephentown, Burton Chapel, Fitch Tract, Barker Tract, the (Boy) 'Scout Camp', the 'CURE Area', and the 'Restricted Zone', etc.

RWB-Caswell Game Land was originally divided into eleven blocks, each designated by a letter 'A' through 'K'. The game land was also divided into six Compartments (1-6) and six Sub-compartments (A-F) for management purposes. Compartments range in size from ~1,175 to ~3,849 acres (average 2,333). (**Appendix X**, Game Land Compartment and Tract Distribution Map)

The Cherokee Scout Reservation, owned by the Old North State Council of the Boy Scouts of America, is located on the western end of the game land and encompasses over 1,700 acres. Mostly upland hardwoods with a 20 acre lake, shooting ranges, private camping facilities, and other amenities, it is included in the Game Land Program as Archery Zone. Management activities here are controlled by the landowner. A small extension of this Boy Scout property (foot access only) also touches S.R. Farmer Lake (365 acres) where additional leisure recreation, boating, fishing, and waterfowl hunting opportunities exist seasonally. The NCWRC constructed a PFA with an Americans with Disabilities Act (ADA) compliant fishing pier on Farmer Lake, which opened in June 2014.

Traditionally known as 'The Turkey Refuge', a 3,010 acre portion near the center of the game land was originally reserved and developed as a sanctuary. This area served primarily to protect the wild turkey, but also as a refuge area for other wildlife species. It was posted as closed to all hunting and served as a trapping source for wild turkeys to be stocked in restoration areas within the state. Turkeys relocated from Caswell (and other isolated strongholds) have allowed for a strong population rebound and today there are turkeys in all 100 counties of the state. (Turkey trapping efforts ceased in 2005, when relocation efforts and viable re-establishment were complete statewide.) Today, known as the Caswell Restricted Area, an approximately 1,550 acre portion remains off limits to the public with limited permit only deer hunts for disabled and youth hunters.

The Caswell CURE Area (**C**ooperative **U**pland Habitat **R**estoration and **E**nhancement), is a 6,574 acre area in the center of the largest contiguous block of RWB-Caswell Game Land. Originally established in 2001, it is divided into 7 CURE Units, ranging from 450 to 1,200 acres in size. Management of this area is focused on maximizing early successional habitat and the corresponding species assemblages that have been declining sharply for decades. (In **Appendix XXII**, Caswell CURE Area Management Plan, see **Figures 1 & 2**)

A single parcel included in RWB-Caswell Game Land is owned by Duke Energy (formerly Progress Energy Carolinas) and leased the State of North Carolina for inclusion into the Game Lands Program. This 185 acre block is located adjacent to the North Hyco Creek arm of Hyco Lake east of Hwy. 119. Management activities here are controlled by the landowner.

PURPOSE OF GAME LAND

RWB-Caswell Game Land is special for many reasons. As a resource for hunting fishing, and outdoor recreation opportunities, few other places in the Northern Piedmont offer such a large, mostly contiguous (~18,000 acres undeveloped lands) outdoor destination to the public. The maturity, quality, and size of contiguous hardwood forests on the game land are unique for this part of the state. The slopes, bottomlands, and streams are also of good quality and support several priority species. Because of the size and quality of these habitats and associated habitat management, RWB-Caswell Game Land is one of the better locations in the Piedmont for turkey hunting and viewing several Neotropical migrating songbird species associated with hardwood forest habitats.

The game land is located within an hour to an hour and a half drive of many of North Carolina's largest metropolitan areas. (**Appendix XI**, Major Cities Proximity Map) The protection and conservation of such a sizeable area of "wild land" in this part of North Carolina makes it extremely unique and valuable to all citizens.

The game land exhibits a model of diverse "on the ground" modern wildlife management in many aspects. With the diversity of habitats and inhabitants there are unique management strategies and challenges. Forestry, prescribed fire, sensitive habitat and

rare species protection, game and non-game species habitat enhancement, and open land management are all currently and have historically been used to manage these lands. Demonstration of these techniques, particularly CURE management, and their results provide valuable educational and research opportunities.

GOALS

- Provide for a diversity of habitat types and forest age classes though science based land management practices that are properly interspersed and juxtaposed across the landscape to ensure that a wide variety of terrestrial and aquatic wildlife species are conserved on the game land.
- Conserve popular sport fish and game species at fishable/huntable levels through science based land management and sound regulations.
- Provide quality habitats across the game land for endangered, threatened, and rare species to promote sustainable and perpetual populations, and if feasible, investigate the possibilities of and means for reintroducing extirpated species which should occur in the region.
- Provide sufficient infrastructure and opportunity to allow all game lands users a quality experience while on the game land with minimal habitat degradation and minimal conflict among user groups.
- Promote forest health (and native species restoration) through timber stand improvement measures while maintaining a sustainable yield of quality forest products where applicable to achieve habitat objectives.

MEASURES OF SUCCESS

- Wildlife and fish inventories/surveys indicate that a wide variety of species are present at sustained levels and are properly managed for on the game land. Some current examples:
    - Bobwhite quail counts indicate a stable or increasing long-term trend.
    - Songbird surveys indicate stable or increasing counts of indicator species of breeding early successional, upland, and bottomland forest songbirds.
    - Periodic reptile and amphibian inventory surveys confirm the continued presence of indicator species.
- Surveys and inventories for target sport fish and game species indicate that population levels are being managed and harvested at sustained levels.
- Inventories/surveys indicate that populations of endangered, threatened, and rare species found on the game land are being maintained or restored.
- Inventories/surveys indicate that previously unknown populations or previously unknown endangered, threatened, and rare species are found on the game land.
- A diversity of habitats are managed and maintained to maximize the benefit to the widest diversity of native species, while protecting sensitive species and significant natural communities, and controlling the spread of invasive species.

- At least 3,600 acres of fire-maintained habitats are prescribed burned on a 3-5 year rotation.
- Infrastructure is provided and maintained at a level that allows the public to reasonably access and enjoy the game land for wildlife-associated recreation.
- Public use of the game land is managed so that minimal conflicts among game land users occur.
- Agreements with conservation partners are initiated that allow game land goals to be reached more expediently.
- Reasonable public complaints regarding management of the game land are minimal.
- Wildlife violations, illegal activity, misuse, and abuse of the resources occurring on the game land are decreased.

PUBLIC USES

HUNTING AND TRAPPING OPPORTUNITIES

With over 3.6 million people living in the Research Triangle and the Piedmont Triad, within a roughly sixty mile radius of RWB-Caswell Game Land, public land hunting opportunities are increasingly important. Hunting has always been an integral part of the management of the property, even back when it was known as the Caswell Wildlife Management Area. In the early years of the Wildlife Commission when big game populations were low statewide, Caswell remained a stronghold for wild turkey (*Meleagris gallopavo*) and white-tailed deer (*Odocoileus virginianus*), and has always provided good small game habitat and populations of rabbits, quail, squirrels, and various furbearers. Hunters remain the primary user group at RWB-Caswell.

Continued habitat protection, management, and enhancement have provided excellent hunting opportunities for countless sportsmen. Caswell County, and RWB-Caswell Game Land in particular, has become one of the best areas in the state for deer and turkey hunting success. Before the successful reintroduction of wild turkeys statewide, Caswell was the premier destination for public land turkey hunting in North Carolina. Caswell also boasts an abundant deer herd with the potential for trophy quality animals. Turkey and deer hunting effort remains heavy and success is high. Currently, deer may be hunted with hounds during the regular gun season.

Over the last five hunting seasons an average of 212 deer (high 276 in 2011) and 32 turkeys (high 37 in 2011) are annually reported as harvested. (PAWS Hunter Harvest Reporting Summary)

Small game hunting at Caswell is fair to good, with moderate to heavy hunting effort and high success for mourning dove (*Zenaida macroura*), eastern gray squirrel (*Sciurus*

carolinensis), and eastern cottontail rabbit (*Sylvilagus floridanus*), but with relatively low hunting effort and success for northern bobwhite quail (*Colinus virginianus*) and American woodcock (*Scolopax minor*). (The portion of the game land in the Caswell CURE Area is currently closed to quail and woodcock hunting but may at some point in the future be open to hunting by permit only.) Other animals that are likely taken incidentally (and expected to occur occasionally too frequently), but are targeted by only a small number of sportsmen are: American crow (*Corvus brachyrhynchos*), groundhog (*Marmota monax*), common snipe (*Gallinago gallinago*), sora (*Porzana carolina*), and Virginia rail (*Rallus limicola*). However, raccoon (*Procyon lotor*) hunting at night remains popular.

Waterfowl hunting opportunities are limited because of the small amount of available wetlands, but are popular particularly in the managed waterfowl impoundments which are open to permit draw hunts (after November 1st). Beaver ponds, farm ponds, larger creeks, and other natural wetlands also provide good waterfowl habitat and hunting opportunities. Wood ducks (*Aix sponsa*) are the primary species harvested, but Canada geese (*Branta canadensis*), mallards (*Anas platyrhychos*), green-winged teal (*Anas crecca*), blue-winged teal (*Anas discors*), and hooded mergansers (*Lophodytes cucllatus*) are encountered frequently. The possibility exists for encountering nearly every species of migratory waterfowl, especially the species of puddle ducks that pass through or overwinter in the Piedmont of North Carolina.

Trapping effort for various furbearers is not well-documented, as is also true for specific varmint and predator hunting. Legally trapped species include: coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), beaver (*Castor canadensis*), striped skunk (*Mephitis mephitis*), bobcat (*Lynx rufus*), river otter (*Lontra canadensis*), Virginia opossum (*Didelphis virginiana*), mink (*Mustela vison*), long-tailed weasel (*Mustela frenata*), and raccoon. Hunter effort specifically targeting coyotes (by calling and shooting) seems to be on the increase in recent years.

In slightly over the past decade, feral swine (*Sus scrofa*) have become well-established and a very serious problem at RWB-Caswell, particularly in the Restricted Zone where they have prospered. They have since moved onto other parts of the game land and surrounding private lands. It is not known for certain how they got here, but it is thought that they were introduced intentionally by local sportsman desiring an additional big game animal. At times their damage has been severe, wiping out entire crop fields and destroying the native understory in areas along Country Line Creek. Serious trapping and eradication efforts began in 2005 (and for a time seemed successful), as for a few years there were only a few hogs seen. Hogs are ever present and barring different strategies and additional resources dedicated to their eradication, they will certainly remain.

Table 1: Feral Hogs Removed by NCWRC

(Through focused NCWRC trapping and sharpshooting efforts, at least **442** feral hogs have been removed from the game land from 2005-2013.)

2005 - **(44)**, 2006 - **(61)**, 2007 - **(193)**, 2008 - **(30)**, 2009 - **(0)**, 2010 - **(10)**, 2011 - **(15)**, 2012 - **(68)**, 2013 - **(21) = 442**

Hog trapping effort has decreased in intensity due to manpower constraints, but techniques have improved. The diligent use of trail cameras and mobile trap set-ups has greatly facilitated success. Hog activity appears to be much less concentrated but more widespread than in the past, making detection and patterning more difficult. Most of the recent catch has been composed of groups of juveniles and sows with litters of piglets. The solitary hogs that remain, thought to be mostly large boars, are more scattered across the game land and have become extremely trap shy and almost impossible to catch. It is thought that the local population has now successfully colonized the majority of RWB-Caswell Game Land. Though actively pursued by some hunters, targeted hunter kill remains rare and the few that are harvested are likely taken incidentally while in pursuit of other game species.

Black bear (*Ursus americanus*) have become increasingly common in recent years in the Northern Piedmont of NC, notably in Caswell and surrounding counties. Sightings are frequent, particularly during the summer months when young males are dispersing from their natal home ranges. Based on recent management suggestions originating from the NCWRC Black Bear Management Plan (NCBBMP, 2011-2012), a Piedmont Bear Management Unit (PBMU) has been established. Statewide public hearings for Piedmont black bear season proposals were held, and a black bear season will be implemented in the fall of 2014. As currently proposed, this bear season would run concurrently with the gun deer season in Piedmont counties and will be subject to the existing laws regarding deer dog hunting. Black bear will now be a legal game species in Caswell County to be pursued by hounds. However, unlike on private lands, bears may not be taken with the aid or use of unprocessed, natural baits on game lands. Baiting for any species is specifically prohibited on all game lands.

RWB-Caswell Game Land is currently a three-day-per-week game land that is open for hunting Mondays, Wednesdays, Saturdays, and holidays (Thanksgiving, Christmas, New Year's, and Martin Luther King Jr. Day). This game land is enrolled in the Disabled Access Program, allowing persons with a qualifying disability and limited physical mobility "to operate vehicles, including ATV's, on any Commission-maintained roads open for vehicular travel, those trails posted for vehicular travel, and open-gated or un-gated roads otherwise closed to vehicular traffic". (NCWRC Regulations Digest, 2012-2013) Through the Permit Hunting Opportunity Program there are also draw hunts on the Caswell Restricted Area for two Tier II, two Tier III, and two Youth deer hunts.

There has been much public comment regarding changing RWB-Caswell to a six-day-per-week game land. Suggestions vary from opening the game land to all types of hunting on all open days, to allowing small game hunting only on the "off days" which are now Tuesday, Thursday, and Friday. As suggested by many, all legal game species could be hunted on Saturdays, but big game hunters would have two weekdays open and small game hunters would have the other three, thus reducing the chances of hunter conflict. This would not increase the hunting pressure on deer and turkey, and it is thought that some small game hunters might avoid the big game days. The impacts of six-day-per- week hunting pressure on small game populations at Caswell is presently undetermined. Permitted waterfowl hunts in the posted impoundments would remain limited to two days per week during the late seasons. Commission staff will

further evaluate this request and may alter the current status of a three-day-per-week game land in the future.

Dog hunting for deer in Caswell County and on the game land remains a popular tradition. However, this type of hunting has the potential to cause great conflict between the organized dog hunters and adjacent private landowners, hunters pursuing other species, and especially those still hunting deer on the game land and on nearby private lands. The release of hounds often entails unpredictable scenarios. Rarely do dogs stay entirely on game land property. In the pursuit of deer, dogs frequently end up on private land and negatively affect the quality and success of (still) hunting on both the game land and adjacent private lands. Livestock disturbance, trespassing, property damage, and lost hunting dogs, are often frequently cited complaints, among others. This has been an issue of contention for many years and may need to be formally addressed. Not all blocks of game land are deemed suitable for intense dog hunting activity because of size. The consideration of these circumstances will be evaluated by NCWRC staff for the feasibility of this type hunting. Tracts that lack sufficient acreage may possibly be removed from general regulations and dog hunting for deer may be prohibited on a localized basis. The intent would never be to prohibit all deer dog hunting opportunities on the game land, but certain parcels may prove more suitable for still hunting only because of small size or immediate proximity to private land. A five (hunting) season average of reported hunter harvest from RWB-Caswell indicates that 28.9% of the total deer harvest has been with the use of dogs. (PAWS Hunter Harvest Reporting Summary).

FISHING OPPORTUNITIES

Fishing is popular at RWB-Caswell, particularly at the two managed Public Fishing Areas. The Rabbit Shuffle Pond (4.4 acres) and the High Rock Pond (3.7 acres) provide disabled accessible fishing piers, improved boat ramps, large parking accommodations, and have fish feeders installed within easy casting distance. Largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and channel catfish (*Ictalurus punctatus*) are the most frequently caught species, but other sunfish and catfish species from previous (unintentional or illegal) introductions are sometimes encountered. Catchable sized channel catfish are routinely stocked by the Commission in these ponds as part of the Community Fishing Program, and at the High Rock Pond hybrid striped bass (*Morone saxitalis X Morone chrysops*) were stocked experimentally.

Other old farm ponds with unimproved access provide good fishing opportunities to those who are willing to walk to them and fish in more “natural”, private settings. Long established, large ponds exist on the Barker Tract (2.2 acres), the Fitch Tract (1.4 acres), and are known by locals to provide excellent fishing with some effort. It is unknown what could potentially be caught in these ponds, for they pre-date later game land acquisition(s) and no surveys or management have ever been completed in these waters.

Creek fishing in Country Line, South Country Line, and North Hyco Creeks provides limited opportunity for fishing because of their small size and inaccessibility from major roads as they course through remote portions of the game land. However, a diversity of sport fish species are known (or could be expected) to occur in suitable riverine habitats including: bluegill, largemouth bass, redbreast sunfish (*Lepomis auritus*), pumpkinseed (*Lepomis gibbosus*), warmouth (*Lepomis gulosus*), green sunfish (*Lepomis cyanellus*), channel catfish, white catfish (*Ameiurus catus*), brown bullhead (*Ameiurus nebulosus*), other bullheads (*Ameiurus spp.*), black crappie (*Pomoxis nigromaculatus*), yellow perch (*Perca flavescens*), redfin pickerel (*Esox americanus*), common carp (*Cyprinus carpio*), and possibly others. A wetland complex on North Hyco Creek in South Frogsboro known as the 'Fish Trap' (prehistoric Indian fishing site, now maintained by beavers) is known to offer fishing potential, though is seldom utilized by anglers.

WILDLIFE VIEWING

Wildlife viewing includes activities such as birding, wildlife photography, and general wildlife viewing. Wildlife viewers are considered to be a primary user group at RWB-Caswell Game Land, and management strategies to increase the number of wildlife viewers utilizing the game land should be implemented. In 2009 the game land was designated as part of the North Carolina Birding Trail (NC Birding Trail) and because of its diversity of habitats it has become an increasingly popular destination for birders and wildlife viewers. Many wildlife viewing enthusiasts who come to the game land are particularly interested in birds, butterflies, and other wildlife species associated with early successional habitat types and mature hardwood forests.

RWB-Caswell Game Land has been designated an Important Bird Area (IBA) by the National Audubon Society, and has been "adopted" by the T. Gilbert Pearson Audubon Society (based in Greensboro) through Audubon's "Adopt an IBA" program. The partnership has the potential to enhance wildlife viewing and educational opportunities on the game land. Strategies to increase and enhance wildlife viewing opportunities include: continue to maintain and develop partnerships with wildlife viewing groups and the public, establish directional signage along roads that provide access to the game land, erect informational signage and kiosks regarding wildlife viewing opportunities at key access locations, better publicize RWB-Caswell as a NC Birding Trail destination, and directly publicizing the birding opportunities to birding groups in the region. Infrastructure improvements needed to better facilitate this user group includes signage as noted above, development of parking areas, and the establishment of informational kiosks at key access locations. (See Infrastructure Section) The continuation of active habitat management as outlined in the habitat and management sections of this plan will ensure that adequate numbers and a high diversity of wildlife species are present on the game land and will serve to keep viewer interest high. Threats to a quality wildlife viewing experience include conflicts with other user groups on the game land.

OTHER GAME LAND USES, USERS, AND ACTIVITIES

To provide public opportunities for hunting, fishing, trapping, and wildlife viewing are the primary uses of game lands. Other resource-based game land uses are permitted to the extent that such uses are compatible with the conservation of natural resources and traditional uses, and can be employed without displacing primary users. (NCWRC Game Land Use Evaluation Procedure)

Non-consumptive user activities include, but are not limited to, all aspects of wildlife/nature viewing on the game land. Walking, hiking, sight-seeing, bird watching, botanizing, and nature photography are widely practiced throughout the year, especially during closed hunting seasons and on non-hunt days. Horseback riding and geocaching by individuals and organized groups has become more popular in recent years. Amateur astronomy is practiced occasionally by those who go there to take advantage of the relatively dark, light pollution-free skies of Caswell County. There have been many biological research and survey projects (on-going and completed) and many future opportunities to be explored. Educational field trips are given frequently to nature clubs, outdoor groups, youth organizations, wildlife professionals, and scholastic programs ranging from elementary through collegiate levels.

Hiking

Hiking popularity on RWB-Caswell Game Land is unknown but certainly occurs year round by casual explorers. There are no designated hiking trails located on the game land. However, with the exception of the Caswell Restricted Area, the entire game land is open to walkers and hikers every day of the year. There are over 30 miles of maintained roads, as well as paths, firelines, utility corridors, etc. available for these activities. Many thousands of acres of forests, fields, and open and undeveloped lands through a diversity of habitat types and age compositions are available to users. This existing network of roads and trails is adequate to meet demand and no new hiking trails are proposed. We do not anticipate the need or desire to dedicate certain existing paths as “hiking only” trails, though “foot travel is encouraged” in these areas. Extensive construction of designated trails would be incompatible with the management objectives of the wildlife resources and habitats. Where appropriate, upgrades to unmaintained, existing paths and roads would increase walking and hiking opportunities for those desiring less strenuous exploration. Strategies to increase and enhance hiking opportunities include: directional signage along roads that provide access to the game land, informational kiosks denoting maintained paths and key access locations, and development of improved parking areas. (See Infrastructure Section) Conflicts among hunters and hikers and wildlife watchers occasionally occur. Increasing game land information available to the public through online resources and informational kiosks at key access locations may help reduce this source of conflict among user groups.

Horseback Riding

Equestrian use is permitted on RWB-Caswell Game Land. Horseback riding is allowed only during June, July, and August and on Sundays the remainder of the year, except during open deer and turkey seasons. Horseback riding is allowed only on roads open to vehicular traffic and participants must obtain a game lands license prior to riding on the area. (NCWRC Regulations Digest, 2012-2013) The equestrian community has expressed great interest in the development of more riding areas, designated trails, and improved access accommodations.

Currently, horseback riding areas on the game land are limited to maintained gravel roads (~16 miles), and "open riding" or trail riding elsewhere is prohibited. For this reason, mounted fox and coyote hunting is not feasible. The development of opportunities for horseback riders and mounted hunters to use the game land and specific recommendations from the public input meeting and on-line survey were reviewed and discussed at length by NCWRC staff. With the highly erosive soils, sensitive plant communities, Natural Heritage Areas, and streamside management zone buffer restrictions at Caswell, it was determined that unrestricted horseback riding and extensive trail development on the game land would be an unsuitable activity. Allowing horseback riding off of maintained roadways would create additional erosion issues, damage to vegetation, wildlife openings, and plantings, and conflicts with hikers, hunters, and wildlife watchers. Equestrian presence also exacerbates the probability of introducing additional exotic plant species to the game land. Horseback riding on RWB-Caswell Game Land should remain limited to roads open for vehicular traffic and no designated single-track "off-road" trails will be developed. In response to the increased demand and interest, additional roads may be opened to create more miles of riding access and larger loop routes, but an extensive adjustment of the rules and regulations (days per week and season) for horseback riding on this game land should not be expected. Larger parking areas at key access points should be constructed to allow for better and safer riding access, and informational kiosks and directional signage would aid in informing users about permissible riding areas and times, potential conflicts with other users, hazards, and game land laws.

There are plans to add an additional ~4.1 miles of equestrian use roads that would connect existing riding areas and the construction of two large parking areas suitable for multiple horse trailers at specific entry points. In the CURE Area, three of these connector additions would link existing riding areas with state maintained road shoulders to provide an approximate 11.7 mile riding loop. In North Frogsboro additional designated roads would create an approximate 2.5 mile one-way route from the parking area, allowing for a 5 mile round trip.

Camping

Primitive (hunter) camping in a designated camping area is restricted to September 1st – February 28th and March 31st – May 14th during open hunting seasons. This camping area consists of an all-weather gravel access road with numerous unimproved "sites" capable of accommodating a few tents or small campers. There are no tables, fire

rings, bathrooms, or running water and availability is on a first-come, first-served basis. Hunters often occupy particular spaces throughout the duration of deer season.

Off-Road Vehicles

Unauthorized off-road vehicle (ORV) and ATV use is a constant and growing problem across all portions of the game land, particularly behind gated closures, on firelines, and through fields. Operation of any motorized land vehicle (except wheelchairs), including ATV's, not licensed for highway use is specifically prohibited. The exception at Caswell is reserved only for holders of a Disabled Access Permit which can drive on any Commission-maintained road open for vehicular travel and on open or un-gated roads and trails for hunting purposes. The development of designated trails or changing restrictions for off-road vehicle use should not be implemented at RWB-Caswell to protect sensitive habitats and reduce primary user group conflicts. Intensive recreational riding has severe negative impacts on wildlife, plant communities, water quality, soil preservation, and the tranquility of the outdoor experience.

Mountain Biking

Mountain biking (on maintained roads and trails) currently occurs at RWB-Caswell Game Land, but at low levels. Hunters sometimes use bikes to access distant areas behind closed gates. The current level of mountain biking should not be increased. High intensity mountain biking should be discouraged due to the erosive nature of the soils and because it can degrade wildlife habitat especially in sensitive areas. Potential conflicts also exist with hunters, hikers, and wildlife viewers. The existing maintained roads on the game land are sufficient to accommodate limited use by bikers, and no designated bike trails will be developed. Ample opportunities for intensive mountain biking on one of the longest and most extensive trail networks in the region can be found nearby in Danville Virginia at Dan Daniel's Memorial Park and Anglers Park. This activity should not be featured at RWB-Caswell.

Edible Plant Collection

Wild edible foraging for personal use only is certainly practiced widely on the game land but it is unknown to what extent. The picking of mushrooms, various edible plants, nuts, fruits, and berries occurs by many whom actively seek these wild foods at specific times of the year. Pursuant to the North Carolina Administrative Code (NCAC), 15A NCAC 10D.0105, only the following plants, animals, and materials may possessed on or removed from game lands:

- Wildlife, birds, or fish legally taken under a valid hunting, fishing, trapping, or falconry license.
- Small amount of edible plants or plant parts for personal consumption, except any plants on a state or federal protected list.

- Insects, worms, or other invertebrates collected as fish bait for personal use, except any on a state or federal protected list. Any fish bait collected may not be sold.
- Small amounts of animal parts, plant parts not removed from live plants, dirt, rocks, and water. These items may not be collected for commercial purposes or sale.
- Firewood for use while camping on game land.
- Litter and road-kill animals, except where specifically prohibited.
- To possess or remove any other plants, animals, and materials requires written permission. This includes, but is not limited to, firewood to be taken off game lands, pine straw, ginseng, snakes, lizards, turtles, frogs, and salamanders.

Firewood Cutting

Firewood collection is commonly practiced on the game land during the cooler months of the year. Local residents cut wood for home heating from dead or downed trees usually in close proximity to roads where loading is facilitated. Firewood collection permits are issued for a fee of $10.00 (money order) and are good for one day and up to two cords. Permits can be obtained from the staff at the Wildlife Depot Office.

Geocaching

Geocaching is an outdoor recreational activity that is occurring on the game land and gaining popularity. Participants use Global Positioning Systems (GPS) or other mobile devices to hide and seek containers called “caches”. There are numerous geocache locations on RWB-Caswell, well-distributed across the game land with most not in particularly remote locations. It is believed that most caches are located in safe to reach locations just off main roads. Caches located in potentially hazardous locations could put people in dangerous situations and should be discouraged. When administered in appropriate areas, geocaching is an outdoor activity that could be used to promote and educate the public about management activities occurring on game lands. Currently, the NCWRC is exploring potential ways to implement these activities across the state’s game lands.

Shooting Range

Plans are currently underway to construct a public shooting range at RWB-Caswell. Site evaluations were performed in areas across the game land and a location on the Caswell Restricted Zone was chosen. Sound studies were conducted in the summer of 2013 and engineering design plans are in progress. The site will provide 100-yard rifle and 25-yard pistol ranges, shooting benches and shelters, improved parking, and will be ADA accessible. The range will be open select days weekly throughout the year. A late summer 2014 completion date is currently projected.

Canoeing, Kayaking, Boating

Opportunities for boating recreation are scarce at RWB-Caswell because of the limited availability of suitable waterways. Improved boat ramps exist at the Rabbit Shuffle and High Rock Ponds for fishing access, but other game land ponds have walk-in-only access and manual transport of boating vessels across land is required. Though there are a probable maximum of 17.5 miles of potentially navigable waters (through sections of private land between roads) on Country Line Creek (12.1 mi.) and North Hyco Creek (5.4 mi.), these streams are probably only feasibly navigable during wet weather periods or high water events. Challenging float trips (with frequent portages) are possible for fishing, duck hunting, and exploration, but unfavorable stream obstacles should be expected. Countless log jams, sand shoals, and beaver dams will be encountered on any lengthy excursion. During normal flow regimes, only the larger downstream sections of these streams should be considered marginally navigable. Put-in and take-out points are difficult and not necessarily associated with game land or state maintained roads.

Research and Education

Research on RWB-Caswell Game Land has included a variety of biodiversity surveys and inventories. Extensive investigations by the North Carolina Natural Heritage Program (NCNHP) have identified significant (exemplary and unique) natural communities and an array of rare, threatened, and special concern vertebrate, invertebrate, and especially plant species. RWB-Caswell Game Land has also been used as a field research site for various University projects.

Research and surveys by the NCWRC has been accelerated in recent years with the implementation of the CURE Program. Baseline and post-management surveys at established CURE survey points have provided much insight into the consequences and habitat effects of CURE management. These surveys include bobwhite quail summer call counts and fall covey counts, winter and summer vegetation surveys, and winter and spring songbird point counts. Extensive effort has also been focused on herpetological and small mammal surveys (cover board studies, small mammal trapping, and acoustical bat surveys). A Habitat Suitability Survey is also performed each fall to determine the percentage change in suitable habitat useable by bobwhite quail following the phases of CURE implementation. (**Appendix XII**, CURE Habitat Suitability Progression Maps)

Educational opportunities at RWB-Caswell include field trips by request ranging from formal scholastic programs to organized special interest groups. In the recent past, students from North Carolina State University, Catawba College, and Wayne Community College; wildlife professionals from The Wildlife Society and wildlife enthusiasts from the Audubon Society have attended field tours focused on land management and habitat manipulation techniques. Annually, students enrolled in the NCSU Fisheries, Wildlife, and Conservation Biology Summer Camp visit the game land for an in-depth field tour as part of the mandatory curriculum.

FISH AND WILDLIFE COMMUNITIES

Upland Pine Forest

Current Extent and Condition: Upland Pine Forest (including Mixed Pine-Hardwood) occupies about 53% (~9,436 acres) of RWB-Caswell Game Land. This forest type is generally confined to the uplands, especially on ridge-tops and side-slopes, on xeric sites, or on sites that were previously in agricultural production. Dominant canopy species include native shortleaf pine *(Pinus echinata)* and Virginia pine *(Pinus virginiana)*, and loblolly pine (*Pinus taeda*) whether naturalized or planted. A minor component of various hardwoods is often present that includes sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), yellow poplar (*Liriodendron tulipifera*), black gum (*Nyssa sylvatica*), white ash (*Fraxinus americana*), and various oaks (*Quercus spp*.) and hickories (*Carya spp*.). Common mid-story species include flowering dogwood (*Cornus florida*), sourwood (*Oxydendrum arboreum*), eastern red cedar (*Juniperus virginiana*), hop-hornbeam (*Ostrya viginiana*), and ironwood (*Carpinus caroliniana*), while scattered species include persimmon (*Diospyros virginiana*), redbud (*Cercis canadensis*), black cherry (*Prunus serotina*), American elm (*Ulmus americana*), and winged elm (*Ulmus alata*). Understory shrub species include viburnums (*Viburnum spp.*), blueberries (*Vaccinium spp*.), huckleberries (*Gaylussacia spp*.), and deciduous hollies (*Ilex spp*.) The herbaceous layer is rather sparse without the influence of timber harvesting and prescribed burning activities, but hosts a diversity of grasses, legumes, and forbs following management.

Loblolly pine plantations are included in this habitat type for these purposes. Although often thought of as monocultures, pine plantings in Caswell County rarely resemble competition-free crops. Seedling survival is often sporadic and the competition from species already on-site is tremendous. Virginia pine, red maple, yellow poplar, and sweetgum are particularly competitive during the establishment of planted pine seedlings. Most all areas clearcut and re-planted were formerly mature Virginia pine

stands. Traditionally, loblolly pine has been used for reforestation purposes on the game land but with recent advancements in shortleaf pine seedling production and consequent survival, future reforestation efforts will be focused on restoring the native shortleaf pine. After multiple burns and a first-time thinning, these pine plantations very closely resemble natural pine stands in appearance and by vegetative composition and structure with representatives of nearly all the aforementioned tree species present in the stand to some degree.

- ***Desired Future Conditions*** *(DFC)* – Include a mix of closed canopy pine woodlands and open canopy pine savannahs using prescribed burning, timber harvests, and regeneration to restore and maintain these stands. The goal will be to restore shortleaf pine stands on suitable sites by replacing Virginia pine stands and manage existing loblolly pine stands to maximize age class diversity. While some sites may have a mix of pine species and scattered mast producing hardwoods, all sites will have a goal to create an open, diverse understory and dense herbaceous groundcover. The creation and maintenance of scattered (~1+/ac) standing snags of various sizes and coarse woody debris is desirable. Some of these stands may be allowed to mature to mixed pine-hardwood forest and eventually to the oak-hickory forest type, particularly those stands that we are not able to regularly manage with fire.

- ***Target Game Species*** – This habitat is particularly important for bobwhite quail and cottontail rabbit, gets significant use by deer and turkey, and sporadic use by gray squirrel and woodcock. These species are closely associated with this habitat type at certain times of the year and during certain life stages, and they should be the focus of management attention because they attract hunters to this game land.

- ***Target Non-Game Species*** – Sharp-shinned hawk (*Accipiter striatus*), brown-headed nuthatch (*Sitta pusila*), hairy woodpecker (*Picoides villosus*), red-headed woodpecker (*Melanerpes erythrocephalus*), field sparrow (*Spizella pusilla*), prairie warbler (*Dendroica discolor*), Seminole bat (*Lasiurus seminolus*), and southeastern crowned snake (*Tantilla coronata*) are among the priority non-game species that should benefit from this habitat type, particularly those stands managed for larger diameter trees and a lush herbaceous and small shrub dominated understory. They should be a focus of management attention because they are especially important on this game land, or there are unique/important management or conservation opportunities. (**Appendix XIII**, NCWAP Priority Species Lists by Habitat)

- ***Management Strategies and Needs*** (to achieve DFC) – Will primarily involve repeated prescribed burning to reduce undesirable hardwood encroachment, open the woody understory, and promote diverse herbaceous groundcover. (Less frequent fires will create pine woodland conditions and more frequent and intense fires will promote pine savannah conditions). Generally, pine woodlands will have a mix of age class and size distribution with advanced pine regeneration available to perpetuate the stand. Pine savannahs generally have a much more

open canopy and a very open understory with a heavy grass and forb component as the dominant groundcover. Timber harvesting, including thinning (to reduce basal area) and clearcutting (for regeneration purposes) will be used. Selective use of herbicides may be required, particularly in stands where we are not able to use fire to sufficiently achieve DFC.

- ***Infrastructure Needs*** – Will primarily involve new firebreak and logging access construction in some areas and re-construction, re-furbishing, improvement, and maintenance of old roads and firebreaks in other areas. In instances where roads, trails, and firelines cross streams or traverse steep slopes, special attention should be given to avoid sediment runoff.

- ***Threats*** – Include invasive species, incompatible adjacent land uses which may limit the use of prescribed fire, catastrophic wildfire, and extreme weather events. Lack of periodic fire, successional change, and encroachment by hardwoods would degrade the quality of these habitats. Monitoring and controlling infestations of kudzu (*Pueria lobata*), multiflora rose (*Rosa multiflora*), and maiden grass (*Miscanthus sinensis*) should be a priority.

Mesic Forest

Current Extent and Condition: Mesic Forest occurs on an unknown acreage of RWB-Caswell Game Land. (This type is not separated from upland hardwood in the old forest inventory). These forests generally occur on lower and middle slopes, and in many streamside corridors where topography creates mesic moisture conditions. Dominant

canopy species include yellow poplar, northern red oak (*Quercus rubra*), white oak (*Quercus alba*), American beech (*Fagus grandifolia*), pignut hickory (*Carya glabra*), and Florida maple (*Acer barbatum*). Other associates occurring commonly include sweetgum, white ash, black gum, red maple, and occasionally the locally rare sugar maple (*Acer saccharum*). In some locations white basswood (*Tilia americana var. heterophylla*), cucumber tree (*Magnolia acuminata*), and the Watch List chinquapin oak (*Quercus muehlenbergii*) are present. Common mid-story species include flowering dogwood, sourwood, hop-hornbeam, ironwood, and redbud. Watch List species in the shrub layer include leatherwood (*Dirca palustris*) and eastern wahoo (*Euonymus atropurpureus*). The herbaceous layer is very dense in the spring but becomes rather sparse after these ephemerals disappear by early summer. Lush spring displays of mayapple (*Podophyllum peltatum*), spring beauty (*Claytonia virginica*), trout lily (*Erythronium americanum*), Dutchman's breeches (*Dicentra cucullaria*), Solomon's seal (*Polygonatum biflorum*), black cohosh (*Cimcifuga racemosa*), bloodroot (*Sanguinaria canadensis*), and bellwort (*Uvularia spp.*) occur on the richest sites. Others including christmas fern (*Polystichum acrostichoides*), broad beech fern (*Phegopteris hexagonoptera*), maidenhair fern (*Adiantum pedatum*), wild ginger (*Asarum canadense*), heartleaf (*Hexastylis spp.*), and liverleaf (*Hepatica americana*) remain visible later in the year.

- ***Desired Future Condition** (DFC)* – Includes ensuring the preservation of these rich habitats without negative influences from active management of the uplands upslope of their occurrence. "Old growth" stands with larger diameter trees, a well-developed mid-story, and periodic canopy gaps with lush herbaceous groundcover will eventually develop in these areas and natural processes will influence their ultimate state. They will be left undisturbed to ensure the threat of invasive species introduction is reduced and the diverse ephemeral herb community remains intact.

- **Target game species** – Transitional habitat for many species, including deer, turkey, gray squirrel, raccoon, etc.

- **Target non-game species** – Kentucky warbler (*Oporornis formosus*), hooded warbler (*Wilsonia citrina*), wood thrush (*Hylocichla mustelina*), and silver-haired bat (*Lasionycteris noctivagans*) are among the priority non-game species associated with this habitat. They should be a focus of management attention because they are especially important on this game land, or there are unique/important management or conservation opportunities. (**Appendix XIII**, NCWAP Priority Species Lists by Habitat)

- **Management Strategies and Needs** (to achieve DFC) – On occasion, at the timber type/habitat break occurring at the upper limit of the mesic forest transition, the removal of scattered non-mast producing trees (yellow polar, red maple, sweetgum, etc.) may be included as part of an upland pine timber harvest to create a better transition between habitats and to help create small canopy gaps, but otherwise no direct forest management activities will occur in these areas. On such steep slopes and highly erodible soils, efforts at artificial forest

regeneration would only further degrade surrounding habitats. Monitoring and targeted control of invasive species may be required.

- **Infrastructure Needs** – None. New infrastructure development (trails, firebreaks, etc.) in this habitat, particularly on steep slopes is discouraged. In instances where existing roads or trails cross riparian areas and streams, special attention should be given to avoid sedimentation and prevent or repair conditions that hinder aquatic animal passage (i.e. perched and blocked culverts).

- **Threats** – Include invasive species, incompatible adjacent land uses (including forestry practices), catastrophic wildfire, and extreme weather events. An increase in the feral hog population would be detrimental.

Floodplain Forest


***Current Extent and Condition**:* Floodplain Forest, better termed Piedmont Alluvial Forest, occurs in bottomland corridors along the major creek drainages and their larger tributaries. These bottomland hardwoods make up approximately 7% (1,328 acres) of RWB-Caswell Game Land. Dominant canopy species include sweetgum, yellow poplar, red maple, slippery elm (*Ulmus rubra*), sycamore (*Platanus occidentalis*), black walnut (*Juglans nigra*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), hackberry (*Celtis laevigata*), bitternut hickory (*Carya cordiformis*), shagbark hickory (*Carya ovata*), boxelder (*Acer negundo*), and occasionally swamp chestnut oak (*Quercus michauxii*) and willow oak (*Quercus phellos*). The understory often contains ironwood, hop-hornbeam, pawpaw (*Asimina triloba*), spicebush (*Lindera benzoin*), and hazelnut (*Corylus americana*). A well-developed groundcover is often present and is comprised of grasses and herbs including woodland sea oats (*Chasmanthium*

latifolium), sedges (*Carex spp.*), spotted jewelweed (*Impatiens capensis*), and wingstem (*Verbesina occidentalis*). Abundant vines include grapes (*Vitis spp.*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*).

- ***Desired Future Conditions*** *(DFC)* – Mature, closed canopy forest with a diversity of over-story and mid-story species adapted to hydric soils, scattered snags and coarse woody debris, well-developed herbaceous layer of native plants, and seasonally flooded sloughs and floodplain pools. Floodplain forests located across the game land will remain undisturbed by active management. Natural disturbances, including periodic flooding, will dictate future forest composition and structure. These stands will be left to develop into old growth forests and serve as streamside management zones and riparian buffers. The protection and retention of these forests ensures they remain as functional buffers along rivers and major streams and creeks. Natural hydrologic functions of these forests should be maintained. Where possible, non-native exotic species are controlled.

- ***Target Game Species*** – This habitat is especially important to woodcock, wood duck, and raccoon, and is heavily used by deer, turkey, gray squirrel, and various furbearers.

- ***Target Non-Game Species*** – This habitat supports a high diversity and abundance of non-game species, including Acadian flycatcher (*Empidonax flaviventris*), yellow-billed cuckoo (*Coccyzus americanus*), worm-eating warbler (*Helmitheros vermivorus*), hooded warbler, Kentucky warbler, wood thrush, hairy woodpecker, spotted salamander (*Ambystoma maculatum*), marbled salamander (*Ambystoma opaqum*), northern gray treefrog, common ribbonsnake (*Thamnopsis sauritus*), hoary bat (*Lasiurus cinereus*), and eastern box turtle (*Terrapene carolina*). (**Appendix XIII**, NCWAP Priority Species Lists by Habitat)

- ***Management Strategies and Needs*** (to achieve DFC) – Timber harvests will not be implemented in most areas unless for salvage for forest health purposes. These habitats should remain undisturbed and allowed to perpetuate on their own and reach climax status. Much of this acreage is already permanently protected as SNHA primary and secondary buffers and falls within streamside management zones (SMZ's) adjacent to riparian areas. Prescribed fire may be allowed to back into these habitats where appropriate, especially where creeks and tributaries can be utilized as natural firebreaks for larger upland burn units. Targeted herbicide applications may be used to control non-native invasive species. Areas severely impacted by beaver activities may need attention to preserve live timber and terrestrial habitat from inundation. Where streambanks and natural hydrology of the stream and floodplain pools have been negatively altered, these conditions should be repaired where feasible.

- ***Infrastructure Needs*** – Identification and limited development of non-vehicular access. Parking areas should be located outside of the floodplain. Gates should limit vehicular access where appropriate. Stream and creek crossings should be

maintained, but new development should not occur. In instances where existing roads or trails cross riparian areas and streams, special attention should be given to avoid sedimentation and prevent or repair conditions that hinder aquatic animal passage (i.e. perched and blocked culverts).

- ***Threats and Management Challenges*** – Limited management is allowed within Natural Heritage buffer areas and SMZ's. An increase in the establishment and spread of invasives like Japanese stilt grass (*Microstegium vimineum*), Chinese privet (*Ligustrum sinense*), autumn olive (*Elaeagnus umbellata*) and Japanese honeysuckle (*Lonicera japonica*) is expected. An increase in the feral hog population would be detrimental.

Oak-Hickory Forest

Current Extent and Condition: Oak-Hickory Forest occupies most of the upland hardwood on RWB-Caswell Game Land (acreage unknown, though the majority of the 35% forests typed as upland hardwoods). The canopy contains a mix of species including white oak, northern red oak, black oak (*Quercus velutina*), southern red oak (*Quercus falcata*), pignut hickory, mockernut hickory (*Carya tomentosa*), and southern shagbark hickory (*Carya carolinae-septentrionalis*). Drier sites contain a higher component of chestnut oak (*Quercus prinus*), scarlet oak (*Quercus coccinea*), and post oak (*Quercus stellata*). Yellow poplar, red maple, black gum, and scattered pines are also common. The understory often contains ironwood, hop-hornbeam, flowering dogwood, sourwood, redbud, eastern red cedar, witch hazel (*Hamamelis viginiania*),

fringe-tree (*Chioanthus virginicus*), and several viburnums, hollies, and blueberries. The herb layer varies from sparse to numerous and diverse with various grasses, legumes, and composites. Some of the best remaining examples of Oak-Hickory Forest (and variants) in the North Carolina Piedmont outside of the Uwharrie Mountains occur in Caswell County.

- ***Desired Future Conditions*** *(DFC)* – Includes maintaining a diversity of upland hardwood species and various age class compositions ranging from undisturbed old growth stands, to areas of upland hardwood regeneration where possible. Because many of these areas are exemplary examples of this forest type in NC, they are protected from active management or disturbance by Natural Heritage guidelines and shall remain intact in perpetuity. They will be left to develop into climax forests and will be altered only by natural processes (light gap regeneration, catastrophic replacement, species successional progression, etc.) In other less significant areas, active management may include limited hardwood thinning and introduction of fire to facilitate oak regeneration, the development of hardwood savannahs to serve as linkage corridors between other upland habitat types, and timber stand improvement cuts to reduce competition, balance species diversity and remove less desirable hardwoods.

- ***Target Game Species*** – Deer, turkey, gray squirrel, raccoon, and various other furbearers. These species rely heavily on this habitat type at certain times of the year and during certain life stages, and they should be the focus of management attention because they attract hunters to this game land.

- ***Target Non-Game Species*** – These species should be a focus of management attention because they are especially important on this game land, or there are unique/important management or conservation opportunities. Priority bird species include: Cooper's hawk (*Accipiter cooperii*), whip-poor-will (*Caprimulgus vociferous*), eastern wood pewee (*Contopus virens*), scarlet tanager (*Piranga olivacea*), yellow-billed cuckoo, wood thrush, hairy woodpecker, and others. Mammal species include: eastern mole (*Scalopus aquaticus*), long-tailed weasel, and likely some bat species. Amphibians include: the northern gray treefrog, northern slimy salamander (*Plethodon glutinosus sensustricto*), four-toed salamander (*Hemidactylium scutatum*), eastern spadefoot toad (*Scaphiopus holbrooki*), and others. Reptiles include: corn snake (*Elaphe guttata*), eastern smooth earthsnake (*Virginia valeria*e), mole kingsnake (*Lampropeltis calligaster rhombomaculata*), eastern kingsnake (*Lampropeltis getula getula*), broad-headed skink (*Eumeces laticeps*), eastern box turtle, and others. (**Appendix XIII**, NCWAP Priority Species Lists by Habitat)

- ***Management Strategies and Needs*** (to achieve DFC) – Will primarily involve a hands-off approach in most stands. In areas where management will be beneficial or can help in restoration or improvement, select timber harvesting strategies will be used to achieve desired species dominance or age class compositions. Some areas will be included into existing or future burn blocks to facilitate ease of burning larger areas without creating permanent firelines, to

promote different understory species, and to facilitate oak regeneration. The creation of hardwood savannahs in a few key connectivity corridors between existing early successional habitats will be implemented. In these localized areas, the basal area of hardwoods left after timber harvest will be very low (~40 BA) and include less dominant trees with slender boles and smaller crowns. The resulting soil scarification, daylighting of the canopy, and the repeated use of prescribed fire will promote an open understory with the heavy herbaceous and shrub groundcover that is required by many high priority game and non-game species.

- ***Infrastructure Needs*** – Will be minimal, but may include gates to control access, new firebreak and logging access construction in some areas, and re-construction, re-furbishing, improvement, and maintenance of old roads and firebreaks in other areas. In instances where roads, trails, and firelines cross streams or traverse steep slopes, special attention should be given to avoid sediment runoff.

- ***Threats*** – Include invasive species, incompatible adjacent land uses, catastrophic wildfire, extreme weather events, and climate change. Lack of occasional fire and encroachment of competing species would degrade the quality of these habitats. Monitoring and controlling infestations of tree-of-heaven (*Ailanthus altissima*), princess tree (*Paulownia tomentosa*), and mimosa (*Albizia julibrissin*) should be a priority.

Xeric Hardpan Forest/Upland Depression Swamp Forest

Current Extent and Condition: Upland Depression Swamp Forest and Xeric Hardpan Forest (acreage unknown) will be discussed together for these purposes. Either type can be considered separately but they usually occur in association with each other on

RWB-Caswell Game Land over mafic rocks. In Caswell County, and state-wide, these represent rather rare, unique, and imperiled natural communities. Except for a small upland depression known near the Caswell Wildlife Depot, the remainder of this forest type on the game land is limited to the Frogsboro area. In particular to the recently acquired Fitch Tract and the game land section adjacent to Ridgeville Rd. south of Leasburg known locally as the "Hickory-Flats".

The Fitch Tract contains the unique and rare forest types known as Xeric Hardpan Forest (formerly called Montmorillonite Forest) and Upland Depression Swamp Forest. The NC Natural Heritage Program has indicated that the Frogsboro Upland Depression Swamp (Nationally Significant) and surrounding Montmorillonite Forest represent the highest quality and best developed examples in the state, noting increased significance by association and transition to excellent examples of other natural community types (Basic Oak-Hickory Forest and Xeric Hardpan Forest). This "upland flat" in the northeastern section of this tract contains four seasonal depression pools, two of which are shared with the adjacent game land. These depressions contain (with variable composition) willow and overcup oaks (*Quercus lyrata*), sweetgum, elms, red maple, and abundant sphagnum moss (*Sphagnum sp.*), with a shrub layer of various blueberries and common greenbrier (*Smilax rotundifolia*). They provide important breeding habitat (verified) for marbled and spotted salamanders, fairy shrimp (Order *Anostraca*), and other species associated with ephemeral wetlands. The surrounding hardpan forest in the poorly-drained flatlands is composed mainly of white, post, and southern red oaks, eastern red cedar, fringe-tree, various viburnums, and southern shagbark hickory, with occasional blackjack oak (*Quercus marilandica*) also present.

- ***Desired Future Conditions*** *(DFC)* – Includes maintaining the integrity of these unique forest communities and the species assemblages that occur there. The wetlands should dry seasonally and be surrounded by forest with abundant stumps and coarse woody debris (for hibernating and refuge for reptiles and amphibians). They will be left to develop and mature naturally and will be altered only by biological and environmental processes (light gap regeneration, catastrophic replacement, climate change, etc.) Most of these examples at Caswell are permanently excluded from intense management or disturbance by Natural Heritage guidelines and shall remain intact in perpetuity. (The Fitch Tract was purchased with NHTF monies.)

- ***Target Game Species*** – This habitat with moist soils is of particular value to woodcock. This habitat gets periodic use by deer, turkey, gray squirrel, raccoon, and other furbearers. The largest wetland on the Fitch Tract may get some use by wood duck.

- ***Target Non-Game Species*** – Species associated with Upland Pine, Upland and Bottomland Hardwood Forests, Mesic forests, Floodplain Forests and transitional zones are associated with this type habitat. Of significant importance is the value to amphibians, particularly marbled and spotted salamanders. (**Appendix XIII**, NCWAP Priority Species Lists by Habitat)

- ***Management strategies and needs*** (to achieve DFC) – Will primarily involve a hands-off approach in most cases. In areas where management will be beneficial or can help in restoration or improvement, select strategies will be used to achieve desired species compositions or continued functionality. These include: restoring the natural hydrology of the degraded upland depression pools that had been previously attempted to drain (by plugging ditches), creating a forested buffer around an exposed pool near an agricultural field, and monitoring and controlling any invasive species encroachment.

- ***Infrastructure Needs*** – Are unknown, but may include additional gates to control access on the delicate soils and to sensitive plant communities. Deliberate measures (mechanical and physical) could be used to restore the natural hydrology of the surrounding forest and specifically the isolated upland depression swamps to enhance and maintain their importance for continued ecological function. The NCWRC should explore the feasibility of re-routing or re-building the game land gravel road that cuts through the middle of the depression swamp forest (at the North Frogsboro Access) to restore natural hydrology and minimize negative impacts.

- ***Threats*** – Include invasive species, incompatible adjacent land uses, catastrophic wildfire, extreme weather events, long-term drought, and unnatural (anthropogenic) vegetative succession resulting from previous land use/misuse. Encroachment of competing species would degrade the quality of these habitats.

Early Successional Habitats/Open Lands

Early successional habitats are one of the most important habitats on the game land for a large diversity of species, particularly many priority species. The loss of these habitats in the last half century has led to the severe decline of so many familiar and once abundant game and non-game species. Isolation via fragmentation and small

"patch" size are limiting factors for several primary early successional transient and permanent residents. Connectivity of suitable habitat is essential for the dispersal and colonization of many specialized inhabitants. Plant diversity is high, forage is abundant, vegetation structure provides excellent vertical cover, and many species (particularly certain Neotropical migrant songbirds and upland game species) rely on these habitats almost exclusively for nesting and brooding activities. Early successional habitats are considered those on which the vegetation is ≤ 20 years of age, or those on which the vegetation is manipulated and maintained by periodic disturbance. For these purposes this category will include (non-agricultural) fields, clearcuts, regenerating forests, utility corridors and right-of-ways, areas with remnant Piedmont prairie species, and thinned forest stands maintained by fire with a high herbaceous and shrub-scrub component. Many of these habitats are ephemeral and have a limited longevity, while others can potentially be maintained indefinitely by periodic burning, disking, mowing, light grazing, selective herbicide applications, and frequent timber management. From bare ground to young forests, countless different plant and animal species will utilize the succession of the changing vegetation structure throughout time. Thus why it is so important to continually create and maintain the full spectrum of early successional habitats across the landscape.

Current Extent and Condition: The condition and quality of early successional habitats varies widely at RWB-Caswell. Fields and open land habitats remain relatively constant at less than 5% of the game land, but forested early successional habitat (thinned and burned pine stands) acreage fluctuates due to timber harvesting activities and burn frequency. As various plant community assemblages change over time, areas that are not intensively managed quickly revert to densely forested conditions. Increased ground level shading caused by canopy closure results in the loss of understory plant diversity and cover structure. Areas left to their own revert to this state in a few decades. Fortunately, with the active timber management program at Caswell, most areas that have seen timber work have remained suitable for classification as forests providing early successional habitat. Repeated burns in thinned pine stands have maintained shrub, grass, and herbaceous groundcover by excluding sapling hardwood encroachment. (Thinned stands without an established burn regime develop a sub-canopy under the dominant trees over time and groundcover diversity is lost.) Some pine stands at Caswell in long-established burn blocks at have been burned in excess of five times over the years on a three to four year regime. (The 58 acre Annual Burn has been burned 24 times in 25 years.)

Traditional forest management strategies have accomplished the clearcutting of mostly small Virginia pine stands historically, but more recently with the inception of the CURE Program, larger scale clearcuts were implemented that affected much larger acreages. These clearcuts provide exceptional early successional habitat within a few growing seasons that lasts for many years as these areas reforest. At a young age these stands are introduced to a fire regime and first-time thinned by the age of 18 to 22 years, once again rejuvenating the value of the early successional habitat for many years to come until time for a second thinning. Since 1977, there have been almost 3,060 acres clearcut and reforested, much of that burned and some now first-time thinned.

Fallow field ("old field") management strategies and periodic maintenance of roadsides, utility corridors, and other non-forested areas creates and maintains a type of early successional habitat almost completely dominated by herbaceous vegetation. Diverse grasses, legumes, coarse herbs (annual and perennial) are characteristic. Key differences from forested types are the near absence of sapling tree species (though various shrubs and diminutive tree species are often scarcely present).

A few common plant species indicative of Piedmont upland early successional habitats (all types) include: pokeweed (*Phytolacca americana*), blackberries (*Rubus spp.*), dog fennel (*Eupatorium capillifolium*), broomstraw (*Andropogon spp.*), partridge peas (*Chamaecrista spp.*), goldenrods (*Solidago spp.*), asters (*Aster spp.*), chickasaw plum (*Prunus angustifolia*), fireweed (*Erechtites hieracifolia*), plume grass (*Erianthus spp.*), Indian grass (*Sorghastrum spp.*), begger lice (*Desmodium spp.*), butterfly peas (*Centrosema* and *Clitoria*), milkweeds (*Asclepias spp.*), fleabanes (*Erigeron spp.*) and various lespedezas (*Lespedeza spp*.).

- ***Desired Future Conditions*** *(DFC)* – Include maintaining (or increasing) a percentage of quality early successional habitats across the landscape with adequate connectivity for early successional species' populations to remain stable or increase. Documentable increases in population levels of quail, various shrub and ground nesting songbirds, and other non-game high priority species. Continued active forest management by way of thinnings and clearcuts and increased use of prescribed fire are essential for maintenance. Non-forested early successional habitats will remain productive and periodic mechanical or chemical maintenance will prevent advanced woody succession. The percentage of the game land acreage classified as early successional habitat will increase over time but not to the detriment of other significant and important habitat types.

- ***Target Game Species*** – Quail, rabbit, woodcock, deer, and turkey. These species rely heavily (quail and rabbit almost exclusively) on this habitat type at most times of the year and during certain life stages, and they should be the focus of management attention because they attract hunters to this game land and are critical for these species.

- ***Target Non-Game Species*** – There is a very high diversity and abundance of shrub-nesting birds on RWB-Caswell Game Land, particularly on the CURE Area. NCWAP priority early successional bird species include: chuck-will's-widow (*Caprimulgus carolinensis*), whip-poor-will, eastern kingbird (*Tyrannus tyrannus*), eastern meadowlark (*Sturnella magna*), prairie warbler, field sparrow, grasshopper sparrow (*Ammodramus savannarum*), and others. American kestrel (*Falco sparverius*), bobolink (*Dolichonyx oryzivorus*), and loggerhead shrike (*Lanius ludovicianus*) are occasional, and barn owl (*Tyto alba*) and dickcissel (*Spiza americana*) could be expected. Priority documented reptiles include: mole kingsnake, eastern kingsnake, and eastern box turtle, and there is potential for eastern slender glass lizard (*Ophisaurus attenuatus longicaudus*). Potential priority mammals include: least shrew (*Cryptotis parva*), meadow vole (*Microtus*

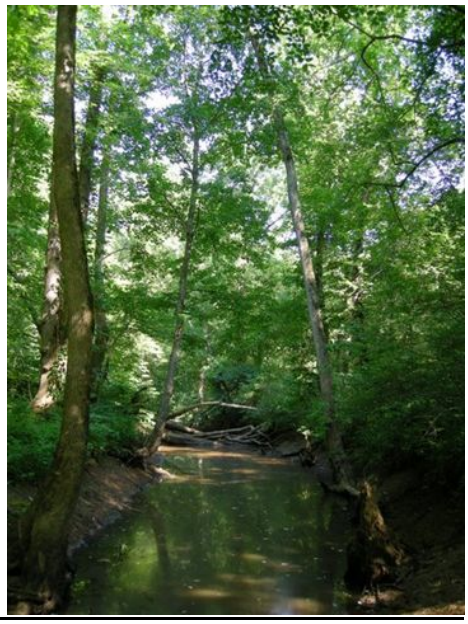
pennsylvanicus), and long-tailed weasel. (**Appendix XIII**, NCWAP Priority Species Lists by Habitat) In addition, there is a high diversity and abundance of invertebrates in early successional habitats and the potential exists for several rare butterflies on the game land.

- ***Management Strategies and Needs*** (to achieve DFC) – Will focus on the maintenance of existing early successional habitats and the creation of additional acreage where possible. Though active forest management will be imperative to ensure habitat creation possibilities in the future, prescribed fire will be the most important aspect of maintaining what already exists. Prescribed fire requirements for the CURE Area specifically will increase dramatically over the next few years as young stands reach burning age and the cumulative effect of more burn acreage due per year continues to build. The amount of suitable "burn days" in a season cannot be controlled, but manpower constraints will make it difficult to achieve prescription goals in the future. Areas currently in an open state by various types of fallow field and "thicket" management should be prevented from converting to woodland by any necessary means (i.e. heavy equipment, herbicide spraying etc.) Continued surveys and monitoring of various key early successional species will allow for assessment of current practices and possible implementation of new methodologies.

- ***Infrastructure Needs*** – Will almost exclusively involve the creation and maintenance of permanent firelines and additional logging access improvements. Gate erection to control access on new firelines and countless culverts and significant gravel in necessary locations on the newly constructed firelines will be required. In instances where roads, trails, or firelines cross streams or traverse steep slopes, special attention should be given to avoid sediment runoff.

- ***Threats*** – Include invasive species and a lack of sufficient resources to maintain the required disturbance regime. Encroachment of competing/undesirable species, fire exclusion, and the discontinuance of intense management would degrade the quality of these habitats. All previously mentioned invasive plant species could be problematic in early successional habitats, including Chinese privet, tree-of-heaven, princess tree, Japanese stilt grass, Japanese honeysuckle, maiden grass, kudzu, autumn olive, mimosa, and multiflora rose. Fire ants and feral hogs are also a problem in this habitat.

Riparian and Aquatic Habitats



Streams within RWB-Caswell Game Land are part of the Roanoke River Basin (Country Line Creek and North Hyco Creek watersheds). As estimated on ArcGis from USGS topographic maps, blue-line streams (including the major creeks) total almost 37 miles, while blue-line intermittent tributaries total about 35 miles. Larger streams in this area typically have substrates composed of sand and woody debris, while smaller tributaries flowing off of surrounding ridges generally have cobble, gravel, and sand substrates. Streams within the aforementioned watersheds support considerable aquatic diversity, including 13 species: 9 fishes (5 endemic) and at least 4 freshwater mussels that are considered priority species by the NCWAP. The priority species include one state endangered and two state threatened freshwater mussels. In addition, the Federally Endangered Roanoke logperch (*Percina rex*) could potentially inhabit the Country Line Creek watershed in the future; however, it is not currently known from the watershed. Since their discovery in Rockingham County in 2007, Roanoke logperch appear to be expanding their range in NC.

The exact acreage of permanent/ephemeral wetland habitats is unknown on the game land. Numerous small beaver ponds, upland depressions, floodplain pools, sloughs, and oxbow lakes of permanent and semi-permanent status exist scattered infrequently across the landscape. Long established lacustrine habitats are likely to remain more permanent, whereas beaver influenced wetlands are subject to natural succession and alteration by natural processes including flooding, breaching, and beaver abandonment. Ephemeral pool type wetlands are subject to recent climatic and metrological conditions.

Current Extent and Condition: The waterways on the game land were historically heavily degraded by sedimentation but have recovered and stabilized somewhat over time. Current land use practices have improved with regard to sedimentation and

nutrient loading in the last half century, but adjacent lands still contribute sediment and pollution. However, these streams still retain relatively good water quality and host a large diversity of aquatic species. All of the streams on the game land possess vegetated riparian buffers and all attempts are made to reduce erosion and sedimentation from management activities.

- ***Desired Future Conditions*** *(DFC)* – Includes maintaining the integrity and functionality of these sensitive aquatic communities and the species assemblages that occur there. They will be protected in perpetuity and should only be negatively altered by biological and environmental processes beyond the control of our management. (Improper land use activities on adjacent private lands in the surrounding watersheds pose the major threat for the continued health of riparian ecosystems.) Improved water quality, reduced pollution and sedimentation, and restored biodiversity should be the goal of all watersheds in the region not just the sections of streams flowing through the game land.

- ***Target Game Species*** – Largemouth bass, various sunfishes, channel catfish, and bullheads.

- ***Target Non-Game Species*** – The following species are a conservation priority in the Roanoke River Basin. They should be a focus of management because there are unique/important management or conservation opportunities and multiple species with special conservation status designations. The NCWAP lists the following fish as priority aquatic species: snail bullhead (*Ameiurus brunneus*), johnny darter (*Etheostoma nigrum*), glassy darter (*Etheostoma vitreum*), riverweed darter, Roanoke hogsucker, notchlip redhorse (*Moxostoma collapsum*), shorthead redhorse (*Moxostoma macrolepidotum*), V-lip redhorse (*Moxostoma pappillosum*), and comely shiner (*Notropis amoenus*). The following mussels are priority aquatic species: variable spike (*Elliptio icterina*), triangle floater, creeper, notched rainbow, and Atlantic pigtoe (presence uncertain). Priority species utilizing isolated and ephemeral wetlands include northern gray treefrog, marbled salamander, spotted salamander, four-toed salamander, and eastern spadefoot toad. (**Appendix XIV**, Aquatic Fauna Chart)

- ***Management Strategies and Needs*** (to achieve DFC) – The protection of waterways from sedimentation by maintaining forested riparian corridors and minimizing sedimentation and erosion from roads, firelines, and other soil disturbance activities should be paramount. This includes maintaining a 200 foot vegetated corridor on perennial streams and 100 foot forested corridor on intermittent streams following all NC Forestry and NCDOT Best Management Practices (BMP's). Beaver management may be needed. Excessive beaver activity (series of dams, impounding long reaches of waterways) can reduce aquatic diversity by homogenizing habitat and altering water quality (e.g., increased temperature and reduced dissolved oxygen). Periodic surveys should be utilized to assess the distribution and status of aquatic fauna. It may be important to work with upstream landowners to fence cattle out of creeks,

enhance natural vegetation adjacent to waterways, and follow other BMP's to reduce sedimentation and nutrient loading in streams.

- ***Infrastructure Needs*** – Are unknown, but may include additional gates to control access on roads and firelines to help prevent further erosion and sedimentation. All earth-moving and soil disturbance projects should be performed following the necessary BMP guidelines for soil stabilization and erosion prevention. (i.e. road and fireline construction/improvement, forestry operations, silt fence, water bar, culvert, and turnout installation, vegetation establishment, and placement of rock/gravel where necessary, etc.) When culvert or ford stream crossings are upgraded or replaced, special consideration should be employed to avoid sedimentation and prevent or repair conditions that hinder aquatic animal passage (i.e. perched and blocked culverts).

- ***Threats*** – Invasive species introduction, pollution, and sedimentation are major threats to aquatic biodiversity in the game land streams. Others include excessive beaver activity, incompatible (deleterious) adjacent land uses, catastrophic weather events, and changes in temperature and rainfall.

FIELD MANAGEMENT

Dove Fields

Approximately 150 acres of fields are managed as dove fields on RWB-Caswell Game Land. Crops planted include corn, sunflowers, various millets, milo, and buckwheat, which all produce seeds that are highly attractive to doves. With little exception, all crops planted here and in the dove fields are planted no-till, which reduces soil

disturbance, but requires the use of herbicides (Glyphosate and 2,4-D) at the time of planting to kill existing groundcover. These areas draw tremendous pressure from the hunting public, especially during the initial week of dove season in September. This provides an enormous opportunity for dove hunters, but also allows an avenue for intense public scrutiny. Many complaints (and also compliments) are received from dove hunters depending on the annually variable success of crops and the availability of birds.

When the crops are mowed for dove season, they are mowed in stages (for later seasons) to provide a continuous source of fresh food. Also, some percentage of the crops are always left un-mowed, especially the taller and more winter hardy crops like corn and milo. These will remain standing long after dove season and provide cover and food for many other species of wildlife during the winter months. Winter wheat is planted as a cover crop to provide grazing opportunities for herbivores and to help with weed control the following spring. In places where the wheat is worth saving, it may be left during the next planting season to provide nesting cover, brooding habitat, and eventually an early summer seed crop.

Other Field Management Techniques

In contrast to the intense management of dove fields, there are many other ways in which the remainder of the fields and openings at RWB-Caswell are maintained (~570 acres). Food plots and successionally disked fields comprise the majority of the remainder of this acreage. Food plots are planted in smaller, less accessible, and often irregularly shaped or linear areas (i.e. powerline and utility right-of-ways). The crops planted in food plots can be annuals, re-seeding annuals, or perennials. (**Appendix XV**, Field Distribution Map)

Annual food plots (~115 acres) are typically planted in warm season wildlife mixes containing milo, Egyptian wheat, various millets, buckwheat, corn, soybeans, and

sunflowers, or any combination of the above. Cool season food plots include crimson clover, rye, wheat, oats, turnips, and other various brassicas. These crops are left untouched until the next planting cycle and fields or portions of fields are alternated between years.

Re-seeding annuals may re-seed themselves and last for multiple years on a given site if properly maintained. Included in this group are some clovers, partridge pea, chufa, annual lespedezas, and other various bean/pea type legumes. A light disking during the winter months or a growing season herbicide application (Poast or 2,4-D depending on the crop and type of weed competition) is typically all that is required to generate a new stand the following year.

Perennial food plots require the least amount of maintenance, as they will persist for many years as long as they are not out-competed by others species, particularly woody saplings. (~110 acres, including re-seeding annual plots) Some clovers and the shrub-type lespedezas (Bi-color and VA-70) are included in this group. (The hybrid VA-70 lespedeza is particularly abundant and naturalizing on this game land after initial plantings by the Commission in the past. It is no longer planted because of its invasive tendencies.) Periodic mowing to eliminate woody competition is all that is required to maintain these plantings. Lespedeza plots are particularly valuable for cover and as a seed source for quail and other songbirds. Clovers like ladino provide extremely nutritious forage for herbivores, as well as brooding and "bugging" areas for turkeys and other ground dwelling bird species.

Successional disking (fallow field management) – These are fields (~200 acres) which are left fallow and disked in thirds on alternating years to promote natural herbaceous vegetation regeneration. The seed bank in any given area is surprisingly diverse and excellent wildlife habitat, cover, and forage can be achieved simply with native plants. Only with severe sapling encroachment are mechanical methods like mowing or herbicide treatments required to maintain an "old field" type habitat. Pokeweed, blackberries, diverse legumes, coarse perennial herbs, and many native grasses respond well to occasional disturbance.

Reptiles, amphibians, and small mammals are attracted to fallow fields for foraging, basking, and burrowing in loose soil. Disking has the potential to kill many of these animals which are often in shallow burrows just below the surface. The extent of this problem is unknown and deserves further study. Given the many habitat benefits of rotational disking, methods should be investigated (e.g. winter disking) to minimize direct mortality while achieving habitat objectives. It is thought however, that the current timing of fall disking is not excessively destructive to populations of these animals because of the small percentage of area affected across the broader landscape scale.

Native warm season grasses (NWSG) – These plantings (~60 acres) provide little in the way of seed production, but the cover produced is essentially unmatched in quality as habitat for quail, rabbits, and small mammals. The vertical structure of these tall grasses and their persistence into the winter months provides exceptional escape cover. The many types of NWSG (switchgrass, eastern gamagrass, coastal panicgrass, Indiangrass, and big bluestem) are termed "bunch grasses" because from above they

appear impenetrable, but underneath they grow from individual clumps interspersed with many open channels in-between clumps. This allows for the easy movement of small animals in what otherwise appears a continuous wall. Periodic burning of these grass patches helps invigorate these stands and removes the dead thatch that builds up over time.

Co-op Rental Fields – Approximately 80 acres of the fields on the game land are part of the Co-op Rental Field Program. These mostly small outlying fields have a variety of uses to the representative fee paying leasees. Some are used for small scale agricultural production (mostly grain, but in some instances for hay and produce production). As required by agreement at least 10% of any given field/crop shall be left unharvested with standing vegetative cover until the next growing season. Hay production should be phased out as it has less value for wildlife.

Orchards – Just over 7 acres of fields are managed as orchards. These are maintained with open groundcover to eliminate competing woody encroachment and crop species are periodically pruned and fertilized. Established plantings include apples, pears, crabapples, chestnuts, grapes, and sawtooth oaks.

Waterfowl Impoundments – There are two waterfowl impoundments on the game land. Caswell Impoundment is about 14.5 acres with around 8 of those managed with agricultural plantings. Brumley Impoundment, actually two sub-impoundments, is also around 14.5 acres with approximately 12.5 acres devoted to agricultural plantings and moist soil vegetation management. Crops planted include milo, Japanese millet, and other wildlife mixes. Sections managed for moist soil plant production favor the establishment of wetland plants including smartweeds and various grasses, sedges, and rushes. The impoundments are partially flooded for the early October duck season (if water is available) and brought to full pool for later seasons. They are drawn down slowly in late February and often allowed to retain at least some water into the early summer. In addition to still providing some habitat for waterfowl and some standing water for amphibian larvae, the exposed edges and mud flats created during drawdown are particularly important to migrating shorebirds and wading birds. (**Appendix XX**, Drainage Infrastructure Map)

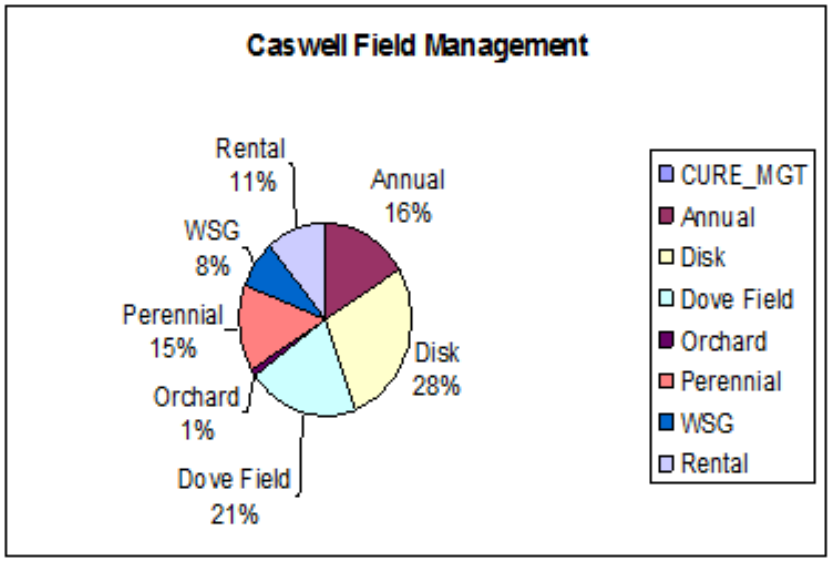


Figure 1- Field Management Distribution

FOREST MANAGEMENT

Objectives:

The application of sound forest management techniques within RWB-Caswell Game Land will provide for optimal quality, quantity, and diversity of wildlife habitat, protection and recovery of significant and sensitive communities, and a sustained yield of forest products. The primary focus of forest management on the game land is restoring ecosystem functionality, improving wildlife habitat, and sustaining overall forest health. Through natural processes and past land use practices, some of the forest communities are less than optimal and are degraded or being replaced. Many of these habitats could benefit from active forest management. To restore and enhance existing forest types and encourage the regeneration of desired future types, implemented forest management practices such as timber harvesting, reforestation, prescribed burning, herbicide applications, and mechanical treatments will be used.

Forest Organization:

Due to the fact that RWB-Caswell is a large non-contiguous land area, some method to ensure a systematic examination of the entire forest has been established. All of the game land is divided and mapped into compartments of 2000-3000 acres each. These

compartments are divided by major land features such as roads, trails, and waterways. A number and a letter are assigned to each (I-VI and A-G). In order to systematically plan management needs, subdivisions of these compartments were mapped and a schedule prepared for annual examinations. The six subdivisions in each compartment are equal to the six year cutting cycle. These subdivisions were mapped according to similar timber types and given a letter designation. A schedule for examination schedule is included in **Figure 2**. At least one subdivision per year, per compartment is scheduled for examination annually through the cycle. (This procedure utilizes a 60-year rotational age for pine and a 100-year rotational age for hardwood.) Timber harvest areas and other necessary silvicultural treatments are determined and Timber-Wildlife Prescriptions are prepared during annual unit examinations. These prescriptions include a summary of proposed sale locations, volumes to be sold, and any reforestation needs after harvest. Areas that are scheduled to be prescribed burned the upcoming winter and spring and those scheduled for herbicide applications are also included in the prescriptions. The main goal of this system is to disperse harvesting and to encourage enough frequency of harvesting in each compartment to ensure that the highest quantity and quality of wildlife habitat is created and maintained. (Seamster, 1976)

Traditional Forest Management vs. CURE Forest Management:

Two types of forest management occur across the landscape of the game land – Traditional and CURE (**C**ooperative **U**pland Habitat **R**estoration and **E**nhancement). The goal is to maximize early successional habitat for bobwhite quail, songbirds, and other floral and faunal species dependent on these habitats. This will be accomplished by intensively managing forested habitats and openings on a landscape scale and emphasizing connectivity of habitats. The area will also serve as a demonstration forest showing private landowners how they can manage forest habitats for early successional species while simultaneously maintaining timber revenue to offset property taxes and maintenance costs, etc. (**Appendix XXII**, see entire Caswell CURE Area Management Plan) Differences between Traditional and CURE management will be outlined below under the individual forest type sections. Major differences are the larger size of the clearcuts and the wider pine reforestation spacing. Also, under CURE management, the size of the burn blocks is greatly increased to encompass the larger reforested clearcuts, existing old burn blocks, and natural firebreaks on a topographic and landscape scale.

Major Forest Types and Management:

Natural Upland Pine (NUP): Approximately 26% of the area on the game land consists of NUP, mostly shortleaf and Virginia pine. The most extensive timber management has taken place in this forest type. The abandonment of agricultural areas in the 1930's-1950's resulted in these second growth woodlands. Most of the abandoned fields on the ridge tops have since grown into Virginia pine stands. Shortleaf pine is located on the side-slopes and some ridges where the remaining nutrients in the soil, after farming, were adequate for their survival. Shortleaf pine is the preferred pine on RWB-Caswell because of its high quality timber and associated habitats. Selected tree removal (thinnings) will be used to reduce the stem density of shortleaf pine stands and to maintain them at approximately 50-60 sq. ft. of basal area per acre. All scattered Virginia pine and non-mast producing hardwoods will also be removed. The result of harvest operations will allow increased growth of remaining trees and stimulate the growth of forbs, grasses, and legumes. If the site allows, prescribed fire will be used to maintain an open understory and diverse herbaceous groundcover. Since 1960 there has been several thousand acres thinned on the game land.

Virginia pine is a much less desirable species because of its ability, in heavily stocked stands, to shade out the forest floor eliminating herbaceous groundcover. Virginia pine provides little to no wildlife benefit and is generally poor for sawtimber production. If access and topography allow, Virginia pine stands will be removed and converted to shortleaf or loblolly plantations. Reforestation of shortleaf pine will be preferred over loblolly pine because loblolly pine is not native to the game land. When a pine stand with a high Virginia pine component has reached rotational age (60 years), it will be clearcut. The maximum size of the clearcut will be approximately 25 acres with an

irregular shape. This increased “edge effect” will provide habitat for many wildlife species. Depending on site productivity, the clearcut will be reforested with loblolly pine on a 10’ X 10’ spacing or shortleaf pine on an 8’ X 10’ spacing. The tighter spacing for shortleaf pine accounts for a 20% mortality rate.

In the CURE Area, loblolly and shortleaf pine thinnings have been aimed at a basal area of 30-40 sq. ft. per acre. This has allowed for a considerably more open canopy and a much thicker and more diverse groundcover and shrub layer. (**Appendix XVI**, CURE I Photo Plot Sequence) Clearcuts, to provide connectivity of early successional habitats, have far exceeded the traditional management scheme, with the largest clearcuts approaching 77 acres.

Pine Plantations (PP): Pine plantations have been established on approximately 17% of the area on the game land. Most of the plantations are loblolly pine but with a few scattered shortleaf plantations and one longleaf pine area. The majority are less than 25 years old, though there are some that were planted before NCWRC management. The plantations vary in spacing from 8’x10’ to 10’x10’ and the younger age stands (2–10 years) have high to moderate amounts of herbaceous groundcover and offer excellent habitat for quail, small game, and other early successional species. Once plantations surpass 10 years of age, there is a significant decline in the composition of brushy and weedy cover. Prescribed fire has been utilized where appropriate to reduce competing stems and to promote understory diversity and structure. Not all existing pine plantations on the game land have seen fire and some have yet to be thinned. With slow growth on poor sites, many are just recently being first-time thinned at 22-25 years of age. Approximately half of the loblolly pine stems, all of the Virginia pine component, and all non-mast producing hardwoods are removed resulting in a basal area of 50-60 sq. ft. per acre. This re-opens the canopy allowing sunlight penetration to maintain herbaceous groundcover. Future thinnings will keep these stands open.

In the CURE Area, pine plantations (regenerated clearcuts) planted on a 10’ x 15’ spacing will ideally be thinned and burned at an earlier age. (First burned at age 8 and first-time thinned at age 18). They are also release sprayed in their second growing season to reduce hardwood competition from stump sprouts. This keeps excellent early successional habitat available for much longer than traditionally managed pine plantations. (**Appendix XVII**, Pine Reforestation Map)

Upland Hardwood (UPH): RWB-Caswell Game Land is known for its oak and hickory ridges that make up 35% of the Game Land. (Over 5,000 acres are in SNHA’s.) A modified two-aged management approach will be used for upland hardwood. This will result in only minor losses in mast production during regeneration. A rotation of 100 years for upland hardwoods has been set, though final harvest of high quality oak-

hickory stands will not occur. These rotations will allow for sawtimber sizes, optimum mast production, and den formation (Jackson et. al., 1981) and also allow for old growth forest attributes (Cooper, 1986). The goal of hardwood regeneration will be to regenerate oaks. This will be attempted using pre-harvest treatments such as chemical injection, basal bark treatment, TSI work (Timber Stand Improvement), and commercial thinnings to create openings in the stand and encourage oak regeneration. Once advanced regeneration is in place either a shelterwood cut or a group selection cut will be employed to allow the regeneration to grow. Shelterwood cuts will retain high quality dominant and co-dominant oaks at a basal area of approximately 40-60 sq. ft. per acre. Pine, soft hardwood, and oaks competing with leave trees will be removed, but adequate den trees will be retained. Theoretically, the forest stand would be composed of hardwoods 50 and 100 years old. Therefore, upland hardwood stands 50 years and older are candidates for regeneration as described above. Management of these hardwood stands with long rotation ages allows these stands to develop old growth characteristics and ensures a significant oak component (Cooper, 1986). To date there have only been a few hardwood thinning areas (savannah creation) and no hardwood clearcuts. Ideally, many hardwood stands will be allowed to age to >100 years and individual trees will “age out”, die naturally, and be replaced intermittently with pockets of younger regeneration in the resultant canopy gaps.

In CURE upland pine stands, selective timber harvests, clearcutting, and prescribed fire will be used on specific hardwood stands to promote brushy and weedy understories more beneficial to quail and other small game and non-game species. The goal will be to create a patchwork of oak savannahs and openings that link up other areas of early successional habitat.

Bottomland Hardwood (BH): Bottomland hardwood accounts for approximately 7% of the area on the game land located along Country Line Creek, North Hyco Creek, and their tributaries. There has been very little timber management work done in BH. Past harvests have removed some selected high quality trees to regenerate shade intolerant species. Future management may continue to include selected removal of trees to promote regeneration but due to intensive pine management, little timber management is expected in the future for bottomland hardwood areas. Dedicated Nature Preserve (DNP) and SNHA restrictions limit active forest management, allow for mature forest development, and protect streamside management zone buffers. Most bottomland hardwood forest occurs in inaccessible and or inoperable areas. There is no CURE management in bottomland or riparian areas.

Mixed Pine-Hardwood (MPH): Approximately 10% of the area on the game land is considered mixed pine-hardwood. These are forest stands where pine, either shortleaf or Virginia, is mixed with an almost equal hardwood component. The MPH forests are a transitional type between upland pine and bottomland hardwood forests and these

stands exist as a result of past selective timber harvesting practices. Over time they will naturally transition to predominately hardwood without active timber management. If a greater hardwood component is desired in any given compartment, timber management practices will be used to convert MPH to hardwood. Considering the large amount of upland hardwoods on the game land, pine may be lacking in some areas. If nesting and brooding habitat is locally limited because of few fields or pine stands, then MPH stands with a high percentage of yellow poplar and sweetgum can be converted to pine. However, conversion to pine will be rare. Mixed pine-hardwood stands within CURE will be typically managed towards whichever component is higher or desired for the site, allowing for the possible creation of hardwood savannahs or high quality upland pine habitats.

Fields/Open Land: Less than 5% of the game land is occupied by fields or open areas. (See previous Field Management section)

*** All data above (except pine plantations and fields) was extrapolated from the most recent forest inventory completed in 1971-1972. Forest type percentages are approximate, as there have been several large acquisitions since 1971 that are not represented in the inventory.**

Prescribed Fire:

Prescribed fire is one of the most beneficial tools land managers have for forest and wildlife management. It is essential to the perpetuation, restoration, and management of many plant and animal communities. At RWB-Caswell, burning is focused in thinned

pine stands, pine and oak regeneration areas, and hardwood savannahs. (**Appendix XVIII**, Established Burn Blocks Map) Approximately 80 designated burning blocks totaling more than 3,300 acres have been established. There are approximately 66 miles of firebreaks surrounding these burn blocks. Past and future blocks are/will be designed, where possible, utilizing natural firebreaks (creeks and streams) or man-made features (roads, trails, and right-of-ways), thus maximizing burn acreage and reducing the need for extensive permanent line construction. Blocks will be burned on a three-year rotation under a long-term fire regime. The distribution of recent burns will be aimed at providing a mosaic of burned and unburned habitats across the landscape. Some managed forest stands will never be incorporated into the prescribed burning program because of distance to Smoke Sensitive Areas (SSA's), proximity to private land boundaries, difficulty of burning, or infrequent required weather parameters. Most burning will be completed in late winter/early spring, though occasional growing season burns may be utilized. Permanent firelines will be planted with wheat, rye, or occasionally various clovers after initial construction and every third year when these blocks are scheduled to be burned again. Recent annual prescription plans call for burning approximately 1,000 acres per year, but in the future as the larger CURE regeneration areas reach eight years of age, annual burning requirements will exceed 1,500 acres per year. To accomplish game land burning goals, additional manpower and equipment will be needed in the future.

Herbicide:

The use of herbicide is another silvicultural practice that is and will continue to be employed on the game land. It is a very effective tool that can be used for a wide range of applications. Due to the topography, aerial application using a helicopter is the preferred method for herbicide application. To date, herbicide has been used to release approximately 890 acres of young pines from hardwood competition on the reforested CURE clearcuts and to site-prep. spray approximately 50 acres for shortleaf pine restoration. Arsenal is used for release spraying because it is hardwood selective and at appropriate rates does not affect conifers and desirable groundcover species like grasses, forbs, legumes, and various vines and shrubs. Site preparation spray mixtures designed for the complete removal of all vegetation (prior to re-planting) will likely be used with more frequency as the emphasis shifts more towards shortleaf pine restoration. Mixtures of Accord, Arsenal, and Milestone are recommended.

Mechanical Treatment:

Mechanical treatment (including roller chopping, pre-commercial thinning, and root-raking) has been used infrequently on the game land in recent history because of the high cost and labor intensity. Prescribed fire and herbicide have been preferred

methods and achieve similar results. However, there are certain instances where fire and herbicide application will not be effective in accomplishing the desired goals. The main uses of mechanical treatment in the future will be to control advanced hardwood competition in pine stands, site preparation work on reforestation areas, and to reduce the number of stems in a regenerating timber stand.


Timber Sale Program:

Timber management on the Game Land has been planned and carried out under a forest management plan and a timber sale program since 1960. Early harvests were designed for selective harvests in pine sawtimber areas, thinnings in pine pulpwood areas, and veneer removals in high-value hardwoods. More recent timber sales have focused almost exclusively on pine dominated stands. Each year on the non-CURE areas of the game land, there are between 2 and 4 timber sales. The average amount of sawtimber sold and cut per year over the last five years was 222,490 board feet of pine, 30,437 board feet of poplar, 20,559 board feet of other hardwood, and 395 cords of pine pulpwood. The average CURE timber sale had approximately 1,200,000 board feet of pine sawtimber, 105,000 board feet of poplar sawtimber, 210,000 board feet of other hardwood sawtimber, and 1,900 cords of pulpwood. Harvesting has been completed under the initial phase of the CURE Plan and not until the reforested clearcuts are in need of a first-time thinning will timber harvests resume (about 18 years of age). Below is a brief description of the timber sale process:

> Each year those units scheduled for examination will be inspected to determine which stands are in need of harvest. Sale areas will be delineated on the ground and definite boundaries established and properly marked. Timber to be sold on these areas will be marked with paint, measured for volume estimates, and recorded in field notes for later determination of volume totals. In most thinnings, a 100% tally of all sawtimber trees to be cut

will be kept, except in some cases where volume estimates will be taken from plot sampling. Where a painted boundary delineates an operator-select or clearcut sale boundary or leave trees are marked to be retained, various pulpwood and sawtimber estimating techniques will be used. (Forester's Field Handbook, NCFS, 1988) Future sales involving mostly pulpwood or very uniform timber stands may be handled on a "per unit" basis. A detailed map showing the locations and boundaries of each sale area will be prepared from aerial imagery data on ArcGIS. Black ink maps are preferred since copies must be made for distribution. A Multiple-Use Forestry Prescription Report will be prepared outlining the impact of the sale on wildlife populations and other aspects of the environment. Information is also included to keep inventory information up to date. Timber sale volumes will be computed from field notes, tally sheets, and plot data and checked for accuracy. A 'Timber Sale Agreement' (contract) will be completed specifying the number, size classes, and species of trees to be cut and outlining the 'Conditions of the Sale' to be met by the timber buyer and the Commission. The 'Timber Sale Agreement', Multiple-Use Report, maps, and volume information will be submitted to the Raleigh office for processing. A Northern Piedmont Region Forester or Wildlife Forest Manager will be responsible for showing the sale to prospective buyers, inspection of the harvesting operation to ensure compliance with the terms of the contract, and making the final inspection for release of the Performance Bond posted by the buyer. (Forest Products Sale Procedures, NCWRC, 2009)

Forest Management Needs:

The most current forest inventory on the game land was completed in 1971-1972. There have been many changes on the game land from timber management, natural succession, and land acquisition over the past forty years, making an updated forest inventory critical for future timber management.

Loblolly pine seedlings have traditionally been preferred over shortleaf pine seedlings and have been used almost exclusively for reforestation on the game land since the 1960's. This is primarily because loblolly pine seedling survival has been superior to shortleaf seedlings until recently. With modern advances in seedling quality, proper planting methods, and site preparation work, shortleaf pine has become a viable option for reforestation with regard to seedling survival. In the future, to further attempt to restore the native species, shortleaf pine should be used when site conditions allow for reforestation.

Upland pine management on the game land has been aimed towards the creation of (forested) early successional habitats. In the future, where appropriate and permissible,

some selected stands of upland hardwoods should be thinned or clearcut to provide linkage corridors between these habitats.

Recent Timber-Wildlife Prescriptions called for prescribed burning approximately 1,000 acres per year at Caswell. This is has only been accomplished one time in the last ten years (1,087 acres in 2007). The CURE Plan calls for burning over 1,500 acres each year henceforth. The number of acceptable burn days is unknown each year, and on every suitable burn day, burning should remain the top priority. Current staffing levels are likely inadequate to achieve this goal. Increased manpower (seasonal employees, trained prescribed burners) will be needed to fulfill this requirement. Other options include contract burning (traditional or aerial ignition), but there is uncertainty that assistance could be acquired from private burning contractors. Aerial ignition burning would be extremely complex to orchestrate in Caswell County because of the relatively small block size, very specific weather parameters required, variable fuel conditions influenced by topography, and simply the distance from other areas in the southeast where large scale helicopter burning would take precedence on such limited burn days. Contract burners in the southeast already have more private land acres to burn than they can possibly accomplish in a single burn season, and they are reluctant to take on new “priority” acres under deadline.

Figure 2:

PLANNING UNIT EXAMINATION SCHEDULE

Fiscal Year

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Compartment	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32
I	F	B	E,G	D	A	C
II	D	A	E	B	F	C,G
III	F	C	D	E	B	A
IV	A	E	F	D	C	B
V	C	E	D	F	A	B
VI	F	B	E	A	D	C

INFRASTRUCTURE

Objectives/Considerations

(Resource Management, Infrastructure Needs, Biological Impacts, and User Experience Satisfaction)

The built infrastructure should provide for sufficient access and use for wildlife-related recreation, support management activities, contribute to the greatest functionality, and should not negatively impact sensitive habitats or wildlife resources. Some guiding principles for developed infrastructure on RWB-Caswell Game Land are listed below:

- Access and accommodations for users (parking lots and roads open for vehicular travel) should remain in the best possible condition at all times, and remedied in a reasonable time after any failure or damage.
- 2-wheel drive, all-weather access should be provided to popular areas, key locations, and strategic access points on the game land.
- Periodic (or emergency) maintenance and repair should be performed on all infrastructure contained on the game land to keep assets in the highest working order and function.
- Infrastructure should be repaired, renovated, or replaced prior to exceeding the reasonable "life span" expectancy when feasible.
- The aesthetic appeal and integrity of RWB-Caswell Game Land should be maintained.
- Through traffic (i.e. cars driving *through*, not *to* the game land) should be discouraged.
- Disabled access should be made to new and existing facilities (fishing piers, hunting blinds, shooting range, through gates, etc.) where possible.
- Erosion related to infrastructure should be avoided, minimized and/or mitigated.
- Traffic speeds (non-DOT roads) should be slow (<30 mph) for public safety, to encourage slower, scenic driving, to minimize conflicts between vehicles and horseback riders, and to minimize wildlife-vehicle collisions and reduce road-kill wildlife mortality.
- Trails, firebreaks, and roads will not be designated for the exclusive use of particular user groups or activities.
- Many visitors come to RWB-Caswell Game Land for the wilderness feel and enjoy the opportunity to "get away from it all." Some of the species found on the game land are sensitive to the direct and indirect impacts of roads and other development. Large tracts of forest free from roads and other infrastructure should be maintained.
- While meeting user and management needs, built infrastructure should leave a minimal footprint on the game land.

Assessments of existing infrastructure throughout RWB–Caswell Game Land were conducted by Engineering & Lands Management staff in 2013. The infrastructure maps

included in the appendices of this document show the locations of existing public roads, administrative access roads, trails, parking areas, dams, and gates within the game land. The results of the assessments along with recommendations for maintenance and improvements are discussed by category below.

Road Assessment

(**Appendix XIX**, Road Infrastructure Map)

The tracts that comprise RWB-Game Land are dispersed in a narrow corridor running from the southwest to northeast with outlying tracts to the southeast. Vehicular access is provided to all tracts of the game land either by the state road network or by roads maintained by the NCWRC. Only three roads act as a connector between the state road network and one of those is limited to travel by disabled sportsmen. The remaining roads terminate on the game lands to provide access to individual game land tracts or a specific feature such as a Public Fishing Area or dove field.

The game land roads provide public access, administrative access, and firelines. The focus of this assessment is on the approximately 26 miles of year round and seasonal public access roads. Public access activities include but are not limited to the following: hunting, fishing, hiking, wildlife viewing, geocaching, horseback riding, and other outdoor recreation.

Existing Road Conditions

The overall condition of the public access roads is very good. The roads are primarily one lane gravel with culverts and ditches. A considerable number of the roads were built in corridors that limited the design because of legal right-of-way issues and geography. Maintenance demands are considerable given the constricted corridors and topography of the game land.

Major roads in good condition include:

Wildlife Road
Wildlife Road is an all-weather road averaging 10’ wide with good drainage that connects Burton Chapel Road with NC Highway 62. Wildlife road provides access to the “Champion Gate” and “Fuller’s Momma’s” portions of the game land. The road is narrow; however, two-way traffic can pass except for portions of the road that are topographically challenged.

Bradford Road
Bradford Road is an all-weather road averaging 10’ wide with good drainage that runs between NC Highway 62 and Badgett Sisters Parkway. The disabled sportsman road in

the southwestern portion of the game land originates on Bradford Road and connects to NC Highway 62 just south of Bradford Road.

Haystack Road
Haystack Road has been recently reworked with the addition of gravel and drainage control structures such as water turnouts.

Future Road Improvements

As stated before the majority of the roads are in good condition. The general lack of functionality is the ability to accommodate two-way traffic without interruption to vehicles meeting at an inopportune location. Given the level of service anticipated by the users and the other constraints imposed by right-of-way corridors and topography, a wholesale overhaul of the roads is not required. Continued routine maintenance will provide functional all weather access to the game land users. There are however, improvements needed based on anticipated changes of use and re-occurring poor road conditions. The following prioritizes road improvements to meet the anticipated needs and correct habitually poor road conditions.

High Priority

The following roads are high priority:

Restricted Area Road – Increased future use
West Lower Frogsboro – Habitual drainage issues
Brumley Impoundment Extension – Improve waterfowl hunter access

Restricted Area Road
Use of the Restricted Area road is currently limited to permit hunts and administrative access. The road is in is good condition and functions as intended. However, plans are in process to construct a public shooting range. The increased volume of traffic will require the road to be upgraded to a minimum of 18' wide. Approximately 0.5 miles of road will need to be improved up to the split to accommodate two-way traffic. Additionally, approximately 0.3 miles of the left hand split may have to be relocated to avoid conflicts with the proposed shooting range. This will not be determined until the plans are finalized for the shooting range.

The estimated cost of the 0.5 mile upgrade is $50,000. The estimate cost to relocate the left hand road, if required will be approximately $60,000.

West Lower Frogsboro
This road provides access to a dove field and the southern portion of the Frogsboro Tract. The current road has minimal gravel, drainage issues, and rutting. Contributing factors to the poor condition include erosion from the adjacent property and logging activities. The 0.5 mile road needs to be completely rebuilt with special attention to

drainage structures that can accommodate potential sediment buildup. The estimated cost to rebuild the 0.5 mile road is $100,000.

Brumley Impoundment Road Extension
Waterfowl hunters currently access the Brumley Impoundment via the impoundment road. There is currently a gate restricting public access and requiring hunters to walk 0.5 miles to the impoundment. Extending the public access a portion of the distance would reduce hunter effort required while still limiting vehicular disturbance of the waterfowl. It is anticipated the new public access will follow the left fork and end approximately 0.3 miles from the current gate. The anticipated cost to upgrade the current administrative road to a public access road is $25,000.

Medium Priority

Swann Road
Swann Road is part of the disabled sportsmen opportunities offered on the game land. The road structure is in good shape; however, to accommodate two-wheel drive vehicles the road needs improvement to ensure all weather access. Improvements recommended are to add gravel, install a culvert at approximately 100' from entrance, and ensure vegetation control is maintained for road drying after a weather event. The cost of improvements is approximately $40,000.

Topnot Road
Topnot Road provides access to the eastern side of Cook Tract. The road is in fair shape and requires only the addition of gravel to improve it to an all-weather road. The 0.2 miles of road would cost approximately $20,000 to improve.

East South Frogsboro

This road is the eastern road leaving John Oakley Road which accesses the southern portion of the Frogsboro Tract. Improvements needed include an upgraded entrance and gravel for the entire 0.1 mile length. Estimated cost is $10,000.

Low Priority

Cook Road
Cook Road is located on a right-of-way for the majority of the 0.3 miles. Severe erosion on the right hand side may encroach on the wildlife maintained road. This situation should be monitored and addressed when the encroachment threatens the integrity of the roadway.

Old Bigelow Road
Old Bigelow Road provides access to a dove field from Burton Chapel Road. Upgrade road with gravel. Approximate cost to upgrade the 0.1 mile road is $10,000.

Boy Scout Road (to the east of)
The 0.5 mile road needs basic upgrading by refreshing ditches, addressing drainage issues with a culvert if required, and adding gravel. The estimated cost is $50,000.

Road Maintenance

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

Typical Road Maintenance Practices

- Inspect Roads regularly, especially before the winter season and following heavy rains.
- Keep ditches and culverts free from debris (see also Culvert Maintenance Section of this Management Plan).
- Remove sediment from the road or ditches where it blocks normal drainage.
- Regrade and shape the road surface periodically to maintain proper surface drainage.
    - Typical road should be crowned at approximately 4%, or ½" per foot.
    - Some roads may not require a crown, but should have a constant cross slope (super-elevation).
    - Gravel should be distributed at an even depth across the road.
    - Gravel should have an even distribution of fine and course materials.
    - Keep downhill side of the road free of berms, unless intentionally placed to control drainage.
    - Proper maintenance and grading of the road will require a motor-grader and a roller.
- Avoid disturbing soil and vegetation in ditches, shoulders, and cut/fill slopes to minimize erosion.
- Maintain shoulders on both sides of the road to ensure oncoming vehicles have enough room to pass. Shoulders should be relatively flat and periodically mowed.
- Maintain an erosion-resistant surfacing such as grass or rip-rap in ditches.
- If it is determined that a road needs major repairs or upgrade, contact Regional Supervisor and Design Services to schedule an assessment.

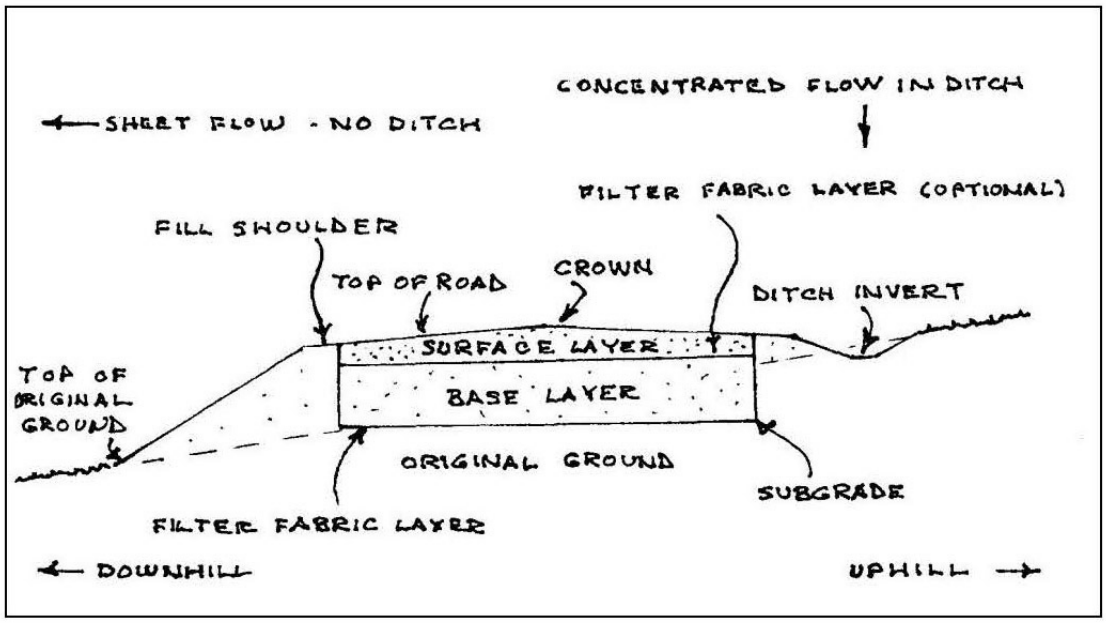


Figure 3 – Typical Road Cross-Section – Canaan, NH Highway Department

Road Safety Features

- Remove trees and other vegetation as necessary to provide adequate sight distance and clear travel way.
- Install and maintain road signage. This includes:
  - Stop signs –Should be installed at every major road intersection, with the signs on the minor roads.
  - Warning signs – Should be installed to warn the public of any road closures or problems in the game land.
  - Road/Route signs – Should be installed at every major road intersection.
  - Information kiosks with Game Land Road Map – Entry signs should be installed at key entrances to the game land off of DOT roads. Information kiosks should be located near the major entrances and parking areas.

Gates

Gates should be used on game lands for maintenance and habitat conservation. For maintenance purposes, gates should be used to limit access to roads that are unsafe or are in disrepair, or to limit use on roads to certain times a year in order to minimize the wear and deterioration of the road. If a road is considered unsafe or in disrepair, field staff should contact an engineer. The engineer will perform an inspection to determine the best course of action to repair or upgrade the road. All gates installed on game lands should the standard swing gate and painted orange for maximum visibility. No cable gates should be installed, and any existing cables should be replaced.

Troubleshooting

Road Surface Problems

Problem: Longitudinal erosion of the road surface
Possible Causes:

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

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

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

Problem: Potholes
Possible Causes:

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

Ditch Problems

Problem: Bottom of ditch is eroding
Possible Causes:

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

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

- Side-slopes are too steep and need to be lessened by digging the back.

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

Parking Areas

Designated parking areas are provided at dove fields, ADA blinds, PFA's, and various other road intersections and terminations. Field staff should evaluate and determine where additional parking would be required based on blocked access, level of use, and safety concerns. Over the duration of this Management Plan, additional parking and turn around areas should be provided. An example where formal parking would be utilized is the northern most game land entrance from John Long Road.

Any new parking area should provide a gravel surface (approximately 6" layer of compacted ABC stone) and provide enough parking for three to five vehicles. Depending on the amount of use, clearing, and grading required, it is estimated that each parking area will cost between $5,000 and $15,000.

Gates

There are around 80 gates located throughout the game land, which limit access to certain roads and portions of the game land. The majority of the gates on the game land are pipe gates with some cable gates. These gates should be phased out in favor of pipe swing gates; particularly the cable gates for safety concerns.

The game land is typically closed outside of hunting season, with all gates closed and locked. Some gates on the game land are opened/closed during specific times of the year, typically for deer and turkey hunting seasons. A Controlled Access Map (**Appendix XIX**, Road Infrastructure Map) has been included in this report, which identifies the times of the year when each gate/road is open to the public

Drainage Structure Assessment

(**Appendix XX**, Drainage Systems Infrastructure Map)

Dams

The two dams on the game land included in the Dam Safety inventory are at the Rabbit Shuffle Pond and the High Rock Pond.

Rabbit Shuffle Pond Dam

Rabbit Shuffle Pond dam is located at the terminus of Campground Road, with an exact location of N 36.35759, W 79.34524. It impounds water for the Rabbit Shuffle Pond

Public Fishing Access Area. The dam is an earthen embankment with a primary control structure consisting of a CMP barrel and riser with gate valve. A secondary control structure consists of a PVC pipe with a series of holes to allow the water to pass through in case of beaver damming. The emergency spillway is a swale lined with gravel in the PFA parking area and grass lined the remaining distance into a wooded area well past the dam embankment.

The dam embankment has been cleared recently of all woody vegetation over 1.5" in diameter. There were no visible reels, gullies, cracks, or erosion on the upstream or downstream embankments. No seeps or other indication of dam leakage were observed on the downstream embankment.

There are short-term and long-term issues that will have to be addressed. In the short-term, the dam clearing recently completed needs to be extended farther down the downstream embankment in particular to the area adjacent to the barrel outlet. The area near the toe of the downstream embankment is particularly susceptible to seepage erosion if it is compromised by uprooted trees. In the long-term the barrel will have to be replaced. The existing barrel has rusted at the seams and is discharging water out the side. At the time of the inspection water was not observed channeling along the barrel; however, the deterioration of the barrel that is exposed will likely extend into the embankment over time. Particular attention should be given to this issue during the regularly scheduled inspections.

The estimated cost to replace the barrel and control structure is $110,000.

<u>High Rock Pond Dam</u>

High Rock Pond Dam is located at the terminus of High Rock Pond Road, with an exact location of N 36.43422, W 79.22021. It impounds water for the High Rock Pond Public Fishing Access Area. The dam is an earthen embankment with a primary control structure consisting of a PVC riser and barrel with gate valve. The emergency spillway is a grass lined swale that extends past the embankment toe.

The High Rock Pond dam was completely reconstructed around 2009. The new riser and barrel have features that supposedly prevent beaver damage to the control structure. Additionally, filter drains were installed in the downstream embankment to prevent seepage erosion of the embankment. At the time of inspection the dam and control structures appeared to be functioning as designed with no apparent improvements required.

There also two additional dams not officially recognized.

One dam was inherited with the property acquired adjacent to the Brumley Impoundment Road, with an exact location of N 36.45206, W 79.20822. It is reported the pond has never filled. This may be due to the limited drainage area or issues with achieving water tightness during construction. The pond was neglected prior to being included in the game lands and does not serve a purpose currently. A more in-depth study would be required to determine if the dam can be made functional and if a functional dam and pond would fit the overall Management Plan. If it is determined that the dam cannot be repaired and in fact the drainage area is limited, the dam should be

breached. The estimated cost to breach the dam would be approximately $20,000. If the dam is left in place the earthen embankment should be cleared of woody vegetation.

The second dam is located at the end of Indian Trail Road (Barker Tract) more exactly located at N 36.389661, W 79.320133. The pond is currently used for duck nesting and feeding. There are several nesting boxes around the perimeter of the pond and a food source is planted yearly after a brief draw down. The control structure riser has deteriorated and fallen into the pond; however, the barrel, a six inch steel pipe with gate valve, allows manual water release. An emergency spillway is located in the southwestern corner of the pond and is currently operating as the primary control structure. The emergency spillway has large diameter trees established in the floodway. The earthen embankment appeared to be in good condition with the exception of large diameter trees on the upstream embankment and large diameter tree stumps on the downstream slope. The primary concern with this dam is removing the trees and stumps before the earthen embankment or spillway is damaged. The control structure will also have to be replaced. The estimated cost to complete the repairs is $110,000.

Impoundments

Managed waterfowl impoundments on the game land are the Caswell Impoundment and Brumley Impoundment(s).

Caswell Impoundment

The Caswell Impoundment is located off of High Rock School Road at N 36.44263, W 79.24989. The impoundment is flooded by controlling a natural stream with a structure consisting of a corrugated metal barrel with flash board risers. An earthen dike approximately 2,000 feet long forms the perimeter along the west, south, and east side. The natural topography forms a barrier to the north. Rip-rap hardened emergency overflows are located in three places within the dike. The impoundment, re-constructed in 2009-2010, is functioning as intended. The embankment and control structure were in good shape except for minor damage caused by muskrat burrows. No improvements are required except routine vegetation removal and rodent damage repair.

Brumley Impoundment

The Brumley Impoundment is located at the end of Brumley Impoundment Road accessed from Stephentown Road with an exact location of N 36.46145, W 79.21593. The impoundment is actually three impoundments connected in series. Water is pumped from Country Line Creek into Brumley Pond. Water flows from Brumley Pond via a gate valve control structure and occasionally an overflow ditch into Upper Brumley. Water then flows from Upper Brumley into Lower Brumley via a gate valve control structure. At the end of the waterfowl season Lower Brumley is then drained back into Country Line Creek. Normal operation is to allow the water to flow through Upper

Brumley until Lower Brumley is full. The gate valve is then closed between Upper and Lower Brumley to allow Upper Brumley to fill.

Considerable maintenance has been completed on the dikes surrounding the impoundment, mainly removal of large trees that may compromise the integrity of the earthen dam. Additional clearing is needed on Upper Brumley. Otherwise routine maintenance of the dike system to keep cleared areas clear and repair rodent damage is all that is required to maintain the embankments. The major concern with the impoundments is the control structures. Operation of the control structures requires an employee to wade into the impoundment and locate the submerged control structure gate valve wheel then open the gate. It is recommended the control structures be replaced with corrugated metal barrels and flash board risers. The estimated cost of improvements to three control structures is $150,000.

Dam/Impoundment Maintenance

Dams are complex structures that consist of many parts (see **Figure 4**). In order to prevent failures, dams must be inspected to identify potential problems, and maintenance must be performed to prevent deterioration of the structure that may result in failures. Because of their complexity, dams can fail in many ways including, but not limited to; overtopping, seepage failure, and structural failure.

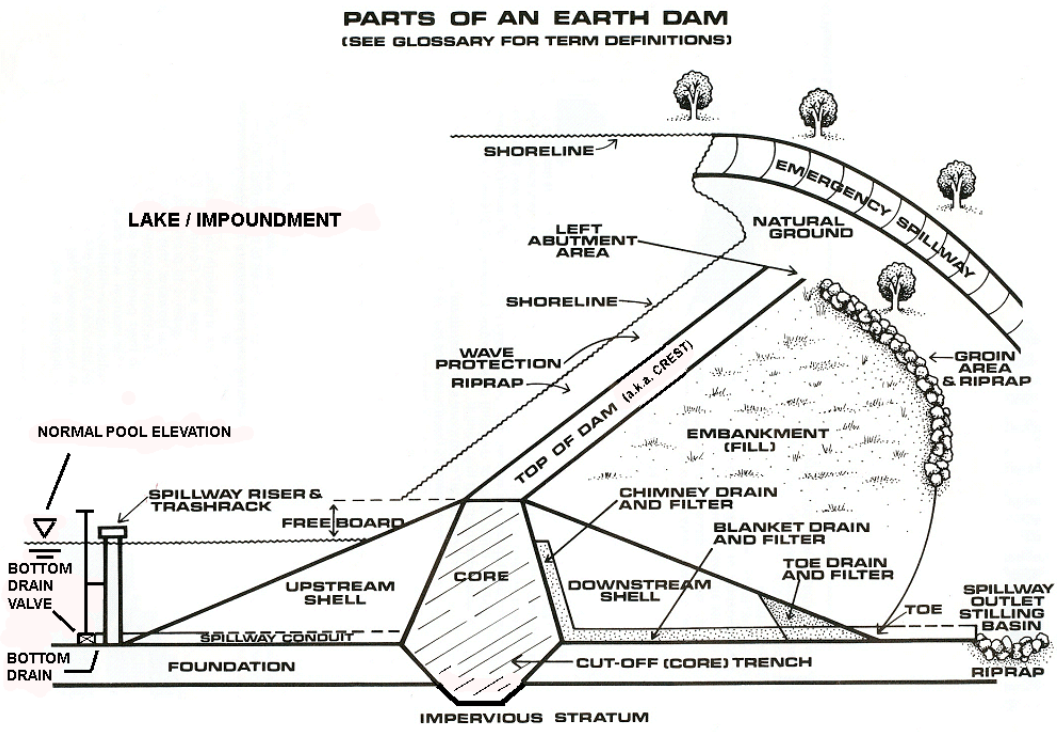


Figure 4 – Parts of an Earthen Dam (from Dam, Operation, Maintenance, and Inspection Manual – NCDENR Land Quality Section)

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

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

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

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

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

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

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

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

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

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

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

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

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

Culverts

Due to the size of the game land and total number of culverts, inspection of all culverts annually is impractical. Several culverts recently installed are functioning very well for the volume of water carried. These include the culverts on Cook Tract-E Block Road and the culvert at the end of Cook Road public access. However, during the road investigation with field staff, several culverts were identified as needing repair or upgrade. These include the following:

> Campground Road; Culvert Location N 36.35764, W 79.34317; 18” CMP 20’ long Culvert appears to be over topping. The inlet was blocked at the time of inspection. Clean inlet and monitor. Replace if overtopping continues with pipe engineered for anticipated flow.

Wildlife Road; Culvert Location N 36.36412, W 79.31138; 15" CMP 20' long Culvert was blocked and has outlet scour. Clean inlet as part of routine maintenance and armor outlet with rip-rap.

Wildlife Road; Culvert Location N 36.36867, W 79.31546; 15" CMP 20' long Inlet and outlet were blocked. The debris should be cleared as part of routine maintenance.

(Culverts replaced on perennial streams should allow the passage of aquatic organisms.)

Culvert Maintenance

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

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

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

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

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

Leaves and woody debris that have accumulated in or around the inlet of the culvert should be removed immediately using hand tools, if possible. Removal of accumulated silt and/or gravel from ditches approaching the culvert inlet should be performed using a small excavator, backhoe, or a tractor equipped with a scrape blade. Sediment in or around the immediate vicinity of the pipe inlet or outlet should be removed using hand tools to prevent damaging the culvert. Cleaned out material is to be pulled away from the culvert then hauled and spread at a site where it cannot be washed back to the culvert area.

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

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

Concrete Crossings

Lake Bottom Road Crossing:
Locations N 36.36489, W 79.34740 and N36.35976, W 79.34784
Lake Bottom Road crosses several small waterways two of which have been improved by concrete crossings that follow the contour of the stream bottom. These crossings have been in place for over 40 years and continue to function as intended. The only issue observed is minor erosion of the stream bottom on the downstream side which is impressive given the life span of the structure. It is recommended the structures be left in place and small rip-rap be placed downstream to protect the “toe” of the structure.

One additional concrete crossing should be built at N 36.35983, W 79.34880 to allow circular travel on Lake Bottom road during wet conditions. The crossing can be poured during a drought when the waterway dries up or poured on high ground and pushed into a bedding stone. One design feature to include would be a lip on the downstream side to dissipate water energy. The anticipated cost would be $4,000. (Installation should minimize sedimentation and scour pool formation, and allow for continued passage of aquatic species at average stream flows.)

Bridges

Cook Tract-E Block Road Bridge: Location N 36.35431, W 79.27838
The bridge is two army surplus metal frame bridges bolted together. The joint between the two bridges protrudes to the point of potentially damaging vehicles utilizing the

bridge. The cross section of the main supporting member tapers from one end to the other causing concern about the moment resistance supplied at the midpoint. The bridge is decked with metal grating that is not securely attached to the bridge structure. The foundation is rough cut large timbers laid on existing soil. This foundation service life in anticipated to be relatively short. The bridge is a liability to the NCWRC and should be removed. Guarantee of access to adjacent land owners requires the bridge be replaced. A property designed and sized culvert should be installed at an approximate cost of $30,000.

Boundary

RWB-Caswell Game Land has approximately 138 miles of boundary line that is maintained. Most of this boundary adjoins private land (without road access), though there is considerable boundary mileage adjoining DOT road frontage and along major creeks. Annually, around 50 miles are painted and posted so that the entire boundary is visited on a three-year rotation. About sixteen miles of the game land boundary are posted only (not painted), as these properties are marked by their respective landowners, the Boy Scouts of America and Duke Energy. In the early summer of 2014, boundary contracts were initiated and private contractors were utilized to paint and post 37 miles of boundary. It is expected that contract boundary posting will continue in the future on an as needed basis.

Recreational Facilities Assessment

(**Appendix XXI**, Recreational Facilities Infrastructure Map)

Boating Access

The two Boating Access Areas on the game land are at the Rabbit Shuffle Pond and the High Rock Pond.

Rabbit Shuffle Pond
The Rabbit Shuffle Pond Boating Access consists of a semi-improved gravel boat launch. The launch accommodates small carry-in boats such as canoes, kayaks, or jon boats. It would be possible to launch a smaller trailered boat; however, utilization by large boats is not anticipated. Improving the launch would be feasible if public demand increases. The estimated cost of improvements for a concrete ramp and small dock is $15,000.

High Rock Pond
The High Rock Pond Boating Access consists of a 10’ X 40 concrete ramp. The ramp is in good shape; however, it is very steep and does not extend into the water. It provides a hardened surface for carry-in type boats but could only be utilized by a four-wheel drive vehicle to launch a trailered boat. A warning sign should be erected to warn the

public of the steep ramp. Improvements to the ramp would require the entire area be regraded at considerable expense. With a low level of use this may be difficult to justify.

Public Fishing Access

The two Public Fishing Access Areas on the game land are at the Rabbit Shuffle Pond and the High Rock Pond.

Rabbit Shuffle Pond

The Rabbit Shuffle Pond PFA consists of a "T" shaped fixed pier, ADA parking with concrete walkway, and gravel parking for 7 vehicles. The fixed pier is 8' X 45' with an 8' X 70' walkway. Routine maintenance is on-going and the pier structure appears to be in relatively good shape. Several decking and handrail boards have been replaced and the remaining ones are nearing the end of their service life. It is recommended that the decking and handrails be refurbished with new lumber in three to four years. The estimated cost will be $12,000.

High Rock Pond

High Rock Pond PFA consists of a rectangular shaped fixed pier, ADA parking with concrete walkway, and gravel parking for 6 vehicles. The fixed pier is 10' X 32' with 6' walkways accessing each end. Routine maintenance is on-going and the pier appears to be on good shape. Routine maintenance should continue.

Shooting Ranges

Design began in 2013 for a shooting range. Tentatively the range will be located on the Restricted Zone near the Restricted Road split. The facility will provide a 100-yard rifle range and a 25-yard pistol range, firing shelters, and ADA accessibility.

Non-Traditional Uses

Geocaching

Geocaching is a recreational activity, in which participants use a GPS receiver or mobile device to hide and locate hidden containers, or caches, located somewhere outdoors. The game land has become a very popular geocaching location, with hundreds of hidden caches. There are no major infrastructure elements required for this non-traditional use, but it would be beneficial to the participants to provide parking areas near the start/end of the geocaching trails.

Hiking/Camping

The game land currently has one designated camping area. It is located on Campground Road off of NC Highway 62. The campground is only open for hunting

season and only provides primitive camping sites. However, as non-traditional uses are becoming more popular, we may need to extend open times or create additional designated campsites in the future.

The game land also contains several miles of roads and firelines. It is anticipated that the existing network of roads and firelines will be sufficient to meet demand for hiking, hunting, and other uses. Hikers and hunters are not restricted to roads and trails and are welcome (and encouraged) to walk across all open portions of RWB-Caswell Game Land. If demand increases, staff will evaluate the need for establishing additional trails.

Horseback Riding

Currently, horseback riding is permitted on the game land roads open to traffic during times outside of hunting season provided a Game Land Use Permit is obtained. Given the increased public demand for this use, potential roads will have to be investigated, designated for horseback riding, and infrastructure will have to be constructed. The primary infrastructure need will be parking for vehicles towing trailers. It is estimated the minimal cost to provide parking will be $70,000. Two new parking areas are planned; one off of the Bradford Road and one off of the Will Paylor Road dead-end.

Recreational Facility Maintenance

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

1. Inspections should examine the following items
   a. Safety inspection items:
      Facility components
      - Decking
      - Handrails
      - Structural supports (piles, substructure, and floats)
      - Fasteners (bolts, screws, and nails)

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

- Drop-offs

Overhead

- Dead trees or limbs
- Overhead utilities

b. Functionality Inspection Items

Parking

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

Ramp

- Blockages (sediment, wood)
- Surface condition

Pier/Dock

- Bollards
- Wooden components
- Bumpers

Shooting range

- Berms
- Target area
- Benches
- Shelter (roof, structure, and floor)

Signage

- Kiosk (entrance, regulation, and information)
  - ADA
  - No Parking
  - Keep Ramp Clear

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

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

repairs. If major repairs are required, supervisor personnel should contact an engineer for assistance.

RESEARCH AND SURVEYS/INFORMATIONAL NEEDS

Research and surveys are a critical component of management of fish and wildlife resources at RWB-Caswell Game Land. Continued and future research and survey projects are needed to make sound scientific decisions, prescriptions, and assessments of these resources across the game land to meet the goals and objectives of this plan. A large component of research and surveys on all game lands should be adaptive management, where monitoring is able to evaluate the effects of management to improve future actions for target species. Current and on-going research and survey projects on the game land focus heavily on the CURE Area, priority species, and hunter success and satisfaction surveys.

Current (and past) research and survey projects occurring on the game land:

- Songbird surveys (winter and spring point counts)
- Bobwhite quail surveys (fall covey and summer call counts)
- Habitat Suitability Surveys (useable habitat for bobwhite quail)
- Vegetation surveys (winter and summer)
- Small mammal surveys (response to management research and acoustical bat surveys)
- Aquatic diversity surveys
- Insect surveys (dragonfly and butterfly)
- Herpetological inventories (cover board studies for reptiles and amphibians)
- Mourning dove and wood duck banding
- Waterfowl hunter surveys (impoundment permit hunts)
- Disabled and youth permit hunt surveys
- Natural Heritage inventory surveys
- Wood duck nest box project

Although there have been several studies conducted and numerous surveys and projects implemented, there is still a need to continue to improve inventories and monitoring, as well as continue to gather knowledge and information regarding wildlife and aquatic resources across the game land. Songbird and quail surveys should be continued to further assess management impacts and measure long-term population trends. Inventory surveys should be conducted to assess whether priority species are present, and which habitats they are using. Further amphibian surveys at isolated wetlands could help to improve our understanding of current amphibian use and potential strategies for future management. Continued songbird, mammal, herpetological, and vegetation surveys are needed to document and monitor management impacts and provide baseline data prior to management (to provide

recommendations for future management). Aquatic surveys of the streams across the game land are needed to monitor populations and to document and monitor aquatic diversity, communities, habitat quality, and the potential for restoration of rare or priority aquatic species.

Research and survey needs (and possibilities) for the game land:

- Continued songbird point count surveys
- Continued spring and fall point count surveys for quail
- Additional and continued inventory of reptiles and amphibians
- Additional and continued small mammal surveys in key habitats
- Establish a North Carolina Bat Acoustic Monitoring Program route, bat mist netting, and installation of bat houses
- Population (size and trend) inventories for target game and priority non-game species
- Inventory and delineate wetland habitats
- Additional hunter effort and success surveys
- Continued comprehensive inventory of aquatic species and habitats
- Continued monitoring of feral hog expansion (and eradication measures)
- Mortality (and re-colonization) surveys of reptiles, amphibians, and small mammals following management (i.e. successional disking, prescribed burning)
- Implement American woodcock and nightjar surveys
- Further inventory of rare insects (dragonflies and butterflies)
- Monitor and control invasive plant species (early detection, rapid response)
- Implement American kestrel and barn owl nest box projects
- Expand research and knowledge of critical habitat types (vernal pools, early successional, shortleaf pine restoration, hardwood savannahs, etc.)
- Continue and expand surveys and monitoring of user group numbers, activities, satisfaction, and intensity
- Complete forest inventory stand mapping for entire game land

Informational needs for the game land include close monitoring of current and planned future land use and projected growth in Caswell County and regionally in the Triad and Greensboro (being the nearest large metropolitan centers to the game land). Local government and community development land use planning, zoning changes, and other arising incompatible land uses will have a tremendous potential impact as they relate to the RWB-Caswell Game Land management goals and objectives. Local development and transportation upgrade related plans and proposed projects should be monitored closely to ensure that negative impacts to important wildlife corridors between the game land and the nearest permanently conserved lands are minimized or mitigated. “Efforts should be made to monitor and provide information from the Green Growth Toolbox to planners for long-range transportation planning and local land use planning that may affect habitat quality and the ability to manage habitats on the game land” (Cook, 2014).

(**Appendix XXIII**, Urban Expansion Projection Maps; 2010, 2030, 2100)

ACQUISITION PLAN

Negative impacts associated with intense development pose significant threats to wildlife species and habitats identified as conservation priorities in North Carolina (Wallace and Tarr, 2012). Landscape scale habitat fragmentation, rapid human population growth, and increased urban expansion in the regional proximity to Caswell County make the protection of undeveloped lands and biological resources paramount. These factors increase the demand for public use areas and wild, open spaces, while at the same time putting tremendous pressure on ecological communities and environmental quality. Incompatible land uses adjacent to the game land can have negative direct impacts on habitats and species and also indirect impacts such as fragmenting remaining habitat patches and impeding movement of animals across the landscape. Incompatible land uses adjacent to the game land can negatively impact management activities (e.g. limiting prescribed burning) and public uses (e.g. no firearm hunting within 150 yards of a building on the edge of game lands).

Currently, RWB-Caswell Game Land is surrounded by predominantly rural lands, which means that there is still an opportunity to maintain the rural landscape, protect additional important habitat areas, buffer existing managed lands, strengthen connectivity corridors for wildlife, and increase public access and use opportunities. In keeping with the objectives of the NCWRC's Game Lands Program to provide, protect, and actively manage habitats to benefit aquatic and terrestrial wildlife resources, there is a need to strategically expand RWB-Caswell Game Land when and where possible.

Priority property acquisitions will be identified and categorized based upon the potential to improve game land access, enhance connectivity of the game land, and/or allow the opportunity to protect critical habitats and imperiled species. The highest priority tracts are inholdings or adjacent tracts that provide key (needed) game land access, enhance the connectivity of current holdings, offer restoration and preservation potential, or connect corridors between the game land and other regional conservation lands. Tracts that contain unique or high quality natural communities, possess listed species, or provide critical buffers along sensitive watersheds or other adjacent biotic features are also highest priority for acquisition or other conservation measures. Tracts of secondary priority are large tracts immediately adjacent to the game land that provide important additional (conservation and recreational) acreage, but do not provide key access to or enhance connectivity of existing holdings or do not contain high priority natural resources.

These properties should be pursued when available. Tracts offered for acquisition should be evaluated on a case by case basis to determine if they address a significant game land and/or conservation need. Land investigations and grant application processes should be initiated. Regardless of acreage, tracts surrounding RWB-Caswell will be evaluated for the:

- Presence of threatened, rare, endangered, and special concern species
- Proximity to and shared boundary with existing NCWRC property
- Protection of existing NCWRC property from encroachment by development
- Improvement of the connectivity between existing game land blocks
- Creation of corridors to partner properties and other conservation lands
- Presence of (or protection for) high quality terrestrial and aquatic habitats
- Presence of exemplary natural communities
- Presence of intact priority habitats or those that can be restored
- Benefits to game land users and improving public access
- Potential to increase the ecological benefits from prescribed fire
- Facilitation of the ease of administering prescribed fire on the landscape

Funding sources for land acquisition activities have had large cuts made to their budgets over the last several years, so leveraging the increasingly scarce acquisition funds and securing new funding sources will be a major future challenge facing NCWRC acquisition activities.

FINANCIAL ASSESTS AND FUTURE NEEDS

Current staffing and available equipment are sufficient to meet immediate needs for maintaining the infrastructure and management needs of the game land. Additional (seasonal) manpower may be needed, particularly to meet future prescribed burning goals. Older pieces of equipment will be replaced as they begin to age, become outdated, or become in a state of disrepair.

Current assets:

- Personnel - The staff located at the Caswell Wildlife Depot includes 4 permanent positions (1 Conservation Technician II and 3 Tech. I's), an 11 month seasonal position, and a 5 month seasonal position. Other regional staff working in part on Caswell includes: EcoRegion Supervisor, Management Biologist, Conservation Technician Supervisor, Wildlife Forest Manager, Assistant Wildlife Forest Manager, District Fisheries Biologist, Fisheries Biologist I, District Wildlife Management Biologist, Central Aquatic Nongame Coordinator, Eastern Aquatic Nongame Biologist, Piedmont Wildlife Diversity Coordinator, Wildlife Diversity Biologist I, up to 4 Wildlife Enforcement Officers, and Facility Engineer(s).

- Equipment- Caswell Depot has crawler dozers, farm tractors, grain drills, mowers (bushhogs, lawnmowers, and A-boom), slip-on fire suppression units, motor-grader, backhoe, dump trucks, utility trailers, hauling units, an impoundment pump, multiple boats, and all-terrain vehicles (gators and four-wheelers).
- Structural – There is a modern single bay shop, old office building (with attached bays, 3 open and 1 enclosed), 1 pole barn, 1 pump shed, 3 storage buildings (seed house, pesticide shed, and large storage/equipment facility), a fenced wildlife holding facility, 5 disabled sportsman hunting blinds, and 1 residence.

Future needs: With an emphasis on increasing and diversifying the user base of the game land, new constituents will expect a higher level of maintenance and access to game land infrastructure. Additional assets and funding needs necessary to meet the goals and objectives of this plan are: (see **Table 2**: Financial Summary of Activities)

- Personnel – No immediate additions to the personnel anticipated
- Equipment – No immediate major equipment purchases anticipated. Funds needed to replace equipment as needed
- Funds for kiosks, signage, and educational materials to inform game land users
- Funding for parking area construction and upgrades
- Funding for future game land parcel acquisitions
- Funding for contract boundary work
- Funds for road construction, improvements, and repairs
- Funds for pond dam repairs and water control structure (WCS) replacement
- Funds for BAA and PFA renovations
- Funds to purchase gravel, culverts, and gates (routine maintenance and construction)
- Funding for additional and on-going training of employees (equipment operation, safety, habitat management work, species identification, etc.)
- Funds for research and surveys
- Funds to complete forest inventory and stand mapping on ~18,000 acres

Table 2: R. Wayne Bailey-Caswell Game Land: Financial Summary of Activities

Habitat Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
H	Firebreaks	Establish firebreaks	2	mi	2000	4000	4000	4000	4000							16000
H	Firebreaks	Maintain firebreaks	25	mi	525	13125	14175	15225	16275	17325	17325	17325	17325	17325	17325	162750
H	Firebreaks	Install culverts on firebreaks	3	ea	200	600	600	600	600							2400
H	Firebreaks	Maintain culverts on firebreaks	28	ea	50	1400	1550	1700	1850	1850	1850	1850	1850	1850	1850	17600
H	Herbaceous Seeding	Seed or maintain	200	ac	175	35000	35000	35000	35000	35000	35000	35000	35000	35000	35000	350000
H	Herbaceous Seeding	Admin. Co-Op farm leases	1	gl	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	10000
H	Nest Structures	Maintain Wood Duck Boxes	48	box	50	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	24000
H	Population Control	Control feral pig population	1	gl	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	30000
H	Tree and Shrub Planting	Plant or maintain orchards	10	ac	100	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	10000
H	Vegetation Control	Prescribe burning	1200	ac	30	36000	36000	36000	36000	36000	36000	36000	36000	36000	36000	360000
H	Vegetation Control	Mowing/Succession Disking	70	ac	30	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	21000
H	Water Level Management	Manage water levels	3	sub-imp	1200	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	36000
H	Water Level Management	Diesel Unit Pumped	300	hr	27	8100	8100	8100	8100	8100	8100	8100	8100	8100	8100	81000
															Sub-total:	**1120750**

Operation and Maintenance Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
O & M	Buildings	Maintain building/grounds	9	blg	4000	36000	36000	36000	36000	36000	36000	36000	36000	36000	36000	360000
O & M	Dams and Dikes	Maintain dams and dikes	3	mi	500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	15000
O & M	Signs and Boundaries	Maintain boundary	50	mi	135	6750	6750	6750	6750	6750	6750	6750	6750	6750	6750	67500
O & M	Public Use Facilities	Maintain campground	1	camp	225	225	225	225	225	225	225	225	225	225	225	2250
O & M	Public Use Facilities	Maintain hunter parking areas	22	park	225	4950	4950	4950	4950	4950	4950	4950	4950	4950	4950	49500
O & M	Road and Trails	Maintain Road	30	mi	2500	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000	750000
O & M	Road and Trails	Install or Replace Culverts	2	ea	500	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	10000
O & M	Road and Trails	Maintain Culverts	65	ea	50	3250	3350	3450	3550	3650	3750	3850	3950	4050	4150	37000
O & M	Road and Trails	Install gates	3	gate	1000	3000	3000	3000	3000							12000
O & M	Road and Trails	Maintain gates	80	gate	100	8000	8300	8600	8900	8900	8900	8900	8900	8900	8900	87200
O & M	Non-Highway Equipment	Maint. & repair of non-hwy. equip.	1	depot	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	30000	300000
															Sub-total:	**1690450**

Development Activities and Renovation

Project	Description	Activity	Quantity	Unit	Unit Cost	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	Total
D	Road Upgrade (1)	Restricted Area Road (To Shooting Range)*	0.5	mi	######											50000*
D	Road Upgrade (1)	Restricted Area Road (Relocation)*	0.3	mi	######											60000*
D	Road Upgrade (1)	West South Frogsboro Road	0.5	mi	######		100,000									100000
D	Road Upgrade (1)	Brumley Imp. Road Extension	0.3	mi	83,333	25,000										25000
D	Road Upgrade (2)	Swann Road	0.4	mi	######			40,000								40000
D	Road Upgrade (2)	Topnot Road	0.2	mi	######				20,000							20000
D	Road Upgrade (2)	East South Frogsboro Road	0.1	mi	######		10,000									10000
D	Road Upgrade (3)	Cook Road	0.3	mi	######					30,000						30000
D	Road Upgrade (3)	Old Bigelow Road	0.1	mi	######	10,000										10000
D	Road Upgrade (3)	Boy Scout Road (East)	0.5	mi	######						50,000					50000
D	WCS and Barrel Replacement	Rabbit Shuffle Pond Dam	1	ea	######							110,000				110000
D	WCS Replacement	Brumley Sub-Impoundments (3)	1	ea	50,000								150,000			150000
D	Dam Breach (or) Dam Clearing	Brumley Pond	1	ea	20,000		20,000									20000
D	Dam Repair	Barker Tract Pond	1	ea	######				110,000							110000
D	Concrete Crossing	Lake Bottom Road Creek Crossing	1	ea	4,000	4,000										4000
D	Bridge Removal & Culvert Instal.	Cook Tract Creek Crossing	1	ea	30,000					30,000						30000
D	BAA Renovation	Rabbit Shuffle Pond Boat Ramp and Dock	1	ea	15,000		15,000									15000
D	PFA Renovation	Rabbit Shuffle Pond Pier and ADA Walkway	1	ea	12,000			12,000								12000
D	Parking Areas (Horse Trailer)	Bradford Rd. and Will Paylor Rd. Lots	2	ea	35,000	70,000										70000
															Sub-total:	**806000**

** Denotes activity and cost incurred in 2014-2015; this cost not included in sub-total*

GRAND TOTAL: 2496450

REGULATIONS AND ENFORCEMENT

Regulations specific to game lands are in place to help manage natural resources. They are developed by NCWRC staff members, state legislatures, county officials, and the general public. Wildlife Enforcement Officers (WEO's) are responsible for enforcing all statutes and regulations that pertain to the game land program. Each game land has unique needs for special regulations that are in place to help manage the resources. There is also a permit system in place to allow game land managers the ability to permit the use of local or specialized resources within the existing framework of statutes and regulations. The Lands and Use Committee developed a set of guidelines to assist field staff in permitting the use of or the harvesting of resources from game lands.

Enforcement issues and specific regulations pertaining to RWB-Caswell Game Land include investigating, patrolling, and checking hunters and fisherman for game and fish law compliance (equipment, bag and creel limits, licenses), managing the illegal removal of wildlife and forest products, illegal off-road vehicle use and equestrian activity, littering, vandalism, and other unauthorized activities. Regulations have been developed to prohibit the removal of certain wildlife and plant species for commercial resale. Amphibians, reptiles, and rare or sensitive plants are vulnerable to collectors and can be over harvested if not regulated. The use of ATV's on game lands is prohibited and horseback riding is limited to designated times and places. Reducing the amount of illegal ATV and equestrian activity helps protect game land roads, forests, fields, and soil and water quality. WEO's play an important role in informing and educating game land users of specific game land laws and regulations and enforcing them.

With the expected rise in non-consumptive game land users, an increased enforcement presence will be necessary at Caswell. A shift in focus away from primarily hunting and fishing regulation enforcement will be required to monitor the activities of diverse user groups, ensure the safety of all persons, and help reduce the likelihood of conflicts between traditional and non-traditional users .

PARTNERSHIPS, COLLABORATION, VOLUNTEER OPPORTUNITIES

See 'Regional Conservation Partnerships' section.

Past and current partnerships are expected to remain strong and viable. Future collaborations will hopefully grow to include projects of larger regional impact on habitat management, conservation, restoration, connectivity, and enhancement. Land acquisition opportunities will be pursued actively and all measures will focus on the protection and preservation of the resource while providing accessibility and opportunity for the greatest diversity of uses by the public when they are compatible with game land primary objectives. Volunteer opportunities will continue to be offered to individuals or

organized groups as requested, and strategies to achieve needed and desired game land management goals for habitat and infrastructure improvements, research study, and education will be implemented and coordinated by NCWRC staff.

PUBLIC INPUT

A major component of this plan is the public input gathered, reviewed, and addressed for biological, recreational, infrastructure, and management related aspects of the game land. The R. Wayne Bailey-Caswell Game Land Management Plan Public Input Meeting was held July 24th, 2013 at the Caswell County Center, Agricultural Building. An overview of game land information and management activities was presented, questions were answered, and comments were taken. Forty-two people were in attendance, 31 citizens and 11 Commission staff. Online comments were taken through a questionnaire survey at www.ncwildlife.org and specific (non-survey) comments were taken at gamelandplan@ncwildlife.org. Additionally, the complete RWB-Caswell Game Land Draft Management Plan was released for public comment and review in late 2014, early 2015.

The Development Team later reviewed all questions and comments, and all comments that pertained to the NCWRC mission and objectives were considered. Individual and collective comments are addressed throughout this plan. The overwhelming majority of comments were about lack of access, infrastructure, and increased opportunity for equestrian activities (see Horseback Riding section). Other frequent comments also addressed in this plan involved six-day-per-week hunting, small game, big game, upland game, non-game, and waterfowl habitat, rare plant and animal species, wildlife viewing and bird watching, riparian, wetland, and upland habitats, current satisfactory access, and deer dog hunting. All legitimate aspects of all public comments were taken into consideration and addressed (biologically and for feasibility) within the content of this Management Plan. (See the following exhibits for all public comments.)

Exhibit 1: Public Input Meeting Notes
Exhibit 2- A, B, C, D & E: Comment Letters
Exhibit 3: Game Land Management Plan Comment Questions
Exhibit 4: On-line Comment Responses
Exhibit 5: Comment Cards Transcribed

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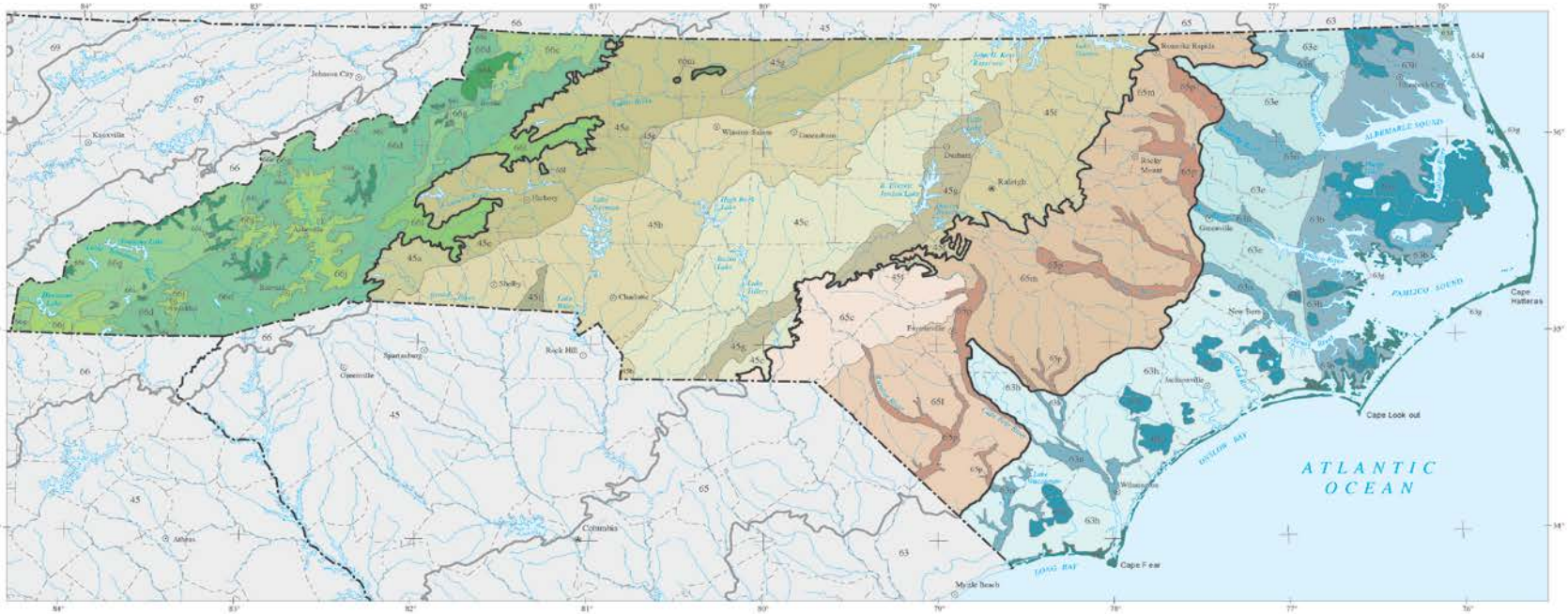
APPENDICES AND EXHIBITS

Legal Documents: Deeds, plat maps, and easements are not included.

(See Page 8 for Appendix Listing.)

Appendix I: Ecoregions of NC Map

Ecoregions of North Carolina



45 Piedmont
- 45a Southern Inner Piedmont
- 45b Southern Outer Piedmont
- 45c Carolina Slate Belt
- 45e Northern Inner Piedmont
- 45f Northern Outer Piedmont
- 45g Triassic Basins
- 45i Kings Mountain

63 Middle Atlantic Coastal Plain
- 63b Chesapeake-Pamlico Lowlands and Tidal Marshes
- 63c Nonriverine Swamps and Peatlands
- 63d Virginian Barrier Islands and Coastal Marshes
- 63e Mid-Atlantic Flatwoods
- 63g Carolinian Barrier Islands and Coastal Marshes
- 63h Carolina Flatwoods
- 63n Mid-Atlantic Floodplains and Low Terraces

65 Southeastern Plains
- 65c Sand Hills
- 65l Atlantic Southern Loam Plains
- 65m Rolling Coastal Plain
- 65p Southeastern Floodplains and Low Terraces

66 Blue Ridge
- 66c New River Plateau
- 66d Southern Crystalline Ridges and Mountains
- 66e Southern Sedimentary Ridges
- 66g Southern Metasedimentary Mountains
- 66i High Mountains
- 66j Broad Basins
- 66k Amphibolite Mountains
- 66l Eastern Blue Ridge Foothills
- 66m Sauratown Mountains

Level III ecoregion — County boundary
Level IV ecoregion — State boundary

SCALE 1:1 500 000

15 10 5 0 30 60 mi
30 20 10 0 60 120 km

Albers Equal Area Projection

PRINCIPAL AUTHORS: Glenn E. Griffith (NRCS), James M. Omernik (USEPA), Jeffrey A. Comstock (Indus Corporation), Michael P. Schafale (NCDENR), W. Henry McNab (USFS), David R. Lenat (NCDENR), and Trish F. MacPherson (NCDENR).

COLLABORATORS AND CONTRIBUTORS: James E. Harrison (USEPA), David L. Penrose (NCDENR), Roy L.Vick, Jr. (NRCS), Gerard McMahon (USGS), Robert Peet (UNC), Chip Smith (NRCS) and Tom Loveland (USGS).

CITING THIS MAP: Griffith, G.E., Omernik, J.M., Comstock, J.A., Schafale, M.P., McNab, W.H., Lenat, D.R., and MacPherson, T.P., 2002, Ecoregions of North Carolina, U.S. Environmental Protection Agency, Corvallis, OR, (map scale 1:1,500,000).

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. They are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregions are directly applicable to many state agency activities, including the selection of regional stream reference sites, the development of biological criteria and water quality standards, and the establishment of management goals for nonpoint-source pollution. They are also relevant to integrated ecosystem management, an ultimate goal of many federal and state resource management agencies.

The approach used to compile this map of North Carolina is based on the premise that ecological regions are hierarchical and can be identified through the analysis of the spatial patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I and Level II divide the North American continent into 15 and 52 regions, respectively (Commission for Environmental Cooperation Working Group 1997). At Level III, the continental United States contains 104 regions (United States Environmental Protection Agency [U.S. EPA] 2000). Level IV is a further subdivision of the Level III ecoregions. Explanations of the methods used to define the U.S. EPA's ecoregions are given in Omernik (1995), Omernik and others (2000), Griffith and others (1994, 1997), and Gallant and others (1989).

The Level III and IV ecoregions were compiled at a scale of 1:250,000 and depict revisions and subdivisions of earlier level III ecoregions that were originally compiled at a smaller scale (U.S. EPA 2000; Omernik 1987). Compilation of this map is part of a collaborative project primarily between the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), the U.S. EPA National Health and Environmental Effects Research Laboratory (NHEERL), U.S. EPA Region IV, and the North Carolina Department of Environment and Natural Resources. This project is also associated with an interagency effort to develop a common framework of ecological regions (McMahon and others 2001). Regional collaborative projects, such as this one in North Carolina where some agreement can be reached among multiple resource management agencies, are a step in the direction of attaining commonality and consistency in ecoregion frameworks for the entire nation.

Comments regarding the Level III and IV Ecoregions of North Carolina map should be addressed to Glenn Griffith, USDA-NRCS, 200 SW 35th Street, Corvallis, OR 97333, (541) 754-4455, FAX: (541) 754-4716, email: griffith.glenn@epa.gov, or to James Omernik, USGS, 200 SW 35th Street, Corvallis, OR 97333, (541) 754-4458, email: omernik.james@epa.gov.

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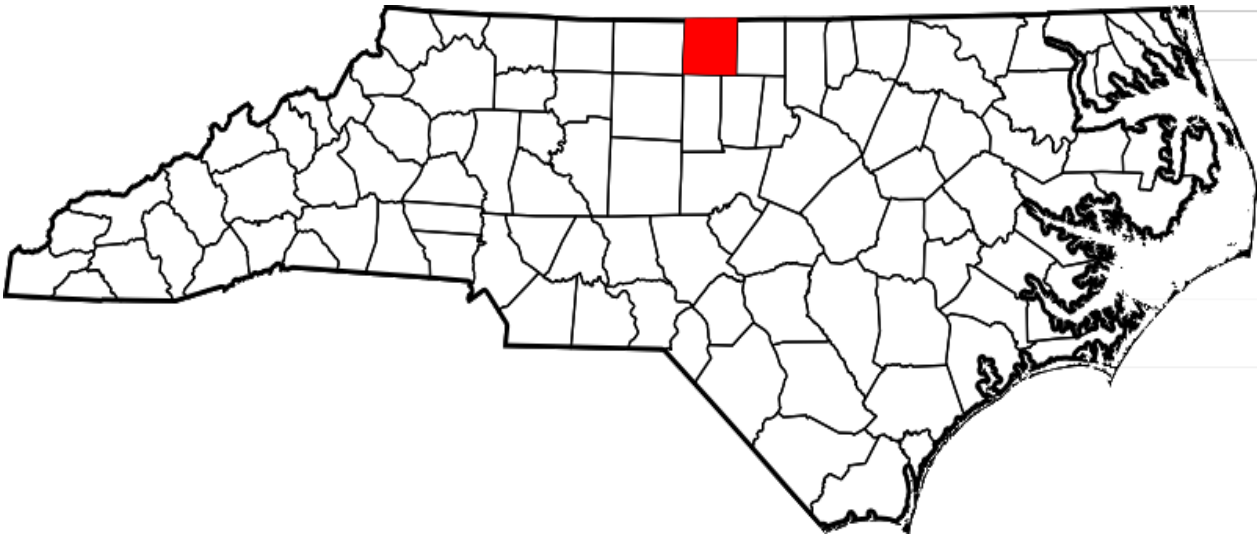
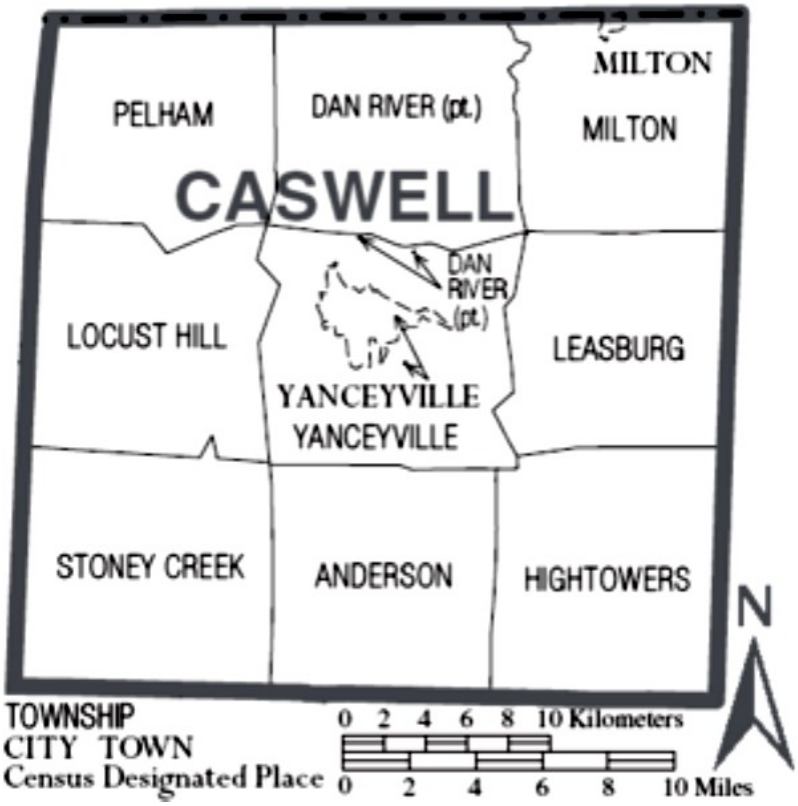
Appendix II: Caswell County Location and Townships Maps

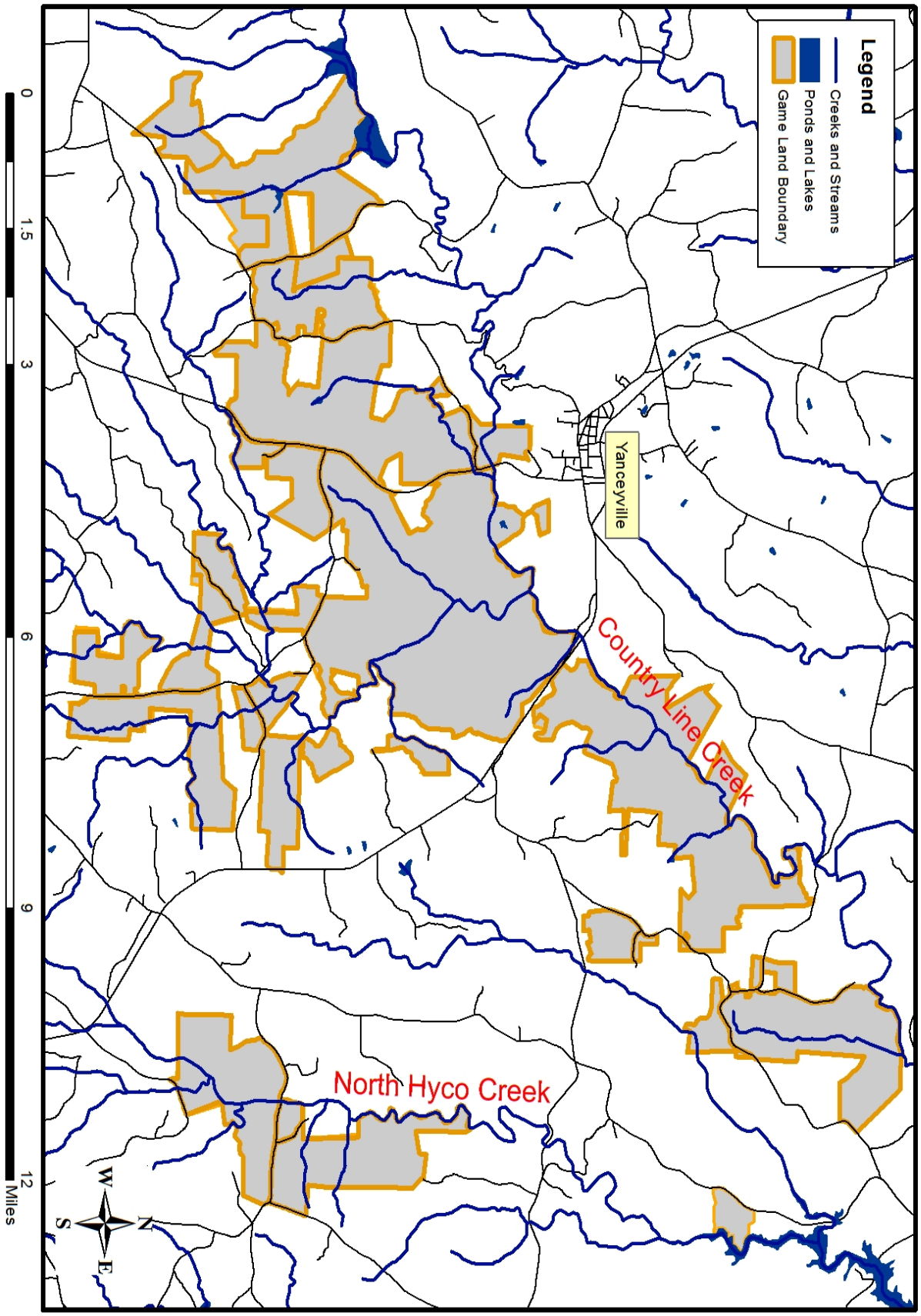
Caswell County Location:



Caswell County Townships:

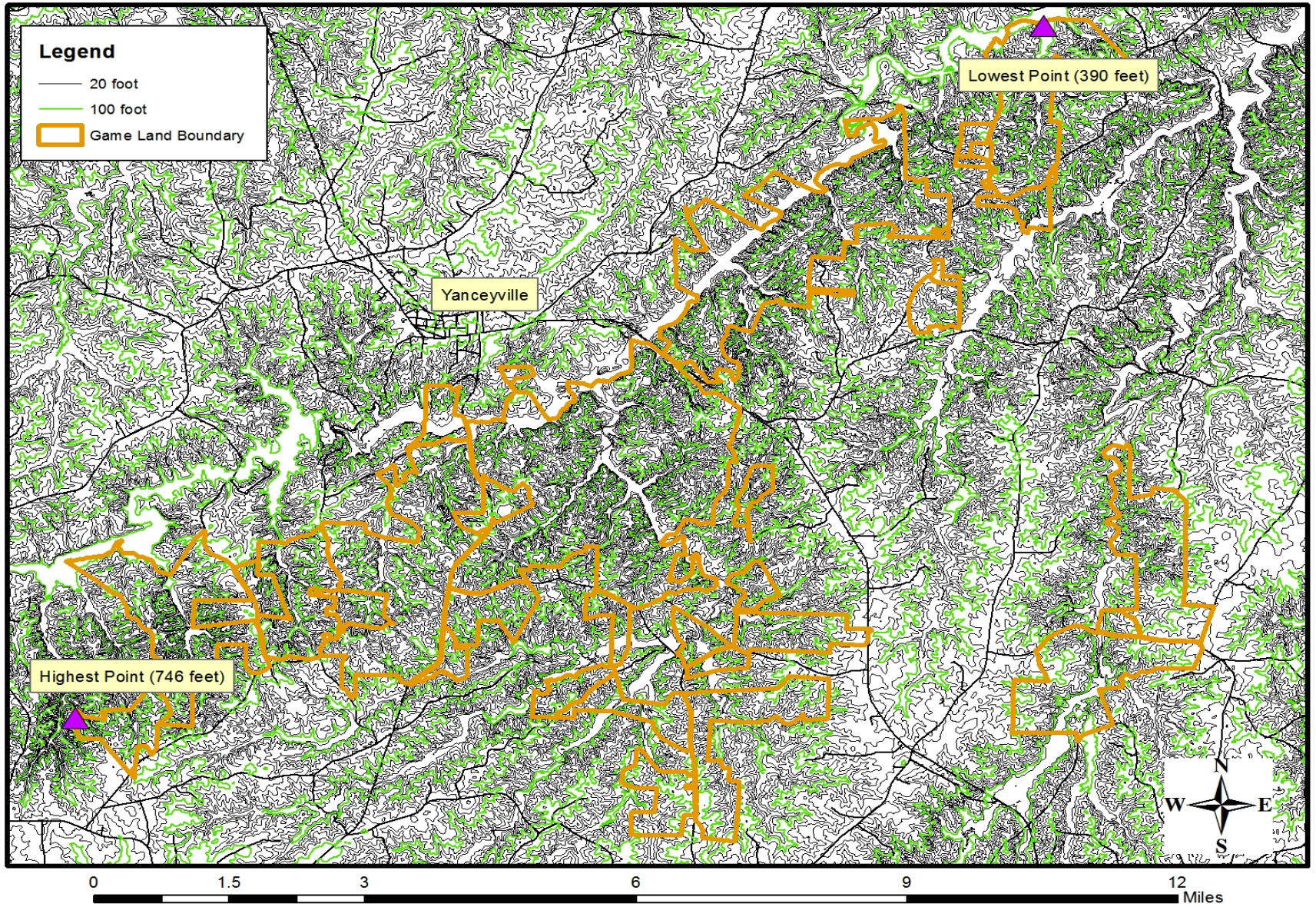


Appendix III: Hydrologic Features Map

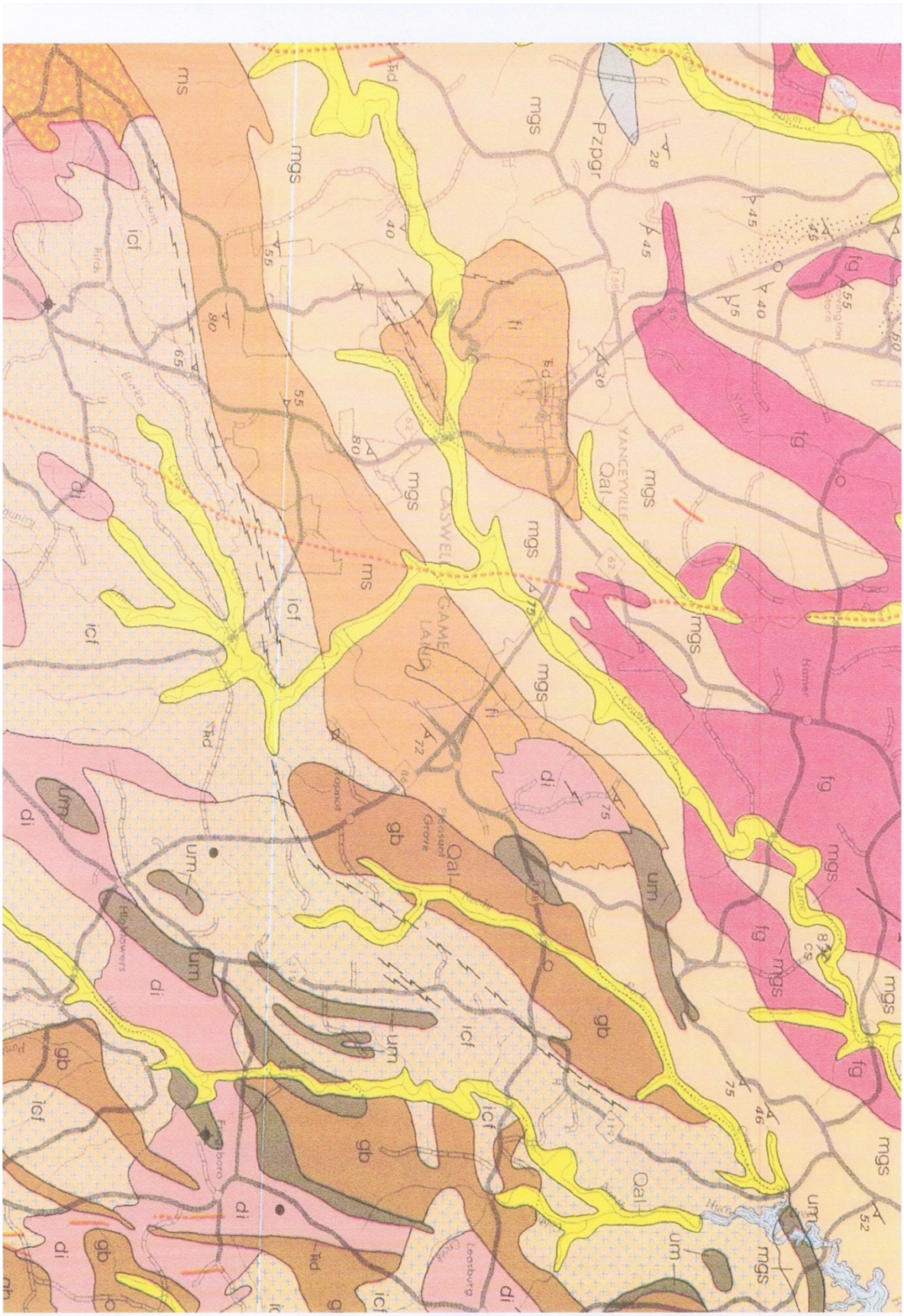


Appendix IV: Topographic Map

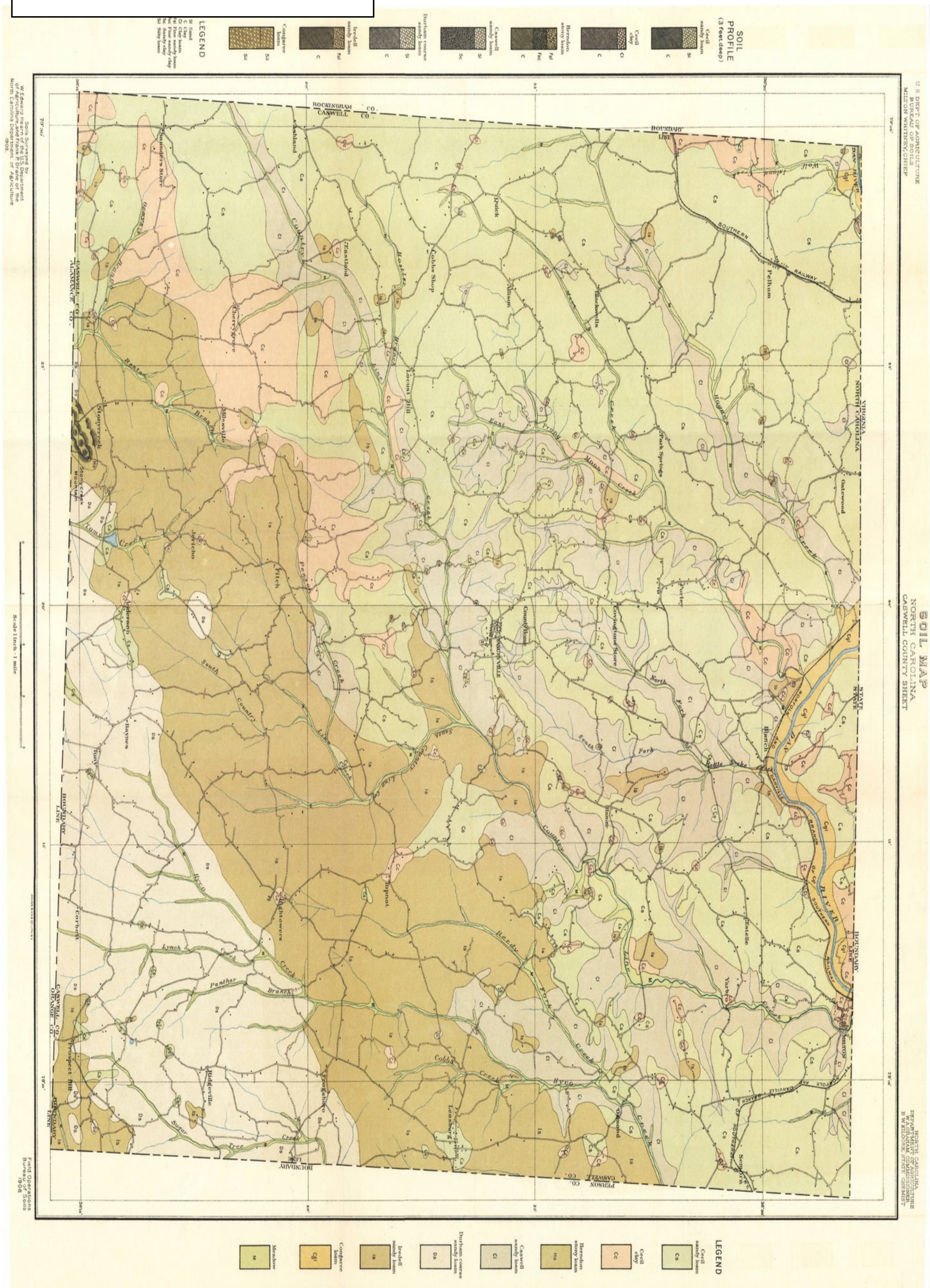
R. Wayne Bailey-Caswell Game Land Topography



Appendix V: Geologic Map (North to Right)



Appendix VI: Soils Map



Appendix VII: Caswell County Rare Species Lists

Table 4. Rare Animal Species Known from Caswell County. Species on the Watch List are included. An explanation of State Status codes appears at the end of the table; see T 3 for the explanation of the Global Rank, State Rank, and US Status codes.

Scientific Name Common Name	Rank Global	 State	Status US	 State
MAMMALS				
none known				
BIRDS				
Ammodramus savannarum Grasshopper Sparrow	G5	S3B, S1N	-	WL
Lanius ludovicianus Loggerhead Shrike	G4	S3B, S3N	-	SC
REPTILES				
none known				
AMPHIBIANS				
Hyla versicolor Northern Gray Treefrog	G5	S2?	-	SR
FISHES				
Etheostoma podostemone Riverweed Darter	G4	S3	-	SC
Hypentelium roanokense Roanoke Hog Sucker	G4	S3	-	SR
Nocomis raneyi Bull Chub	G4	S3	-	WL
MUSSELS				
Alasmidonta undulata Triangle Floater	G4	S2	-	T
Fusconaia masoni Atlantic Pigtoe	G2	S1	FSC	E
Strophitus undulatus Creeper	G5	S2	-	T
Villosa constricta Notched Rainbow	G3	S3	-	SC
CRUSTACEANS				
Cambarus davidi * Carolina Ladle Crayfish	G3	S2S3	-	SR

Table 4. (Continued)

Scientific Name Common Name	Rank Global	 State	Status US	 State
INSECTS – CADDISFLIES				
Triaenodes melacus a caddisfly	G5	S3	-	WL
INSECTS – BUTTERFLIES				
Autochton cellus Golden Banded-Skipper	G4	S2	-	SR
Erynnis martialis Mottled Duskywing	G3	S2	-	SR
Hesperia metea Cobweb Skipper	G4G5	S3	-	WL
Pontia protodice Checkered White	G4	S1S2	-	SR
Satyrium favonius ontario Northern Oak Hairstreak	G4T4	S2S3	-	SR
Thorybes confusis Confused Cloudywing	G4	S3S4	-	WL
INSECTS – DRAGONFLIES				
Cordulegaster erronea Tiger Spiketail	G4	S3?	-	WL
Gomphus abbreviatus Spine-crowned Clubtail	G3G4	S3?	-	SR
Gomphus dilatatus * Blackwater Clubtail	G5	S3?	-	WL
Gomphus ventricosus * Skillet Clubtail	G3	S1S2	-	SR
Stylurus amnicola * Riverine Clubtail	G4	S3?	-	WL

* = Historical records; species not observed in the county within at least 20 years. However, t
species might still occur in the county and be re-discovered.

Table 3. Rare Plant Species Known from Caswell County. Species on the Watch List are also included. An explanation of the rank and status codes appears at the end of the table.

Scientific Name Common Name	Rank Global	 State	Status US	 State
Acmispon helleri Carolina birdfoot-trefoil	G3	S3	FSC	SC-V
Agalinis decemloba Piedmont gerardia	G4Q	S3	-	W1
Agastache nepetoides Yellow giant-hyssop	G5	S1	-	SR
Baptisia australis var. aberrans Prairie blue wild indigo	G5T2	S2	-	E
Carex granularis * Limestone meadow sedge	G5	S1?	-	W7
Carex jamesii James' sedge	G5	S2	-	SR
Celastrus scandens American bittersweet	G5	S2?	-	E
Corallorhiza odontorhiza Autumn coral-root	G5	S4?	-	W1
Desmodium cuspidatum Large-bract tick-trefoil	G5	S2?	-	W7
Diplazium pycnocarpon Glade fern	G5	S3	-	W1
Dirca palustris Leatherwood	G4	S3	-	W1
Dryopteris carthusiana Spinulose woodfern	G5	S2	-	W7
Enemion biternatum Eastern isopyrum	G5	S2	-	SC-V
Erigenia bulbosa Harbinger-of-spring	G5	S1	-	SR
Erythronium americanum ssp. americanum American trout lily	G5T5	S2?	-	W7
Euonymus atropurpureus Eastern wahoo	G5	S2	-	W7
Eupatorium altissimum Tall thoroughwort	G5	S2	-	W1
Eupatorium godfreyanum Godfrey's thoroughwort	G4	S3	-	W1
Eupatorium saltuense * Tall boneset	G4	S1?	-	SR

Table 3. (Continued)

Scientific Name Common Name	Rank Global	 State	Status US	 State
Euphorbia commutata * Cliff spurge	G5	S1	-	T
Humulus lupulus var. lupuloides American hop	G5T5	S1	-	W7
Isoetes virginica * Virginia quillwort	G1	S1	FSC	SR
Juncus secundus * Nodding rush	G5?	S1S2	-	W7
Lathyrus venosus Smooth peavine	G5	S3	-	W1
Lysimachia tonsa Southern loosestrife	G4	S2	-	SR
Mertensia virginica Virginia bluebells	G5	S2	-	W7
Panax quinquefolius Ginseng	G3G4	S3S4	-	W5B-SC
Panax trifolius * Dwarf ginseng	G5	S3	-	W1
Parthenium auriculatum Glade wild quinine	G3G4	S2	-	SR
Phacelia covillei Buttercup phacelia	G3	S3	FSC	SR
Philadelphus inodorus Scentless mock-orange	G4G5	S3	-	W1
Polygonum erectum * Erect knotweed	G5	S1S2	-	W7
Pseudognaphalium micradenium Small rabbit-tobacco	G3?	S1	-	SR
Pycnanthemum torreyi Torrey's mountain-mint	G2	S1	FSC	SR
Pycnanthemum virginianum Virginia mountain-mint	G5	S1?	-	SR
Pyrola Americana * American shinleaf	G5	S2S3	-	W1
Quercus muehlenbergii Chinquapin oak	G5	S2	-	W1
Quercus palustris * Pin oak	G5	S2	-	W1

Table 3. (Continued)

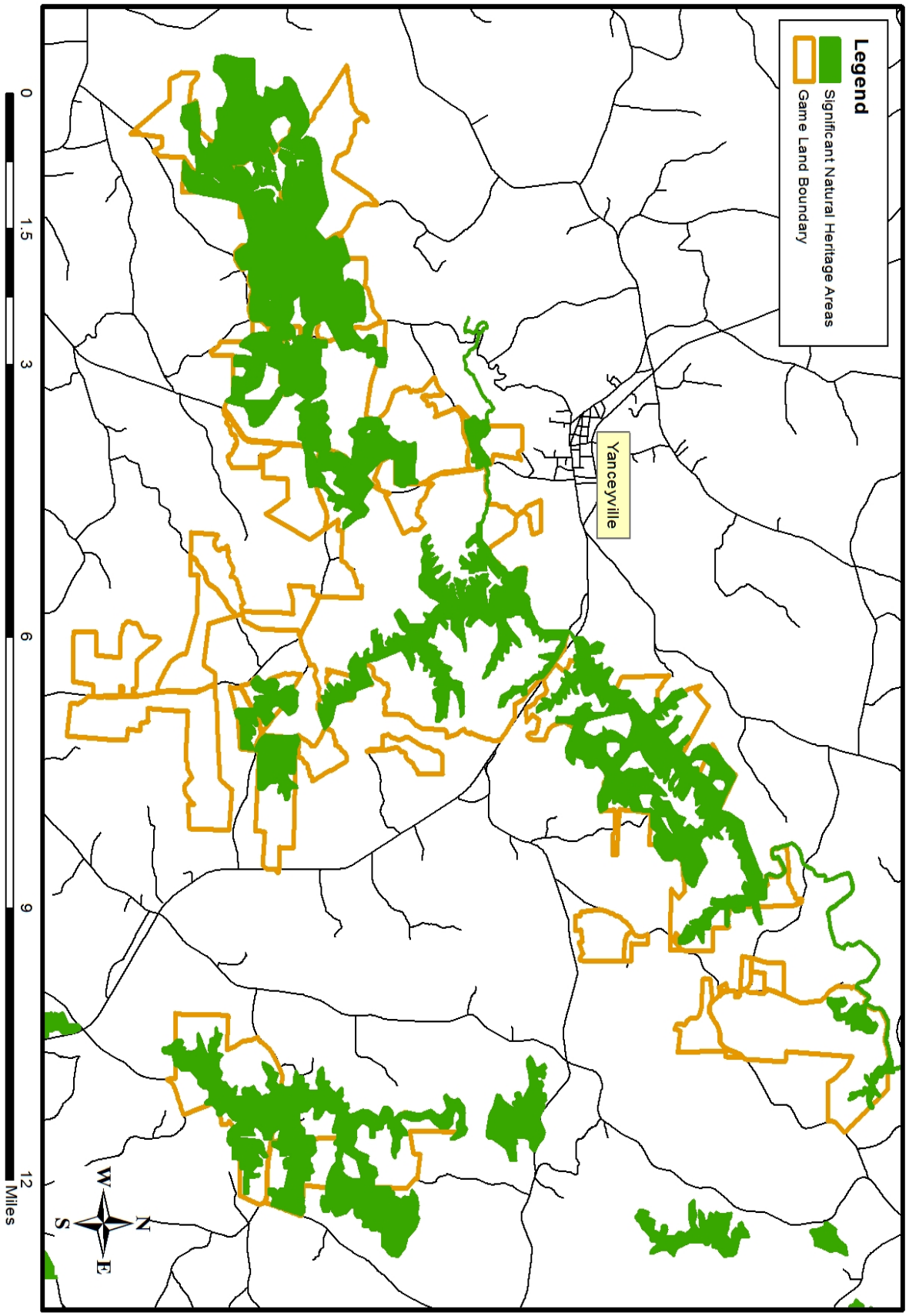
Scientific Name / Common Name	Rank Global	Rank State	Status US	Status State
Ranunculus micranthus Rock buttercup	G5	S1	-	SR
Ruellia purshiana Pursh's wild-petunia	G3	S2	-	SC-V
Scutellaria ovata sp. bracteata Heartleaf skullcap	G5T3T5	S2?	-	W7
Scutellaria serrata Showy skullcap	G4G5	S2S3	-	W1
Symphyotrichum leave var. concinnum Narrow-leaf aster	G5T4	S2	-	T
Tradescantia virginiana Virginia spiderwort	G5	S1	-	T
Trifolium reflexum Buffalo clover	G3G4	S1S2	-	T
Triosteum angustifolium Narrowleaf tinker's-weed	G5	S2?	-	W7

* = Historical records; species not observed in the county within at least 20 years. However, the species might still occur in the county and be re-discovered.

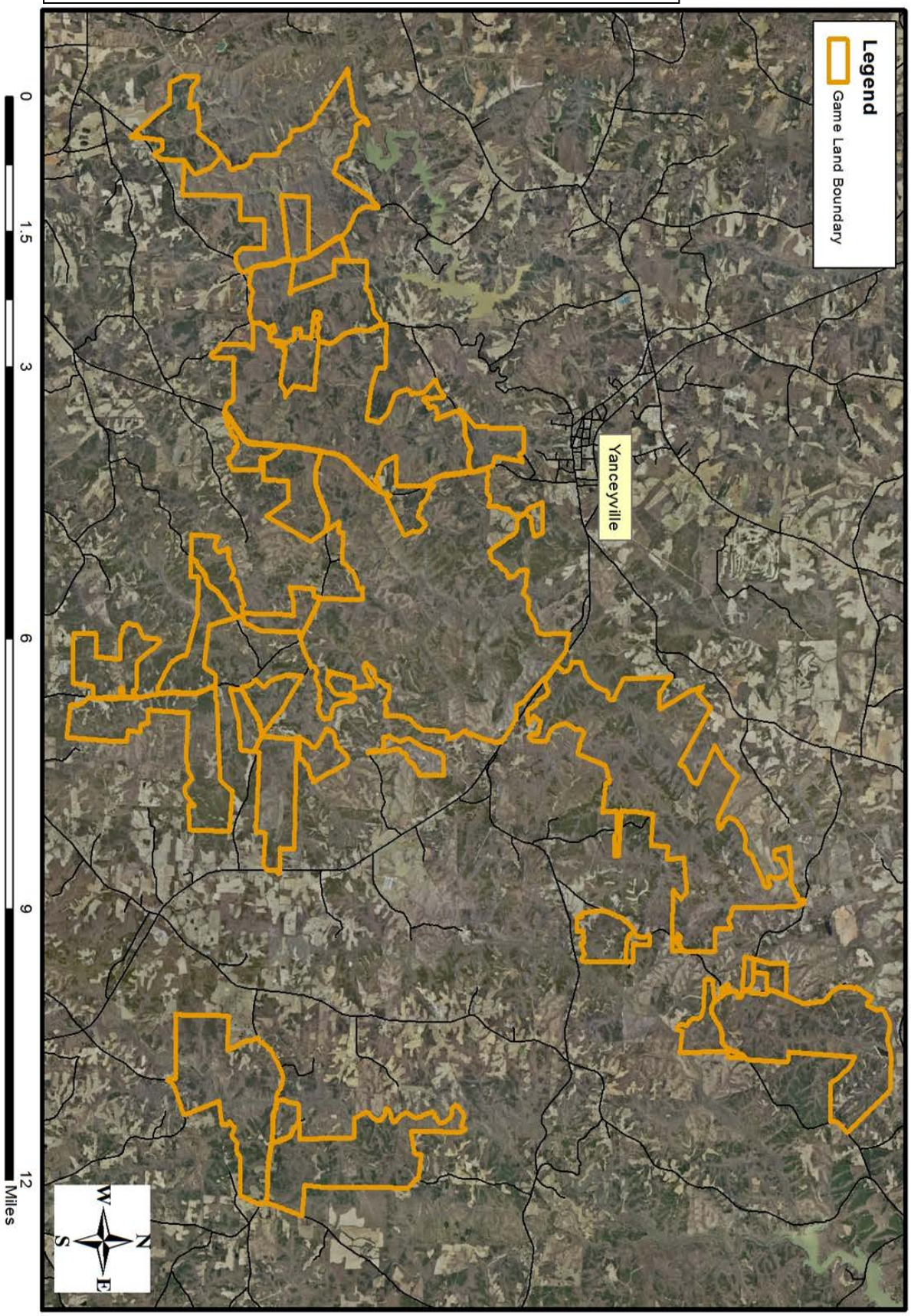
EXPLANATION OF STATUS AND RANK CODES FOR PLANTS

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.

Appendix VIII: Significant Natural Heritage Areas Map

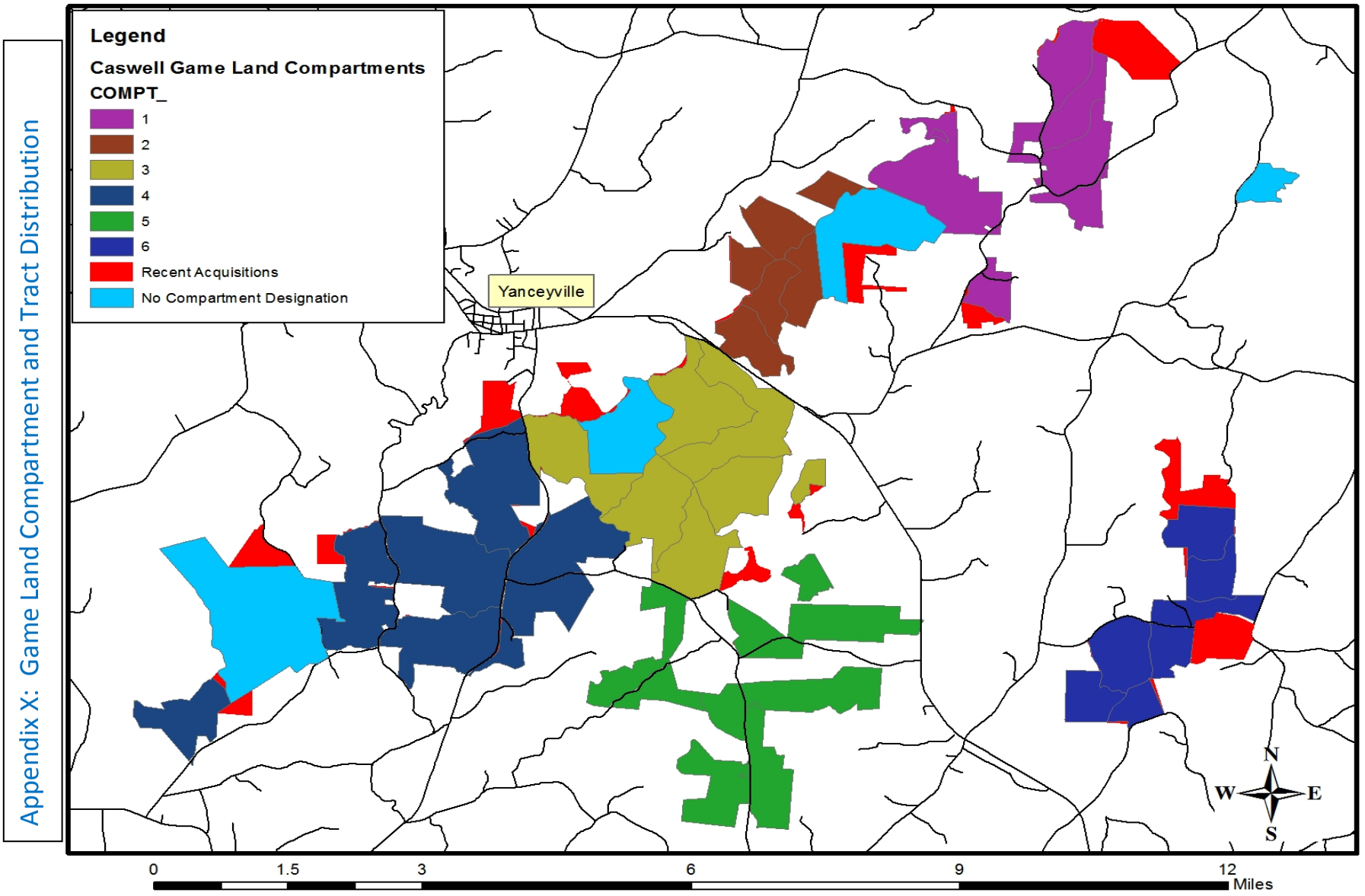


Appendix IX: Game Land Vicinity Aerial Photo

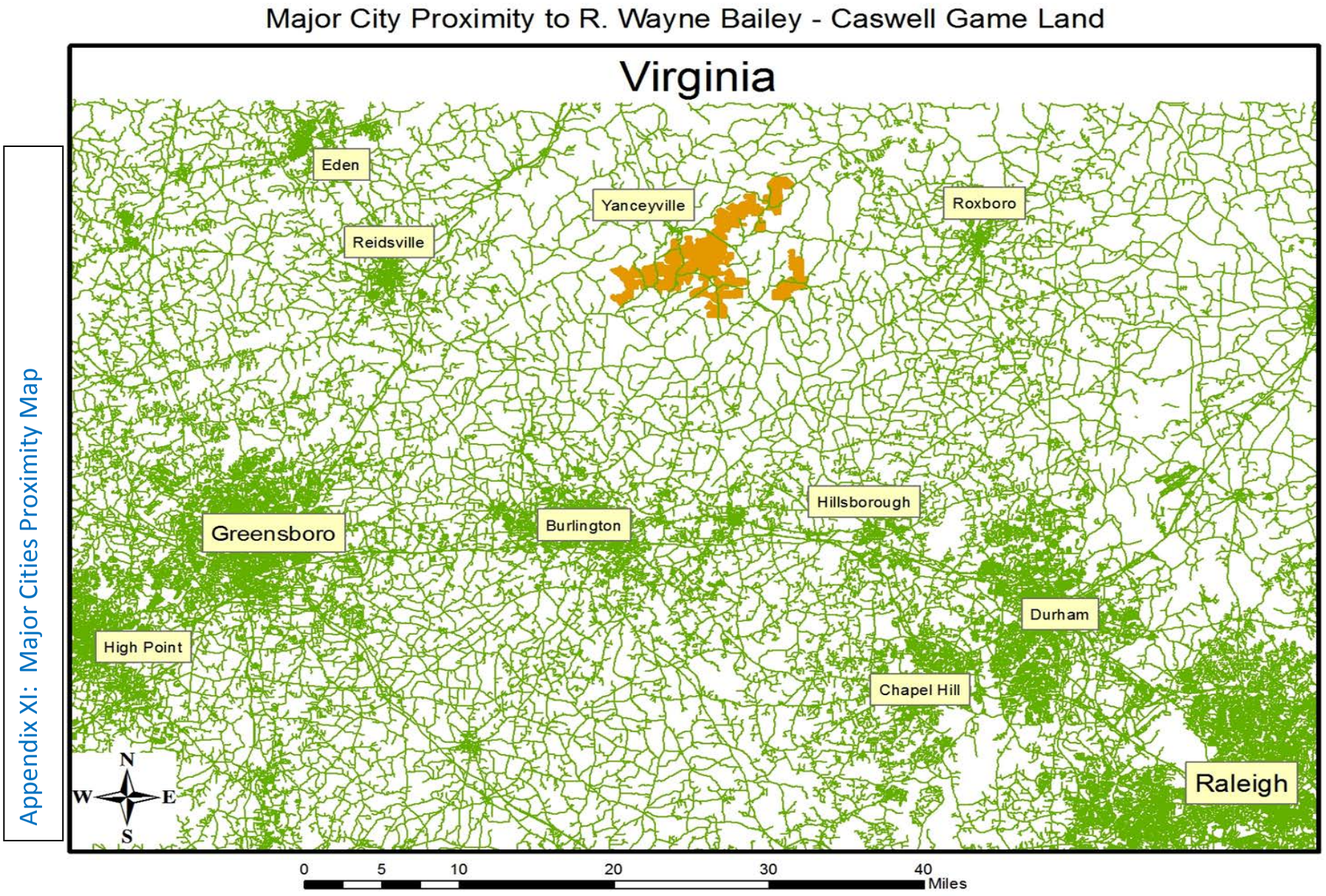


Appendix X: Game Land Compartment and Tract Distribution

R. Wayne Bailey-Caswell Game Land Compartments and Tract Distribuitions

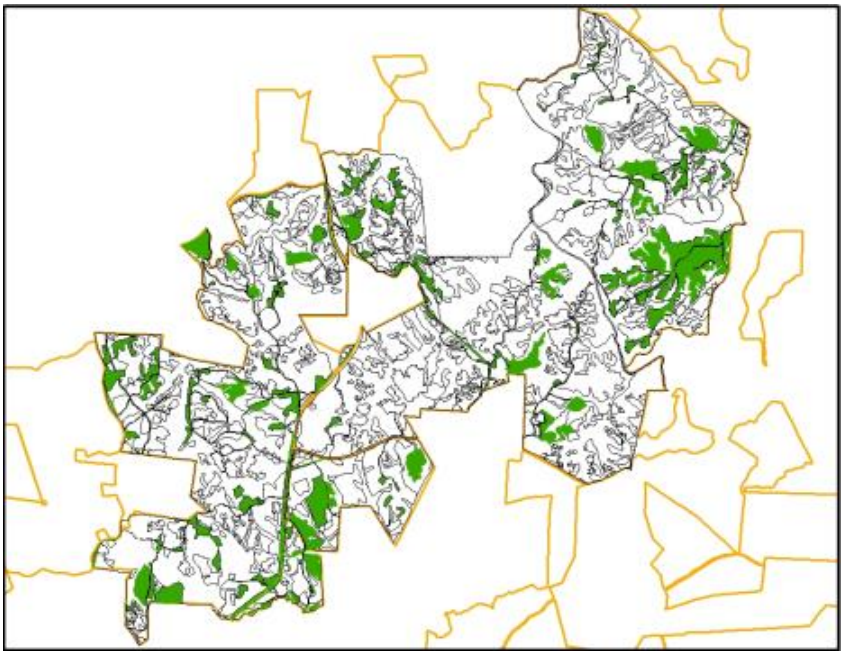


Appendix XI: Major Cities Proximity Map

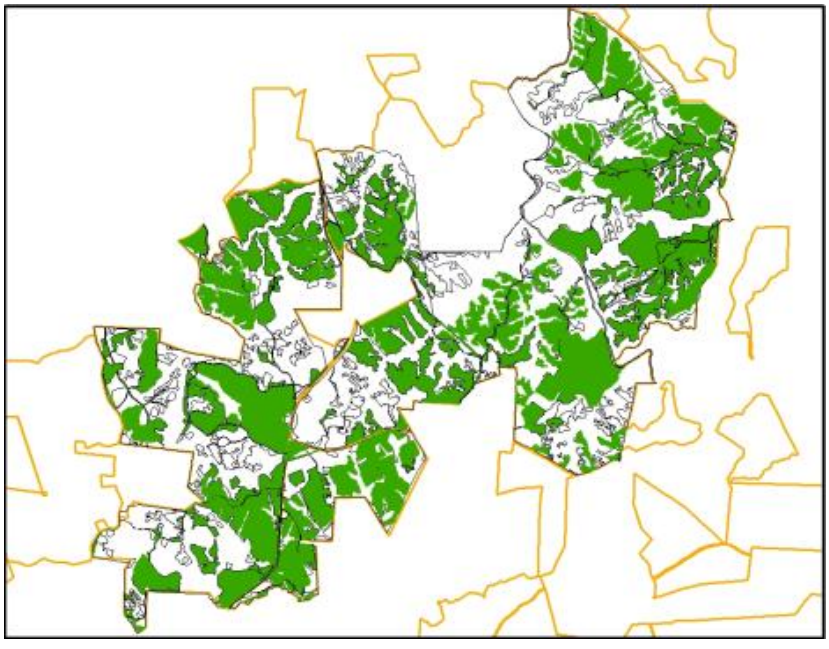


Appendix XII: CURE Habitat Suitability Progression Maps

Caswell CURE Area Habitat Suitability



2002, Before CURE Initiation (<10% Useable Habitat)



2012, After Final CURE Phase (>39% Useable Habitat)

Appendix XIII: NCWAP Priority Species Lists by Habitat

Priority species associated with piedmont dry coniferous woodlands:

Group	Scientific Name	Common Name	State Status (Federal Status)
Birds	*Accipiter cooperii*	Cooper's Hawk	SC
	Accipiter striatus	Sharp-shinned Hawk	SR
	Caprimulgus carolinensis	Chuck-will's-widow	
	Caprimulgus vociferus	Whip-poor-will	
	Colaptes auratus	Northern Flicker	
	Contopus virens	Eastern Wood-pewee	
	Falco sparverius	American Kestrel	
	Melanerpes erythrocephalus	Red-headed Woodpecker	
	Picoides villosus	Hairy Woodpecker	
	Sitta pusilla	Brown-headed Nuthatch	
Mammals	*Lasiurus seminolus*	Seminole Bat	
Reptiles	*Crotalus horridus*	Timber Rattlesnake	SC
	Sistrurus miliarius	Pigmy Rattlesnake	SC
	Tantilla coronata	Southeastern Crowned Snake	

Priority species associated with piedmont mesic forest:

Group	Scientific Name	Common Name	State Status (Federal Status)
Birds	*Accipiter cooperii*	Cooper's Hawk	SC
	Accipiter striatus	Sharp-shinned Hawk	SR
	Coccyzus americanus	Yellow-billed Cuckoo	
	Colaptes auratus	Northern Flicker	
	Contopus virens	Eastern Wood-pewee	
	Helmitheros vermivorus	Worm-eating Warbler	
	Hylocichla mustelina	Wood Thrush	
	Melanerpes erythrocephalus	Red-headed Woodpecker	
	Oporornis formosus	Kentucky Warbler	
	Picoides villosus	Hairy Woodpecker	
	Wilsonia citrina	Hooded Warbler	
Mammals	*Lasionycteris noctivagans*	Silver-haired Bat	SR
	Mustela frenata	Long-tailed Weasel	
	Scalopus aquaticus	Eastern Mole	
Amphibians	*Ambystoma maculatum*	Spotted Salamander	
	Ambystoma opacum	Marbled Salamander	
	Ambystoma talpoideum	Mole Salamander	SC
	Hemidactylium scutatum	Four-toed Salamander	SC
	Hyla gratiosa	Barking Treefrog	
	Hyla versicolor	Northern Gray Treefrog	SR
	Plethodon glutinosus sensustricto	Northern Slimy Salamander	
Reptiles	*Clemmys guttata*	Spotted Turtle	
	Crotalus horridus	Timber Rattlesnake	SC
	Elaphe guttata	Corn Snake	
	Eumeces laticeps	Broadhead Skink	
	Lampropeltis calligaster rhombomaculata	Mole Kingsnake	
	Terrapene carolina	Eastern Box Turtle	
	Virginia valeriae valeriae	Eastern Smooth Earthsnake	

Appendix XIII: NCWAP Priority Species Lists by Habitat (cont.)

Priority species associated with piedmont floodplain forest:

Group	Scientific Name	Common Name	State Status (Federal Status)
Birds	*Caprimulgus vociferus*	Whip-poor-will	
	Coccyzus americanus	Yellow-billed Cuckoo	
	Colaptes auratus	Northern Flicker	
	Contopus virens	Eastern Wood-pewee	
	Haliaeetus leucocephalus	Bald Eagle	T (T)
	Helmitheros vermivorous	Worm-eating Warbler	
	Hylocichla mustelina	Wood Thrush	
	Limnothlypis swainsonii	Swainson's Warbler	
	Melanerpes erythrocephalus	Red-headed Woodpecker	
	Nyctanassa violacea	Yellow-crowned Night-heron	
	Oporornis formosus	Kentucky Warbler	
	Picoides villosus	Hairy Woodpecker	
	Scolopax minor	American Woodcock	
	Wilsonia citrina	Hooded Warbler	
Mammals	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat	T
	Lasiurus seminolus	Seminole Bat	
	Myotis austroriparius	Southeastern Bat	SC
Amphibians	*Ambystoma maculatum*	Spotted Salamander	
	Ambystoma opacum	Marbled Salamander	
	Ambystoma talpoideum	Mole Salamander	SC
	Eurycea guttolineata	Three-lined Salamander	
	Hemidactylium scutatum	Four-toed Salamander	SC
	Hyla versicolor	Northern Gray Treefrog	SR
	Plethodon glutinosus sensustricto	Northern Slimy Salamander	
Reptiles	*Clemmys guttata*	Spotted Turtle	
	Clemmys muhlenbergii	Bog Turtle	T (T)
	Crotalus horridus	Timber Rattlesnake	SC
	Elaphe guttata	Corn Snake	
	Eumeces laticeps	Broad-headed Skink	
	Heterodon platirhinos	Eastern Hog-nosed Snake	
	Lampropeltis getula getula	Eastern Kingsnake	
	Terrapene carolina	Eastern Box Turtle	
	Thamnophis sauritus sauritus	Common Ribbonsnake	

Priority species associated with piedmont riverine aquatic habitat:

Group	Scientific Name	Common Name	State Status (Federal Status)
Amphibians	*Eurycea guttolineata*	Three-lined Salamander	
Reptiles	*Apalone spinifera aspera*	Gulf Coast Spiny Softshell	
	Farancia abacura abacura	Eastern Mudsnake	
	Kinosternon baurii	Striped Mud Turtle	
	Thamnophis sauritus sauritus	Common Ribbonsnake	

Appendix XIII: NCWAP Priority Species Lists by Habitat (cont.)

Priority species associated with piedmont oak forests and mixed hardwood/pine stands:

Group	Scientific Name	Common Name	State Status (Federal Status)
Birds[2]	*Accipiter cooperii*	Cooper's Hawk	SC
	Caprimulgus vociferus	Whip-poor-will	
	Coccyzus americanus	Yellow-billed Cuckoo	
	Colaptes auratus	Northern Flicker	
	Contopus virens	Eastern Wood-pewee	
	Helmitheros vermivorous	Worm-eating Warbler	
	Hylocichla mustelina	Wood Thrush	
	Melanerpes erythrocephalus	Red-headed Woodpecker	
	Picoides villosus	Hairy Woodpecker	
	Wilsonia citrina	Hooded Warbler	
Mammals	*Mustela frenata*	Long-tailed Weasel	
	Scalopus aquaticus	Eastern Mole	
Amphibians	*Ambystoma maculatum*	Spotted Salamander	
	Ambystoma opacum	Marbled Salamander	
	Hemidactylium scutatum	Four-toed Salamander	SC
	Hyla versicolor	Northern Gray Treefrog	SR
	Plethodon glutinosus sensustricto	Northern Slimy Salamander	
	Scaphiopus holbrookii	Eastern Spadefoot	
Reptiles	*Cemophora coccinea copei*	Northern Scarletsnake	
	Crotalus horridus	Timber Rattlesnake	SC
	Elaphe guttata	Corn Snake	
	Eumeces laticeps	Broad-headed Skink	
	Lampropeltis calligaster rhombomaculata	Mole Kingsnake	
	Lampropeltis triangulum elapsoides	Scarlet Kingsnake	
	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	
	Sistrurus miliarius	Pigmy Rattlesnake	SC
	Terrapene carolina	Eastern Box Turtle	
	Virginia valeriae valeriae	Eastern Smooth Earthsnake	

Priority species associated with piedmont small wetland communities:

Group	Scientific Name	Common Name	State Status (Federal Status)
Birds	*Melanerpes erythrocephalus*	Red-headed Woodpecker	
	Nyctanassa violacea	Yellow-crowned Night-heron	
Amphibians	*Ambystoma maculatum*	Spotted Salamander	
	Ambystoma opacum	Marbled Salamander	
	Ambystoma talpoideum	Mole Salamander	SC
	Ambystoma tigrinum	Eastern Tiger Salamander	T
	Eurycea guttolineata	Three-lined Salamander	
	Eurycea quadridigitata	Dwarf Salamander	SC
	Hemidactylium scutatum	Four-toed Salamander	SC
	Hyla gratiosa	Barking Treefrog	
	Hyla versicolor	Northern Gray Treefrog	SR
	Scaphiopus holbrookii	Eastern Spadefoot	
Reptiles	*Clemmys guttata*	Spotted Turtle	
	Thamnophis sauritus sauritus	Common Ribbonsnake	

Appendix XIII: NCWAP Priority Species Lists by Habitat (cont.)

Priority species associated with piedmont early successional habitats:

Group	Scientific Name	Common Name	State Status (Federal Status)
Birds	*Aimophila aestivalis*	Bachman's Sparrow	SC
	Ammodramus henslowii	Henslow's Sparrow	SR
	Ammodramus savannarum	Grasshopper Sparrow	
	Caprimulgus carolinensis	Chuck-will's-widow	
	Caprimulgus vociferus	Whip-poor-will	
	Chordeiles minor	Common Nighthawk	
	Colinus virginianus	Northern Bobwhite	
	Dendroica discolor	Prairie Warbler	
	Dolichonyx oryzivorus	Bobolink	
	Empidonax traillii	Willow Flycatcher	
	Falco sparverius	American Kestrel	
	Icterus spurius	Orchard Oriole	
	Lanius ludovicianus	Loggerhead Shrike	SC
	Scolopax minor	American Woodcock	
	Spiza americana	Dickcissel	
	Spizella pusilla	Field Sparrow	
	Sturnella magna	Eastern Meadowlark	
	Tyrannus tyrannus	Eastern Kingbird	
	Tyto alba	Barn Owl	
Mammals	*Cryptotis parva*	Least Shrew	
	Microtus pennsylvanicus	Meadow Vole	
	Mustela frenata	Long-tailed Weasel	
	Peromyscus polionotus	Old-field Mouse	SR
	Scalopus aquaticus	Eastern Mole	
	Zapus hudsonius	Meadow Jumping Mouse	
Reptiles	*Lampropeltis calligaster rhombomaculata*	Mole Kingsnake	
	Lampropeltis getula getula	Eastern Kingsnake	
	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	
	Terrapene carolina	Eastern Box Turtle	

Appendix XIV: Aquatic Fauna Chart

Taxa Group	Scientific Name	Common Name	State Status	Within NC, restricted to the Roanoke Basin (native range)
CRAYFISH (4)	*Cambarus davidi*	Carolina Ladle Crayfish		
	Cambarus diogenes	Devil Crawfish		
	Cambarus sp. C	n/a		
	Procambarus acutus	White River Crayfish		
FISH (60)	*Ameiurus brunneus*	Snail Bullhead		
	Ameiurus catus	White Catfish		
	Ameiurus melas	Black Bullhead		
	Ameiurus natalis	Yellow Bullhead		
	Ameiurus platycephalus	Flat Bullhead		
	*Amia calva**	Bowfin		
	Aphredoderus sayanus	Pirate Perch		
	Catostomus commersonii	White Sucker		
	Chrosomus oreas	Mountain Redbelly Dace		
	Clinostomus funduloides	Rosyside Dace		
	Cyprinella analostana	Satinfin Shiner		
	*Cyprinus carpio **	Common Carp		
	Dorosoma cepedianum	Gizzard Shad		
	*Dorosoma petenense **	Threadfin shad		
	Erimyzon oblongus	Creek Chubsucker		
	Esox americanus	Redfin Pickerel		
	Esox niger	Chain Pickerel		
	Etheostoma flabellare	Fantail Darter		
	Etheostoma nigrum	Johnny Darter		
	Etheostoma podostemone	Riverweed Darter	SC	X
	Etheostoma vitreum	Glassy Darter		
	Fundulus rathbuni	Speckled Killifish		
	Gambusia holbrooki	Eastern Mosquitofish		
	Hybognathus regius	Eastern Silvery Minnow		
	Hypentelium nigricans	Northern Hogsucker		
	Hypentelium roanokense	Roanoke Hogsucker		X
	Ictalurus punctatus	Channel Catfish		
	*Lepisosteus osseus **	Longnose gar		
	Lepomis auritus	Redbreast Sunfish		
	Lepomis cyanellus	Green Sunfish		
	Lepomis gibbosus	Pumpkinseed		
	Lepomis gulosus	Warmouth		
	Lepomis macrochirus	Bluegill		
	Lepomis microlophus	Redear Sunfish		
	Luxilus albeolus	White Shiner		
	Luxilus cerasinus	Crescent Shiner		X

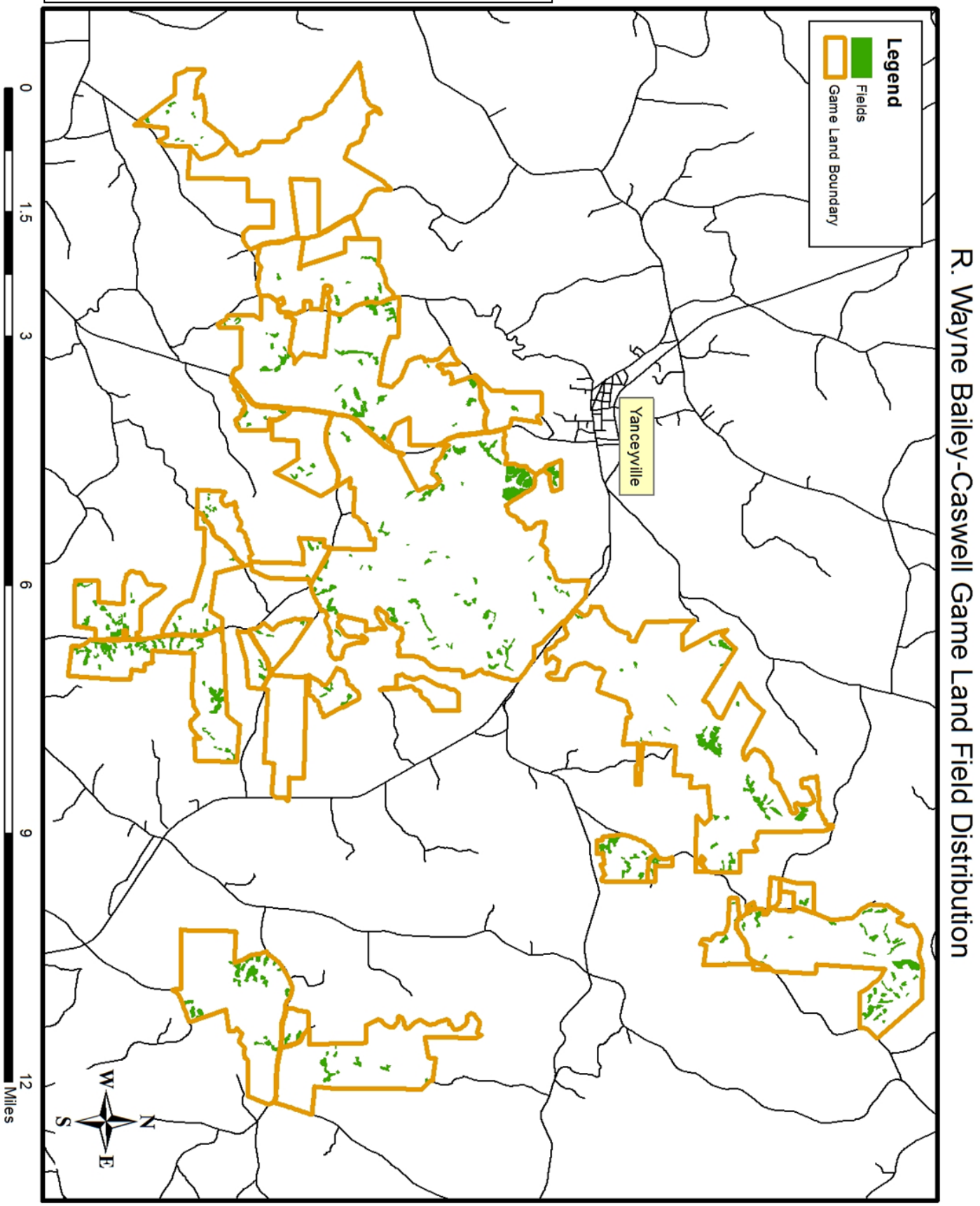
Appendix XIV: Aquatic Fauna Chart (cont.)

	Lythrurus ardens	Rosefin Shiner		X
	Micropterus salmoides	Largemouth Bass		
	Moxostoma collapsum	Notchlip Redhorse		
	Moxostoma erythrurum	Golden Redhorse		
	Moxostoma macrolepidotum	Shorthead Redhorse		
	Moxostoma pappillosum	V-lip Redhorse		
	Nocomis leptocephalus	Bluehead Chub		
	Notemigonus crysoleucas	Golden Shiner		
	Notropis alborus	Whitemouth Shiner		
	Notropis altipinnis	Highfin Shiner		
	Notropis amoenus	Comely Shiner		
	Notropis chiliticus	Redlip Shiner		
	Notropis hudsonius	Spottail Shiner		
	Notropis procne	Swallowtail Shiner		
	Noturus insignis	Margined Madtom		
	Oreochromis aureus **	Blue Tilapia		
	Perca flavescens	Yellow Perch		
	Percina nevisense	Chainback Darter		
	Percina roanoka	Roanoke Darter		
	Percina rex **(potential)**	Roanoke Logperch	**(Fed. End.)**	X
	Pomoxis nigromaculatus	Black Crappie		
	Pylodictis olivaris	Flathead Catfish		
	Semotilus atromaculatus	Creek Chub		
	Tilapia zillii **	Redbelly Tilapia		
Mussels (8)	*Alasmidonta undulata*	Triangle Floater	T	
	Elliptio complanata	Eastern Elliptio		
	Elliptio icterina	Variable Spike		
	Fusconaia masoni **(uncertain)**	Atlantic Pigtoe	E	
	Pyganodon cataracta	Eastern Floater		
	Strophitus undulatus	Creeper	T	
	Utterbackia imbecillis	Paper Pondshell		
	Villosa constricta	Notched Rainbow	SC	
Clam (2)	*Corbicula fluminea*	Asian Clam		
	Sphaerium striatinum	Striated Fingernailclam		
Snails (6)	*Campeloma decisum*	Pointed Campeloma		
	Elimia proxima	Sprite Elimia		
	Elimia symmetrica	Symmetrical Elimia		
	Helisoma anceps	Two-ridged Rams-horn		
	Leptoxis carinata	Crested Mudalia		
	Physella sp.	n/a		

* Probable and likely, especially downstream of game land stream sections

** Introduced, presumably restricted to Hyco Lake

Appendix XV: Field Distribution Map



Caswell CURE I Photo Plot Sequence

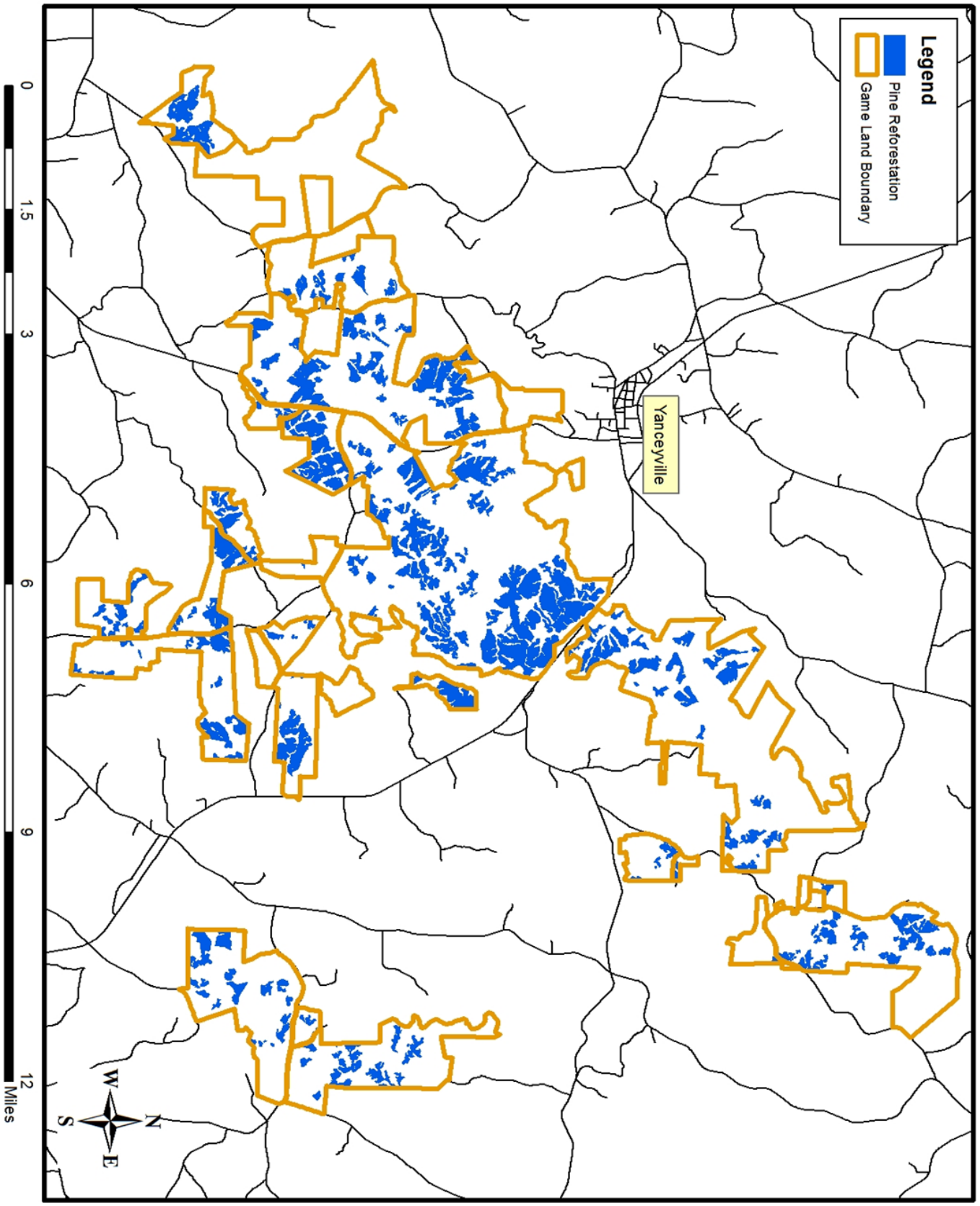
Pre-treatment

Post Harvest

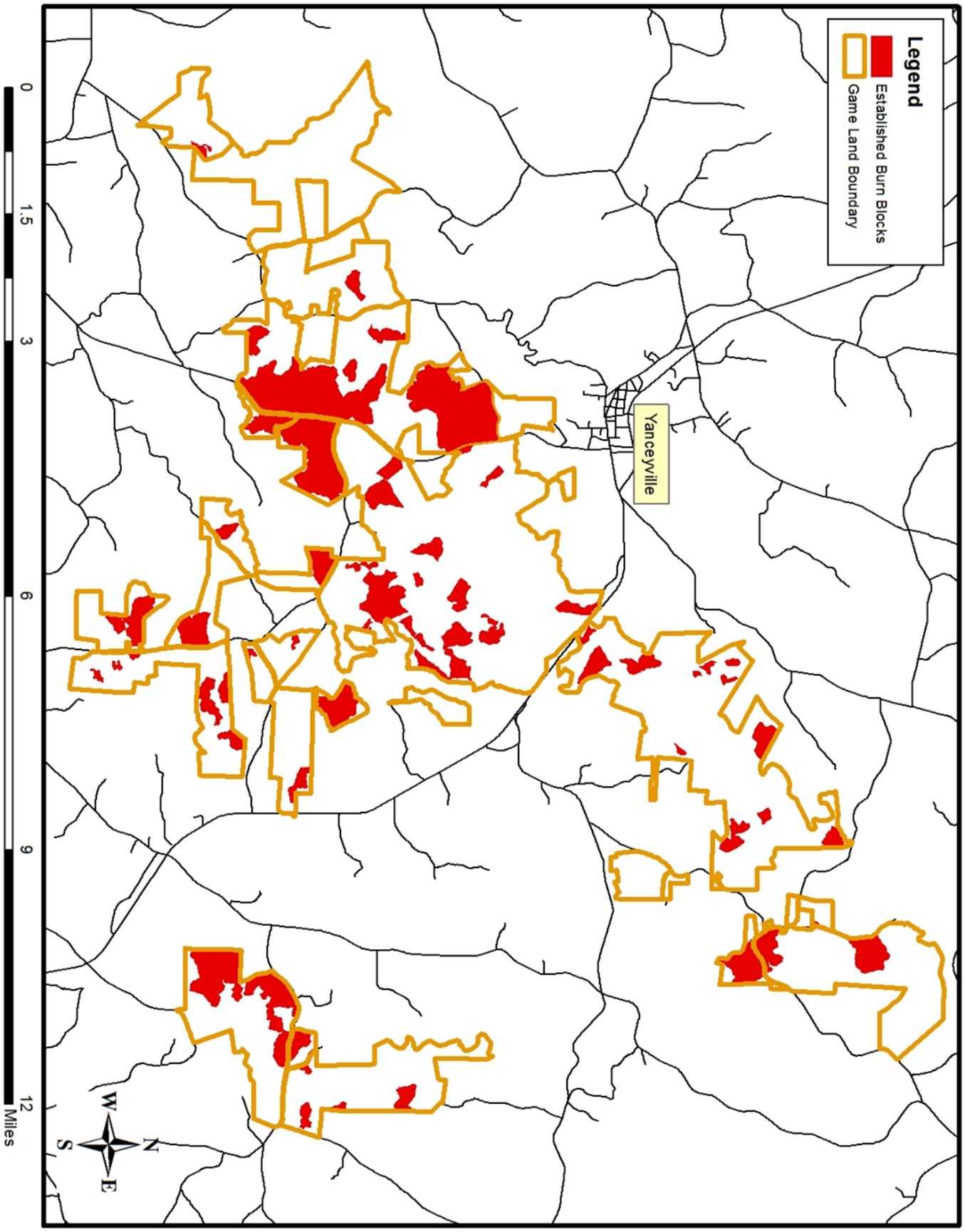
Post Burn

First Growing Season

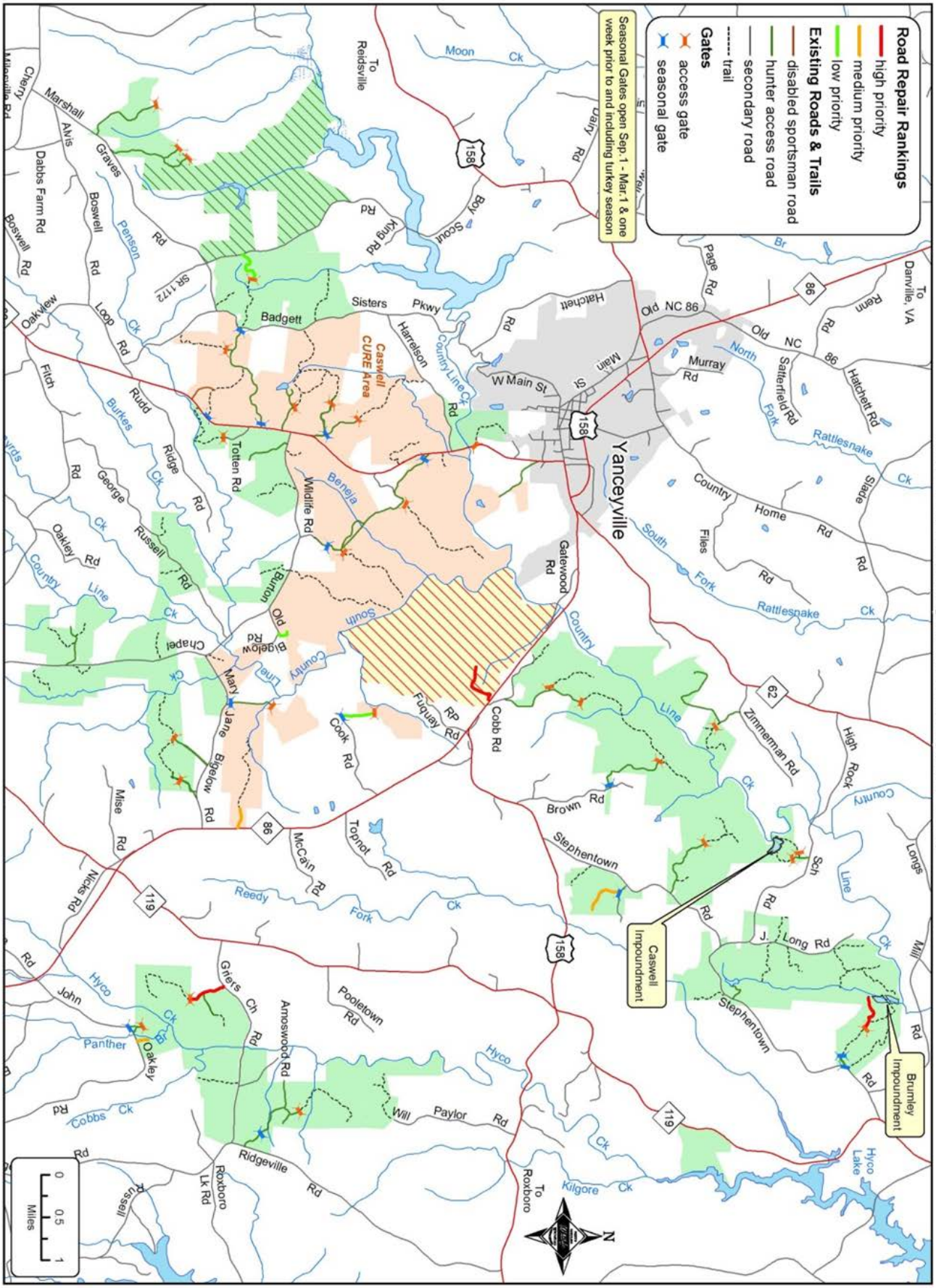
Appendix XVII: Pine Reforestation Map



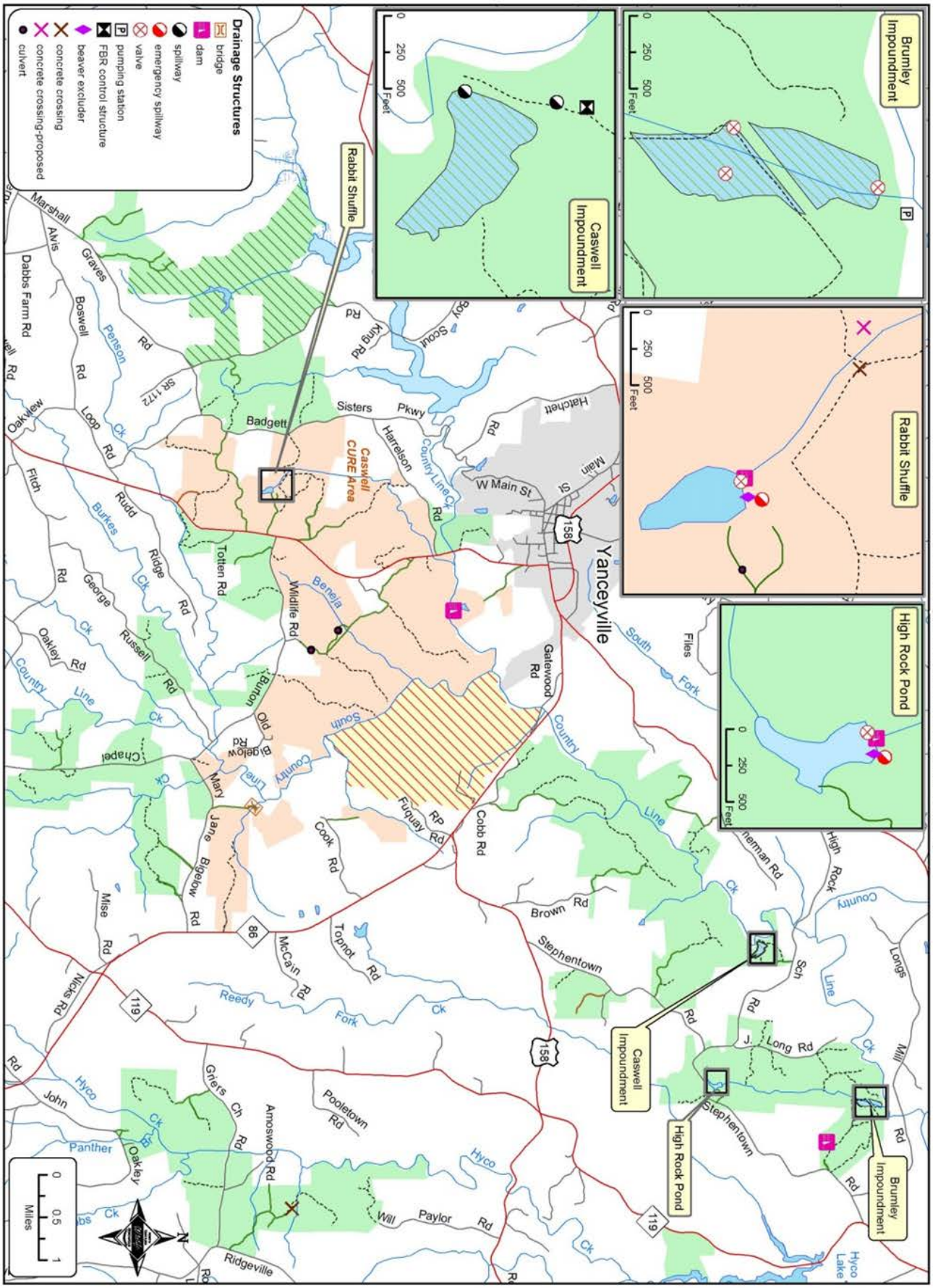
Appendix XVIII: Established Burn Blocks Map



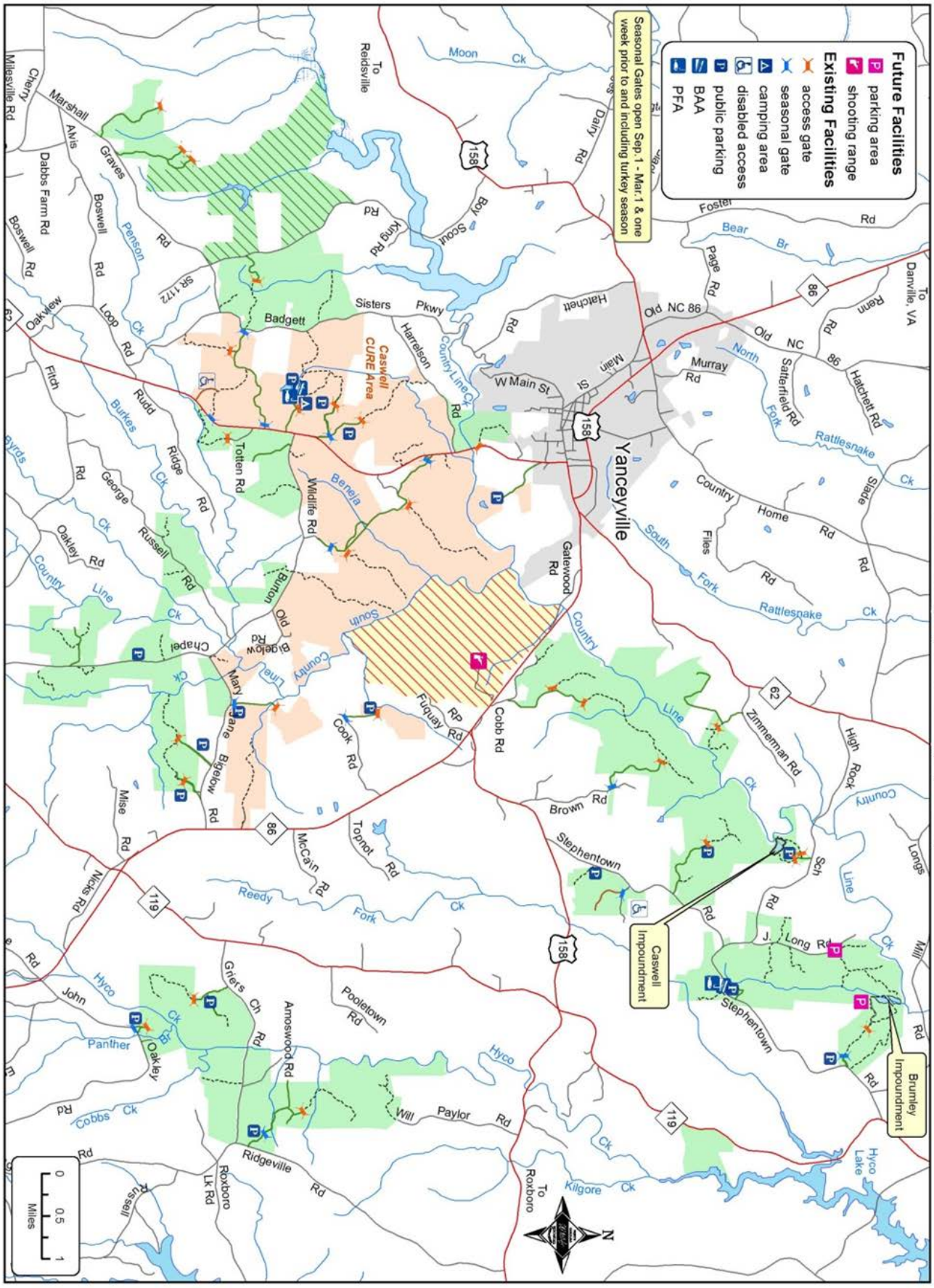
Appendix XIX: Road Infrastructure Map



Appendix XX: Drainage Infrastructure Map



Appendix XXI: Recreational Facilities Infrastructure Map



R. WAYNE BAILEY-CASWELL GAME LAND - RECREATIONAL FACILITIES
Northern Piedmont Ecoregion, Caswell County (17,974 acres)

Caswell Game Land

CURE Area Management Plan

February 10, 2004

Caswell Game Land CURE Area Management Plan

I. Introduction

Statewide CURE Program: The North Carolina Wildlife Resources Commission is initiating a new approach to small game management, referred to as the CURE Program – an acronym for Cooperative Upland-habitat Restoration and Enhancement. The Wildlife Commission's objective is to increase populations of quail and other wildlife species that depend on brushy and weedy habitats by intensively managing on a landscape scale. The CURE Program affects management on both public and private lands. On private lands, three general areas with a suitable mixture of agriculture and woodlands have been identified upon which to focus CURE efforts. Public land CURE efforts will be focused on selected portions of Caswell Game Land, Sandhills Game Land, Suggs Mill Pond Game Land, and South Mountains Game Land. Due to the lack of agricultural operations on the game lands, efforts there will be dominated by forestry practices.

Caswell Game Land: Caswell Game Land has been selected as the game land in the Northern Piedmont portion of the state to demonstrate management of early successional habitats for the benefit of quail, and various other associated small game and nongame species. Caswell Game Land lies in Caswell County, which is located in the northern central region of the state on the North Carolina and Virginia border. It is a 16,632 acre mosaic of hardwood forests, upland pine stands, small fields, and abandoned farms. A multitude of creeks, small streams and steep ravines dissect the landscape. At present, the game land is less than ten percent early successional habitat and has low numbers of quail, rabbit, and other associated species that depend on these habitats. The game land does provide habitat for deer, turkey, and squirrels and general abundance of these species is good. To achieve the overall goals of developing and maintaining early successional habitats, a large amount of acres will be affected and some unique challenges will have to be overcome.

II. Goals

1. To increase the populations of bobwhite quail, songbirds, and other flora and fauna species that are dependent on early successional habitats by intensively managing forested habitat and openings on a landscape scale.

2. To emphasize connectivity of early successional habitats and/or provide early successional areas located in close proximity.

3. To conduct periodic surveys of wildlife and vegetation to measure changes in populations of small game and other associated wildlife species.

III. Objectives

1. To develop and maintain 51% of the Caswell CURE Area as early successional habitat through timber harvest, herbicide application, prescribed burning, and field/opening management.

    a. Reduce basal area of mature loblolly and shortleaf pine stands to 40 ft^2/acre.
    b. Clear-cut Virginia pine stands and regenerate using methods that will maximize brushy and weedy components.
        1. Replant loblolly pine at 290 trees/acre
        2. Utilize herbicides to reduce hardwood competition and promote grasses, legumes, and forbs
        3. Initiate prescribed fire on a 2-3 year rotation when plantations are eight years old
    c. Develop forest openings from 5% of current hardwood stands and strategically locate openings to connect other areas of early successional habitat.
    d. Develop “oak savannahs” from 5% of current hardwood stands and strategically locate savannahs to connect other areas of early successional habitat.
    e. Manipulate fields with agricultural methods, fallow rotations, and prescribed fire to maximize early succession benefits.

2. To increase the number of bobwhite quail coveys heard in the fall covey-count survey from 0 to 10 each year.

3. To increase herbaceous plant cover in treated areas by 75%.

IV. Caswell CURE Program

Area Description: A core portion of the Caswell Game Land, comprising 5,803 acres, has been selected as the Caswell CURE Area (Figure 1). The area lies between Highway 86 and Old Highway 62 and is centrally located around the Caswell Wildlife Management Depot. The CURE Area has been divided into seven management units, ranging in size from 454 to 1,228 acres (Figure 2).

Habitat Composition: The Caswell CURE Area is comprised of six different habitat types (Figure 1). Hardwood forest is by far the dominant cover type, occupying 51.1% (2965.4 acres) of the acreage. Substantial areas of pine stands and younger pine plantations occur as well, chiefly on the upland ridges. Pine stands account for 31.2% (1811.7 acres) of the area; pine plantations account for 10.4 % (606.4 acres). The field habitat type includes hay fields (leased to private farmers), agricultural fields, and fallow fields. Fields account for 3.6% (207.7 acres) of the area. Hardwood/pine stands are the least dominant cover type with 0.6% (33.0 acres) of the acreage. All other areas, to include wildlife pens, developed areas, gas lines, power lines and water, account for 3.1% (179.0 acres) of the CURE Area. Some of the linear areas, such as power lines or gas lines, may effectively link other areas of suitable habitat, but management options will be limited.

V. Habitat Management Prescriptions

The Caswell CURE Area has been divided into seven management units to facilitate the prescription and implementation process. With only a few exceptions, habitat composition among the seven units is relatively uniform (Table 1). CURE management activities began on Unit I in 2001, and timber management activities addressing necessary changes will continue to be initiated on one unit each

fiscal year (July – June) through 2007. Management activities within a given unit will take several years to accomplish:

Year 1: Evaluate timber stands, prepare written timber prescriptions.
Year 2: Mark timber, execute timber sales, timber harvesting operations begin.
Year 3: Timber harvesting operations complete, begin constructing new firelines as needed. Begin any work necessary for fields to achieve CURE goals.
Year 4: Construct new firelines as needed. No burning in first winter for thinned pine stands – allow time for fine fuels to accumulate. Clearcut areas may lie dormant for one year if site preparation herbicide treatment is needed, or be burned, planted and receive a release spray the second growing season if no site preparation is needed. Complete field management activities.
Year 5: Construct new firelines as needed. Begin prescribe burning in thinned areas. Herbicide spray, burn, and plant clearcut areas needing site preparation.

The six different cover types within the management units will all receive specific prescriptions:

Field – In November 2003, detailed prescriptions were prepared for all fields in the CURE Area. Each CURE field will be managed as one of five types based on its size, proximity to other areas, and potential for early successional habitat. Fields that are leased to private farmers or managed for dove hunts (58.7 acres), will not be managed under CURE. The five types of CURE field management are:

1. Successional Disking – One third of the field will be disked each year, two-thirds will remain fallow, disked section will change each year.
2. Annual Plantings – Fields planted with milo, millets, partridge pea, small grains, lespedezas, vetch, clover, peas, or beans.
3. Perennial Plantings – Fields planted with perennial lespedezas or clover. Periodic maintenance consisting of mowing, seeding, fertilizing, and liming will be needed.
4. Warm Season Grass – Fields planted with switchgrass, indiangrass, Atlantic coastal panicgrass, little bluestem, or big bluestem. Periodic maintenance consisting of burning, mowing, or disking will be needed.
5. Orchards – These are fields that have been previously planted with fruit trees or mast producing trees. Mowing and/or disking around trees will help maintain early successional cover.

Hardwood – Selective timber harvest, clearcutting, and prescribed fire will be used on 10% of the hardwood stands to promote brushy and weedy habitats more beneficial to quail and other small game. The goal will be to create a patchwork of oak savannas and openings that link up other areas of early successional habitat.

Hardwood/Pine – Selective timber harvest, clearcutting, and prescribed fire will be used to promote more brushy and weedy habitats.

Pine – Changes in management of pine stands represent the greatest opportunity for increasing populations of early successional species. The older stands of loblolly and shortleaf will be thinned to reduce basal area to 40 ft^2/acre. Opening up the canopy in this way and conducting prescribed burns to reduce the duff layer will allow more sunlight to reach the forest floor, thereby stimulating the growth of grasses, legumes, and forbs.

Areas with a heavy component of Virginia pine will be clearcut and regenerated using methods that will maximize the amount of brushy and weedy cover. Replanting will be with loblolly pine seedlings on a very wide spacing (10' x 15'). Herbicides will be utilized to reduce competition from encroaching Virginia pine and unwanted hardwoods and to promote growth of grasses and legumes. Prescribed fire will be integral in maintaining a fairly open tree canopy and herbaceous groundcover. Burning goals will aim for a 2-3 year rotation beginning when plantations are eight years old.

Pine Plantation – This habitat type includes planted loblolly pine stands from 1 – 30 years of age. Currently, the younger age stands (2 – 10 years) have high to moderate amounts of herbaceous groundcover, and offer excellent habitat for quail, small game, and other associated species. In the past, these plantations have been established at planting densities greater than what is desired under the CURE Program. Thus, most of the plantations older than 10 years have begun to decline markedly in providing brushy and weedy cover. Prescribed fire will be utilized in these areas to thin out some of the competing stems and to promote more herbaceous and grassy cover in the understory. Roller-drum chopping and/or pre-commercial thinning will be used in areas where fire alone does not reduce the number of stems/acre sufficiently.

Other – Linear areas within this cover type (such as power lines, gas lines, and road shoulders) will be used to effectively link other areas of suitable habitat. They will be maintained with plantings, successional disking, or mowing.

Detailed figures regarding the implementation of the CURE Program and accomplishments to date are given in Figures 3 – 10 and Tables 2 – 9. By 2012, CURE activities will have affected approximately 1,513 acres of pine and hardwood/pine forest, 1,853 acres of burn blocks, 52 miles of firelines, and 149 acres of fields (Table 9). Since this is a dynamic plan, these figures and tables will have to be updated yearly as prescriptions are implemented and exact number of acres affected are measured. The habitat composition within the Caswell CURE Area currently provides 9.5% of the acreage in early succession, but will provide 51% in early successional habitats after all management prescriptions are complete (Table 10). Maintaining these habitats in an early succession state will require the most man-days and present the greatest challenges.

VI. Surveys

Surveys will be used to monitor the response of both wildlife and vegetation to our management actions. Detailed protocols for all surveys may be obtained from the N.C. Wildlife Resources Commission. The following surveys are being conducted:

Bobwhite Quail Call Counts – There are two standard 20 mile quail call count routes used for Caswell Game Land. These routes are part of the statewide quail survey, with only a few points within the CURE Area. This survey is conducted three times per year during the period of June 15 – 30.

Bobwhite Quail Fall Covey Counts – The fall covey-call surveys will index and monitor the number of quail coveys using the CURE Area. This survey is conducted annually, on two consecutive days, during the second or third week of October. There are 14 points established on the Caswell CURE Area (Figure 11).

Spring Songbird Point Count – This survey will monitor bird population trends over time and measure landscape scale population response to habitat manipulation. A fixed interval route with 26 points has been established on the Caswell CURE Area (Figure 11).

Winter Songbird and Vegetation Survey – The CURE early successional habitat improvements being implemented are providing important winter cover for some species of songbirds and may be influencing the density and distribution of wintering birds. For this reason, these two surveys have been added for the CURE Area and will be conducted during the winter of 2004 and each year thereafter. The winter songbird survey has three main objectives:

1. Identify the species of birds using CURE habitat areas in winter.
2. Evaluate the impacts of CURE habitat work on the diversity and abundance of selected wintering birds.
3. Compare the relative value of the different treatment types for wintering birds.

The objectives of the vegetation survey are:

1. Correlate vegetation structure with bird presence and abundance. For example, compare vegetation measurements from transects where certain bird species were detected with transects where they were not detected to give an idea of what structure we need to manage for to benefit a given species.
2. Provide an objective measure of habitat quality. These measurements could be used to determine if a given habitat patch was "useable space" for quail or other birds.
3. Describe in very general terms the composition and structure of habitat improvement areas, and how they compare to unimproved areas.

Summer Vegetation Survey – The summer vegetation survey will measure amounts of cover during the growing season and has objectives that are similar to the winter vegetation survey. The objectives are as follows:

1. Describe the habitat improvement areas in terms of dominant vegetation and structure.
2. Evaluate the suitability of habitat improvement areas as nesting cover and escape cover.
3. Compare the suitability of habitat improvement areas between treatments.

Useable Habitat Survey – The useable habitat survey is designed to meet the objectives of determining the minimum required number of fall covey survey stations and to track changes in habitat available to quail in order to help illuminate the bird response. The survey allows us to answer several important questions, including:

1. Is the habitat available to quail in the breeding season or the non-breeding season, and which habitat type is most limiting for quail?
2. How much of the available habitat was created by CURE, and how much was created outside of our activities?
3. What is the composition of useable and non-useable habitats in the landscape (i.e. forestland, cropland, fallow areas, etc)?

This survey will be updated every October and will consider the status of each stand over the previous 12 months. Habitat will be classified as "useable" or "not-useable". The "useable" habitat will be further broken down into three categories: "breeding only", "non-breeding only", and "most of year". Figure 12 shows the results of the most recent useable habitat survey.

VII. Personnel and Budget Schedules

The Caswell Wildlife Management Depot currently has a three person crew and adequate equipment to handle most game land activities. However, additional personnel and equipment will be needed to accomplish planned CURE management activities. The following resources are requested:

1. Two temporary employees to assist in prescribe burning and timber marking each year (January – June). Temporary personnel will supplement permanent employees and assist in the expanded burning and timber marking goals developed for the CURE Area.
2. A new crawler tractor with fire plow and a new slip-on pumper unit. With the increased amount of prescribe burning planned, proper suppression equipment is mandatory for the safety of personnel and the resources.
3. New aerial photography and a forest inventory will be greatly needed when all of the management treatments are complete. This should be completed by 2009.

Man-days and expenditures have been projected through the year 2012 for the major CURE activities (Table 11). Anticipated revenue from CURE timber sales and the cost for additional personnel and equipment have also been projected (Table 12).

VIII. Tables and Figures

Figure 1: Caswell CURE Area

Figure 2: Caswell CURE Area, Management Units

Table 1: Habitat composition of management units for the Caswell CURE Area

Figure 3 – 10: Implementation schedules for CURE Units I – VII showing timber harvest accomplishments, field management strategy, and location of established burn blocks

Tables 2 – 9: CURE Units I – VII planned management activities

Table 10: Caswell CURE Area habitat composition and percentage of area in early successional habitats before CURE management changes, and anticipated habitat composition after CURE (approximately 10 years) management changes are implemented

Figure 11: Locations of survey points for bobwhite quail fall covey counts and spring songbird point counts on the Caswell CURE Area

Figure 12: Habitat suitability for the Caswell CURE Area for October 1, 2003 through September 30, 2003

Table 11: Man-days and Expenditures for Major CURE Activities

Table 12: Timber Sale Revenues and Additional Costs

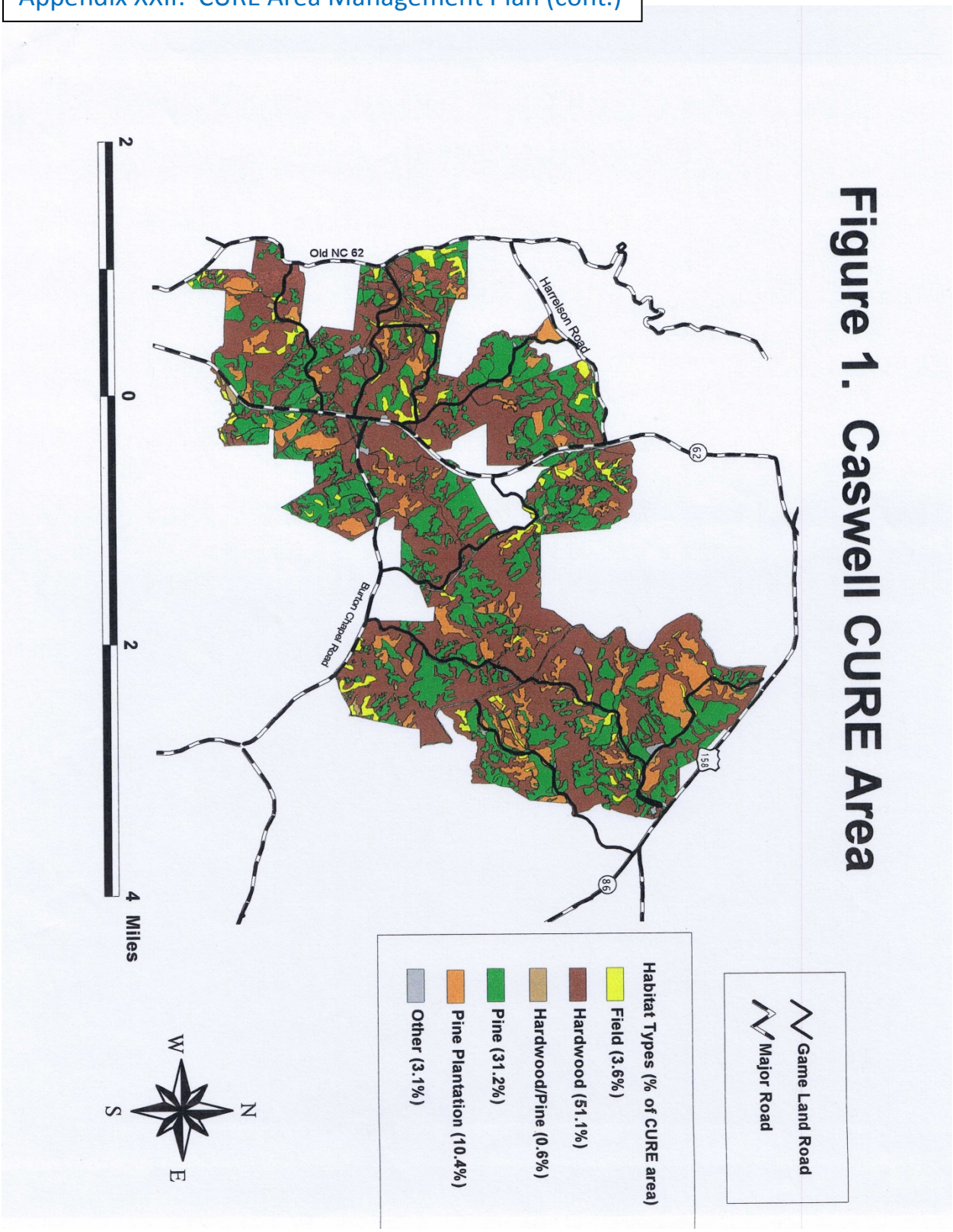


Figure 1. Caswell CURE Area
Old NC 62
Harrelson Road
Burton Chapel Road
62
158
86
Game Land Road
Major Road
Habitat Types (% of CURE area)
Field (3.6%)
Hardwood (51.1%)
Hardwood/Pine (0.6%)
Pine (31.2%)
Pine Plantation (10.4%)
Other (3.1%)
2
0
2
4 Miles
N
E
S
W

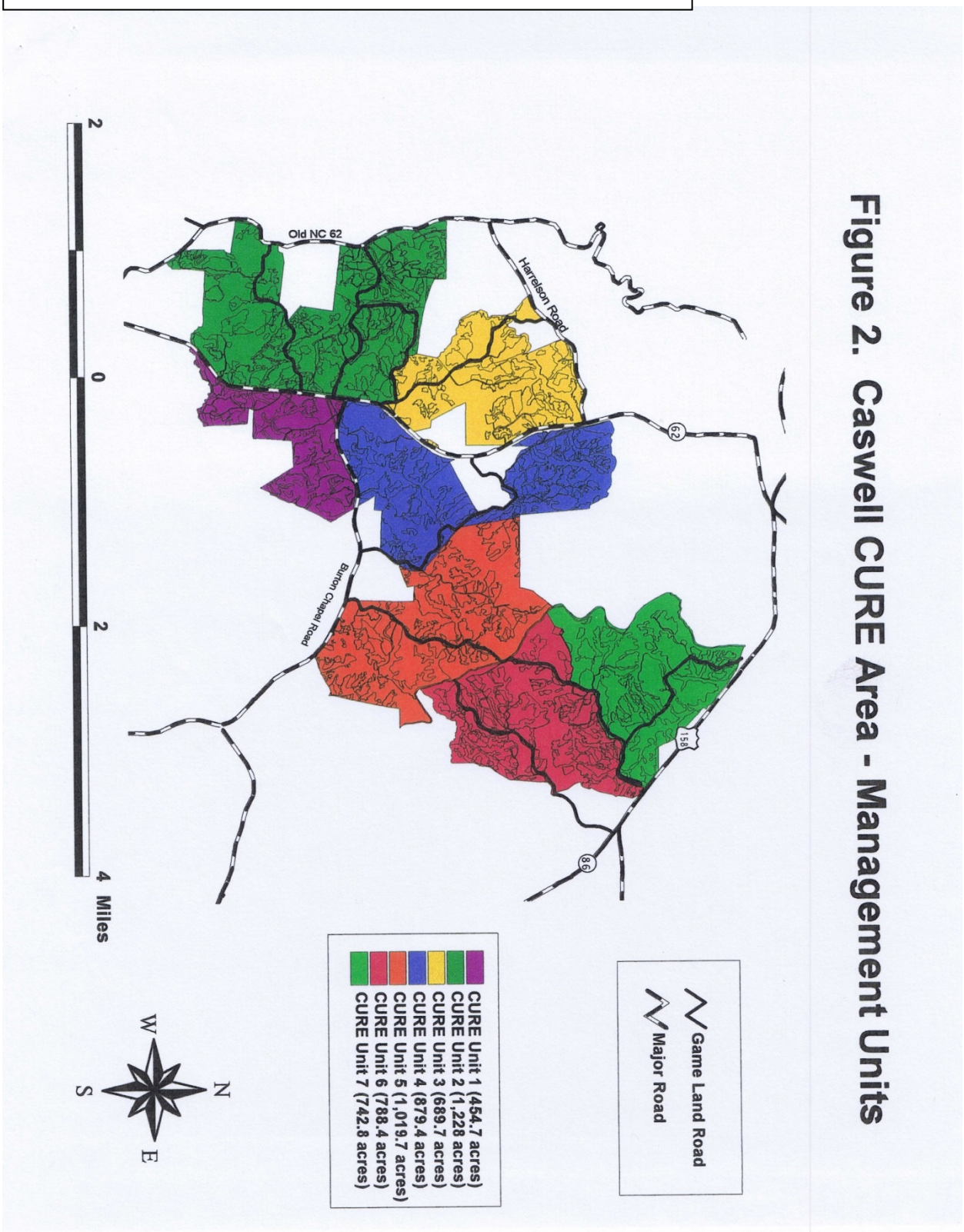


Figure 2. Caswell CURE Area - Management Units

Table 1. Habitat composition of management units for the Caswell CURE area. Habitat type and acreage determined with an ArcView GIS developed from 2002 aerial images and ground-truthing.

Habitat Type		CURE Management Unit 1	2	3	4	5	6	7	Total
Field	acres	14.3	68.4	19.0	35.3	31.2	30.4	9.1	207.7
	%	3.1	5.6	2.8	4.0	3.1	3.9	1.2	3.6
Hardwood	acres	143.6	671.0	352.0	487.4	605.0	384.4	322.0	2965.4
	%	31.6	54.6	51.0	55.4	59.3	48.8	43.3	51.1
Hardwood/ Pine	acres	5.1	5.5	5.2	4.8	8.4	1.1	2.9	33.0
	%	1.1	0.4	0.8	0.5	0.8	0.1	0.4	0.6
Pine	acres	215.6	328.8	247.0	282.3	262.6	242.3	233.1	1811.7
	%	47.4	26.8	35.8	32.1	25.8	30.7	31.4	31.2
Pine Plantation	acres	60.2	106.3	45.8	47.4	87.6	109.7	149.4	606.4
	%	13.2	8.7	6.6	5.4	8.6	13.9	20.1	10.4
Other	acres	15.9	48.5	20.7	22.2	24.9	20.5	26.3	179.0
	%	3.5	3.9	3.0	2.5	2.4	2.6	3.5	3.1
Total	acres	454.7	1228.5	689.7	879.4	1019.7	788.4	742.8	5803.2
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 2. Cure Unit I planned management activities.

CURE Unit: I
Total Acres: 455

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Timber Harvest	Proposed													
	Prescribed		130											
	Marked/Sold			173										
	Clearcut				128									
	Thin				45									
	Re-plant					128								

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	7	7	7	7	7	7	7	7	7	7	7	7	7
	New Thinnings	0	0	0	0	0	45	45	45	45	45	45	45	45
	Old Unburned Thinnings	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Planted Pine	0	0	41	41	41	41	41	60	60	60	60	60	188
	Burning Total	7	7	48	48	48	94	94	113	113	113	113	113	241

Miles of Fireline

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Firelines	Established Lines	1	1	1	1	1	4	4	4	4	4	4	4	4
	New Lines	0	0	0	0	3	0	0	0	0	0	0	0	0
	Total	1	1	1	1	4	4	4	4	4	4	4	4	4

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	0	0
	Annual Plantings	0	0
	Perennial Plantings	4	5
	Warm Season Grass	3	4
	Orchard	0	0
	Field Total	7	9

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

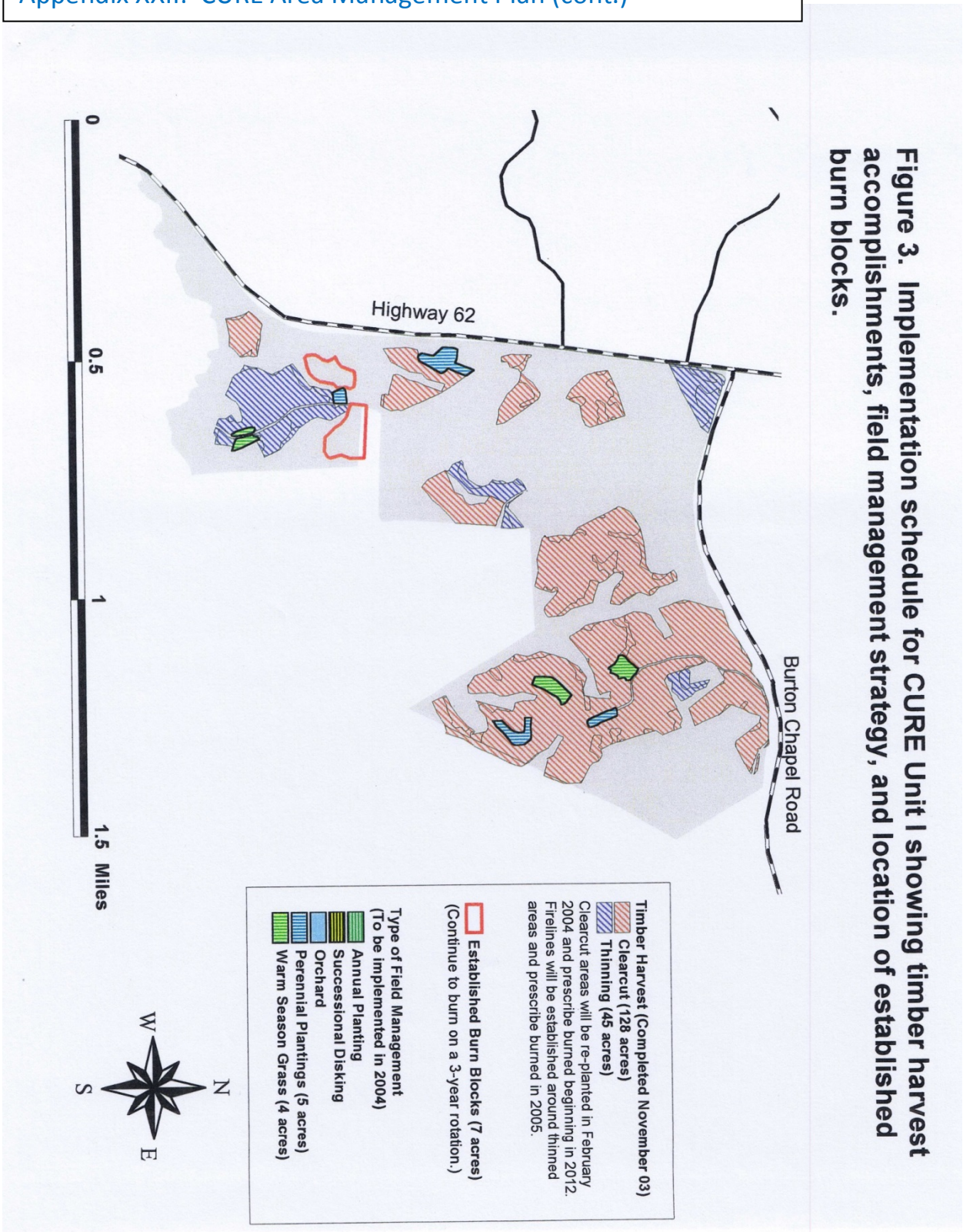


Figure 3. Implementation schedule for CURE Unit I showing timber harvest accomplishments, field management strategy, and location of established burn blocks.

Table 3. CURE Unit II planned management activities.

CURE Unit: II
Total Acres: 1229

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Timber Harvest	Proposed													
	Prescribed			148										
	Marked/Sold				179									
	Clearcut					133								
	Thin					46								
	Re-plant						133							

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	140	140	140	140	140	140	140	140	140	140	140	140	140
	New Thinnings	0	0	0	0	0	0	46	46	46	46	46	46	46
	Old Unburned Thinnings	15	15	15	15	15	15	15	15	15	15	15	15	15
	New Planted Pine	41	41	41	65	87	87	87	87	87	96	96	96	96
	Burning Total	196	196	196	220	241	241	287	287	287	296	296	296	296

Miles of Fireline

Firelines	Established Lines	3	3	3	3	3	3	10	10	10	10	10	10	10
	New Lines	0	0	0	0	0	7	0	0	0	0	0	0	0
	Total	3	3	3	3	3	10	10	10	10	10	10	10	10

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	7	20
	Annual Plantings	4	6
	Perennial Plantings	6	14
	Warm Season Grass	2	3
	Orchard	0	0
	Field Total	19	43

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

Figure 4. Implementation schedule for CURE Unit II showing timber harvest areas, field management strategy, and location of established burn blocks.

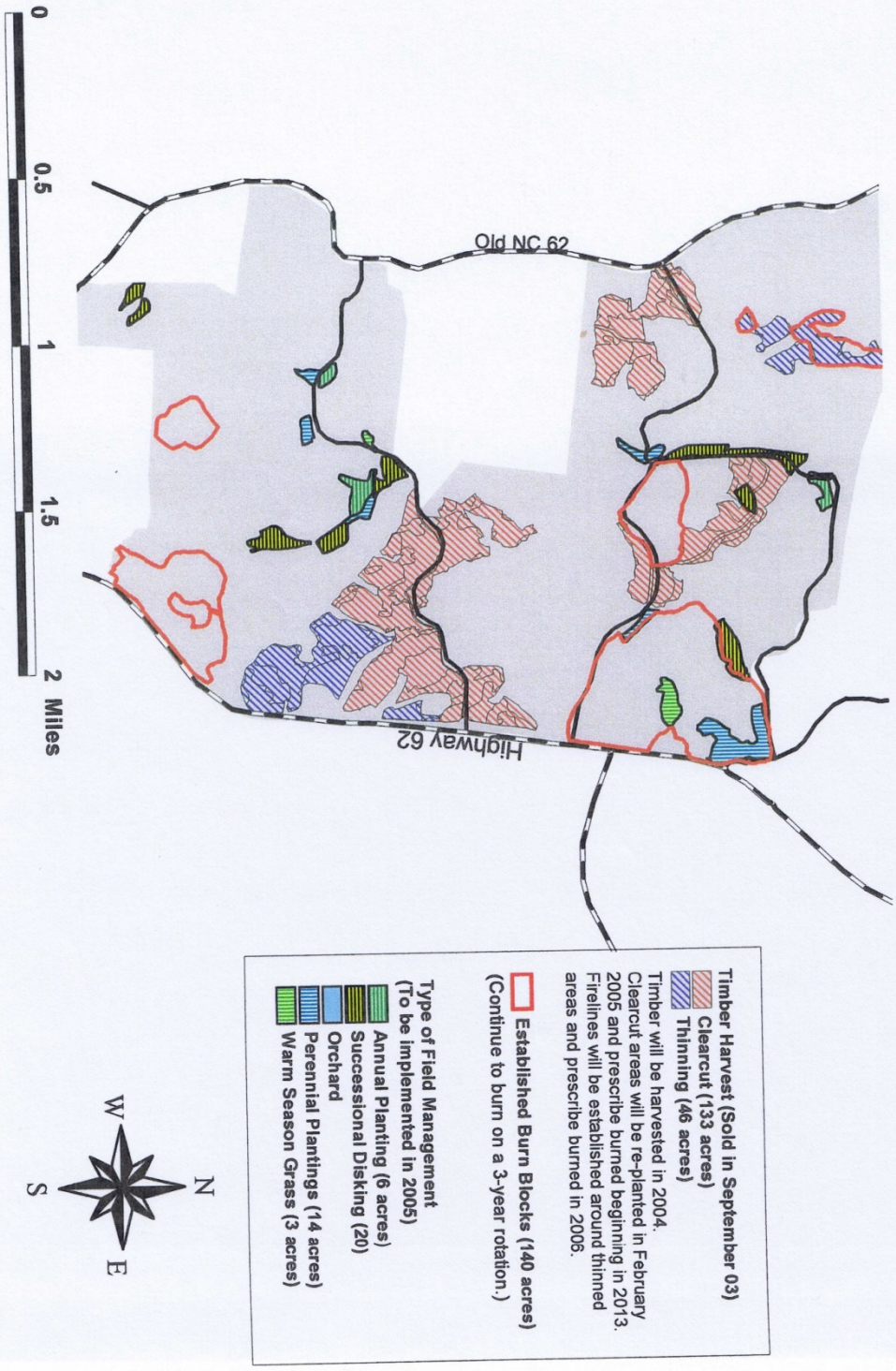


Table 4. CURE Unit III planned management activities.

CURE Unit: III
Total Acres: 690

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Timber Harvest	Proposed													
	Prescribed				225									
	Marked/Sold					225								
	Clearcut						101							
	Thin						124							
	Re-plant							101						

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Thinnings	0	0	0	0	0	0	0	124	124	124	124	124	124
	Old Unburned Thinnings	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Planted Pine	14	28	28	28	28	28	28	46	46	46	46	46	46
	Burning Total	14	28	28	28	28	28	28	170	170	170	170	170	170

Miles of Fireline

Firelines	Established Lines	0	0	0	0	0	0	0	6	6	6	6	6	6
	New Lines	0	0	0	0	0	0	6	0	0	0	0	0	0
	Total	0	0	0	0	0	0	6	6	6	6	6	6	6

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	3	9
	Annual Plantings	1	2
	Perennial Plantings	0	0
	Warm Season Grass	0	0
	Orchard	0	0
	Field Total	4	11

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

Figure 5. Implementation schedule for CURE Unit III showing prescribed timber harvest areas and field management strategy.

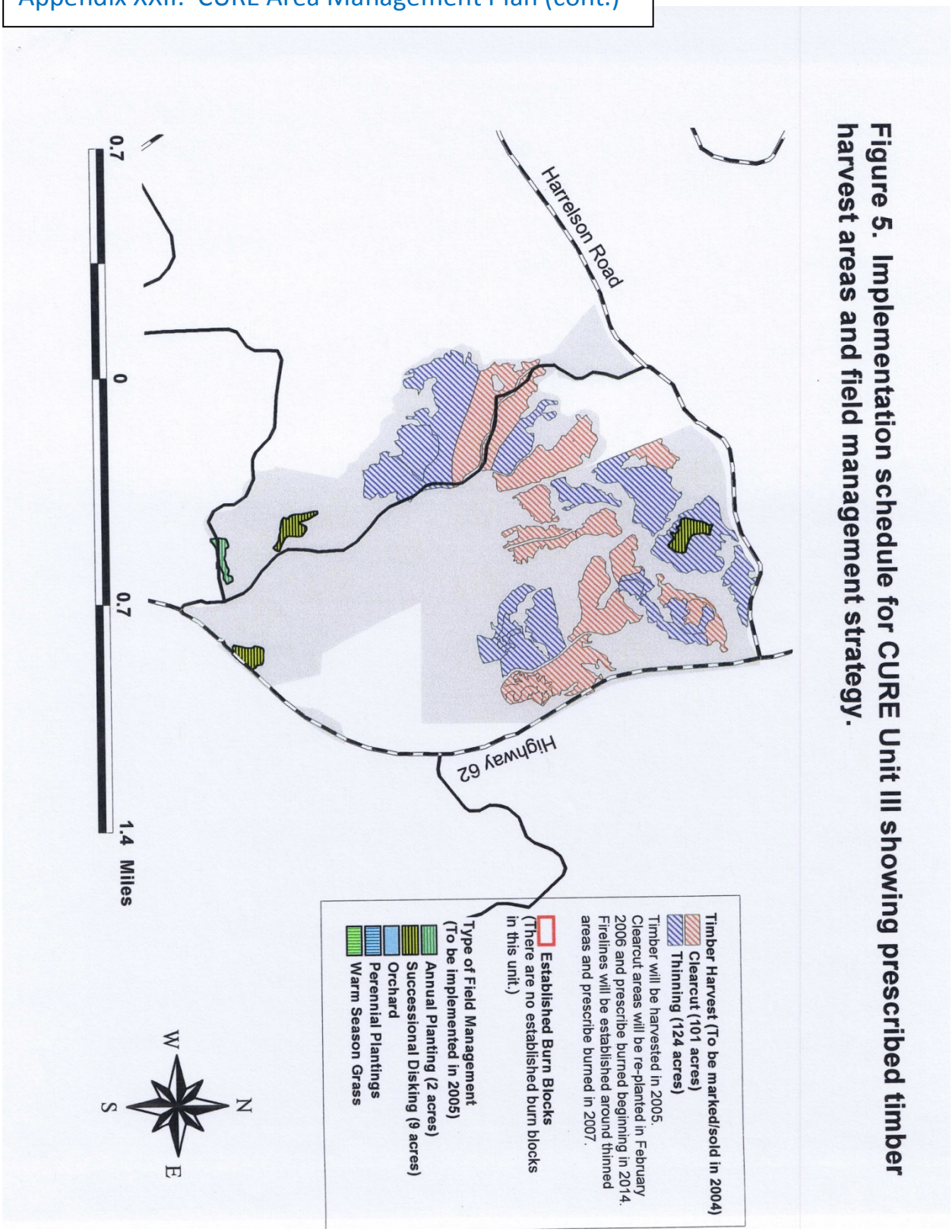


Table 5. CURE Unit IV planned management activities.

CURE Unit: IV
Total Acres: 879

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Timber Harvest	Proposed					271								
	Prescribed													
	Marked/Sold						271							
	Clearcut							163						
	Thin							108						
	Re-plant								163					

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	9	9	9	9	9	9	9	9	9	9	9	9	9
	New Thinnings	0	0	0	0	0	0	0	0	108	108	108	108	108
	Old Unburned Thinnings	11	11	11	11	11	11	11	11	11	11	11	11	11
	New Planted Pine	42	42	42	42	42	42	42	47	47	47	47	47	47
	Burning Total	62	62	62	62	62	62	62	67	175	175	175	175	175

Miles of Fireline

Firelines	Established Lines	1	1	1	1	1	1	1	1	7	7	7	7	7
	New Lines	0	0	0	0	0	0	0	6	0	0	0	0	0
	Total	1	1	1	1	1	1	1	7	7	7	7	7	7

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	5	15
	Annual Plantings	9	14
	Perennial Plantings	3	2
	Warm Season Grass	3	2
	Orchard	3	1
	Field Total	23	34

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

* Detailed timber prescriptions for this unit will not be completed before 2004. "Proposed" timber harvest acreage reflects pine and pine/hardwood acreage in the GIS database. Based on work in CURE Units I-III it is expected that 60% of the proposed acreage will be clearcut and 40% will be thinned.

Figure 6. Implementation schedule for CURE Unit IV showing proposed timber harvest areas, field management strategy, and location of established burn blocks.

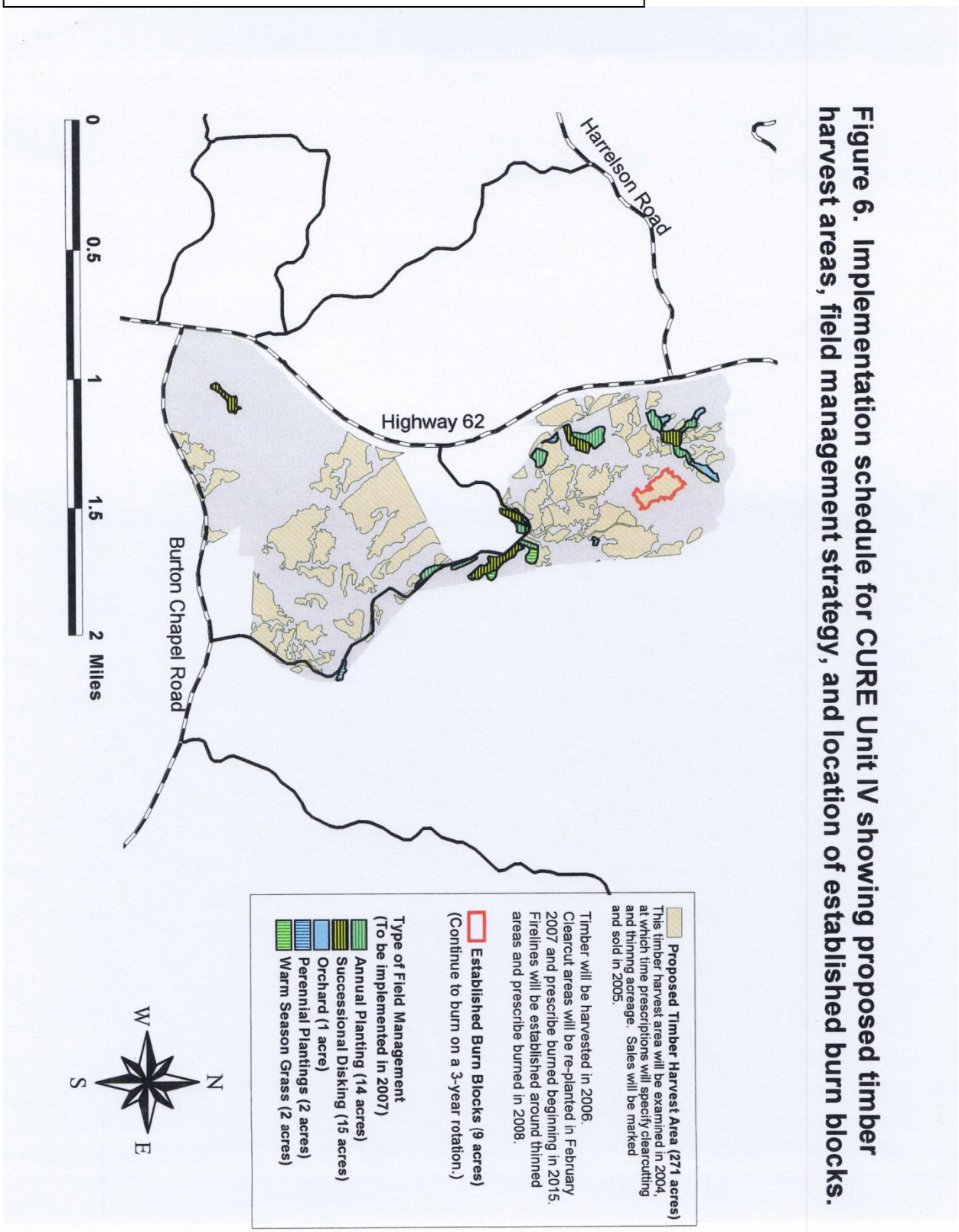


Table 6. CURE Unit V planned management activities.

CURE Unit: V
Total Acres: 1019

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Timber Harvest	Proposed						183							
	Prescribed													
	Marked/Sold							183						
	Clearcut								110					
	Thin								73					
	Re-plant									110				

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	129	129	129	129	129	129	129	129	129	129	129	129	129
	New Thinnings	0	0	0	0	0	0	0	0	0	73	73	73	73
	Old Unburned Thinnings	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Planted Pine	37	57	57	74	74	74	74	74	74	88	88	88	88
	Burning Total	166	186	186	203	203	203	203	203	203	290	290	290	290

Miles of Fireline

Firelines	Established Lines	2	2	2	2	2	2	2	2	2	8	8	8	8
	New Lines	0	0	0	0	0	0	0	0	6	0	0	0	0
	Total	2	2	2	2	2	2	2	2	8	8	8	8	8

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	1	2
	Annual Plantings	0	0
	Perennial Plantings	2	1
	Warm Season Grass	6	5
	Orchard	0	0
	Field Total	9	8

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

* Detailed timber prescriptions for this unit will not be completed before 2005. "Proposed" timber harvest acreage reflects pine and pine/hardwood acreage in the GIS database. Based on work in CURE Units I-III it is expected that 60% of the proposed acreage will be clearcut and 40% will be thinned.

Figure 7. Implementation schedule for CURE Unit V showing proposed timber harvest areas, field management strategy, and location of established burn blocks.

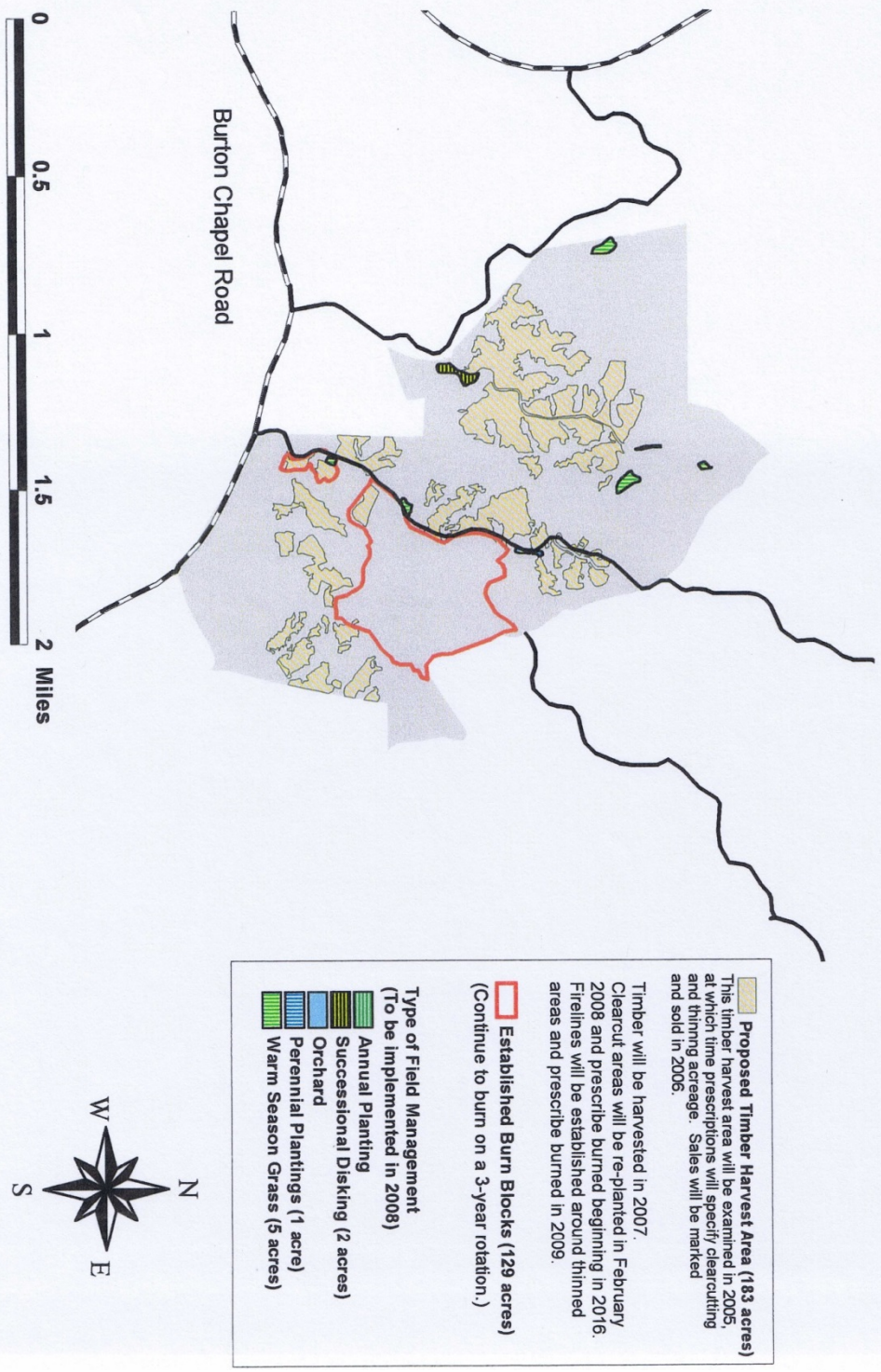


Table 7. CURE Unit VI planned management activities.

CURE Unit: VI
Total Acres: 788

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Timber Harvest	Proposed							182						
	Prescribed													
	Marked/Sold								182					
	Clearcut									109				
	Thin									73				
	Re-plant										109			

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	189	189	189	189	189	189	189	189	189	189	189	189	189
	New Thinnings	0	0	0	0	0	0	0	0	0	0	73	73	73
	Old Unburned Thinnings	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Planted Pine	16	16	28	28	60	60	60	60	70	95	95	95	95
	Burning Total	205	205	217	217	249	249	249	249	259	284	357	357	357

Miles of Fireline

Firelines	Established Lines	4	4	4	4	4	4	4	4	4	4	10	10	10
	New Lines	0	0	0	0	0	0	0	0	0	6	0	0	0
	Total	4	4	4	4	4	4	4	4	4	10	10	10	10

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	5	7
	Annual Plantings	0	0
	Perennial Plantings	5	13
	Warm Season Grass	8	8
	Orchard	2	3
	Field Total	20	31

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

* Detailed timber prescriptions for this unit will not be completed before 2006. "Proposed" timber harvest acreage reflects pine and pine/hardwood acreage in the GIS database. Based on work in CURE Units I-III it is expected that 60% of the proposed acreage will be clearcut and 40% will be thinned.

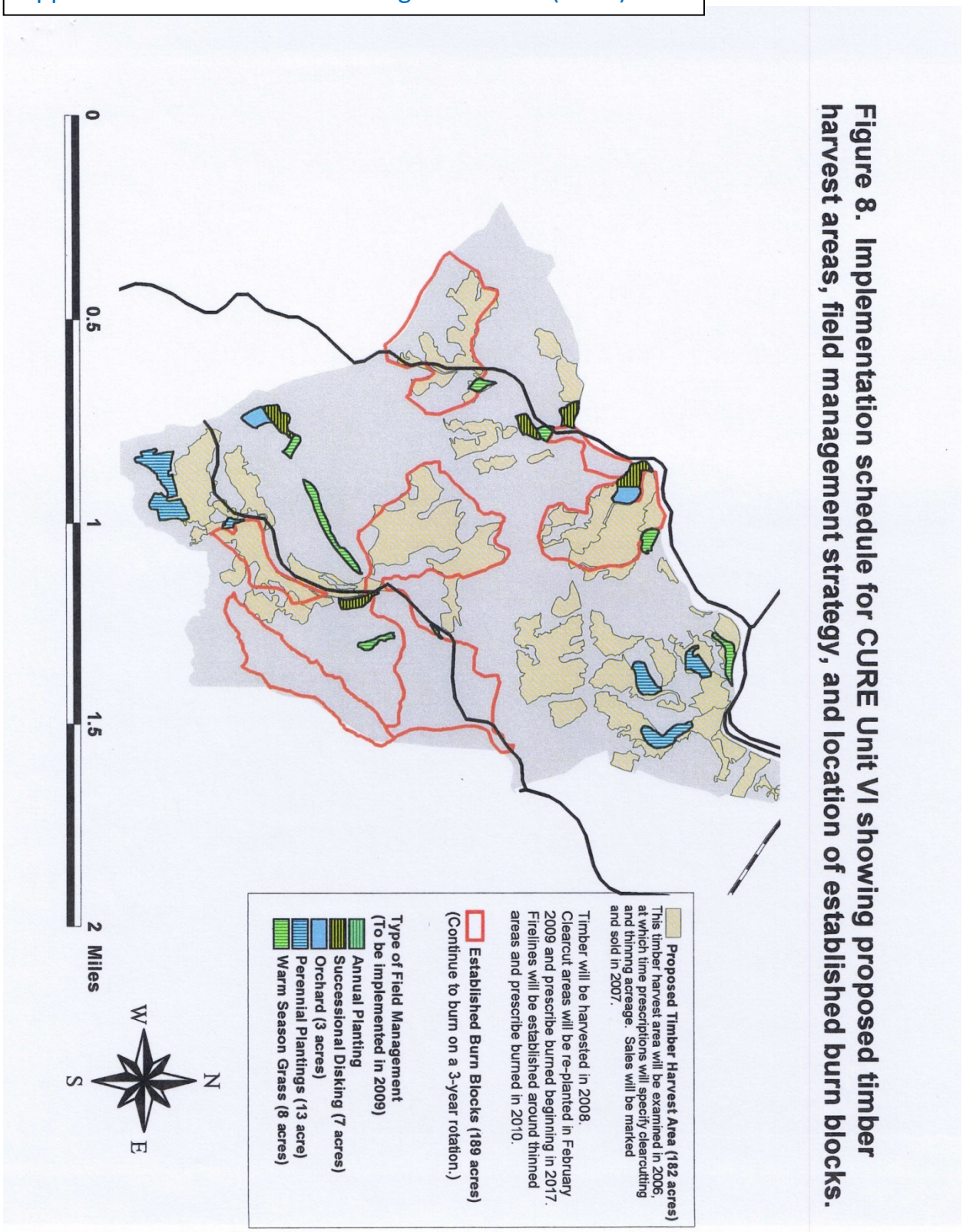


Figure 8. Implementation schedule for CURE Unit VI showing proposed timber harvest areas, field management strategy, and location of established burn blocks.

Table 8. CURE Unit VII planned management activities.

CURE Unit: VII
Total Acres: 743

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Timber Harvest	Proposed								300					
	Prescribed													
	Marked/Sold									300				
	Clearcut										180			
	Thin										120			
	Re-plant											180		

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	32	32	32	32	32	32	32	32	32	32	32	32	32
	New Thinnings	0	0	0	0	0	0	0	0	0	0	0	120	120
	Old Unburned Thinnings	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Planted Pine	110	110	126	126	153	162	162	162	162	162	162	172	172
	Burning Total	142	142	158	158	185	194	194	194	194	194	194	324	324

Miles of Fireline

Firelines	Established Lines	1	1	1	1	1	1	1	1	1	1	1	7	7
	New Lines	0	0	0	0	0	0	0	0	0	0	6	0	0
	Total	1	1	1	1	1	1	1	1	1	1	7	7	7

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	2	5
	Annual Plantings	1	1
	Perennial Plantings	3	3
	Warm Season Grass	5	4
	Orchard	0	0
	Field Total	11	13

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

* Detailed timber prescriptions for this unit will not be completed before 2007. "Proposed" timber harvest acreage reflects pine and pine/hardwood acreage in the GIS database. Based on work in CURE Units I-III it is expected that 60% of the proposed acreage will be clearcut and 40% will be thinned.

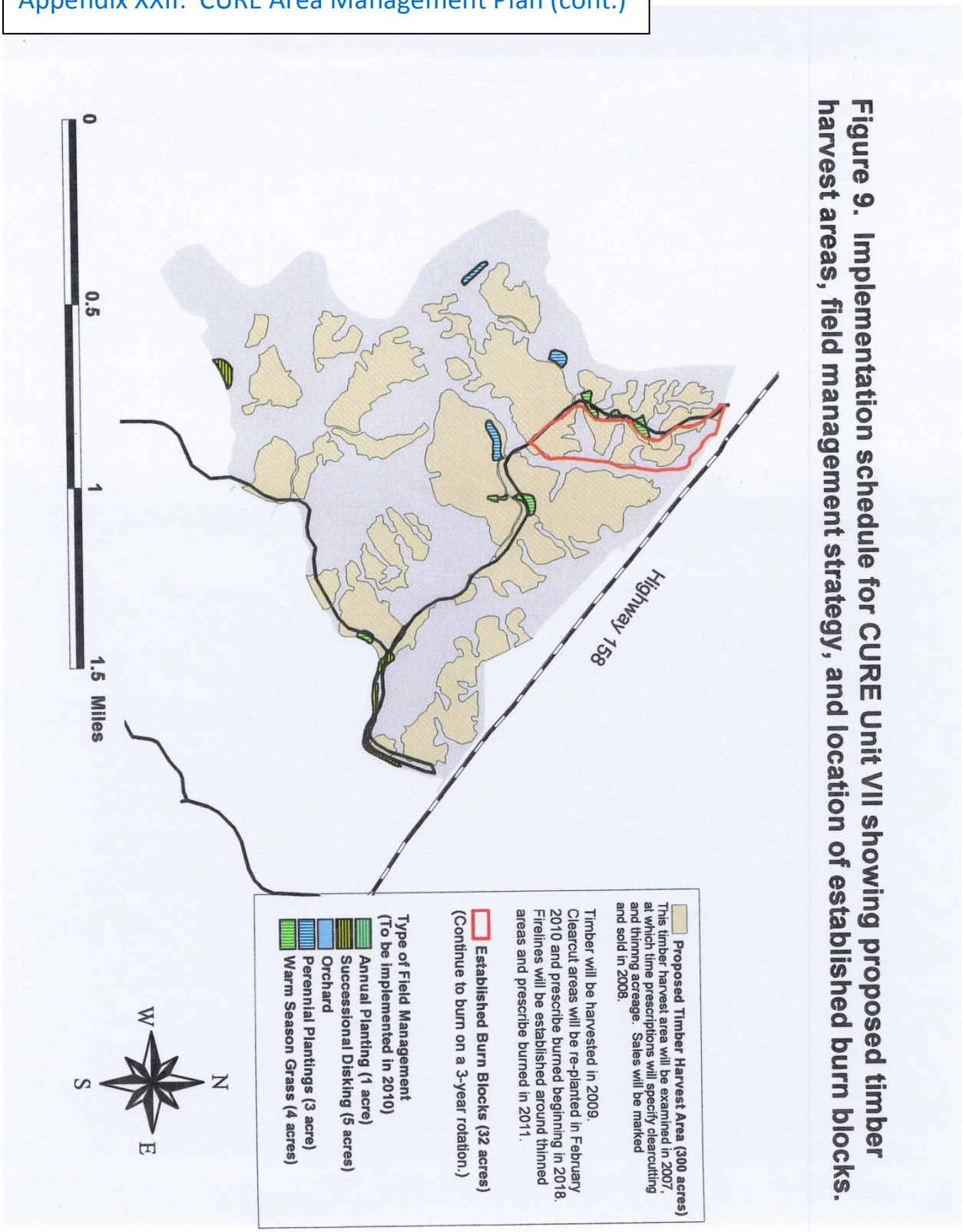


Figure 9. Implementation schedule for CURE Unit VII showing proposed timber harvest areas, field management strategy, and location of established burn blocks.

Table 9. Caswell CURE planned management activities.

CURE Unit: Total
Total Acres: 5803

Number of Acres Affected By Year For CURE Timber Harvesting Activities

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Timber Harvest	Proposed	0	0	0	0	271	183	182	300	0	0	0	0	0	936
	Prescribed	0	130	148	225	0	0	0	0	0	0	0	0	0	503
	Marked/Sold	0	0	173	179	225	271	183	182	300	0	0	0	0	1513
	Clearcut	0	0	0	128	133	101	163	110	109	180	0	0	0	924
	Thin	0	0	0	45	46	124	108	73	73	120	0	0	0	589
	Re-plant	0	0	0	0	128	133	101	163	110	109	180	0	0	924

Number of Acres and Type of Burn Block Maintained By 3-year Burning Regime

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Burning	Established Blocks	506	506	506	506	506	506	506	506	506	506	506	506	506
	New Thinnings	0	0	0	0	0	45	91	215	323	396	469	589	589
	Old Unburned Thinnings	26	26	26	26	26	26	26	26	26	26	26	26	26
	New Planted Pine	260	294	364	405	485	494	494	536	546	594	594	604	732
	Burning Total	792	826	896	937	1017	1071	1117	1283	1401	1522	1595	1725	1853

Miles of Fireline

Firelines	Established Lines	12	12	12	12	12	15	22	28	34	40	46	52	52
	New Lines	0	0	0	0	3	7	6	6	6	6	6	0	0
	Total	12	12	12	12	15	22	28	34	40	46	52	52	52

Number of Fields and Acres By Management Type

	Management Type	Fields	Acres
Fields	Successional Disking	23	58
	Annual Plantings	15	23
	Perennial Plantings	23	38
	Warm Season Grass	27	26
	Orchard	5	4
	Field Total	93	149

Additional notes and explanation

* In the "Timber Harvest" section acreage figures listed from 2000-2003 reflect accomplishments. Acreage figures for 2004-20012 reflect planned activities.
* "Thinned" timber harvest acres are added in the "New Thinning " burning category two years later.
* Clearcut" timber harvest acres are added in the "Re-plant" category the following year.

* Acreage figures in the burning section represent the total acreage in the burn program. Approximately 1/3 of this total will be burned in a given year.
* "Old Unburned Thinnings" burning acres reflects timber harvests completed prior to the CURE program that have not been placed in a 3-year burning rotation.
* "New Planted Pine" acreage reflects pine plantations that reach the minimum of 8 years of age to initiate prescribed fire in the CURE program.

* Detailed timber prescriptions for CURE Units IV-VII have not been completed. "Proposed" timber harvest acreage reflects pine and pine/hardwood acreage in the GIS database for these units. Based on work in CURE Units I-III it is expected that 60% of the proposed acreage will be clearcut and 40% will be thinned.

Figure 10. Timber harvest areas, proposed timber harvest areas, field management strategy, and location of established burn blocks for the entire Caswell CURE area.

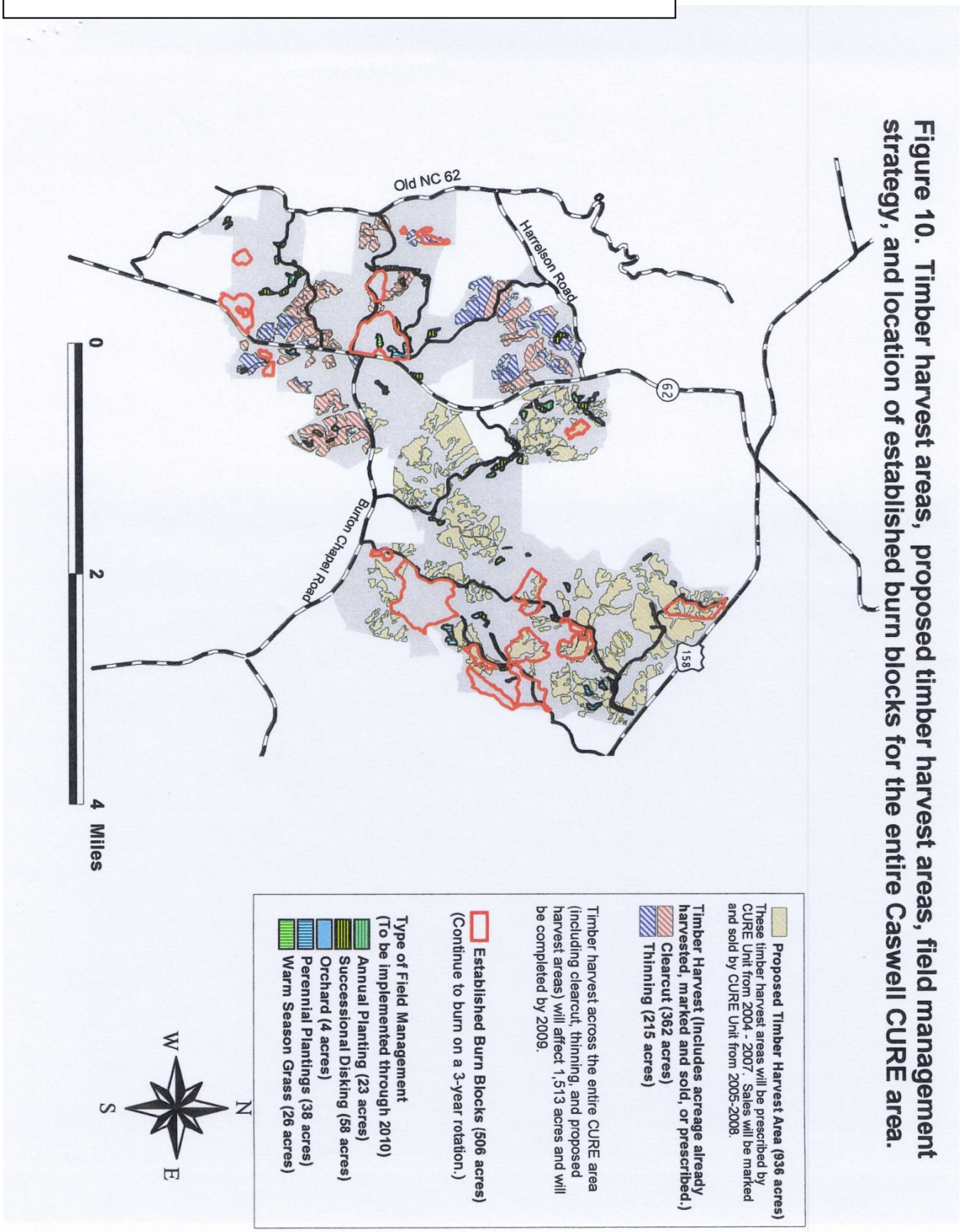


Table 10. Caswell CURE area habitat composition and percentage of area in early successional habitats before CURE management changes, and anticipated habitat composition after CURE (approximately 10 years) management changes are implemented.

	Before CURE				After CURE		
Habitat Type	Acres	%	Early Successional Habitat (%)	Anticipated Change	Acres	%	Early Successional Habitat (%)
Field	207.7	3.6	3.6	No acreage change	207.7	3.6	3.6
Hardwood	2965.4	51.1	--	90% remain as hardwoods (2668.9 ac) 5% converted to oak savannas (148.3 ac) 5% converted to openings (148.3 ac)	2668.9	46.0	--
Oak Savanna	--	--	--		148.3	2.6	2.6
Hardwood/Pine	33.0	0.6	--	No acreage change	33.0	0.6	0.6
Pine	1811.7	31.2	--	40% can be manged with thinnning (724.7 ac) 45% clearcut and replanted (815.2 ac) 15% clearcut and not replanted (271.8 ac)	740.0	12.8	12.8
Pine Plantation	606.5	10.5			1406.3	24.2	
1 - 10 years	(343.8 ac, 5.9% of CURE area		5.9	Ages to 11-20 year category	(815.2 ac, 14.0% of total area)		14.0
11 - 20 years	(247.3 ac, 4.3% of CURE area)		--	Ages to 21-30 year category	(343.8 ac, 5.9% of total area)		5.9
21 - 30 years	(15.4 ac, 0.3% of CURE area)		--	Ages to Pine (thinning) category	(247.3 ac, 4.3% of total area)		4.3
Other	179.0	3.1	--	No acreage change	179.0	3.1	--
Forest Openings	n/a	n/a	--	Openings created from hardwood (148.3 ac) and pine (271.8 ac) stands.	420.1	7.2	7.2
Total	5803.3	100.0	9.5		5803.3	100.0	51.0

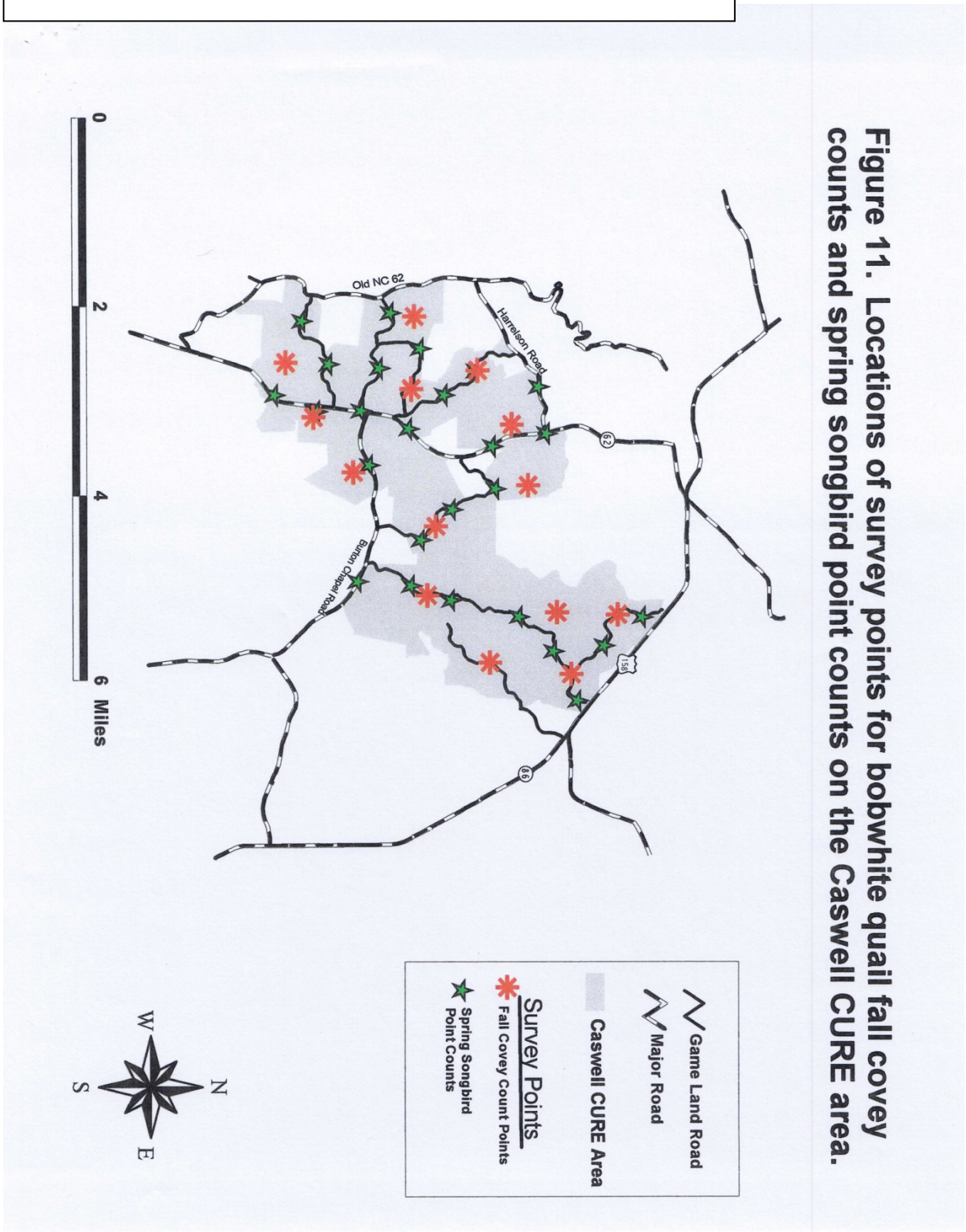


Figure 11. Locations of survey points for bobwhite quail fall covey counts and spring songbird point counts on the Caswell CURE area.

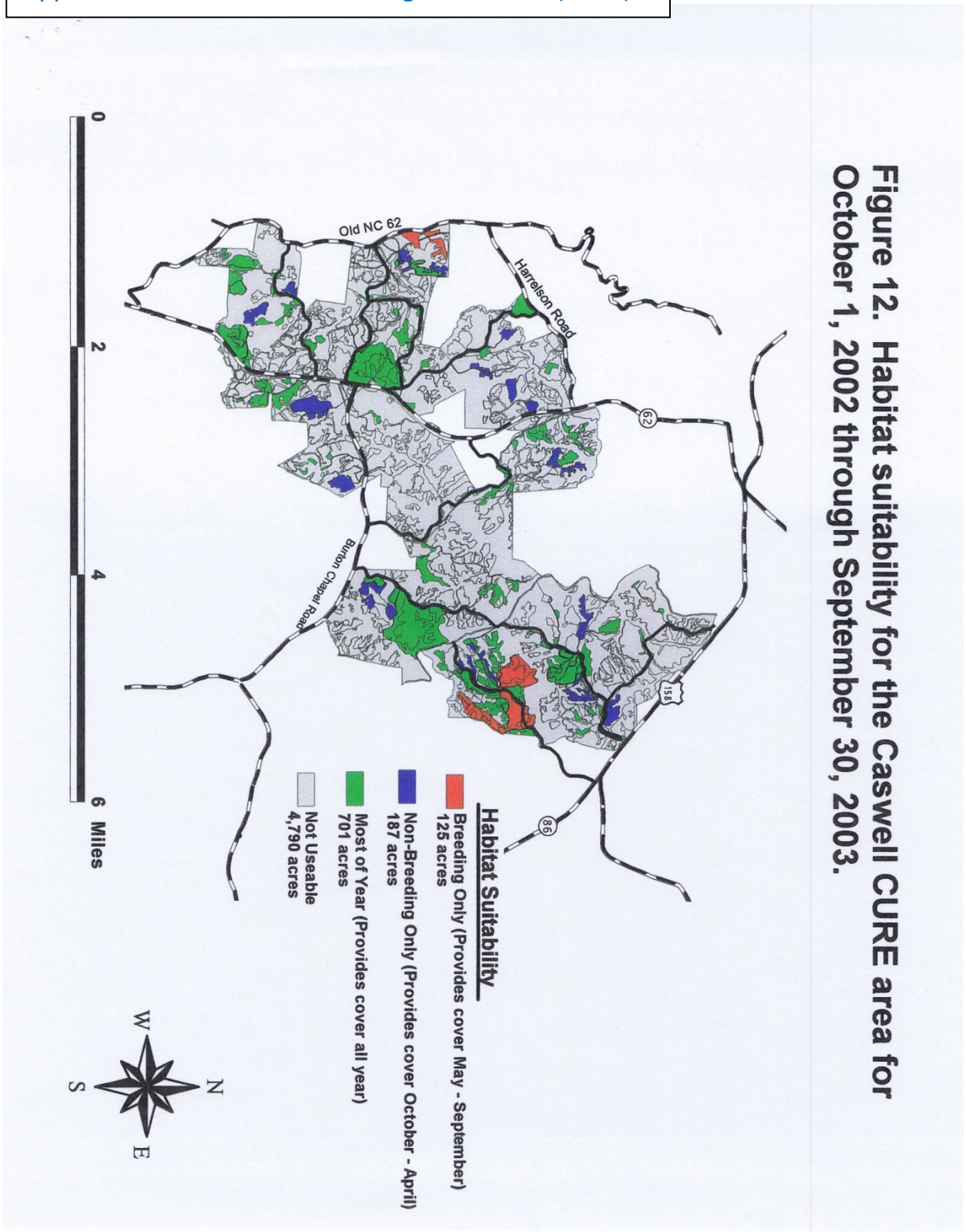


Figure 12. Habitat suitability for the Caswell CURE area for October 1, 2002 through September 30, 2003.

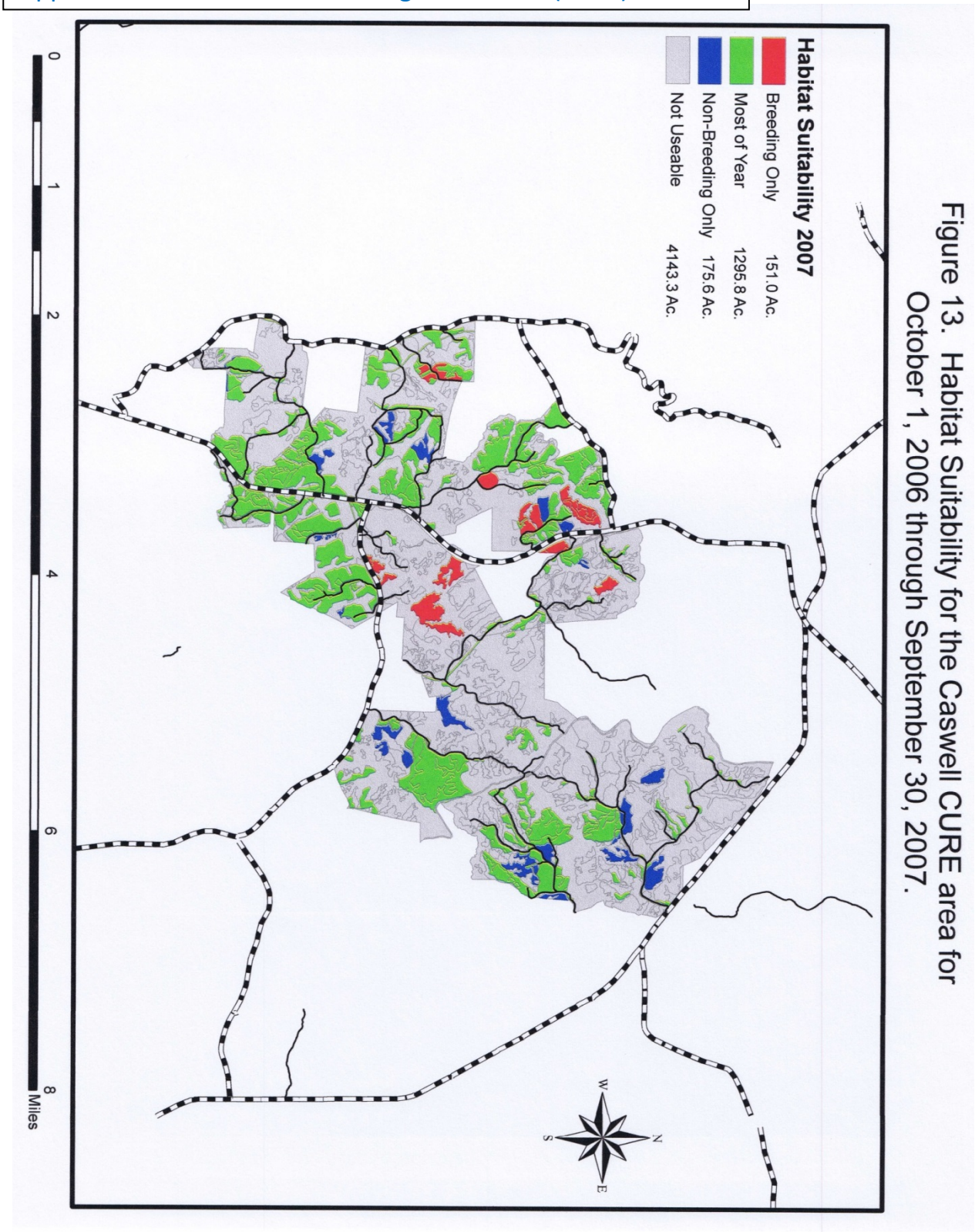


Figure 13. Habitat Suitability for the Caswell CURE area for October 1, 2006 through September 30, 2007.

Table 11. Man-days and Expenditures for Major CURE Activities

Activity	2000 MD's	2000 $	2001 MD's	2001 $	2002 MD's	2002 $	2003 MD's	2003 $	2004 MD's	2004 $	2005 MD's	2005 $	2006 MD's	2006 $	2007 MD's	2007 $	2008 MD's	2008 $	2009 MD's	2009 $	2010 MD's	2010 $	2011 MD's	2011 $	2012 MD's	2012 $	Total MD's	Total $
Tree Planting					2	$360	3	$8,960	3	$9,310	3	$7,070	3	$11,410	3	$7,700	3	$7,630	3	$12,600	0	$0	0	$0	23	$65,040		
Herbicide Spraying							3	$11,520	3	$9,090	3	$14,670	3	$9,900	3	$9,810	3	$18,200	0	$0	21	$83,160		
Prescribed Burning					10	$1,590	16	$5,310	16	$5,355	19	$5,585	21	$6,415	23	$7,005	25	$7,610	27	$7,975	29	$8,625	31	$9,264	221	$64,734		
Fireline Construction							9		21		18		18		16		18		18		18		18		18		156	
Fireline Maintenance							2		5		8		9		11		13		15		17		17		17		97	
Field Maintenance	30		30		30		30		30		30		30		30		30		30		30		30		30		360	
Timber Marking					35	$1,000	36	$1,000	45	$1,000	54	$1,000	36	$1,000	36	$1,000	60	$1,000									302	$7,000
Quail Call Counts	2		2		2		2		2		2		2		2		2		2		2		2		2		26	
Fall Covey Counts	7		7		7		7		7		7		7		7		7		7		7		7		7		84	
Spring Bird Survey	2		2		2		2		2		2		2		2		2		2		2		2		2		24	
Winter Bird Survey							10		10		10		10		10		10		10		10		10		10		90	
Summer Vegetation Survey			15		8		8		8		8		8		8		8		8		8		8		8		95	
Habitat Suitability Survey			5		5		2		2		2		2		2		2		2		2		2		2		28	
Total MD's:$	2	41	96	$1,000	102	$2,950	138	$15,270	165	$27,185	148	$25,625	151	$27,915	179	$30,375	123	$25,140	127	$30,385	128	$24,825	127	$9,264	1527	$219,934		

Explanation of Costs and Expenditures

Prescribed Burning – $15/acre, assuming burn 1/3 of acres in rotation each year, 1 man-day/20 acres

Herbicide spraying – $90/ acre, assuming spray planted pines after 2 growing seasons

Timber Marking – 1 man-day/5 acres, $1,000/year for tree marking paint

Field Maintenance – 30 man-days for "maintaining" 1/3 of fields each year

Fireline Maintenance – 1 man-day/2 miles of fireline

Fireline Construction – 3 man-days/mile

Table 12. Timber Sale Revenues and Additional Costs

Anticipated Revenue From CURE Timber Sales

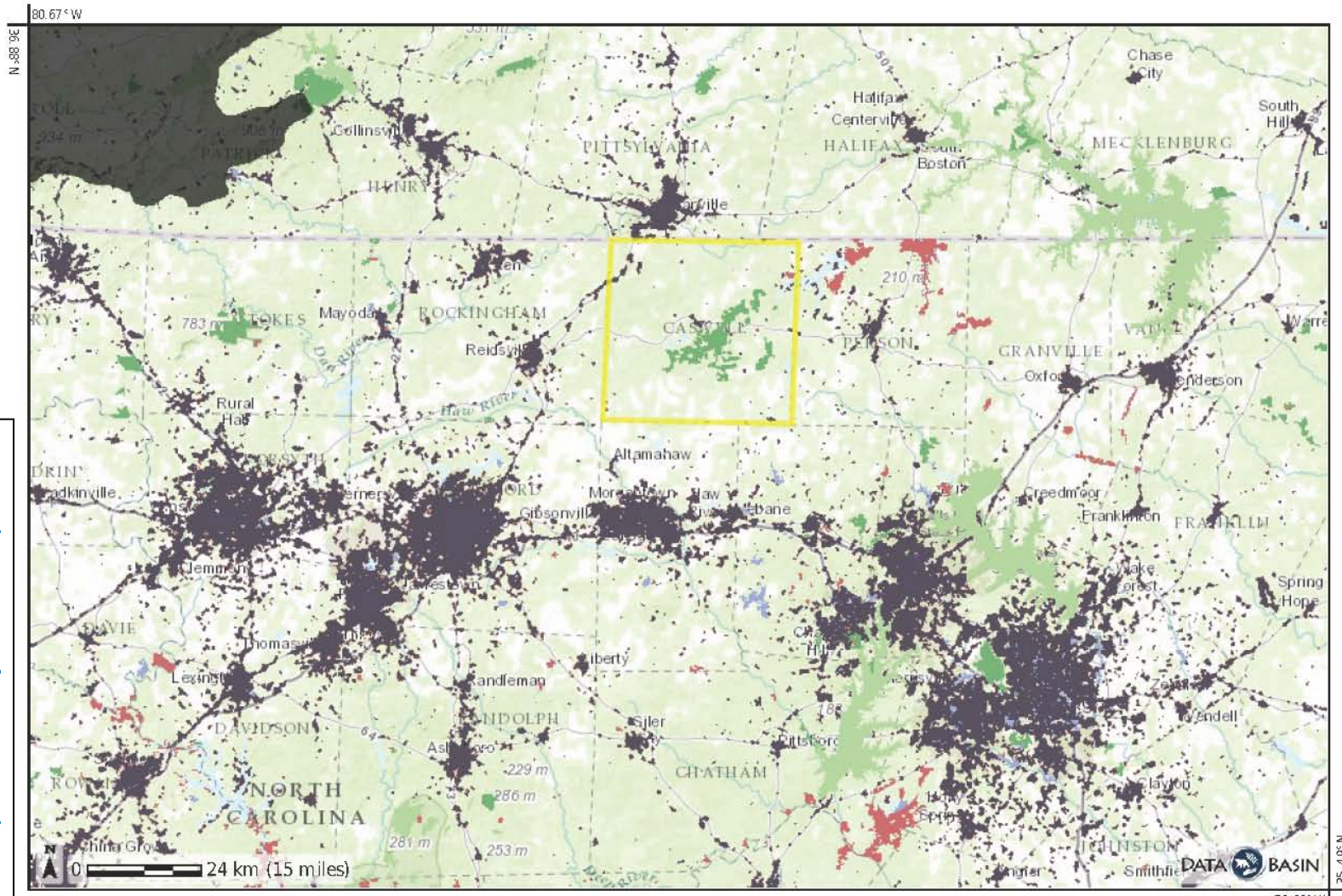
Year	Timber Sale	Size (ac)	$/ acre	Revenue
2002	CURE I	173	$1,214.00	$210,000.00
2003	CURE II	179	$1,232.00	$220,538.00
2004	CURE III	225	$1,220.00	$274,500.00
2005	CURE IV	271	$1,220.00	$330,620.00
2006	CURE V	183	$1,220.00	$223,260.00
2007	CURE VI	182	$1,220.00	$222,040.00
2008	CURE VII	300	$1,220.00	$366,000.00
	Total	**1513**	**n/a**	**$1,846,958.00**

Anticipated Cost for Additional Personnel and Equipment

	Cost	Year
Two Tempory Personnel	$14,000.00/yr	2005 On
Crawler Tractor	$120,000.00	2005
Fire Plow	$10,000.00	2005
Slip-on Pumper Unit	$12,000.00	2005
Drip torches, Fire Rakes	$2,500.00	2005
Aerial Photography	$5,000.00	2009
Forest Inventory	$50,000.00	2009
Total*	**$213,500.00**	

* Includes cost of two temps. For one year only

Appendix XXIII: Urban Expansion Projection Map 2010



Legend

South Atlantic LCC Mask with Special Integration Zone

Displaying: **SouthAtlanticMask**

- Outside of the South Atlantic LCC
- Speical Integration Zone between South Atlantic LCC and Gulf Coastal Plains and Ozarks LCC

Protected Areas Database of the United States, PAD-US (CBI Edition) Version 2

Displaying: **Owner Type**

- Federal Land
- State Land
- Native American Land
- Local Land
- Private Conservation Land
- Joint Ownership; Unknown

Marine Protected Areas Inventory, March 2012

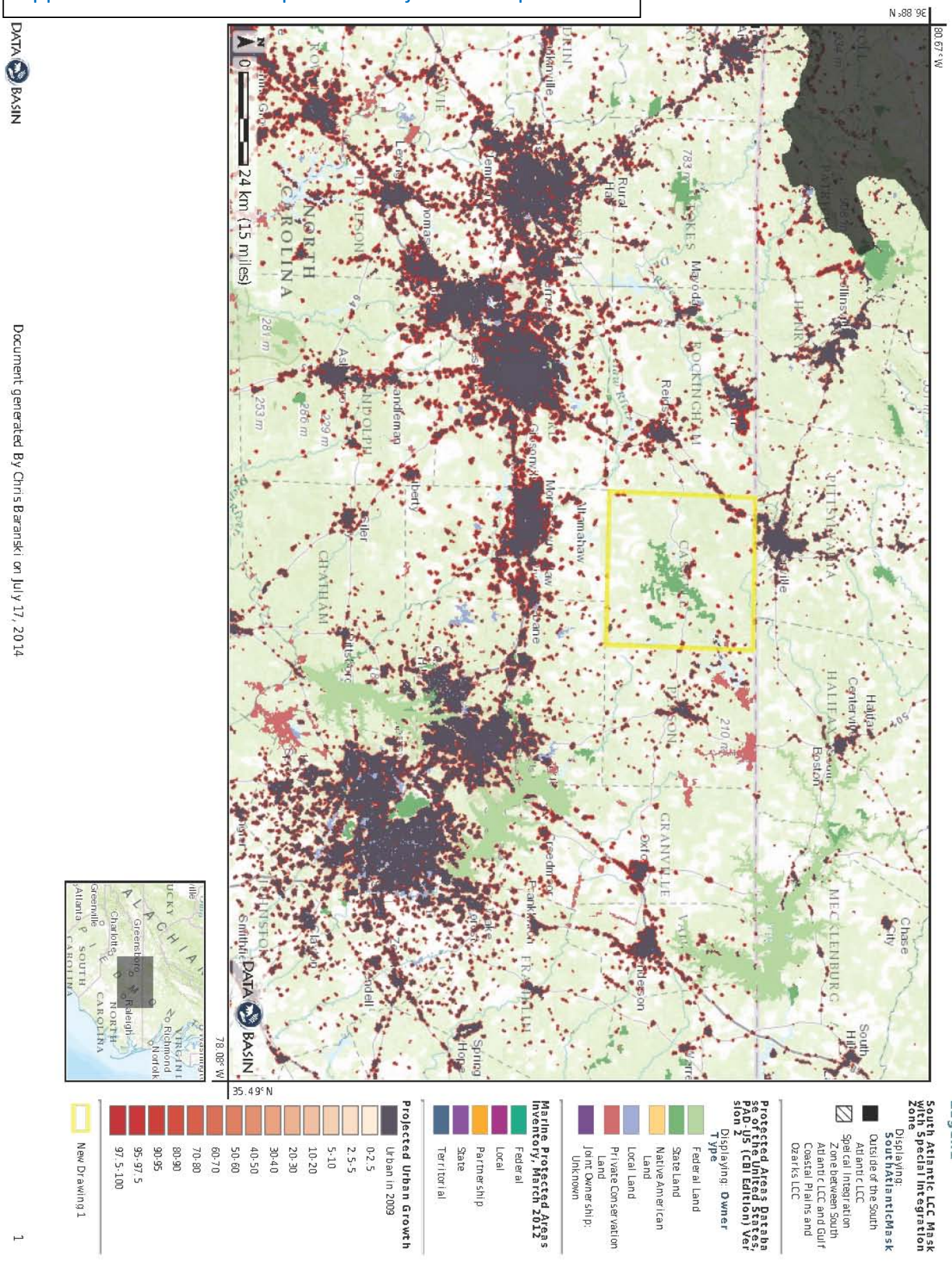
- Federal
- Local
- Partnership
- State
- Territorial

Projected Urban Growth

- Urban in 2009
- 0-2.5
- 2.5-5
- 5-10
- 10-20
- 20-30
- 30-40
- 40-50
- 50-60
- 60-70
- 70-80
- 80-90
- 90-95
- 95-97.5
- 97.5-100

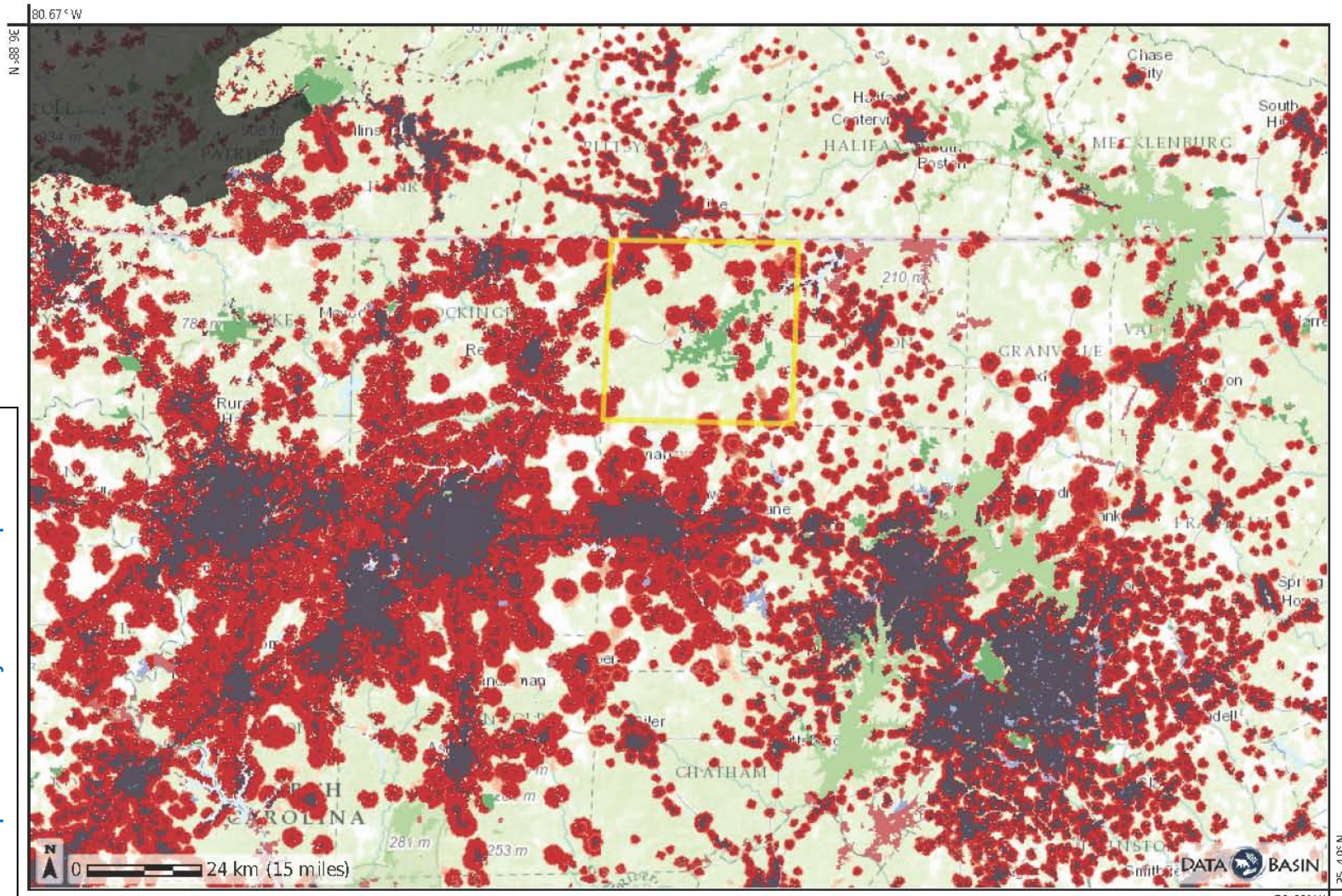
- New Drawing 1

Appendix XXIII: Urban Expansion Projection Map 2030



Document generated By Chris Baranski on July 17, 2014

Appendix XXIII: Urban Expansion Projection Map 2100



Legend

South Atlantic LCC Mask with Special Integration Zone

Displaying: **SouthAtlanticMask**

- Outside of the South Atlantic LCC
- Speical Integration Zone between South Atlantic LCC and Gulf Coastal Plains and Ozarks LCC

Protected Areas Database of the United States, PAD-US (CBI Edition) Version 2

Displaying: **Owner Type**

- Federal Land
- State Land
- Native American Land
- Local Land
- Private Conservation Land
- Joint Ownership; Unknown

Marine Protected Areas Inventory, March 2012

- Federal
- Local
- Partnership
- State
- Territorial

Probability of Urbanization in 2100, 2010

- Urban in 2009
- 0-2.5
- 2.5-5
- 5-10
- 10-20
- 20-30
- 30-40
- 40-50
- 50-60
- 60-70
- 70-80
- 80-90
- 90-95
- 95-97.5
- 97.5-100

(continued on next page

North Carolina
Department of Administration

Beverly Eaves Perdue, Governor

Moses Carey, Jr., Secretary

February 20, 2012

Secretary Dee Freeman
Department of Environment and Natural Resources
512 N. Salisbury Street
Raleigh, North Carolina 27603-8003

Mr. Gordon S. Myers, Executive Director
N.C. Wildlife Resources Commission
512 N. Salisbury Street
Raleigh, North Carolina 27603-8003

Re: Dedication of Portions of the **Caswell Game Land**, Caswell County

Dear Secretary Freeman and Mr. Myers:

Pursuant to Article 9A, Chapter 113A of the North Carolina General Statutes, this letter of allocation is executed for the purpose of dedicating the State-owned lands hereinafter described as a North Carolina Nature Preserve. These articles of dedication replace the articles of dedication dated July 24, 2002. The articles were amended to reflect additions of property to the preserve.

This real property is currently administered by the North Carolina Wildlife Resources Commission as a portion of the Caswell Game Land and consists of approximately 1,264 acres located in Caswell County and composed of:

1. Caswell Game Land tract (Primary Area) 508 acres, including restoration area of 10 acres
2. Caswell Game Land tract (Buffer Area) 756 acres

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

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

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

Location:
116 West Jones Street
Raleigh, North Carolina

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

The Governor and Council of State have approved the dedication of the State-owned lands hereinabove described as the Caswell Game Land Nature Preserve to be held in trust by the Custodian for the uses and purposes expressed in the Nature Preserves Act at a meeting held in the City of Raleigh, North Carolina, on the 13th of September, 2011.

Sincerely,

Moses Carey, Jr.

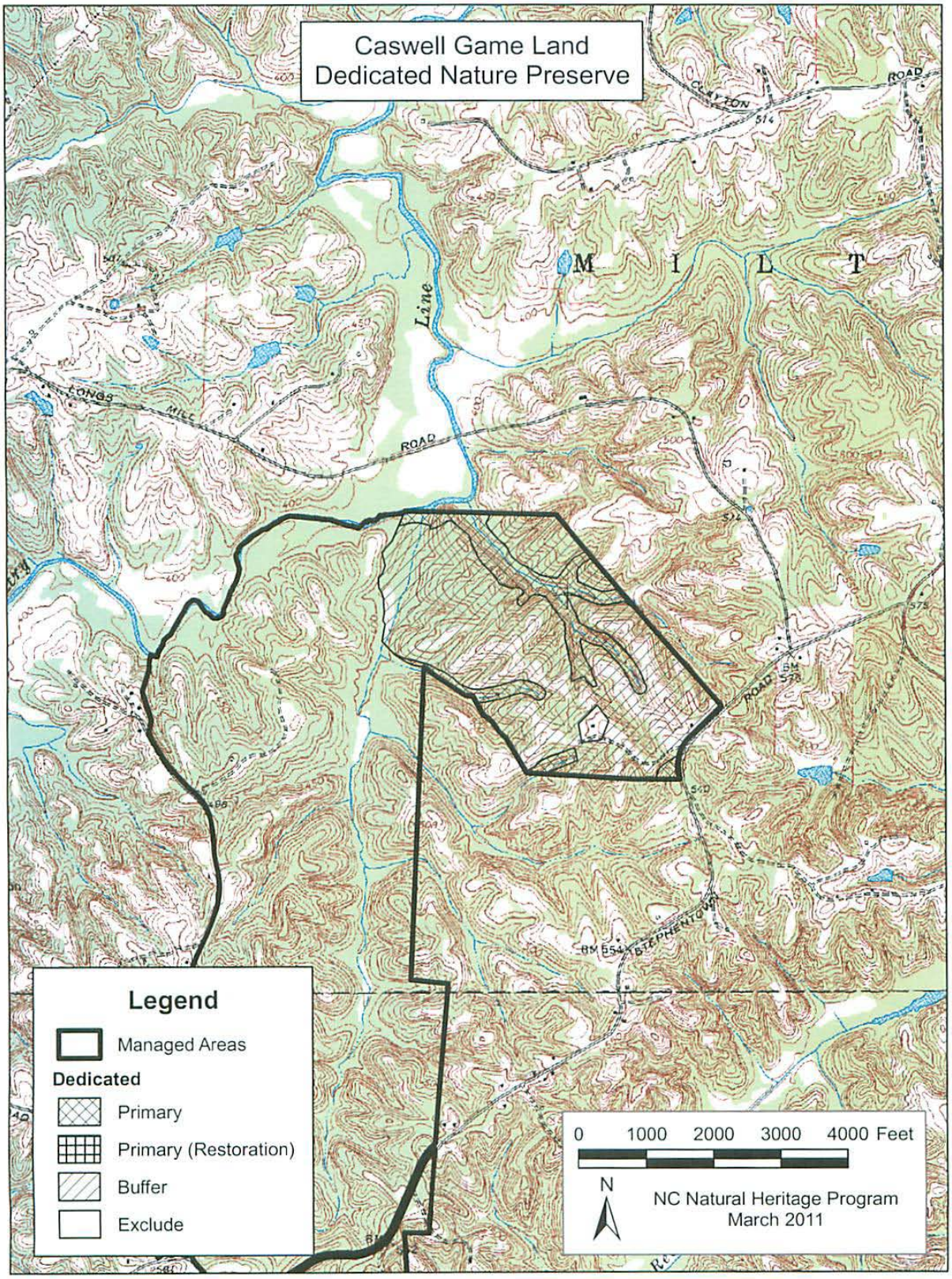
MC

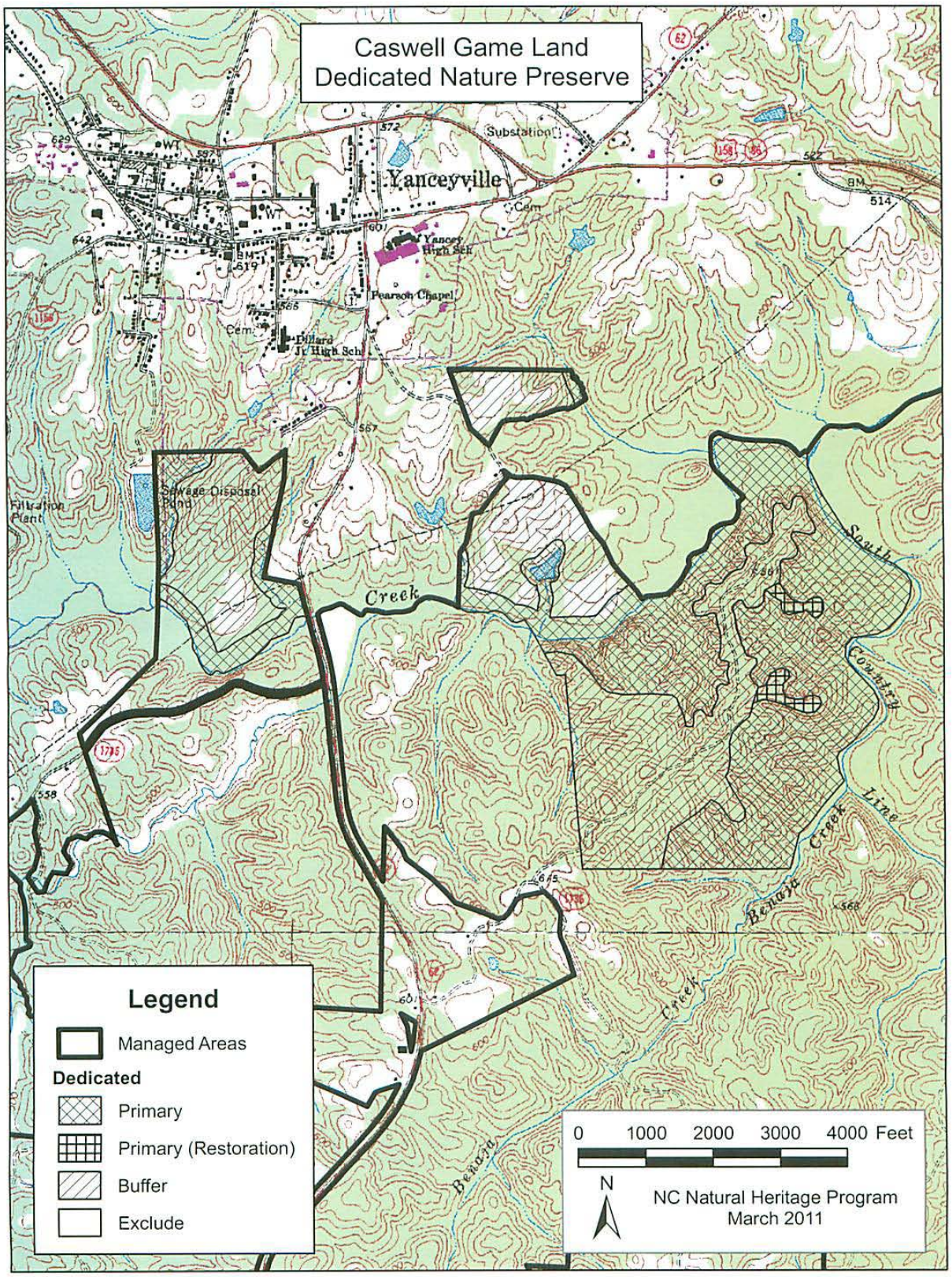
Attachment

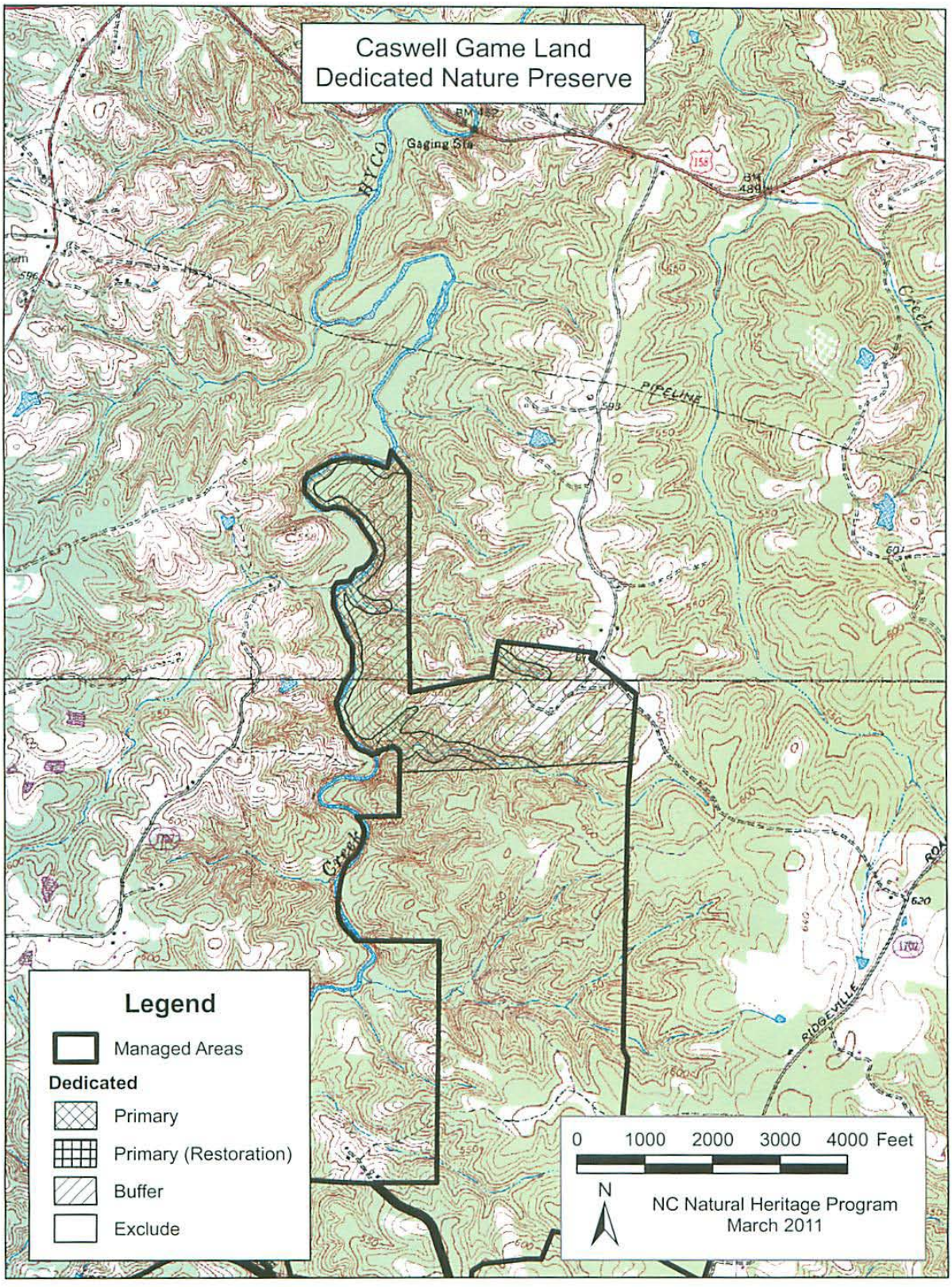
CONSENTED AND AGREED TO:

Secretary Dee Freeman
Department of Environment and Natural Resources

Gordon S. Myers, Executive Director
Wildlife Resources Commission


Caswell Game Land
Dedicated Nature Preserve
M I L T
Line
LONGS MILL ROAD
CLAYTON ROAD 514
ROAD 575
BM 554
STEPHENSON
Legend
Managed Areas
Dedicated
Primary
Primary (Restoration)
Buffer
Exclude
0 1000 2000 3000 4000 Feet
N
NC Natural Heritage Program
March 2011


Caswell Game Land
Dedicated Nature Preserve
Yanceyville
Substation
Cem
Yancey High Sch
Pearson Chapel
Dillard Jr High Sch
Sewage Disposal Pond
Filtration Plant
South Country Line Creek
Benaja Creek
Legend
Managed Areas
Dedicated
Primary
Primary (Restoration)
Buffer
Exclude
0 1000 2000 3000 4000 Feet
N
NC Natural Heritage Program
March 2011


Caswell Game Land
Dedicated Nature Preserve
Legend
Managed Areas
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Primary
Primary (Restoration)
Buffer
Exclude
0 1000 2000 3000 4000 Feet
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NC Natural Heritage Program
March 2011
PIPELINE
RIDGEVILLE

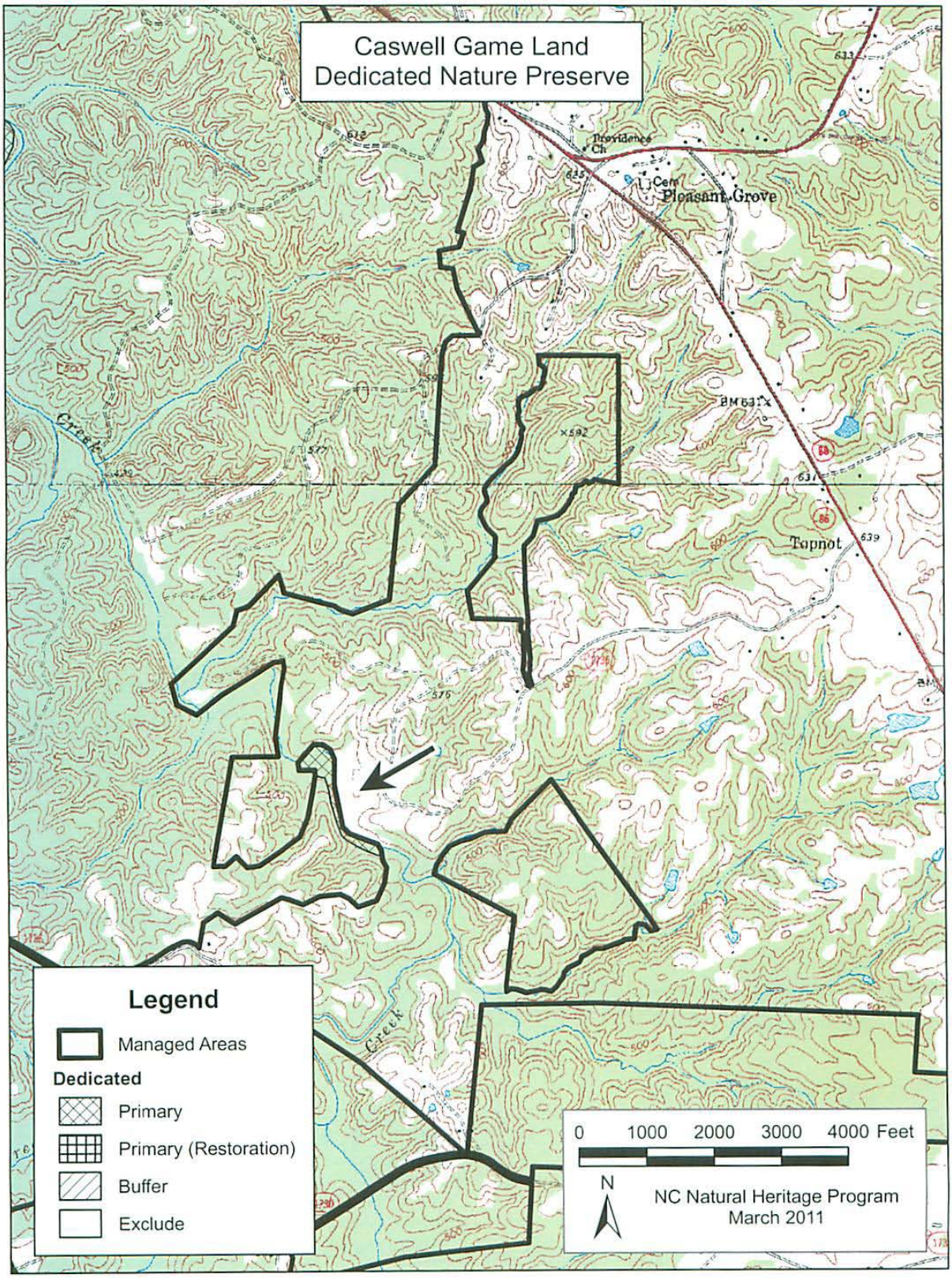
Caswell Game Land
Dedicated Nature Preserve
Providence Ch
Cem
Pleasant Grove
Topnot
Legend
Managed Areas
Dedicated
Primary
Primary (Restoration)
Buffer
Exclude
0 1000 2000 3000 4000 Feet
N
NC Natural Heritage Program
March 2011

EXHIBIT A

CASWELL GAME LAND
DEDICATED NATURE PRESERVE

HYCO CREEK SECTION

DESCRIPTION

COUNTY: Caswell PHYSIOGRAPHIC PROVINCE: Piedmont

TOPOGRAPHIC MAPS: Leasburg and Ridgeville

SIZE OF AREA: ca. 212 acres (primary area 45 acres; buffer area 167 acres)

OWNER/ADMINISTRATION: State of North Carolina, Wildlife Resources Commission

LOCATION: Eastern portion of Caswell County, located along the east side of Hyco Creek, just south and west of the end of Will Paylor Road (SR 1703). The tract adjoins a much larger portion of Caswell Game Land to the south.

DESCRIPTION: This portion of the primary area consists of rather narrow zones along the eastern side of Hyco Creek, running eastward up several tributary streams. The zone along the creek contains a very narrow floodplain, though most of the primary area consists of rich and often steep, rocky slopes. It encompasses part of the State Significant Griers Church Road Ultramafic Forest Significant Natural Heritage Area.

Some of the slopes and bluffs next to the creek are quite steep, and one bluff is roughly 60' high. Where over more acidic soils, American beech (*Fagus grandifolia*), sourwood (*Oxydendrum arboreum*), witch-hazel (*Hamamelis virginiana*), and various blueberries (*Vaccinium* spp.) and viburnums (*Viburnum* spp.) are present. Dittany (*Cunila origanoides*), small heartleaf (*Hexastylis minor*), and several composites are typical of the herb layer. This is best called a "Piedmont Beech Bluff" natural community, currently included within other natural community types. Where slopes and bluffs are over more circumneutral soils, a different set of plants is present under the beech canopy; Florida maple (*Acer barbatum*), hop-hornbeam (*Ostrya virginiana*), tall pawpaw (*Asimina triloba*), downy arrow-wood (*Viburnum rafinesquianum*), and fringe-tree (*Chionanthus virginicus*) are typical woody species. Maidenhair fern (*Adiantum pedatum*), lopseed (*Phryma leptostachya*), and white snakeroot (*Ageratina altissima*) are widespread on these rich slopes.

Several portions of the natural area, both on slopes and on narrow levees next to the creek, contain circumneutral soils with noteworthy plant species. Perhaps the largest population of the Watch List leatherwood (*Dirca palustris*) in Caswell Game Land, and one of the largest in the state, is present on the Graves tract; at least 145 plants were counted on the field survey,

scattered along most of the creek banks on the tract. One individual of the Watch List eastern wahoo (*Euonymus atropurpureus*) was seen, at the base of a rich slope at the northern end of the tract. Other notable plants of circumneutral soils on levees are eastern columbine (*Aquilegia canadensis*), starry campion (*Silene stellata*), and heartleaf aster (*Symphyotrichum cordifolium*). The Watch List tall thoroughwort (*Eupatorium altissimum*) occurs in a clearcut upslope from the creek.

BOUNDARY JUSTIFICATIONS: This portion of the primary area contains mature hardwood forests along streams. The primary area has been expanded upslope along an old jeep track to include the population of tall thoroughwort. A minimum 100-foot primary area is retained on each side of all perennial tributaries within the preserve. The buffer area includes recent clearcuts extending down into the floodplain in several places.

MANAGEMENT AND USE: The preserve, managed as the Caswell Game Land, was acquired primarily to provide public hunting, trapping, and wildlife observation opportunities.

MAP: attached

(July 2010, NC NHP)

EXHIBIT B

CASWELL GAME LAND
DEDICATED NATURE PRESERVE

COUNTRY LINE CREEK (NORTH SECTION)

DESCRIPTION

COUNTY: Caswell PHYSIOGRAPHIC PROVINCE: Piedmont

TOPOGRAPHIC MAP: Leasburg

SIZE OF AREA: ca. 295 acres (primary area 53 acres; buffer area 242 acres)

OWNER/ADMINISTRATION: State of North Carolina, Wildlife Resources Commission

LOCATION: Northeastern portion of Caswell County, located northwest of Stephentown Road (SR 1564) and south of Longs Mill Road (SR 1565) and Country Line Creek. The tract abuts existing Caswell Game Land on the west.

DESCRIPTION: This portion of the preserve consists of moderate to steep slopes to the east and west of a tributary stream to Country Line Creek, plus a number of side tributaries of this stream. The slopes alongside these streams contain mature hardwood stands, some of which appear to be underlain by mafic rock/basic soils. Several good examples are present of the uncommon Basic Mesic Forest natural community. It includes lands adjacent to the Regionally Significant Country Line Creek Aquatic Habitat which supports populations of several rare mussels, the creeper (*Strophitus undulatus*) and the triangle floater (*Alasmidonta undulata*), both of which are State Threatened. It additionally supports a population of the riverweed darter (*Etheostoma podostemone*), a State Threatened fish. The preserve encompasses most of the Locally Significant Brumley Impoundment Mafic Slopes Significant Natural Heritage Area.

The most significant portion of the tract is a northeast-facing slope along a tributary of Country Line Creek. Close to the northwestern end of this slope (and just south of a gasline clearing), American beech (*Fagus grandifolia*) is common, and Christmas fern (*Polystichum acrostichoides*) is abundant along the slope. Considerable amounts of spicebush (*Lindera benzoin*) grow up the slope, and several mature basswoods (*Tilia heterophylla*) are present; this tree is an excellent indicator of high pH (basic) soils in the Piedmont. Other basic-soil indicators include bitternut (*Carya cordiformis*) and slippery elm (*Ulmus rubra*); and the Watch List eastern wahoo (*Euonymus atropurpureus*), another such indicator, is present at the base of the slope.

Farther along the slope to the southeast, clumps of maidenhair fern (*Adiantum pedatum*) and broad beech fern (*Thelypteris hexagonoptera*) are common, and hop-hornbeam (*Ostrya*

virginiana) is an abundant understory tree. Several ravines that cut back from the slope contain Mesic Mixed Hardwood Forest, with American beech and Florida maple (*Acer barbatum*) being very common in the canopy. The upper reaches of the tributary and its forks contain acidic soil, and there are several small stands of the uncommon fragrant sumac (*Rhus aromatica*).

Another fork that flows westward through the tract also appears to have basic soils along it. Leatherwood (*Dirca palustris*) occurs in the narrow floodplain, and the Godfrey's thoroughwort (*Eupatorium godfreyanum*) grows along the margins of a jeep track that fords the creek; both of these are Watch List species. An impressive, mature Mesic Mixed Hardwood Forest grows on a north-facing slope just east of the ford.

At least one other portion of this part of the preserve appears to have biological significance. Along a curve of Stephentown Road, at the southeastern corner of the tract, is a population of the Significantly Rare Carolina birdfoot-trefoil (*Acmispon helleri*) along the road margin; fragrant sumac is also present.

BOUNDARY JUSTIFICATIONS: The primary areas consist of hardwood stands that are in good to excellent condition. Primary areas of at least 300-foot are retained on the Country Line Creek Significant Aquatic Habitat. A minimum 100-foot primary area is retained on each side of all perennial tributaries within the preserve. Hardwood stands which show various types of disturbances, are narrow in width, or lack high pH soil indicator species are designated as buffer areas. Areas dominated by pines, or contain early succession vegetation (as well as cultivated fields and ponds) are also included as buffer areas.

MANAGEMENT AND USE: The preserve, managed as the Caswell Game Land, was acquired primarily to provide public hunting, trapping, and wildlife observation opportunities. There is an impoundment in a floodplain next to a tributary of Country Line Creek, with several sub-impoundments. These ponds, as well as fields and foodplots, are managed to provide habitat for waterfowl and other wildlife. Country Line Creek, as a part of the Dan River Subbasin, is listed by the Commission as a priority aquatic conservation area. Thus, the Commission's other main goal, besides providing habitat for terrestrial wildlife (and related hunting opportunities), is to provide permanent protection to important aquatic resources (rare fishes and mussels) in this creek and the Dan River downstream.

MAP: attached

(August 2010, NC NHP)

EXHIBIT C

CASWELL GAME LAND
DEDICATED NATURE PRESERVE

COUNTRY LINE CREEK (SOUTH SECTION)

DESCRIPTION

COUNTY: Caswell PHYSIOGRAPHIC PROVINCE: Piedmont

TOPOGRAPHIC QUADS: Yanceyville

SIZE OF AREA: ca. 757 acres (primary area 409 acres, including several restoration area totaling 10 acres; buffer area 348 acres)

OWNER/ADMINISTRATOR: State of North Carolina, Wildlife Resources Commission

DESCRIPTION: This portion of the Caswell Game Land preserve consists of areas of floodplain and dissected uplands around Country Line Creek. The central part of Caswell County, where they occur, is a broad hilly area that contains one of the largest expanses of upland hardwood forest in the Piedmont part of the state. It includes lands adjacent to the Regionally Significant Country Line Creek Aquatic Habitat which supports populations of several rare mussels, the creeper (*Strophitus undulatus*) and the triangle floater (*Alasmidonta undulata*), both of which are State Threatened. It additionally supports a population of the riverweed darter (*Etheostoma podostemone*), a State Threatened fish. It encompasses part of the Regionally Significant Country Line Creek/South Country Line Creek Slopes Significant Natural Heritage Area (SNHA) and the Locally Significant Country Line Creek Bluffs SNHA.

The preserve contains uplands dissected by typical dendritic drainage patterns, including gently sloped upland ridge tops, narrow spur ridges, steep slopes, and ravine bottoms. The ridge tops have all been cultivated in the past and support successional Virginia pine stands or planted loblolly pine stands. The portion of the preserve west of where South Country Line Creek flows into Country Line Creek has numerous steep north-facing slopes and ravines. These support Mesic Mixed Hardwood Forest on the south side and a very good example of the rare Basic Mesic Forest on the north side of the site. Some of the latter community type is relatively old, with many trees at least 24 inches d.b.h. A few small areas of Dry-Mesic or Basic Oak - - Hickory Forest also occur within the natural area. A small cliff occurs near the northwest corner of the site. It is transitional to a Piedmont Mafic Cliff community, but is too small and shaded to be a representative example of that type. The floodplain along Country Line Creek is up to a quarter mile wide, while that on South Country Line Creek is fairly narrow. Both support Piedmont Alluvial Forest. While this community type is not mature, it is of good quality, with natural species composition that is not excessively dominated by weedy species.
Several tracts to the east and west of NC 62 adjoining Country Line Creek and its tributaries are

also included within the preserve, as well as one tract farther upstream on South Country Line Creek. Some of the riparian areas are broadened to include floodplain pools.

BOUNDARY JUSTIFICATION: The primary boundary for this portion of the preserve encompasses the rare community types, including Basic Mesic Forest, and high quality examples of more common natural community types. Primary areas of at least 300-foot are retained on the Country Line Creek Significant Aquatic Habitat. A minimum 100-foot primary area is retained on each side of all perennial tributaries within the preserve. The buffer includes pine plantations and lower quality habitat which serves important functions as a connective buffer.

MANAGEMENT AND USE: Caswell Game Land will be used primarily for public hunting and other forms of low intensity recreational.

Country Line Creek, as a part of the Dan River Subbasin, is listed by the Commission as a priority aquatic conservation area. Thus, the Commission's other main goal, besides providing habitat for terrestrial wildlife (and related hunting opportunities), is to provide permanent protection to important aquatic resources (rare fishes and mussels) in this creek and the Dan River downstream.

A number of invasive exotic plant species are present in the dedicated area, especially along South Country Line Creek. Monitoring of invasive populations and specific attempts at control are encouraged.

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

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

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

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

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

5. **Management Areas:** For the purposes of management, the preserve shall be considered to consist of a Primary Area (approximately 508 acres), including a Restoration Area (approximately 10 acres), and a Buffer Area (approximately 756 acres), as more particularly described in Exhibits A, B, and C, attached thereto and by this reference made a part hereof. The Primary Area consists essentially of the rare Basic Mesic Forest natural community and high quality examples of other natural communities, including Mesic Mixed Hardwood Forest and Piedmont Alluvial Forest and associated rare plant species; several rare mussels and fish species are associated with Country Line Creek.

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

   The Buffer Area, which contributes to the management and protection of the Primary Area, consists of managed forests and fields.

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

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

Activities and uses unrelated to those listed above are prohibited except as otherwise provided in these Articles or unless necessary to carry out the purposes of the preserve. Prohibited activities include, but are not limited to: construction; commercial activities and development; commercial silviculture; agriculture and grazing; gathering of native species of plants or plant products; the removal, disturbance, molestation, or defacement of minerals, archaeological and natural resources, except for research purposes as approved by the Custodian; and those activities specifically restricted in these Articles. There shall be no fires, except as necessary for ecological management of the preserve or in conjunction with supervised educational activities of the Custodian, or further excepted as herein provided or otherwise expressly permitted.

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

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

D. Disturbance of Natural Resources: The cutting or removal of trees, dead or alive, or the disturbance of other natural resources is prohibited except as necessary for removal of hazards to visitors, control of disease that would damage or reduce the significance of the preserve, restoration after severe storm damage, trail clearance and maintenance, or for purposes of maintenance or restoration of natural communities or rare species populations as stipulated in the preserve management plan and that which is consistent with the purposes of these Articles. Salvage timber cuts which may be necessary due to natural catastrophe will be allowed in both Primary and Buffer Areas, but in a manner that will contribute to the recovery of the prevailing natural conditions of the forest and in consultation with the North Carolina Natural Heritage Program.

The restoration area within the Primary Area will be managed to restore the hardwood natural communities through selective removal of loblolly pines and use of prescribed burning, allowing the burns to spread into the rest of the Primary Area.

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

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

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

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

I. Control of Populations: Any control of animal or plant populations on the preserve shall be for the purpose of correcting those situations where those populations are significantly affecting natural conditions on the preserve, and in accordance with the Custodian's established regulations for hunting, trapping, or

fishing of designated game animals. The Custodian may, in consultation with the North Carolina Natural Heritage Program, apply biological controls, herbicides and pesticides, and other means deemed necessary or appropriate to control or eradicate exotic or native species of plant or animal that are degrading the natural character of the preserve. Because of potential impacts on native species, no exotic flora or fauna shall be introduced into the preserve.

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

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

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

M. Management Plan: The Wildlife Resources Commission, as Primary Custodian of the preserve, shall be required to prepare and submit for approval to the Secretary of the Department of Environment and Natural Resources a management plan for the preserve. The management plan will be part of the larger management plan developed for the gamelands. This plan shall be subject to all the provisions of this dedication and shall additionally be consistent with the management principles set forth in the North Carolina Administrative Code 15 NCAC 12H.0300 and .0400, and such other regulations as may be established from time to time by the Secretary of the Department of Environment and Natural Resources. In any case where contradictions may arise between this instrument of dedication and other management regulations, the terms of this dedication shall take precedence.

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

   Buffer functions within the dedicated area may include protecting the primary area(s) from indirect detrimental ecological effects, providing additional area for species and ecological processes that require larger areas, and providing important successional stages and disturbance regimes and other habitat diversity for wildlife. Based on these general objectives, the following buffer functions will be addressed in the management plan.

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

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

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

Exhibit 1: Public Input Meeting Notes

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

Public Input For Game Land Planning - Notes

R. Wayne Bailey-Caswell	July 24, 2013 Wednesday	7 p.m.	Caswell County Center Agriculture Building NC Cooperative Extension Service 126 Court Square, Yanceyville, N.C. 27379

Jane Sorrels – Caswell County

- Consider horse trails that are located off of the graveled roads
- NC Horse Council could help with the development of these trails
- Horse trails could be created and maintained by volunteers/organizations donating time as well as money
- Would also like to see mounted fox and coyote hunts allowed on GL
- Trails could help boost local economy
- Establish trails on the CURE Area

Sam Griffin – Rockingham County

- Where does the money to manage GL come from? - Dawes answered
- Where does the money from timber sales go? - Dawes answered
- Would like to see the establishment of more NWSG fields on GL
- What species of ducks do you usually see in the impoundments and do you feel like the management of these impoundments in worth the effort? – Baranski/Hannah answered

George Daniels – Caswell County – Blanch

- Have you considered user fees? – Dawes answered
- Consider charging for non-traditional users
- By charging all users you may open up the GL to a more diverse group than you realize is out there
- When is your hunting season? – Dawes answered
- Supports a diverse group of users as long as it does not interfere with what is biologically sound – "compatible with biological needs"
- Supports user fees as long as it does not limit users
- "Folks who want services don't mind paying"
- "Access should not be limited due to a lack of funds"
- What are primary users? – Dawes answered

Mailing Address: N.C. Wildlife Resources Commission • 1701 Mail Service Center • Raleigh NC 27699-1701
Telephone: (919) 707-0010

Tom Berry – Guilford County – NCWRC Commissioner

- Began by addressing the group regarding services being cut due to budget cuts – told them that they would see cuts
- Thinks horseback riding on GL is a good idea
- Believes the GL is a great asset that is under utilized
- Asked if we thought the GL was under or overutilized – Dawes responded
- Thinks we should look into implementing QDM on GL – somehow restricting the harvest of smaller deer – stated that "many people have suggested this to me and this is something that you should look into"
- Tells audience about the Apprentice License
- Asks what is the process now? What happens after this meeting is over? – Dawes answers
- Promises everyone that "changes will be made" and "I have a vested interest in this county and I can assure you will see changes"

Zac Taylor – Yanceyville

- What days can you ride on GL? - Dawes answered
- Where can we park? – Dawes answered
- Where can we ride, where are the start and stop points? – Dawes answered
- Appreciates the work we do
- Doesn't have a clear understanding of the rules and regulations as they are currently written
- Would like to see more horseback riding opportunities

Harvey Holden - ?

- Do you have to have a license to ride horses? – Dawes answered
- Is there an age limit on the license? Can children utilize the GL without a license? – Dawes answered
- When can I train doge on GL? – Baranski, Allen, Dawes addressed this question

Karen Chavis - ?

- Can we get a group permit to ride horses? – Dawes answered

Lisa Taylor – Yanceyville

- Would like to see larger parking areas for horse trailers

Jason Ashe – Randolph County

- Would like to see additional roads opened up for disabled hunters to use

Elaine Berry - ?

- Have you attempted to re-establish piedmont prairies on the GL? – Baranski answered

Johnny Hodges – Providence

- We need horseback riding
- Don't allow riding during the gun season or turkey season – but during the rest of the year it should be allowed
- Riding trails on Caswell GL could be a money maker for the county

Johnny Hodges continued

- Supports the installation and use of "managed" trails through the woods
- Supports the implementation of some type of a user fee – suggested a parking fee
- Supports having outside groups/organizations responsible for the installation and maintenance of trails
- Concerned about the harvest of hardwoods on GL – Dawes and Baranski addressed this

Paula Nelson – Summerfield, Guilford County

- Suggested that we solicit the NC Horse Council for assistance in laying out the trails
- NC Horse Council will do this for free
- Supports designated trails on GL vs. free riding all over
- Cited bill HR1825 - BILLS-113hr1825ih.pdf that declared horseback riding on federal lands as an accepted traditional use
    - I read through this bill and found no reference to horseback riding

Doug Fuquay - ?

- When can we run (train) dogs? – Dawes, Baranski, Allen answered
- Supports allowing small game hunting on "off" days

Exhibit 2-A: NCDENR Comment Letter

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

August 30, 2013

Mr. Chris Baranski, Management Biologist
R. Wayne Bailey-Caswell Game Land
Caswell Wildlife Depot
3372 NC Highway 62 S,
Yanceyville, NC 27379

RE: R. Wayne Bailey-Caswell Game Land Management Plan

Dear Mr. Baranski:

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

The Natural Heritage Program (NHP) welcomes a continued partnership in conservation, and offers to provide information on natural resources that we have compiled over the years – often with the help of WRC biologists. We propose that WRC incorporate into the management plan consideration of rare species, special animal habitats, and exemplary and rare natural communities, and particularly, the Significant Natural Heritage Areas that have been identified by the NHP as priorities for conservation. Information on these resources is available from NHP as GIS data layers and natural area site reports. In addition, NHP biologists are available to provide additional specific information as needed.

We suggest that existing commitments associated with Dedicated Nature Preserves and Registered Heritage Areas be recognized in the management plan. The information on Dedicated Nature Preserves was recently provided to Isaac Harold for all game lands; if we need to provide information specific to Caswell directly to you, please let us know.

There are some specific issues we recommend addressing in the R. Wayne Bailey-Caswell Game Land management plan. These recommendations would include maintaining the integrity of the hardwood forests, especially those within Significant Natural Heritage Areas (SNHAs), and minimizing fragmentation to the extent possible. If at all possible, any proposed recreational trails, such as for equestrians, ATV and mountain bike users, and other user groups, should avoid the SNHAs; most of these natural areas are located on rich slopes and floodplains, and these habitats are highly sensitive to disturbance, which can introduce invasive species that quickly overrun native herbaceous species. Also, monitoring for and removal of invasive exotic species is recommended, especially the removal of woody invasives such as privet. Monitoring for and treating any gypsy moth outbreaks, or outbreaks of the emerald ash borer, using the most target-specific means available, is also recommended.

The R. Wayne Bailey-Caswell Game Land management plan is intended to guide management and user activities for the next ten years. During that time, North Carolina will most likely continue to be one of the fastest-growing states in the U.S. Maintaining the integrity of natural areas and connectivity

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

Sincerely,

Linda Pearsall

Exhibit 2-B: Michael Seamster Comment Letter

From: mike.seamster
Sent: Monday, July 29, 2013 9:31 AM
To: SVC_WRC.gamelandplan; Baranski, Christopher M
Subject: Caswell Game Land Comments

I attended the public input meeting held in Yanceyville on July 24, 2013 for the development of game land management plans. The meeting was attended by an organized group of horseback riders who were there to request the establishment of designated horseback riding trails on the R. Wayne Bailey/Caswell Game Land. Specifically, they were requesting the establishment of lengthy back woods riding trails (instead of riding on open game land roads), the development of large graveled parking areas to accommodate trucks, horse trailers, and campers, and the expansion of allowable riding days on the area.

The R. Wayne Bailey/Caswell Game Land is a Commission-owned game land paid for primarily by hunters and fishermen for the purposes of hunting, fishing, and trapping. I am very strongly opposed to the establishment of horseback riding trails on this game land.

I personally have nothing against horseback riding. It is a wonderful outdoor activity that many people enjoy. I simply believe that this activity should be pursued on local, state, and national parks, National Forests, equestrian centers, and private lands, not on Commission-owned game lands whose primary purpose is hunting, fishing, trapping, and other wildlife related activities.

In general, the NCWRC is charged with managing our wildlife resources, not with managing other outdoor recreational activities. Several other State and Federal agencies are charged with managing and accommodating various outdoor recreational user groups such as horseback riding groups, dirt bike riders, mountain bikers, etc. They provide recreational areas to accommodate these many and varied groups. In my opinion, birding trails would be a legitimate use of the game land because it would be a legitimate use of our wildlife resources and, as so, should be managed by the agency. However, the agency should not be in the business of accommodating horseback riding, dirt bike riding, mountain bike riding, etc. These activities have no positive impacts on our wildlife resources, only detrimental effects. For the NCWRC to establish and manage horseback riding trails on any Commission-owned game land, I believe would open the proverbial “Pandora’s Box”. If the agency provides horseback riding trails, then other outdoor recreational user groups will have a legitimate argument to expect mountain bike trails, dirt bike trails, 4-wheeler trails, etc. How do you accommodate one of these groups and not the others? Slowly but surely, premier and pristine hunting areas would gradually become over-used outdoor recreational areas. Unfortunately, we’ve all seen this happen on some of our National Forests in North Carolina and, with the increasing human population in our state, these negative impacts will only be exacerbated in the future. I sincerely hope the NCWRC will not consider establishing horseback riding trails or any other activities for which it has no agency responsibility on our Commission-owned game lands and which has only negative impacts for both our wildlife resources and our hunters.

Specifically, the R. Wayne Bailey/Caswell Game Land is located in the Northern Piedmont region of the state within easy driving distance of several major cities, including Raleigh, Durham, Chapel Hill, Greensboro, and Winston Salem. If horseback riding trails were established on this game land, there is little doubt they would receive heavy usage by large organized groups of horseback riders. The horseback riders at the input meeting even talked about how popular riding trails would be in this area of the state and the large number of groups that would undoubtedly use them. Regardless of how well horse trails are planned, with heavy usage some environmental damage is unavoidable. The additional work

Exhibit 2-B: Michael Seamster Comment Letter (cont.)

associated with establishing and maintaining horseback riding trails and parking areas would further tax the agency's limited manpower and resources. I don't believe the NCWRC should start down this road.

Horseback riders already have plenty of riding trails to choose from in North Carolina. One need only Google any number of sites such as www.horsetraildirectory.com or www.horseandmuletrails.com to find ample places to ride. The horse trail directory site alone shows 58 different sites totaling more than 3,300 miles of riding trails available to horseback riders in North Carolina. In addition to many privately-owned equestrian centers and riding areas, National Forests provide public lands that accommodate horseback riders and hunters (as well as numerous other user groups). Also, State Parks and National Parks offer numerous public land riding trails but do not allow hunting. On those areas, horseback riders have riding trails where they don't have to contend with hunters utilizing these areas. In my opinion, Commission-owned game lands, such as the R. Wayne Bailey/Caswell Game Land, should remain as areas where hunters can enjoy their sport without having to contend with other user groups like horseback riders.

I, therefore, respectfully request that the NCWRC not allow the establishment of horseback riding trails on the R. Wayne Bailey/Caswell Game Land or any other Commission-owned game land. Please don't allow our well-managed game lands to be turned into over-used outdoor recreational areas. Thank you for your consideration of my comments.

Michael Seamster

Exhibit 2-C: Todd Menke E-mail, 30 Day Public Comments of Draft Plan

From: Todd Menke
Sent: Monday, December 22, 2014 2:21 PM
To: SVC_WRC.gamelandplan
Subject: All Draft Game Land Management Plans Available for Public Review

Only part of the primary users help support the Game Lands through hunting, fishing, trapping, and game lands licenses. Wildlife viewing, hiking, biking, and walking pets are a variety of users who do not have to purchase a license for using game lands. One objective for all game land management plans should be to implement and require all users to purchase a game lands license if the objective is to provide for more public opportunity. This would help generate additional funds to implement objectives. If resources are to be shared by multiple users then those users should have to pay equally.

Todd Menke

Exhibit 2-D: Sean Maloy Comment Letter

January 8, 2014

NC Wildlife Commission
ATTN: Commissioner, District 5
1751 Varsity Drive
Raleigh, NC 27607

Subject: Evaluation of Hunting Deer with Dogs in the Caswell Game Lands

Dear NC Wildlife Commissioner,

After 32 years of service in the US Army, I'm retiring to Caswell County this August from the Ft. Bragg area. Three years ago, we purchased a farm adjacent to the Caswell Game Lands located near Ridgeville Road and Greer Chapel Road (Leasburg) as a retirement homestead and still hunting retreat for our family (map is attached). Deer hunting has been great during archery and muzzleloader season; however, when gun season begins, hunting on our property becomes a futile experience when the hunters arrive to hunt with deer dogs.

Over the past three deer seasons, we've witnessed and documented with photos and video some of the following:

1. Hunters with dogs releasing on private property South of these game lands to run through that property, through ours, towards the game land (all without permission).
2. Hunters with dogs releasing on game lands only to have them run straight through (approximately 1/3 mile) to our property where we have several food plots & stands, and spending the entire day running around our property, our house, chasing our cats, and also onto our neighbors horse farms along Fuqua Road. They push the deer and turkey off all our property and ruin ALL hunting opportunities for my family & neighbors for the weekend. According to trail cameras, it takes about 2 days for the animals to return.
3. Deer carcasses left in areas where these hunters' trucks were parked (can't prove that they were theirs, but no still hunters are in that area when they run dogs).
4. Dogs wandering, sometime for days, that end up at our home or neighbors home, dehydrated and malnourished, then we have to try to call the hunters and sometimes find that the number on the collars have been disconnected. Then these poor animals become our problem to deal with, find their owners and care for them. It seems that the dog hunters don't really care about their animals in some cases.
5. Multiple instances of having to capture dogs on our property or our neighbors and call their owners while hunting.
6. We've observed rabbit hunters with beagles whose hunting experience is degraded because of lost deer dogs, who are looking for their owners, which end up trying to run with the rabbit beagles.
7. We've talked with father's who've brought their sons to still hunt in these game lands, only to be disappointed that the deer dogs have pushed ALL game from the woods, thus degrading their hunting experience.
8. I've spoke with dog hunters who had deer in their trucks...one bragged about shooting at the deer seven times before finally killing it. I believe this style

of "hunting" leads to many wounded animals, some mortally. In the past two years, we've found three dead deer (two does & one spike) in our deer bedding areas during our post season scouting that I believe died of wounds and not natural causes. The run-and-gun style of hunting deer goes contrary to the NC Wildlife Safety Manual of ethical shooting of game animals.
9. The Stats for deer taken by dogs in Caswell County indicate a reduction in two of the past three years. It's unknown to me exactly how many have been taken on game land vs private lands, but I'm willing to bet that the majority of these are taken on private land.

My points and request are these:
1. I believe that deer hunting with dogs in the game lands in Caswell County benefits a very small group of select hunters and degrades hunting opportunities for the vast majority of visiting hunters and private land owners who have adjoining properties.
2. At this time, I don't advocate banning hunting deer with dogs in the Caswell game lands or within the County; but I do ask that certain game land parcels (such as ours) be evaluated for the feasibility of deer hunting with dogs. Like in other game lands, some of these parcels should be labeled as Archery only, all weapons, dogs permitted, etc. Deer hunters with dogs need larger parcels of land to hunt in that they can easily access, effectively hunt, and locate & secure their dogs without infringing on private land or affecting the hunting or lifestyles of the citizens in the surrounding communities.
3. Caswell County seems to have a history of clashes with dog hunters vs still hunters, dog hunters vs private landowners, etc...but the common denominator is the Deer Hunter with dogs. I'm new to the county and still have an open mind and try to see all sides (even while I'm directly affected).

I request that the NC Wildlife Commission conduct an investigation to objectively evaluate the stewardship of the wildlife, determine the proper manners & locations in which they should be hunted, the protection of the game lands properties, and the goodwill to the private land owners and communities that surround them.

I respectfully request that this proposal be considered and action be taken on it in the coming months of 2014. Upon request, I will gladly share our photos & video's and invite you to walk our property with me to better illustrate the items above. Currently, I believe there can be a viable solution for all parties, but the NC Wildlife Commission has to lead this effort. Your consideration of this request is much appreciated.

Sincerely,

M. Sean Maloy
819 Lakeridge Drive
Cameron, NC 28326
704-650-6258

Property Address:
808 Fuqua Road
Leasburg, NC

Exhibit 2-D: Sean Maloy Comment Letter (cont.)

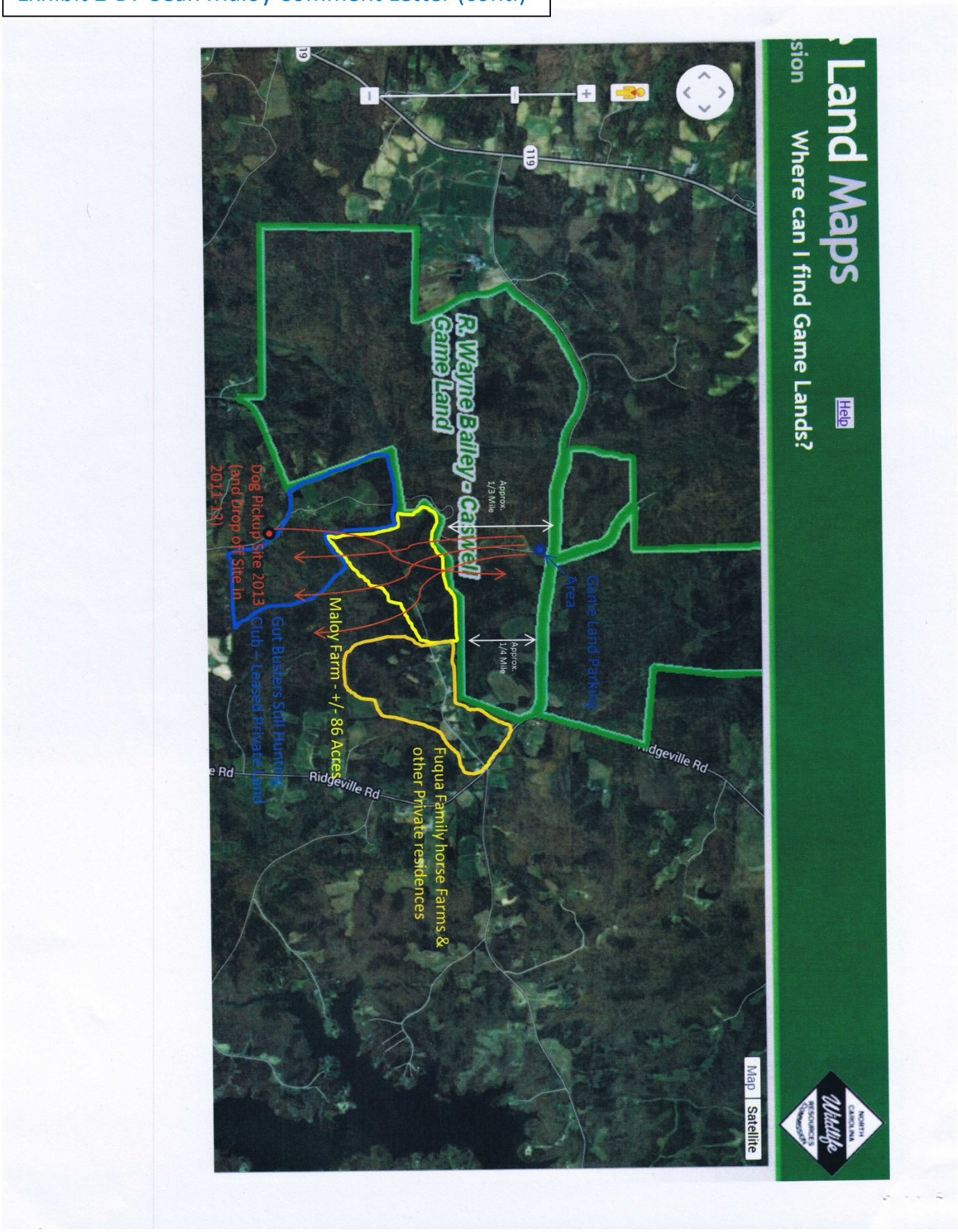

Exhibit 2-E: NC Natural Heritage Program Comments of Draft Plan

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

Pat McCrory
Governor

Bryan Gossage
Director

Donald R. van der Vaart
Secretary

January 16, 2015

Chris Baranski, Management Biologist
R. Wayne Bailey-Caswell Game Land

Dear Mr. Baranski:

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

The Natural Heritage Program (NHP) is pleased that the R. Wayne Bailey-Caswell Game Land has been recognized for the large number of rare species and natural areas it harbors. For this reason, we encourage maintaining the integrity of its hardwood forest and minimizing fragmentation where feasible. NHP therefore supports the acquisition plan noted in the draft, as it identifies promoting connectivity and protecting important natural resources as primary goals.

The NHP agrees with WRC regarding user activities on the game land, especially horseback riding, off-road vehicles, and mountain biking. Current levels of authorized activity seem to be compatible with the stated goals of the game land, but we concur that increased levels of activity or new trails could be detrimental to wildlife and other natural resources.

In review of the draft management plan, NHP staff expressed appreciation for the well-presented section on Fish and Wildlife Communities, as well as agreement with the target non-game species for each major habitat type. In this section there was one point of emphasis on salvage operations in floodplains running a high risk of soil disturbance and invasion of non-native plants such as privet, *Microstegium*, and Japanese honeysuckle. NHP staff agreed with the draft that floodplain forest "habitats should remain undisturbed and allowed to perpetuate on their own and reach climax status." The NHP also agreed with the statement that "The NCWRC should explore the feasibility of re-routing or re-building the game land gravel road that cuts through the middle of the depression swamp forest (at the North Frogsboro Access) to restore natural hydrology and minimize negative impacts." As WRC staff know, this depression swamp is a highly significant natural habitat, and thus great care should to be taken to avoid impacting this site.

In the section of the draft on Major Forest Types and Management, the NHP concurs with most of the management recommendations, and the need to create more early succession habitats on Caswell Game Land, for the CURE (Cooperative Upland Habitat Restoration and Enhancement) Program. Our one concern is that upland hardwood forests of the acreage found in Caswell Game Land are rare in the Piedmont, away from Uwharrie National Forest, and many forest interior species are declining in the Eastern United States. We encourage management in the pine forests or mixed pine-hardwood forests on the game land first - especially those not located within NHP identified natural areas - where thinning and timber harvest activities can be performed to meet CURE goals. We do support prescribed fire in some of the mature upland hardwood stands, as described in the draft plan. These fires can burn downslope into some mesic hardwood forests and floodplain forests and be extinguished at creeks, as is currently done in some stands. Such prescribed burns should be somewhat limited in hardwood stands, as burns can eliminate (for several years) crucial shrub and sapling growth in forests that are needed by many animal species for nesting, foraging, and cover.

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Exhibit 2-E: NC Natural Heritage Program Comments of Draft Plan

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

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

Sincerely,

Scott Pohlman

Exhibit 3: Game Land Management Plan Comment Questions

R. Wayne Bailey-Caswell Game Land Management Plan

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

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

3- How do you use this game land?

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

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

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

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

Name: _____
Address: _____
Phone: _____
Email: _____

(Continue on back if necessary)

RWB-Caswell Game Land Management Plan On-line Comments

HARTMAN, DAVID J (Iredell)

Q1- Would be nice to see releases of wild pheasant on the game lands as they seem to be non-existent in NC.

Q4- The more diverse parking areas to get into various sections of the land, the better. Even dirt road access to designated parking areas would be better.

CATES, RICHARD C (Person)

Q1- Waterfowl and upland game habitat.

BRIDLE, KENNETH A (Stokes)

Q1- There are several nice occurrences of rare plants and natural communities along the bluff of Country Line Creek that should be protected and preserved.

Q3- Bird and butterfly watching, botanizing and hiking.

Q4- I think it is very important to protect the natural resources on these game lands and continue to limit non-resource related activities like horse riding, off-road vehicles and mountain bikes. Not only are these uses damaging to the roads and trails they are disruptive to the wildlife and other users who appreciate some place natural and restrictive of abusive uses.

Q6- It would be nice if there was a public restroom nearby as part of the game lands. It would also be nice if the public could meet some of the staff that manage the game lands and learn to appreciate what they do.

BERNARD, THOMAS C (Caswell)

Q1- The quail and other small game habitat.

Q2- The species that live on both that are endangered.

Q3- I have not used the gamelands in a long time but would like to use them in the future. Would like to see more trails put in for the use of horses (working with the NC Horse Council to prevent any erosion that some people might think that may happen). Money is available to help put these trails in.

Q4- The current level of access is not satisfactory, there are only a few points of entrance on horseback.

Q5- I would suggest working with the horse folks to come up with a good plan for more use of the gamelands that would not disturb the wildlife.

Q7- I think that financial assistance and labor is available through the NC Horse Council and local Horse Assc. If a working plan is put into place for the betterment of the gamelands, hunters and horse folks.

ASHE, JASON P (Randolph)

Q1- This section of Game land in my opinion only lacks in deer food plots the biologists have done a very good job in creating and protecting habitats for many species here.

Q3- I am the president of Big Dog Hunt Club my group and I hunt on this section of Game land. We utilize this property not only for deer but many other Game Species. I am speaking for many of my members that do not have internet or quick and easy access to this survey (approx. 50 to 60) individuals. We moved to this section of Game land around 10 years ago we did hunt the Sandhills Gameland but through heavy hunting and a maximum doe season the hunting was inadequate, we are very pleased with this section and strongly enjoy running deer dogs on this area. We would like to see a little more emphasis on deer habitat and food plots in this area.

Q4- As the president of a very diverse hunting club I see how access affects all ages of hunters. I feel that the access on this game land is adequate for hunters with a sound mind and body but it lacks in disabled hunter access. I and my club would like to see the disabled hunter access grow on this game land. We have discussed this issue at club meetings and feel a more adequate approach would be for the disabled hunter who seeks access to obtain a disabled access day permit on top of having an existing disabled hunter access permit. The revenue off of a second permit could help in maintenance of the new roads that could be used. We also feel that access should be limited to ATV only to limit destruction of the shoulders of the road bed. We just have a lot of older men and woman that cannot access a large percentage of this property due to there only being two handicap roads designated on the whole 17000 acres.

Q5- Myself and my club feel that this gameland section is one of if not the best managed and maintained area in the state. The biologist and wildlife personnel that are involved in this area do a very good job, and it makes it a great pleasure to hunt in such a beautiful and game rich setting.

Q6- Do not add any restrictions on the users. This section of gameland is wonderful the way it is and how it is.

Q7- Myself and my club are strongly against a maximum season on doe. Through experiencing this in the Sandhill Gameland around 10 years ago it destroyed there deer herd. If there is to be a change then we feel that a permit system would be an excellent choice to address the issue. We feel that the biologist should appropriate the amount of tags and then the hunters buy the tags separate from their normal license. We also would like to see more disabled hunter access through possibly an access permit system on some of the gated roads with ATV only. We are not opposed to Horseback riding as long as it is not in any hunting season.

SEAMSTER, MICHAEL H (Caswell)

Q1- Riparian areas, wetlands, and upland hardwoods.

Q2- Wild turkey

Q3- Hunting and fishing

Q4- Access is more than satisfactory. If anything more gated roads and walk-in only areas would be preferred.

Q7- I attended the input meeting in Yanceyville on 7/24/13. There was a number of requests for the establishment of horseback riding trails on this area. I am opposed to these requests and have submitted my in depth comments by email regarding the reasons for my opposition. Thank you.

GIANOPULOS, KRISTIE (Johnston)

Q2- The game lands should be managed and protected for all wildlife, not just game animals - the amphibians and reptiles in particular are important to me.

Q5- The game lands should be managed and protected for all wildlife, not just game animals - the amphibians and reptiles in particular are important to me.

Q6- Natural surface pedestrian trails, open during times that are closed to hunters (for the safety of the recreational users).

NORWOOD, JOHN R (Rockingham)

Q2- I believe the duck habitat is the one that needs improving the most since they already have a very good turkey management plan in place. I still think they need to stick with their turkey plan to continue improving the turkey numbers.

Q3- I use the gameland for Duck, Turkey, Squirrel Hunting and also fishing.

Q4- I believe the access to the gameland is satisfactory but it is not satisfactory to the Brumley Impoundment. I also like how they restrict access to horseback riders during hunting days and believe they do not need any more trails or special parking.

Q6- I would use it more if it was open on more days. But I also understand they do not want to over hunt the animals on the gameland.

Q7- I believe the Brumley impoundment needs to be planted to have more ducks in there. Also it is such a long walk into the impoundment especially early in the morning. So a parking lot closer to the impoundment would be nice.

BOYD, CONRAD M (Durham)

Q3- I use the Caswell Game Land during the permit hunts. At that time I have access to the restricted area where there is much or no pressure or other hunters competing for the same space.

JOHNSON, LARRY R (Alexander)

Q3- I deer hunt in muzzleloading season.

Q4- Needs to be 6 days hunting access.

Q5- Need to have porta- jons at campgrounds and a place to dispose of deer carcasses.

Q6- It's a two and half hour drive from my home and with the price of fuel. It would be nice to go for 2 to 3 straight days and be able to hunt every day instead of every other day.

SEAWELL, HOWARD R (Moore)

Q2- Turkeys are the most important game animal on the Caswell Game Land, years ago hunters would travel half the state to get a chance at a turkey there, now we have enough to hunt in other areas, I would like to see less timber cutting on the game land, this is a problem for the turkeys, it moves them away then after a few years predators will use it to hunt and populate thus harming small game and turkey survival.

Q3- Turkey hunt

LEMERE, ANNE (Rockingham)

Q3- I would like to see an expansion of access for equestrians in the gamelands area. Expanded trail access as well as dates of access. Horses have played a critical role in the settlement and history of America and should continue to be allowed access into wilderness, state and federally held lands. Thoughtful equestrian use within the gamelands allows more tax payers to enjoy the lands and would have minimal impact on game.

Q4- Access for equestrian use is currently limited from time as well as trails perspective. Equestrians are only allowed on a limited number of roads within the game lands and only during a very limited number of days within the year. Expansion of suburbs and cities is severely limiting the number of safe trails for riding horses and impact on the game lands would certainly be much less severe than that of ATVs, etc.

Q6- Expanded equestrian access.

Q7- I applaud the efforts to maintain a safe habitat for wild game here in NC. With expansion of suburbs and cities, wild game territory is rapidly shrinking. As an integral part of America, I would like to propose that recreational horseback riders be allowed increased access to the game lands. With thoughtful use, impact would be much less severe than that of ATVs and expand utilization of the game lands to more tax payers. The horse industry generates money for states that encourage access and are "horse friendly". Many equestrial organizations across the country are contributing significant volunteer hours towards the maintenance of trails and habitats to supplement limited resources in state and national parks due to government budget cuts. I strongly encourage consideration of expansion of hours and trails for equestrians.

LOUIE, CAROL A (Guilford)

Q3- We would like to see the game land developed and used for horse riding. We are not aware of any trails there yet, therefore are not active users of the land at this time.

Q6- Having horse trails would encourage us to use the land actively.

CAMPBELL, SUSAN M (Moore)

Q3- Occasional wildlife watching

Q4- Current access is good

HALL, NATHANIEL (Caswell)

Q4- Over the years I have received inquiries as to why horseback riders could not have trails and access to the game lands. It would be a tremendous economic impact for Caswell County and it would encourage non-hunters to get outside and enjoy nature. Travel and tourism would be encouraged. **Nate Hall, County Commissioner**

Q5- Develop or allow development of horseback riding and walking trails. **Nate Hall, County Commissioner**

Q7- The game land could be more user friendly for local non-hunting citizens. Explore other recreational activities with local organizations and county government. **Nate Hall, County Commissioner**

BERGMAN, DAVID CHAD (Durham)

Q3- I Use It For Dove And Turkey Hunting, And Also Small Game (Squirrel).

SCARPITTI, CARMALEE J (Wake)

Q4- As an equestrian I would like to see more access for horseback riding here and on all the gamelands. I drive to the Sandhills several times a year to ride often spending the night at Chadbourne Farm and contributing to the local economy. I would do the same at Caswell if the opportunity to ride was there.

Q6- Allowing better access to equestrians. This would include both the times when I could ride and access to non-vehicular trails.

DUBUISSON, JULIE (Forsyth)

Q4- Need better trail access, riding trails and hiking

SHACKLEFORD, LYNDA L (Guilford)

Q4- I would like more access for horseback riding.

MINOR, ALEX (Guilford)

Q4- I would love to see the game lands opened up for equestrian use. I enjoy using the Hoffman game lands for some riding activities and would love to see more of them opened up. I favor more support of the gamelands program if the land was opened up to more public access. At a time when development continues to encroach open land, we need to be able to share the land resources we have!

EVANS, MELISSA L (Alamance)

Q4- I think there needs to be a more active interest in opening it up for horseback riding.

HARRINGTON, FRANKIE E (Forsyth)

Q5- Extended horseback riding trails would encourage participation by many additional people and increase the funds and volunteers available for projects.

SMOOT, CHRIS (Guilford)

Q5- Horses and horse owners represent a much larger population than many people realize. There are thousands of equestrians in NC representing millions of dollars in economic impact, including thousands of jobs supported and millions in taxes paid. Well-designed horse trails can be sustained for decades with minimal environmental impact. Please include horse trails in your planning. Mountain biking as well.

YOUNG, DEBORAH P (Rowan)

Q5- We need more horse trails!!!!!! Day parking for trailers....and primitive overnight camping areas.....just a place to park w/ access to water...

LOFTIS, MICHAEL D (Yancey)

Q5- As a land owner in the county I would like to see the hunting of deer with dogs stopped on game lands. Also I would like to see a move to more trophy management of deer on Caswell Game Lands. Thank you for the opportunity to comment.

BARTON, VIRGINIA L (Caswell)

Q5- It would be beneficial to all if trail riding access is granted to horseback riders, horse folks could help maintain trails and land.

MATTHEWS, ANISA S (Caswell)

Q6- Local horseback riders are always interested in riding trails more local. It would be nice for the game lands of Caswell to be more accessible for this wonderful activity.

PETTY, CATHY S (Out-of-State, Dry, Fork, VA)

Q6- Horseback riding

SMITH, KIMBERLY J (Randolph)

Q6- I would like to see horseback riding trails. I know my family would use them along with several of my friends.

RIPPERTON, GLORIA D (Chatham)

Q6- If you had trails for horseback riding or carriage driving.

TAYLOR, TOHCIA (Guilford)

Q6- Equestrian trails that are open for riders regularly. I ride the Hoffman trails regularly, but it is a much farther distance.

JOHNSON, BRUCE W (Cabarrus)

Q7- NO COMMENT, LEFT BLANK

GWALTNEY, GREYSON W (Rockingham)

Q7- This is regarding the waterfowl impoundment hunt that I drew for opening day of the late season of last year. I drew the Caswell impoundment and it was completely dry when we went to scout it out a few days before our hunt. I talked to one of the people who run the gameland and was told they did not put the boards in the riser to flood the impoundment until a couple of weeks before the first scheduled hunt. That does not allow for enough rain to fall to fill the impoundment. We regularly have dry spells in the fall of a few weeks and it was really disappointing to pay 5 dollars for a hunt, feel excited I had a chance to hunt a nice impoundment only to find out a few days before it was bone dry.

GALLMAN, JUDY B (Guilford)

Q7- Please allow equestrian use of the trails in the game lands.

LEESA, LINEBERRY (Alamance)

Q7- Would like to see more horse trails closer to me. I heard you could ride there but have not tried yet. Don’t know where the you would go to park the trailer and start.

RWB-Caswell Public Input Comment Cards Transcribed

Sam Griffith (Reidsville)

Q1- The disked fields are very important for brooding habitat. They are a key part of keeping the turkey populations healthy and the larger areas for quail. The improvement would be adding more to the burn regime while also planting more NWSG.

Q2- Turkey and quail are probably the most important. Keep the hunters happy and revenue will continue to be generated.

Q3- I turkey hunt on the Caswell Gameland every season. I occasionally fish and duck hunt as well.

Q4- There is satisfactory access on these Gamelands. There is enough seclusion to get away from heavy pressure near the major roads.

Q5- I would like to see more NWSG across the landscape. Turkey and quail brooding habitat can never be too abundant.

Q6- Allowing small game hunting on the off days of the 3 days per week.

Q7- One of the great things about the Gamelands is the seclusion. I enjoy getting off the roads and away from all the people. My favorite thing about the Gamelands is lack of good roads.

Ian T. Richardson (Stokesdale)

Q1- Upland bird habitat and wetlands/waterfowl habitat are those that I believe warrant the most emphasis.

Q2- Turkey, quail, and doves are those species that I believe warrant the most attention. Small game species, particularly rabbits, are also of interest, although it has been my experience that these species are fairly strong on the Game Lands.

Q3- I hunt the Caswell Game Lands primarily for wild turkey and doves. I also fish the Game Land ponds.

Q4- It has been my experience that access is very satisfactory.

Q5- The emphasis in terms of management should remain on the uses of hunting, fishing, and trapping primarily and before other non-traditional uses.

Q6- Continued emphasis on the CURE areas, etc. for upland bird habitat that would lend to greater hunting opportunities for these species and expanded waterfowl hunting opportunities.

Q7- I would be interested in allowing the possibility of allowing small game hunting on the off-days aside from Monday, Wednesday, and Saturday being expanded. This would open up a lot of opportunities and keep from interfering with big game hunters.

Lauren M. Spillmann (Greensboro)

Q1- All habitats are important to provide a diverse population of species.

Q2- It is important to protect all native species.

Q3- I would like to horseback ride and fox hunt-- I would like to see horseback riding on all off days that are not open for hunting.

Q4- I am not familiar enough with the current accesses. However, I would like to see better access for horse trailers.

Q5- I would like to see accessibility for horseback riding.

Q6- The ability to access the land by horseback.

George B. Daniel (Blanch)

Q1- Woodcock, quail, waterfowl, small game, and turkey as well as pond and wetland habitats.

Q2- Woodcock, quail, waterfowl, small game, and turkey.

Q3- I would like to hike, walk, observe, and horseback ride on gamelands.

Q4- Accessibility to gamelands for diverse uses of walking, hiking, horseback riding, and observing is greatly restricted and limited or not allowed at all. The NC Wildlife Comm. mission is to provide opportunities to all citizens for wildlife viewing and enjoyment and wildlife associated activities. More diversity and use is needed to attract full use of this NC resource.

Q5- Provide greater use gameland through more diverse opportunities that do not impede on other uses but rather enhance citizen's opportunities to know of this NC resource for utilization planning.

Q6- For the NC Wildlife to open up gamelands for walking, hiking, birding, horseback riding, picnicking – expand facilities for a greater utilization – parking, entry access, additional trails to year round use roads and seasonal roads.

Q7- Need to consider user fee for hunter, fisher, or trapper that would help fund these expanded and diverse uses and not let a lack of funding mechanism be a continued impediment to expanding the knowledge of and utilization of this NC resource.

Joey E. Knight III, Extension Director (Yanceyville)

Q1- Rare insect and plant species. Turkey, deer, birds, fish, and other species.

Q2- Amphibians, songbirds, quail, herbs, native plant species, more hardwoods, rabbits, doves, and turkeys.

Q3- Educational outreach for youth. Caswell viewing areas.

Q4- Need to make changes to make more accessibility for equine owners. This will increase economic development and keep monies in Caswell County.

Q5- Continue using BMP's and plant more warm season grasses for increase in quail production. Keep controlling coyotes by trapping and shooting (problem farms adjacent to gamelands). Use timber sales to make improvements on gamelands.

Q6- More hiking trails tied into the Caswell trails. Open more land and riding times for horse owners. More viewing areas with picnic tables. More parking areas for horse trailers.

Q7- Charge a user fee which would generate additional funds for the gamelands.

Robbie Manning (Providence)

Q6- Horse trails that are not gravel, parking areas for trucks, trailers, more times that horses are allowed.

Q7- We ride a lot of other parks, forests, and camp also. We certainly would not mind paying fees to do so. We ride Uwharrie Forest, Staunton River Park. As at Uwharrie, each trail is maintained by groups, individuals, etc., and they are usually clean. Larger parking areas for trailers.

Johnny M. Hodges (Providence)

Q3- No, I hunt on private land in Caswell.

Q4- Only used for seasonal hunting – Open for horses the rest of the year.

Q5- Open to horses. Then possible revenue for vehicle parking while riding.

Q6- For horseback riding recreation.

Q7- Want access on, ability to ride on horseback on Gameland during off season of deer and turkey season.

Fred Berry (Reidsville)

Q1- All -- But we need more varied habitat -- Clearings are good

Q3- Don't, but would like to ride and chase foxes and coyotes with hounds.

Q4- Need horse trails.

Q6- See above

Q7- I will help any way I can.

Paula Nelson (Summerfield)

Q3- I don't. Had no idea horseback riding was allowed, but I'm glad I found out because that's what I wanted to do. Need trail access but not just on roads.

Q4- Would love to have better visibility of option for usage -- Horseback riding restricted to the roads is less than optimal.

Q5- Open to more segments of the population.

Q6- Would like for you to allow organized fox and coyote hunting on horseback (CURE Area), to help control predator species. Mounted horseback hunting for fox and coyote is compatible with land use.

Q7- HR 1825 -- Recreational Fishing & Hunting Heritage & Opportunities Act recognized legitimate and important activities on national forest and BLM lands -- See no reason why NC can't model usage of state lands on same usages as federal lands -- Including horseback riding as a heritage activity.

NC Horse Council has geologist who can and will do soil analysis to help site trails to minimize soil impact/erosion control/etc. There are ways to allow horseback riding off the road that will be consistent with land use goals and still control access. Designated trails would be lovely -- We do <u>not</u> need "free range" access.

We want horseback riding allowed on <u>all</u> non-hunting days year round. If hunting is only allowed 3 days a week, horseback riding should be allowed the other 4 days.

We would also like to run hounds from horseback to hunt fox and coyote. This will help keep predators down and allow rabbits and small game to survive and be pursued by other hunters.

NC limited liability laws address equine related accident -- No "insurance" issues to worry about by allowing riding.

Jan Sorrells (Reidsville)

Thank you for having the meeting in Yanceyville last week. It was very informative. I do hope you will consider working with the equestrians!

Q1- I think the quail habitat you are working on is to be commended. I am told 40 years ago, there were abundant quail and very few deer. Now it is reversed. The quail need help.

Q2- I think we need to protect the indigenous species.

Q3- I don't currently use the gamelands because it is not open to all hunting. I participate in mounted fox, coyote, and bobcat hunting and would like to see the laws/regulations changed to permit this type of hunting.

Q4- Without an extensive trail network, the gamelands are not really useable for horseback riding. There are many equestrians in Caswell who would love to have access. There is no extensive network of trails in the area and it is sorely needed. Surely, with so much acreage, there is a way to work with equestrians and hunters to permit more riding.

Q5- Work with the NC Horse Council and local equestrian groups to plot out an extensive trail network. We would not expect the few wildlife employees to maintain the trails. We could have workdays, and pursue grant money to help with trail development and maintenance.

Q6- I would gladly take an active part in the development and maintenance of a comprehensive trail network that would be ecofriendly. I would love to ride in the gamelands.

Q7- Caswell County is a poor county in dire need of economic development. A huge portion of the county is taken by the gamelands, but the county benefits very little from it. If a comprehensive trail network could be established it would be a much needed economic boon to the county. Equestrians would actually buy and settle here if we had a good place to ride.

Did you know that in 2008 the North Carolina General Assembly commissioned a study of the equine industry in North Carolina? Equine-related spending totals about $2 billion annually. There are 300,000 horses in North Carolina, with the largest concentration in the Piedmont. We need a good place to ride!
