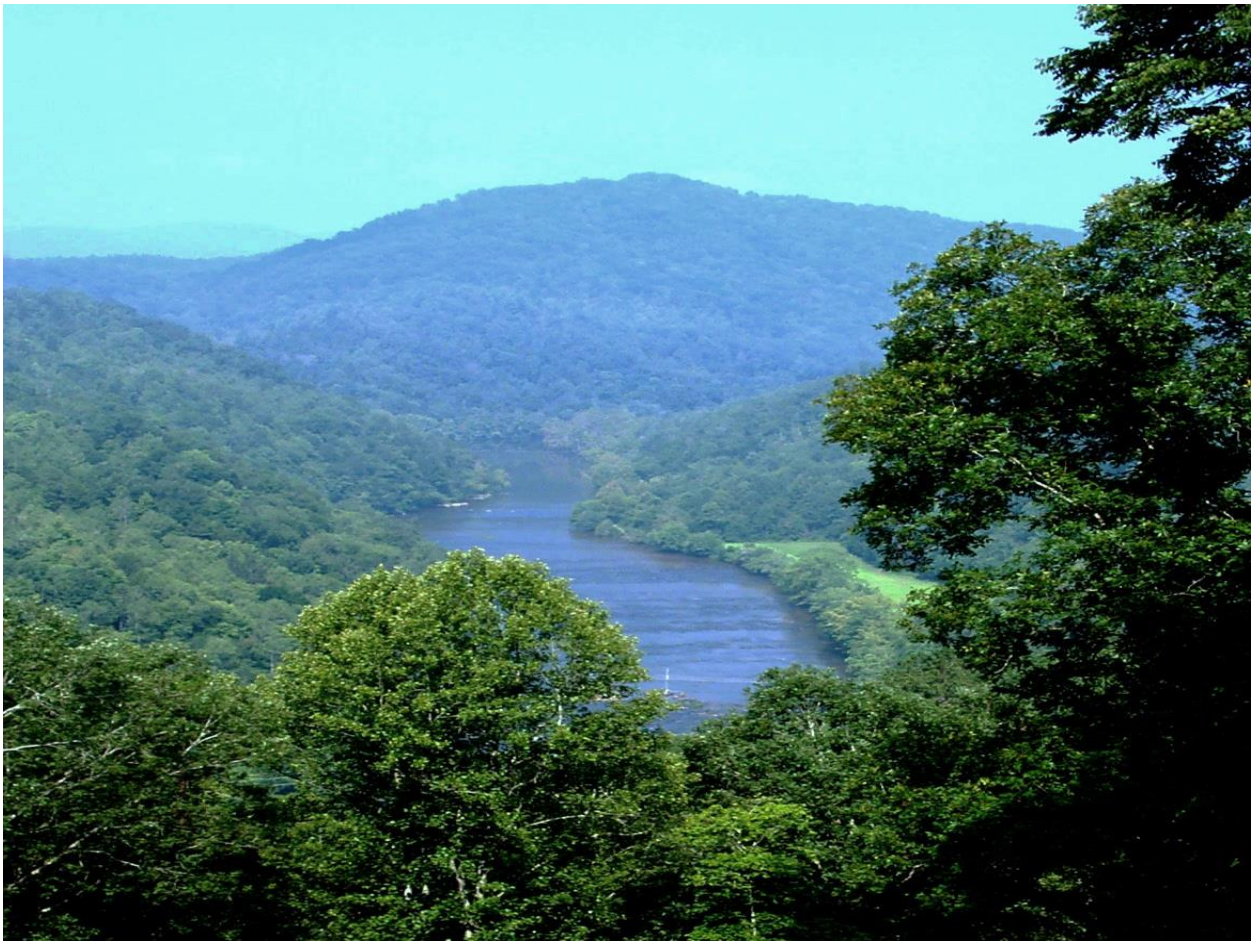
Needmore Game Land Management Plan

2017-2026

NORTH CAROLINA Wildlife RESOURCES COMMISSION



North Carolina Wildlife Resources Commission staff 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 for change were developed using the best available science and professional working knowledge of NGL, including its habitats, and terrestrial and aquatic species. Careful consideration has been given to all input received from the public, external agencies, and organizations that have an interest in or use the game land, to ensure that a comprehensive management program is administered. The successful implementation of the plan will depend on the continued feedback and support from all interested parties.

Needmore Game Land Management Plan Development Team

Brandon Allen- Conservation Technician I, Franklin Depot, Division of Engineering Services and Lands Management

David Allen- Conservation Technician II, Andrews Depot, Division of Engineering Services and Lands Management

Brian Cookston- District 9, Division of Enforcement

Jeff Ferguson- Engineer, Division of Engineering Services and Lands Management

Steve Fraley- Western Aquatic Nongame Coordinator, Division of Inland Fisheries

Ryan Jacobs- Mountain Ecoregion Wildlife Forest Manager, Division of Engineering Services and Lands Management

Don Jones- Conservation Technician I, Andrews Depot, Division of Engineering Services and Lands Management

Scott Loftis- Mountain Aquatic Habitat Coordinator, Division of Inland Fisheries

John Macemore- Southern Mountains Technician Supervisor, Division of Engineering Services and Lands Management

Mike Parks- Conservation Technician II, Franklin Depot, Division of Engineering Services and Lands Management

Brian Rau- Conservation Technician I, Andrews Depot, Division of Engineering Services and Lands Management

T.R. Russ- Western Aquatic Nongame Biologist, Division of Inland Fisheries

David Stewart- Southern Mountains Land Management Biologist, Division of Engineering Services and Lands Management

George Taylor- Conservation Technician I, Franklin Depot, Division of Engineering Services and Lands Management

Gordon Warburton- Mountain Ecoregion Supervisor, Division of Engineering Services and Lands Management

Kendrick Weeks- Mountain Wildlife Diversity Supervisor, Division of Wildlife Management

Powell Wheeler- District 9 Fisheries Biologist, Division of Inland Fisheries

David Woody- Conservation Technician I, Andrews Depot, Division of Engineering Services and Lands Management

Executive Summary

Needmore Game Land (NGL) consists of roughly 5000 acres lying within the blue ridge physiographic province in Macon and Swain counties and is owned by the State of North Carolina with the N.C. Wildlife Resources Commission (NCWRC) being the primary custodian. The property's most significant feature is the Little Tennessee River, which runs through the entirety of the game land. The game land is a popular destination for the public and is actively used by hunters, fishermen, and wildlife watchers. Popular game species occurring on the game land include deer and wild turkey. The game land is 83% forested with oak forests being the most predominant forest type (57%). Several endangered, threatened, or rare species are found on NGL. Management goals for the game land include providing for a diversity of habitat types and forest age classes though science based land management that are properly interspersed and positioned across the landscape, conserve popular sport fish and game species at huntable/fishable levels, provide quality habitat for endangered, threatened, and rare species, and provide sufficient infrastructure and opportunity to allow all game lands users a quality experience while on the game land. To ensure these goals are met NCWRC will need to collect various types of information regarding wildlife species and game land users, secure funding to accomplish management goals, acquire additional properties as they become available, maintain and develop regulations that promote sustained use of natural resources, and develop relationships with conservation partners that help meet management goals.

Table of Contents

Appendixes

INTRODUCTION

GAME LAND PROGRAM MISSION STATEMENT

Consistent with the original establishment legislation (G.S. 143-239) for the North Carolina Wildlife Resources Commission (NCWRC), the mission of the game lands program is to enhance, facilitate, and augment delivery of comprehensive and sound wildlife conservation programs. Inherent in delivery of a land conservation program consistent with this mission is the feasibility and desirability of multiple uses on lands owned by the state within the game land 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, public hunting areas in North Carolina were limited to designated and tightly controlled Wildlife Management Areas. The current Game Lands Program was established in 1971. This change involved expanding the area of game lands from about 700,000 acres to 1.5 million acres, changing regulations, and reducing fees for hunters and fishermen (Dean 1971). The old Wildlife Management Areas were incorporated into the new Game Lands Program, but the new program also allowed NCWRC to lease/incorporate additional lands as game lands to expand the land base. Beginning in the 1980's, land owners (both corporate and private) realized they could lease their properties for higher rates to hunting clubs and private individuals and began to remove their properties from the Game Lands Program. Fortunately, the Natural Heritage Trust Fund (NHTF) was established in 1987 and the Clean Water Management Trust Fund (CWMTF) in 1996. These funds provided money for the fee simple acquisition of select properties, many of which have been incorporated into the Game Lands Program. These Funds greatly compensated for the loss of game lands leased from the private sector and currently approximately 2 million acres are enrolled in the Game Lands Program.

While operating under the Management Area system, NCWRC staff was housed on each management area. These personnel were assigned both law enforcement and habitat management duties on their respective areas. Under the administration of the Game Lands Program, NCWRC depots were strategically established near all game lands in the state. These depots housed equipment and habitat development crews which were assigned to the management of multiple game lands. All law enforcement on these properties then became assigned to the new Division of Law Enforcement. With some minor organizational changes, this system remained intact until 2012. In 2012, land management staff in the Division of Wildlife Management and certain similar positions in the Division of Inland Fisheries were merged with Division of Engineering staff into the Division of Engineering and Lands Management. This organizational change was made to deliver a more comprehensive and efficient wildlife and fisheries management program on all public lands and waters in the state. Depots remained at former locations with the establishment of new depots/crews at certain remote locations to improve the efficiency of NCWRC programs.

PURPOSE AND NEED FOR PLAN

A comprehensive game land management plan is needed for NGL to implement the NCWRC Strategic Plan and accomplish game land program objectives in a timely and efficient manner. Another major driver for the development of this plan was the creation of the North Carolina Wildlife Action Plan (NCWAP) in 2005. The NCWAP is a comprehensive wildlife conservation plan that prioritizes species native to North Carolina for which there is a concern of population decline either due to known declines or suspected declines (i.e. Species of Greatest Conservation Need [SGCN]). Approval of this plan by the United State Fish and Wildlife Service makes the agency eligible for State Wildlife Grant funding to address SGCN species through inventory, monitoring, and/or research. For the purposes of this plan a ten-year planning horizon was used, with the need for review and amendments to the plan being made as needed.

REGIONAL CONTEXT

Needmore Game Land lies within the NCWRC Mountain Ecoregion and the Southern Mountains work area (Appendix 1 *I).* This work area includes 11 counties or portions of counties within the Blue Ridge Mountains and contains portions or all the following river basins: French Broad (2800sq mi) Little Tennessee (1797sq mi) Hiwassee (641sq mi) and Savannah (172sq mi) (NC River Basins Website Retrieved 29 January 2014). Six game lands containing approximately 779,000 acres are located within the work area. The game lands within the Southern Mountain Work Area are contained in the Blue Ridge physiographic province. (Giffith et al. 2002).

The State of North Carolina, with NCWRC as the primary custodian, owns in fee simple 14,644 acres of game lands within the Southern Mountains work area. Approximately 750,000 acres of game lands within the work area are owned by the USDA Forest Service and managed as game lands under a cooperative agreement. The remaining 14,281 acres of game lands are leased from other governmental agencies or the private sector. The work area also contains twenty-one public boating access areas, thirty-four public fishing access areas, one education center, and one fish hatchery; with staff located strategically at 3 work depots throughout the Ecoregion. Seventeen permanent staff under the direction of an Ecoregion supervisor is stationed in the Southern Mountains work area.

REGIONAL CONSERVATION PARTNERSHIPS

The Game Lands Program is vital to many conservation efforts and partnerships within the Mountain Ecoregion. NCWRC enjoys a long-standing alliance with the USDA Forest Service as wildlife resources on forest service lands are cooperatively managed by both agencies. The Natural Heritage and Clean Water Management Trust Funds along with the Ecosystem Enhancement Program have all provided significant and critical funding for the acquisition of key properties that have been added to the Game Lands Program. Many of the properties acquired with these funding sources have been established as or have enhanced existing State Natural Heritage Areas and/or have been dedicated as Nature Preserves by the N.C. Natural Heritage Program. Many nonprofit land conservancies within the ecoregion have played vital roles to acquire properties that have been added to the Game Lands Program such as The Land Trust for the Little Tennessee (LTLT). Other conservation partnerships that are important to the game lands program include the United States Forest Service (USFS) Southern Research Station, North Carolina State University (NCSU), The University of Tennessee, Western Carolina University, Haywood Community College, the Ruffed Grouse Society, Quality Deer Management Association, National Wild Turkey Federation, Partners in Amphibian and Reptile Conservation, Partners in Flight, Appalachian Mountains Joint Venture, Eastern Brook Trout Joint Venture, The Nature Conservancy, Appalachian Landscape Conservation Cooperative, and others. Other important conservation lands surrounding NGL are mapped in Appendix 2.

GOALS

- Restore a diversity of habitat types and forest age classes using 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.

- Manage popular game species and sport fish at huntable/fishable levels through science based land management and sound regulations.

- Provide quality habitat for endangered, threatened, and rare species located on the game land to ensure their continued existence and recovery.

- Provide sufficient infrastructure and opportunity to allow all game lands users a quality experience while on the game land with minimal habitat degradation and minimal conflict among user groups.

MEASURES OF SUCCESS

- 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.

- Inventories of forest communities show progress towards accomplishing restoration goals.

- Monitoring and surveys of target sport fish and game species indicate that population levels of these species are being managed at sustained levels.
- Monitoring and surveys indicate that populations of endangered, threatened, and rare species found on the game land are stable or increasing.
- Monitoring and surveys indicate that previously unknown populations or previously unknown endangered, threatened, and rare species are found on the game land.
- Infrastructure is provided and maintained at a level that allows the public to reasonably access and enjoy the game land.
- 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.
- Valid public complaints regarding management of the game land are minimal.
- Increased compliance with wildlife regulations and laws.

GENERAL GAME LAND INFORMATION

LOCATION

Needmore Game Land consists of 4,797 acres of state owned lands located in Macon and Swain counties and lies on both sides of the Little Tennessee River, from the bridge on US 19/74 upstream to the mouth of Burningtown Creek, around river mile 96. Several additional disjunct parcels lie upstream of the contiguous portion for several miles. Generally, the game land is accessed by Needmore Road, Lower Needmore Road, Sawmill Creek Road and others. However, some portions of the game land do not have public access across private lands, but can be accessed from the Little Tennessee River (Appendix 3 and 4). The game land is centrally located in the Southern Mountains work area and managed by staff located at the Franklin and Andrews Depots. Game land boundary is marked on boundary line trees by a double orange stripe and a N.C. Game Lands diamond marker.

PURPOSE OF GAME LAND

The purpose of NGL is to manage habitats to benefit aquatic and terrestrial wildlife resources and flora on the property. The game land provides opportunities for public hunting, fishing,

trapping, wildlife viewing, and other wildlife based recreational activities. These are the primary public uses of the game land. The game land also provides other public outdoor recreational opportunities to the extent that these uses are compatible with the conservation and management of the resources located there and do not displace primary users. The game land also provides a sustainable yield of forest products as allowed by topography and other factors. All forestry conducted on the game land is directed by wildlife management objectives.

HISTORY OF GAME LAND

Needmore Game Land was purchased from Crescent Resources LLC, a real estate development and land management subsidiary of Duke Energy Corporation. Funding came from a variety of sources, including Clean Water Trust Fund (CWMTF), Natural Heritage Trust Fund (NHTF), Recovery Land Acquisition Fund, NC Ecosystem Enhancement Program, Land Trust for Little Tennessee, and The Nature Conservancy and other private funds. The property was then dedicated as a nature preserve through funding agreements with the Natural Heritage Trust Fund and the Clean Water Management Trust Fund (Appendix 5, Appendix 30). Dedication is used by NHTF and CWMTF to protect the conservation investments of these trust funds in perpetuity. (Natural Heritage Program 2013).

The dedication was completed in compliance with the Nature Preserves Act (G.S. 113A-164) on December 27, 2010 through a signed agreement between the Department of Administration, the Department of Environment and Natural Resources (NCDENR) and the Wildlife Resources Commission. A revised dedication agreement was signed in April 2016 and is included in Appendix 30. The NGL dedication incorporates the land that is protected through deed restrictions resulting from the use of Ecosystem Enhancement Program funding to purchase the riparian buffer as part of a high-quality preservation mitigation project as well as much of the rest of the game land.

Terms of dedication are described in Appendix 30, and specify the following:

- The principal activities in the preserve are hunting, fishing, trapping, walking, research and observation.
- The preserve consists of a Primary Area (approximately 2,339 acres), a Buffer Area (approximately 2,149 acres), and a Special Management Area (3 acres).
- The Primary Area consists of the exceptionally significant aquatic habitat and adjoining high quality and restorable natural communities. This includes all areas within 300 feet of the Little Tennessee River and major tributaries that contain rare aquatic species. An exception to this is made for approved existing open fields, which may remain in their current footprint with the exception of the 100 feet closest to the river. Along other tributary streams, the primary area consists of 100 feet on each side of the stream.
- Much of the Primary Area in the Needmore Tract was protected through fee simple acquisition by the NC Ecosystem Enhancement Program (NCEEP), Clean Water Management Trust Fund (CWMTF), and Natural Heritage Trust Fund (NHTF) and is subject to deed restrictions required by these funding sources. Construction of new roads is restricted in the Primary Area.
- Prohibited activities in the dedicated area include construction, commercial activities and development, and more. The cutting or removal of trees or the disturbance of other natural resources is prohibited except as necessary for hazard removal, restoration after

storm damage, trail maintenance, and purposes of natural community maintenance or restoration.

- The Buffer Area generally consists of less mature forests and early successional areas. Forestry and wildlife management activities can be implemented to a greater extent in the Buffer Area than in the Primary Area.
- The Special Management Area consists of a botanically diverse old field grassland within 100 feet of the Little Tennessee River on the Raby Farm tract, which will be maintained as open grassland.

LANDSCAPE CONTEXT

Needmore Game Land is located within the Southern Blue Ridge (SBR) province. This province covers over 9.4 million acres and is one of the most biologically significant and diverse landscapes in the United States. Elevations of the province range from 1,500 to 6,684 feet and receive the highest rainfall amounts in the United States, east of the Cascade Mountains. The SBR province has a wide range of climate types from warm temperate to boreal, as well approximately 4,000 species of plants, of which 400 species are listed as rare and over 250 being endemic. The SBR province has the second highest hardwood and conifer diversity in North America as well as the third highest number of endemic hardwood and conifer species. The area also has the world's highest salamander diversity, the highest number of snail species, and more than 400 endemic species, the most found in any other province in North America. More than 130 natural terrestrial communities have been defined within the SBR with over 90% of these occurring nowhere else. A total of 66 at-risk aquatic species occur in the SBR, 20 of which are federally-listed as threatened or endangered. Nearly 35% of the landscape is in public ownership, with the largest public land management agency being the US Forest Service, which manages 26% of all public lands here. (LandScope America 2013)

SURROUNDING LAND USE

Land use in the region is approximately 89% forested, 5% urban/developed, and 6% pasture Land ownership surrounding the game land is greater than 50% publicly owned with private lands adjacent to the game land being largely agricultural. Hay fields and pasturelands are the more dominant agricultural uses in the area. Non-industrial private forests also dominate the landscape surrounding the game land, with residential housing also being a growing use of the surrounding lands (N.C. Wildlife Resources Commission, 2005).

PHYSICAL ATTRIBUTES

Needmore Game Land consists of a long stretch of floodplain and adjacent uplands along the Little Tennessee River. It provides many miles of riparian buffer along the Little Tennessee River and the lower reaches of its tributaries. The Little Tennessee River is a nationally significant aquatic site, containing a large collection of rare fishes, mussels and aquatic amphibians. Along most of the dedicated area, the river is wide and swift, with alternating pools, bedrock shoals, and cobble bars. The channel divides in several places to produce islands. At the downstream end of the game land, the river is impounded by Fontana

Lake. The river floodplain ranges from narrow bands to broader areas up to 0.1-mile wide. It includes a diversity of alluvial landforms, including terraces of several different elevations, steep banks, sloughs, pools, bedrock islands, and gravel bars, with relief of 10 feet or more above the river (Appendices 5-8 topo and slope maps ??).

Many fields are present in wider areas, some currently being managed as wildlife openings, others long abandoned and containing successional herbaceous vegetation or young trees. Intact Montane Alluvial Forest community patches in varying condition are interspersed. Collectively, they represent by far the most intact and most diverse occurrence of this rare community type. In most areas, they are dominated by tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), and sycamore (*Platanus occidentalis*), sometimes with abundant black walnut (*Juglans nigra*). In the best developed large patches, the forest also includes shingle oak (*Quercus imbricaria*), red oak (*Quercus rubra*), cherrybark oak (*Quercus pagoda*), black cherry (*Prunus serotina*), silverbell (*Halesia tetraptera*), and other species. The understory is generally dominated by ironwood (*Carpinus caroliniana*). The shrub and herb layers vary widely, with parts having abundant cane (*Arundinaria gigantea*), beds of dog hobble (*Leucothoe fontanesiana*), or diverse herb beds with open spicebush (*Lindera benzoin*) or yellowroot (*Xanthorhiza simplicissima*). Widespread floodplain species such as river oats (*Chasmanthium latifolium*) and wild rye (*Elymus virginicus*) mix with species typical of rich cove forests. As in most alluvial communities, invasive nonnative plants are common.

Across much of the game land, the Montane Alluvial Forest is not altered hydrologically. At the downstream end of the game land, where the river is impounded, a portion of this community is affected by fluctuating water levels of the lake. In part, this affects only the lowest elevations of the community, with the higher portions remaining in good condition. Distinctive Rocky Bar and Shore communities occur on the edges of the river and on islands and shoals in places. The shallowest shoals have bar communities dominated by water-willow (*Justicia americana*). Relatively stable gravel bars have young sycamore and other species characteristic of the Montane Alluvial Forest. One scoured bedrock island has a distinctive shrub and herbaceous community. A few sloughs have distinctive wetland vegetation, dominated by red maple (some apparently swamp red maple - *Acer rubrum var. trilobum*), sycamore, and green ash (*Fraxinus pennsylvanica*). They have more water-tolerant herb layers, including some bur-reed (*Sparganium americanum*), three-way sedge (*Dulichiwn arundinaceum*), and arrowhead (*Peltandra virginica*). A couple of blocked sloughs are even wetter, and support Floodplain Pool communities with permanent water.

Most of the uplands are of typical mountainous terrain, with broad upland ridges, narrow spur ridges, steep side slopes, and narrow to broad ravines and coves. Steep bluffs are present on the outside of river bends, and the north end of the site is a steeper gorge. The most abundant natural community in the uplands is Montane Oak—Hickory Forest, covering most of the open slopes and ridges. It is dominated by a mix of trees that includes white oak (*Quercus alba*) as a major component. Scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus montana*), red oak (*Quercus rubra*), mockernut hickory (*Carya alba*), and red maple are common. Some portions are a drier subtype that includes more characteristically Piedmont species such as southern red oak (*Quercus falcata*) and a variety of different herbs. The more sheltered slopes and coves mainly support Acidic Cove Forest communities. They are dominated by a varying mix of trees that includes tulip poplar, red maple, red oak, Canada hemlock (*Tsuga canadensis*), and sweet birch (*Betula lenta*). Generally, they have dense shrub layers of rhododendron (*Rhododendron*

maximum) or dog hobble, and few herbs. Less often they have few shrubs, and have dense herb layers of Christmas fern (*Polystichum acrostichoides*). A few limited areas of Rich Cove Forest are present, indicated by the addition of characteristic trees such as basswood (*Tilia Americana var. heterophylla*), and a diversity of characteristic herbs. Rich Cove Forests were probably once abundant (NC Natural Heritage Program 2010 Dedication Document).

The driest parts of the uplands, on south- and west-facing slopes, support Pine~Oak/Heath communities (of the distinctive and less common Low Mountain Pine Forest type). A variety of pines occur in these communities, including pitch pine (*Pinus rigida*), Virginia pine (*Pinus virginiana*\ Table Mountain pine (*Pinus pungens*), and shortleaf pine (*Pinus echinata*). Hard woods, especially scarlet oak, chestnut oak, red maple, and black gum (*Nyssa sylvatica*), are also common. These communities are dependent on periodic fire to maintain their natural composition. Areas that have not been recently burned and have dense shrub layers of mountain laurel (*Kalmia latifolia*), but open patches still have the characteristic herbs that could be expected to increase with burning. These communities have had heavy impacts by southern pine beetles, killing most of the pines which, in the absence of fire, have not regenerated (see Appendix 30).

Several communities occur in small patches, including Montane Acidic Cliff, and a small glade-like Montane Mafic Cliff. Also notable is a series of Low Elevation Seep communities scattered through the site. These wetlands occur in small pockets along the base of the bluff. They have some trees rooted within them, especially red maple, white oak, and silverbell. Parts have alder (*Alnus serndata*) as a distinct tall shrub layer. Most parts have a dense herb layer that includes cinnamon fern (*Osmunda cinnamomea*), netted chain fern (*Woodwardia areolata*), sedges (*Carex* spp.), cone flower (*Rudbeckia laciniata*), bee balm (*Monarda didyma*), meadow-rue (*Thalictnim clavatum*), and other wetland species. Several rare species have been found in the site, in addition to those in the river. Of greatest note is Virginia spiraea (*Spiraea virginiana*), on the river bank in a couple of places. Blue Ridge bindweed (*Calystegia catesbiana*) and Huger's carrionflower (*Smilax hugeri*) occur in upland areas. Tawny crescent (*Phyciodes batesii macronensis*) has been reported along Lower Needmore Road and may be elsewhere in the site (see Appendix 30).

CLIMATE

Climate of the game land is classified as humid subtropical (State Climate Office of N.C. 2014). The following is climate data recorded in Macon County;

Normal monthly maximum temperature, 67.6 degrees F (yearly average)
Normal monthly minimum temperature, 42.1 degrees F (yearly average)
Normal monthly mean temperature, 54.9 degrees F (yearly average)
Normal monthly precipitation, 54.4 inches (yearly average)
Highest mean temperature, 78.3 degrees F (yearly average)
Lowest mean temperature, 23.8 degrees F (yearly average)
Highest recorded temperature, 101degrees F, recorded on July 29, 1952
Lowest recorded temperature, -19 degrees F, recorded on Jan. 21, 1985
Greatest one day precipitation, 21.15 inches, recorded on July 29, 1879

Greatest one day snowfall, 25.5 inches, recorded on March 13, 1993
(State Climate Office of N.C., 2014)

The following is climate data recorded in Swain County:

Normal monthly maximum temperature, 68.5 degrees F (yearly average)
Normal monthly minimum temperature, 38.9 degrees F (yearly average)
Normal monthly mean temperature, 53.7 degrees F (yearly average)
Normal monthly precipitation, 58.3 inches (yearly average)
Highest mean temperature, 76.5 degrees F (yearly average)
Lowest mean temperature, 24.4 degrees F (yearly average)
Highest recorded temperature, 100 degrees F, recorded on August 22, 1983
Lowest recorded temperature, -23 degrees F, recorded on January 21, 1985
Greatest one day precipitation, 5.10 inches, recorded on January 16, 2013
Greatest one day snowfall, 16.0 inches, recorded on March 3, 1942
(State Climate Office of N.C., 2014)

SOILS

Due to the complexity of soil types found on NGL, the soils have been broken down into six categories. Well drained soils, moderately drained soils, soils with moderate run off potential, soils with high run off potential, soils that are occasionally flooded, and soils that are frequently flooded (Appendix 9 and 10).

HYDROLOGY

Needmore Game Land lies within the Little Tennessee River Basin which has an area of 797 square miles and contains 2501 miles of streams and rivers and 21,158 acres of impoundments. The Little Tennessee River basin drains parts of Graham, Macon, Swain, Jackson, and Clay counties in the Blue Ridge physiographic province of southwestern North Carolina. The headwaters of the Little Tennessee River originate in northeastern Georgia and flow for seven miles before flowing 125 miles through North Carolina and enters Tennessee. Only the upper reaches of the mainstem from the headwaters downstream to Lake Emory at Franklin, and from Lake Emory downstream to the backwaters of Fontana Reservoir, are free-flowing and unimpounded. The major tributaries of the Little Tennessee include the Cullasaja, Nantahala, Tuckasegee, Oconaluftee, and Cheoah rivers. Significant impoundments in the basin include Fontana, Santeetlah, Nantahala, Glenville, Cheoah, Calderwood, Bear Creek, Wolf Creek, Balsam, Tanassee, Queens Creek, and Lake Emory (N.C. Wildlife Resources Commission, 2005).

Larger streams found on NGL are Brush Creek, Burningtown Creek, Tellico Creek, Wiggins Creek, Sawmill Creek, Licklog Creek, Rattlesnake Creek, Dehart Creek, and Painter Creek. There are also numerous smaller streams, many of which are unnamed (N.C. Wildlife Resources Commission, 2016).

Some tributary streams, as well as sections of the Little Tennessee River, have been identified as being inadequately buffered. There have also been areas where streambank restoration projects should be implemented.

HABITATS

Major habitats within NGL consist of fallow agricultural fields, Rich Cove Forest, Montane Oak-Hickory Forest, and Piedmont/Low Mountain Alluvial Forest as described by Schafale and Weakely (1990). Habitats identified in the NCWRC Wildlife Action Plan include Cove Forest, Early Successional Habitats, Dry Coniferous Woodlands, Oak Forests, Bogs and Associated Wetlands, Floodplain Forest, and Riverine Aquatic Communities (Appendix *14*). Of the 4797 acres that make up NGL, 3918 acres (82%) is forested habitat, 373 acres (8%) is open habitat, 411 acres is aquatic habitat (8%), and 95 acres (2%) is developed open space or unusable habitat (Appendices 15-16). Specific information regarding habitats found on NGL is included in the Habitat Description section of this document

UNIQUE FEATURES AND DESIGNATIONS

An abundance of natural resources is located on NGL as it contains excellent natural values and biodiversity. The primary feature of NGL is the Little Tennessee River. The river has been classified through the NC Division of Water Quality (NCDWQ) Classifications and Standards Unit which protects these waters for fishing, wildlife, fish consumption, aquatic life, propagation of aquatic life, survival and maintenance of biological integrity, and agriculture. The Little Tennessee River has a "C" surface water classification. Class C Waters are protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner (NCDWQ, 2013).

The 24-mile reach of the Little Tennessee River from Lake Emory to Fontana Reservoir (of which the majority is within or adjacent to NGL) is the only remaining reach of the mainstem that is still free-flowing and that has suffered relatively minimal impacts to native habitats and aquatic wildlife communities. The 24-mile reach of the Little Tennessee River has had exceptional Index of Biotic Integrity scores over the years. As a result, the reach is also unique among rivers in the Blue Ridge physiographic province in NC in that it is believed to still support most, if not all, of the aquatic fauna found there historically. Presently, the reach supports fifteen aquatic Species of Greatest Conservation Need (SGNC), including two federally designated Endangered and one Threatened species. The entire reach of the Little Tennessee River within the Needmore GL is designated Critical Habitat for Appalachian elktoe (*Alasmidonta raveneliana*) and Spotfin chub (*Erimonax monachus*) (USFWS 1977, 2002). A coalition which includes the National Wildlife Federation, The International Federation of Fly Fishers, and others has designated the entire Little Tennessee River basin as a Native Fish Conservation Area.

(http://www.fedflyfishers.org/Conservation/Policies/NativeFishConservationArea.aspx)

In October 2015, the entire Little Tennessee River basin was designated as the nation's first Native Fish Conservation Area (http://www.littlet.org/). Native Fish Conservation Areas (NFCAs) are river basins that are managed for the conservation and restoration of native fish and other aquatic species, as well as compatible recreational and commercial uses. The goal of

NFCAs is to sustain the integrity of key aquatic habitats to maintain long-term persistence of native aquatic species. NFCAs involve a non-regulatory, collaborative approach to conservation that incorporates biological needs and local community values into watershed management practices.

Much of the NGL is also part the Little Tennessee River Floodplain natural area, rated Exceptional by the NC Natural Heritage Program due to the richness of rare species found within it and its importance in protecting the best examples of the natural communities and rare species it contains.

Old agricultural fields and home places are another unique value of NGL. These areas are unique both culturally and ecologically. Where possible, these fields and openings are maintained as quality early successional habitats. Another culturally important value of NGL is that it contains a portion of the historic "Trail of Tears". At present time, the specific trail location has not yet been identified.

Two rare plant species found on NGL are Stewartia ovata, a plant with SR-P status in NC with state/global rank of S2/G4, and Fraser's loosestrife (E status at state and FSC status at federal level, S3/G3 rank).

Needmore Game Land was dedicated as a State Nature Preserve on December 27, 2010. A dedication agreement is like a conservation easement in that it identifies specific conservation purposes and outlines activities that can occur on the property and are compatible with these purposes, and other activities, such as commercial development, that are prohibited. The NGL dedication agreement specifies the following:

- The dedication includes the Little Tennessee River Significant Aquatic Habitat and its adjoining high quality and restorable natural communities. Specifically, this includes a vegetated riparian buffer of 300 feet along both sides of the Little Tennessee River and its major tributaries that contain rare aquatic species. The dedicated area also includes a riparian buffer of 100 feet on both sides of tributaries that do not contain rare aquatic species. Areas that are exempt from 300 and 100 foot buffers include existing agricultural fields.

- The Dedicated Nature Preserve will be managed as a natural area for hunting, fishing, trapping, walking, research and observation.

- Prohibited activities in the dedicated area include construction, commercial activities and development, and more. The cutting or removal of trees or the disturbance of other natural resources is prohibited except as necessary for hazard removal, restoration after storm damage, trail maintenance, and purposes of natural community maintenance or restoration.

- New roads shall not be constructed in the riparian dedicated area. Existing roads within or on the boundary of the area may be maintained by grading of the roadbed, replacing culverts, or adding stone to the roadbed as needed to maintain the integrity of the road for vehicular use. Daylighting of roads should be minimized.

- The terms and conditions of the agreement may be modified upon agreement of the Secretary of the NCWRC and NCDENR and approved by the Council of State. (NC Natural Heritage Program 2013)

- Refer to Appendix 30 for a complete list of terms and conditions of the dedication agreement.

Needmore Game Land also serves as an important ecological reservoir for many endangered, threatened, or rare species. A table of rare species known to occur at Needmore is listed below:

Taxonomic Group	Scientific Name	Common Name	NC Status	US Status	NC Ranking	US Ranking	Habitat Type
Amphibian	*Cryptobranchus alleganiensis*	Eastern hellbender	SC	FSC	S3	G3G4	Riverine
Ámphibian	*Necturus maculosus*	Mudpuppy	SC		S1	G5	Riverine
Mammal	*Myotis leibii*	Eastern small-footed myotis	SC	FSC	S2	G1G3	Rock Outcrop
Mammal	*Myotis septentrionalis*	Northern long-eared bat	SR		S3	G3	Forest
Bird	*Haliaeetus leucocephalus*	Bald eagle	T		S3B, S3N	G5	Riverine and Forest
Bird	*Vermivora cyanoptera*	Blue-winged warbler	SR		S2B	G5	Shrub Early Succession
Reptile	*Plestiodon anthracinus*	Coal skink	SR		S2S3	G5	Rock Outcrop

A table of Endangered, Threatened, and other Species of Greatest Conservation Need known from the NGL and adjacent waterways is below:

Taxonomic Group	Scientific Name	Common Name	NC Status	US Status	NC Ranking	US Ranking	Habitat Type
Fish	*Erimonax monachus*	Spotfin chub	T	T	S1	G2	Riverine Aquatic
Fish	*Noturus flavus*	Stonecat	E	-	S1	G5	Riverine Aquatic
Fish	*Moxostoma sp.*	Sicklefin redhorse	T	C	S1	G2Q	Riverine Aquatic
Fish	*Etheostoma vulneratum*	Wounded darter	SC	FSC	S1	G3	Riverine Aquatic
Fish	*Clinostomus sp.*	Smoky dace	SC	FSC	S3	G3Q	Riverine Aquatic
Fish	*Percina squamata*	Olive darter	SC	FSC	S2	G3	Riverine Aquatic
Mollusk	*Pegias fabula*	Littlewing pearlymussel	E	E	S1	G1	Riverine Aquatic
Mollusk	*Alasmidonta raveneliana*	Appalachian elktoe	E	E	S1	G1	Riverine Aquatic
Mollusk	*Alasmidonta viridis*	Slippershell	E	FSC	S1	G4G5	Riverine Aquatic
Mollusk	*Pleurobema oviforme*	Tennessee clubshell	E	FSC	S1	G2G3	Riverine Aquatic
Mollusk	*Pleuronaia (=Fusconaia) barnesiana*	Tennessee pigtoe	E	-	S1	G2G3	Riverine Aquatic
Mollusk	*Lampsilis fasciola*	Wavy-rayed lampmussel	SC	-	S1	G5	Riverine Aquatic
Mollusk	*Villosa iris*	Rainbow	SC	-	S1	G5Q	Riverine Aquatic
Mollusk	*Elliptio dilatata*	Spike	SC	-	S1	G5	Riverine Aquatic
Crayfish	*Cambarus georgiae*	Little Tennessee crayfish	SC	C	S2S3	G2	Riverine Aquatic

E= Endangered, T=Threatened, SC=Species of Concern, FSC=Federal Species of Concern, C=Candidate for Federal listing presently under review.

The NCWAP (N.C. Wildlife Resources Commission, 2016) is a comprehensive wildlife conservation plan that prioritizes Species of Greatest Conservation need (SGCN). Approval of this plan by the United State Fish and Wildlife Service makes NCWRC eligible for State Wildlife Grant funding to address SGCN through inventory, monitoring, research, and management. The NCWAP is currently in revision and should be completed by 2015. The list consists of rare and endangered species but also species that are not officially listed but in need of inventory, monitoring, and/or research. "Species of Greatest Conservation Need"(SGNC) birds documented or likely to occur on Needmore include bald eagle (*Haliaeetus leucocephalus*), Northern bobwhite quail (*Colinus virginianus*), Copper's hawk (*Accipiter cooperii*), American kestrel (*Falco sparverius*), yellow-billed cuckoo (*Coccyzus americanus*), Eastern whip-poor-will (*Caprimulgus vociferus*), chimney swift (*Chaetura pelagica*), hairy woodpecker (*Picoides villosus*), Northern flicker (*Colaptes auratus*), red-headed woodpecker (*Melanerpes erythrocephalus*), Eastern wood-pewee (*Contopus virens*), Eastern kingbird (*Tyrannus tyrannus*), brown-headed nuthatch (*Sitta pusilla*), wood thrush (*Hylocichla mustelina*), worm-eating warbler (*Helmitheros vermivorum*), hooded warbler (*Setophaga citrina*), prairie warbler (*Setophaga discolor*), field sparrow (*Spizella pusilla*), blue grosbeak (*Passerina caerulea*), Kentucky warbler (*Geothlypis formosa*), American woodcock (*Scolopax minor*), Blue-winged warbler (*Vermivora cyanoptera*), and Eastern meadowlark (*Sturnella magna*). SGCN mammals likely to occur on

the property include Eastern small-footed myotis (*Myotis leibii*) and Northern long-eared bat (*Myotis septentrionalis*). SGCN amphibians and reptiles found, or likely to occur, on the property include Eastern hellbender (*Cryptobranchus alleganiensis*), mudpuppy (*Necturus maculosus*), spotted salamander (*Ambystoma maculatum*), coal skink (*Plestiodon anthracinus*), and Eastern box turtle (*Terrapene carolina*). Potential amphibians also include the Four-toad Salamander (*Hemidactyium scutatum*), Mole Salamander (*Ambystoma taipoideum*), Marbled Salamander (*Ambystoma opacum*), and Three-lined Salamander (*Eurycea guttoineata*).

HABITAT TYPES

Forested Habitats

Approximately 82% of the total area of NGL is forested. This area totals 3918 acres and consists of 4 main habitat types. These include: Oak Forests (70%), Cove Forests (18%), Dry Coniferous Woodlands (10%), and Floodplain Forests (2%) (Appendix *16*).

OAK FORESTS

Oak forests account for the largest habitat type found on NGL. This type totals 2731 acres and encompasses approximately 57% of the total game land. Oak forests on the game land consist of two main classifications: Southern Appalachian Oak Forests and Dry Oak Forests. This habitat type covers a wide range of moisture and topographic gradients, from xeric (dry) to mesic (wet), with the driest sites often dominated by Chestnut oak (*Quercus prinus*) and Scarlet oak (*Quercus coccinea*) and moister sites dominated by White oak (*Quercus alba*) and hickories (*Carya sp*.). Understory vegetation is quite diverse and supports a wide variety of species such as flowering dogwood (*Cornus florida*), blueberry (*Vaccinium spp*.) and huckleberry (*Gaylussacia baccata*) (NCNHP 2013). Oak forests are of great importance to wildlife across NGL because of its predominance, the variety of conditions in which it is found, and its overall mast (acorn) production capacity. This habitat type produces vast quantities of acorns, hickory nuts, and a wide variety of associated soft mast forage for wildlife and is often a critical habitat type for a variety of wildlife species (N.C. Wildlife Resources Commission, 2005).

Southern Appalachian Oak Forests

Southern Appalachian oak forests (SAOF) make up approximately 57% (1560 acres) of all oak forests across the game land. They occur on open slopes, ridge tops, low-elevation peaks, and higher parts of broad valley bottoms; and are found at low to moderate elevations. Soils in these forests are usually deep residual soils, but are often rocky. Moisture levels are somewhat mesic in range and are often located on intermediate slopes between coves and dry ridges. Topography, elevation, and soil depth are the most important factors separating this system from other forested systems (NatureServe 2007).

Vegetation of SAOF's are dominated by oak species, most typically White oak, Southern red Oak (*Quercus falcate*), and Northern red oak (*Quercus rubra*) on higher elevations. Hickories are often a co-dominant species within these forests, as well as having varying amounts of Black

walnut (*Juglans nigra*), Eastern white pine (*Pinus strobus*), and Red maple (*Acer rubrum*). Prior to the blight, American chestnut (*Castanea dentate*) was once the dominant or co-dominant species of these forests (NatureServe 2007). Sub-canopies and shrub layers are usually well-developed with some having associations of dense evergreen shrubs such as mountain laurel (*Kalmia latifolia*), while others have open shrub layers. Herbs are usually sparse to moderate in density. Fire occurs fairly frequently in this type forest and is usually of low to moderate intensity that is typically non-catastrophic (Abrams 1992, Delcourt and Delcourt 1997). Fire is often an important factor for favoring oak dominance over more mesophytic (moisture adapted) tree species within these forests and can be expected to have a moderate effect on vegetation structure, producing a somewhat more open canopy and less dense understory and shrub layer. Past logging may have greatly affected these forests in many instances by changing canopies to a more even-aged, structure (NatureServe 2007).

- *Desired Future Condition (DFC)* - Comprised largely of both closed canopy (basal area (BA) > 60) and woodland (BA 30- 60) over-story conditions. Over-story consists of a diversity of hardwood species including soft mast producing species such as Black cherry (*Prunus serotina*), Black gum (*Nyssa sylvatica*), and persimmon (*Diospyros virginiana*), with the primarily over-story species being that of oak and hickory. Understories contain a diversity of herbs and forbs with adequate regeneration of oak and hickory throughout. Relative over-all abundance of mountain laurel and rhododendron (*Rhododendron spp*.) is reduced throughout areas managed as woodlands.

- *Target Game Species*- Whitetail deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), black bear (*Ursus americanus*), Eastern gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), and Ruffed grouse (*Bonasa umbellus*)

- *Target Non-Game Species*- Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include Eastern wood-pewee, Cooper's hawk, chimney swift, Northern flicker, yellow-billed cuckoo, worm-eating warbler, wood thrush, hairy woodpecker, spotted salamander, Four-toad Salamander and Eastern box turtle.
- *Management Strategies and Needs*- Increase timber harvest in suitable areas (see Forest Management section). Implement appropriate applications of herbicide to sites where there is a need to control competitive vegetation and non-native invasive species. Increase prescribed burning at appropriate locations, frequencies, intensities, and seasonality. Implement strategies that favor and maintain oak species.

- *Infrastructure Needs*- Increased planning, identification, and development of fire lines and access to suitable stands and potential burn units. Temporary logging roads and landings.

- *Management Challenges* - Limited management allowed within Primary areas. Increased establishment and spread of non-native invasive species. Increased development and adjacent private/ urban interface along game land boundary. Limitations due to topography and access. Impacts from disease and insects such as: southern pine beetle (*Dendroctonus frontalis Zimmermann*), gypsy moth (*Lymantria dispar*), sudden oak death syndrome, hypoxylon canker (*Hypoxylon spp*.), and regional oak decline.

Dry Oak Forests

This type of oak forest makes up approximately 43% (1171 acres) of all oak forests across the game land. This forest system occurs at much drier settings than that of other oak matrix forests. It is characteristic of coarse and infertile soils that are often shallow and associated with acidic igneous or metamorphic rock. They are generally positioned on exposed ridges and convex slopes that are generally well drained, which contributes to the dry conditions of these forests (Schafale and Weakley 1990).

These forests are often dominated by oak species such as Chestnut oak, Scarlet oak, and White oak with cohorts of co-dominant tree species such as Mockernut hickory (Carya *tomentosa*), Shortleaf pine (*Pinus echinata*), and Virginia pine (*Pinus virginiana*). Dry oak forests occur with varying conditions and structure, from open savannah like conditions to closed canopy. Understory in these forests commonly consists of a sparse to moderate herb layer with associations of heath type shrubs such as blueberry, huckleberry, and mountain laurel particularly on the driest sites. More open stands where fire is common grasses may also be found. In areas where fire has been suppressed Red maple and White pine are often common canopy species (NatureServe 2007). Fires in this system occur more frequently than those of more mesic oak forests, with fire occurring most often with in the dormant season but having an occasional growing season fire once or twice every 20- 25 years (Croy and Frost 2007).

- *Desired Future Condition (DFC)* - Over-story is comprised largely of woodland and "savannah like" conditions (BA 20- 60) with areas located within the Primary areas and those that are limited by access and topography remaining in closed canopy conditions. Composition consists predominantly by that of oak with small cohorts of hickory and yellow pine. Understories contain a diversity of herbs, forbs, and grasses with adequate regeneration of oak throughout. On drier sites, a greater abundance of Vaccinium species such as blueberry and huckleberry are found in the understory. Relative over-all abundance of mountain laurel and rhododendron is reduced throughout all areas.

- *Target Game Species*- Whitetail deer, wild turkey, black bear, Eastern gray squirrel, Ruffed grouse, and Eastern cottontail rabbit (*Sylvilagus floridanus*).

- *Target Non-Game Species* Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include bald eagle, Eastern wood-pewee, Cooper's hawk, Northern flicker, red-headed woodpecker, Eastern whip-poor-will, worm-eating warbler, Eastern hognose snake (*Heterodon platirhinos*), coal skink, and Eastern box turtle

- *Management Strategies and Needs*- Increase timber harvest in suitable areas (see Forest Management section). Implement appropriate applications of herbicide to sites where there is a need to control competitive vegetation and non-native invasive species. Increase prescribed burning at appropriate locations, frequencies, intensities, and seasonality. Implement strategies that favor and maintain oak species.

- *Infrastructure Needs*- Increased planning, identification, and development of fire lines and access to suitable stands and potential burn units. Temporary logging roads and landings.

- *Management Challenges* - Limited management and access allowed due to Primary areas. Increased establishment and spread of non-native invasive species. Increased development and adjacent private/ urban interface along game land boundary. Limitations due to topography and access. Impacts from disease and insects such as: southern pine beetle, gypsy moth, sudden oak death syndrome, hypoxylon canker, and regional oak decline.

COVE FORESTS

Cove forests make up approximately 15 % of NGL and encompass an area of 723 acres. This type habitat includes two classifications types: Appalachian Hemlock- Hardwood Forests, which totals 18% of all cove forests on the game land, and Southern Appalachian Cove Forests, which accounts for 72% of cove forest habitat. These classifications are primarily distinguished by soil acidity, with hemlock- hardwood forests having the highest soil acidity of the two. Cove forests typically occur on concave and topographically protected mixed- mesophytic slopes (NatureServe 2007) and have generally higher associations of herbs and forbs in the understory as compared to other forest types. Depending on soil acidity, cove forests may contain a shrub layer consisting of mountain laurel and rhododendron. On richer sites, Spicebush (*Lindera benzoin*) is often a dominant shrub species forests (The Encyclopedia of Southern Appalachian Forest Ecosystems 2004). Cove forests in general, provide high amounts of herbaceous forage for wildlife, and often have high species diversity of both plants and animals. Small vertebrates, such as salamanders, birds, and small mammals, can be particularly abundant and diverse with in these forests (The Encyclopedia of Southern Appalachian Forest Ecosystems 2004).

Cove forests are typically closed canopy systems with very diverse canopies often consisting of Yellow Poplar (*Liriodendron tulipifera*), Carolina Silverbell (*Halesia carolina*), Northern Red Oak, Eastern Hemlock (*Tsuga canadensis*), Basswood (*Tilia americana*), White Ash (*Fraxinus americana*), and American Beech (*Fagus grandifolia*) (Clebsch and Busing 1989). Many of these forests exhibit a more un-even aged structure than other forest types and regeneration is commonly regulated through gap-phase dynamics and patch openings created by wind and ice. Although fire plays a lesser role in this habitat type, it may have occurred in these forests at low to moderate frequencies. Fire effects in these habitats were likely minimal as many of the species that occur in these type habitats are some of the most fire-intolerant in the region (NatureServe 2007).

- *Desired Future Condition (DFC)* - Over-story is comprised largely of closed canopy conditions (BA <60) with some small areas located outside of Primary areas and areas where topography and access permit, being converted to woodland conditions (BA 30- 60). Composition consists of a wide diversity of species including yellow poplar, ash, white pine, American beech, Black cherry, Black walnut, and Eastern hemlock. Understories are extremely lush containing a wide diversity of herbs and forbs.

- *Target Game Species*- Whitetail deer, Wild turkey, Black bear, Eastern Gray squirrel, Ruffed grouse, Raccoon, and American woodcock

- *Target Non-Game Species*- Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include Eastern wood-pewee, yellow-billed cuckoo, wood thrush, hairy woodpecker,

Swainson's warbler (*Limnothlypis swainsonii*), hooded warbler, smoky shrew (*Sorex fumeus*), spotted salamander (*Ambystoma maculatum*), Four-toad Salamander and Eastern box turtle.

- *Management Strategies and Needs*- Increase timber harvest in suitable areas (see Forest Management section). Implement appropriate applications of herbicide to sites where there is a need to control competitive vegetation and non-native invasive species. Improve diversity of species composition and implement strategies to encourage and maintain oak species.

- *Infrastructure Needs*- Increased planning, identification, and development of access to suitable stands. Temporary logging roads and landings.

- *Management Challenges* - Limited management allowed within EEP buffer areas. Increased establishment and spread of non-native invasive species. Increased development and adjacent private/ urban interface along game land boundary. Limitations due to topography and access. Proliferation of Hemlock Wooly adelgid (*Adelges tsugae*) killing Eastern hemlock trees.

DRY CONIFEROUS WOODLANDS

Dry Coniferous Woodland habitat includes both Montane Pine and Southern Appalachian Low Elevation Pine systems. These habitat types represent approximately 10% of the total game land area, equaling 393 acres, occupying the southern exposures and broader ridge tops of both gently rolling and steeper mountain terrains. They are often associated with shallow and generally sandy soils, and vary in elevation from river bottomlands up to 4000 feet. The dominant tree species in this forest type include Shortleaf pine, which typically occupies more than 50% of the over-story, Pitch pine (*Pinus rigida*), Virginia pine, and occasionally Eastern white pine. On some sites, oaks and hickories may also occur in the over-story.

Under natural fire regimes, where fire occurred more frequently, these systems likely consisted of herbaceous (grassy) understories, with a relatively sparse woody shrub layer (Fryar 2004). However, acidic-tolerant shrubs such as blueberry and huckleberry may also be well-developed in these forests. The number of herbs and shrubs is greatly linked to the frequency of fire, with stands that burn more frequently having a greater abundance of grasses and herbs and stands with less frequency of fire having a greater abundance of shrubs (NatureServe 2007). In the absence of fire, understory species are often fire-intolerant and shade-tolerant hardwoods such as dogwood, red maple, sassafras (*Sassafras albidum*), sourwood (*Oxydendrum arboreum*), Black gum, and others. Following over-story replacement events, Virginia pine, if previously a component or in adjacent stands, can quickly replace native shortleaf communities (Frost 2005). Fire is clearly an important influence in these forests, and may be the sole factor determining the occurrence of this system rather than that of hardwood forests. Natural fires were likely frequent and of low intensity, or a mix of low and higher intensity. Settlement, logging, pine beetle outbreaks, and fire suppression have potentially altered the character and blurred the boundaries of these type forests more than most other systems in the region (NatureServe 2007).

- *Desired Future Condition (DFC)*- Over-story is comprised largely of woodland and "savannah like" conditions (BA 20- 60) with areas located within the primary designations and areas that are limited by topography and access remaining in closed canopy conditions. Composition consists predominantly of mountain yellow pine species but includes some dry

oak species such as scarlet oak, chestnut oak, and white oak. Understories contain a diversity of herbs and forbs as well as an abundance of grasses. On drier sites, an abundance of Vaccinium species such as blueberry and huckleberry are found. Increased regeneration of shortleaf and pitch pine is found throughout the under-story, and relative over-all abundance of mountain laurel and rhododendron is reduced.

- *Target Game Species*- Whitetail deer, Wild turkey, Black bear, Eastern Cottontail rabbit, and Mourning dove (*Zenaida macroura*)

- *Target Non-Game Species*- - Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include Eastern wood-pewee, Cooper's hawk, chimney swift, Northern flicker, red-headed woodpecker, hairy woodpecker, brown-headed nuthatch, Eastern whip-poor-will, prairie warbler, least shrew, least weasel, coal skink, and Eastern box turtle

- *Management Strategies and Needs*- Increase prescribed burning in conjunction with increased timber harvests, particularly thinning, throughout all suitable areas (see Forest Management section). Implement appropriate applications of herbicide to sites where there is a need to control competitive vegetation and non-native invasive species.

- *Infrastructure Needs*- Increased planning, identification, and development of access and firebreaks in to suitable stands and potential burn units.

- *Management Challenges*- Increased establishment and spread of non-native invasive species. Proliferation of Virginia pine on Shortleaf pine sites. Increased development and adjacent private/ urban interface along game land boundary. Limitations due to topography and access. Impacts from southern pine beetle infestations.

FLOODPLAIN FORESTS

Floodplain forests of NGL make up approximately 2% of all forested areas, and total 71 acres. It includes two classifications: South- Central Interior Large Floodplain forests and South- Central Interior Small Stream and Riparian forests. These forests occur along large rivers and streams where topography and alluvial processes have resulted in a well-developed floodplain as well as along small streams and floodplains with low to moderately high gradients (NatureServe 2007). Canopies in these forests vary greatly along topographical gradients and among various soil types which consist primarily of flood-carried sediments. Dominant tree species include a mixture of bottomland and mesophytic hardwoods such as: American sycamore (*Platanus occidentalis*), yellow poplar, American beech, white ash, American elm (*Ulmas americana*), river birch (*Betula nigra*), box elder (*Acer negundo*), red maple, and black walnut. Other common trees include; green ash (*Fraxinus pennsylvanica*), American holly (*Ilex opaca*), Southern hackberry (*Celtis laevigata*), American hornbeam (*Carpinus caroliniana*), and to a lesser extent some oaks and hickories. The herbaceous and shrub layers in these forests can be extremely diverse, with the density and abundance of species closely linked to the level of disturbance and soil type (NatureServe 2007). Understories can range from densely closed thickets to open woodlands and may consist of such species as, Spicebush (*Lindera benzoin*), River Cane (*Arundinaria gigantean*), Strawberry-bush (*Euonymus americanus*), Dog-hobble (*Leucothoe fontanesiana*), alder (*Alnus spp.*), and a variety of herbs and forbs. Vines are also

particularly common in floodplain forests and typically include Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), and *Smilax* spp. (Schafale and Weakley 1990).

These forests are rarely impacted by fire except under extreme drought conditions, but are more commonly regulated and maintained by seasonal and annual flooding events. Not only do these flooding events effect soil movement and deposition, but they also play a major role in seed dispersal, plant successional processes, and the creation of vernal pools. Beavers can also be an important disturbance factor in these forests, setting back succession, creating canopy gaps, and developing semi-permanent wetlands within these forests (Schafale and Weakley 1990). Floodplain forests are particularly important habitats for breeding amphibians and the American woodcock in the region, especially where there are inclusions of floodplain pools and semi-permanent impoundments. These temporarily flooded areas provide critical breeding habitat for many species of salamanders and frogs (N.C. Wildlife Resources Commission 2005).

- *Desired Future Condition (DFC)* - Because most of the Floodplain forests located across the game land occur within EEP buffers and streamside management zones, over-story of this forest type will remain comprised predominantly of closed canopy conditions. Natural disturbances such as flooding, sediment deposition, and beavers will continue to occur, dictating forest composition and structure. Natural hydrologic functions of these forests are maintained. Over-story and understory composition consists of a wide diversity of species suited to hydric soils. Where allowed, non-native exotic species are controlled. River cane breaks are restored and maintained.

- *Target Game Species*- Whitetail deer, Wild turkey, Black bear, American woodcock, beaver (*Castor canadensis*), River otter (*Lontra Canadensis*), Raccoon, and various waterfowl species

- *Target Non-Game Species*- Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include Cooper's hawk, chimney swift, Northern flicker, red-headed woodpecker, yellow-billed cuckoo, worm-eating warbler, wood thrush, hairy woodpecker, spotted salamander, mole salamander (*Ambystoma talpoideum*), Four-toad salamander, Marbled salamander, bald eagle, Kentucky warbler, Swainson's warbler, hoary bat (*Lasiurus cinereus*), and Eastern box turtle

- *Management Strategies and Needs*- Implement limited forestry activities where permitted to develop woodcock and other wildlife habitat. Implement appropriate applications of herbicide to sites where there is a need to control competitive vegetation and non-native invasive species.

- *Infrastructure Needs*- Increased planning, identification, and development of access to suitable stands.

- *Management Challenges* - Limited management allowed within designated Primary areas. Increased establishment and spread of non-native invasive species. Limitations due to topography, access, and stream side management zone buffers. Siltation.

Open Habitats

Open habitats on NGL are habitats that do not contain a developed, forested, over-story, and includes all areas of non-forested early succession habitat. Open habitats make up approximately 8% of the total area of game land (373 acres).

NON-FORESTED EARLY SUCCESSION

Open habitats consist of three main classifications which include: Herbaceous Early Succession (63% of ESH), Shrub Early Succession (25% of ESH), and Woody Early Succession (12% of ESH) (Appendix 18). Maintained phone and power line right-of-way's that intersect and cross the game land (53 acres) are also included in the category of non-forested early successional habitat. For this plan, early successional habitat is generally defined as areas that are between 0-18 years of age and located structurally between bare ground and young forests.

Within different types of ESH, structure and plant composition differ considerably, consisting of grasses, forbs, shrubs, woody stems and sprouts, or a mix of herbaceous and developing woody vegetation. However, between different types of early successional habitat, there are two common factors. First, these habitats will have a well-developed ground cover layer that does not have a closed, mature tree canopy; and second, early successional habitats are created and or maintained by intense or recurring disturbances (Greenberg 2011). These disturbances include varying types and intensities of natural disturbances such as wind, ice, disease, and fire; as well as human caused disturbances such as timber harvest, prescribed burns, land clearing, and cattle grazing. Topographic position, soil characteristics, and climate may also play an important role in the creation and maintenance of early successional areas (N.C. Wildlife Resources Commission 2005). Depending on the type of disturbance and other ecological and environmental factors, the size and distribution of these type habitats may range from small canopy openings to large meadows and grasslands. Early successional plant composition consists primarily of herbaceous annuals and perennials immediately following disturbance, and then succeed in the absence of continued disturbance towards a composition of woody vegetation.

ESH is an extremely important habitat type as it is one of the most endangered types of ecosystems in the United States (Natural Resources Conservation Service 2007). It is a priority habitat for numerous birds and other wildlife species. In fact, over 120 bird species in the southeast have been recognized to be associated with grassland, shrub-scrub, and other early successional habitats (Hunter et al. 2001). These communities are highly ephemeral and are constantly changing in structure, composition, and location across the landscape. This is also true at NGL, where early successional habitats are continually transitioning. Each year, areas of herbaceous early successional habitat succeed to shrub habitats, shrub habitats to woody habitats, and without management or disturbance, woody habitats to young forests. Therefore, frequent disturbances of these habitats are needed to "reset" or suppress succession and maintain open habitat conditions. Continued disturbances across the game land are critical not just for maintaining current early successional habitats, but for creating new areas of habitat to replace those that are transitioning to forested conditions.

Many of the wildlife species closely linked to this type of habitat are also disturbance-adapted wildlife species, and with the lack of disturbance, the attractiveness and productivity of these habitats decline (Natural Resources Conservation Service 2007). Many species of invertebrates

particularly butterflies and moths are also dependent on specific hosts and forage plants that are often only found within early successional plant communities. These type habitats produce an abundance of seeds and attract assemblies of insects that are critical forage for birds and small mammals. The absence of a closed canopy is also important as it allows both light and heat to penetrate to ground level, an essential feature in this habitat for reptiles that depend on heat for temperature regulation (Natural Resources Conservation Service 2007). These habitats are also important areas for many interior forest bird species that use these areas for fledgling and migration habitats.

Herbaceous Early Succession

Herbaceous ESH covers approximately 5% of the total area of NGL and totals 234 acres. This habitat type includes areas with vegetation age classes between 0- 4 years and differs from shrub and woody early successional types by having a composition consisting predominantly of grasses, forbs, and other annual and perennial vegetation. Areas such as grasslands, meadows, fallow fields, and food plots are all included in this habitat type. Herbaceous early successional habitats have the shortest fire return interval or frequency of disturbance of any habitat across the game land, occurring annually or biannually. Frequent prescribed fires, annual mowing, and agricultural planting are all tools commonly used for the creation and maintenance of this habitat type.

- *Desired Future Condition (DFC)* - Total amount of habitat occurring on the game land remains relatively stable to slightly decreasing, with some acres transitioning back and forth between shrub and woody type early succession. Tall fescue (*Festuca arundinacea*) has been removed from all sites and fire adapted communities and plant associations have been restored to areas that are not maintained through agricultural practices (food plots). Overall abundance of non-native invasive species is reduced.

- *Target Game Species*- Whitetail deer, Wild turkey, Black bear, Eastern Cottontail rabbit, Mourning dove, and American woodcock

- *Target Non-Game Species*- Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include American kestrel, barn owl, Eastern whip-poor-will, Eastern kingbird, prairie warbler, field sparrow, Eastern meadowlark, Meadow jumping mouse (*Zapus hudsonius*), least weasel, coal skink, and Eastern box turtle

- *Management Strategies and Needs*- Implement short interval prescribed burn rotations on all areas not maintained as wildlife food plots. Maintain existing food plots and planted areas using appropriate agricultural practices. Implement appropriate applications of herbicide to sites where there is a need to control unwanted vegetation and non-native invasive species.

- *Infrastructure Needs*- Increased planning, identification, and development of access and firebreaks in to suitable stands and potential burn units.

- *Management Challenges*- Increased establishment and spread of non-native invasive species. Increased development and adjacent private/ urban interface along game land boundary. Limitations due to topography and access.

Shrub Early Succession

Shrub ESH covers approximately 2% of the total area of NGL and totals 94 acres. This habitat type includes areas with vegetation age classes between 4- 10 years. It differs from herbaceous and woody early successional types by having a composition consisting predominantly of shrub type vegetation, but may also contain remnant components of grasses and forbs along with some woody regeneration beginning to establish. Areas such as hedge rows, old fields, and routinely maintained field borders are all included in this type of habitat. These areas have relatively short fire return intervals or frequencies of disturbance that occur every 3-5 years. Regular prescribed fires, infrequent mowing, and applications of herbicide are common tools used for the creation and maintenance for this type habitat. Also included in this habitat designation are power line and telephone rights-of-way.

- *Desired Future Condition (DFC)* - Total amount of habitat occurring on the game land is increased, with some acres transitioning back and forth between shrub and woody type early succession. Tall fescue has been removed from all sites and fire adapted communities and plant associations have been restored to all areas. Overall abundance of non-native invasive species is reduced.

- *Target Game Species*- Whitetail deer, Wild turkey, Black bear, Eastern Cottontail rabbit, and American woodcock

- *Target Non-Game Species*- Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include American kestrel, barn owl, Eastern whip-poor-will, Eastern kingbird, prairie warbler, field sparrow, orchard oriole, blue-winged warbler**,** least weasel, and Eastern box turtle
    -

- *Management Strategies and Needs*- Implement short interval prescribed burn rotations on all areas. Implement appropriate applications of herbicide to sites where there is a need to control unwanted vegetation and non-native invasive species.

- *Infrastructure Needs*- Increased planning, identification, and development of access and firebreaks in to suitable stands and potential burn units.

- *Management Challenges*- Increased establishment and spread of non-native invasive species. Increased development and adjacent private/ urban interface along game land boundary. Limitations due to topography and access.

Woody Early Succession

Woody ESH covers approximately 1% of the total area of NGL and totals 45 acres. This habitat type includes areas with vegetation age classes between 11- 18 years. It differs from herbaceous and shrub early successional types by having a composition consisting predominantly of regenerative, woody vegetation with some assemblages of shrubs, and to a much lesser extent, remnant grasses and forbs. Areas such as abandoned fields and secondary successional areas

such as clear-cuts are included in this type of habitat. These areas have fire return intervals or frequencies of disturbance that occur every 6-8 years to maintain. Often these areas are created by removing disturbances from and allowing other early successional areas to succeed. Much of the woody early successional habitat on NGL has established from old pastures and fields that are not being managed due to deed restrictions, inaccessibility, or other limitations that prevent them from being maintained. Regular low intensity prescribed fires, bush hogging, and clear-cutting, are common tools used for the creation and maintenance for this type habitat.

- *Desired Future Condition (DFC):* Total amount of habitat occurring on the game land remains relatively stable to slightly decreasing, with some acres transitioning back and forth between shrub and woody type early succession. Tall fescue has been removed from all sites and fire adapted communities and plant associations have been restored to all areas. Overall abundance of non-native invasive species is reduced.

- *Target Game Species*- Whitetail deer, Wild turkey, Black bear, Eastern Cottontail rabbit, Ruffed grouse, and American woodcock

- *Target Non-Game Species*- Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game lands. Some examples from the 2005 edition include Eastern whip-poor-will, field sparrow, wood thrush, hairy woodpecker, yellow-billed cuckoo, Eastern kingsnake, least weasel, and Eastern box turtle

- *Management Strategies and Needs*- Implement short interval prescribed burn rotations on all areas. Implement appropriate applications of herbicide to sites where there is a need to control unwanted vegetation and non-native invasive species.

- *Infrastructure Needs*- Increased planning, identification, and development of access and firebreaks in to suitable stands and potential burn units.

- *Management Challenges*- Increased establishment and spread of non-native invasive species. Increased development and adjacent private/ urban interface along game land boundary. Limitations due to topography and access.

Aquatic Habitats

Aquatic habitats account for approximately 8% of the total game land (405 acres) and include two classifications: Riverine and Aquatic Communities and Wetlands.

RIVERINE AND AQUATIC COMMUNITIES

Riverine and Aquatic Communities represent most of the aquatic habitats on NGL. These consist of the Little Tennessee River and numerous tributaries.

Where restoration is proposed within Primary areas of the Dedicated Nature Preserve, any activities must fit within the conditions of the Dedication agreement. Restoration plans shall include avoiding or having minimal impact to element occurrences including rare species and high quality natural communities. Restoration activities that may result in impacts to element occurrences may require review and approval by the Natural Heritage Advisory Committee and Clean Water Management Trust Fund Board.

Little Tennessee River

Needmore Game Land contains 26.2 miles of shoreline along Little Tennessee River. The river is a popular recreation destination for anglers, wildlife viewers, and paddling sport enthusiasts.

- *Desired Future Condition (DFC)* - Overall amount of fine sediment and other non-point source pollutants into the river are reduced and controlled. Diversity and productivity of aquatic communities are restored. Riparian buffer vegetation is maintained and improved where needed. Areas of scour and erosion along channel banks are stabilized. Anthropogenic barriers to aquatic organism passage are eliminated. Floodplain hydrology and wetland habitat is restored.

- *Target Game Species*- There are a variety of sportfishes in the NGL section of the Little Tennessee River including redbreast sunfish (*Lepomis auritus*), rock bass (*Ambloplites rupestris*), channel catfish (*Ictalurus punctatus*), and flathead catfish (*Pylodictis olivaris*); however, smallmouth bass (*Micropterus dolomeiu*) are the primary targeted species. In addition, to these resident sportfishes, the Little Tennessee River is visited by spring spawning runs of walleye (*Sander vitreus*) and white bass (*Morone chrysops*) from Lake Fontana.

- *Target Non-Game Species*- All species listed in Table of Endangered Species. Recent declines in Appalachian elktoe, Slippershell, and other mussel populations may be related to non-point source pollutants.

- *Management Strategies and Needs*- Sportfish populations are managed through harvest and size restrictions under NCWRC fishing regulations. Aquatic habitat and water quality necessary for target game and non-game species, alike, can be improved and protected by observing forestry Best Management Practices on game land property and by working cooperatively with other governmental agencies, non-governmental organizations, and landowners to protect and improve riparian areas throughout the watershed. NCWRC staff will assess sediment sources including unstable stream banks, areas in need of riparian buffer restoration, and other existing problems within the game land. A preliminary list of stream bank restoration opportunities has been developed, which includes the Little Tennessee River at Raby Bend, the island in the Little Tennessee River opposite Licklog Creek, and the Little Tennessee River at Coweeta Bottoms. Restoration opportunities will be prioritized and planned with the input of NHP staff.

- *Infrastructure Needs*- The NCWRC has constructed five and planned two additional float fishing access points on the game land. In addition, there are many informal roadside access points for wade anglers and other users. Therefore, we anticipate that future access needs will be minimal.

- *Management Challenges*- Aquatic habitat in the Little Tennessee River is degraded by fine sediment pollution from erosion in the watershed resulting from land disturbances including roads, commercial and residential development, and agricultural and forestry practices. The large watershed beyond the game land boundaries contains numerous non-point sources of pollution and sedimentation, which are not addressed by this plan. Project implementation is subject to funding availability and limitations on management within the Primary Area described in the terms of the Nature Preserve dedication agreement.

Burningtown Creek

Needmore Game Land borders 2.0 miles of Burningtown Creek.

- *Desired Future Condition (DFC)* - Overall amount of fine sediment and other non-point source pollutants into the stream are reduced and controlled. Diversity and productivity of aquatic communities are restored. Riparian buffer vegetation is maintained and improved where needed. Areas of scour and erosion along channel banks are stabilized. Anthropogenic barriers to aquatic organism passage are eliminated. Floodplain hydrology and wetland habitat is restored.

- *Target Game Species*- The trout population is managed with monthly stockings (March to July) of catchable-sized brook trout, brown trout, and rainbow trout.

- *Target Non-Game Species*- Sicklefin redhorse (*Moxostoma* sp.), Spotfin chub, Little Tennessee crayfish (*Cambarus georgiae*), Smoky dace (*Clinostomus* sp.), Rainbow mussel (*Villosa iris*), and Slippershell inhabit, or may inhabit, Burningtown Cr. throughout the year or seasonally. Species that inhabit the Little Tennessee River will also benefit from reduced non-point source pollution in the watershed.

- *Management Strategies and Needs*- Burningtown Creek is designated as Public Mountain Trout Waters and classified as Hatchery Supported. NCWRC staff will assess sediment sources including unstable stream banks, areas in need of riparian buffer restoration, and other existing problems within the game land. A preliminary list of restoration opportunities has been developed, which includes stream bank restoration and wetland enhancement on Burningtown Creek upstream of Tellico Road. Restoration opportunities will be prioritized and planned with the input of NHP staff.

- *Infrastructure Needs*- none

- *Management Challenges*- The watershed beyond the game land boundaries contains numerous non-point sources of pollution and sedimentation. Project implementation is subject to funding availability and limitations on management within the Primary Area described in the terms of the Dedicated Nature Preserve agreement.

Tellico Creek

NGL contains 1.0 miles of Tellico Creek.

- *Desired Future Condition (DFC)* - Overall amount of fine sediment and other non-point source pollutants into the river are reduced and controlled. Diversity and productivity of aquatic communities is restored. Riparian buffer vegetation is maintained and improved where needed. Areas of scour and erosion along channel banks are stabilized. Anthropogenic barriers to aquatic organism passage are eliminated. Floodplain hydrology and wetland habitat is restored.

- *Target Game Species*- It contains a fishable population of wild brown and rainbow trout.

- *Target Non-Game Species*- Spotfin chub, Little Tennessee crayfish (*Cambarus georgiae*), and Smoky dace (*Clinostomus* s.) inhabit, or may inhabit, Tellico Cr. throughout the year or seasonally. Species that inhabit the Little Tennessee River will also benefit from reduced non-point source pollution in the watershed.

- *Management Strategies and Needs*- Tellico Creek is designated as Public Mountain Trout Waters and classified as Wild Trout with Natural Bait. NCWRC staff will assess sediment sources including unstable stream banks, areas in need of riparian buffer restoration, and other existing problems within the game land. Restoration opportunities will be prioritized and planned with the input of NHP staff.

- *Infrastructure Needs*- none

- *Management Challenges*- The watershed beyond the game land boundaries contains numerous non-point sources of pollution and sedimentation. Project implementation is subject to funding availability and limitations on management within the Primary Area described in the terms of the Dedicated Nature Preserve agreement

Other Streams in the Needmore Game Land

In addition to the streams listed above, NGL contains numerous named and unnamed tributary streams to the Little Tennessee River.

- *Desired Future Condition (DFC)* - Overall amount of fine sediment and other non-point source pollutants into the river are reduced and controlled. Diversity and productivity of aquatic communities are restored. Riparian buffer vegetation is maintained and improved where needed. Areas of scour and erosion along channel banks are stabilized. Anthropogenic barriers to aquatic organism passage are eliminated. Floodplain hydrology and wetland habitat is restored.

- *Target Game Species*- Some of these streams support trout on NGL.

- *Target Non-Game Species*- Some of these streams support target non-game species, such as Spotfin chub, Little Tennessee crayfish (*Cambarus georgiae*), and Smoky dace

(*Clinostomus* sp.). Species that inhabit the Little Tennessee River will also benefit from reduced non-point source pollution in the watersheds of these streams.

- *Management Strategies and Needs*- NCWRC staff will assess sediment sources including unstable stream banks, areas in need of riparian buffer restoration, and other existing problems within the game land. Restoration opportunities will be prioritized and planned with the input of NHP staff.

- *Infrastructure Needs*- Lower Sawmill Road, which provides access to the Sawmill Creek Public Fishing Area, was in extreme disrepair but recently improved by NC Department of Transportation. Although improved, it still serves as a source of sediment to Sawmill Creek and the Little Tennessee River. Upgrades and maintenance of the road would not only benefit the aquatic resources but also ensure that NGL users have adequate access.

- *Management Challenges*- The watershed beyond the game land boundaries contains numerous non-point sources of pollution and sedimentation. Project implementation is subject to funding availability and limitations on management within the Primary Area described in the terms of the Dedicated Nature Preserve agreement.

WETLANDS

Known wetlands on NGL primarily consist of sixteen large floodplain wetlands and fifty or more floodplain pools or seeps (Appendices 13-14). Hydrology in these areas range from permanently saturated to intermittently dry to permanently flooded or pooled in the floodplain wetlands. The floodplain seeps are generally fed by seepage groundwater, whereas the floodplain pools and wetlands are fed through surface run off, groundwater or flooding events. Vegetation in these areas may range from dense shrub thickets to highly diverse herb and sedge dominated areas that may contain dense mats of Sphagnum moss (*Sphagnum flexuosum*). Tree species such as Red maple, Eastern white pine, and Eastern hemlock are commonly found along the edges.

Most herbaceous wetlands, including bogs, in the area are being threatened by the succession of shrubs, trees, and invasive exotic species which alter natural water flows and act to dry out wetlands. The tendency for these areas to experience relatively quick plant succession may suggest that some form of periodic disturbance is needed to keep these areas open and functioning naturally. Historically, such disturbances likely include flooding caused by beavers and storm events, grazing by herds of large mammals, fire, and clearing by Native Americans (Schafale and Weakley 1990). A complete survey of all wetlands has yet to be completed, and is necessary to assess habitat condition and species occupancy.

- *Desired Future Condition (DFC):* Natural hydrologic processes are restored on existing and other potential wetland areas. Relative abundance of non-native invasive species is reduced. Native plant, aquatic, and wildlife populations are maintained and restored.

- *Target Game Species*- Various waterfowl species, Raccoon

- *Target Non-Game Species*- spotted salamander, mole salamander, three-lined salamander (*Eurycea guttolineata*), four-toed salamander (*Hemidactylium scutatum*), Marbled salamander and common ribbon snake (*Thamnophis sauritus*)

- *Management Strategies and Needs*- Identify, delineate, and map wetlands and potential restoration areas. A preliminary list of restoration opportunities has been developed, which includes stream bank restoration and wetland enhancement on Burningtown Creek upstream of Tellico Road. Restoration opportunities will be prioritized and planned with the input of NHP staff.

- *Infrastructure Needs*- Currently none is known to occur, but will depend upon complete assessment of all bogs and other wetlands present on the game land. However, any infrastructure developments in these areas would be limited to include soft or hard engineered water control structures needed to facilitate the restoration of natural hydrologic processes and functions. Platforms or board walks to facilitate wildlife study and viewing.

- *Management Challenges*- Proliferation and encroachment of plant succession and the introduction of non-native invasive species. Limited management allowed within primary buffer areas.

Geologic Habitats

LOW ELEVATION CLIFFS AND ROCK OUTCROPS

Most of this habitat type occurs along the Little Tennessee River and Brush Creek. Overall areas of these habitats have not been mapped and are included in the forested acres of the game land (Appendices 15-16). These habitats on Needmore include very steep to near vertical, rock slopes of mafic, basic igneous or metamorphic origin. Hydrology of these habits vary based on slope and aspect, with northern slopes creating cool, moist microclimates to increasingly dry microsites on southern slopes. On some sites, wet seepages occur. Vegetation is typically limited to non-existent due to the extreme slopes and rocky substrates, and in some cases, may be too dry to allow for growth of vegetation, particularly to a closed canopy condition. Plants that do occur in these areas are largely limited to crevices, small pockets of soil, margins between rock faces, and the cliffs, and bases. Disturbances within these habitats are common and routinely include landslides, falling rock, erosion from run-off, and undercutting by streams (Schafale and Weakley 1990). A complete survey of the cliffs and rock outcrops has yet to be completed, and is necessary to assess habitat condition and species occupancy in these areas.

- *Desired Future Condition (DFC):* Natural hydrologic and geologic functions associated with these type habitats are maintained and protected. Adjacent soils and waters surrounding these areas are preserved as well as adequate buffers are maintained.

- *Target Game Species*- Black bear, Gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*)

- *Target Non-Game Species*- Eastern small-footed bat, least weasel, coal skink, and timber rattlesnake (*Crotalus horridus*).

- *Management Strategies and Needs*- Identify, delineate, and map current, non-identified, and potential restoration areas. Protect areas from disturbance.

- *Infrastructure Needs*- None known to exist.
- *Management Challenges*- Potential disturbance from unwanted recreational use. Limited management allowed within EEP buffer areas.

Developed Habitats

This designation includes all areas on the game land that are unsuitable habitat for wildlife and have otherwise been developed. These include areas such as roads, rights-of-way, and parking areas, and total 95 acres or 2% of the total game land. Needs for developed habitats are included in the Infrastructure section of this document.

FOREST MANAGEMENT

Forest management practices are probably the most cost-effective method available for affecting and achieving desired habitat conditions and creating diversity across the landscape of these game lands. Forestry practices are key to restoring communities to diverse compositions and structures. Forestry tools, including timber harvest, herbicides, prescribed burning, tree planting, and other silvicultural techniques will be used to achieve wildlife habitat goals and objectives. Additionally, these forestry tools and combinations of techniques are important and vital to restoration of certain habitat types and forest communities, improving wildlife habitat diversity within forest stands and across the game land, reducing the risk of catastrophic wildfire, keeping forests healthy, and providing sustainable forest resources.

Needmore Game Land is divided into 21 management units (Appendix 19), which range in size from 2 acres to 727 acres. These units are delineated by tract boundaries, watershed drainages, large streams, power line right-of-way's, and roads. Due to factors such as inaccessibility, terms of the Dedicated Nature Preserve allocation, steep terrain, and or unsuitable timber, not all areas in each management unit are conducive for forest management. Although early successional habitat is also an important aspect of management the game land, because approximately 82% of NGL is forested, forest management is a primary focus of the creation and maintenance of wildlife habitat. To date there has been no forest inventory data collected for the game land, but most of forested areas across the game land are naturally established. Many of the forested stands have been harvested previously or established from the abandonment of fields over the past 100 years. For the most part, much of Needmore
Game Land has seen significant human disturbance, either though timber harvest and land clearing, or from free grazing livestock. Although there may be a few isolated areas along steeper terrains and drainages that have seen little human disturbance, these areas are likely to have been impacted in the past from both natural and anthropomorphic fires. Since Wildlife Resources Commission ownership, there has been very little timber management, in the form of harvest across the game land. This has been primarily due to limitations from Natural Heritage designation restrictions and limited access to suitable stands. To date only one salvage sale to facilitate a potential camping area and multiple salvage removals of downed timber for pallets and firewood have occurred on the game land.

Where restoration is proposed within Primary areas of the Dedicated Nature Preserve, any activities must fit within the conditions of the Dedication agreement. Restoration plans shall include avoiding or having minimal impact to element occurrences including rare species and high quality natural communities. Restoration activities that may result in impacts to element occurrences may require review and approval by the Natural Heritage Advisory Committee and Clean Water Management Trust Fund Board.

The primary focus of forest management on the game land is directed towards restoring ecosystem functionality and improving wildlife habitat within the oak and mountain yellow pine forest communities. Due to the lack of recent disturbances and past poor land use practices, many of the oak and shortleaf pine communities across the game land are degraded, dying, and or being replaced by more shade tolerant, mesic tree species such as Yellow poplar, Eastern white pine, and Red maple.

PRESCRIBED FIRE

The use of prescribed fire is of vitally important for restoring and maintaining ecosystem and habitat diversity across the game land and is the primary forest management tool used by NCWRC to manage the property. Many of the habitats across the game land, in particularly those that are the most degraded and most lacking, require regular fire for propagation, enhancement, and maintenance. These include such habitats as oak and mountain yellow pine communities as well as the early successional habitats that are critical for wildlife. Burning with prescribed fire also helps reduce hazardous forest fuel loads that have the potential to carry wildfire from or across the game land to the many surrounding private lands, houses, and developments that have surrounded the property and continue to increase in number. Burning is also an important forest management tool for site preparation prior to regenerative forest plantings. Fire also serves to reduce competition from less desirable tree species such as yellow poplar, white pine, and red maple as well to control off site establishment of mountain laurel and rhododendron. The use of fire also helps to control the spread and establishment of many of the non-native, invasive species that have proliferated across the game land.

Currently there are 22 prescribed burn units set up across the game land totaling approximately 1676 acres (Appendix 29). At present, there are only 15 units totaling 1290 acres in a burn rotation, with the remaining 7 units totaling 386 acres scheduled to be burned sometime over the next two years. One unit totaling 164 acres serves as a Southern Blue Ridge Fire Learning Network (FLN) demonstration site for the Nantahala Mountains Landscape and receives special funding through The Nature Conservancy to conduct fuels and vegetation monitoring. Nine of the 22 units are enrolled with the NC Forest Service (NCFS) under the Community Protection Plan (CPP), a federal program which provides funding to states to help prevent wildfires and mitigate hazardous fuel conditions that could threaten high risk communities within a 10-mile radius of National Forest lands. Under the plan, the NCFS is contracted to conduct prescribed burns at no charge. To date, 2 of the nine CPP units have been implemented.

Because opportunities to harvest timber across NGL are limited and because of the value and cost benefit of prescribed burning to develop and manage wildlife habitat, prescribed burning will remain a top forestry priority for NGL. Approximately 35% of the game land is currently in or scheduled to be in a prescribed fire rotation. These burn units are implemented in both

forested and open habitats, and are currently being conducted under a restoration and maintenance burning regime that is completed on a 2-5-year rotation. Additional burn units and the merging of existing burn units are planned to be developed in the future.

TIMBER HARVEST

As previously mentioned, to date there have been no implemented timber sales on NGL, other than some small salvage operations to remove downed timber and facilitate infrastructure improvements. However, future timber harvests on NGL are planned and will be needed to meet restoration and wildlife habitat objectives. Implemented timber harvests will improve stand age class distribution on these game lands and will provide opportunities for continued productive forest stands in the future. Harvest methods employed will involve a variety of techniques including shelter-wood and selection type harvests, clear-cutting, and various thinning regimes. Non-commercial thinning (mechanical and by herbicide use) will also be utilized to meet stand needs and wildlife habitat management objectives.

Some general guidelines used for timber harvest on NGL include:

1. Shelter-wood, selection type harvests, and various thinning regimes generally select leave trees that are beneficial to wildlife (mast producers, etc.), although in some cases may include conifer species (hemlock, shortleaf pine, Table Mountain pine, etc.) where restoration is the goal.

2. Clear-cut units will be less than 25 acres in size and will be distributed across the game land to provide habitat diversity and early successional habitat needs on the landscape.

3. Sites of proposed clear-cutting will be reviewed for significant cultural resources and all sites of proposed timber harvest will be reviewed with appropriate staff regarding issues of protected plants, animals, significant natural and cultural resources, non-game species, potential management conflicts, etc.

4. Firewood harvests will be administered through the sale of firewood permits on designated sites (usually along roads and at log landings where personal fuel wood is easily available).

5. Riparian buffer zones will be left at widths of no less than those recommended by North Carolina Forest Service Forestry Best Management Practices and all North Carolina Forest Practices Guidelines will be applied where applicable.

REFORESTATION

To date no reforestation projects have been implemented on NGL. However, future timber sale areas may include reforestation practices, where natural regeneration is insufficient or where restoration to site specific species is needed to meet restoration and habitat management goals. Generally, stands that are clear-cut will either be planted back to either shortleaf pine or and oak species. In some situations, clear-cut sites may be planted back in varying arrangements of oak and pine, with pine being planted on the ridges and drier sites of the harvested areas. In rare situations and where appropriate white pine may be planted. In these situations, white pines are

planted to provide cover and roosting places, but they also develop into small pockets of highly value timber. In many instances, the incorporation these highly valued white pine stands into timber sales provide loggers with an additional incentive to harvest stands of less valuable timber that are needed to implement important forest restoration management activities across the game land.

In most all situations, a varying arrangement of a mixed pine/hardwood stand will be desired. Sites that are planted back with pine will occur on a wide spacing of 14 by 14 feet to encourage development of mixed pine/hardwood stands, which provide better habitat diversity than pure pine stands. Additionally, sites to be planted with pines are often site prepared by prescribed burning, which will generally occur during summer and fall months outside of the nesting season. However, areas planted with oaks are often planted on a somewhat tighter spacing (typically 10x10 or 12x12) than those areas planted with pines to account for dead loss. Natural regeneration has and will continue to be a major form of reforestation on the game land. In some cases, herbicide use, mechanical release, and prescribed burning will be used to enhance both natural and planted regeneration (both pre-and post-harvest) as needed. In the future plantings of American chestnut and Eastern hemlock may also occur to restore areas impacted by exotic pests.

HERBICIDE TREATMENTS

Applications of herbicide for forest management are another tool that is regularly implemented on NGL. Large scale herbicide projects are generally carried out through contracts with the North Carolina Forest Service in conjunction with both site preparation services and or tree planting services. However, most ongoing herbicide treatments across the game land is currently being administered by NCWRC staff, and are primarily focused towards treating non-native invasive species such as kudzu. This use of herbicide for forest management purposes is particularly important with regards to controlling the wide variety and excessive amounts of non-native invasive species that are found throughout the game land. Controlling invasive species is a critical component of habitat restoration and a pivotal step in ensuring the success of reforestation plantings following timber harvest. Herbicide is also beneficial in helping to control competition to planted seedlings from fast growing tree species such as yellow poplar and white pine following timber harvests. These applications control competitions are typically carried out following reforestation plantings, but are also being implemented prior to timber harvest as well.

KG BLADING and MECHANICAL MULCHING

Due to steep topography and limitations of management in Primary Areas by the terms of the Dedicated Nature Preserve agreement, the use of a KG blade has not been available; however, opportunities to implement some mechanical mulching projects across the game land do exist and would prove beneficial for restoring habitat conditions and resetting succession in some stands. A mechanical mulching machine would also provide a means for creating firebreaks and could be used in conjunction with prescribed fire to help enhance burn effects.

FOREST MANAGEMENT NEEDS

Given the high percentage of oak stands on the game land and their importance as mast (acorns) producers to a variety of wildlife species, oak and oak/pine has and will continue to be a primary focus of forest management across the game land. Threats to oak forests from pathogens, inadequate advanced oak regeneration, and invasive species, create the need for continual forest management practices to be implemented in these systems. Timber harvest (primarily shelter-wood cutting and/or thinning), herbicide use (to control competition with oak regeneration), prescribed burning (to enhance forest stand structure and promote oak reproduction), and planting of oaks will be needed to promote healthy and diverse oak forests.

Dry coniferous pine forests, particularly shortleaf pine forests, will also be a primary focus of forest management, as there is a great need to address the loss of these forests across the game land due primarily to the historical lack of disturbance needed to promote these forests, devastating losses of stands over the last decade from infestations of southern pine beetle, and the conversion of many sites to pastures. For the same reasons, Shortleaf pine communities, regionally, have declined significantly over the last 100 years, and efforts to promote restoration of these important forest communities is currently a priority for management on NGL as well as across the region. As with oak forests, timber harvests (primarily shelter-wood cutting and/or thinning), herbicide use (to control competition with other regeneration), mechanical release, prescribed burning (to enhance forest stand structure and promote reproduction), and planting of shortleaf will be needed to promote healthy and diverse pine forests.

There is also an immediate need to conduct accurate forest resources inventory and stand maps for the entire game land. This will provide important information for planning and directing forestry and wildlife habitat management on Needmore. Additionally, opportunities for forest management and wildlife habitat research have and should continue to be encouraged on the game land.

GAME LAND INFRASTRUCTURE

INFRASTRUCTURE ASSESSMENT

Assessments of existing infrastructure throughout the NGL were conducted by Engineering & Lands Management staff in 2014. The NGL consists of numerous tracts in contiguous groups and parcels that are disconnected or isolated. These tracts are organized into 21 different management units located across both Swain and Macon Counties.

The infrastructure maps included in this document (–Appendices 22-28) show the locations of existing public roads, administrative access roads, historical roads, fire lines, gates, public fishing accesses and parking areas within the NGL. The results of the assessments along with recommendations for maintenance and improvements are discussed by category below.

Roads

There are 21 distinct management areas covering the nearly 4,800 acres that make up NGL. These tracts are traversed and connected by 25 miles of public, NCDOT maintained roads. Within the game land boundary, there are over 20 miles of access roads, fire lines and historic road beds or wagon tracks. There are also over 4 miles of rights of way through the game land to private properties beyond the boundary lines. These rights of ways need to be researched to determine the extent of the right of way or to determine if a legal right of way exists. There are several instances across the game land where the actual legal right of way is unclear.

Most of the access roads, fire lines and historic road beds within the game lands are accessible to the public by foot. Motorized vehicle access is restricted to WRC management and enforcement uses and for occasional survey work involving other agencies or groups. A small number of these access roads are un-gated and open to motor vehicles as they are used to reach inholdings that include churches, cemeteries, and sites of old home places or schools. These roads total to about one mile. In some cases, these roads are maintained by the churches, and if not, they are maintained by NCWRC. The 4 miles of right of ways scattered across the game land are typically open to public vehicle traffic up to the point where they reach the boundary with private property. Most of these roads are being maintained as driveways by the private land owners.

The remaining 19 miles are a combination of improved gravel roads, existing logging or farming road beds, fire breaks and access lines, and historic wagon paths or overgrown road beds. These roads were field located using GPS shortly after acquisition of the game lands. The farm fields and road grades are typically only used by WRC vehicles that include 4WD trucks and tractors and occasionally by logging trucks or other equipment. These roads are not usually maintained for a high level of service. Areas that are frequently wet are treated with surge stone and gravel as needed. Where ditches are needed and can be maintained; they are. Some roads have been cut into steep hillsides with rocky surfaces and little room to maintain crowns or ditches. In most cases, these roads are open to foot traffic for access to hunting, fishing or just walking in nature. Routine maintenance of these roads includes keeping them cut down and clear. Sections should not be allowed to become completely impassible on foot. Obstacles such as downed trees should be removed where possible.

Some of the historic paths across the game land have not been cleared or opened in decades. However, many are still used by hunters and hikers and are generally not improved unless there is a public demand, timber sale, or the addition of new managed clearings or burn units. A wagon path runs along the edge of the Little Tennessee River through some management areas in the game land. It is historically significant as it has been part of a centuries old corridor for travel and commerce. Sections of this path are part of the Cherokee Trail of Tears wagon train route. NCWRC staff has and will continue to confer with the Eastern Band of the Cherokee Indians (EBCI) prior to any land clearing or new maintenance activities.

Development of new roads through primary natural resource areas is restricted. Improvement of any pre-existing roads is allowed under certain conditions. The primary areas generally include those within 300’ of the banks of the Little Tennessee River and within 100’ of either side of an active stream or tributary. Those restrictions combined with areas of steep and rocky terrain limit the development and construction of new access roads through the game land.

The system of existing roads through the various management areas is illustrated in –Appendices 22-28 of this document. Roads are color coded to indicate whether they are public roads maintained by NCDOT, game land access roads, or undeveloped roads through the game land. The roads identified for recommended improvements or development has also been identified. Due to the large number of system roads across the entirety of the NGL, the existing condition narrative will be organized by NCWRC management unit. The roads that are regularly used or other roads that have special needs or concerns will be described in more detail. The located historical roads, which are essentially unimproved or receive little use, have been identified and briefly described.

Existing Road Conditions

Existing road conditions of NGL are organized by NCWRC management unit. Management units are listed in alphabetical order with descriptions of the condition of existing roads within the boundaries of the NGL listed below:

Brush Creek Management Unit

Lower Needmore Road (or Brush Creek Church Rd.)

This NCDOT maintained road begins at NC-28, and runs for 2.1 miles and dead ends at a NCWRC gate. The first 0.7 miles are well maintained with a good gravel surface, crown and ditching. The next 1.2 miles run along the right bank of the Little Tennessee River. This section is prone to flooding, and is poorly maintained. It lacks proper drainage, and therefore has several muddy or rutted areas following heavy rains. There are several large, deep puddles; the worst of which was located at (N35.32299°, 83.51825°). Collected rainwater will conceal the true depth of some of the puddles which could be a hazard to drivers. While the primary users are visitors to the game land or NCWRC staff, it is still the responsibility of NCDOT to keep this section of road maintained to a safe level. The remaining 0.2 miles leads to a loop and small parking area (4 to 5 vehicles) and gate at the entrance to the Brush Creek House field. It also connects to the gate at Old River Road. This section of the road and the parking area are also under NCDOT maintenance, but they are at a higher elevation and in better condition. Both the road and parking area need additional gravel.

One end of the Quarry or Needmore swinging bridge is located on the Brush Creek management unit at (N35.325792°, W83.522828°). This is one of three historic swinging bridges located on the NGL that are still used by pedestrians to cross the Little Tennessee River. These bridges were installed in the 1920's and 1930's to provide local residence with access to schools and churches. The bridges and their approaches have been and are maintained by NCDOT.

Brush Creek House Road

Beyond the parking area and the gate at (N35.31778°, 83.51501°), Brush Creek House Road runs for 0.2 miles to a clearing at an old home site. This area is managed for wildlife habitat, and is not open to public vehicles. This section of road is somewhat overgrown, and needs some brush and limbs cut back along the edges. There is little or no gravel or ditches with some ruts and washes. The road crosses a small, unnamed tributary with an old rock culvert that appears to be in sufficiently good condition. After this point, there is no actual road; just tracks through the

meadow. Management staff and public users are supposed to keep 600' away from the established eagles nest on the ridge at the opposite end of the meadow.

Old River Road (or Double Gate Rd.)

Two NCWRC steel tube gates are kept locked on both sides of a ford through Brush Creek at the start of Old River Rd. (N35.31845°, 83.51655°). The road runs for 2.1 miles along the edge of bottom land fields and the river bank. There are several managed food plots on these bottoms and access to burn areas. There is also a unique and environmentally sensitive ephemeral pool feature that runs between the road and the river for some distance. This feature limits maintenance options along a section of the road, and there are some muddy ruts and puddles. The entire length is essentially unimproved and is mostly used for tractors or survey vehicles. Hunters access the fields and forest areas by foot or from the river. At a minimum, 3" gravel should be added to maintain the stability of this road bed.

Taterpatch Road & Spur

The Taterpatch Road splits off the Old River Rd. at (N35.31008°, 83.51987°), and runs up slope for 0.5 miles to the junction with Taterpatch Spur on the ridge top. Taterpatch Spur then runs back down the opposite slope for 0.5 miles to meet with the end of Old River Rd. These cannot be reached without going through the double gates at the beginning of Old River Rd., so they are not accessible to public vehicle traffic. The roads are unimproved, and are primarily used by NCWRC staff as access to fire lines, for logging, and by public users on foot. The road is overgrown and either rocky or rutted in places. It is likely that a new road will be cut in above the old, and the old road will be abandoned after a potential timber sale in this area.

Marr Ridge Fire Line

A short section of improved gravel road leads from Lower Needmore Rd. to a steel tube gate at (N35.31972°, W83.50900°). Beyond the gate, a fire line is maintained along the ridge top through to the Brush Creek House meadow. This is a high and dry hike for hunters who prefer to access the meadow by foot over driving out along the river on Lower Needmore Rd.

The road up to the gate is steep (>20%), but it is in good condition. There is no turn around at the gate, and it is difficult to back down the steep grade. It may be helpful to develop one or two single vehicle parking spaces at the bottom of the grade along Lower Needmore Rd. It is recommended that the potential to add additional parking on either side of the NCDOT maintained road be investigated at this location.

Burningtown North Management Area

This area has several clearings that are managed for wildlife food and habitat. It is accessed from the north end off Burningtown Road (SR-1372). NCWRC maintains a parking area large enough for 10-15 vehicles just before a steel tube gate at (N35.27722°, W83.4039°). The parking area has a good gravel base. A line of boulders and the gate restrict public vehicle access to the open field beyond. The access road runs for about 700' through the first clearing then up through a wooded area for another 700' before reaching a large, food plot area. The first

section is fairly level, and has a good gravel base and crown. It crosses two small drainages over CMP culverts that area in good condition. The section of the road that approaches the last clearing is steeper, but currently appears to be in good condition. There are several private roads with rights of way through this management area. They are maintained by the property owners beyond the game land boundary. One of these roads used to access Burningtown Road by a timber bridge that has since collapsed. The owners of the residence have evidently found a different route to access their property. NCWRC is under no obligation to maintain this bridge or right of way.

Burningtown South Management Area

This area is currently inaccessible by NCWRC management staff or the public. Access was formerly granted by permission through a private campground that connects to Burningtown Rd. Presently permission to access the road has been denied, and a private gate has been installed to block the only existing route into the management area. Streams run between all remaining public roads and the management area. The management area has a large clearing that needs to be maintained. Pursuing an alternative easement or right of way through adjacent private properties or purchasing additional land to connect to this management area is needed to gain access. If no such options are available, it may be necessary to consider development of a bridge through NCDOT right of way to cross Burningtown Creek.

Cody/Coggins Bend Management Area

This area consists of two, separate parcels. The Cody parcel runs along the right bank of the Little Tennessee River upstream from Coggins Bend. There is currently no administrative or public access to the tract except for by river. There is some possibility to gain access through the adjacent Beliles property (private). A privately-owned bridge would need to be repaired to connect to the Cody tract.

The Coggins Bend tract also runs along the right bank of the Little Tennessee River. The opposite side of the tract is bordered by a private drive. NCWRC management staff has legal administrative access through permission, but public access from this drive is prohibited. Access may still be allowed to the bottom lands via the river. There is evidence that 4-wheelers have been riding on this tract. Adjacent owners have also posted No Hunting/No Trespassing signs on the game land. The Little Tennessee Land Trust (LTLT) owns a parcel that would connect the Cody and Coggins Branch tracts and provide access to both. LTLT has been in discussions with NCWRC about possibly donating this parcel.

Coweeta Bottoms Management Area

This parcel is far removed from the rest of NGL. It is located along the upper Little Tennessee River south of Franklin. The 42-acre parcel is divided by Coweeta Creek. Both sections can be accessed from US HWY 441. Steel cattle gates located at (N35.08397°, W83.38942°) and (N35.082403°, W83.384023°) restrict public vehicle access. Parking for the northern section is limited to the pull-in before the gate. A private timber framing company located along 441 between the two sections allows some parking on their property. There is somewhat more space

in front of the gate to the southern section, but vehicles parked there may still block the gate. A loop road on the northern section is used for administrative access. It is essentially a grassy path cut through the forest. The southern section is an open field and is leased by a local farmer for hay production. There may be opportunities to develop additional parking beyond the existing gates on both sections if there is sufficient demand. This would be more needed at the entrance to the northern section. Some clearing and the addition of at least two gates and other barriers to prevent 4-wheeler access would be necessary. These areas are subject to flooding. Some areas may require placement of 3" stone to maintain the stability of the cut. There is currently no kiosk located at this management area.

Dean Falls Management Area

This area currently has no direct access from public roads or through other management areas. However, the public can access this management area from the Little Tennessee River. Dean Falls Branch Road is a private drive which passes through a development that runs from NC-28 to the game land boundary, but NCWRC does not have a legal right of way to access via this road. The bottom land along the river on the southern portion of this management area would be well suited for wildlife habitat or food plot development if administrative and public access could be obtained. The LTLT has been working with NCWRC to acquire access to this area.

There is also a historic wagon path road bed that runs from NC-28 and connects to the Trail of Tears historic wagon path running along the right bank of the Little Tennessee River. This path is unimproved, and the short section that connects to NC-28 runs through private property. The Trail of Tears path is a continuation of Old River Road that runs along the river in the Brush Creek management area. The old wagon path is unimproved, and can be muddy in places where there are active springs. Any improvements to this path would require permission from the EBCI. Improved access may also open this path to 4-wheeler riders from the adjacent developments which would be unacceptable given the archeological considerations.

Dehart Management Area

The Dehart management area shares a boundary with the Brush Creek management area along the first mile of Lower Needmore Rd. from NC-28 down to the Little Tennessee River.

Brush Creek Church & Cemetery Roads

Two short, gravel roads through the game land provide right of way access to the Brush Creek Church and Brush Creek Cemetery inholding. WRC staff keeps the cemetery road maintained, while the road to the church has been maintained by NCDOT and church members. Both roads are in good condition with adequate gravel surfaces. Ditches are in place, but could be improved along the steeper sections.

Downriver Road

This access road begins just past the entrance to the Brush Creek Church road on the east side of Lower Needmore Rd. The road immediately fords a small creek near the steel tube gate at (N35.32815°, W83.51316°). The road then runs for 0.8 miles along the right bank of the Little Tennessee River leading to the Hogback Gap and Wiggins Island fire lines. The Downriver

Road is confined in places by the top of the river bank on one side and a steep rocky slope on the other. The road runs within a Natural Heritage primary area, and some activities are restricted due to sensitive habitat.

There are many natural springs draining from the slope to the Downriver Rd. Several locations were poorly drained and prone to stay muddy and rutted. These problem areas were repaired in 2013 by installing a series of 12" Ø CMP culverts then stabilizing the base with geotextile and surge stone. The condition of the road has improved significantly, but additional stone will be needed in some areas.

A timber bridge on large concrete block abutments crosses Dehart Creek at (N35.33201°, W83.51439°). The 16' long by 12' wide temporary bridge was constructed by NCWRC staff shortly after acquisition of the tract. The bridge was inspected during a recent assessment and was found to be in good condition. The approaches to both sides of the bridge need to be built up to divert runoff away from the structure; otherwise, there is no reason not to keep this bridge in service.

A 24" Ø CMP culvert was installed to pass an unnamed tributary at the end of Downriver Road (N35.33509°, W83.52106°) where several fire lines split off. This culvert is in good condition. There are some signs of erosion near the end of this road where maintenance vehicles turn around. It is recommended that additional 3" stone be added to stabilize the soft areas.

Historical Roads & Fire Lines

The Dehart management area is traversed by 3.8 miles of historical roads which have been improved to serve as fire lines, management access and on foot public access. These fire lines can be narrow and steep in places. Since they are intended only for seasonal use by WRC tractors and 4WD vehicles and because of the difficulty of hauling gravel into these areas, these roads mostly have dirt & grass surfaces.

The Wiggins Island and Hogback West fire lines were developed from the historic road beds running from the end of the Downriver Rd. to ends at different locations along the Little Tennessee River. These fire lines are used by NCWRC staff to manage food plots and wildlife fields.

The Hogback Gap Road runs up and over the ridge to become the Hogback Ridge Road. These are also historic roads that have been developed into fire lines and management access corridors for food plots and burn units. The Hogback Ridge Road intersects with Winchester access road that runs for an additional 0.5 miles to its end at the Little Tennessee River on the northernmost section of the Dehart management area. The Winchester Rd. ends at a clearing very near the end of the Sawmill Upriver Road which originates in the Sawmill management unit. Approximately 0.2 miles of the Sawmill Upriver Rd. run along the historic wagon path adjacent to the Little Tennessee River before reaching a section of private property that separates the Dehart and Sawmill management areas. A gate on the Sawmill management area restricts public vehicle access to this section along the river where sensitive natural and cultural resources are present. There is little or no management in this area, and the roads are not regularly maintained.

The Dehart Creek fire line was developed from a road bed that ran adjacent to Dehart Creek. It is 0.5 miles in length ending at the game land boundary, and is used to access managed fields and burn units. The road is primitive and narrow, but no significant problems have been noted. Roads adjacent to perennial streams (such as this one) must be regularly inspected for existing or potential erosion problems to minimize impacts in primary areas.

Hall Farm Management Area

The Hall Farm management area is a 52-acre tract located on the left bank of the Little Tennessee River on the opposite side from the Cody management area. From Rose Creek Road (SR-1456), a private 1.3-mile gravel road follows the river edge through private property and EBCI lands. A steel tube gate at (N35.26209°, W83.41774°) restricts vehicle access to administrative use only. NCWRC has an administrative right of way to the gate. The road up to the gate has been maintained by others. NCWRC maintains the access road beyond the gate and for 1,000'. Both the access road and gate are currently well maintained and in good condition. The gate soon may require some modification to prevent dirt bike and 4-wheeler riders from illegally accessing the area. To date there has been several instances where these illegal activities have occurred on this portion of the game land.

The Hall Farm management area also contains identified archeological sites including the Cowee mound. No vehicle access except for NCWRC & EBCI management/enforcement and those conducting archeological surveys should be allowed to this management area. Public access (by boat) is permitted. Currently there is adequate parking along the entrance road leading up to the gate. No kiosk has been installed at the entrance to this management area.

Hightower Management Area

The Hightower management area is a 347-acre tract that includes the left bank of the Little Tennessee River across from the Dehart and Brush Creek management units. Needmore Road crosses this management unit, and the public can access the area from pull-offs along the NCDOT maintained road. The opposite end of the Quarry or Needmore swinging bridge (see Brush Creek Management Area) connects to a narrow strip of the Hightower area between Needmore Rd. and the river. There are also three roads (not maintained by NCDOT) through this management unit.

Campground Road

This road was cut in by NCWRC staff in 2010 to provide access to the proposed campground site that was to be managed by Friends of Needmore. The campground was to be located along the section of bottom land on the opposite side of the Little Tennessee River from Brush Creek Road. Now, it is unclear whether the planned campground will ever be developed.

The new road begins at a gate off Needmore Road (N35.331067°, W83.521971°), and runs just above the head of an intermittent stream bed. The road continues for approximately 600' to the bottom land at the site of the proposed camping area. It was cut across a hillside, and the second half drops steeply (18%-30%) toward the proposed campground site. This grade is too steep for public use, and is currently eroding. In 2011, Engineering Services staff was asked to evaluate the condition of the existing road, and develop a plan to adjust the alignment and grade. A

preliminary plan was developed that would move the alignment lower and put it on a constant 12% grade. Since then, there has been no further movement toward development of the public campground. The proposed re-alignment of the new access road has not been constructed.

Another entry point to the bottom land field begins at a second gate off Needmore Rd. at (N35.33009°, W83.520955°). This road was not suitable for use as public access to the proposed campground because of the tight turn that would be required to enter from Needmore Rd. It would also have been necessary to build up a road bed across a long section of the bottom land for campground traffic since the field is frequently wet and soft.

If there are no longer any future plans to develop a public campground at this site, the second entrance would provide adequate access to the bottom for NCWRC management activities. In this case, the new road should be abandoned or maintained for foot traffic only. Water breaks should be cut into the steep section, and it should be seeded to minimize the erosion problems.

Franks Drive

This road is a right of way through the game land to a private inholding. A steel cattle gate was installed at the entrance (N35.32057°, W83.52541°). The gate and the road are maintained by the private landowner. The public is permitted to access this section of the game land on foot using Franks Drive. There is little management activity in this area except for boundary maintenance.

Windy Gap Road (or Hightower Church Road)

There are no management activities on the sections of the tract adjacent to this road apart from routine boundary maintenance. This section of the management area is bordered by Needmore Road and several private residences. It is not a good area for hunting, and there is little public demand for access to the game land from Windy Gap Road. The road beyond the private inholding is overgrown and not regularly maintained.

There are 4 abandoned and deteriorating outbuildings located near Hightower Church. Two appear to be located within the inholding, one appears to be located on the boundary line (N35.31765°, W83.52769°) and the forth is located entirely within the game land (N35.31771°, W83.52733°). The forth building has been knocked down and is currently on the ground. The remains of the downed building can be reached from Windy Gap Road. Removal of any of the others would require access through the church property. Additional details are provided in the subsequent “Structures” section of this document.

Horseshoe Bend Management Area

Horseshoe Bend Roads

This management area consists of 387 acres along the left bank of the Little Tennessee River across from the Dehart management area. There is one small parcel on the point of Horseshoe Bend that is isolated from the remainder of this management area. It is inaccessible except by river.

The northern section of the Horseshoe Bend management area can be accessed by Fred Breedlove Road (SR-1118). A steel tube gate is located at end of a paved, DOT maintained road (N35.35125°, W83.51990°). Currently there is an adequate amount of area available to park & turn around in front of the gate. Beyond the gate, the Horseshoe Bend access road provides administrative vehicle and public foot traffic access down to horseshoe bend on Little Tennessee River. The road is used more by hunters to access the game land than by anglers to access the river. The road is essentially unimproved. It follows Tarkiln Branch for approximately 1,800 feet on a steep and rocky grade. It then follows an existing road bed adjacent to the Little Tennessee River for another 1,100 feet until it crosses the game land boundary. This section is soft in places, and improvements to the steep, rocky section along Tarkiln Brach would be prohibitive.

The Horseshoe Bend road branches off from the main Horseshoe Bend Rd. near the beginning. It is a historic cart path that runs for 0.9 miles to the top of the ridge and returns to the main Horseshoe Bend Rd. near its end by the river. This road is only suitable for access on foot. The Slagle Cemetery Rd. spurs off the Horseshoe Bend Rd. It has not been maintained for decades, and large trees have grown up on the road bed. There has been no call for NCWRC to clear this road by anyone wishing to gain better access to the cemetery. Since NCWRC does little to manage this section, improvement of these roads is not a high priority. Vehicles are infrequently seen parked at the gate, and an expansion parking at this area is not needed now.

Freeman Farm Road

This road begins at Needmore Rd. and runs through the adjacent Wiggins Management unit. It is primarily used as access to the Panther Branch public fishing area on the Little Tennessee River. A steel tube gate is maintained at (N35.34307°, W83.52636°) to restrict vehicle access to the Freeman Farm fields located on the Horseshoe Bend management area. NCWRC manages these fields for wildlife habitat. The public is permitted to access this area on foot. There is limited space for parking at the gate, but there is adequate area for parking to access these fields in the parking area for the Panther Branch PFA.

Iotla Bridge Management Area

The Iotla Bridge management area is a 2.1-acre parcel along the right bank of the Little Tennessee River at the intersection of Bryson City Rd. (NC-28) and Saunderstown Rd. (SR-1335). The NC-28 bridge crosses over a portion of this parcel where it crosses the river. The section of the parcel on the upstream side of the bridge is a steep slope from the NCDOT right of way along Saunderstown Rd. down to a narrow bottom bench on the riverside. The area is unimproved and not regularly maintained. Anglers can park alongside Saunderstown Rd. to access this area, but there is no developed path or bank fishing facility.

The section on the downstream side of the bridge curves with the river and then parallels NC-28. There is a fair sized, mostly cleared field at the bend in the river. A power pole is set in the middle of this area. The top part of a driveway (N35.26131°, W83.46944°) from NC-28 down to the bottom was constructed prior to NCWRC acquisition. It ends abruptly, but has potential to be developed to provide vehicle access to the river bottom. An additional 200 linier feet of new road would need to be built to reach the bottom bench, and has been assessed as a potential float fishing access area. A step-down launch structure or possibly a small ramp could potentially be

installed to provide non-motorized boating access to this section of the Little Tennessee River. There could also be space to include a fixed, accessible fishing platform, as well as parking for up to 6 vehicles. The site has good visibility from NC-28 and power on site which will help with security. This site is in an area with high potential for archeological artifacts, and would require a complete archeological survey which could limit or prohibit development of the site.

Leatherman Management Area

The Leatherman management area is a 35-acre strip along the right bank of the Little Tennessee River. There is no direct, legal access through surrounding private property to the management area; however, NCWRC is currently allowed to maintain the wildlife areas through a handshake agreement with a neighboring landowner. The public may hunt this area by accessing it from the river or by crossing private property with permission. The road used to manage this area is a primitive farm road through one of the hay pastures. There are two culverts located on this tract that must be crossed to reach the managed fields. The culverts are in good condition, but may occasionally become plugged because of beaver activity. Options for acquiring a permanent, legal easement to the area should be considered.

Lost Bridge Management Area

The Lost Bridge management area is a 171-acre tract that lies on both sides of NC-28 with a narrow portion between the NCDOT right of way and the right bank of the Little Tennessee River. The bulk of the tract on the north side of NC-28 is steep, wooded land. There are currently no formal parking areas developed along NC-28, but at least two pull-off spots have potential for building an improved parking area that could be used by the public to access this tract.

A small finger of this tract runs up a draw to the 1,970' contour. A paved, private entrance to the Hidden Acres residential development runs through the game land at this location. Stone signs marking the entrance to the development were built on the game land and the area near the entrance is landscaped. An old cabin is located on the game land boundary. Based on GIS records, approximately 3/4 of the cabin is on the game land, and the rest is on the Hidden Acres development. The cabin is not habitable, but the developers began improvements to spruce up its appearance as a feature for the entrance to the development. It was brought to their attention that a portion of that structure is on the game land, and the improvements were halted. There have been some discussions about a possible land swap to give the developer the entire cabin. The Hidden Acres road is not used for administrative or public access to the game land.

Narrows Management Area

The Narrows management area runs along both banks of the Little Tennessee River where it meets the head of Fontana Lake. The banks are extremely steep and wooded. NCWRC currently has no direct access or right of way to the either parcel of the Narrows management area. An old road bed runs across the right bank parcel, and can be accessed by foot from the US-74 right of way. There is no access from Parton Road. This management area is sometimes reached by hunters from Fontana Lake. Due to the steep and rocky terrain and lack of any legal rights of way to this management area, improvements to existing paths or development of new roads would be a low priority.

Queens Branch Management Area

The Queens Branch management area is accessed from a LTLT parking area located at the intersection of Bryson City Rd. (NC-28) and Queens Branch Rd. (SR-1362). NCWRC maintains a steel tube gate at (N35.28373°, W83.466849°) at the beginning of the existing access road, and has administrative and public access by a legal right of way through LTLT land. The road currently used to access Queens Branch also runs through private property (Deans) before reaching the game land boundary. NCWRC currently has permission from the Dean family to use this section of road for administrative access to the Queens Branch management area, but does not allow for public access via this route. The public can access this section of the game land on foot through the adjacent LTLT field. If WRC loses permission to traverse the Dean family property for administrative access, there would be a need to develop a new section of road within the legal right of way through LTLT land.

The length of the access road from the parking area to the game land boundary is 400'. NCWRC works closely with LTLT to keep this section maintained. An old white oak skidder bridge crosses a small stream just before the existing access road reaches the game land boundary. This bridge is holding up well, but it may limit the size and weight of vehicles and equipment accessing the game land. If the bridge begins to show signs of stress from regular use or if large equipment or trucks need to cross this stream, NCWRC would need to coordinate with LTLT to replace or upgrade this crossing.

After reaching the game land boundary, the access road runs for approximately 2,000' through woods, then across a power line easement, then runs along the edge of the managed fields until it ends near a tributary to the Little Tennessee River. This access road is in good condition for administrative purposes and for public access on foot. It has a good gravel base and a fair crown. The road crosses two culverts. One is a new 24" Ø CMP, and the other is an old rock/timber culvert that needs to be replaced.

From this point the historic road bed turns up the creek and past an abandoned farm house before ending at the last food plot. This road is unimproved and somewhat overgrown, but it is satisfactory for its limited use. The abandoned farm house at (N35.27832°, W83.46621°) is collapsing and needs to be removed. This will be discussed in more detail in the subsequent "Structures" section of this document.

Raby Bend/McCoy Management Area

The Raby Bend/McCoy management area includes portions of both sides of the Little Tennessee River downstream of the H.P. McCoy Bridge. There are sections of private land that break up the continuity of this management area along the river. The McCoy section is located along the left bank of the river, and the Raby Bend section is on the runs along the right bank. There is one private inholding on the McCoy side of the river. Most of the upstream section of the McCoy parcel can be accessed directly from the NCDOT maintained McCoy Road (SR-1373). There is currently no legal right of way for NCWRC or the public to access the parcels downstream of Long Branch on the McCoy side of the Little Tennessee River.

The upstream field on the McCoy side was in the process of being developed as a step-down float fishing access in 2013, however construction was suspended due to complaints from the adjacent property owner. A concrete abutment for the structure was left on the bank after all other components were disassembled and removed. The adjacent property owner has since erected a wooden fence around this abutment and posted "no trespassing signs" illegally on state property without the permission of NCWRC.

A second site for the float fishing access has been selected, and is currently being reviewed for potential archeological impacts. This site is in a current hay lease field beyond an existing steel tube gate at (N35.27684°, W83.44532°). Approximately 150' of new road and a gravel parking area for 8 vehicles are proposed for development at this site.

The upstream end of the Raby Bend parcel (on the right side of the Little Tennessee River) is the site of a new parking area near the intersection of Oak Grove Rd. and NC-28). The gravel lot provides parking for 6 to 8 vehicles, and can be used by the public to access the Raby Bend tract and the Oak Grove swinging bridge to cross the river and reach the upper McCoy tract. The historic Oak Grove swinging bridge located at (N35.27846°, W83.44873°) is maintained by NCDOT. It is anchored on both banks of the Little Tennessee River within the boundaries of this management area.

The parking area here is in good condition and has a wooden fence that has been installed around the perimeter to prohibit vehicle access beyond the parking area. The sight distance at the entrance to the parking area is not good, and can make it difficult for users to back out if they are unable to turn around when there is heavy use. To access the Raby Bend tract from the parking area, the public must walk along a cut path and through Caler Cove Branch which runs along the western side of the parking area. This stream has been severely impacted by cattle in the past. Implementing a restoration & enhancement plan for the 250' section of this branch that runs through the game land from NC-28 to the Little Tennessee River, as well as the installation of a foot bridge across the branch should be a priority. Previously there was an old barn on the game land located adjacent to this parking area which was determined to be a public hazard and has since been leveled. The remains of this structure are still present and should be removed from the management area.

Downstream of Caler Cove Branch is a small, private inholding on NC-28. This property does not run all the way to the river and therefore does not separate the upper and lower sections of the Raby Branch tract. The public can access the downstream section on foot through the corridor along the river bank. NCWRC uses a gated farm road adjacent to the inholding for administrative access to the downstream section. This section consists of several large wildlife fields, food plots and burn units. The access road is unimproved, and during the summer, it is a worn pathway through the hay pasture. No improvements to the farm road are needed except at two culvert crossings. A 12" Ø CMP pipe is rusted with a buried outlet. It is too short to get large equipment across, and needs to be replaced. A 24" Ø CMP crossing a live stream exhibits corrosion and signs of outlet scour. It is occasionally clogged by beaver activity, and should also be replaced. At both locations, there is need for the road bed to be raised. A fire line from this road leads to an old canning shed located within the game land which should be removed. Additional details regarding this old shed are provided in the subsequent "Structures" section of this document.

Rattlesnake Management Area

The Rattlesnake management area includes just over 2 miles of the left bank of the Little Tennessee River on the opposite side of the Brush Creek management area. Needmore Road (SR-1114) runs through the northern section of the management area for 0.5 miles then follows the river bank through the management area for another 1.5 miles. Most of the management area can be accessed from Needmore Road. The most heavily used public facility is the Rattlesnake float fishing launch and parking area located at (N35.30701°, W83.52222°). This facility and the parking area will be discussed in the subsequent "Parking Areas" and "Recreation Facilities" sections of this document.

Much of the game land boundary for this management area follows the 1,970' contour which was the boundary established by Duke Power before NCWRC acquired the tract. There are several narrow coves along the west side of Needmore Road with established access roads that lead through the game land to private residences and farms beyond the boundary. Many of these private land owners have legal rights of way through the game land while others do not. In most cases, the sections of these access roads through the game land are maintained by others.

Rattlesnake Road

Approximately 3,700' of this inherited, gravel road runs adjacent to Rattlesnake Creek within the game land boundary. It continues beyond the boundary to several residences with private rights of way through the game land.

The community at the upper end of Rattlesnake Rd. has been maintaining the entire length of this road. There is little public interest in using Rattlesnake Rd. to access the game land. Slopes on both sides of the road are very steep and rugged. There are no opportunities for public parking pull-offs along the section running through the game land.

Three 15" Ø CMP culverts are located at different points along the section of road on the game land. All three are clogged at the inlet. A wash-out problem was observed associated with one of these culverts on a steep section of the road. Recommend increased maintenance of ditches and culvert inlets by WRC on the section of Rattlesnake road within the game land.

Bull Branch Road

575' of gravel road lie within the narrow section of game land that runs up the unnamed cove between Needmore Rd. and the 1,970' contour. This road is used primarily by the farm and residences above the game land boundary, and there is a cleared slope on the north side of Bull Branch Road under hay lease. Most of this field is within 150' of a private residence. A small, cleared plot located on the south side of Bull Branch Rd. at the intersection with Needmore Rd. may be suitable for hunting, but it is also near residences.

The road is maintained by the land owners at the upper end, and does not have any notable issues of concern.

Long Branch Road

A narrow finger of game land lies along both sides of the lower end of Long Branch up to the 1,970 contours. Approximately 950' of inherited, gravel road runs through the game land before entering private property. Several residences beyond have right of way through the game land.

The road is not currently being maintained by NCWRC, as it is apparently maintained by residents at the upper end. The larger portion of the game land is located along the south side of Locust Cove Rd. This area is wooded with some patchy clearings. There may be some need to develop a pull-off parking space along the lower end of Locust Cove Rd. for hunter access.

A 15" Ø CMP culvert and a 12" Ø HDPE pipe are located on the section within the game land. There are no problems with the 15" Ø pipe, but the 12" Ø HDPE pipe is clogged at the upper end. Recommend replacing the 12" Ø HDPE pipe with a 15" Ø CMP culvert at this location, and regular inspection and maintenance of the ditches within the game land.

Ditch Branch Road

Ditch Branch Road is approximately 900' of gravel road through a wooded section between Needmore Rd. and the 1,970' contour. There are private lands beyond the upper limit of the game land boundary, but no residences. The road receives little traffic from game land users, and none of the adjacent areas are managed for wildlife. NCWRC does not currently maintain this road. NCWRC staff should monitor the condition of the road when working in the vicinity to ensure that there are no erosion problems or hazards on the game land section.

Kudzu Corner Road

This road is a right of way to a residential development beyond the game land boundary. About 0.25 miles runs through the game land. The gravel road is maintained by the development, and is in very good condition with crown and ditches. The development has been landscaping and mowing along the section of this road located on the game land. There is a single 12" Ø CMP culvert (in good condition) on the game land section.

Loudermilk Branch Road

This gravel road runs along Loudermilk Branch up to the 1,970' contour. The section of game land along this road is narrow and confined by the steep nature of this cove. There are no pull-off parking spaces, and there is little to no public use of this section. The road switches back near the upper limit of the game land, and then leads to a private residence. The owners of the land beyond the boundary have been maintaining this road. There are three culverts on the game land section of this road. Each has problems that will be addressed in the "Culverts" section of this report. Some wash-out was observed associated with the culvert on the steepest section of this road.

Rose Creek Management Area

This is a small, isolated management area. It is transected by Furman Welch Rd. (SR-1374) and bordered on the south end by Rose Creek Road (SR-1456). The shape of this management area, the proximity to these public roads and private residences makes it a less desirable site for

hunting. There has been no public request for better access to this area. The open fields on this tract are currently under hay leases.

Sawmill Management Area

The Sawmill management area abuts the right bank of the Little Tennessee River immediately upstream of the Narrows management area.

The upstream section of the management area is primarily accessed by Lower Sawmill Road (SR-1125). Once this road crosses onto the game land, it follows Sawmill Creek down to the river. The entire road is supposed to be maintained by NCDOT through a historic ford of Sawmill Creek and ultimately to the Sawmill swinging bridge that crosses the Little Tennessee River. The road through the game land has not been well maintained by NCDOT through the years. As part of a plan to develop a fishing access to the river on the Sawmill management area, WRC staff performed improvements to a 900' section of Lower Sawmill Rd. in 2013 from the game land boundary to the entrance of the parking area for the fishing access. This section of the road is very low, and is prone to regular flooding by the creek. WRC staff improved this section of road by building a surge stone base and providing better drainage. At the entrance to the parking area and the official starting point for WRC maintenance, a new 24" Ø HDPE culvert (N35.35718°, W83.50623°) was installed to improve drainage from the uphill side of the road to Sawmill Creek. Beyond this point is the parking area for the public fishing access. Both facilities will be discussed in following sections of this report.

Where the road splits at the entrance to the parking area, the NCDOT maintained section continues through the game land and crosses an established ford through Sawmill Creek. The ford is extremely rocky and difficult to navigate. It involves driving down the center of the creek for at least 50' before exiting onto the opposite bank. Past the ford, this road continues for another 700' before reaching the Sawmill swinging bridge and a steel tube gate installed by WRC at (N35.35553°, W83.50507°). This gate was installed to alleviate an ongoing problem with 4-wheelers degrading the historic road to the swinging bridge as well as the wagon path and private property beyond the game land boundary. The northern end of the historic swinging bridge is located on the Sawmill Management unit. It crosses the Little Tennessee River to private land on Horseshoe Bend. This bridge is maintained by NCDOT. The section of road leading from the ford to the bridge is in poor condition. There are many deep pot holes that are probably remnants of past 4-wheeler activities. No apparent attempt has been made to re-grade this section of road or to add gravel to the pot holes. It would be very difficult to have gravel delivered by trucks through the ford. Vehicle traffic along this section of the NCDOT maintained road has been reduced since there is no place to turn a vehicle around near the gate. The road is used by hunters to access other sections of the game land by foot.

A section of Sawmill Hill Road (SR-1200) crosses through the Sawmill management are before reaching a dead end. A historic road bed begins near the point where Sawmill Hill Road crosses the game land boundary. The road bed is referred to as 4-wheeler road because it has frequently been used to ride on the game land. This 0.5 mile of unimproved road terminates at the field adjacent to the Sawmill public fishing access. This road is not used by WRC staff for management purposes. Attempts have been made to prevent 4-wheelers from accessing this road such as placing boulders or digging trenches. Preventing 4-wheeler access is an ongoing challenge, and there are no perfect solutions. This must be a combined effort involving

maintenance of obstacles and blocking bypasses along with targeted enforcement. The riders still find ways to bypass these obstacles. Hunters may access this road by foot from the Sawmill PFA parking area.

The downstream most section of the Sawmill Management area is not accessible to WRC management, enforcement or the public. Beyond the end of State maintenance on Parton Rd. (SR-1124), the road continues through private property and then onto the game land. Land owners adjacent to the game land will not allow access to WRC management or enforcement staff or to the public to the section of Parton Rd. that runs through their property before reaching the game land boundary. They only allow their friends and family to access the game land and the road leading to the river from this point. Individuals maintain private docks on Fontana Lake that are located on the game land. These adjacent property owners have apparently been cutting roads through the game land as they see fit. Acquisition of a small parcel of land from a different, adjacent property owner would provide WRC staff with a way to reach the existing 0.5 miles of roads (Parton East Fork & Parton Main) that cross the management area and terminate at the river/lake edge. This access would enable management and enforcement to reclaim control of this area. The needed parcel is located approximately at (N35.36384°, W83.513078°). This situation should be considered a high priority, and should be reviewed with State Property Office to determine what options are available.

Tellico Management Area

The Tellico management areas is a 491-acre tract that is traversed by several NCDOT maintained roads including: Needmore Rd., Tellico Rd., Cabe Cove Rd., High Lonesome Rd. and Wadhams Rd. Game land management & access roads and private drives through the game lands are described below.

Wadhams Drive

The GIS record of the NCDOT secondary road system shows that Wadhams Drive (SR-1473) runs for one mile from Tellico Road near Tellico Church to Needmore Road at the mouth of Tellico Creek. Their record indicates that this entire length of road is in the NCDOT system. From field observations by WRC staff, Wadhams Road from Tellico Church does not actually connect to Lower Wadhams Road which begins at Needmore Road. Wadhams Drive runs for 0.5 miles through the game land and ends at a private residence located at (N35.288889°, W83.508411°). The connection between Wadhams Drive and Lower Wadhams Road was broken when Wadhams Drive was extended up to a private residence. Conversations with NCDOT staff in the field indicate that NCDOT only maintains the paved section (first 0.1 miles) of Wadhams Drive up to but not including the bridge crossing Tellico Creek. Beyond that point, the gravel road has been maintained by the private property owner at the end.

A 50’L.x12’W. bridge crosses Tellico Creek at (N35.28506°, W83.50083°). This bridge is of unknown age, and it was not built to NCDOT standards. It is does not appear that this bridge is maintained by NCDOT since there are no guard rails, warning signs or weight limits posted. The bridge is decked with 4x4 timbers on (4) 12”x4” steel I-beams. The beams span the entire width of the creek, and are supported by concrete piers that were cast using oil drums as forms. The deck is at least 8’ above the stream bed. The bridge (along with the majority of Wadhams Road) is located within the game land boundary. The bridge only serves one private residence, but it must be crossed to reach the Wadhams-B and Wadhams-C game land access roads. There is a

large, open field on the management area located on the right side of Wadhams Drive before the bridge. The clearing meets the road, and there are no gates. Hunters will occasionally park along the edge of this field, cross Tellico Creek at on foot at the Wadhams Drive bridge and hike along the creek to the eastern end of the Tellico field's food plots.

It is not clear who currently maintains or is legally responsible for maintenance of the Wadhams Drive bridge. WRC needs a definitive determination regarding which party (NCDOT, WRC or the private land owner) has responsibility for maintenance of this bridge and for public safety at this crossing. If WRC is responsible for the bridge, then a more detailed assessment and recommendations for safety improvements are a priority.

The remainder of Wadhams Drive runs for 0.4 miles up to the private estate at the end. The private land owner has right of way through the game land, and has been maintaining the drive beyond the bridge. Wadhams Drive intersects with the Wadhams-B access road at 300' past the bridge crossing, and intersects with Wadhams-C after another 700'. Both are unimproved road beds that run for less than 0.2 miles. The beginning of Wadhams-B is blocked by a flat trailer that is believed to belong to the property owner at the end of Wadhams Drive. Any potential parking to access this road is currently taken by this trailer. The suspected owner has been contacted and asked to remove the trailer. Wadhams-C is in similar condition as Wadhams-B.

The only parking for this access is the access road itself. Past Wadham-C, the drive approaches private property with no pull-offs or turn-around before the owner's gate. There is little reason for game land users to drive beyond Wadham-C. Neither of these access roads lead to food plots or wildlife openings. The Wadham-C road is used as a fire line and access to a burn unit.

Lower Wadhams Road

While the NCDOT GIS record of secondary roads shows the entire Wadhams Road in their system, Lower Wadhams Road does not actually connect to Wadhams Drive. It appears that the connection was broken when Wadhams Drive was extended up to a private residence. NCDOT has never improved or maintained the Lower Wadhams section. Conversations with NCDOT staff in the field indicate that NCDOT only maintains the paved section of Wadhams Drive up to but not including the bridge.

Access to Lower Wadhams Road is restricted by a WRC gate at the intersection with Needmore Road across from the Tellico public fishing access. Lower Wadhams is a graveled road bed that is only used for limited administrative access and public foot traffic. The road is currently used by WRC as a fire line to access burn areas. There are no wildlife openings or managed food plots. WRC may change management practices following a timber sale in this area. Following any sale, WRC should plan to improve majority of the 0.5-mile Lower Wadhams Road.

High Lonesome Road

This gravel road winds for 0.8 miles though the eastern section of the Tellico management unit. It is maintained by NCDOT, and is in good condition. There are several residences at the end of this road beyond the game land boundary. Many of the curves have wide pull-off areas which are used by the public as parking to access the game land. WRC maintains a steel tube gate half way up High Lonesome Road at the entrance to a kudzu field. WRC has been working to

eradicate the kudzu to allow for wildlife management. There is enough parking for 3 vehicles at this gate which is sufficient for the current use.

Burningtown Lower Road

This is an unimproved management access road leading to a food plot clearing. From the WRC steel tube gate located near Burningtown Road at (N35.28277°, W83.48261°), the road bed follows Burningtown Creek for 0.14 miles. The road is in fine condition for limited management access and public foot traffic.

Arch Hill Road

This is a historic road bed that leads from Needmore Rd. to a small clearing that was an old home place. The road runs through some boggy fields and is not used for management activities. There is no gate at the entrance to this road, and no parking along Needmore Road for public access to this section. If timber is sold from this section or wildlife management practices are added, then WRC should consider improving the 0.2-mile road. If 4-wheeler riders begin using this road, then a gate should be installed at the entrance.

Wiggins Management Area

The Wiggins management area runs along the left bank of the Little Tennessee River on both sides of Needmore Road. Wiggins Creek Road (SR-1110) traverses the management area from east to west for approximately 1 mile. There are several established farm roads and drives with rights of way to residences and developments that located within the boundary of this management area.

Freeman Road (Panther Branch PFA)

This gravel access road from Needmore Rd. is in good condition. The first section drops at about 10% for 250' to a switch-back at the bottom. A steel tube gate at the switchback restricts public vehicle access to the remainder of Freeman Rd. which leads to Freeman field on the Horseshoe Bend management area.

The improved road continues around the switchback, and then runs level for another 250' leading to the parking area for the Panther Branch fishing access. The widest point of the switchback is 50'. A 25' turning radius is not sufficient for larger vehicles or trucks. There is adequate space to perform a three-point turn, but that would be difficult for vehicles with trailers in tow. This lot is surfaced with packed gravel, and is in good condition. There appears to be adequate parking for 20 single vehicles. The access to the river is a gravel paved ramp to the water's edge.

There are two 18" Ø culverts in series that carry runoff from near the entrance of this road to beneath the parking area. There are problems associated with these pipes that will be addressed in the subsequent "Culverts" section of this report.

Phillips Farm Road

A steel gate is located at (N35.340691°, W83.532539°) is the entrance to a managed field. An un-graded road runs approximately 500' into the field. This road is only used for management and public foot traffic. There is room at the gate for 5 single vehicles to park. Additional 3" stone is needed at the gate.

Cabe Farm Road

Located off Wiggins Creek Rd.; an inherited steel cattle gate in fair condition (N35.33849°, W83.5327°) limits access to WRC management vehicles and public foot traffic. The gravel access road is rough, but suitable for the management needs. Additional improved parking is needed at the gate, but would be limited to one or two vehicles.

Flint Rock & Glory Mountain Roads

These are inherited roads that run through the game land to private properties beyond the boundary. They share a common origin at Wiggins Creek Rd., but divide after about 300'. The beginning of the road crosses Wiggins Creek which passes through a 36" Ø CMP culvert. This pipe could be as old as the road itself (built in the 1950's?), and may be located within NCDOT R/W. The culvert does not appear to need replacement at this point, but should be inspected frequently for signs of potential failure (corrosion, damage or bypass).

At the divide, Flint Rock Road continues to the north for 580' to the game land boundary. The road to the south runs alongside Charley Branch for another half-mile to the Glory Mountain development beyond the game land boundary. This road is maintained by others, and is generally in good condition. Some ditches require clean-out.

One 24" Ø CMP culvert is located on this section of Glory Mountain Rd. within the game land boundary. This culvert discharges directly into Charley Creek, and hangs over the creek by 2'. Due to the rocky banks and stream bed, there are no indications of scour resulting from this hanging culvert.

Future Road Improvements

Needs for road maintenance and improvements have been identified on existing sections of NCWRC access roads along with needs for development of new roads to access isolated sections of the game land. Total estimated cost of all identified road maintenance, improvement, and new access road development projects for the next ten years is $405,000. These recommendations are described below in order of priority:

High Priority Level

Based on assessments of the current condition, levels of use and anticipated use of existing roads on the NGL and the needs to acquire permanent administrative and public access to isolated sections; the following activities should be considered the highest priority for upgrade over the next ten years:

- Brush Creek M.A. – Lower Needmore Road
- Burningtown South M.A. – Develop new access road
- Cody/Coggins Bend M.A. – Develop new access road
- Dean Falls M.A. – Develop new access road
- Dehart M.A. – Downriver Road
- Iotla Bridge M.A. – Develop new access road
- Raby Bend/McCoy M.A. – Develop new access road
- Sawmill M.A. – Develop new access road

The total cost of potential high priority level road work to be done during the next ten years is estimated at $256,000.

Brush Creek M.A. – Lower Needmore Road

A one mile section of Lower Needmore Road (SR-1129) that runs low and level along the Little Tennessee River is in poor condition. This is a NCDOT maintained road that runs through the game land and is open to public vehicles. The road is used by hunters and anglers to access the game land and river and by sightseers. It is also the access to one end of the quarry swinging bridge across the Little Tennessee River.

This road needs more maintenance than it currently receives from NCDOT. There are numerous low spots with poor drainage where large potholes form. Following rains, runoff fills the potholes making it difficult to judge their depth. Many of these holes are deep enough to cause damage to the vehicles of unsuspecting driver if taken at too high of a speed.

NCDOT staff has been approached about the maintenance needs in the field, but so far has not repaired these hazards. This is possibly because it is not a through road or because of frequent flooding. According to WRC staff, the river only floods this area once in ten years. The problems are more likely caused by poor drainage and periods of heavy or frequent rainfall.

The hazards along this road need to be repaired, either temporarily by filling the holes with 3" stone and topping with ABC, or by raising the elevation of the low sections then installing ditches and culverts to improve drainage. Higher level contact with NCDOT should be made to determine their intent for this section. If they do not plan to address these conditions, WRC will need to decide if the Agency should take the initiative to affect either temporary or long-term repairs for the sake of the game land users.

Estimated cost for implementing long term repairs is $40,000. Temporary repairs could cost up to $10,000.

Burningtown South M.A. – New access road development

The Burningtown South management area is currently inaccessible for maintenance or public use. The only existing road access to the unit and a large open field surrounded by forest is through a private campground. The owner has installed a gate at the boundary of the game land and refused access through that road.

The remainder of the management area is bordered by private lands or NCDOT right of way along Burningtown Road (SR-1372). There are no existing roads through private lands connecting to the management area, and the area is separated from Burningtown Road by Burningtown Creek.

NCWRC should pursue options to acquire a right of way or easement through existing property or purchase a parcel to connect to either Burningtown Road to the east or Shope Cove Road (SR-1371) to the north. It appears that any new acquisition would require development of a section of new road and would require construction of a stream crossing over either Burningtown Creek or a smaller unnamed tributary.

If the management area boundary already touches the NCDOT right of way along Burningtown Road, then it may be more practical to identify the best location to build a new access road and include construction of a small bridge to cross Burningtown Creek at that point. Limited parking could also be included in this development plan.

Estimated cost to build a new bridge, 600LF of new road, a small parking area with gate and kiosk could be as high as $100,000 or higher if a land purchase is also required.

Cody/Coggins Bend M.A. – New access road development

The Cody and Coggins Bend tracts both run along the Little Tennessee River with good bottom land fields. The upstream Cody tract is currently without any administrative or public access except for by river. The downstream Coggins Bend tract has permission for administrative access only through a private drive, Cody Road. Cody Road is private and runs through several different private properties before it runs along part of the Coggins Bend tract boundary. The private land owners have denied public access via this road, and have posted no trespassing & no hunting signs on the game land along the road. There is evidence (such as chairs by the river & 4-wheeler tracks) indicating that the neighboring land owners are making their own use of this section of the game land.

A new route needs to be developed to provide public and administrative access to both tracts. LTLT has been working toward acquiring a parcel of land that could connect one or both tracts to NCDOT right of way along Bryson City Road (NC-28). If this can be done, they would likely provide an easement for access. NCWRC staff would need to plan to construct several hundred feet of new road with a gate and possible parking at an estimated cost of $30,000.

Dean Falls Management Area – New access road development

Dean Falls is a long, narrow management area along 2 miles of the Little Tennessee River that currently has no public or administrative access except by river. NC-28 parallels the eastern boundary, but there is no direct connection. Acquisition of a connecting parcel or permanent easement would at lease require construction of 400’-800’ of new road along with a gate and possible parking. Estimated cost for this development is $25,000 without including any cost for acquisition.

Dehart Management Area – Downriver Road

This existing, gated game land access road runs for just under 1 mile through a primary natural resource area adjacent to the Little Tennessee River. This area was used for mud bogging before WRC restricted access. Work has been done by WRC staff to stabilize low sections of this access where spring flows from the adjacent, rocky slope tend to keep the road wet and muddy. Placement of geotextile and application of layers of 3" stone along with installation of ditches and culverts has done much to stabilize this section. There are still areas that need additional stone for stabilization work. The road ends at the head of several fire lines. The turnaround area at the end is on a slope, and needs additional stone for stabilization. It is necessary to ford a Creek to reach this road, and it is easiest to have stone delivered to the Brush Creek access parking lot and haul small loads to where it is needed. Estimated cost for additional materials and labor is $6,000.

Iotla Bridge Management Area – New access road development

The section of this tract that is immediately downstream of the NC-28 bridge over the Little Tennessee River has been assessed as a potential float fishing and public fishing access area. Construction of a driveway on the game land starting at (N35.26131°, W83.46944°) along NC-28 apparently began before NCWRC acquired the tract and was stopped. Completing the development of this access road for another 200' would provide access to the potential launch and fishing pier site at the river's edge.

There are potential archeological issues that may prevent or limit development of this site. If the area is cleared, then there is a good chance that it will be developed within the next ten years. Construction of the new access road would require compacted backfill to build a grade down to the bottom land. Estimated cost to complete is $20,000.

Raby Bend/McCoy Management Area – New access road development

A public float fishing launch and parking area has been approved for development by NCWRC, and is currently under archeological review. The proposed site is a field between McCoy Road (SR-1373) and the left bank of the Little Tennessee. The field has been under hay lease, and has access to McCoy road through a gate at (N35.27684°, W83.44532°). If development proceeds, the current access road will need to be improved to meet slope and width required for public 2WD level of service. These improvements will require compacted earth fill delivered to the site. Estimated cost of road development is $25,000.

Sawmill Management Area – New access road development

The most downstream section of the Sawmill management area contains 0.5 miles of existing roads leading from the upper part down to the Little Tennessee River. This section of the management area and these roads are currently not accessible to NCWRC management, enforcement or the public. Beyond the end of State maintenance on Parton Rd. (SR-1124), the road continues through private property and then onto the game land. Land owners adjacent to the game land will not allow access to NCWRC management or enforcement staff or to the public on the section of Parton Rd. that runs through their property before reaching the game land boundary. They only allow their friends and family to access the game land and the road

leading to the river from this point. Individuals maintain private docks on Fontana Lake that are located on the game land. These adjacent property owners have apparently been cutting roads through the game land as they see fit.

Acquisition of a small parcel of land from a different, adjacent property owner would provide NCWRC staff with a way to reach the existing 0.5 miles of roads (Parton East Fork & Parton Main) that cross the management area and terminate at the river/lake edge. This access would enable management and enforcement to reclaim control of this area. There may be several options, but the one that would require the shortest and easiest length of road to develop is located at approximately (N35.36384°, W83.513078°). This situation should be considered a very high priority, and should be reviewed with State Property Office to determine what options are available. If a connecting parcel or permanent, legal easement can be acquired, the estimated cost to develop a short section of new road would be $10,000. Due to the importance of establishing this connection, WRC should consider a land swap of fee simple purchase of a small, connecting parcel at an estimated additional cost of $30,000

Medium Priority Level

The following road projects should be considered as medium level priorities to be completed as opportunities or needs arise during the next ten years or after completion of the high priority projects:

- Brush Creek M.A. – Old River Road
- Brush Creek M.A. – Taterpatch Road
- Hightower M.A. – Campground Road
- Sawmill M.A. – Sawmill DOT Road
- Tellico M.A. – Wadhams Drive bridge

The total cost of potential medium priority level road work to be done during the next ten years is estimated at $83,000.

Brush Creek Management Area – Old River Road

There are several sections along the access road (beyond the double gates) that have large potholes and muddy ruts. These areas located at or near (N35.30273°, W83.51914°). These sections should be stabilized with surge stone and topped with crusher run. Sections with springs or poor storm water drainage should be raised and drainage culverts should be installed. Estimated cost is $10,000.

Brush Creek Management Area – Taterpatch Road

This old road bed provides a connection near the beginning of Old River Road (beyond the double gates) over a ridge and down to the meadow at the Brush Creek house site. This 1 mile road is a high and dry alternative for hunters on foot or NCWRC management vehicles particularly when the longer Old River Road is wet.

Taterpatch Road is rocky, steep and narrow in places. It is also overgrown for administrative vehicle passage. NCWRC staff is considering improvements and possible relocation of sections of this road that would follow a future timber sale on the ridge. Estimated cost for these improvements is $50,000.

Hightower Management Area – Campground Road

This road was cut in by NCWRC staff in 2010 to provide access to the proposed campground site that was to be managed by Friends of Needmore. The campground was to be located along the section of bottom land on the opposite side of the Little Tennessee River from Brush Creek Road. Now, it is unclear whether the planned campground will ever be developed.

The new road begins at a gate off Needmore Road (N35.331067°, W83.521971°), and runs just above the head of an intermittent stream bed. The road continues for approximately 600' to the bottom land at the site of the proposed camping area. It was cut across a hillside, and the second half drops steeply (18%-30%) toward proposed campground site. This grade is too steep for public use, and is currently eroding. In 2011, Engineering Services staff was asked to evaluate the condition of the existing road, and develop a plan to adjust the alignment and grade. A preliminary plan was developed that would move the alignment lower and put it on a constant 12% grade. Since then, there has been no further movement toward development of the public campground. The proposed re-alignment of the new access road has not been constructed.

If there are no longer any future plans to develop a public campground at this site, the second entrance would provide adequate access to the bottom for NCWRC management activities. In this case, the new road should be abandoned or maintained for foot traffic only. Water breaks should be cut into the steep section, and it should be seeded to minimize the erosion problems. Estimated cost to realign and improve the existing campground road for public vehicle use is $20,000. Estimated cost to stabilize the existing road for foot traffic and erosion control is $3,000.

Sawmill Management Area – Sawmill DOT Road

The upper section of Lower Sawmill Road (SR-1125) crosses onto the game land and follows Sawmill Creek down to the Little Tennessee River. The entire road is supposed to be maintained by NCDOT through a historic ford of Sawmill Creek and ultimately to the Sawmill swinging bridge that crosses the river. WRC improved the section of Lower Sawmill road from the game land boundary to the entrance to the Sawmill public fishing access parking area. The remaining section of Lower Sawmill road through the game land has not been well maintained by NCDOT through the years.

The NCDOT maintained section continues through the game land and crosses an established ford through Sawmill Creek located at (N35.357054°, 83.506022°). The ford is extremely rocky and difficult to navigate. It involves driving down the center of the creek for at least 50' before exiting onto the opposite bank. Past the ford, this road continues for another 700' before reaching the Sawmill swinging bridge and a steel tube gate installed by WRC at (N35.35553°, W83.50507°). This gate was installed to alleviate an ongoing problem with 4-wheelers degrading the historic road to the swinging bridge as well as the wagon path and private property beyond the game land boundary. The northern end of the historic swinging bridge is located on

the Sawmill Management unit. It crosses the Little Tennessee River to private land on Horseshoe Bend. This bridge is maintained by NCDOT. The section of road leading from the ford to the bridge is in poor condition. There are many deep pot holes that are probably remnants of past 4-wheeler activities. No apparent attempt has been made to re-grade this section of road or to add gravel to the pot holes. It would be very difficult to have gravel delivered by trucks through the ford. Vehicle traffic along this section of the NCDOT maintained road has been reduced since there is no place to turn a vehicle around near the gate. The road is used by hunters to access other sections of the game land by foot. If NCDOT will not maintain the section of this road through the game land from the ford to the swinging bridge, WRC will need to decide whether the Agency is willing to pay for maintenance for improved access. Estimated cost for maintenance could be up to $10,000.

Tellico Management Area – Wadhams Drive bridge

A 50'L.x12'W. bridge crosses Tellico Creek at (N35.28506°, W83.50083°) within the management unit boundary. This bridge is of unknown age, and it was not built to NCDOT standards. It is does not appear that this bridge is maintained by NCDOT since there are no guard rails, warning signs or weight limits posted. The bridge is decked with 4x4 timbers on (4) 12"x4" steel I-beams. The beams span the entire width of the creek, and are supported by concrete piers that were cast using oil drums as forms. The deck is at least 8' above the stream bed. The bridge only serves one private residence, but it must be crossed to reach the Wadhams-B and Wadhams-C game land access roads. There is a large, open field on the management area located on the right side of Wadhams Drive before the bridge. The clearing meets the road, and there are no gates. Hunters will occasionally park along the edge of this field, cross Tellico Creek at on foot at the Wadhams Drive bridge and hike along the creek to the eastern end of the Tellico fields food plots.

It is not clear who currently maintains or is legally responsible for maintenance of the Wadhams Drive bridge. NCWRC needs a definitive determination regarding which party (NCDOT, NCWRC or the private land owner) has responsibility for maintenance of this bridge and for public safety at this crossing. Discussions with NCDOT field staff indicate that they do not maintain the bridge. If NCWRC is responsible for the bridge, then a more detailed assessment of the bridge's structural integrity and safety is needed. Potential cost for installing guard rails and other safety features along with any minor repairs to the deck is estimated at $10,000.

Low Priority Level

Needs have been identified for the following roads, but they should be considered low priorities relative to those projects listed above:

- Horseshoe Bend M.A. – Horseshoe Bend Road
- Queens Branch M.A. – New access road development
- Tellico M.A. – Lower Wadhams Road

The total cost of potential low priority level road work to be done during the next ten years is estimated at $66,000.

Horseshoe Bend Management Area – Horseshoe Bend Road

The existing Horseshoe Bend Road is the only access to the he northern section of the 367-acre Horseshoe Bend management area. A steel tube gate is located at end of the paved, NCDOT maintained Fred Breedlove Road (SR-1118) at the beginning of the Horseshoe Bend access road (N35.35125°, W83.51990°). There is a good area available to park & turn around in front of the gate. Beyond the gate, the Horseshoe Bend access road provides administrative vehicle and public foot traffic access down to horseshoe bend on Little Tennessee River. While WRC management of this section of the game land is minimal, the road is used by hunters and to reach the upper Horseshoe Bend access road and by anglers to access the river.

The road is essentially unimproved. It follows Tarkiln Branch for approximately 1,800 feet on a steep and rocky grade. It then follows an existing road bed adjacent to the Little Tennessee River for another 1,100 feet until it crosses the game land boundary. This section is soft in places. Improvements to the steep, rocky section along Tarkiln Brach would be prohibitive. If future plans include development of wildlife habitat or food plots in the area served by this road, then NCWRC should consider improving its condition. Estimated cost is $16,000.

Tellico Management Area – Lower Wadhams Road

While the NCDOT GIS record of secondary roads shows the entire Wadhams Road in their system, Lower Wadhams Road does not actually connect to Wadhams Drive. It appears that the connection was broken when Wadhams Drive was extended up to a private residence. NCDOT has never improved or maintained the Lower Wadhams section. Conversations with NCDOT staff in the field indicate that NCDOT only maintains the paved section of Wadhams Drive up to but not including the bridge.

Access to Lower Wadhams Road is restricted by a NCWRC gate at the intersection with Needmore Road across from the Tellico public fishing access. Lower Wadhams is a graveled road bed that is only used for limited administrative access and public foot traffic. The road is currently used by NCWRC as a fire line to access burn areas. There are no wildlife openings or managed food plots. NCWRC may change management practices following a timber sale in this area. Following any sale, NCWRC should plan to improve majority of the 0.5-mile Lower Wadhams Road. Estimated cost is $30,000.

Road Maintenance

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

In the Mountain region; terrain, geology and critical habitat may prohibit or physically restrict the types of road management practices that can be installed and maintained. In general, the following typical road maintenance practices should apply to any game land roads that are used for administrative or public vehicle access:

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.
- Re-grade 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, with a mowed grass surface.
- Maintain an erosion-resistant surfacing such as grass or rip rap in ditches.
- If it is determined that a road needs major repairs or upgrade, contact Regional Supervisor and Design Services to schedule an assessment.

Parking Areas

There are currently eight identified parking areas maintained by NCWRC on or adjacent to the NGL. The existing parking areas are described below, and are listed by management area. Needs for any maintenance, expansion or other improvements are noted along with a relative priority for each. The existing parking areas with identified high priority needs are: Brush Creek FFA, Rattlesnake FFA, Sawmill FFA and Panther Branch FFA. The total estimated cost of all existing parking area maintenance & improvement and new parking area development projects is $244,000.

Existing Parking Areas

The total estimated cost for high priority parking area development projects for the next 10 years is $21,000. The total estimated cost for high priority maintenance and/or improvements to

existing parking facilities is $48,000. The total estimated cost for recommended projects at existing parking areas is $124,000.

Brush Creek Management Area – Brush Creek House

Facility: Managed wildlife meadow
Location: (N35.31786°, W83.51593°)
Parking Spaces: 4-6
Area: 0.05 Acres
Description: A gravel surfaced loop at the end of Lower Needmore Rd. before gate to Brush Creek House meadow; the road and parking area should be maintained by NCDOT. WRC has been adding gravel and grading. A clearing adjacent to the existing parking area could provide space to expand by an additional 4 spaces.
Priority: Low
Estimated Cost: $10,000

Burningtown North Management Area – Burningtown North

Facility: Managed wildlife fields & food plots
Location: (N35.27728°, W83.40851°)
Parking Spaces: 10-15
Area: 0.15 Acres
Description: A gravel surfaced parking area just off Burningtown Rd; it has new steel tube gate & boulders placed to prevent bypass. The lot is in good condition & has good capacity for demand. A NCWRC kiosk has recently been added.
Priority: Medium
Estimated Cost: $2,000

Dehart Management Area – Brush Creek FFA

Facility: Existing parking for Downriver Rd. & proposed float fishing access
Location: (N35.32757°, W83.51364°)
Parking Spaces: 4-6
Area: 0.06 Acres
Description: This narrow parking area is in fair to poor condition. Runoff drains down the center creating ruts. The area is confined by Lower Needmore Rd. and by the primary area along an adjacent creek. NCWRC plans to widen slightly and improve drainage. Will install kiosk with FFA construction.
Priority: High
Estimated Cost: $6,000

Queens Branch Management Area – Queens Branch LTLT

Facility: Managed wildlife fields & food plots
Location: (N35.28368°, W83.46729)
Parking Spaces: 8-10
Area: 0.15 Acres

Description: This gravel surfaced parking area is located on LTLT land adjacent to Queens Branch management area and NC-28. LTLT allows game land users to park and access through LTLT. The lot is in very good condition. NCWRC assists with maintenance. LTLT has a kiosk, but there is no NCWRC kiosk or game land regulations posted.
Priority: Low
Estimated Cost: $2,000

Raby Bend/McCoy Management Area – Oak Grove

Facility: Managed wildlife areas, field & food plots. Swinging bridge.
Location: (N35.27901°, W83.44935°)
Parking Spaces: 6-8
Area: 0.06 Acres
Description: This new parking area was built by NCWRC in 2013. It is surrounded by split rail fence to prevent motorized vehicle access beyond. The lot is used to as parking to access Raby Farm fields & game lands on opposite side of Little Tennessee River via the swinging bridge. The area is in good condition with good parking for the current demand. Additional parking at new McCoy FFA should add parking capacity for the management area without expanding Oak Grove. 150' of Caler Cove Branch runs along the northern edge of the parking area. This stream has been severely impacted by cattle, and would be an ideal game land restoration/enhancement project. A foot Bridge is needed to cross Caler Cove Branch to access the Raby Farm fields. A NCWRC kiosk as recently been added.
Priority: Medium
Estimated Cost: $60,000

Rattlesnake Management Area – Rattlesnake FFA

Facility: Float Fishing Access
Location: (N35.30696°, W83.52243°)
Parking Spaces: 8-12
Area: 0.20 Acres
Description: This parking area improved with construction of a float fishing step launch in 2011. The area is heavily used by paddlers and outfitters. The lot is well sized for the intended capacity of the launch structure. The parking area and facilities have a history of being vandalized. Plan to replace the kiosk periodically. All signs are currently missing from the kiosk. Explore vandal resistant practices to protect signs and kiosk. Enforcement surveillance of the facility should be increased.
Priority: High
Estimated Cost: $2,000

Sawmill Management Area – Sawmill FFA

Facility: Float fishing & managed wildlife area access
Location: (N35.35615°, W83.50644°)
Parking Spaces: 12-14
Area: 0.20 Acres
Description: This gravel parking area was installed along with improvements to Lower Sawmill Rd. and construction of a gravel access ramp to the Little Tennessee River. A line of boulders

was placed and trees were planted to prevent 4-wheeler access to the managed field beyond the gate. Vandals have pulled the gate, cut trees and moved rocks to gain illegal access. The kiosk has been vandalized. Signs have been removed. Shingles have been used for bonfires in the parking area. Increased enforcement is badly needed at this facility. The Lower Sawmill road continues across a ford of Sawmill Creek ending at a WRC gate located just beyond the access to the Sawmill swinging bridge. NCDOT is supposed to maintain the ford and this section of road, but does not. There is no easy way to cross the creek on foot or by vehicle to access the swinging bridge. A possible solution would be for NCWRC to install a foot bridge at the parking area to connect to the swinging bridge. Also consider additional practices to prevent bypassing gate.
Priority: High
Estimated Cost: $30,000

Tellico Management Area – Tellico FFA

Facility: Float fishing & managed wildlife area access
Location: (N35.28885°, W83.49143°)
Parking Spaces: 4-6
Area: 0.10 Acres
Description: This area is a small, improved access for float fishing launch on the Little Tennessee River reached from Needmore Rd. The area consists of a tight, gravel loop; a short, gravel ramp into the river, and a gravel parking area for 4 to 6 vehicles. The parking area may also be for access to the gated Lower Wadhams Road through the Tellico management area. No problems with the site's current condition. No kiosk installed.
Priority: Medium
Estimated Cost: $2,000

Wiggins Management Area – Panther Branch FFA

Facility: Float fishing & wildlife management area access
Location: (N35.35.34184°, W83.52786°)
Parking Spaces: 10-12
Area: 0.20 Acres
Description: This new gravel parking area was installed with the 2011 development of the Panther Branch float fishing access to the Little Tennessee River. It also serves as parking for the Freeman Farms wildlife food plots on the adjacent Horseshoe Bend management area. The lot is in good condition, and is well sized. The kiosk has been damaged, and is currently leaning. There is a large, eroding gully between a culvert that discharges from beneath the entrance road and the new culvert that was installed to run beneath the parking area. This needs to be stabilized by either over-excavating the gully and installing a rock riprap lining or by installing a drop structure to capture discharge from the upper pipe and run it down slope and under the parking area.
Priority: High
Estimated Cost: $10,000

New Parking Areas

The following sites have been identified as having need for development of new parking areas. The relative priories, number of spaces needed and estimated cost are provided for each.

Coweeta Bottoms Management Area – Coweeta Bottoms North

Facility: Managed wildlife areas
Location: (N35.08408°, W83.38381°)
Parking Spaces Needed: 6-10
Description: The only existing parking for this area is by pulling off US HWY-441 and parking in front of the gate. There is a level wooded area just beyond the gate that has potential for parking development. The northern parcel is a loop through wooded and open areas that runs out to the Little Tennessee River and ends back at the gate. The section of this management area is an open field. There is a bit more parking available at the gate to the southern section, but the two parcels are separated by Coweeta Creek. Addition of parking at the northern section would reduce a potential safety hazard if users need to park along the shoulder of the highway to access. Proximity to the river may add increased angler demand for parking at this area.
Priority: Medium
Estimated Cost: $15,000

Dehart Management Area – Marr Ridge

Facility: Managed wildlife areas
Location: (N35.31955°, W83.50799°)
Parking Spaces Needed: 2-4
Description: The existing gravel road to Marr Ridge (located on the Brush Creek management area) was originally installed by Duke Power for inspection and maintenance of their power line easement. The road has since been improved by WRC, and a gate has been installed at the top of a short but steep grade. The grade is too steep for 2WD vehicles to access easily, and there is no good place to turn around at the gate. Backing down the steep grade can be difficult. Beyond the gate is a fire line that is also used by hunters as a high and dry access by foot to the Brush Creek House meadow area. Two or three parking spaces are needed near the bottom of the Marr Road grade to accommodate these hunters. The best option for developing a parking area may be at the site of a standing relic milking shed (at the coordinates above) across Lower Needmore Rd. from the beginning of Marr Rd. This structure should be demolished and removed to eliminate potential liability. This site could then be converted to parking.
Priority: Medium
Estimated Cost: $5,000

Iotla Bridge Management Area – Proposed Iotla Bridge FFA/PFA

Facility: Proposed float fishing & public fishing access site
Location: (N35.23614°, W83.39598°)
Parking Spaces Needed: 8-12
Description: This site has been identified for potential FFA and/or PFA development. If this project proceeds, a gravel parking area with capacity for 8 to 12 vehicles will be needed.

Priority: Medium
Estimated Cost: $10,000

Lost Bridge Management Area – NC-28

Facility: Potential managed wildlife areas
Locations: (N35.28857°, W83.47710°)
(N35.28968°, W83.48038°)
Parking Spaces Needed: 2-4 each
Description: There is currently no parking available for game land users to access the Lost Bridge management area. There is some hunter demand for access to this area as vehicles a have been parked along NC-28 near the locations above. These two sites have limited potential for developing small, pull-in parking spots.
Priority: High
Estimated Cost: $8,000

Raby Bend/McCoy Management Area – Proposed McCoy FFA

Facility: Proposed float fishing & wildlife management access
Location: (N35.27687°, W83.44479°)
Parking Spaces Needed: 8-12
Description: This site has been identified for potential FFA development. If this project proceeds, a gravel parking area with capacity for 8 to 12 vehicles will be needed. This area will also provide additional parking for game land users to access the game land tracts on the McCoy side of the Little Tennessee River.
Priority: High
Estimated Cost: $10,000

Wiggins Management Area – Phillips Farm

Facility: Managed wildlife areas
Location: (N35.34076°, W83.53207°)
Parking Spaces Needed: 2-3
Description: Parking spaces are needed for game land users to access the Phillips Farm fields on this management area. The only parking currently available is for one space at the gate or by parking along the side of Wiggins Creek Rd. There appears to be adequate space near the gate to develop a small parking area.
Priority: High
Estimated Cost: $3,000

Gates

Lockable gates are installed at or near the entrance of most NCWRC maintained access roads and fields. These gates limit access in these areas to maintenance and survey vehicles and to

public foot traffic. There are not gated roads within the NGL where the gates are opened for seasonal public vehicle access.

There are currently 29 NCWRC maintained gates on the NGL. The locations of these gates are indicated in –Appendices 22-28 of this document. Most gates have been recently installed and are constructed of steel pipe with concealed locks. Some gates were pre-existing cattle gates that were inherited with the game land acquisition. Some of these gates have been replaced, and others will need replacement.

The information provided below describes those gates that will need replacement or modification, and areas where new gates may need to be installed during the next ten years.

Coweeta Bottoms Management Area – Coweeta Bottoms North

Location: (N35.08395°, W83.38903°)
Description: An existing steel cattle gate at the entrance to the northern section of the Coweeta Bottoms management area should be replaced with a standard NCWRC steel tube gate. If additional parking is developed at this area, then two new gates may be needed.

Coweeta Bottoms Management Area – Coweeta Bottoms South

Location: (N35.08924°, W83.38402°)
Description: An existing steel cattle gate at the entrance to the southern section of the Coweeta Bottoms management area should be replaced with a standard NCWRC steel tube gate.

Hall Farm Management Area – Hall Farm Road

Location: (N35.26209°, W83.41774°)
Description: The gate at the entrance to the Hall Farm management area is a new, NCWRC steel tube gate. There is evidence that dirt bike riders are bypassing the gate by sliding their bikes under the side of the gate that rises at the bottom near the lock. Due to the presence of Tribal archeological sites on this management area, this gate should be replaced or modified with one that will prevent this activity.

Tellico Management Area – Arch Hill Road

Location: (N35.28666°, W83.49048°)
Description: There is currently no gate at the entrance to the game land access road at Arch Hill. If 4-wheeler riding or other illegal activities have been noticed, then installing a WRC steel tube gate near the entrance at Needmore Road may be necessary.

Drainage Structures

Dams

There are currently no dams or impoundments with the boundaries of the NGL management areas. If any future land acquisitions include dams or impoundments of any type or condition,

they should be assessed by engineering staff. Following an assessment, recommendations will be made for maintenance, repair or removal of these dams or impoundments.

Culverts

Thirty culverts have been identified on access roads located within the boundaries of the NGL. Of the 30 culverts identified, 7 are recommended for replacement and 8 are recommended for some repair or possible replacement. All culverts shall be maintained according to the guidelines identified below. Engineering staff will be conferred with to verify size, types, and specifications for any new or replacement culvert before installing. Game land culverts are listed below by my management area with descriptions and recommendations.

Brush Creek Management Area

Road: Brush Creek House
Location: (N35.31517°, W83.51324°)
Size: n/a
Type: Rock/Log
Condition: Antiquated culvert carrying active stream flow. Culvert is not plugged, but it is difficult to determine its load capacity or remaining life. Width of crossing is <15'.
Recommendation: Replace

Road: Old River
Location: (N35.3147°, W83.51842°)
Size: 12" Ø
Type: CMP
Condition: Culvert is in good condition. It discharges to a sensitive vernal pool running between Old River Rd. and the Little Tennessee River. Some evidence of outlet scour. Recommend placing a large, flat rock beneath outlet.
Recommendation: Repair

Road: Old River
Location: (N35.3134°, W83.51956°)
Size: 12" Ø feeding into 15" Ø
Type: CMP
Condition: 15" Ø pipe was slipped onto end of 12" Ø to widen crossing. Culverts are in good condition and functioning properly.
Recommendation: Maintain & repair as needed.

Road: Taterpatch
Location: (N35.3091°, W83.51734°)
Size: 12" Ø
Type: CMP
Condition: Two 10' lengths joined. Culvert is bent at band. Inlet is clogged
Recommendation: Replace

Burningtown North Management Area

Road: Burningtown North
Location: (N35.27684°, W83.40252°)
Size: 24” Ø
Type: CMP
Condition: New. Good condition. No problems.
Recommendation: Maintain & repair as needed.

Road: Burningtown North
Location: (N35.27374°, W83.47855°)
Size: 24” Ø
Type: CMP
Condition: New. Good condition. No problems.
Recommendation: Maintain & repair as needed.

Dehart Management Area

Road: Downriver
Location: (N35.33025°, W83.51250°)
Size: 12” Ø
Type: CMP
Condition: New. Good condition. No problems.
Recommendation: Maintain & repair as needed.

Road: Downriver
Location: (N35.33098°, W83.51323°)
Size: 12” Ø
Type: CMP
Condition: New. Good condition. No problems.
Recommendation: Maintain & repair as needed.

Road: Downriver
Location: (N35.33281°, W83.51571°)
Size: 12” Ø
Type: CMP
Condition: New. Good condition. No problems.
Recommendation: Maintain & repair as needed.

Road: Downriver
Location: (N35.33520°, W83.521096°)
Size: 24” Ø
Type: CMP
Condition: New. Good condition. No problems.
Recommendation: Maintain & repair as needed.

Leatherman Management Area

Road: Leatherman
Location: (N35.25024°, W83.41194°)
Size: 18” Ø
Type: CMP
Condition: Good condition. Occasional clogging due to beaver activity.
Recommendation: Maintain & repair as needed.

Road: Leatherman
Location: (N35.25052°, W83.41103°)
Size: 18” Ø
Type: CMP
Condition: Good condition. Occasional clogging due to beaver activity.
Recommendation: Maintain & repair as needed.

Queens Branch Management Area

Road: Queens Branch
Location: (N35.27823°, W83.46664°)
Size: n/a
Type: Rock/Log
Condition: Antiquated, damage, overtopping & scour.
Recommendation: Replace.

Road: Queens Branch
Location: (N35.27816°, W83.46838°)
Size: 24” Ø
Type: CMP
Condition: Good condition. No issues.
Recommendation: Maintain & repair as needed.

Raby Bend/McCoy Management Area

Road: Raby Farm
Location: (N35.27394°, W83.45358°)
Size: 12” Ø
Type: CMP
Condition: Blockage and damage. Narrow crossing width.
Recommendation: Replace.

Road: Raby Farm
Location: (N35.27736°, W83.45244°)
Size: 24” Ø
Type: CMP
Condition: Corrosion, blockage & overtopping.
Recommendation: Replace.

Rattlesnake Management Area

Road: Kudzu Corner
Location: (N35.29922°, W83.51012°)
Size: 12” Ø
Type: CMP
Condition: Good condition.
Recommendation: Maintain & repair as needed.

Road: Long Branch
Location: (N35.3084°, W83.5271°)
Size: 15” Ø
Type: CMP
Condition: Good condition.
Recommendation: Maintain & repair as needed.

Road: Long Branch
Location: (N35.3084°, W83.5264°)
Size: 12” Ø
Type: HDPE
Condition: Dry. Possible bypass.
Recommendation: Replace.

Road: Loudermilk
Location: (N35.29488°, W83.51647°)
Size: 12” Ø
Type: HDPE
Condition: Overtop. Gravel in creek.
Recommendation: Replace.

Road: Rattlesnake
Location: (N35.30177°, W83.52682°)
Size: 15” Ø
Type: CMP
Condition: Inlet Clogged.
Recommendation: Repair or replace if needed.

Road: Rattlesnake
Location: (N35.30307°, W83.52596°)
Size: 15” Ø
Type: CMP
Condition: Inlet Clogged.
Recommendation: Repair or replace if needed.

Road: Rattlesnake
Location: (N35.30500°, W83.52093°)
Size: 15” Ø
Type: CMP

Condition: Inlet Clogged.
Recommendation: Repair or replace if needed.

Sawmill Management Area

Road: Lower Sawmill
Location: (N35.35718°, W83.50623°)
Size: 24" Ø
Type: HDPE
Condition: New. Good condition. No issues.
Recommendation: Maintain & repair as needed.

Tellico Management Area

Road: Wadhams Drive
Location: (N35.28658°, W83.50049°)
Size: 24" Ø
Type: CMP
Condition: Good condition.
Recommendation: Maintain & repair as needed.

Wiggins Management Area

Road: Flint Rock/Glory Mountain
Location: (N35.33207°, W83.53803°)
Size: 36" Ø
Type: CMP
Condition: Old. May be in NCDOT R/W. Functioning well, no signs of problems.
Recommendation: Inspect regularly. Confer with NCDOT. Repair or replace as needed.

Road: Freeman
Location: (N35.34226°, W83.52768°)
Size: 18" Ø
Type: CMP
Condition: Pipe is in good condition. Scoured gully down slope at outlet. Gull runs to inlet of 18" Ø running under parking area.
Recommendation: Repair outlet by either over-excavating gully & lining with rock riprap, connect upper pipe to lower pipe with slope drain or drop structure then fill & stabilize slope.

Road: Glory Mountain
Location: (N35.33224°, W83.54023°)
Size: 24" Ø
Type: CMP
Condition: Pipe is in good condition. Outlet hangs over Charley Branch by 2'. Stream bed & banks are rocky. No apparent problems.
Recommendation: Maintain & repair as needed.

Road: Glory Mountain
Location: (N35.33210°, W83.54107°)
Size: 15” Ø
Type: CMP
Condition: Long leading ditch, but otherwise pipe is in good condition. No apparent problems.
Recommendation: Maintain & repair as needed

Road: Panther Branch PFA
Location: (N35.34221°, W83.52762°)
Size: 18” Ø
Type: HDPE
Condition: New pipe installed with parking area development. Inlet at end of long, deep gully scoured from discharge at culvert under Freeman at entrance to area.
Recommendation: Repair gully by either over-excavating gully & lining with rock riprap, connect upper pipe to lower pipe with slope drain or drop structure then fill & stabilize slope.

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, culverts requiring frequent repeat maintenance, and culverts identified as aquatic organism passage barriers 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

- Drop from outlet of pipe to channel bed and water surface below the pipe, the slope of the pipe and size and depth of installation. Pipe crossing will need to be redesigned and replaced if it presents an aquatic organism passage barrier

Staff will 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 near 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.

Stream Crossings

Thirteen stream crossing points including fords, bridges and endpoints of NCDOT maintained swinging bridges crossing the Little Tennessee River have been identified on access roads located within the boundaries of the NGL. These crossings are listed below by my management area along with descriptions and recommendations.

Brush Creek Management Area

Road: Old River
Location: (N35.31845°, W83.51655°)
Size: 20’L.
Type: Ford
Condition: Between the double gates. Ford runs straight through Brush Creek. Good condition.
Recommendation: Inspect, particularly after flood events. Confer with engineering staff if repairs or stabilization is required.

Road: Lower Needmore
Location: (N35.32578°, W83.52294°)
Size: 320’L.
Type: Historic Swinging Bridge (NCDOT)
Condition: Swinging bridge abuts on game land. NCDOT maintains.
Recommendation: Inspect, particularly after flood events. Report to NCDOT maintenance engineer if damage is observed.

Dehart Management Area

Road: Downriver
Location: (N35.32810°, W83.51295°)
Size: 20’L.
Type: Ford
Condition: Ford runs at angle through unnamed tributary. No apparent problems.
Recommendation: Inspect, particularly after flood events. Confer with engineering staff if repairs or stabilization is required.

Road: Downriver
Location: (N35.33509°, W83.52106°)
Size: 20’L.
Type: Temporary bridge
Condition: Bridge built by WRC as temporary crossing over Dehart Creek is 20’L.x 12’W., white oak deck & beams supported by large, stacked concrete blocks. Seems strong and in good condition. No apparent reason to remove from service.
Recommendation: Inspect, particularly after flood events. Repair deck boards or replace lag screws as needed. Confer with engineering staff if repairs or stabilization is required.

Dehart Management Area

Road: Needmore
Location: (N35.32541°, W83.52388°)
Size: 320’L.
Type: Historic Swinging Bridge (NCDOT)
Condition: Swinging bridge abuts on game land from opposite end on Brush Creek management area. NCDOT maintains.
Recommendation: Inspect, particularly after flood events. Report to NCDOT maintenance engineer if damage is observed.

Leatherman Management Area

Road: Leatherman
Location: (N35.24984°, W83.40654°)
Size: 20’L.
Type: Ford
Condition: Ford runs straight through unnamed tributary. No apparent problems.

Recommendation: Inspect, particularly after flood events. Confer with engineering staff if repairs or stabilization is required.

Queens Branch Management Area

Road: Queens Branch
Location: (N35.28341°, W83.46701°)
Size: 16'L.
Type: Skidder bridge
Condition: Located on access road through LTLT or Dean family property. A 16' L. skidder bridge crosses unnamed tributary just before reaching game land boundary. Narrow, but has held up to management equipment so far. No apparent signs of pending failure. May need to be replaced with culvert or new bridge.
Recommendation: Inspect frequently. Confer with engineering staff if bridge appears to drop, shift or change in any significant way.

Raby Bend/McCoy Management Area

Road: Bryson City
Location: (N35.27871°, W83.44880°)
Size: 200'L.
Type: Historic Swinging Bridge (NCDOT)
Condition: Swinging bridge abuts on game land. NCDOT maintains.
Recommendation: Inspect, particularly after flood events. Report to NCDOT maintenance engineer if damage is observed.

Road: McCoy
Location: (N35.27817°, W83.44864°)
Size: 200'L.
Type: Historic Swinging Bridge (NCDOT)
Condition: Swinging bridge abuts on game land. NCDOT maintains.
Recommendation: Inspect, particularly after flood events. Report to NCDOT maintenance engineer if damage is observed.

Sawmill Management Area

Road: Lower Sawmill
Location: (N35.35705°, W83.50602°)
Size: 50'L.
Type: Ford
Condition: NCDOT maintained section of Lower Sawmill Road leads to swinging bridge. Ford enters Sawmill Creek at an angle then runs down the stream bed for 50' before exiting at an angle on opposite bank. Very rocky and rough. Difficult to ford even with 4WD truck. NCDOT has not repaired or maintained this ford. Would be very difficult to get gravel trucks through.
Recommendation: Consult with NCDOT engineer about need for maintenance. Do not attempt to maintain or reroute without conferring with WRC engineering staff.

Road: Lower Sawmill
Location: (N35.35605°, W83.50514°)
Size: 320'L.
Type: Historic Swinging Bridge (NCDOT)
Condition: Swinging bridge abuts on game land. NCDOT maintains.
Recommendation: Inspect, particularly after flood events. Report to NCDOT maintenance engineer if damage is observed.

Tellico Management Area

Road: Wadhams Drive
Location: (N35.28506°, W83.50083°)
Size: 50'L.
Type: Bridge
Condition: 50'L.x12'W. timber decked bridge crosses Tellico Creek within game land boundary. Bridge is not built to NCDOT standards, and NCDOT does not claim maintenance responsibility. Bridge is decked by 4x4 treated timbers fastened to (4) 12"x4" steel I-beams. Beams span the entire width of Tellico Creek and are supported by concrete piers along bank that appear to have been slip formed using oil drums. No indication of depth of pilings or weight capacity. No guard rails, warning markers or weight limits posted. 8'+ drop from deck to creek below. Bridge appears to be in fair to good condition but is not up to safety standards for a bridge that is accessible to public vehicles.
Recommendation: Recommend determining whether NCWRC is ultimately responsible for bridge maintenance, safety and liability. If so, have the bridge structure assessed by a qualified engineer for signs of potential failure or maintenance needs. Determine weight limit and recommend improvements to meet standards for public safety. May require maintenance, repairs and installation of guard rails, reflectors, marker signs and more.

Road: Cabe Cove
Location: (N35.28496°, W83.50618°)
Size: 20'L.
Type: Ford
Condition: Ford runs straight through Tellico Creek. No apparent problems.
Recommendation: Inspect, particularly after flood events. Confer with engineering staff if repairs or stabilization is required.

Recreation Facilities

Needmore Game Land provides a variety of opportunities for public recreation on both the game lands and the Little Tennessee River. All existing and currently proposed recreation facilities are related to improving public access to the Little Tennessee River for the launch and retrieval of non-motorized vessels for float fishing and recreation. Facilities such as short, graveled ramps or framed step/slide structures are intended to provide safe and relatively clean and easy access to the river without contributing to bank erosion.

This section will review existing recreation facilities and associated infrastructure and describe sites identified for potential new development. These descriptions are listed by management area and include recommendations for any repairs or improvements.

Float Fishing Access Areas (FFA) or Public Fishing Areas (PFA)

Rattlesnake Management Area

Facility: Rattlesnake Float Fishing Access
Location: (N35.30701°, W83.52221°)
Type: Timber step/slide launch structure
Condition: This is the first of several new framed step/slide launch structures. These are intended to aid in the launching of canoes, kayaks rafts and possibly small jon boats from high, steep river banks. This initial structure was built by field staff in 2010-2011. The design was not engineered. It is supported by an array of treated 4x4 posts set on individual concrete footings poured into augured holes. Footing sizes and depths appear to vary. This structure has 16 steps on either side of a 2' wide by 16' long slide with hand railings along the outsides of the staircases. This is the only such facility on the NGL. Standard designs for this type of launch have since been engineered with more substantial foundations. This structure is used heavily during warmer months mostly by recreational paddlers. Occasionally, commercial outfitters bring groups of paddlers to put in using this facility. During such times, paddlers have been observed riding their boats down the slide and climbing on the banks beside the structure to launch. The structure appears to be in good condition considering the level of use and despite several attempts at vandalism. The kiosk at this site has repeatedly been vandalized and signs have been removed.
Recommendation: Frequently inspect this structure for loose boards or any signs of undermining or scour around the foundation posts (particularly following high water events). Notify engineering staff if there are any indications that the structure has shifted or has been impacted by floating debris. If the structure seems unstable, it should be closed immediately until a NCWRC engineer assesses the condition and makes a recommendation. Consider installing fiberglass reinforced plastic grip plates to the forward face of each tread to improve traction and safety. Report any observed unsafe or potentially damaging activities to enforcement staff. Repair or replace signs and kiosk as needed. Experiment with new practices to deter or prevent vandalism of signs and kiosks.

Sawmill Management Area

Facility: Sawmill Float Access
Location: (N35.35599°, W83.50665°)
Type: Gravel ramp
Condition: This site was developed primarily as a float fishing put-in or take-out to the Little Tennessee River. The shallow ramp can also be used as an access for wading anglers. It was also intended to be used as a point of access to managed wildlife areas on the Sawmill management unit. The gravel ramp is approximately 20' long and stops at the river edge at normal low water level. The ramp itself is in good condition. There have been repeated problems with loitering and vandalism at the site. Fires are frequently built in the parking area. Shingles from the kiosk have been used for firewood. There is also a recurring problem with 4-

wheeler riders removing or destroying barriers set to restrict access to the adjacent managed wildlife clearing.
Recommendation: Frequently inspect this area for vandalism or damage to any of the infrastructure including the ramp and parking area surfaces; kiosk; barrier gates, boulders or trees. Report damages to enforcement staff. Repair or replace infrastructure as needed. Current kiosk requires repair or replacement after roof shingles were removed and burned. Signs have removed from kiosk and need to be replaced.

Tellico Management Area

Facility: Tellico Float Fishing Access
Location: (N35.28885°, W83.49143°)
Type: Gravel ramp
Condition: This site was developed primarily as a float fishing put-in or take-out to the Little Tennessee River. The shallow ramp can also be used as an access for wading anglers. The site can also be used as a point of access to the Tellico management area on the gated Lower Wadhams Road across the facility from Needmore Road. The gravel ramp is approximately 16' long and stops at the river edge at normal low water level. The ramp itself is in good condition. There is currently no kiosk at this site.
Recommendation: Frequently inspect this area for vandalism or damage to any of the infrastructure including the ramp and parking area surfaces. Report damages or other illegal activities to enforcement staff. Repair or replace infrastructure as needed. Plan to install NCWRC kiosk.

Wiggins Management Area

Facility: Panther Branch Float Fishing Access
Location: (N35.35599°, W83.50665°)
Type: Gravel ramp
Condition: This site was developed primarily as a float fishing put-in or take-out to the Little Tennessee River. The shallow ramp can also be used as an access for wading anglers. The parking area at the fishing access is used by the public to access the Freeman Farm managed fields on the adjacent Horseshoe Bend management area. The gravel ramp is approximately 20' long and stops at the river edge at normal low water level. The ramp itself is in good condition. There have been repeated problems with loitering and vandalism at the site. Attempts have been made to pull the kiosk down, and it is currently leaning. The slope between two culverts has scoured forming a gully that is approximately 4' wide by 3' deep.
Recommendation: Frequently inspect this are for vandalism or damage to any of the infrastructure including the ramp and parking area surfaces; kiosk; barrier gates, boulders or trees. Report damages to enforcement staff. Repair or replace infrastructure as needed. Current kiosk requires repair or replacement after attempts were made to pull it down. Signs have removed from kiosk and need to be replaced. Work with engineering staff to develop a repair plan for the gully between the culverts as described in the "Culverts" section of this report.

Proposed and Potential Float Fishing Access Areas (FFA) or Public Fishing Areas (PFA)

Dehart Management Area

Facility: Brush Creek Float Fishing Access
Location: (N35.32769°, W83.51395°)
Type: Permitted timber step/slide launch structure
Condition: This is a shorter version of the framed step/slide launch at the Rattlesnake FFA site. This structure will be built on driven timber pilings. The parking area will be widened slightly and drainage problems will be corrected. A packed gravel fines path will be installed to connect the parking area to the concrete top deck of the launch structure. A new kiosk will be installed on the site.
Expected Construction: Summer of 2014

Iotla Bridge Management Area

Facility: Potential Iotla Float Fishing Access and/or Public Fishing Area
Location: (N35.23627°, W83.39611°)
Type: Possible framed step/slide launch structure or a walk-down concrete ramp. Also, possible fixed, accessible fishing platform.
Condition: This site was assessed as a potential access development project in 2014. The site has good potential for fishing access opportunities on the Little Tennessee River. Development will also require construction of a new access road and parking area. Potential for presence of archeological artifacts is high for this site. Results of surveys may restrict or prohibit development of this site.
Expected Construction: TBD

Raby Bend/McCoy Management Area

Facility: McCoy Float Fishing Access
Location: (N35.27677°, W83.44443°)
Type: Proposed timber step/slide launch structure
Condition: Plan for construction of an engineered, timber step/slide launch on the Little Tennessee River is under review for archeology. If approved for development, the site will also include a parking area to be used to access adjacent game land areas.
Expected Construction: Summer of 2015

Fishing Piers

There are currently no public fishing piers or platforms located on streams or rivers in the NGL. The above-mentioned float fishing access facilities can also be used by wading anglers to access the Little Tennessee River. The Iotla Bridge site on the game land has potential for development to include an accessible public fishing pier, but this site is still being evaluated and no proposed project has been approved at the time of this report.

Shooting Ranges

There are currently no designated shooting ranges on the NGL. Due to the presence of ecologically sensitive areas throughout the game land, the existence of sensitive archeological sites and the prevailing steep terrain, there are likely few potential sites for development on current management areas that would meet the qualifications for development as a shooting range.

Camping Areas

There are currently no designated camping areas or sites on the NGL. Before the game land tracts were acquired by NCWRC, there were frequent occurrences of individuals and groups setting up campsites along the river or in fields for long periods during the summer. This activity has been prohibited, and any campers or remains of camp sites have been removed from the management areas. There was serious discussion with the Friends of Needmore group about having NCWRC develop a public campground along a large bottom land area at a bend in the Little Tennessee River (N35.329719°, W83.396113°). The campground was to be managed by the Friends of Needmore through an agreement with NCWRC. NCWRC staff installed a new access road to the proposed campground site. Some of the grades on that road were too steep for public vehicle access. To date, there has been no further progress or movement toward development of this campground facility.

Trails

There are no official trails established or maintained by NCWRC on the NGL. Most of the gated access roads and fire lines throughout the management areas (as discussed in the "Roads" section of this report) are open to public foot traffic to include recreational hiking. No trail markers or blazes are set or maintained by NCWRC or cooperating partners. Game land boundaries are clearly marked by double orange stripes painted on boundary line trees as well as posted with game land signs.

Recreational Facilities 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.

Structures

Eight relic structures in various states of repair are located within or on the boundaries of the NGL. These structures are listed below in order of their management areas. Their current conditions and recommendations for assessment and/or removal are also included. Locations of these structures are also shown in –Appendices 22-28 of this document.

Dehart Management Area

Structure: Timber milking shed beside Lower Needmore Rd.
Location: (N35.31954°, W83.50791°)
Type: Standing, relic shed/barn
Condition: This relic milking shed is currently used to store hay and fertilizer by NCWRC staff. The barn is directly adjacent to Lower Needmore Road across from the beginning of the Marr Ridge access road. The building appears to be in fair condition, but is a potential liability. Easy access from Lower Needmore Rd. also makes it a potential target for vandalism or arson.
Recommendations: Remove all materials from this structure and demolish. Immediately remove all debris from site for disposal at an approved landfill facility. Re-grade site. Consider converting site into parking spaces for the Marr Ridge access road.

Hightower Management Area

Structure: Outbuilding near Hightower Church
Location: (N35.31765°, W83.52765°)
Type: Standing, relic shed/barn in on game land boundary line
Condition: This building is standing both on the Hightower management unit and adjacent private property. The shed does not appear to be in current use, and is in poor condition. Agreement with adjacent property owner will be required to access and remove structure.
Recommendations: Pursue written agreement with shared owner to demolish and remove structure and rehabilitate former site.

Structure: Outbuilding near Windy Gap Road
Location: (N35.35.31771°, W83.52733°)
Type: Relic shed located entirely within management area
Condition: This structure has been leveled by NCWRC staff. Debris has not been removed from the site.
Recommendations: Plan to remove remaining debris for off-site disposal. Clean, grade and stabilize former site.

Lost Bridge Management Area

Structure: Cabin also on Hidden Acres development
Location: (N35.28804°, W83.47323°)
Type: Standing abandoned cabin.
Condition: This cabin is located on top of what is now the boundary between the Lost Bridge management area and the private Hidden Acres development. According to the GIS record of the boundary and aerial photography, the southern 3/4 of the cabin appears to be on the management area. A physical boundary survey has verified that the structure is located on the boundary. The developers began a restoration of the cabin to serve as a landscape feature for the entrance to the development. NCWRC staff informed the developers of the boundary issue, and renovation work was halted. Structure is currently posted with no trespassing signs.
Recommendations: Pursue a possible land swap or other agreement with the Hidden Acres developers that will deed the entire structure to them along with any maintenance responsibilities and liabilities.

Queens Branch Management Area

Structure: Old farm house
Location: (N35.27832°, W83.46621°)
Type: Abandoned farm house (asbestos shingles).
Condition: This old farm house is located on an isolated and overgrown site within the management area. The roof has partially collapsed, and the remains should follow soon. The house appears to be sided in asbestos shingles.
Recommendations: Contract a hazardous materials specialist to assess structure and recommend removal plan. Considering the condition and potential risk of this structure, this should be a top priority.

Raby Bend/McCoy Management Area

Structure: Oak Grove barn
Location: (N35.27908°, W83.44902°)
Type: Relic barn adjacent to new parking area.
Condition: This barn was standing but collapsing at the time of the new Oak Grove parking area development. During construction of the parking area, the barn was leveled. Debris remains on the site adjacent to the parking area.
Recommendations: Remove remaining debris and haul to landfill facility for disposal. Re-grade and stabilize former site.

Structure: Raby Farm canning shed
Location: (N35.27378°, W83.45433°)
Type: Cinderblock shed.
Condition: This standing cinderblock canning house is located within the management area near a burn unit. Block walls have joint cracks, and the building appears structurally unsound.
Recommendations: Demolish structure and remove all debris from site for disposal at an approved facility. Clean up area. Apply seed & mulch.

Structure: McCoy Inholding Barn
Location: (N35.27742°, W83.44863°)
Type: Timber hay barn.
Condition: This barn stands on an inholding surrounded by the McCoy tract of this management area. The inholding is included as part of a life estate to be donated to LTLT. The barn is currently used, and appears in good condition considering its age.
Recommendations: If LTLT acquires this inholding and it is incorporated into the surrounding management area, assessments and decisions about the structure should be made at that time.

Game Land Use and Development

PUBLIC USE

Hunting/ Trapping

Hunters and trappers are a primary user group for NGL, with white-tailed deer and wild turkey (*Meleagris gallopavo*) being the two primary hunted game species. Deer harvested between the 2010 and 2013 hunting seasons has averaged approximately 40 deer. Turkeys are also found in good numbers across the game land and have had an average harvest of 11 gobblers over the same time. Black bear has increased their range over the past 20 years in North Carolina and are present on NGL, however at low numbers. Since 2008, only 30 bears have been harvested on the game land. Although limited trapping does occur on NGL, the last several years have seen an increase in interest from trappers using the game land, in particularly, those trappers who are pursuing predator species such as coyotes and bobcats. Beavers are also another commonly sought-after furbearer species. Small game and furbearer species such as: Gray squirrel, Eastern cottontail rabbit, mourning dove, American woodcock, and Virginia opossum (*Didelphis virginiana*) are all found across the game land and actively hunted and trapped. Some waterfowl species occur on the game lands along the river but hunting pressure for these species is light.

Management strategies directed towards hunting and trapping should include those that help to maintain or increase the current numbers of hunters and trappers using the game land. Acquisition of properties or easements that provide for better access to remote areas of the game land would be a primary means to help increase the available use of the game land by hunters and trappers. Although approximately 50% of those that attended the public meeting felt that the current level of access to the game land is satisfactory; there are several recommended actions which would help increase access to the game land. In addition, locations that will enhance disabled hunter opportunities will also be a primary focus of game land development, and strategies to improve disabled access will be considered when implementing infrastructure improvement and development projects across the game land. A focus on active habitat management will ensure that adequate numbers of game and furbearer species are present to help keep hunter and trapper interest high. Challenges to a quality hunting or trapping experience include conflicts with other game land users as well as low numbers of game species that can be managed for on the game land.

Fishing

Anglers are a primary user group of NGL. Most of existing angling use occurs along the Little Tennessee River for smallmouth bass and other warm water species. In addition, Burningtown Creek is designated as Public Mountain Trout Waters and classified as Hatchery Supported and managed with monthly stockings of catchable-sized brook trout, brown trout, and rainbow trout from March to July. Tellico Creek is designated as Public Mountain Trout Waters and classified as Wild Trout with Natural Bait. Finally, other small tributaries on the game land, such as Sawmill Creek, Wiggins Creek, Licklog Creek, and Rattlesnake Creek, contain wild trout but are not formally designated as Public Mountain Trout Waters.

Wildlife Viewing

Wildlife viewing includes activities such as birding, wildlife photography, and general wildlife viewing. Many wildlife viewing enthusiasts come to NGL to view and to study birds, butterflies, and other wildlife species associated with the game land. Wildlife viewers are a primary user group at NGL, and management strategies to increase the number of wildlife viewers utilizing the game land will be implemented. Strategies to increase and enhance wildlife viewing opportunities include: continue to maintain and to develop partnerships with wildlife viewing groups and public, establish directional signage along roads that provide access to the game land, establish informational signage regarding wildlife viewing opportunities at key access locations (i.e. parking areas), increase efforts using all media outlets to better publicize Needmore as an birding destination, and identify key waypoints along birding routes as a means to educate and enhance the viewing experiences. Infrastructure improvements needed to better facilitate wildlife viewers include signage as noted above, development of parking areas (see infrastructure section), and the establishment of additional kiosks at key access locations. The continuation of active habitat management 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. Efforts to provide viewing opportunities near public access will also greatly help to build this new constituency. Some challenges to a quality wildlife viewing experience include conflicts with other user groups on the game land, overcrowding, and potential loss of popular viewing areas to succession.

Other Outdoor Recreation

Water related recreation such as canoeing, kayaking and swimming are very popular activities on the game land. With the development of public access areas and possible additional access areas, water related recreational activities will continue to become more popular at Needmore. Possible conflicts include usage of public access areas by commercial outfitters. This could cause conflicts with recreational users from the public. Also, commercial activities are prohibited in the Needmore Dedication Agreement.

Hiking is also a popular activity on the game land and occurs year-round. There are no designated hiking trails currently located at NGL. However, there are several miles of maintained paths, roads, and linear wildlife openings available for hiking. Although there are restrictions by Natural Heritage Program, that limit new trail construction, opportunities to upgrade unmaintained, existing paths and roads to a maintained status will be explored to provide increased walking and hiking opportunities to the public. Other strategies to increase and enhance hiking opportunities include: adding directional signage along roads that provide access

to the game land, providing informational signage regarding maintained paths at key access locations (i.e. parking areas), publicizing trails in local outlets and other media sources, and adding user information at kiosks that indicate the best times of the year for hiking. Infrastructure improvements that will be provided to encourage this user group includes: upgrading selected paths and log roads to trails, developing signage as noted above, establishing parking areas (see infrastructure section), and the establishing additional kiosks at key access locations. Conflicts among hunters and hikers may occasionally occur, but increasing game land information available to the public through online resources and kiosks at key access locations may help reduce this source of conflict among user groups.

Mountain biking currently occurs at NGL, but at low levels. The current level of mountain biking is not causing any immediate resource issues but should not be increased. Based on an intensive staff review, there have been no suitable trail locations identified. The creation of new biking trails on the game land could also potentially create conflicts with hikers, hunters, and wildlife watchers, as well as degrade wildlife habitat improvements especially in sensitive areas. Additionally, trail development restrictions within primary buffer areas further limit available options to provide for these users. Ample opportunities for mountain biking can be found on the nearby Nantahala National Forest and this activity should not be featured on NGL.

There are currently no designated horseback riding areas on NGL. The development of opportunities for horseback riders to use the game land were reviewed and discussed by NCWRC staff. The review of the NGL revealed a lack of suitable roads of sufficient length and character (loop opportunities) for horse trails. Additionally, stream buffer restrictions placed on the game land by Natural Heritage Dedication prohibit trails and activities causing erosion in these areas which further reduced potential opportunities for establishing horse trails. Allowing horseback riding on maintained trails would create additional erosion issues, damage to linear wildlife openings, and conflicts with hikers, hunters, and wildlife watchers. Horseback riding also increases the probability of introducing additional exotic species on the game land. Therefore, due to the lack of suitable trails, trail development restrictions and the potential negative impacts, horseback trails will not be developed on NGL. Ample opportunities for horseback riding on the nearby Nantahala National Forest and other public lands in the region offset the lack of opportunities on NGL.

Currently there no known geocache locations on NGL. When administered in appropriate areas, geocaching is a great outdoor activity that could be used to promote and educate the public about management activities occurring on game lands. Currently NCWRC is developing a statewide policy to regulate geocaching on game lands, and NGL will follow these guidelines.

Wildlife/Habitat Inventory and Monitoring Needs

White-tailed deer and wild turkey are featured big game species on NGL. Big game harvest records are an important tool utilized to monitor population levels and trends and make management decisions. However, additional surveys (camera traps, hunter surveys.) would augment current information and help NCWRC staff better manage and make more informed decisions about appropriate harvest levels for both species.

We currently lack adequate information regarding small mammals, amphibians and reptiles on NGL. General Surveys to inventory and monitor these species and their habitats are warranted.

With basic inventory information on these species, we can develop target population levels and develop habitat management strategies to achieve those levels where feasible.

There are many invasive plants that are well established on NGL. Control efforts for some of these plants are ongoing. Other invasive plants are so established and widespread on NGL that total control is not possible. It is important to rapidly detect and eradicate new invasive species before they become entrenched. Enhanced monitoring of these invasive species is needed to identify problem areas and better guide control strategies and efforts.

Monitoring land use and community planning efforts adjacent NGL is needed. These include local government land use, long range transportation plans, zoning changes, and new commercial and residential development. To the extent that these uses and plans may affect the success of game land management goals and objectives, appropriate bodies should be informed how to minimize impacts to the game land where possible. Monitoring of local development and transportation plans and proposed projects in terms of how they may affect important wildlife corridors between regional conservation lands is also important.

Wildlife/Habitat Management Needs

Habitat management needs are summarized within each habitat section and goals described in the "desired future conditions" subsection. The overall management objective for NGL will focus on restoration and enhancement of critical habitats and communities (oak forests, early successional, aquatic, rock outcrops, etc.). Researching areas for development of critical habitat types and monitoring the success and impacts of habitat and community restoration activities will be needed. Species specific management focus will continue to be on popular game species (trout, white-tailed deer, wild turkey, gray squirrel, cottontail rabbit, mourning dove, etc.), WAP priority species, and threatened and endangered plants.

User Group Needs

Listed below are key needs identified to address public use of NGL:

- Construct kiosks with relevant game land information
- Provide additional signage to address the needs of a variety of user groups
- Implement and promote opportunities for disabled sportsmen
- Develop clear, understandable, and enforceable regulations
- Consider possible back country and canoe access camping locations

ENFORCEMENT AND REGULATIOINS

Currently there are two primary assigned Wildlife Enforcement Officers to work NGL. One is stationed in Macon County and the other in Swain County.

As with most game lands, the major enforcement problems on Needmore pertain to littering, regulations violations, and adjoining landowner issues and conflicts. Enforcement issues to

Needmore include: illegal dumping and illegal hunting, and vandalism to kiosks and parking areas. Adjoining landowner issues such as encroachments are an ever-growing problem. The complexity of the game land boundary makes this problem more difficult to deal with. Surveys are needed to help lessen this problem. Examples of encroachments are structures built on game land property, illegal use of game land roads, posting of game land property, and development signage and landscaping on the game land.

Another issue that needs to be addressed on NGL is the commercial usage of the game land. This includes, but may not be limited to; commercial river guides using game land boating access areas. Commercial usages of these areas displace game land users and this type of usage possibly violates the dedication agreement concerning commercial activities on NGL.

The following is a list of regulations specifically related to NGL:

- On posted dove fields, dove hunting on the opening day of dove season is by permit only
- Designated as a six day per week game land
- No gun either-sex season except for last day of muzzleloader season
- Horseback riding is prohibited except on designated trails

No new regulation changes have been identified on NGL to address user conflicts, conserve wildlife populations, or provide additional game user opportunities.

PARTNERSHIPS AND COLLABORATIONS

Partnerships and collaborations among various conservation groups, universities, state and federal agencies, non- governmental agencies, non-profit groups, national organizations, clubs, and private citizens are and will continue to be an important aspect of management at NGL. Newly created and continued partnerships between the NCWRC and these groups will be essential for meeting the goals and needs outlined in this document. A list of current and potential partnerships for Needmore is listed below:

- Carolina Bird Club
- Ducks Unlimited
- The Audubon Society
- Haywood Technical Community College
- Local birding groups
- Local conservation organizations
- Local fire departments
- Local hiking clubs
- Local landowners
- National Wild Turkey Federation
- N.C. Bow Hunters Association
- N.C. Division of Mitigation Services
- N.C. Forestry Association
- N.C. Forest Service

- NC State University
- Quail Unlimited
- Quality Deer Management Association
- Regional Land Trusts
- Ruffed Grouse Society
- Shortleaf Pine Restoration Initiative
- Eastern Band of Cherokee Indians
- Southern Appalachian Raptor Research
- Trout Unlimited
- Land Trust for the Little Tennessee
- USFS- Southern Research Station
- Western Carolina University
- N.C. Natural Heritage Program

RESEARCH AND SURVEYS

Research and surveys provide critical information necessary for the management and conservation of fish and wildlife resources at NGL. 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 is to provide information for adaptive management, where monitoring is used to evaluate the effects of management to improve future actions for target species.

Below is a list of current research and survey projects occurring on Needmore Game Land:

- Inventory of wetland habitats for priority herps
- Aquatic surveys for Eastern Hellbender
- Aquatic surveys for Mudpuppy
- Wood Duck nest box project
- Fire Learning Network prescribed burn monitoring

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. Bat surveys are needed and could be accomplished through establishing a North Carolina Bat Acoustic Monitoring Program route, monitoring bat roosts (including installation of bat houses), and mist-netting. Although some salamander surveys have been conducted in localized areas, more wide-ranging surveys are needed to document important breeding areas and provide baseline data prior to management. Reptile surveys have not been conducted across the game land and are needed. In particular, aquatic turtle nesting habitat should be identified and protected, rock outcrops surveyed, and cover board transects need to be established. Continued aquatic surveys of the streams, at intervals, across the Game Land will be needed to monitor aquatic habitat quality, aquatic communities, and the potential for restoration of priority aquatic species. Surveys and inventories of unique habitats such as wetlands, rock outcrops, and cliffs are also key lacking areas of knowledge that need to be addressed.

A list of research and survey needs for Needmore Game Land is listed below:

- Additional and continued inventory of small mammals, reptiles, and amphibians
- Monitor establishment and restoration of shortleaf pine community types and their impacts on wildlife populations
- Monitoring of important game species
- Implement the use of camera traps to evaluate wildlife populations
- Inventory and delineate wetland habitats
- Inventory and delineate rock outcrops
- Survey and identify aquatic turtle nesting habitat
- Implement American woodcock surveys
- Initiate a MAPS (Monitoring Avian Productivity and Survivorship) station
- Initiate bat survey routes
- Inventory, identify, and monitor invasive species
- Implement research and monitoring of wildlife openings
- Expand research and knowledge of critical habitat types (vernal pools, early successional, etc.)
- Continue and expand surveys and monitoring of user group numbers and activities
- Develop accurate forest wide stand maps and inventories for all forested systems
- Inventory sediment sources such as unstable stream banks, as well as areas in need of riparian buffer restoration

ACQUISITION PLAN

Due to the continual expansion of urbanized areas in the proximity the game land, increasing demand for public use areas, and 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 expand NGL. A total of 93 tracts totaling 4,349 acres have been identified as priority property acquisitions on NGL (Appendix 20). These tracts range in size from 1.3 acres to 178.68 acres.

Priority property acquisitions have been identified and categorized based upon the potential to improve game land access, enhance connectivity of the game land and other conservation areas, and or contain critical habitats. Tracts identified as Level 1 acquisitions are the highest priority. These tracts are generally inholdings or adjacent tracts that provide key game land access or that enhance connectivity of current holdings. Level 2 tracts are those that provide additional game land access and enhance connectivity to existing holdings, but aren't considered as high priority as Level 1 tracts. Level 3 tracts are large tracts immediately adjacent to the game land that provide important additional acreage, but do not provide key access to or enhance connectivity of existing holdings. 44 have been identified as level 1 priority tracts, 18 as level 2 priorities, and 31 as level 3 (Appendix 20). Tracts adjacent the game land that are not identified on the map and are 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. In a broader sense, any property that

may be offered for acquisition should be evaluated in terms of its ability to provide connectivity or corridors between the game land and other regional conservation lands and/or its ability to provide critical habitat for threatened or endangered species.

ASSETS

While it is important to note that, no NCWRC staff are solely assigned to NGL, the current level of staff needed to meet the objectives of the plan are deemed to be adequate. Current NCWRC staff which have NGL assigned to their work area include:

- 1 Eco Region Supervisor
- 2 Wildlife Foresters
- 1 Land Management Biologist
- 1 Conservation Technician Supervisor
- 15 Conservation Technicians
- 1 District Fish Biologist
- 1 Fisheries Bio I
- 1 Aquatic Wildlife Diversity Coordinator
- 1 Aquatic Habitat Biologist
- 4 Wildlife Diversity Staff
- 2 Wildlife Enforcement Officers
- 1 Field Engineer

Additional asset and funding needs necessary to meet the goals and objectives of this plan are listed below:

- Mower/mulcher (i.e. Fecon mower for early successional habitat development and maintenance)
- Funds needed to replace aging equipment as needed
- Kiosks and signage as needed to direct and inform game land users
- Educational materials for kiosks
- Funds to repair and stabilize roads and trails
- Construction/upgrades to public parking areas
- Funds to purchase gravel, culverts, gates (for routine maintenance and new construction)
- Additional and ongoing training of employees (equipment operation, forestry practices, habitat work, etc.)
- Funding for land acquisition
- Funding for contract boundary maintenance
- Funding for 30 trail cameras to facilitate wildlife population monitoring and usergroup surveys and activity level monitoring.
- Funding for research and surveys
- Funding for forest inventory and stand mapping

FUNDING NEEDS

Current and future estimated expenditures for managing NGL through 2024 are presented in the table on the following page.

Needmore Game Land

Financial Summary of Activities

Habitat Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2017-18	2017-18	2018-19	2019-2020	2020-21	2021-22	2022-23	2023-24	2024-25	2026-27	Total
H	Firebreaks	Maintain firebreaks	1.5	mi	$ 525	788	807	827	848	869	890	912	935	958	982	$ 8,815
H	Firebreaks	Construct firebreaks	0.25	mi	$ 3,000	750	769	788	807	827	848	869	890	912	935	$ 8,395
H	Herbaceous Seeding	Seed or maintain	75	ac	$ 175	13125	13451	13784	14126	14476	14835	15203	15580	15967	16363	$ 146,910
H	Trees/Shrubs	Planting and Maintenance	20	GL	$ 6	120	123	126	129	132	136	139	142	146	150	$ 1,343
H	Vegetation Control	Prescribe burning	100	ac	$ 150	15000	15372	15753	16144	16544	16955	17375	17806	18248	18700	$ 167,897
H	Develop Clearings	develop openings	2	ac	$ 3,000	6000	6149	6301	6458	6618	6782	6950	7122	7299	7480	$ 67,159
H	Develop Clearings	maintain openings	6	ac	$ 200	1200	1230	1260	1292	1324	1356	1390	1424	1460	1496	$ 13,432
															Subtotal	$ 413,949

Operation and Maintenance Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2017-18	2017-18	2018-19	2019-2020	2020-21	2021-22	2022-23	2023-24	2024-25	2026-27	Total
O & M	Bridges	Replace Culvert	1	culvert	$ 2,500	2500	2562	2626	2691	2757	2826	2896	2968	3041	3117	$ 27,983
O & M	Nesting Structures	Nest Box Maintenance	15	each	$ 30	450	461	473	484	496	509	521	534	547	561	$ 5,037
O & M	Signs and Boundaries	Maintain boundary	15	mi	$ 135	2025	2075	2127	2179	2233	2289	2346	2404	2463	2525	$ 22,666
O & M	Public Use Facilities	Maintain parking areas	8	each	$ 225	1800	1845	1890	1937	1985	2035	2085	2137	2190	2244	$ 20,148
O & M	Road and Trails	Maintain gates	10	each	$ 100	1000	1025	1050	1076	1103	1130	1158	1187	1217	1247	$ 11,193
O & M	Road and Trails	Maintain roads and trails	11	mi	$ 2,500	27500	28182	28881	29597	30331	31083	31854	32644	33454	34283	$ 307,810
															Subtotal	$ 394,836.79

Development Activities

Project	Description	Activity	Quantity	Unit	Unit Cost	2017-18	2017-18	2018-19	2019-2020	2020-21	2021-22	2022-23	2023-24	2024-25	2026-27	Total
D	Road Upgrade	Access Rd to Iotla FFA	0.1	mi	$ 20,000			20,000								$ 20,000.00
D	Road Upgrade	Access Rd to Raby/McCoy FFA	0.1	mi	$ 25,000	25,000										$ 25,000.00
D	Road Upgrade	Old River Rd repairs	1	mi	$ 10,000	10,000										$ 10,000.00
D	Road Upgrade	Taterpatch Rd repairs	1	mi	$ 50,000				50,000							$ 50,000.00
D	Road Upgrade	Wadhams Rd bridge repair	1	each	$ 10,000			10,000								$ 10,000.00
D	Road Upgrade	Horseshoe Bend Rd repair	0.6	mi	$ 16,000						16,000					$ 16,000.00
D	Road Upgrade	Lower Wadhams Rd repair	0.5	mi	$ 30,000							30,000				$ 30,000.00
D	Parking Areas	Coweeta Bottoms parking	1	each	$ 15,000									15,000		$ 15,000.00
D	Parking Areas	Marr Ridge parking	1	each	$ 5,000	5,000										$ 5,000.00
D	Parking Areas	Phillips Farm Parking	1	each	$ 3,000		3,000									$ 3,000.00
D	FFA/PFA	Construct Iotla FFA	1	each	$ 10,000			10,000								$ 10,000.00
D	FFA/PFA	Consruct Raby/McCoy FFA	1	each	$ 10,000	10,000										$ 10,000.00
															Subtotal	$ 204,000.00
														Grand Total		**$ 1,012,785.80**

Inflation rate is calculated from the Consumer Price Index (CPI-U) which is compiled by the U.S. Bureau of Labor Statistics

2013	2.07%
2012	3.16%
2010	1.64%
2009	-0.34%
2008	3.85%
2007	2.85%
2006	3.24%
2005	3.39%
2004	2.68%
2003	2.27%
10 yr Av	2.48%

PUBLIC COMMENT

As part of the Needmore Management Plan development process NCWRC sought to gather information and comments from the public. This public input provided valuable information about different user groups and user group needs for NGL. To gather this input, a public meeting was held in Franklin NC, and was advertised to individuals, groups, and businesses through various news outlets and prominent businesses where potential game land users were likely to visit. A list of locations where the meeting was advertised is included below:

- Fliers posted at gates on NGL
- Tractor Supply Co. of Franklin
- Village Trader convenience store
- Cowee Convenience Store
- K-Mart of Franklin
- Wal-Mart of Franklin and Sylva
- Macon County Soil Conservation Office
- Sylva Herald
- Franklin Press
- Three Eagles Outfitters
- Coffee Shop at Three Eagles Outfitters
- Nantahala Chapter of NWTF
- 076 LLC

SUMMARY OF PUBLIC INPUT

The public input meeting was held at the First Presbyterian Church's Tartan Hall at 26 Church Street in Franklin, NC at 6:30 PM on Feb. 20th, 2014. 18 people were in attendance. During the meeting, this group of interested public was presented with a power point presentation which provided information about the game land and the management activities which occur there. Following the initial presentation, the audience was divided into two groups. These "break out" groups were presented with a list of questions and asked to fill out sheets with each person's answers to the questions. Individuals were then asked to discuss their answers among the group and provided with an opportunity to ask any questions they may have. The public was also given the opportunity to write down any additional comments or questions they may have on the questionnaire. In total, seventeen comment forms were submitted to NCWRC staff from the meeting. For those who were not able to attend the public input meeting, a website was created that allowed the public to provide input on-line. The plan development team later reviewed all questions and comments, and all comments that pertained to the NCWRC mission and objectives were considered. A summary of all comments received from the public are detailed as follows:

1. What habitats do you think are most important to protect and/or improve on the NGL?

Comment	Plan Team Response
Early successional - wetland bog	Noted
River	Noted
River - I do not want to see high traffic usage like the Nantahala - I believe this would impact many river species and river banks.	Agreed. Need to address and consider policy. Will address commercial usage in plan.
Aquatic habitat, Eagle/Osprey nesting sites, other important or rare bird habitat, wetland, riparian areas, stream restoration - fish passage	Noted
River & Forest & Wetlands	Noted
The river itself and its biodiversity, the wetlands which may be under-recognized, the streams, the forest- well, just about everything.	Noted
Fishing, forests, wetland, eagle and osprey nesting sites, don't want kayaking @ level of Nantahala.	Agreed. Need to address and consider policy. Will address commercial usage in plan.
Wetlands, tributary streams, open woodlands, fire	Noted
Riparian buffer	Noted, will address in plan
Open area - increase protect old growth	Noted
Deer, turkey, aquatic	Noted
(blank)	
Protect - aquatics that holds rare species. Manage/improve bottoms and uplands	Noted
Aquatic, migratory birds, birds of prey	Noted
Deer, bear, turkey in that order. As for small game we do need more rabbit (places to hunt these)	Noted
Food plot - small game habitat	Noted

Aquatic, Terrestrial	Noted
Multiple Habitats	NCWRC does not designate "sanctuaries". WRC has provided comments to NCDOT concerning Needmore Road. NCWRC allows trapping and hunting with hounds on game lands. Legal traps are designed to be humane. NGL is currently used for nature study and other educational activities. Extra precautions are taken to follow Bald Eagle Management Guidelines. The “gardens" provide supplemental food for a variety of wildlife in times when natural foods are scarce. Needmore currently has "forever wild" places. These are Primary Areas that allow very limited management as determined in the Dedicated Nature Preserve Terms and Conditions.
(Culturally Sensitive Areas	Culturally sensitive areas will be recognized and considered when planning management activities on NGL

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

Comment	Plan Team Response
non-game - migratory - endangered	Noted
endangered species	Noted
Grouse, pheasant, quail, Elk Toe Muscles and otter. Species only found in Needmore - Keeping them a treasure to the Needmore.	Noted
aquatic species, rare birds, rare terrestrial species, game species, otter	Noted
Eagles, All wildlife	Noted
All the unique species, not just the endangered, birds	NCWRC manages for a diversity of wildlife species and habitats
Deer, eagles, endangered species. Why not do what we can to keep it.	Noted. NCWRC manages for a diversity of wildlife species and habitats
Rare aquatic species	Noted
River otter, bald eagles, endangered aquatic life	Noted

Bear, deer, turkey. Improve grouse and quail eliminate coyotes	Noted. coyotes may be harvested on game lands any time there is an open season on a game animal.
Land	Noted
1-rare stuff 2-game species	Noted
Aquatic species	Noted
Deer on land, Smallmouth bass in water mallard and wood duck - rabbit	Noted
small game deer turkey grouse	Noted
native plants, wildlife, native aquatics	Noted

3. How do you use NGL?

Comment	Plan Team Response
hiking-fishing-hunting-herb collection	Noted. Refer to Regulations digest for information concerning removal of plants
Get Home! Scenery, Hiking	Noted
Picnicking, walking, biking, swimming, fishing, through way to Franklin.	Noted
Fishing, birding, walking	Noted
Hiking, view wildlife	Noted
Frequent walks and hikes year round for 30 years, fishing.	Noted
Hiking, hunting, canoeing, photography	Noted
Swim, hike	Noted
Hiking, biking, canoeing, kayaking	Noted
Hunt, fish, walk	Noted
Hiking, canoeing, hunting, fishing	Noted
Canoeing/overnight canoe trips, Mountain biking	Noted
Deer hunt my son paddles/fishes	Noted
Hiking, canoeing, birding fishing	Noted
To hunt and fish	Noted
Hunt and fish	Noted
hiking and bird watching	Noted

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

Comment	Plan Team Response
N/A	
Not Satisfactory-Needmore road (gravel) is horrible!	Needmore road is NCDOT maintained, not NCWRC maintained
Camping - Backcountry - test sites. Mtn. Neighbors would be interested in being a managing part of this idea.	Will address in plan. Need to consider enforcement and safety issues
I appreciate the Needmore access, on the main part, but more access on the outlier parcels would be great - one or two designated hiking trails - preserve swinging bridges	Will address access in plan. We have many old roads and trails for hiking. NCDOT maintains swinging bridges.
More hiking trails. Access and parking at swinging bridges	Note above
Very satisfactory - don't need too easy access but the river access etc. You've provided is done well. "Dispersed use" as you said in the presentation is best.	Noted
From Sawmill area, I think it's more than adequate	Noted
Generally satisfactory. Small campsites - out of the riparian buffer - could be a way to move camping forward	Will address in plan
Doing a great job	Noted
It is ok but could be better	Noted
Good access. Would like to see greenway following river right. "Family oriented".	NCWRC does not manage greenways. Many opportunities for walking on the game land.
(blank)	
Access is good at -------? No need to extend new boat access areas are great	Noted
Because when I looked at the maps provided I realized that there has been only a small percent of area that I have ever used because of limited public access (by permission only).	Will address improving public access in plan
Is satisfactory	Noted
Access for boating needs to continue to improve	Will address in plan

5. What suggestions, if any, do you have for changing how the NGL is managed and maintained?

Comment	Plan Team Response
N/A	
Additional monitoring required by personnel	Noted
Litter (Sawmill Boat Ramp)	Noted
dispersed but designated camping, accessible only by boat or foot, cultural heritage mgmt. descriptions	Address in plan. Must consider restrictions in river primary area.
(blank)	
I would like to see the disturbance from access roads minimized. On the Brush Creek side, some of the agency access roads really tore up the area and seem excessive. These are gated roads. Please keep esthetics in mind and don't do more than needed for minimal access.	Noted. Will address issues at Brush Creek
Litter - from sawmill boat ramp - head down to Fontana Lake - terrible situation!	Will address
Recognize Needmore is keystone to the migratory corridors connecting the Cowee to Nantahala Mountains. In management plan, recognize support of two corridors in a climate change adaptation landscape.	Will be considered in the acquisition section of the plan
Do a pilot - backcountry type camping	Will address/consider.
Need more law enforcement	Noted
It is an important land bridge and link from large amounts of steep less accessible land to manage. It could be the more early successional is needed to -------surrounding area. Also-Rx burning.	Noted
Please work with EBCI on MOU's/management agreements on Hall Mountain Tract. Maintain cultural heritage resources!	Will address in plan. NCWRC currently works with EBCI
By planting the most efficient forage possible	Noted
More open land, NO MOUNTAIN BIKES!	Bikes are not prohibited, but other restrictions keep Needmore from being suitable for biking trails
Plant ID -----? Restore natural areas	Noted

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

Comment	Plan Team Response
Cutting out camping on Needmore solved many problems such as safety, litter and unregulated and harmful footprints along river; however I would like to see picnic areas where families can enjoy the area. It is sad to no longer see people along the road.	Picnicking is allowed on the game land. NCWRC does not have designated areas.
I use it a lot (more access on Needmore outliers) any designated trails would be great - no place currently to hike on a trail	Access will be addressed. No designated trails but many trails and old roads to hike.
? used enjoyment would be greatly reduced if the road is widened/paved	DOT issue
We use it regularly now	Noted
Keep up existing roads	Addressed in plan
Clean up trash. Foraging permits. Rifle Range.	Trash addressed. Refer to Regulation Digest for info on Foraging. No place for shooting range on NGL, has been reviewed.
Posting of hunting seasons. The fear of being accidently shot keeps me off land.	Kiosks will be placed on game land. Seasons are public information in regulation digest and on line at ncwildlife.org.
Better access/less congestion. A rifle range 300+ yards	Access will be addressed. Refer above regarding shoorting range.
longer dog training season	NCWRC feels that current training season is adequate.
Limit mass usage by only certain groups. Contacting public before burning	Public can subscribe to NC wildlife updates via email. Will

	address mass usage in plan

7. What additional comments do you have about NGL?

Comment	Plan Team Response
NCWRC has done a great job so far!	Noted
Historical and Cultural Documentation	Will address in plan
Create acquisition plan to keep protecting more land connecting Nantahala and Cowee mountains - partner with LTLT, private landowners. Protect Trail of Tears corridor, map historic sites and create historic interpretation signs and kiosks.	Is part of the plan
You're doing a great job. If you're on the -----? Committee for the road, please protect the Needmore.	Noted. NCDOT maintains the Needmore Road
It's a wonderful place	Noted
Continue expanding the game land through continued land acquisition in partnering with LTLT.	Addressed in the plan
This should have been held in Swain County, most of the game land is in Swain County	Noted
Should be protected	Noted
No intensive management before full analysis from archeologists-LT river was used as route for trail of tears - protective status!	Addressed in the plan. No intensive management will be implemented without analysis

In addition to the comments received from the public input meetings, NCWRC also received email comments from the public. Below is a summary of email comments as well as a document detailing comments from Mainspring Conservation Trust.

Comment	Plan Team Response
Stream buffers are unbuffered or not buffered well	NCWRC is obligated to follow the rules of Natural Heritage Program Dedication Agreement. NCWRC will continue to address this issue.
Wetlands need a thorough inventory	Agreed. Surveys and Inventories are mentioned in the plan. NCWRC welcomes assistance with such inventories.
Sawmill Creek Road ford to foot bridge	NCWRC has discussed this with NCDOT.

NCWRC internal roads are over-built for their purpose. They are visually disruptive. They are not inviting as foot trails.	NCWRC builds and maintains roads and trails for managing the game land. The public may not always understand the specific purpose. NCWRC does not maintain roads and trails for aesthetics and the public is welcome to hike any game land road or trail unless otherwise noted or posted.
Sport fisheries. Needs evaluating. Any activity directed toward evaluating or benefiting recreational fisheries would be welcome.	Noted.
NCWRC needs to be aware of Stewartia.	NCWRC field staff has been identifying the locations of Stewartia on NGL.
Boat-Access-Only boating needs to be addressed.	Noted. This has been discussed. Will continue to discuss and NCWRC welcomes additional input.
NCWRC needs to increase the priority level of the Iotla Bridge FFA/PFA.	Noted.
More wildlife friendly trees in riparian areas.	NCWRC has been working on this.
Streambank stabilization project needed at Coweeta Bottoms.	This has been discussed. Agreed.
NCWRC should not lease fields for hay production.	NCWRC leases only a few of their fields for hay production. NCWRC agrees to the importance of fallow fields and quality ES habitat management. NCWRC also recognizes historic use and the importance of being a good neighbor and the value of the local farmer.
NCWRC needs to look at additional access for boats in the southern part of Macon County. They should also modify the rule that there is no swimming at boating access areas. Swimming should be allowed if no motor boats are allowed or use the access.	Noted.
There is a disconnect in linking upstream water quality and the disappearance of two federally-listed mussel species within the NGL.	NCWRC is committed to enhancing the habitat for federally listed species occurring on NGL. NCWRC has no regulatory authority regarding land management practices that occur outside of the game land.
Would like to see disabled sportsman hunting opportunities at Needmore as well as other areas.	NCWRC is working with partners to discuss the possibility of providing some disabled sportsman hunting opportunities at NGL. For disabled hunting opportunities on other

	properties, go to www.ncwildlife.org and review the “special hunting opportunities” booklet. This may help.
Needmore Road is a disgrace.	NCDOT is responsible for the maintenance of Needmore Road.

MAINSPRING
CONSERVATION TRUST

557 East Main Street | Franklin, NC 28734
P.O. Box 1148 | Franklin, NC 28744
828.524.2711 | mainspringconserves.org

September 16, 2016

NC Wildlife Resources Commission
Raleigh, NC

Re: Comments on proposed Needmore Game Lands Management Plan

Dear WRC,
You have been a valued partner in Mainspring's efforts to conserve the waters, forest, farms, and heritage of the upper Little Tennessee River valley. We applaud your efforts to develop a written long-term management plan for the Needmore Game Lands We thank you for providing the opportunity for the public to offer input during the planning process. The following are our comments on the proposed plan.

Mainspring's comments on the Needmore Management Plan (draft, D. Desmond, 9/16/2016, 2pm)

1. Updates needed since original draft:
    a. LTLT is now Mainspring Conservation Trust (use "Mainspring", please do not use acronym)
    b. Acreage. Document says 4,797 acres. Mainspring's calculations:

Needmore Game Land
Update: August 31, 2016

Parcel	Date	Acres
Original	Jan-04	4407.56
Lost Bridge	Jan-00	160.46
Queen Branch III	Sep-06	67.8
Queen Branch IV	Dec-06	21.2
Coweeta Creek I & II	Aug-08	47.56
Raby Bend I & II	Sep-11	76.54
Clark Raby	Sep-12	54
Duvall	Jul-14	39.69
Allen	?/2015	128
TOTAL		**5002.81**
Pending		
Indian Grave Gap		37.86

MAINSPRING
CONSERVATION TRUST

557 East Main Street | Franklin, NC 28734
P.O. Box 1148 | Franklin, NC 28744
828.524.2711 | mainspringconserves.org

c. Ditto goes for miles of Little Tennessee River shoreline
d. Ditto goes for map of other conserved lands (e.g., Mainspring properties, conservation easements, EBCI properties (Hall Mountain, Cowee Mound, Carter Branch; we can provide shapefiles)
e. Boat launch area at Raby Bend/McCoy MA, page 60.

2. Page 2. Executive Summary, 1st sentence. We would not consider NGL part of the Blue Ridge "Escarpment", but rather part of Blue Ridge Ecoregion or Province.

3. Page 14. Physical Attributes – rare species. Stewartia ovata, a plant with SR-P status in NC with state/global rank of S2/G4, is found within the Needmore tract (e.g., Horseshoe Bend). Also, Mainspring has heard report that Fraser's loosestrife (E status at state and FSC status at federal level, S3/G3 rank) is found along Needmore Road within Needmore Game Lands.

4. Page 15. Significant streams. The choice of the four mentioned seems rather arbitrary. The three largest are Burningtown, Tellico, and Brush. If Wiggins is considered significant, then we would suggest that Sawmill, Licklog, Rattlesnake, DeHart, Painter, and maybe other named streams should also be considered significant. Mainspring has biomonitoring/fish inventory data on at least 9 tributaries on the NGL that we would be happy to share.

5. Page 16. Little T. The 24-mile reach of the Little T. The river has had exceptional Index of Biotic Integrity scores over the years. This could be cited to support its Unique Value.

6. P. 30-31. Tributary streams. We opine that the treatment of tributary streams is inadequate.

- Only the 2 largest tribs (Burningtown and Tellico) are mentioned individually, omitting the next-biggest stream, with the longest reach on NGL (Brush Creek).
- The use of tribs in the fall by spotfin chub (and other non-threatened cyprinids) should be at least mentioned as a potential management consideration.
- We suggest adding a paragraph emphasizing the need to work with private landowners and other agencies on ALL of the tributary watersheds above the NGL boundary.
- A lot of the small tributary streams (as well as parts of the Little T itself) are inadequately buffered. Planting of hard and soft mast trees as buffer species, such as persimmon, shingle oak, and paw paw, would enhance food for wildlife.
- Stream restoration projects where banks are unstable should be identified and implemented (e.g., Coweeta Bottoms).

MAINSPRING
CONSERVATION TRUST

557 East Main Street | Franklin, NC 28734
PO Box 148 | Franklin, NC 28744
828.524.271[illegible] | mainspringconserves.org

- **A number of former natural streams have been historically converted to ditches. A goal could be restoration of natural channel conditions, with appropriate buffering.**

7. **P. 31-32, Bogs and associated wetlands.**
   a. **We opine that these areas need more attention, and we support the cited need to complete a survey. We have data from our survey in 2000 that we are happy to share.**
   b. **We opine that a more systematic approach to wetland management is needed on NGL, as current management is at time at cross purposes with wetland preservation. For example, the management of floodplain areas on former agricultural fields as wildlife food plots; left alone, or encouraged, these areas might revert to wetland condition.**

8. **Non-native Invasive Species (NNIS). Mainspring considers management of NNIS an important aspect of the management of the Needmore Game Lands, including detection, prevention, inventory, and control. There are rather vague mentions about this topic in the current draft. There is need to do a detailed inventory of species/locations and come up with prioritized control plan and cost estimate.**

9. **Roads and Access. Unlike such topics as wetlands and NNIS, there is quite an amount of detail on roads and access. Our general comment is that we encourage NCWRC to give greater attention to protecting conservation values, including habitat and esthetics, when proposing, planning, and constructing infrastructure.**

   a. **Culvert and bridge construction/upgrades– need to consider aquatic species passage.**
   b. **Page 40, Old River Road. If we are referring to the same location, the "ephemeral pool" is a spring-fed oxbow pond which maintains water sufficient to support fish even in severe droughts.**

10. **NGL and Mainspring properties.**
    a. **Cody and Coggins Bend (p. 42 and 59). This needs correction. Mainspring tried to acquire the Lucy Smarr tract, but negotiations ended in 2015.**
    b. **Queen Branch. Page 63 mentions new access road development for Queens Branch M.A., but then does not include a detailed section on this. We assume this would be within the existing right-of-way through Mainspring's Queen Branch tract.**

MAINSPRING
CONSERVATION TRUST

557 East Main Street | Franklin, NC 28734
P.O. Box 1148 | Franklin, NC 28744
828.524.2711 | mainspringconserves.org

c. McCoy Inholding (p. 88). There may be confusion here about structures and ownership. We are not clear what building WRC refers to with regards to the "timber hay barn".
    i. On the inholding: Lawrence and Florence Robbins have a life estate on the house and the land on which the house is located, which is only part of the 2.3 acres that Mainspring owns. Mainspring owns the rest of the 2.3 acres free and clear. There are a couple of outbuildings that are part of the inholding that Mainspring leases to the Robbins and that are used by the Robbins.
    ii. There is a wooden shed across the road, in the field, next to the swinging bridge across the river. Mainspring has no claim to this building. We do not know who uses this building.
d. Wiggins Creek. There is a small, abandoned shed just to the north of Mainspring's 0.95-acre Wiggins Creek parcel. Our understanding is that this building is on state property. It is not used by the lessee of the mobile home on Mainspring's property, Mae Lee Cabe. We suggest it be included in the Structures section (p.86) of the management plan, with the suggestion that it be torn down and removed.

11. Page 94. Research. We advocate for continued research about spotfin chub movements in trigutaries—how and why, leading to management decisions regarding tributaries.

REFERENCES CITED

Abrams, Marc D. 1992. *Fire and the Development of Oak Forests.* BioScience Vol. 42, No. 5; University of California Press, Berkley, CA

Clebsch, E.E.C., and R.T. Busing. 1989. *Secondary Succession, Gap Dynamics, and Community Structure in a Southern Appalachian Cove Forest*. Ecology 70: 728-735.

Climate Normals 1971-2000 State Climate Office of North Carolina Retrieved 24 April 2014 from www.nc-climate.ncsu.edu/cronos/normals.php?station=313

Croy, S. and Frost, C. 2007. Fire Regime Condition Class (FRCC): Interagency Handbook. Potential Natural Vegetation Group: Appalachian Dry-Mesic Oak Forest.

Dean, J. 1971. *What About the Game Lands Expansion?* August 1971 edition of Wildlife in North Carolina magazine, pages 4-6.

Delacourt, Hazel R. and Paul A. Delacourt. 1997. *Pre-Columbian Native American Use of Fire on Southern Appalachian Landscapes*. Conservation Biology 11(4):1010-1014

Discover North Carolina River Basins Website Retrieved 29 January 2014 from www.eenorthcarolina.org

Frost, Cecil; 2005. Fire Regime Condition Class (FRCC): Interagency Handbook. Potential Natural Vegetation Group: Piedmont Oak-Hickory-Shortleaf Pine.

Fryar, Roger; 2004. Fire Regime Condition Class (FRCC): Interagency Handbook. Potential Natural Vegetation Group: Dry- Mesic Pine (Shortleaf Pine).

Greenberg, Cathryn H.; Collins, Beverly S.; Thompson III, Frank R.; 2011 *Sustaining Young Forest Communities; Ecology and Management of Early Successional Habitats in the Central Hardwood Region*.

Griffith, G.E., Omernik, J.M., Comstock, J.A., Schafale, M.P., McNab, W.H., Lenat, D.R., MacPherson, T.F., Glover, J.B., and Shelburne, V.B., 2002, *Ecoregions of North Carolina and South Carolina.* Reston, Virginia

Guyon, Lyle J.; Rolfe, Gary L.; Edgington, John M.; and. Mendoza, Guillermo A. 1989. *A Comparative Analysis of the Diversity of Woody Vegetation in Old-Growth and Secondary Southern Appalachian Cove Forests.*

Hunter, W.C., D.A. Buehler, R.A. Canterbury, J.L. Confer, and P.B. Hamel. 2001. *Conservation of disturbance-dependent birds in eastern North America*. Wildlife. Soc. Bull 29(2):440-455.

Kennard, Deborah K.; Flebbe, Patricia A.; Schmolde, Daniel L.; Hubbard, William G.; Jordin, J. Bryan; Milnor, William; Rauscher, H. Michael. *The Encyclopedia of Southern Appalachian Forest Ecosystems.* Accepted for Publication in Forest Ecology and Management -July 2004

LandScope America. 2013. Southern Blue Ridge Ecoregion. www.landscope.org/explore/natural_geographies/ecoregions/Southern%20Blue%20Ridge

Natural Resource Conservation Service. 2007. *Early Successional Habitat; Fish and Wildlife Habitat Management Leaflet #41*

NatureServe. 2007. *International Ecological Classification Standard: Terrestrial Ecological Classifications*. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 October 2007.

NC Divison of Water Quality. 2013. Surface Water Classifications. www.ncdenr.gov/web/wq/ps/csu/classifications

N.C. State University. 2008. Southeastern GAP Analysis data. www.basic.ncsu.edu/segap/datazip/state/nc/lc_segap_nc_metadata.htm

NOAA. 2002.*Climatography of the United States No. 81: Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1971- 2000; North Carolina*. National Climatic Data Center Asheville, NC.

North Carolina Natural Heritage Program. 2013. Biotics Database. Department of Environment and Natural Resources, Raleigh, North Carolina.

North Carolina Wildlife Resources Commission. 2005. *North Carolina Wildlife Action Plan*. Raleigh, NC.

North Carolina Wildlife Resources Commission. 2016. *North Carolina Wildlife Action Plan*. Raleigh, NC.

Schafale, Michael; and Weakley, Alan; 1990 *Classification of the Natural Communities of North Carolina* (CNCNC). North Carolina Natural Heritage Program. Raleigh, NC.

Simone, S.A., 2011, *Ecological Zones in the Southern Blue Ridge: 3rd Approximation*, Ecological Modeling and Fire Ecology Inc., Asheville, NC.

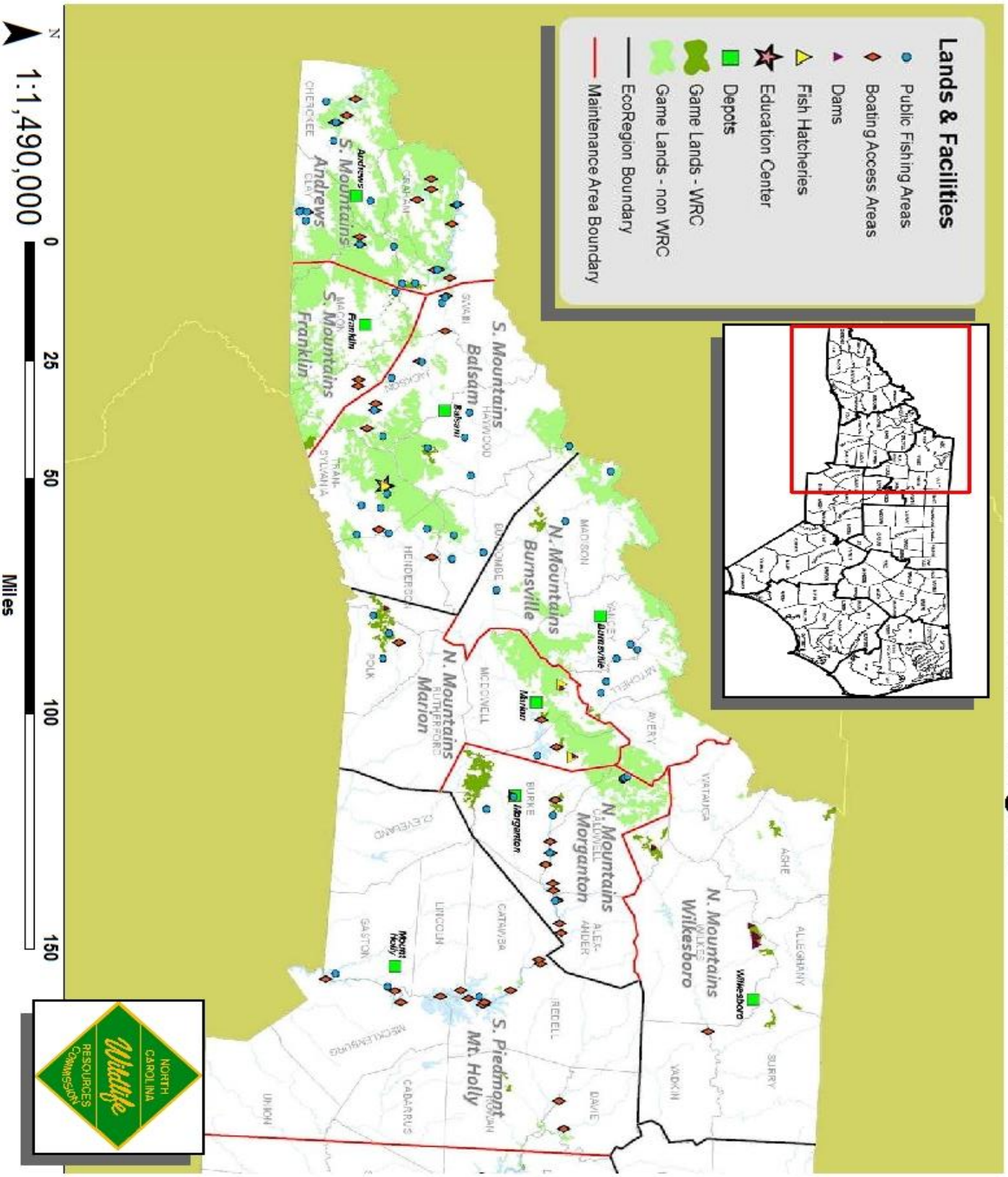
U.S. Census Bureau. 2013. State and County QuickFacts. www.quickfacts.census.gov/qfd/states/37/37021.html

USFWS 1977. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Five Species of Southeastern Fishes. Federal Register 42(175), 45526-45530.

USFWS 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Appalachian Elktoe. Federal Register 67(188), 61016-61040.

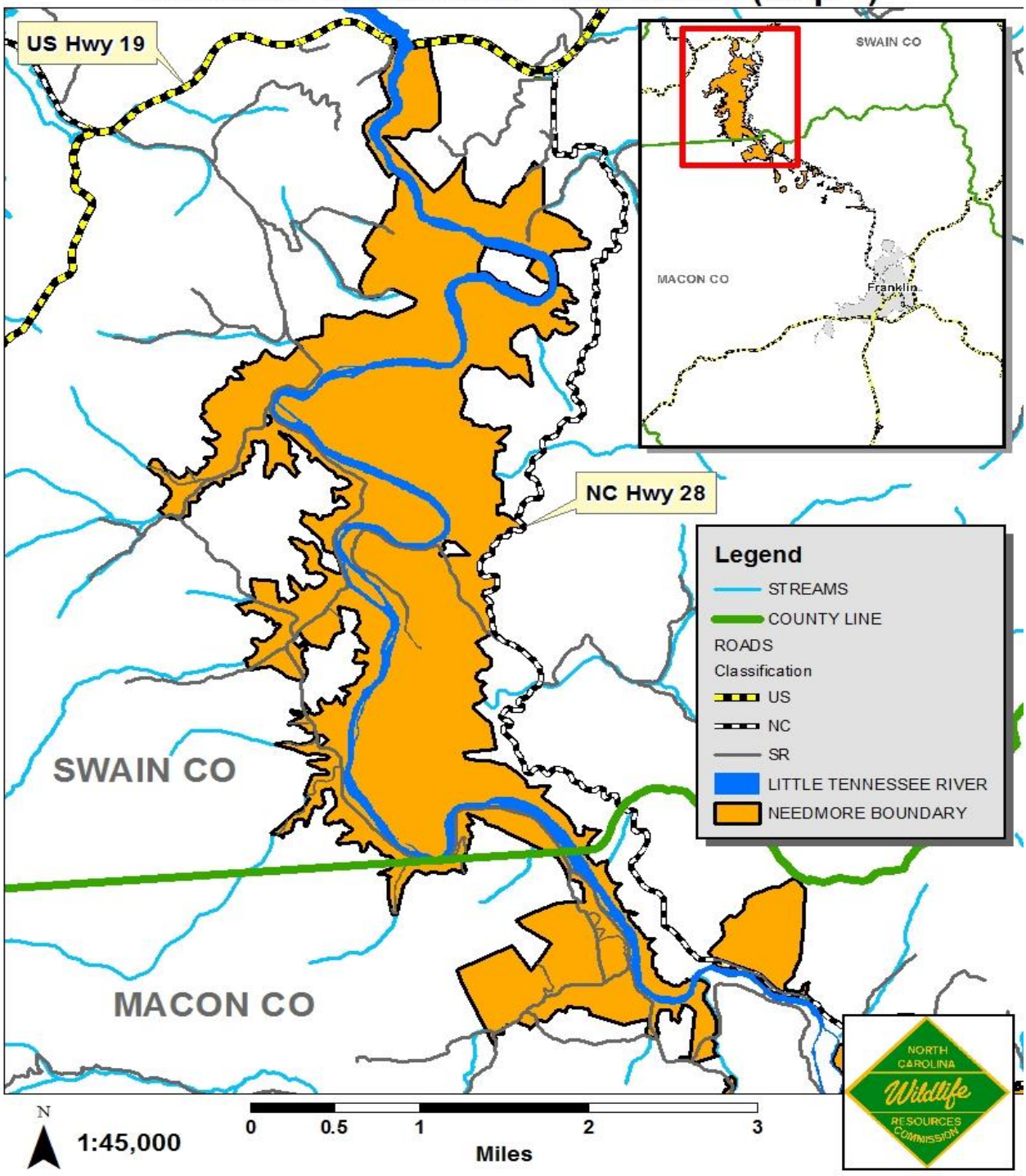
Weather Extremes State Climate Office of North Carolina Retrieved 24 April 2014 from www.nc-climate.ncsu.edu/climate/nc_extrimes.php

Appendix 1

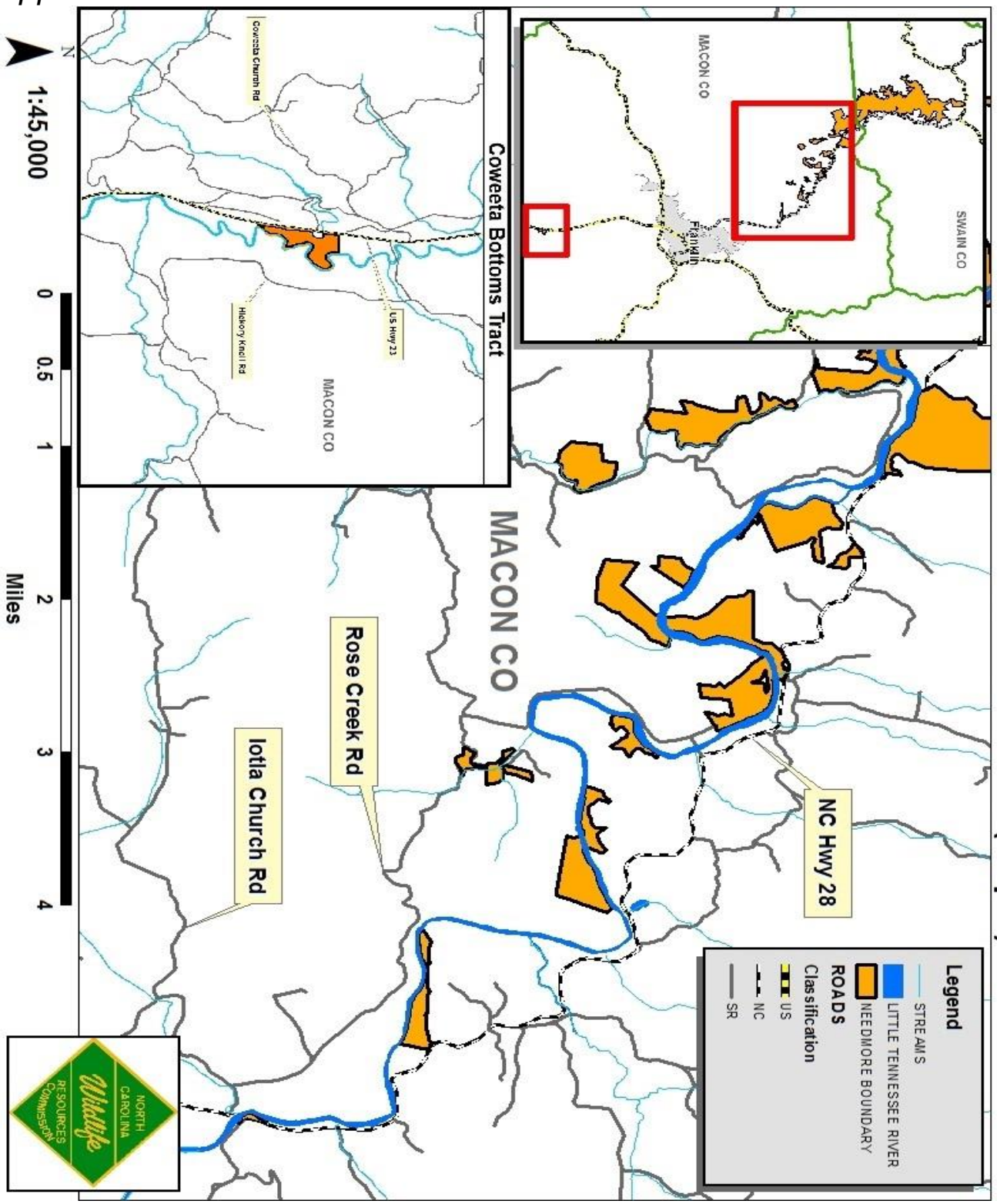

NCWRC Mountain Eco-Region
Lands & Facilities
Public Fishing Areas
Boating Access Areas
Dams
Fish Hatcheries
Education Center
Depots
Game Lands - WRC
Game Lands - non WRC
EcoRegion Boundary
Maintenance Area Boundary
S. Mountains Andrews
S. Mountains Franklin
S. Mountains Balsam
N. Mountains Burnsville
N. Mountains Marion
N. Mountains Morganton
N. Mountains Wilkesboro
S. Piedmont Mt. Holly
1:1,490,000
0
25
50
100
150
Miles
N
NORTH CAROLINA Wildlife RESOURCES COMMISSION

Appendix 2

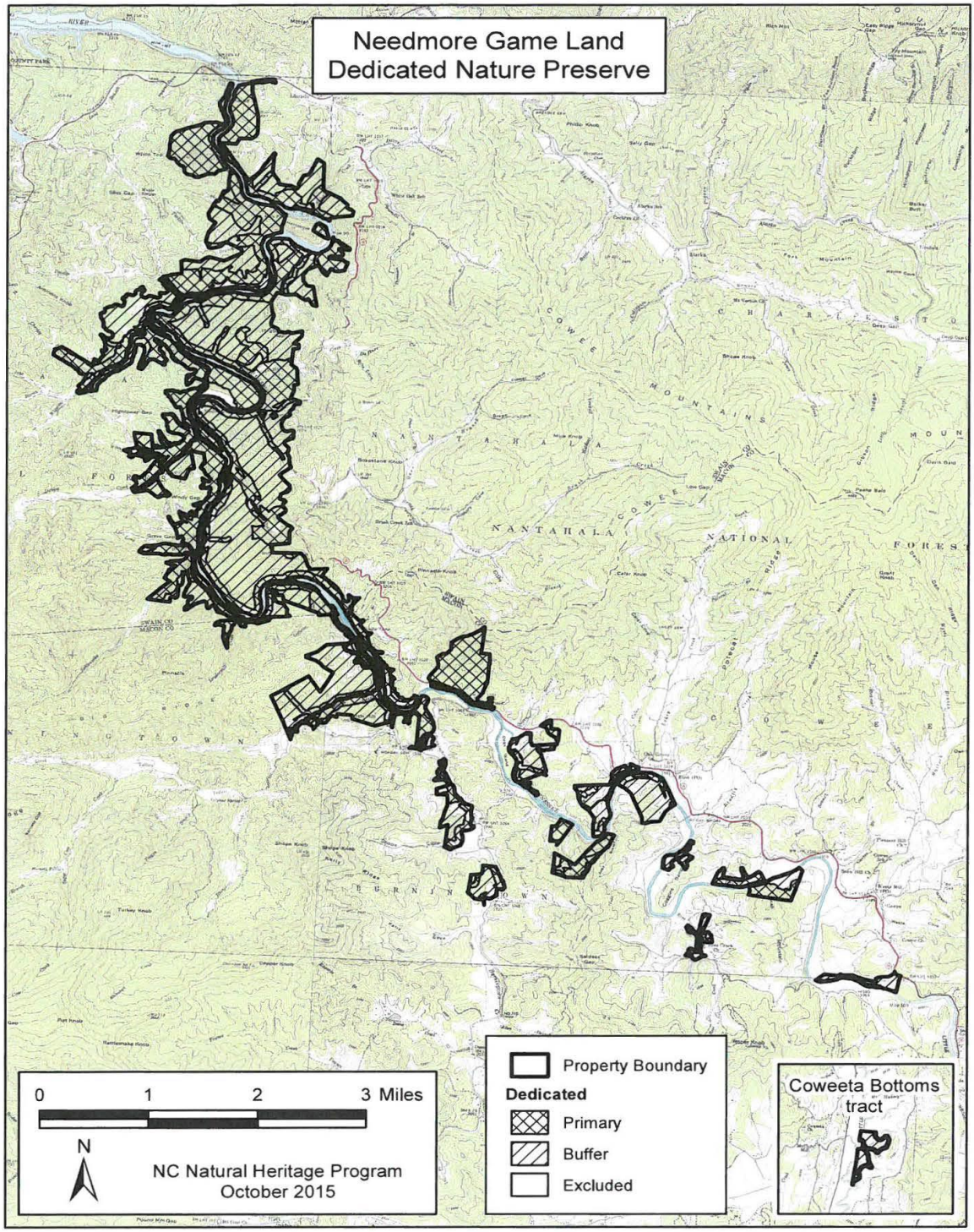
Needmore Game Land- 4797 Acres (Map 1)



Appendix 3

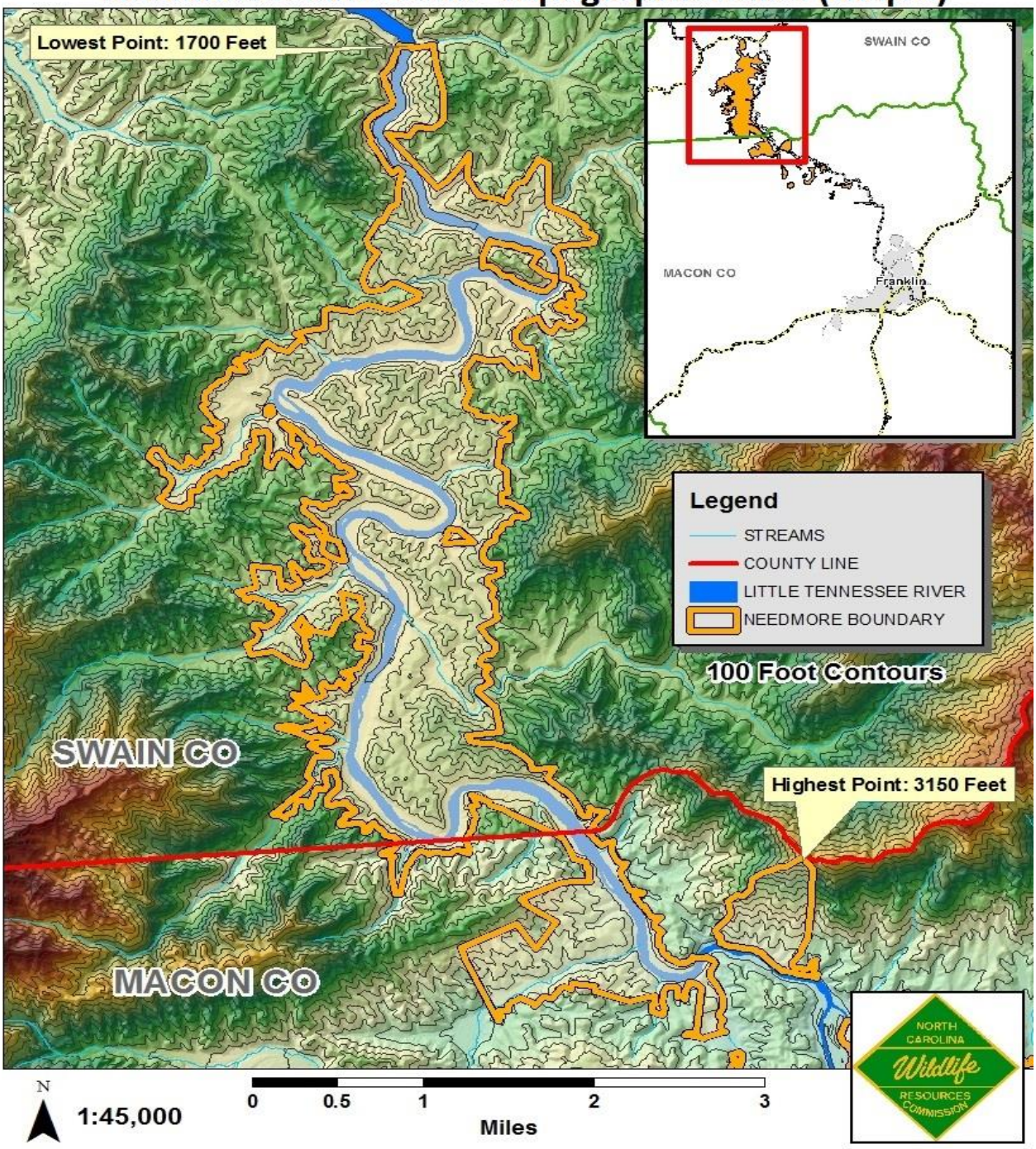

Needmore Game Land- 4797 Acres (Map 2)
Legend
STREAMS
LITTLE TENNESSEE RIVER
NEEDMORE BOUNDARY
ROADS
Classification
US
NC
SR
NC Hwy 28
Rose Creek Rd
Iotla Church Rd
MACON CO
SWAIN CO
MACON CO
Franklin
Coweeta Bottoms Tract
Coweeta Church Rd
US Hwy 23
Hickory Knoll Rd
MACON CO
N
1:45,000
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION

Appendix 4

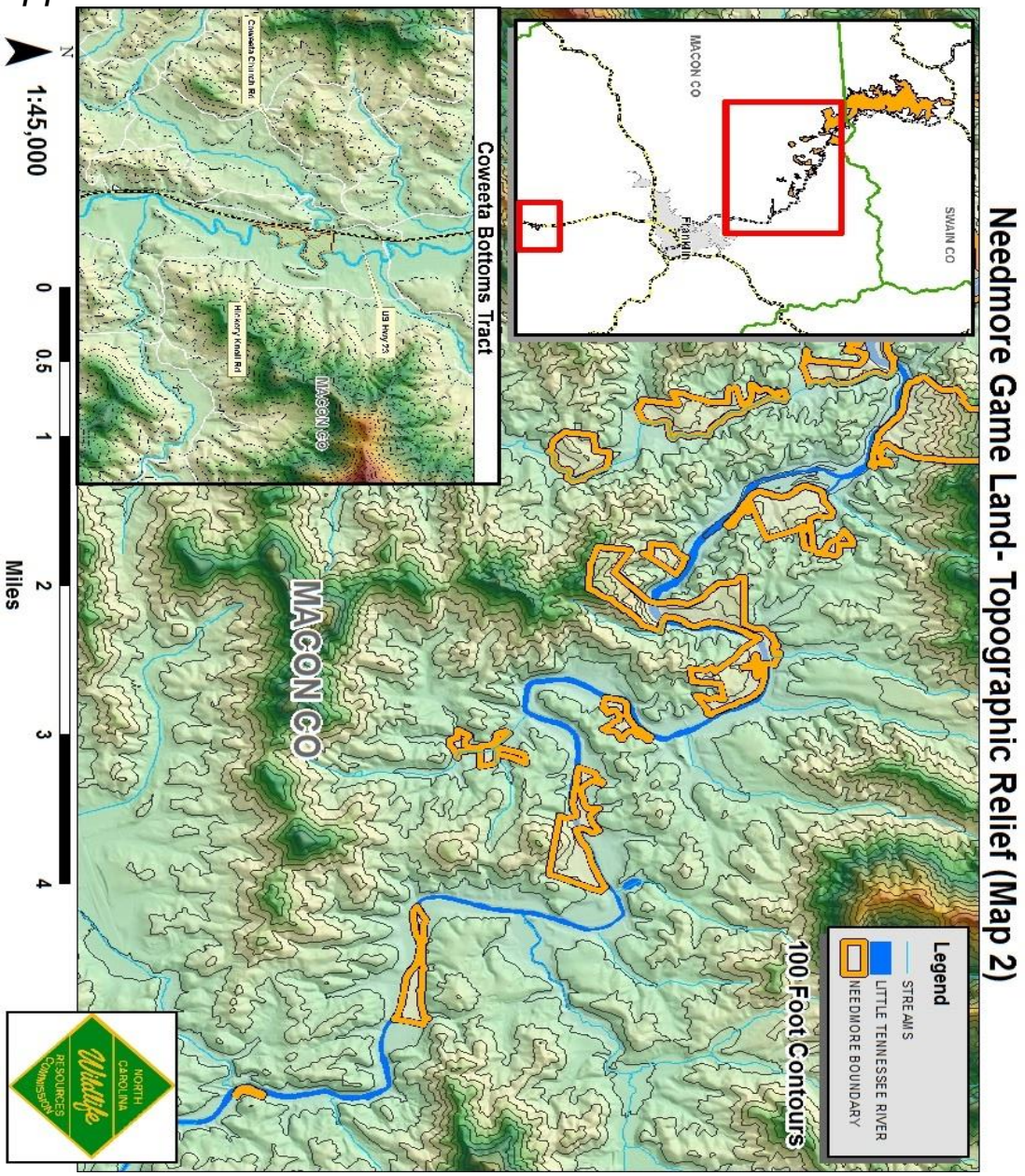

Needmore Game Land
Dedicated Nature Preserve
0 1 2 3 Miles
N
NC Natural Heritage Program
October 2015
Property Boundary
Dedicated
Primary
Buffer
Excluded
Coweeta Bottoms
tract

Appendix 5

Needmore Game Land- Topographic Relief (Map 1)

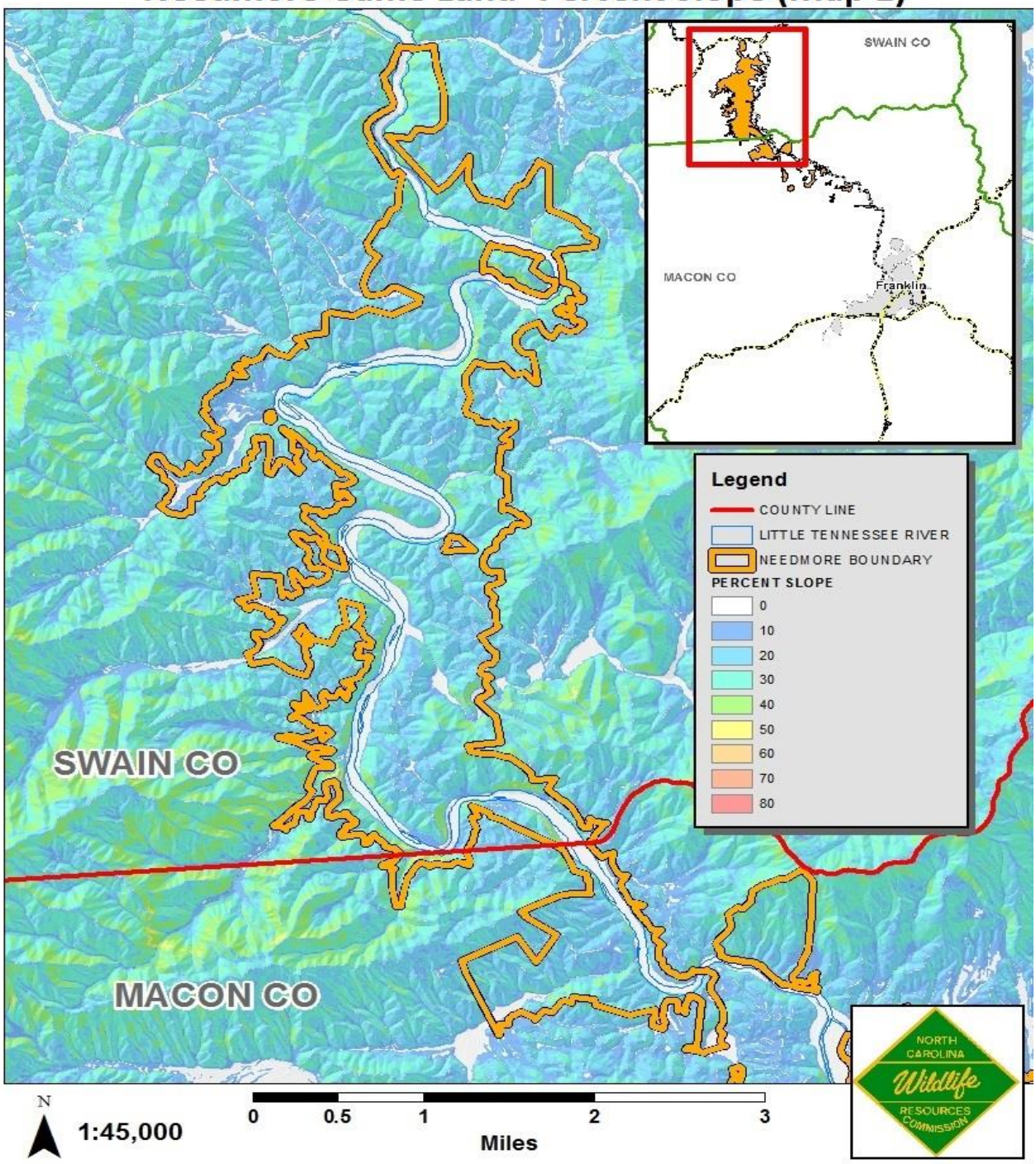


Appendix 6

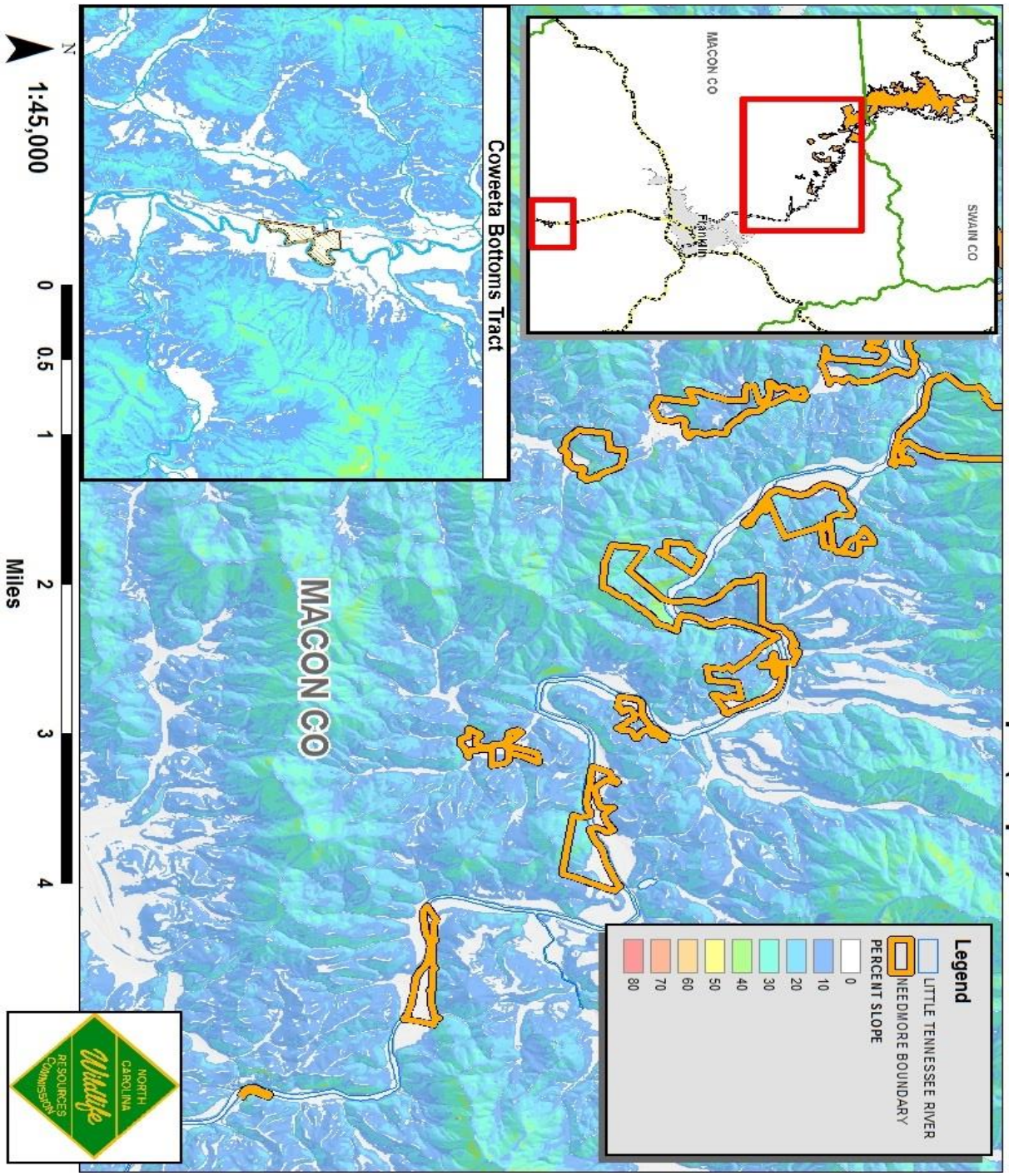

Needmore Game Land- Topographic Relief (Map 2)
Legend
STREAMS
LITTLE TENNESSEE RIVER
NEEDMORE BOUNDARY
100 Foot Contours
SWAIN CO
MACON CO
Franklin
Coweeta Bottoms Tract
MACON CO
US Hwy 64
Coweeta Church Rd
Hickory Knoll Rd
MACON CO
N
1:45,000
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES
COMMISSION

Appendix 7

Needmore Game Land- Percent Slope (Map 1)

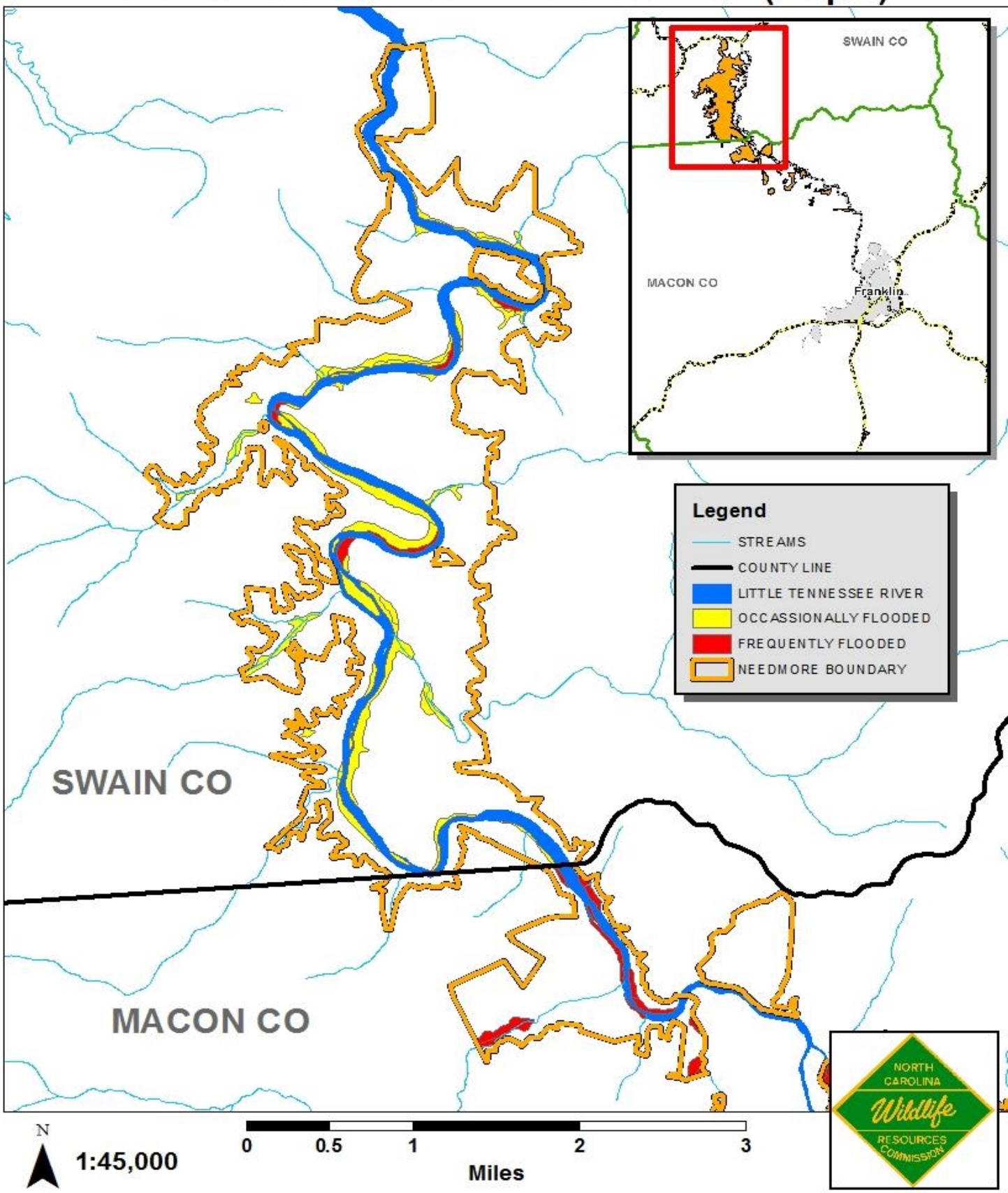


Appendix 8

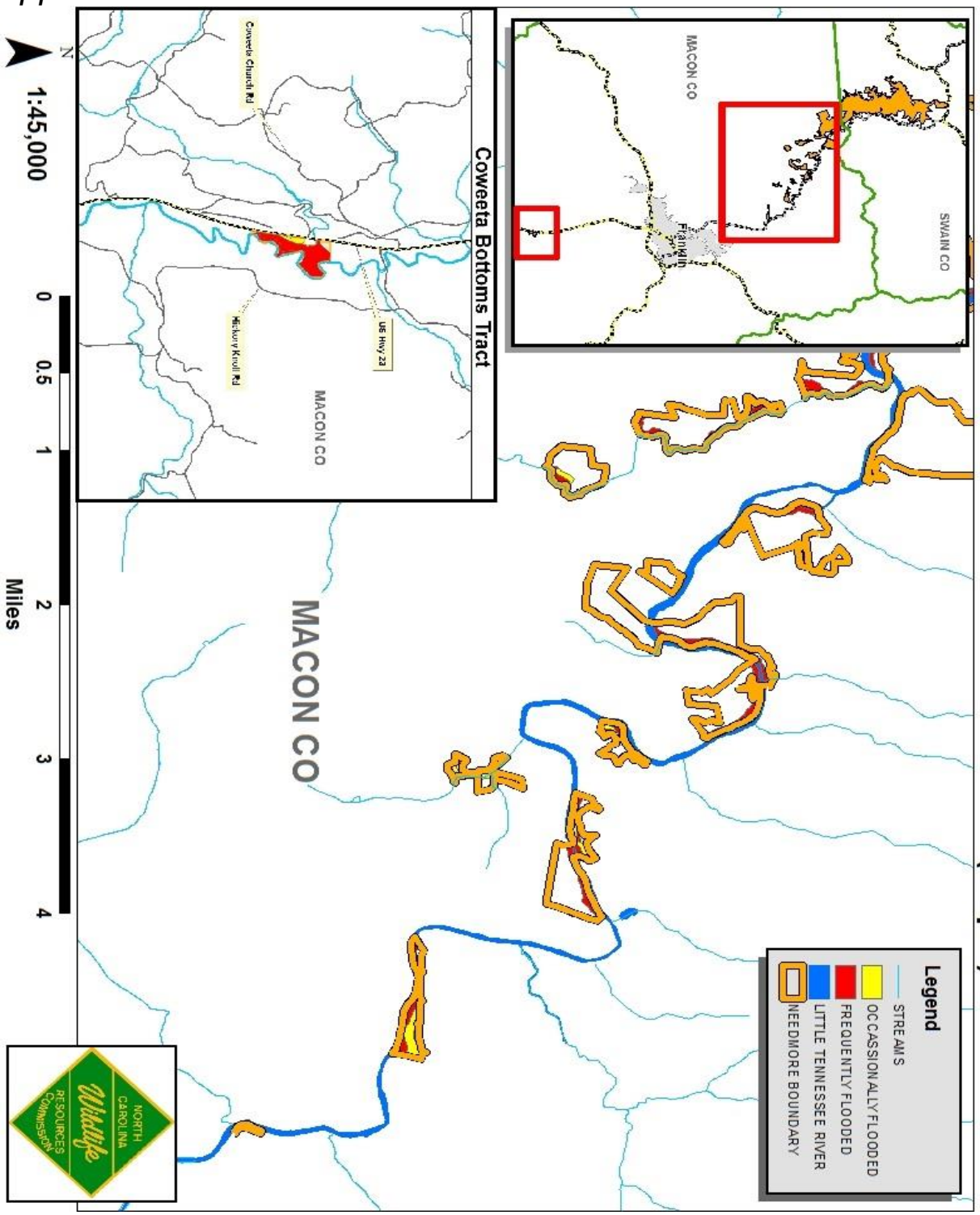

Needmore Game Land- Slope (Map 2)
Legend
LITTLE TENNESSEE RIVER
NEEDMORE BOUNDARY
PERCENT SLOPE
0
10
20
30
40
50
60
70
80
SWAIN CO
MACON CO
Franklin
Coweeta Bottoms Tract
MACON CO
N
1:45,000
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES Commission

Appendix 9

Needmore Game Land- Flooded Soils (Map 1)

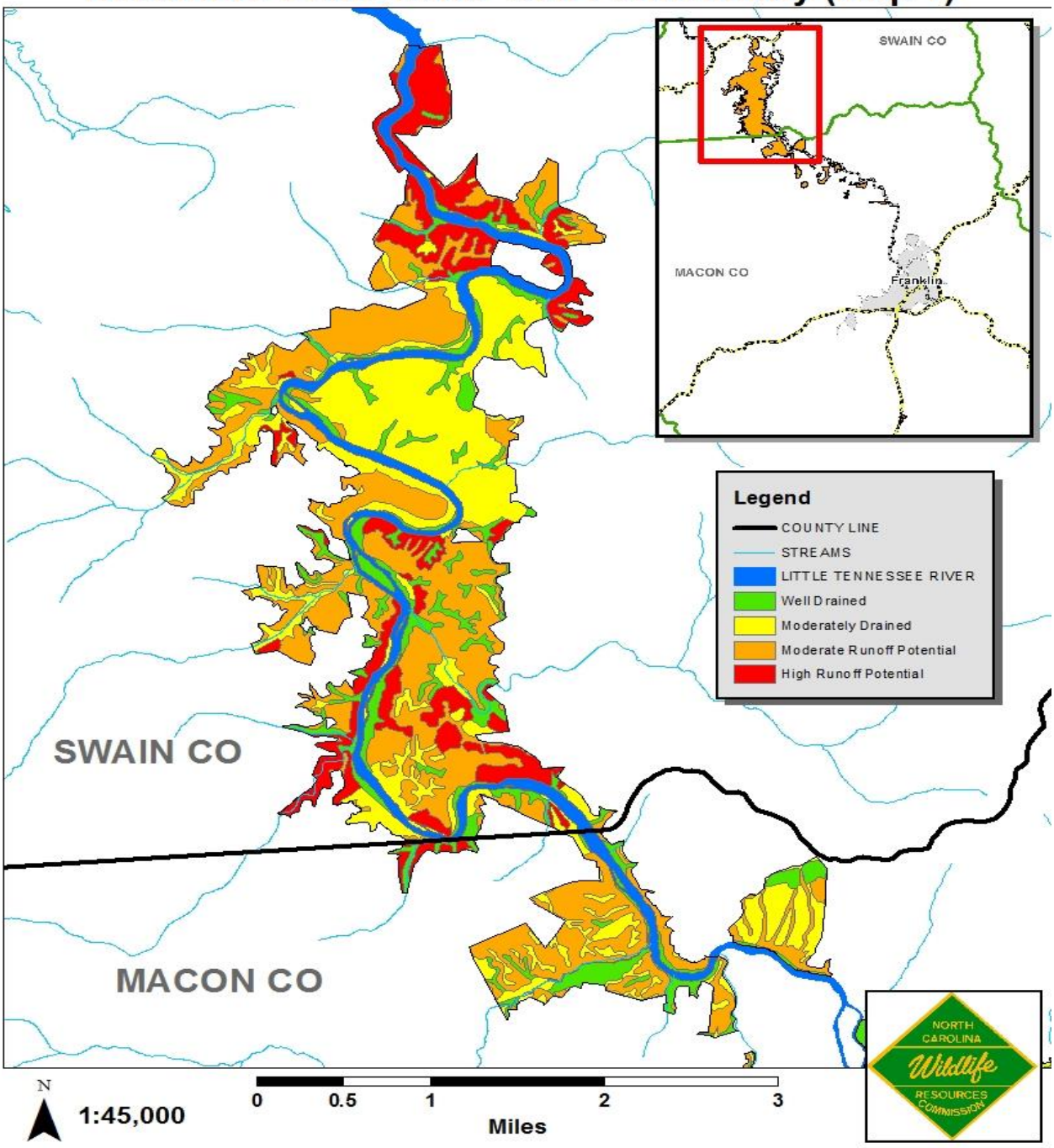


Appendix 10

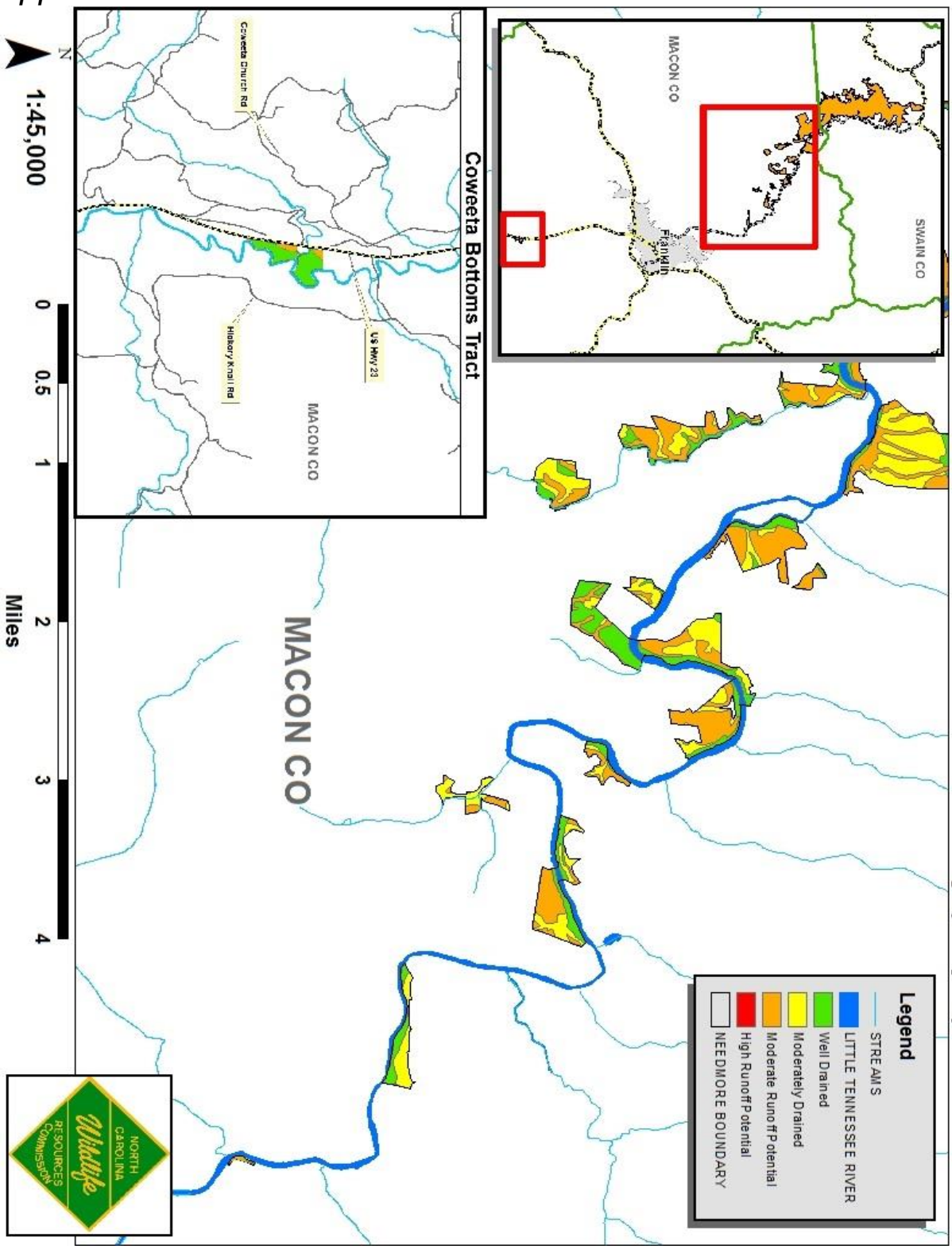

Needmore Game Land- Flooded Soils (Map 2)
Legend
STREAMS
OCCASSIONALLY FLOODED
FREQUENTLY FLOODED
LITTLE TENNESSEE RIVER
NEEDMORE BOUNDARY
MACON CO
SWAIN CO
Franklin
Coweeta Bottoms Tract
Coweeta Church Rd
US Hwy 23
Hickory Knoll Rd
N
1:45,000
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION

Appendix 11

Needmore Game Land- Soil Permeability (Map 1)

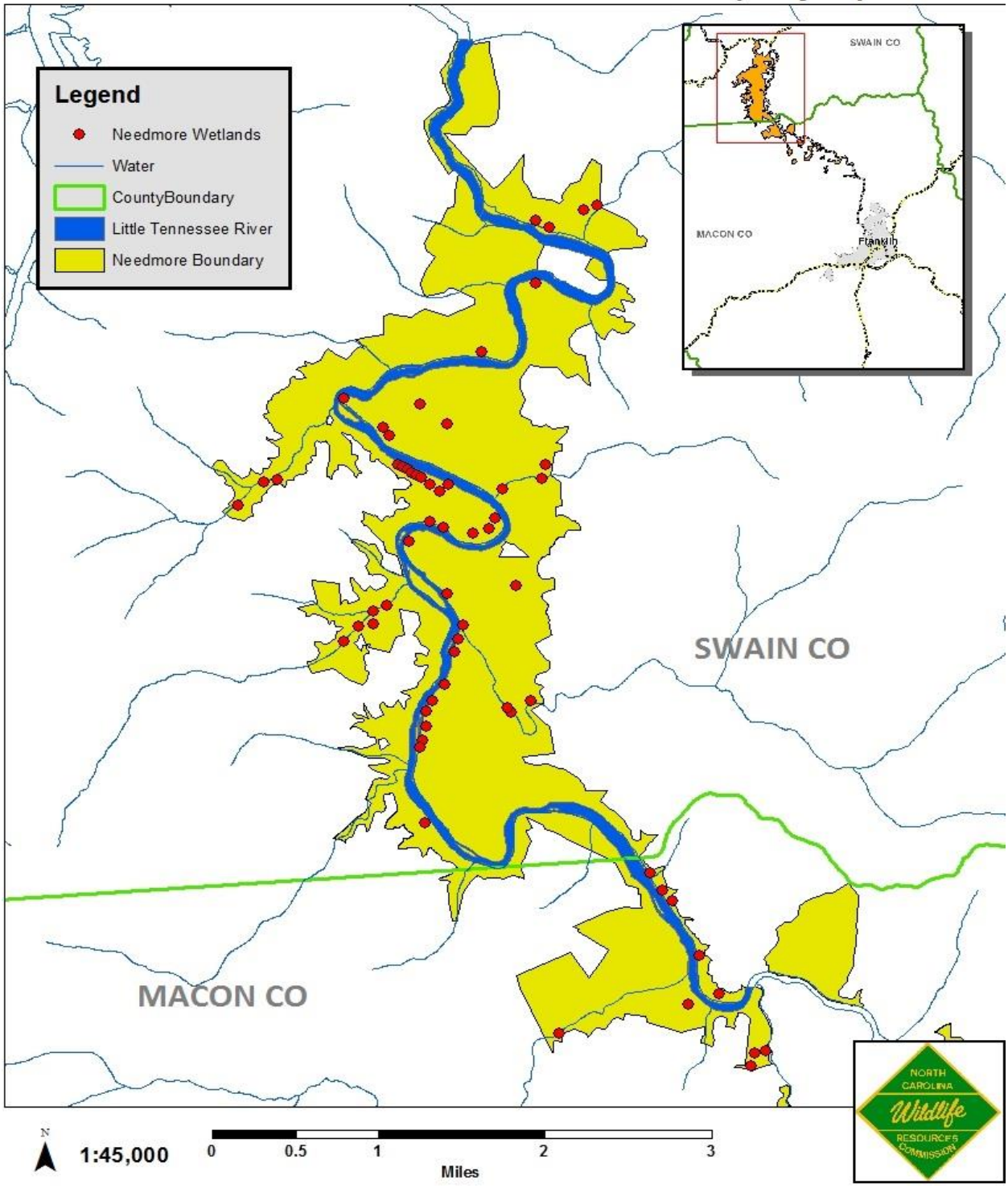


Appendix 12

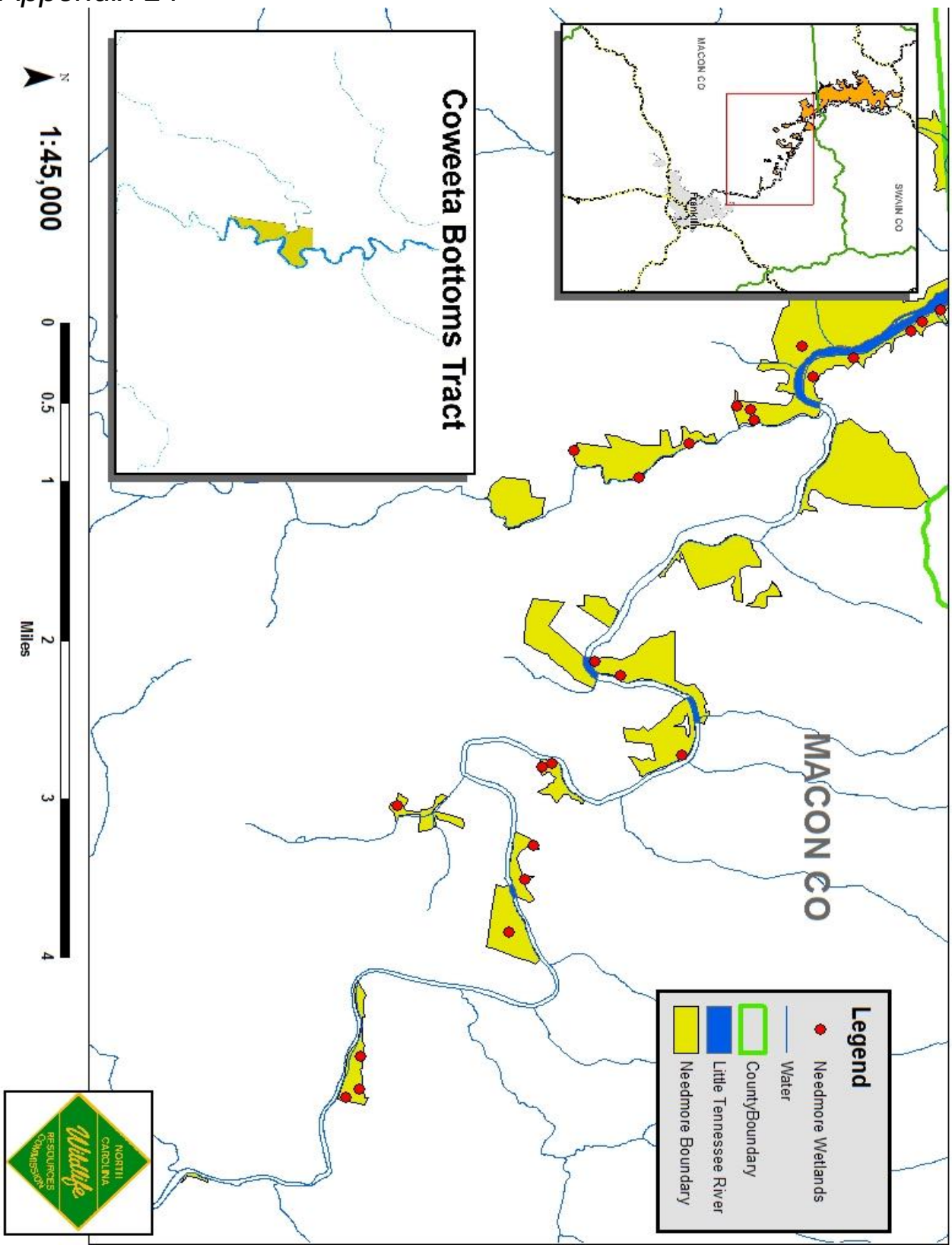

Needmore Game Land- Soil Permeability (Map 2)
Legend
STREAMS
LITTLE TENNESSEE RIVER
Well Drained
Moderately Drained
Moderate Runoff Potential
High Runoff Potential
NEEDMORE BOUNDARY
SWAIN CO
MACON CO
Franklin
Coweeta Bottoms Tract
Coweeta Church Rd
US Hwy 23
Hickory Knoll Rd
MACON CO
MACON CO
N
1:45,000
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION

Appendix 13

Needmore Game Land- Wetlands (Map 1)

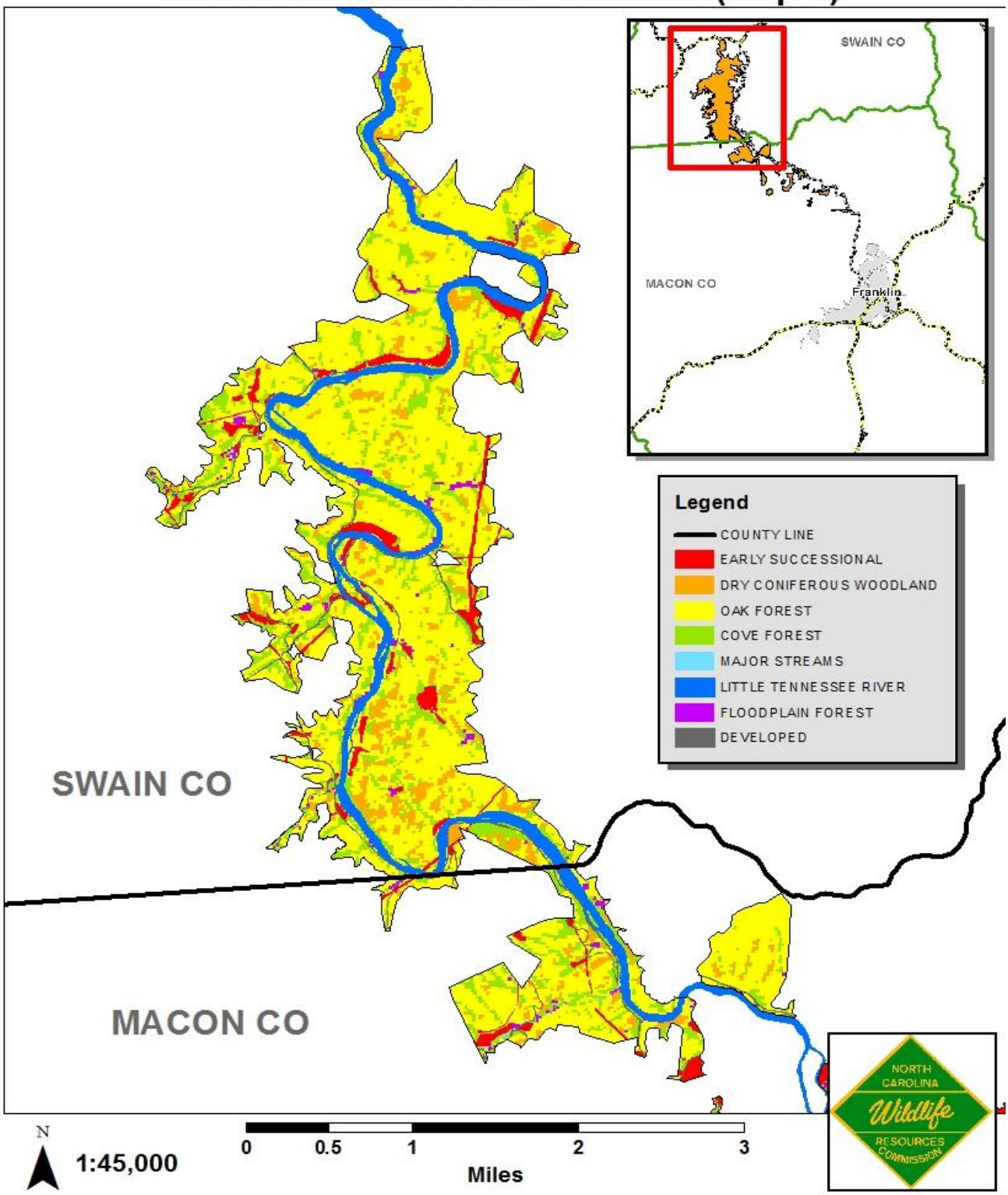


Appendix 14

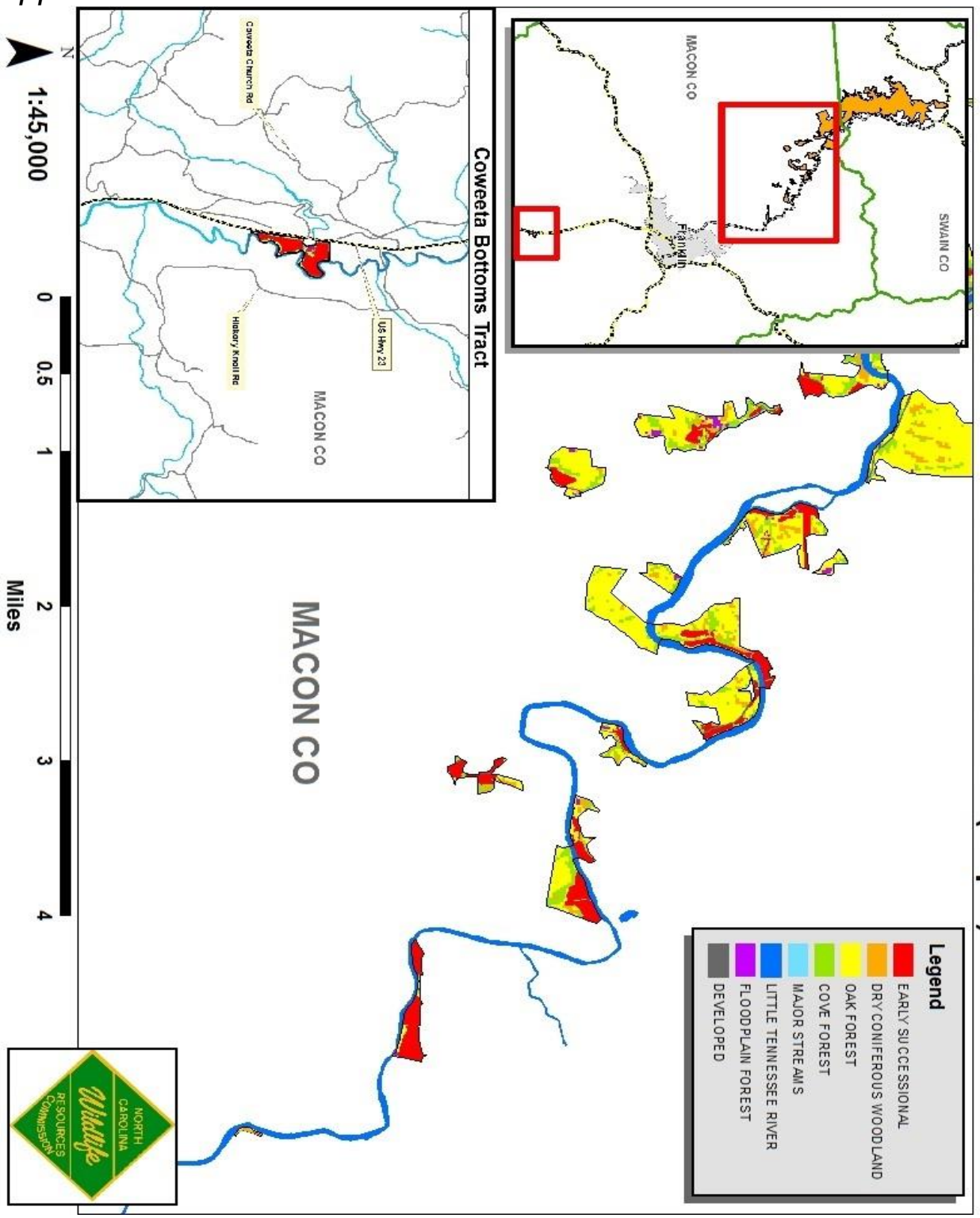

Needmore Game Land- Wetlands (Map 2)
Coweeta Bottoms Tract
MACON CO
SWAIN CO
Legend
Needmore Wetlands
Water
County/Boundary
Little Tennessee River
Needmore Boundary
N
1:45,000
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION

Appendix 15

Needmore Game Land- Habitats (Map 1)

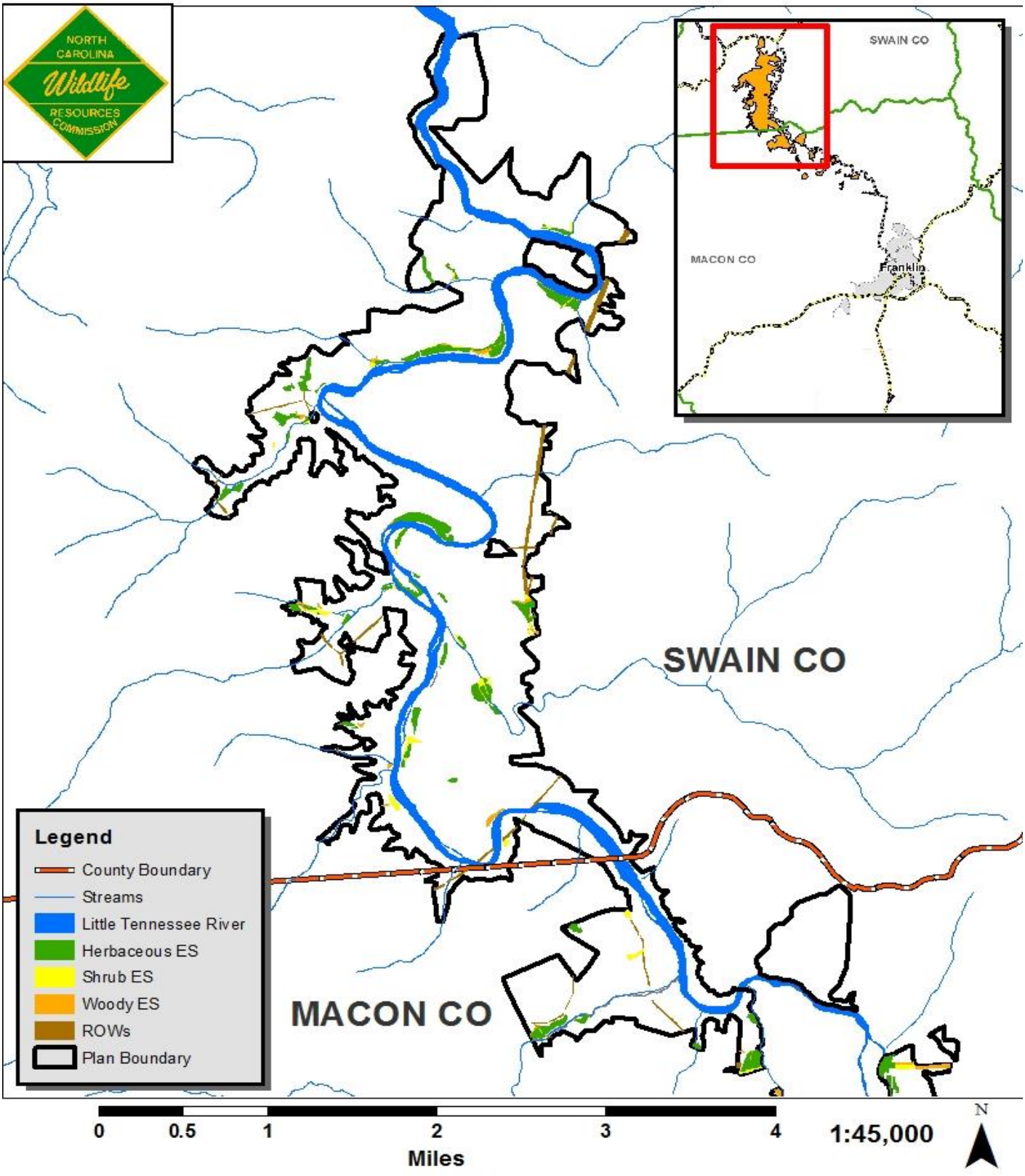


Appendix 16

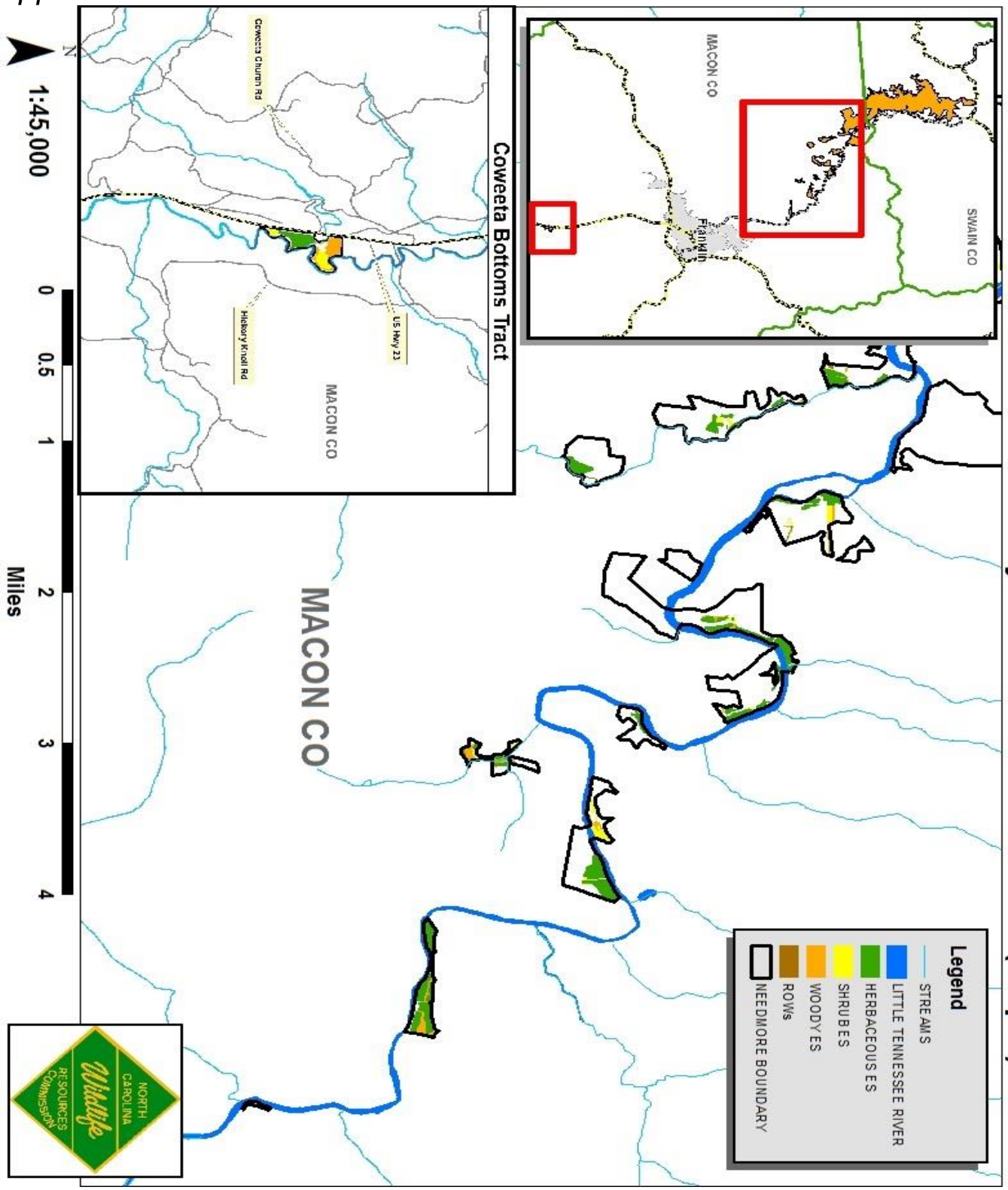

Needmore Game Land- Habitats (Map 2)
Legend
EARLY SUCCESSIONAL
DRY CONIFEROUS WOODLAND
OAK FOREST
COVE FOREST
MAJOR STREAMS
LITTLE TENNESSEE RIVER
FLOODPLAIN FOREST
DEVELOPED
MACON CO
SWAIN CO
Franklin
Coweeta Bottoms Tract
Coweeta Church Rd
US Hwy 23
History Knoll Rd
1:45,000
N
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION

Appendix 17

Needmore Game Land- Early Successional Habitat (Map 1)

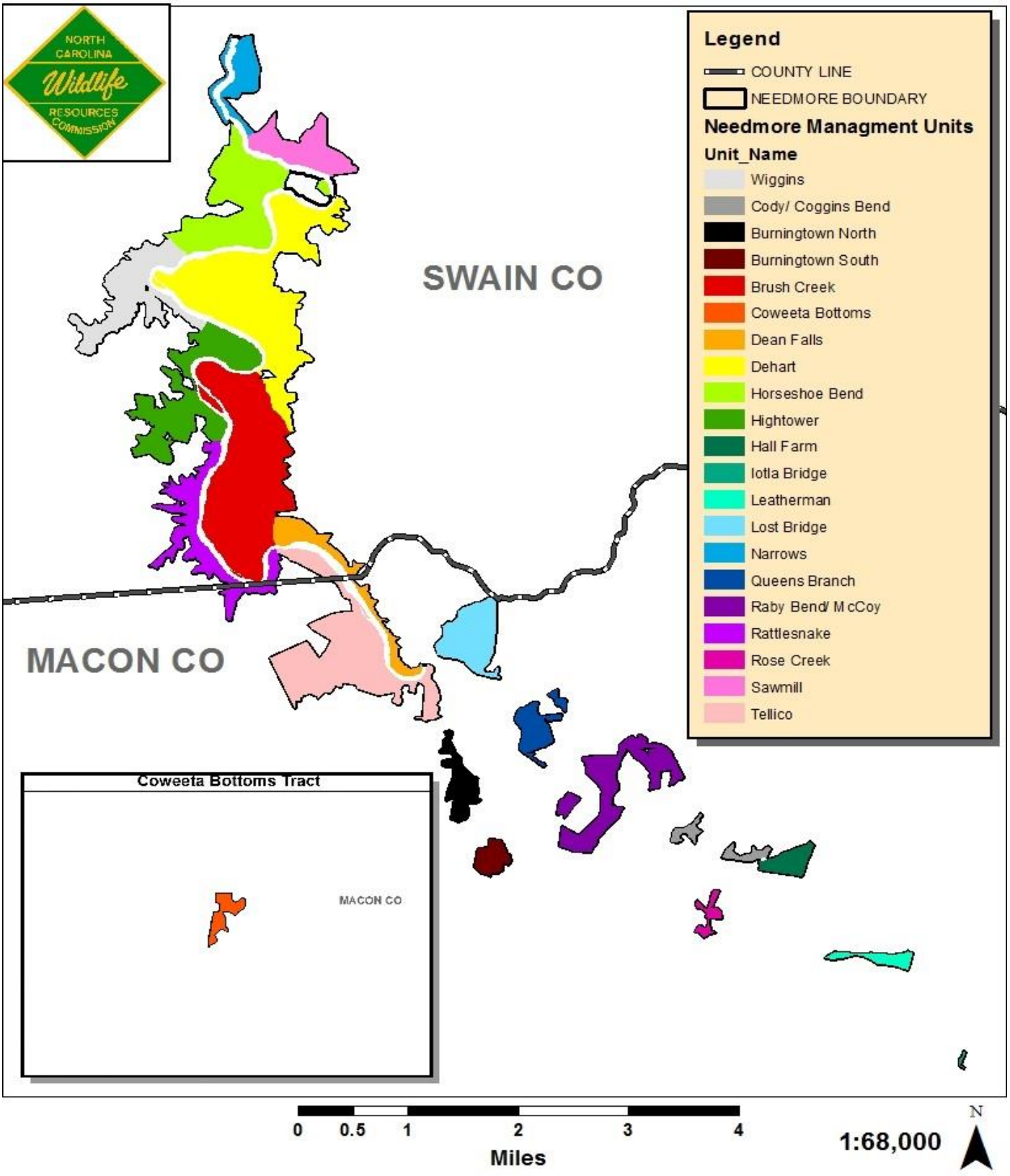


Appendix 18

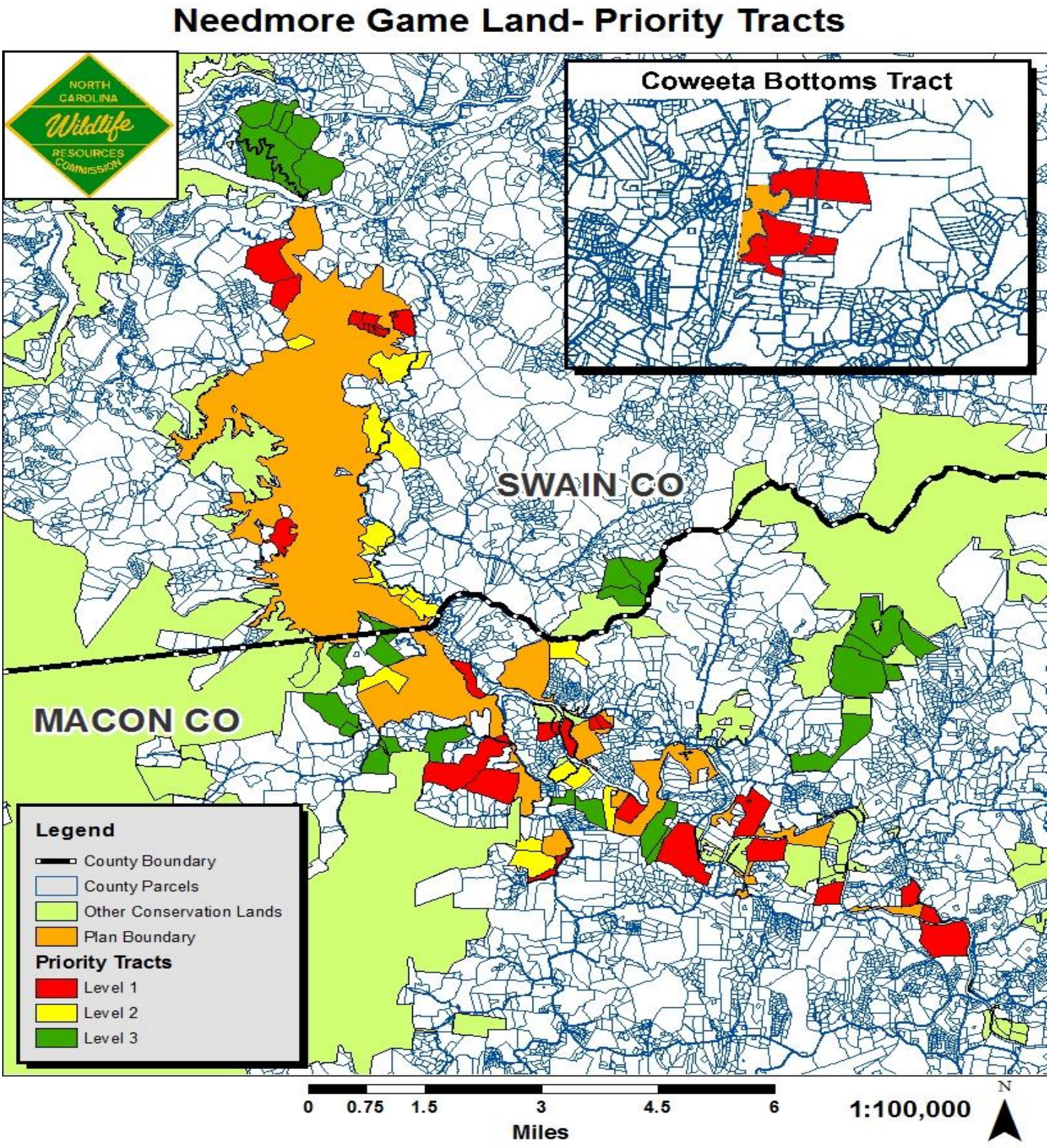

Needmore Game Land- Early Successional Habitats (Map 2)
Legend
STREAMS
LITTLE TENNESSEE RIVER
HERBACEOUS ES
SHRUBES
WOODYES
ROWs
NEEDMORE BOUNDARY
MACON CO
SWAIN CO
Franklin
Coweeta Bottoms Tract
Coweeta Church Rd
US Hwy 23
Hickory Knoll Rd
N
1:45,000
0
0.5
1
2
3
4
Miles
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION

Appendix 19

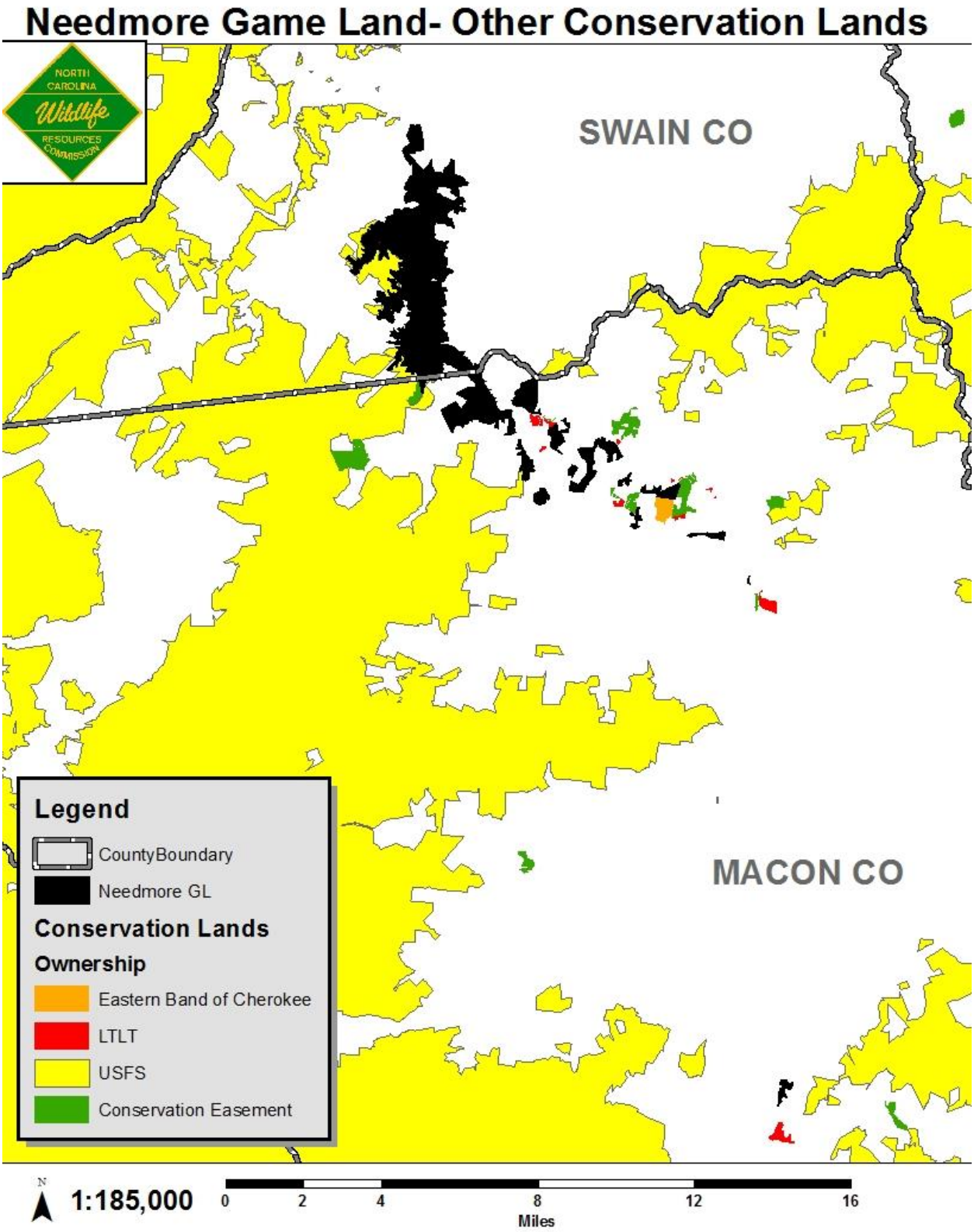
Needmore Game Land- Management Units



Appendix 20

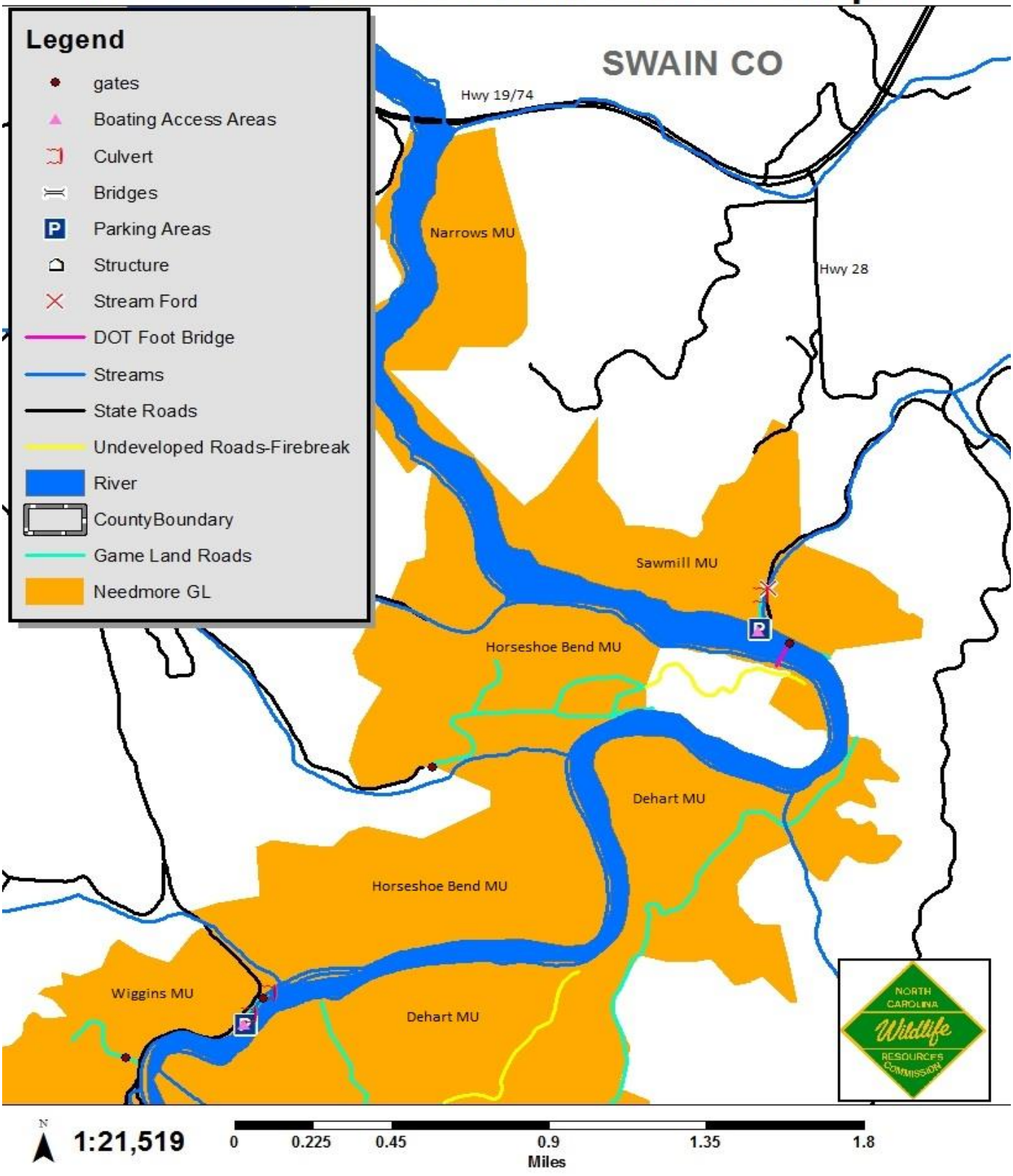

Needmore Game Land- Priority Tracts
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION
Coweeta Bottoms Tract
SWAIN CO
MACON CO
Legend
County Boundary
County Parcels
Other Conservation Lands
Plan Boundary
Priority Tracts
Level 1
Level 2
Level 3
0 0.75 1.5 3 4.5 6
Miles
1:100,000
N

Appendix 21

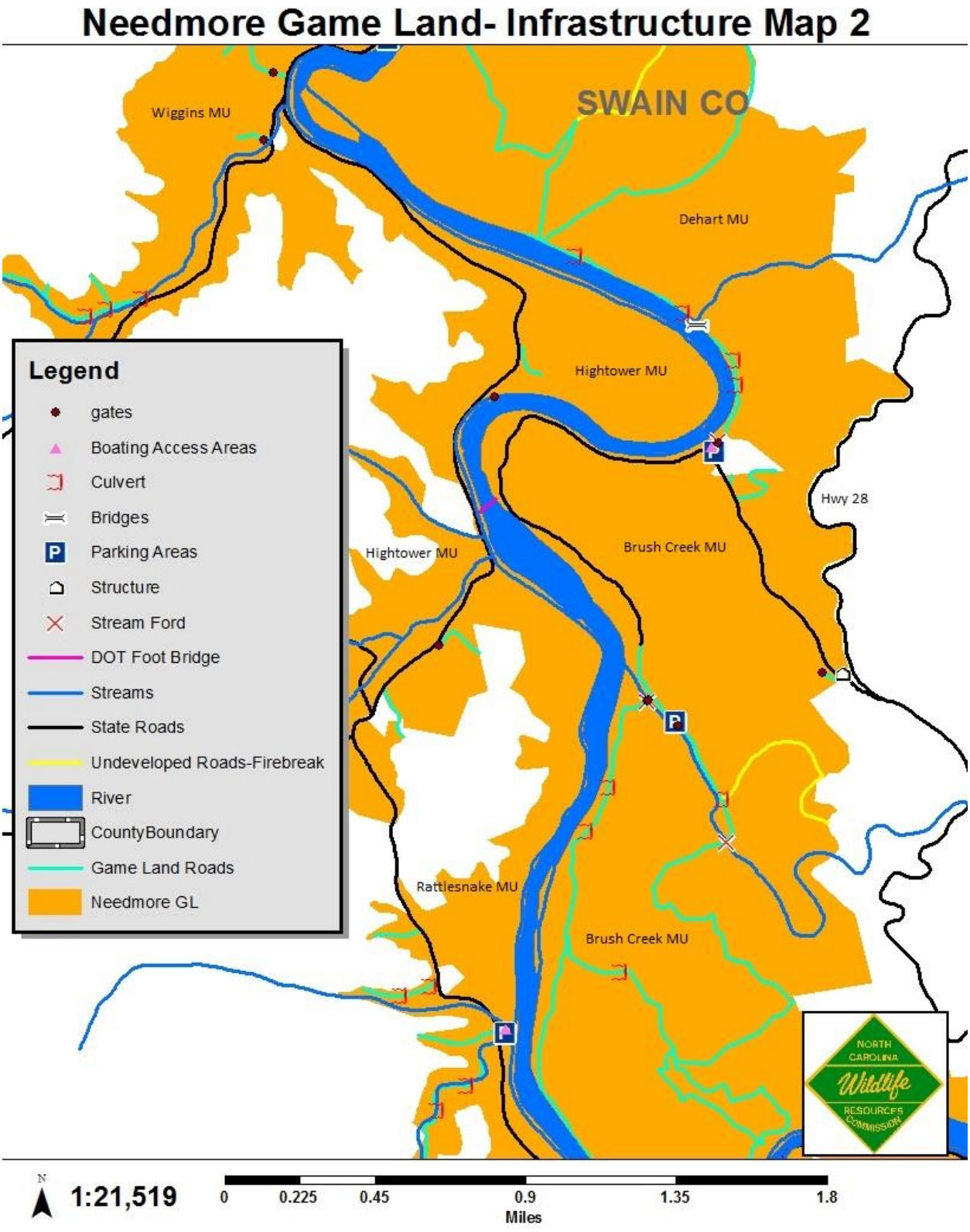

Needmore Game Land- Other Conservation Lands
NORTH CAROLINA
Wildlife
RESOURCES COMMISSION
SWAIN CO
MACON CO
Legend
CountyBoundary
Needmore GL
Conservation Lands
Ownership
Eastern Band of Cherokee
LTLT
USFS
Conservation Easement
N
1:185,000
0
2
4
8
12
16
Miles

Appendix 22

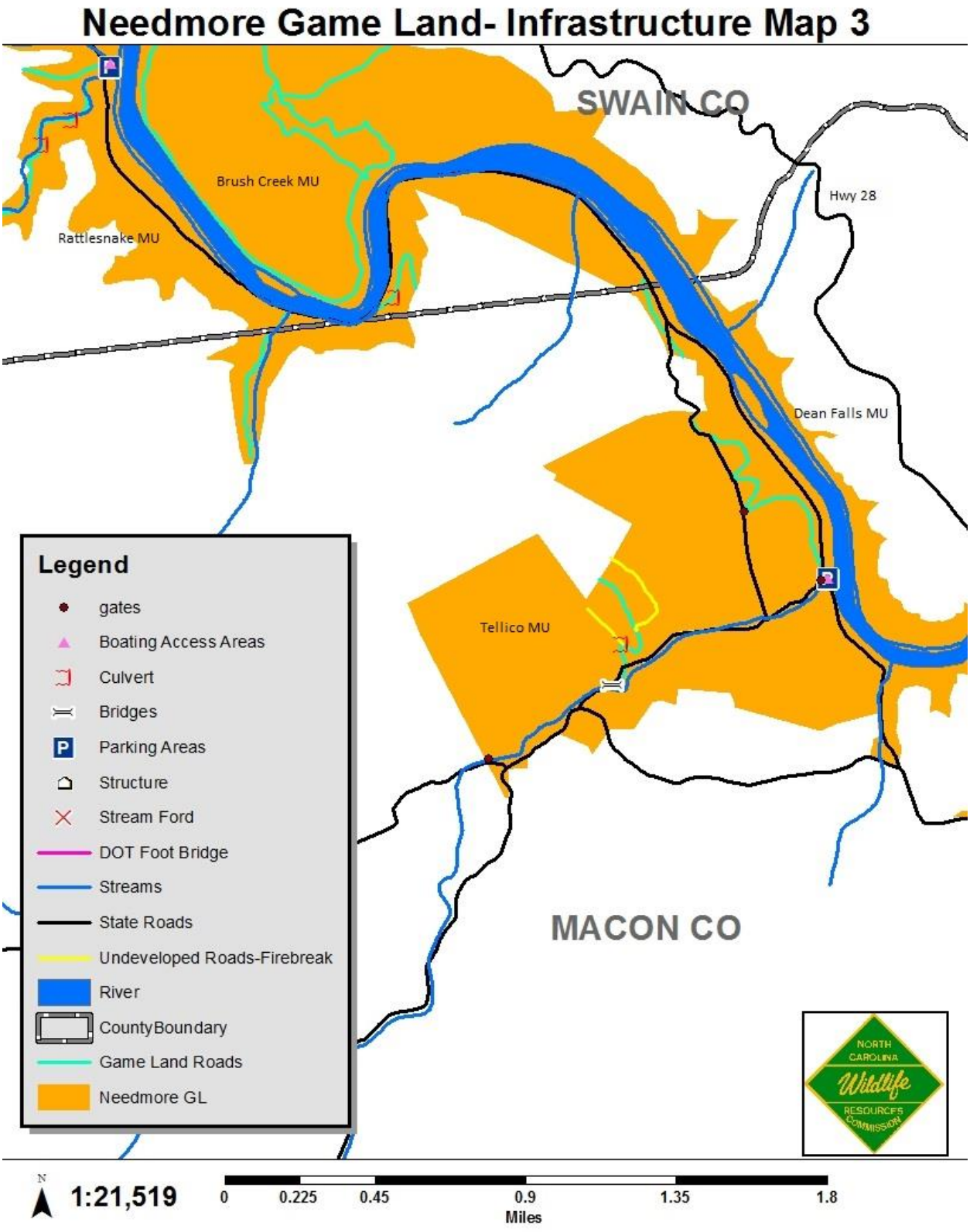
Needmore Game Land- Infrastructure Map 1



Appendix 23

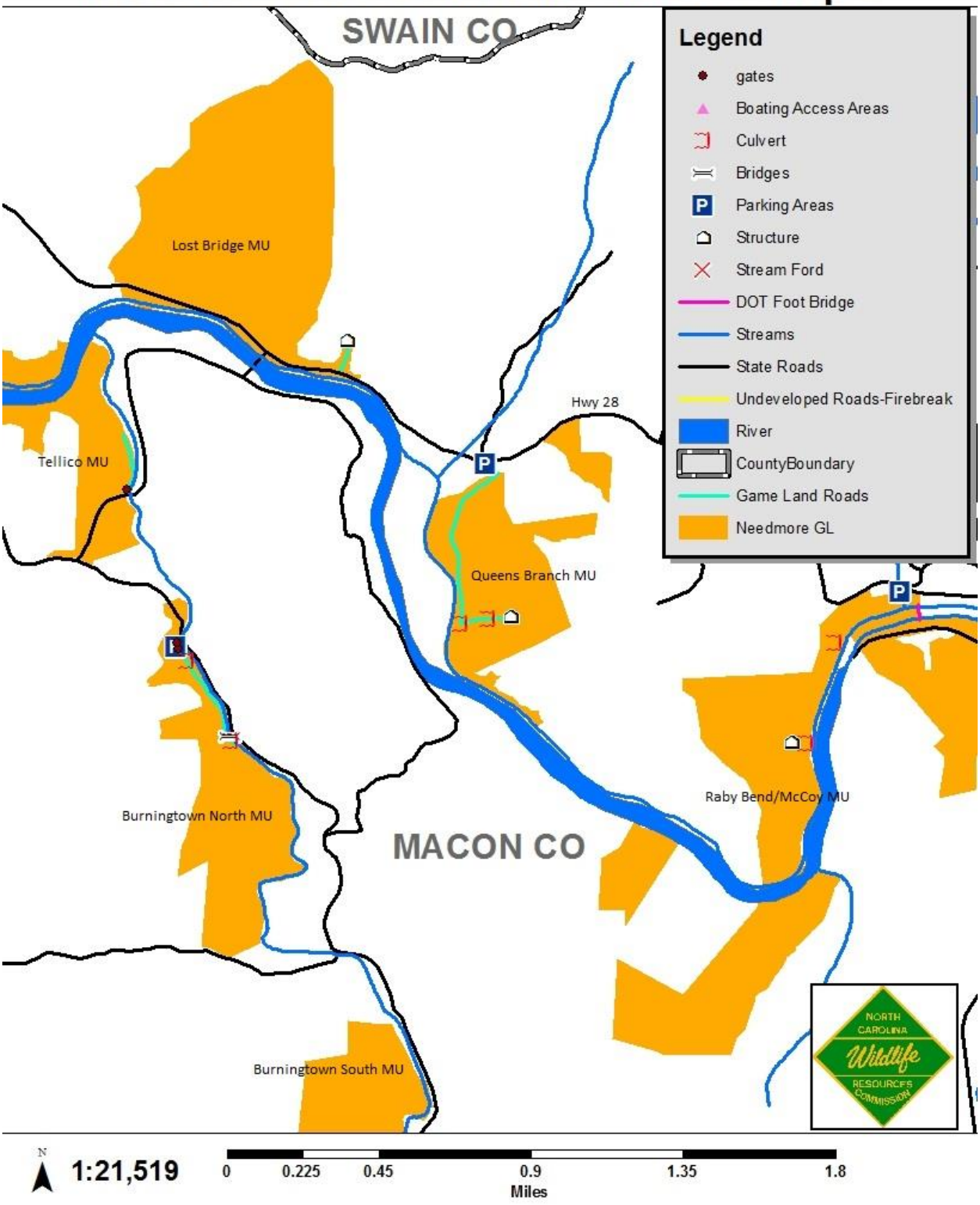

Needmore Game Land- Infrastructure Map 2
SWAIN CO
Wiggins MU
Dehart MU
Hightower MU
Hwy 28
Brush Creek MU
Hightower MU
Rattlesnake MU
Brush Creek MU
Legend
gates
Boating Access Areas
Culvert
Bridges
Parking Areas
Structure
Stream Ford
DOT Foot Bridge
Streams
State Roads
Undeveloped Roads-Firebreak
River
CountyBoundary
Game Land Roads
Needmore GL
N
1:21,519
0
0.225
0.45
0.9
1.35
1.8
Miles

Appendix 24

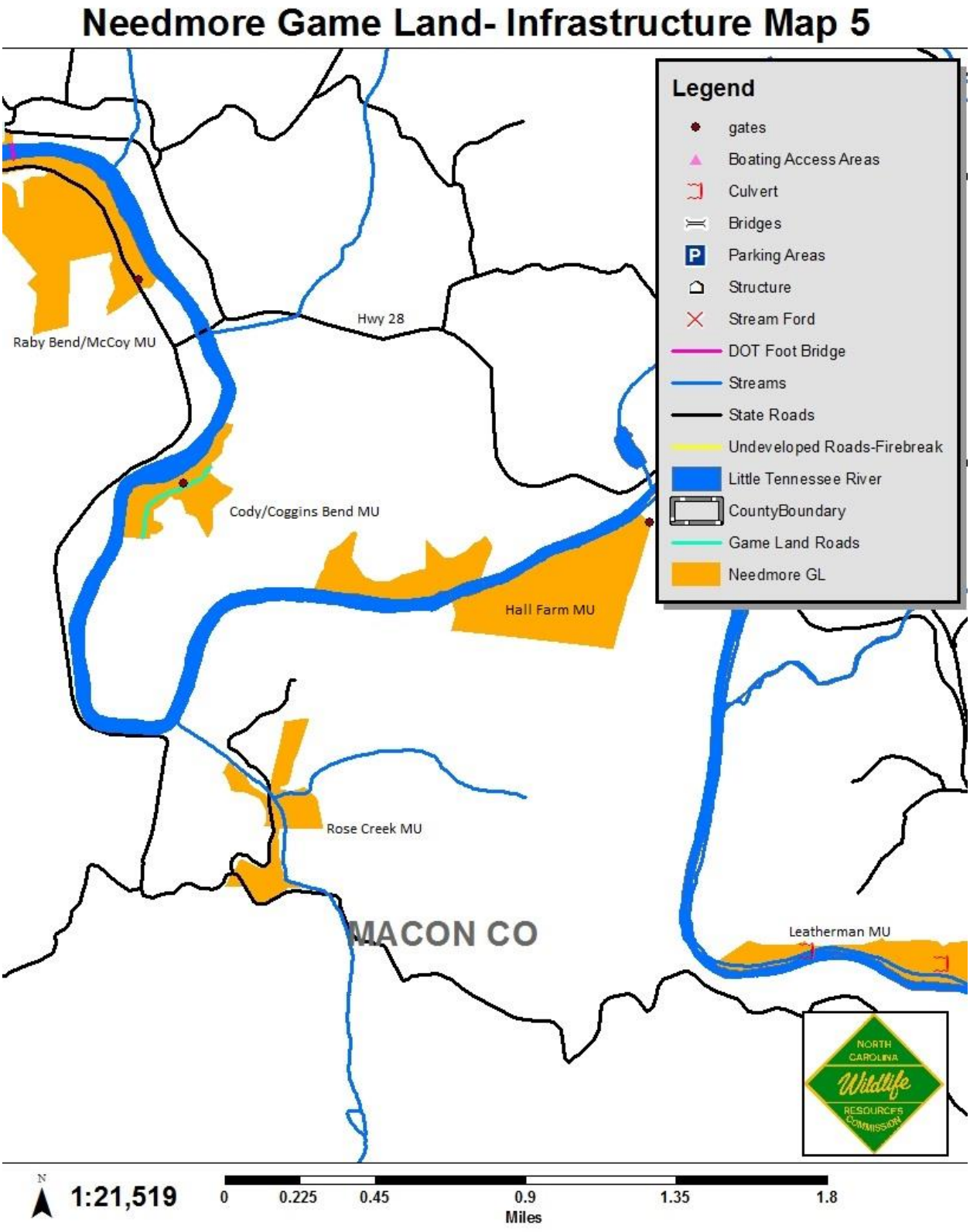

Needmore Game Land- Infrastructure Map 3
SWAIN CO
Brush Creek MU
Rattlesnake MU
Hwy 28
Dean Falls MU
Tellico MU
MACON CO
Legend
gates
Boating Access Areas
Culvert
Bridges
Parking Areas
Structure
Stream Ford
DOT Foot Bridge
Streams
State Roads
Undeveloped Roads-Firebreak
River
CountyBoundary
Game Land Roads
Needmore GL
NORTH CAROLINA Wildlife RESOURCES COMMISSION
N
1:21,519
0
0.225
0.45
0.9
1.35
1.8
Miles

Appendix 25

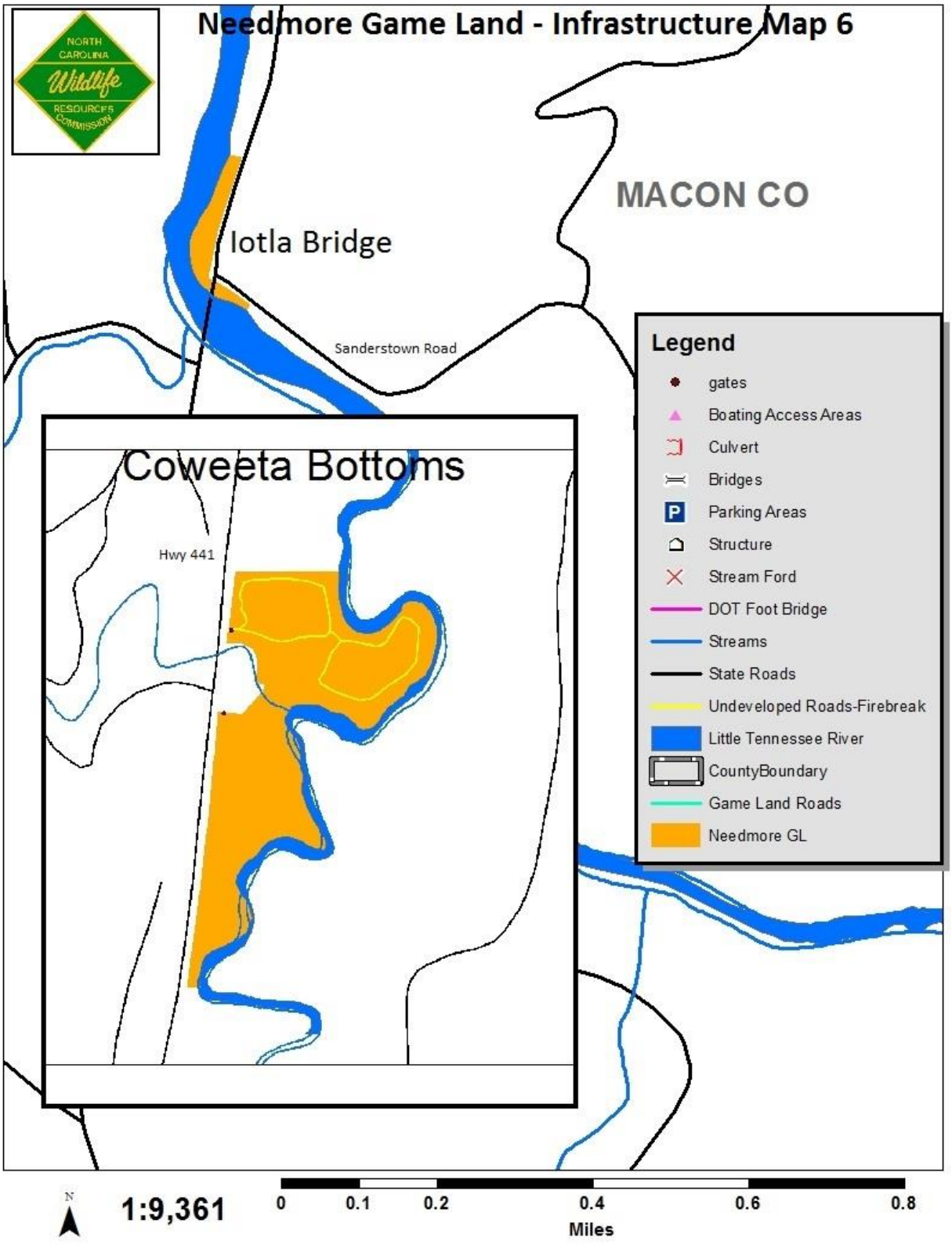
Needmore Game Land- Infrastructure Map 4



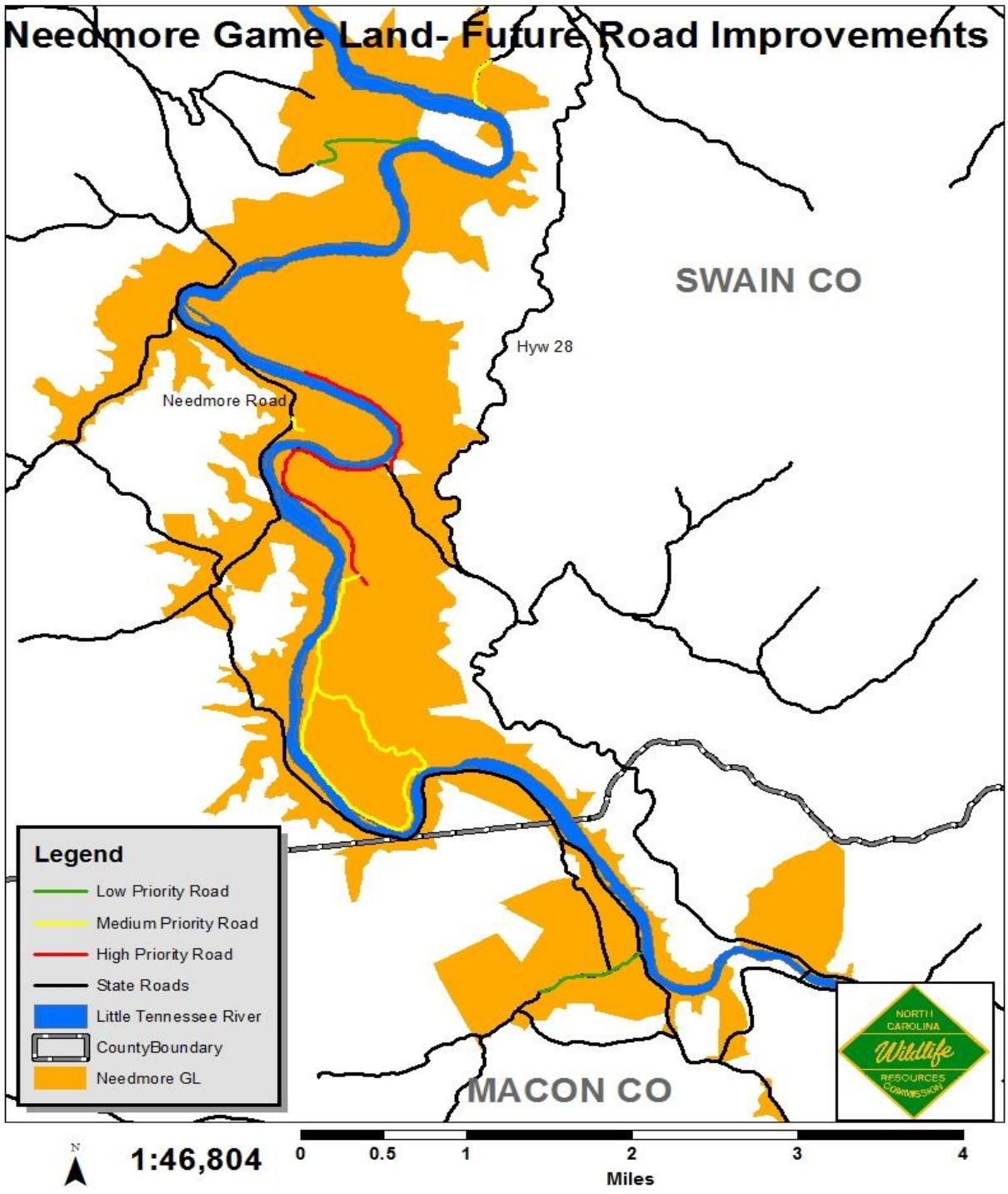
Appendix 26


Needmore Game Land- Infrastructure Map 5
Legend
gates
Boating Access Areas
Culvert
Bridges
Parking Areas
Structure
Stream Ford
DOT Foot Bridge
Streams
State Roads
Undeveloped Roads-Firebreak
Little Tennessee River
CountyBoundary
Game Land Roads
Needmore GL
Raby Bend/McCoy MU
Hwy 28
Cody/Coggins Bend MU
Hall Farm MU
Rose Creek MU
MACON CO
Leatherman MU
NORTH CAROLINA Wildlife RESOURCES COMMISSION
N
1:21,519
0
0.225
0.45
0.9
1.35
1.8
Miles

Appendix 27

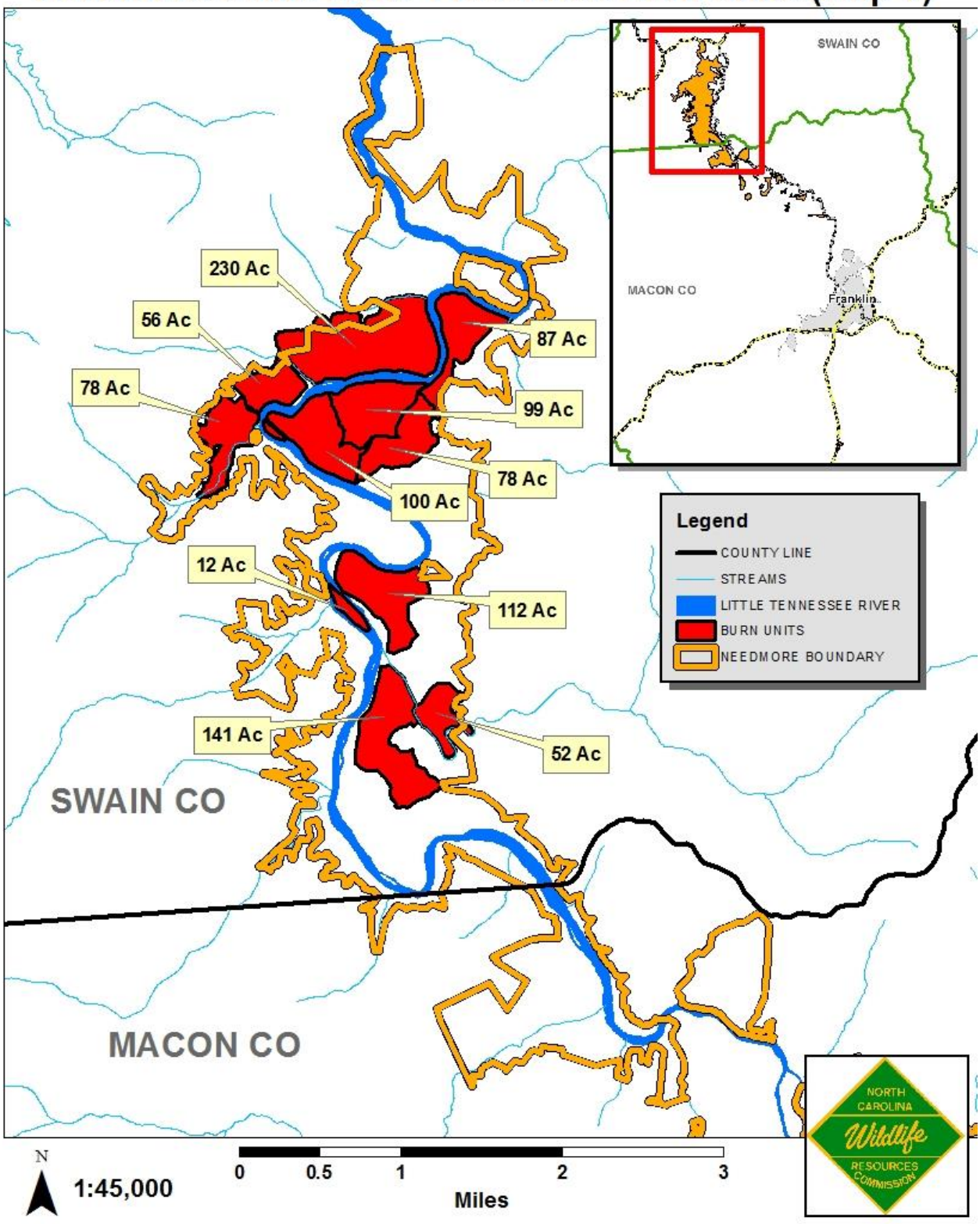

Needmore Game Land - Infrastructure Map 6
NORTH CAROLINA Wildlife RESOURCES COMMISSION
MACON CO
Iotla Bridge
Sanderstown Road
Coweeta Bottoms
Hwy 441
Legend
gates
Boating Access Areas
Culvert
Bridges
Parking Areas
Structure
Stream Ford
DOT Foot Bridge
Streams
State Roads
Undeveloped Roads-Firebreak
Little Tennessee River
CountyBoundary
Game Land Roads
Needmore GL
N
1:9,361
0
0.1
0.2
0.4
0.6
0.8
Miles

Appendix 28


Needmore Game Land- Future Road Improvements
SWAIN CO
Hyw 28
Needmore Road
MACON CO
Legend
Low Priority Road
Medium Priority Road
High Priority Road
State Roads
Little Tennessee River
CountyBoundary
Needmore GL
N
1:46,804
0
0.5
1
2
3
4
Miles

Appendix 29

Needmore Game Land- Prescribed Burn Units (Map 1)



Appendix 30

Administration

PAT MCCRORY
Governor
KATHRYN JOHNSTON
Secretary

April 11, 2016

Secretary Susan W. Kluttz
Department of Natural and Cultural Resources
4601 Mail Service Center
Raleigh, North Carolina 27699-4601

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

Re: Dedication of Portions of the **Needmore Game Land,** Swain and Macon Counties

Dear Secretary Kluttz and Mr. Myers:

Pursuant to Part 42 of Article 2 of Chapter 143B 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 December 27, 2010. The articles were amended to reflect ownership boundary corrections and additions of property to the preserve.

This real property is currently administered by the North Carolina Wildlife Resources Commission and consists of approximately 4,491 acres located in Swain and Macon Counties and composed of:

1. Needmore Game Land Preserve (Primary Area) — 2,342 acres, including special management area of 3 acres
2. Needmore Game Land Preserve (Buffer Area) — 2,149 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 Needmore Game Land Nature Preserve.

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

Nothing Compares™
State of North Carolina | Administration
1301 Mail Service Center | 116 W. Jones Street | Raleigh, NC 27699-1301
Kathryn.Johnston@doa.nc.gov 919 807 2425 T | 919 733 9571 F

The Governor and Council of State have approved the dedication of the State-owned lands hereinabove described as the Needmore 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 5th of January, 2016.

Sincerely,

Kathryn Johnston

KJ

CONSENTED AND AGREED TO:

Secretary Susan W. Kluttz
Department of Natural and Cultural Resources

Gordon S. Myers, Executive Director
N. C. Wildlife Resources Commission

THIS ALLOCATION IS MADE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

1. **Definitions:** As used in this Letter, the terms "natural area" and "nature preserve" have the same meaning as contained in North Carolina General Statutes 143B-135.254.

2. **Dedication:** Pursuant to North Carolina General Statutes 143B-135.264, all State-owned lands lying within the above designated area are hereby dedicated as nature preserves for the purposes provided in the Nature Preserves Act, as amended, and other applicable law, and said State-owned land shall be held, maintained, and used exclusively for said purposes.

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

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

5. **Management Areas:** For the purposes of management, the preserve shall be considered to consist of a Primary Area (approximately 2,339 acres), a Buffer Area (approximately 2,149 acres), and a Special Management Area (3 acres) as more particularly described in Exhibit A, attached hereto and by this reference made a part hereof. The Primary Area consists essentially of the exceptionally significant aquatic habitat and its adjoining high-quality and restorable natural communities, including any associated rare species. The aquatic habitat contains the federally listed mussels: the Appalachian elktoe (*Alasmidonta raveneliana*) and littlewing pearlymussel (*Pegias fibula*), and the spotfin chub (*Erimonax monacha*), a federally listed fish, as well as other state-listed and rare aquatic species. High-quality and restorable natural communities include Montane Alluvial Forest, Rocky Bar and Shore, Pine-Oak/Heath, Montane Oak-Hickory Forest, Montane Acidic Cliff, Montane Mafic Cliff, and Low Elevation Seep.

   The Primary Area is deemed by the Secretary of the North Carolina Department of Natural and Cultural Resources to qualify as an outstanding natural area under statutory criteria for nature preserve dedication (G.S. 143B-135.260) and further serves all of the public purposes for a dedicated preserve as stated in Administrative Rules 15 NCAC 12H.0301(b).

   The Buffer Area, which contributes to the management and protection of the Primary Area, consists of less mature forests and early successional areas.

6. **Rules for Management:**

   a. Character of Visitor Activity: The principal activities in the preserve shall be hunting, fishing, trapping, walking, research, and observation. These activities may 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 provided in this Dedication or unless necessary to carry out the purposes of the Preserves. Prohibited activities include, but are not limited to, commercial development; commercial silviculture; agriculture and grazing; gathering of plants or plant products for purposes other than approved research; the removal, disturbance, molestation, or defacement of minerals, archaeological and natural resources; and those activities specifically restricted in these Articles. There shall be no fires, except as necessary for ecological management of the preserve, for wildfire hazard reduction to the surrounding community, 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, scientific research, and preserve management. Exhibits, programs and printed materials may be provided by the Custodian. The Custodian may create and maintain nature trails, overlooks, boardwalks, and primitive campsites adequate to promote the permitted use of the preserve. Guardrails, fences, steps, bridges, and boardwalks may be provided when appropriate. The Custodian reserves the right to erect structures necessary to protect the preserve from unwanted or excessive visitor traffic and structures to restrict visitor access to sensitive environmental resources.

d. 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 for management purposes, such as service paths for patrol, fire control, right-of-way maintenance, and other management activities. The Custodian may maintain roads presently existing within the preserve. 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.

e. Other Structures and Improvements: Buildings or facilities other than those defined in this document shall not be erected by the Custodian within the preserve, except as may be consistent with the purposes of the preserve as stated herein. Site selection shall be consistent with this dedication.

f. Research and Collecting Permits: Any person wishing to engage in scientific research or collecting shall first secure written permission from the Custodian.

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. Excavation: There will be no mining, drilling, removal of topsoil, sand, gravel, rock, minerals, or other material, nor any change in topography or surface hydrology of the preserve. Exceptions for ecological restoration to more natural conditions, consistent with the Management Plan, may be made in consultation with the North Carolina Natural Heritage Program.

i. Water Level Control: The purpose of water level control shall be to maintain the Preserves' natural water regimes. Water levels that have been altered by human activities 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. Millponds are an example of situations in which water levels have been historically managed.

j. Bringing in Flora and Fauna: No exotic flora and no animals except leashed dogs and cats, hunting dogs as permitted in game lands, horses on trails designated for

horseback riding, or animals being reintroduced shall be brought into the preserve. Any reintroduction will be of species native to the natural community and shall be done according to an approved resource management plan.

k. Wildfire Control: Wildfires may mimic natural processes historically occurring in an ecosystem on a landscape level. When the extent of a wildfire does not threaten human life or structures, it may be allowed to burn with minimal control. If wildfire control is necessary, firebreaks may need to be established; when possible, existing roads and firebreaks will be utilized. When new firebreaks need to be created, environmentally sensitive areas will be avoided when possible. Old firebreaks that 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.

l. Disturbance of Natural Features: The cutting or removal of trees, dead or Disturbance of Natural Resources: The cutting or removal of trees, dead or alive, or the disturbance of other natural resources is prohibited except as necessary for removal of hazards to visitors, control of disease or insect infestations that would damage or reduce the significance of the preserve, restoration after severe storm damage, trail clearance and maintenance, or for purposes of maintenance or restoration of natural communities or rare species populations as stipulated in the preserve management plan and that which is consistent with the purposes of these Articles. If needed to maintain the presence of the Montane Oak-Hickory Forest and Pine-Oak/Heath Forests, silvicultural practices (e.g., prescribed burning, thinning, two-age methods) may be employed. Plans for maintenance of this community type will be submitted to the Natural Heritage Program for review. 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 Primary Areas defined along the Needmore Tract were protected through fee simple acquisition by the State of North Carolina and deed restrictions were imposed by the Ecosystem Enhancement Program. These deed restrictions are recorded in Swain County, NC, Register of Deeds, January 16, 2004, Deed Book 285, Pages 992-995 and in Macon County, NC, Register of Deeds, January 16, 2004, Deed Book S-27, Pages 2098-2105.

m. 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 nontarget portions of the ecosystem. Prescribed burning is essential to some ecosystems and may be used where natural wildfire historically kept understories open and promoted herbaceous diversity.

n. 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.

o. Management Plan: The Primary Custodian shall be required to prepare and submit for approval to the Secretary of the Department of Natural and Cultural Resources a management plan for the preserve. 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. The dedicated nature preserves will continue to be subject to other applicable regulations within NCAC Title 15, Chapter 12. 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 Primary Custodian, in addition to providing for the buffer functions in relation to the Primary Area. 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.

    a. Managing 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.)

    b. Maintaining habitat connectivity and continuity among Primary Areas.

    c. Providing for habitat diversity.

    d. Managing the needs of rare animal and plant species populations occurring within the Buffer Area.

    e. Protecting 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, Modification, and Termination:** Any changes to this Dedication must be made in accordance with the provisions of North Carolina General Statutes 143B-135.264, which require the approval of the Governor and the Council of State.

EXHIBIT A
NEEDMORE GAME LAND
DEDICATED NATURE PRESERVE

COUNTY: Swain, Macon PHYSIOGRAPHIC PROVINCE: Mountains

TOPOGRAPHIC QUADS: Wesser 7.5'

SIZE OF AREA: ca. 4,491 acres total (primary area 2,342 acres, including special management area of 3 acres; buffer area of 2,149 acres)

OWNER/ADMINISTRATOR: State of NC, Wildlife Resources Commission

LOCATION: Both sides of the Little Tennessee River, from the bridge on US 19/74 upstream to the mouth of Burningtown Creek, around river mile 96. Several additional disjunct parcels lie upstream of the contiguous portion for several miles. Access is by Needmore Road, Lower Needmore Road, Sawmill Creek Road, and numerous others, but some portions do not have public access across private lands. See Map 1.

DESCRIPTION: The Needmore Game Land consists of a long stretch of floodplain and adjacent uplands along the Little Tennessee River. It provides many miles of riparian buffer along the Little Tennessee River and the lower reaches of its tributaries. The Little Tennessee River is a nationally significant aquatic site, containing a large collection of rare fishes and mussels. Among them are the Appalachian elktoe (*Alasmidonta raveneliana*), littlewing pearlymussel (*Pegias fibula*), and the spotfin chub (*Erimonax monacha*), all globally endangered species which are federally listed. The Tennessee pigtoe (*Fusconaia barnesiana*) and slippershell mussel (*Alasmidonta viridis*) are also globally rare and are state listed. Several other aquatic species are extremely rare in the state. Along most of the dedicated area, the river is wide and swift, with alternating pools, bedrock shoals, and cobble bars. The channel divides in several places to produce islands. At the downstream end of the dedicated area the river is impounded by Fontana Lake.
The river floodplain ranges from narrow bands to broader areas up to 0.1 mile wide. It includes a diversity of alluvial landforms, including terraces of several different elevations, steep banks, sloughs, pools, bedrock islands, and gravel bars, with relief of 10 feet or more above the river. A number of fields are present in wider areas, some recently cultivated, others long abandoned and containing successional herbaceous vegetation or young trees. Intact Montane Alluvial Forest community patches in varying condition are interspersed. Collectively, they represent by far the most intact and most diverse occurrence of this rare community type. In most areas, they are dominated by tulip poplar (Liriodendron tulipifera), red maple (*Acer rubrum*), and sycamore (*Platanus occidentalis*), sometimes with abundant black walnut (*Juglans nigra*). In the best developed large patch, the forest also includes shingle oak (*Quercus imbricaria*), red oak (*Quercus rubra*), cherrybark oak (*Quercus pagoda*), black cherry (*Prunus serotina*), silverbell (*Halesia tetraptera*), and other species. The understory is generally dominated by ironwood (*Carpinus caroliniana*). The shrub and herb layers vary widely, with parts having abundant cane (*Arundinaria gigantea*), beds of dog hobble (*Leucothoe fontanesiana*), or diverse herb beds with open spicebush (*Lindera benzoin*) or yellowroot (*Xanthorhiza simplicissima*). Widespread floodplain species such as river oats (*Chasmanthium latifolium*) and wild rye (*Elymus virginicus*) mix with species typical of rich cove forests. As in most alluvial communities, invasive non-native plants are common. In most of the site, the Montane Alluvial Forest is not altered hydrologically. At the downstream end of the site, where the river is impounded, a portion of the community is affected by the high water. In part, this affects only the lower spots in the community, with the higher portions still appearing to be in good condition.

Distinctive Rocky Bar and Shore communities occur on the edges of the river and on islands and shoals in places. The shallowest shoals have bar communities dominated by water-willow (*Justicia americana*). Relatively stable gravel bars have young sycamore and other species characteristic of the Montane Alluvial Forest. One scoured bedrock island has a distinctive shrub and herbaceous community.

A few sloughs have distinctive wetland vegetation, dominated by red maple (some apparently swamp red maple – *Acer rubrum* var. *trilobum*), sycamore, and green ash (*Fraxinus pennsylvanica*). They have more water-tolerant herb layers, including some bur-reed (*Sparganium americanum*), three-way sedge

(*Dulichium arundinaceum*), and arrowhead (*Peltandra virginica*). A couple of blocked sloughs are even wetter, and support Floodplain Pool communities with permanent water. An elongated Floodplain Pool with year-round standing water and little vegetation occurs in the floodplain near Raby Bend. The pool extends over a hundred feet and reaches 1-2' deep. There is almost no vegetation in the pool, and it appears to be natural in origin. The pool sits at the toe of slope to the south, and small rock outcrops border the pool in places. The pool is surrounded by acidic alluvial forest dominated by mountain doghobble.

Most of the uplands are typical mountainous terrain, with broad upland ridges, narrow spur ridges, steep side slopes, and narrow to broad ravines and coves. Steep bluffs are present on the outside of river bends, and the north end of the site is a steeper gorge. The most abundant natural community in the uplands is Montane Oak—Hickory Forest, covering most of the open slopes and ridges. It is dominated by a mix of trees that includes white oak (*Quercus alba*) as a major component. Scarlet oak (*Quercus coccinea*), chestnut oak (*Quercus montana*), red oak (*Quercus rubra*), mockernut hickory (*Carya alba*), and red maple (*Acer rubrum*) are common. Some portions are a drier subtype that includes more characteristically Piedmont species such as southern red oak (*Quercus falcata*) and a variety of different herbs.

The more sheltered slopes and coves mainly support Acidic Cove Forest communities. They are dominated by a varying mix of trees that includes tulip poplar, red maple, red oak, Canada hemlock (*Tsuga canadensis*), and sweet birch (*Betula lenta*). Generally they have dense shrub layers of rhododendron (*Rhododendron maximum*) or dog hobble, and few herbs. Less often they have few shrubs, and have dense herb layers of Christmas fern (Polystichum acrostichoides). A few limited areas of Rich Cove Forest are present, indicated by the addition of characteristic trees such as basswood (*Tilia americana* var. *heterophylla*), and a diversity of characteristic herbs. Rich Cove Forests were probably once fairly abundant, but most have been cleared for fields, which occupy most of the wider coves.

The driest parts of the uplands, on south- and west-facing slopes, support Pine--Oak/Heath communities (of the distinctive and less common Low Mountain Pine Forest type). A variety of pines occur in these communities, including pitch pine (*Pinus rigida*), Virginia pine (*Pinus virginiana*), Table Mountain pine (*Pinus pungens*), and shortleaf pine (*Pinus echinata*). Hardwoods, especially scarlet oak, chestnut oak, red maple, and black gum (Nyssa sylvatica), are also common. These communities are dependent on periodic fire to maintain their natural composition. Most have not burned, and have dense shrub layers of mountain laurel (Kalmia latifolia), but open patches still have the characteristic herbs that could be expected to increase with burning. These communities have had heavy impacts by southern pine beetles, killing most of the pines which, in the absence of fire, have not regenerated. Most of the beetle-killed patches are not included in the primary area, but some patches in the primary area have remaining mature pines or have regenerated stands of young pines.

Several communities occur in small patches, including Montane Acidic Cliff, and a small glade-like Montane Mafic Cliff. Also notable is a series of Low Elevation Seep communities scattered through the site. These wetlands occur in small pockets along the base of the bluff. They have some trees rooted within them, especially red maple, white oak, and silverbell. Parts have alder (*Alnus serrulata*) as a distinct tall shrub layer. Most parts have a dense herb layer that includes cinnamon fern (*Osmunda cinnamomea*), netted chain fern (*Woodwardia areolata*), sedges (*Carex* spp.), cone flower (*Rudbeckia laciniata*), bee balm (*Monarda didyma*), meadow-rue (*Thalictrum clavatum*), and other wetland species.

Several rare species have been found in the site, in addition to those in the river. Of greatest note is Virginia spiraea (Spiraea virginiana), on the river bank in a couple of places. Autumn coral-root (*Corallorhiza odontorhiza*) and Huger's carrionflower (*Smilax hugeri*) occur in upland areas. Tawny crescent (*Phyciodes batesii macronensis*) has been reported along Lower Needmore Road and may be elsewhere in the site.

BOUNDARY JUSTIFICATION: The primary area includes most riparian areas, along with upland areas where communities are in good condition. All areas within 300 feet of the Little Tennessee River and the major tributaries that contain rare aquatic species are dedicated as primary areas to protect the water quality in the streams. An exception is made for existing open fields; these are prior disturbances that may be maintained within their current footprint, with the exception of the 100 feet closest to the river. On the Raby Farm tract, a 50-foot minimum riparian zone is allowed for the duration of the current hay meadow

lease contract, but will revert to a 100 foot width with a change in the leasee. Along other tributary streams, 100 feet along each side are dedicated as primary area to protect water quality. Beyond the 300 foot and 100 foot zones, the primary area includes only the more mature forest areas, uncommon communities, and rare species locations. Along the river, a botanically diverse old field grassland is being maintained in open condition. This area, within the 100 feet riparian zone, is mapped as a special management area to allow for its continued management as open grassland. WRC indicated plans to plant a thicker riparian zone of native canopy vegetation along the river itself, allowing it to thin out away from the river into a savannah-type habitat, maintaining some of the warm season grass habitat. The rest of the game land is dedicated as buffer, to provide additional protection to water quality, to buffer the primary areas from detrimental edge effect, and to provide additional habitat for wider-ranging wildlife.

MANAGEMENT AND USE: The dedicated nature preserve is managed as game land, for public hunting, wildlife viewing, and passive recreation.

Prescribed burning is recommended on the upland portions of the site. The pine communities in particular need fire to reverse significant deterioration. The Montane Oak—Hickory Forests also would benefit from low-intensity fire, and burning may prove crucial in the long run to prevent deterioration.

The pine communities that have been heavily disturbed by southern pine beetles may need restoration work beyond burning to allow pines to regenerate. This may include mechanical treatment of hardwoods and shrubs, and possibly planting pines where seed sources have been lost.

Control of invasive exotic plants is encouraged, especially in the floodplain and seep areas where they are dense. Stilt-grass (*Microstegium vimineum*), Japanese honeysuckle (*Lonicera japonica*), murdannia (*Murdannia keisak*), multiflora rose (*Rosa multiflora*), and Chinese privet (*Ligustrum sinense*) are dense enough to cause ecological damage in some areas and have the potential to spread. Kudzu (*Pueraria lobata*) patches are present and have invaded forests in some places. Though not noted, Japanese knotweed (*Reynoutria japonica*) has the potential to appear and to be a threat to bars and possibly other floodplain communities. Sericea (*Lespedeza cuneata*) is not presently a problem but has proved invasive in burned communities elsewhere, so it should be watched for. A number of other non-native plants are present in small numbers but do not appear to represent significant threats at present. Non-native pests, especially hemlock woolly adelgid, are also a great concern. Control of non-native species that are causing damage or have the potential to cause damage is recommended; however, control methods need to be specific to the target species and designed to avoid harm to native species or to the communities in which they occur.

Forest roads are a potential concern in the site. In places, roads run very near the river or streams. Erosion of unstable roads is a threat to water quality in the river.

It has been recommended that the dedication document allow for the selective and manual harvest of river cane for cultural purposes at Coweeta Bottoms. The terms would allow the cane to be harvested within the riparian zone by selecting single stalks, and occasionally burning the cane to encourage new growth.

Appendix 31

North Carolina Wildlife Resources Commission
Game Lands Use Evaluation Procedure

I. PURPOSE

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

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

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

II. ENABLING LEGISLATION

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

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

III. APPLICATION OF PROCEDURE

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

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

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

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

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

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

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

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

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

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

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

IV. DEFINITIONS

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

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

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

V. DETERMINING APPROPRIATE USE

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

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

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

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

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

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

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

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

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

VI. DETERMINING COMPATIBILITY

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

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

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

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

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

roads, parking areas, facilities)?

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

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

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

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

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

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

VII. EVALUATION

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

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

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

EXHIBIT 1

APPROPRIATE USE DETERMINATION

Property Name: _____

Requested or Considered Use: _____

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

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

Determination (check one below):

_____ Appropriate _____ Not Appropriate

Comments:

Property Manager: _____ Date: _____

Regional Supervisor: _____ Date: _____

EXHIBIT 2

COMPATIBILITY DETERMINATION

(*Use as much space as needed*)

Property Name: _____

Requested or Considered Use: _____

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

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

Determination (Check one below):

_____ Compatible _____ Not Compatible

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

Justification/Comments:

Property Manager: _____ Date: _____

Regional Supervisor: _____ Date: _____