Green River Game Land Management Plan

2015 – 2025

NC WILDLIFE'S CROWN JEWELS

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

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

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

Game lands include:

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

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

North Carolina Wildlife Resources Commission staff 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 Green River Game Land, 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 on Green River Game Land. The successful implementation of the plan will depend on the continued feedback and support from all interested parties.

PLAN COLLABORATIVE TEAM MEMBERS

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EXECUTIVE SUMMARY

Green River Game Land (GRGL) contains 14,331 acres and lies along the Blue Ridge Escarpment in Henderson and Polk counties. The game land is owned by the State of North Carolina and the North Carolina Wildlife Resources Commission (NCWRC) is the primary custodian. The game land was originally purchased in the early 1950s with additional tracts added through 2008. GRGL is a popular destination for hunters, fishermen, and wildlife watchers in addition to outdoor recreational enthusiasts such as hikers, kayakers, swimmers, and tubers. Important game species include deer, wild turkey, and trout and early successional bird species are popular with birders. The game land is 97% forested with oak forests predominating (67%). The Green River flows through approximately 14 miles of the game land. Fifteen endangered, threatened, or rare species are found on GRGL. Management goals include restoring a diversity of habitat types and forest age classes through science-based land management in order to ensure that a diversity of wildlife species are conserved, maintaining popular sport fish and game species at appropriate levels, providing quality habitat for endangered, threatened, and rare species, and providing sufficient infrastructure and opportunity to allow all users a quality experience while on the game land with minimal habitat degradation and minimal conflict among user groups. To ensure these goals are met, the NCWRC will monitor wildlife and fish species and users of the game land, secure funding to accomplish management goals, acquire additional properties as they become available, maintain and develop regulations that promote sustained use of natural resources, and develop relationships with conservation partners that help meet management goals.

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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 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 or 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 was established in 1987 and the Clean Water Management Trust Fund in 1996. These funds provided money for the fee simple acquisition of select properties, many of which have been incorporated into the Game Lands Program. These Funds greatly compensated for the loss of game lands leased from the private sector. Currently, approximately 2 million acres are enrolled in the Game Lands Program.

With the Wildlife 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. Administration of the new Game Lands Program was assigned to the Division of Wildlife Management. Depot locations with equipment and habitat development crews were established and strategically located in the vicinity of all game lands in the state. All law enforcement on these properties was 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 and 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 Green River Game Land (GRGL) to implement the NCWRC Strategic Plan and accomplish game land program objectives in a timely and efficient manner. The previous game land plan for GRGL was produced in 1995 and therefore, it is out-of-date (N.C. Wildlife Resources Commission 1995). Many new tracts have been added to GRGL since 1995. In addition, the NCWRC created the North Carolina Wildlife Action Plan (NCWAP) which provides direction for those species which are not typically hunted or fished (N.C. Wildlife Resources Commission 2005). This plan is currently undergoing revision, which is expected to be complete by 2015. Finally, GRGL has seen increased use by both traditional and other recreational users leading to a need to address potential issues. It is therefore timely to address new challenges and opportunities with a new and comprehensive game land management plan.

The plan was developed with input from NCWRC staff as well as input from external agencies, organizations, and individuals that have interest in or use the game land to ensure a comprehensive management program is administered on GRGL. The successful implementation of this plan will depend on the continued feedback and support from all staff and stakeholders. The GRGL plan will focus on a 10 year planning horizon. Our staff will review and amend the plan as needed.

REGIONAL CONTEXT

Mountain Ecoregion/Northern Mountains Work Area

Green River Game Land lies within the NCWRC Mountain Ecoregion and the Northern Mountains work area (Appendix 1, Map 1). This work area includes 20 counties or portions of counties within the Blue Ridge Mountains and along the transition zone between the Blue Ridge Mountains and the Piedmont. Approximately 4,200 mi^2 of the work area lies within the Blue Ridge physiographic province (Griffith et al., 2002). The remaining 2,690 mi^2 are contained within the Piedmont physiographic province. The work area contains portions or all of the following river basins: Broad (998 mi^2), Catawba (1,594 mi^2), French Broad (1,433 mi^2), New (753 mi^2), Roanoke (15 mi^2), Watauga (205 mi^2), and Yadkin (1,901 mi^2). The work area contains 13 game lands consisting of approximately 415,991 acres. Approximately 97% of game land acreage within the work area is contained in the Blue Ridge physiographic province, with the remainder in the Piedmont province (Griffith et al., 2002; Appendix 1, Map 1).

The State of North Carolina, with the NCWRC as the primary custodian, owns in fee simple 66,641 acres of game lands within the Northern Mountains work area. Approximately 347,504 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 1,846 acres of game lands are leased from other governmental agencies or the private sector. The work area also contains 13 public boating access areas, 50 public fishing access areas, and 3 fish hatcheries. Depots within the work area are located in Burnsville, Marion, Morganton, and Traphill (Appendix 1, Map 1). Seventeen permanent staff under the direction of an Ecoregion supervisor are stationed in the Northern Mountains work area. Two wildlife foresters also serve the Mountain Ecoregion.

Regional Conservation Partnerships

The Game Lands Program is vital to many conservation efforts and partnerships within the Mountain Ecoregion. The NCWRC enjoys a long standing alliance with the USDA Forest Service with wildlife resources on forest service lands cooperatively managed by both agencies. The Natural Heritage and Clean Water Management Trust Funds along with the N.C. 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 (NHP). Many nonprofit land conservancies within the ecoregion, such as Blue Ridge Conservancy, Piedmont Land Conservancy, Foothills Conservancy of N.C., Pacolet Area Conservancy, Conservation Trust for N.C., Southern Appalachian Highlands Conservancy, The Trust for Public Land, and The Nature Conservancy have all played vital roles to acquire properties that have been added to the Game Lands Program. Other

conservation partnerships that are important for the Game Lands Program include the United States Forest Service (USFS) Southern Research Station, North Carolina State University (NCSU), Western Carolina University, Clemson University, University of Tennessee, the Southern Blue Ridge Fire Learning Network, the Ruffed Grouse Society, Quality Deer Management Association, National Wild Turkey Federation, Trout Unlimited, Partners in Amphibian and Reptile Conservation, Partners in Flight, Appalachian Mountains Joint Venture, Eastern Brook Trout Joint Venture, and the Appalachian Landscape Conservation Cooperative.

GENERAL GAME LAND INFORMATION

Location

Green River Game Land (14,331 acres) is located in Henderson and Polk counties in the southwestern corner of the Northern Mountains work area along the Blue Ridge escarpment (Appendix 1, Map 2). Approximately 11,464 acres of the game land are located in Polk County with the balance in Henderson County. Approximately 4,029 acres have been dedicated by the N.C. Natural Heritage Program as the Green River Game Land Dedicated Nature Preserve (Appendix 1, Map 3) (Appendix 4).

Hendersonville, North Carolina, is about 3 miles northwest of the game land and is the nearest large town. Interstate 26 bisects the southwestern end of the game land in two locations. Several public roads, maintained by the North Carolina Department of Transportation (NCDOT), also traverse the game land.

Physical Attributes

Green River Game Land is generally steep and rugged, and drained by fast flowing streams. Topography is characterized by steep narrow ridges and valleys and it ranges from a few flat flood plains along Green River in Green River Cove to steep, rocky cliffs and bluffs in the Green River Narrows and other locations along and adjacent the river corridor and the tributaries feeding into it (Appendix 1, Map 4). Elevations on the game land range from approximately 1,000 feet along the river to over 2,900 feet on the highest peaks.

Climate

The climate is classified as humid subtropical ("Köppen-Geiger Climate Zones of the Continental United States", 2013). Average annual temperate is 60°F (State Climate Office of North Carolina, 2013). Lowest mean monthly temperature occurs in January (30.1°F) and highest mean monthly temperature occurs in July (83.2°F) (State Climate Office of North Carolina, 2013). Average monthly precipitation ranges from a low of 4.75" in April to a high of 6.66" in March (State Climate Office of North Carolina, 2013). Average annual precipitation is 65.4" and is generally well distributed throughout the year (State Climate Office of North Carolina, 2013). Average annual last spring frost date is April 20 and first average annual fall frost date is October 15 giving the area a 26 week frost free growing season on average (North Carolina Cooperative Extension, 2013).

Soil

In all, 44 soil types have been identified on GRGL (King 1980, Keenan 1998). However, the soils on the game land can generally be classified as sandy loam (86%) (King 1980, Keenan 1998) (Appendix 1, Map 5). Very little predominantly clay soil is present. The most productive soils, and those well suited for agricultural purposes, are located in certain areas along Green River and its tributaries. The sandy loam soil on the game land is prone to erosion. Soils on 41% of the game land have severe potential for erosion, 51% have moderate potential for erosion, while only 8% have slight erosion potential (King 1980, Keenan 1998) (Appendix 1, Map 6).

Hydrology

Green River Game Land lies within the Broad River basin, which includes 1,513 square miles in North Carolina. Due to steep topography, streams on the game land are generally narrow and fast flowing. The Green River flows wholly or partially through the game land for 14.4 miles between lakes Summit and Adger and its flow is regulated by a hydroelectric dam located on Lake Summit (Tuxedo Dam) and operated by Duke Energy. The game land contains approximately 53 miles of tributaries to the Green River including Cove Creek, Gadd Creek, Hungry River, Laurel Branch, Laurel Creek, Little Cove Creek, Ostin Creek, and Pulliam Creek.

Green River Game Land History

The original land purchases for GRGL occurred in 1953 and 1954, with state funds. Many small tracts were purchased from private landowners. Based on a survey in the early 1980's, the original purchase contained approximately 5,063 acres.

The absence of clear boundary lines hindered forestry work, wildlife management, and road improvement activities. A timber stand inventory was conducted on GRGL in 1971. However, game land boundaries and compartment acreages were not well defined and stand acreages

and estimated timber volumes for certain areas were inexact. Information collected during this initial inventory was not adequate to support thorough planning of overall management efforts.

Initial habitat management activities on the new game land included establishing and maintaining wildlife openings on old farm areas, pruning and releasing fruiting shrubs and trees around old home sites, and pre-commercial thinning in some of the timber stands. Crews chopped, painted, and posted boundaries to facilitate use of the area by sportsmen. In 1971, the last restocking of deer occurred on the area and wild turkey restoration projects were accomplished in 1972 and 1985.

In 1984, a Forest Management Plan for GRGL was prepared and implemented. This plan, which directed forestry work on the game land for the period 1984 through 1993, was the initial catalyst for initiating larger timber harvests on the game land beyond the small firewood sales which had occurred during the ten years prior to the plan. During the period of the 1984 plan, forestry and wildlife habitat management work was greatly expanded and accelerated and included several larger timber sales, a greater use of prescribed burning, more emphasis on pre-commercial treatments of timber stands, increased reforestation work and plantings for wildlife, and reconstruction of several major logging roads and improvement of access. Although constraints of limited manpower and equipment were present, the creation of a reforestation fund and development of contracting procedures in the late 1980's assisted in the growth of the very successful forestry and wildlife habitat management programs on GRGL.

A detailed inventory and stand mapping of the forest resources on approximately 4,240 acres of GRGL was conducted in 1989. This inventory provided a very extensive and accurate data base of the forest resources on the game land.

In 1993, the Walcott and Jack Story Tracts were purchased through a grant from the Natural Heritage Trust Fund adding another 588 acres to the game land. During this same year, inventory and stand mapping of the forest resources on this acreage and the 823 acres of GRGL excluded from the 1989 inventory was completed. This information was added to the data base of the forest resources for the rest of the game land.

Land acquisitions in 1994 more than doubled the size of the game land. A grant, again from the Natural Heritage Trust Fund, provided funds for the purchase and addition of another 6,609 acres known as the Duke Power Company and Herman and Staley Tracts. In 2001 a 1,761 acre tract located on White Oak Mountain was purchased with a grant from the Natural Heritage Trust Fund and added to the game land. In 2005, a 63 acre inholding in the game land was purchased from Jack Story with NCWRC funds. In 2003 a 5/7 undivided interest in the Posey Henderson Estate was purchased with a grant from the Natural Heritage Trust Fund. Negotiations with the heirs resulted in an additional 106 acres being added to the game land in 2008. Finally, in 2008, a land trade was accomplished to bring the game land to its current acreage. Two tracts (19.7 and 37.2 ac.) with poor access, located at the northern portion of the game land were traded to Bright’s Creek Holdings, LLC in exchange for a 105 acre tract with excellent access adjacent to the White Oak Mountain tract.

Habitats

Green River Game Land is almost completely forested (97%). The remainder of the land base is comprised of grass/forb openings, rock outcrops/cliffs, water, or developed areas (i.e. roads, etc.). In general, the forest types on the game land are as follows: cove (14%), oak (67%), pine (8%), woody early successional (5%), and other (6%) (N.C. State University 2008). In the uplands a dense understory of mountain laurel (*Kalmia latifolia*) and punctatum (*Rhododendron carolinianum*) is common, especially along ridge tops. Thickets of rhododendron (*Rhododendron maximum*) are common along streams, especially the tributaries of Green River. A layer of herbaceous groundcover is often found in rich cove sites.

Major habitat types defined by the NCWAP and found on GRGL include riverine aquatic communities, floodplain forests, early successional, oak forests (including mixed oak/pine), dry coniferous woodlands, low elevation cliffs/rock outcrops, and cove forests (N.C. Wildlife Resources Commission, 2005) (Appendix 1, Maps 7 and 8). Oak forests are by far the predominant habitat type found on the game land. Each of these habitat types will be discussed in greater detail in subsequent sections.

Surrounding Land Use

An analysis of SEGAP data indicates the following conditions within a 5 mile radius of GRGL: agricultural – 14%, developed – 14%, forested – 59%, grass/forb – 4%, shrub/scrub – 3%, evergreen plantations – 4%, and other – 2% (N.C. State University 2008). Land use adjacent the game land varies between Henderson and Polk counties. Review of 2012 aerial photography reveals that residential, agricultural, and non-industrial private forests dominate the landscape immediately surrounding the Henderson County portion of the game land. With Hendersonville only 3 miles from the game land housing density is fairly high and most of the residences are single family dwellings. Several subdivisions are located near the game land. Agricultural use in the vicinity of this portion of the game land is dominated by apple orchards although some pasture and land used for haying also exists. A good portion of the game land in Polk County lies along the Blue Ridge Escarpment. The escarpment is characterized by very steep and rugged lands that are not well suited for agricultural purposes. Surrounding land use in this area is mainly residential and non-industrial private forests. Until recently most of the residences in the vicinity of the game land were constructed on flatter terrain at the bottom of the ridges and could be characterized as rural single family dwellings. The views on many of the ridges surrounding the game land in this area are spectacular. Developers realized this and several resort type developments have been constructed around the game land in the past 15 years. Review of 2012 aerial photography reveals 7 resort type developments around the game land with all but one located in Polk County. The vast majority of the homes built on these properties are second or vacation homes. Agricultural lands are found at the eastern end of the game land in Polk County consisting mainly of pasture, hay, and vegetable farms.

Landscape Context

Green River Game Land lies along the Blue Ridge Escarpment where the piedmont and mountains meet. Eighty four percent of the game land lies within the Blue Ridge physiographic province and 16% within the Piedmont province (Griffith et al., 2002). Due to its geographic location it contains flora and fauna endemic to both the mountains and piedmont and unique to the intersection of these two provinces. Within the state, GRGL serves as an important conservation corridor enhancing the connectivity among public lands managed primarily for conservation purposes such as Pisgah National Forest, Chimney Rock, South Mountains, and Stone Mountain State Parks, Doughton Park, Dupont State Forest, South Mountains, Johns River, Buffalo Cove, Thurmond Chatham, and Mitchell River Game Lands, and various private tracts including but not limited to Box Creek Wilderness and Camel Knob State Natural Heritage Areas. In a broader sense GRGL enhances connectivity regionally to such properties as the Sumter National Forest to the south, the Nantahala National Forest and Great Smoky Mountains National Park to the west, and the George Washington and Jefferson National Forest to the north.

Purpose

The purpose of GRGL is to manage habitats and communities to benefit aquatic and terrestrial wildlife resources 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 wildlife resources and do not displace primary users. Finally, GRGL 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.

Unique Values/Public Use

An abundance of natural resources are located on GRGL. Most lands situated along the Blue Ridge escarpment and the transition zone between the piedmont and mountains are very steep and rugged and have excellent natural values and biodiversity. Green River Game Land is no exception to this. These features also make the game land a destination for outdoor recreation.

The N.C. Natural Heritage Program has established 11 State Natural Heritage Areas located wholly or partially on the game land (North Carolina Natural Heritage Program 2013). Most notable among these are the Green River Gorge, Cove Creek/Bradley Falls, and White Oak Mountain/Tryon Peak State Natural Heritage Areas, all which have an R-rating of “very high” (North Carolina Natural Heritage Program 2013).

Green River Game Land serves as an important reservoir for a number of endangered, threatened, or rare species. White irisette (*Sisyrinchium dichotomum*) is federally endangered and has been documented at 2 locations on the game land (North Carolina Natural Heritage Program 2013). Cherokee sedge (*Carex cherokeensis*) and mountain heartleaf (*Hexastylis*

contracta), both state endangered, are documented on the game land (North Carolina Natural Heritage Program 2013). An additional 8 species of vascular plants and 4 species of vertebrate animals found on the game land are threatened or considered species of special concern at the state level (North Carolina Natural Heritage Program 2013) (Table 1). In addition, many common species of both flora and fauna occur on GRGL.

Scientific Name	Common Name	State Status	Federal Status	S_RANK	G_RANK	EO_STATUS
Agastache nepetoides	Yellow Giant-hyssop	SR-P		S1	G5	Extant
Carex cherokeensis	Cherokee Sedge	E		S1	G4G5	Extant
Carex pedunculata	Longstalk Sedge	SC-V		S2	G5	Extant
Carpiodes sp. cf. cyprinus	Atlantic Quillback	SR		S2?	G5	Extant
Collinsonia verticillata	Whorled Horsebalm	SC-V		S2	G3G4	Extant
Crotalus horridus	Timber Rattlesnake	SC		S3	G4	Extant
Cyprinella zanema	Santee Chub	SR		S3	G4	Extant
Dendroica cerulea	Cerulean Warbler	SC	FSC	S2B	G4	Extant
Hexastylis contracta	Mountain Heartleaf	E	FSC	S1	G3	Extant
Hexastylis rhombiformis	French Broad Heartleaf	SR-L	FSC	S2	G2	Extant
Packera millefolium	Divided-leaf Ragwort	T	FSC	S2	G2	Extant
Sisyrinchium dichotomum	White Irisette	E	E	S2	G2	Extant
Smilax lasioneura	Blue Ridge Carrion-flower	SR-P		S1	G5	Extant
Trillium simile	Sweet White Trillium	T		S2	G3	Extant
Veratrum woodii	Ozark Bunchflower	T		SH	G5	Extant

Table 1. Endangered, threatened, and rare species present on Green River Game Land (North Carolina Natural Heritage Program 2013).

Hunting is a popular activity on the game land with white-tailed deer and wild turkey the two primary big game species. Deer harvest over the past 3 hunting seasons (2010, 2011, and 2012) has averaged 5.15 deer per square mile. The deer herd is generally stable and deer are the most commonly hunted game species on the game land. Wild turkeys are also found in good numbers. Harvest has averaged 1.52 gobblers per square mile during the past 3 spring seasons (2011, 2012, and 2013). Black bear have increased their range over the past 20 years in North Carolina and are present on GRGL, but only at low numbers. Since 2008, only 4 bears have been harvested on the game land. Gray squirrel, cottontail rabbit, bobwhite quail, ruffed grouse, mourning dove, woodcock, red and gray fox, bobcat, raccoon, and opossum are small game and furbearer species found and actively hunted for on GRGL. A few ducks occur along the Green River and its tributaries and hunting pressure is very light.

Green River Game Land is a popular trout fishing destination. The majority of the waters on the Game Land are designated by the NCWRC as Public Mountain Trout Water. Other designations include Hatchery Supported, Wild Trout, and Delayed Harvest. Big Hungry River is classified as Hatchery Supported on the game land and the other tributaries are classified as Wild Trout.

The NCWAP (N.C. Wildlife Resources Commission, 2005) 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. Bird surveys have occurred on the game land since 1999 (SGCN birds detected: Eastern wood-pewee, hairy woodpecker, hooded warbler, Kentucky warbler, prairie warbler, whip-poor-will, wood thrush, worm-eating warbler, yellow-billed cuckoo, and yellow-breasted chat). Additionally, empirical research conducted by the USFS Southern Research Station and Clemson University has focused on the effects of prescribed fire and fire surrogate management on nongame bird, reptile, amphibian, and small mammal species. Other surveys and incidental observations have also provided information and other SGCN have been detected on Green River such as cerulean warbler and Swainson's warbler. The game land is also on the North Carolina Birding Trail (North Carolina Birding Trail, 2009) and its unique position along the escarpment provides birders with a range of habitat types to observe birds. SGCN amphibians and reptiles found on the property include coal skink, Eastern box turtle, Eastern hognose snake, and timber rattlesnake.

The Green River and its tributaries within the game land have some of the highest water quality remaining in the North Carolina section of the Broad River Basin and is a priority watershed designated in the NCWAP (N.C. Wildlife Resources Commission, 2005). Downstream of Cove Creek, the Green River has high species diversity, including several rare species, and is home to 31 native fishes.

Green River Game Land is the focus of many popular outdoor recreational activities. Green River is located entirely on the game land in many cases, and at some locations the river serves as the game land boundary. The section of river between the upper game land boundary and

the Fishtop public fishing access area on Green River Cove Road is popular with kayakers. In particular, “The Narrows” (the portion of the river confluence of from where Big Hungry River flows into Green River to the Fishtop access area), is a worldwide destination for kayakers and contains several class V rapids (American Whitewater 2013). Several businesses associated with kayaking are located in Hendersonville and Saluda. Between the Fishtop and the Big Rock public fishing access areas the river is heavily used by tubers during the summer months. Several tube rental and shuttle businesses are present in Green River Cove and nearby towns.

The steep, mountainous terrain typical of the area creates many scenic vistas on the game land and it is a popular destination for hikers. There are 13.7 miles of trails established in the Big Hungry section of the game land and along the Green River. Several waterfalls are present on the game land and are popular with hikers, most notable among these is Bradley Falls located on Cove Creek.

GOALS

- Restore a diversity of habitat types and forest age classes through science based land management 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 sport fish and game species at appropriate 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 to promote recovery.
- Provide sufficient infrastructure and opportunity to allow all 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 and monitoring indicate that a wide variety of species are present at appropriate levels.
- Inventories of forest communities show that progress is being made toward accomplishing restoration goals.
- Monitoring and surveys and inventories of target sport fish and game species indicate that population levels of these species are appropriate levels.
- Monitoring and surveys indicate that populations of endangered, threatened, and rare species found on the game land are stable or increasing.
- 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.

HABITATS

Habitat types are defined according to the NCWAP and are delineated according to an analysis of SEGAP data (N.C. State University 2008) as well as GIS data collected or digitized by NCWRC staff (Appendix 1, Maps 7 and 8).

Oak Forest

Oak forests are by far the predominant habitat type on GRGL, occupying approximately 67% of the land base (9,571 acres). We subdivide oak forests on the game land as either Southern Appalachian oak forest or the dry oak-pine forest.

Southern Appalachian Oak Forest

- Current Extent and Condition

Southern Appalachian oak forest (SAOF) comprises about 84% of the oak forests on the game land (7,988 acres). This forest type is generally found on the mesic (wetter) sites and is often located on open slopes, ridgetops, lower elevation peaks, and higher parts of broad valleys (NatureServe 2007). SAOF is typically dominated by oak species, most typically chestnut oak (*Quercus prinus),* white oak *(Quercus alba)*, scarlet oak (*Quercus coccinea)*, and black oak (*Quercus velutina*) with varying amounts of hickory (*Carya* spp.), red maple (*Acer rubrum)*, yellow poplar (*Liriodendron tulipifera),* and other species (NatureServe 2007). American chestnut (*Castanea dentate)* was once a prominent species in many of these forests. The understory ranges from dense thickets of mountain laurel (*Kalmia latifolia*) to open with a sparse to moderate herbaceous layer. The age class distribution of this forest type is widely spread across all forest age classes but is generally clumped between 61 and 110 years of age.

- Desired Future Condition (DFC)

DFC include oak woodlands on areas accessible and operable for timber harvest (primarily shelter-wood cutting), oak savannah development on areas most accessible, operable, and appropriate for prescribed burning rotations, and old growth oak stands on primary areas or areas inaccessible or inoperable for active management.

Generally, oak woodlands will have a mix of age class and size distribution with advanced oak regeneration available to perpetuate a dominant oak component in the stand. Oak savannas generally have a much more open canopy dominated by oaks (as a goal, averaging a diameter at breast height (DBH) of 16 inches) but a very open understory with a native grass and forb component as the dominant ground cover. Old growth oak stands will eventually develop an all age class distribution with large,

medium and small trees dispersed throughout the stand. . As a goal, these stands will be well distributed across the game land to promote landscape diversity.

- Target Game Species

Target game species include white-tailed deer, wild turkey, gray squirrel, and raccoon.

- Target Non-Game Species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include whip-poor-will, chuck-will's-widow, cerulean warbler, worm-eating warbler, wood thrush, eastern wood-pewee, timber rattlesnake, spotted salamander, and Eastern box turtle.

- Management Strategies and Needs

Management strategies include timber harvest (primarily shelter-wood cutting but also some clear-cutting may be employed to achieve oak regeneration goals), natural regeneration (but also may include some planting, primarily of white oak), herbicide use to control competition with oak regeneration, and prescribed burning to promote oak regeneration (less frequent and intense for oak woodland development and more frequent and intense on areas selected for oak savannah conditions). Participation in American chestnut restoration efforts will occur as appropriate and feasible. In general, oak woodlands will be emphasized on areas accessible and operable for timber harvest (primarily shelter-wood cutting), oak savannah development on areas most accessible, operable, and appropriate for prescribed burning rotations, and old growth oak stands in dedicated primary areas and on areas inaccessible and/or inoperable for active management.

- Infrastructure needs

Infrastructure needs will include new logging road and firebreak construction in some areas and installing new gates to control access. Re-construction, re-furbishing, improvement, and maintenance of old roads and firebreaks will also be a significant infrastructure need.

- Management Challenges

Management challenges in Southern Appalachian Oak Forests include gypsy moth, sudden oak death syndrome, hypoxylon canker, oak decline, lack of adequate advanced oak reproduction, invasive species, incompatible adjacent land uses, and climate change.

Dry Oak-Pine Forest

- Current Extent and Condition

Dry oak-pine forest (DOPF) typically occurs at lower elevations and on dryer sites than SAOF. It comprises about 16% of the oak forests on the game land (1,583 acres). This forest type is dominated by upland oaks and pines. Common oak species include chestnut oak (*Quercus prinus),* white oak *(Quercus alba)*, and scarlet oak (*Quercus coccinea).* Common pine species include*,* shortleaf pine *(Pinus echinata),* Virginia pine *(Pinus virginiana)*, pitch pine (*Pinus rigida*), and table mountain pine (*Pinus pungens*). Varying amounts of hickory (*Carya* spp.) and red maple (*Acer rubrum)* are also present. A dense understory of mountain laurel (*Kalmia latifolia*) and/or blueberry (*Vaccinum sp.)* is often present. The age class distribution of DOPF is widely spread across all forest age classes but is generally clumped between 61 and 110 years of age.

- Desired Future Condition

The goal will be to manage for a diverse mix of common oak species along with shortleaf, table mountain, and pitch pines. Generally, oak-pine woodlands will have a mix of age class and size distribution with advanced oak-pine regeneration available to perpetuate the stand. Oak-pine savannas generally have a much more open canopy but a very open understory with a native grass and forb component as the dominant ground cover. Old growth oak stands will eventually develop an all age class distribution large, medium and small trees dispersed throughout the stand. As a goal, these stands will be well distributed across the game land to promote landscape diversity.

- Target Game Species

Target game species include white-tailed deer, wild turkey, gray squirrel, and raccoon.

- Target Non-Game Species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include timber rattlesnake, brown-headed nuthatch, worm-eating warbler, wood thrush, whip-poor-will, chuck-will's-widow, hairy woodpecker, and Eastern box turtle.

- Management Strategies and Needs

Management strategies include timber harvest (primarily shelter-wood cutting but also some clear-cutting may be employed to achieve oak-pine regeneration goals), natural regeneration on some areas (especially on sites with oak-table mountain/pitch pine regeneration goals), and planting shortleaf pine where the primarily goal is restoration of shortleaf pine-oak stands. Some herbicide use may be employed but generally prescribed burning to promote oak-pine regeneration will be a primary tool (less frequent

and intense for oak-pine woodland development and more frequent and intense on areas selected for oak-pine savannah conditions). In general, oak-pine woodlands will be emphasized on areas accessible and operable for timber harvest (primarily shelter-wood cutting) and oak-pine savannah development on areas most accessible, operable, and appropriate for prescribed burning rotations. Old growth oak-pine stands will be developed on dedicated primary areas or areas inaccessible and/or inoperable for active management.

- Infrastructure Needs

Infrastructure needs will include new logging road and firebreak construction in some areas and installing new gates to control access. Re-construction, re-furbishing, improvement, and maintenance of old roads and firebreaks will also be a significant infrastructure need.

- Management Challenges

Management challenges include southern pine beetle, gypsy moth, sudden oak death syndrome, hypoxylon canker, oak decline, invasive species, incompatible adjacent land uses, and climate change.

Cove Forest

- Current Extent and Condition:

Cove forests occupy about 14% (1,968 acres) of GRGL. This forest type consists of mesophytic hardwood or hemlock-hardwood forests of sheltered topographic positions (NatureServe 2007). Cove forests are generally found in hollows or small valleys that promote moist conditions and often occur on east or north facing slopes. Of the cove forests on the game land the hemlock-hardwood association is limited to about 15%. The remainder includes a mosaic of acidic and "rich" coves that may be distinguished by individual plant communities based on perceived differences in soil fertility and species richness (NatureServe 2007). Rich coves normally have a well-developed herbaceous layer at ground level whereas acidic coves most often do not. At GRGL it is estimated that of the cove forest not classified as hemlock-hardwood approximately ⅔ are acidic and ⅓ rich coves. Characteristic species include buckeye (*Aesculus flava),* ash *(Fraxinus Americana),* basswood *(Tilia Americana),* yellow poplar *(Liriodendron tulipifera),* Silverbell *(Halesia tetraptera),* eastern hemlock *(Tsuga Canadensis),* American beech *(Fagus grandifolia),* Cucumber *(Magnolia acuminate)*, and Fraser magnolia (*Magnolia fraseri) (NatureServe 2007)*. Rhododendron (*Rhododendron catawbiense)* is the dominant understory in acidic coves and in the hemlock-hardwood association. The age class distribution of this forest type is widely spread across all forest age classes but is generally clumped between 61 and 110 years of age.

- Desired Future Condition

DFC includes ensuring a diverse species and age composition, protecting and promoting hemlock stands where possible, retaining streamside management zones/riparian buffers where needed, and providing appropriate levels of early successional wildlife habitat. In general, this forest type will be of an older age structure although a diversity of ages is an important DFC.

- Target game species

Target game species include white-tailed deer, wild turkey, and raccoon.

- Target non-game species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include Swainson's warbler and wood thrush, salamanders, and cerulean warbler.

- Management strategies and needs

Management strategies include identifying, protecting, and treating hemlock stands where possible to reduce loss of this species, retention of variable buffers along either side of creeks, streams, and seeps in this forest type, timber harvest using a mix of thinning (with attention to retaining a diverse mix of species beneficial to wildlife, including American Beech, persimmon, etc.) and clear-cutting techniques to create early successional wildlife habitat where feasible and appropriate, and natural regeneration. Old growth stands may be developed over time within streamside management zones/riparian buffers, dedicated primary areas and on areas inaccessible and/or inoperable for intensive active management. As a goal, these stands will be well distributed across the game land to promote landscape diversity.

- Infrastructure needs

Infrastructure needs will include new logging road construction in some areas and installing new gates to control access as well as culverts, bridges, and fords for crossing streams and creeks. Re-construction, re-furbishing, improvement, culvert replacement, and maintenance of old roads and culverts will also be a significant infrastructure need.

- Management Challenges

Management challenges include invasive species (i.e. hemlock wooly adelgid), incompatible adjacent land uses, and climate change.

Pine Forest

Pine forests occupy approximately 8% of the land base (1,134 acres) on GRGL. For purposes of this discussion pine forests on the game land are subdivided and classified as either Dry Coniferous Woodlands or other pine forest.

Dry Coniferous Woodlands

- Current Extent and Condition

Dry coniferous woodlands occupy about 6% (899 acres) of GRGL. This forest type generally occurs on more xeric (drier) sites, especially ridge tops along with west and south facing slopes. Common pine species include*, shortleaf pine (Pinus echinata), Virginia pine (Pinus virginiana)*, pitch pine (Pinus rigida), and table mountain pine (*Pinus pungens*). A component of oaks that favor dryer sites, such as chestnut oak (*Quercus prinus)* and scarlet oak (*Quercus coccinea)* is frequently present. A dense layer of mountain laurel (*Kalmia latifolia*) and/or blueberry (*Vaccinum sp.)* is often present in the understory. The age class distribution of this forest type is widely spread across all forest age classes but is generally clumped between 61 and 110 years of age.

- Desired Future Condition

DFC includes a mix of pine woodlands and pine savannahs. The goal will be to restore table mountain/pitch pine stands on higher elevation sites and shortleaf pine on lower elevation sites. While some sites may have a mix of these pine species, all sites will have a goal to create an open, diverse understory and herbaceous ground cover. Generally, pine woodlands will have a mix of age class and size distribution with advanced pine regeneration available to perpetuate the stand. Pine savannas generally have a much more open canopy but a very open understory with a native grass and forb component as the dominant ground cover.

- Target game species

Target game species include white-tailed deer and wild turkey.

- Target non-game species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include timber rattlesnake, whip-poor-will, chuck-will's-widow, bats, red-headed woodpecker, and brown headed nuthatch.

- Management Strategies and Needs

Management strategies will primarily involve repeated prescribed burning to reduce hardwood canopy trees, open the understory, and promote table mountain, pitch, and shortleaf pine regeneration (less frequent and intense fire will create pine woodland conditions and more frequent and intense fires will promote pine savannah conditions). In some cases, stand replacement fires, timber harvest or other forestry practices using a mix of thinning and clear-cutting techniques, and planting shortleaf pine (where the primary goal is restoration of shortleaf pine stands) may be used.

- Infrastructure Needs

Infrastructure needs will primarily involve new firebreak construction in some areas and re-construction, re-furbishing, improvement, and maintenance of old roads and firebreaks in other areas.

- Management Challenges

Management Challenges include southern pine beetle, invasive species, incompatible adjacent land uses, climate change, lack of fire, successional change, and encroachment by hardwoods.

Other Pine Forest

- Current Extent and Condition

At GRGL, this forest type comprises about 2% (235 acres) on the game land and primarily includes pine stands dominated by eastern white pine (*Pinus strobus)*, which typically occur in pure or nearly pure stands (natural and planted) on better, more productive sites than the dry coniferous woodlands. However, due to fire exclusion and shade tolerance of white pine, it has spread into other, less typical sites in some locations where it might not normally occur if historic disturbance regimes had continued. This forest type also includes a few very small loblolly pine (*Pinus taeda)* stands that have previously been planted on the game land. Understory conditions in these "Other Pine Forest" stands are typically absent of vegetative ground cover and shrubs but sometimes include a light amount of mountain laurel (*Kalmia latifolia*), a few mixed hardwood saplings, and/or scattered pine regeneration. The age class distribution of this

forest type generally ranges from the younger age classes (areas planted over the past 25 years or so) up to mature stands of white pine up to 90 years of age.

- Desired Future Condition

DFC includes pine woodlands that are open (thinned), more diverse (mixed with hardwoods), and more structurally beneficial to wildlife, consisting of an herbaceous, grass, and forb component in the understory. The few areas of loblolly stands may also develop pine savannah conditions where access and operability allow for prescribed burning rotations. The goal will be to change any pine monoculture/plantation conditions to more diverse mixed pine-hardwood stands.

- Target game species

Target game species include white-tailed deer and wild turkey.

- Target non-game species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include timber rattlesnake, whip-poor-will, chuck-will's-widow, bats, red-headed woodpecker, and brown headed nuthatch.

- Management Strategies and Needs

Management strategies will primarily involve timber harvest (initially thinning and eventually clear-cutting) as these stands mature and develop merchantable timber. Natural regeneration of hardwoods will be key to diversifying these stands and developing a desired future mixed pine-hardwood composition. Some planting of oaks and some herbicide use may be employed where needed to develop pine-oak stands. Where appropriate and needed, prescribed burning may also be used.

- Infrastructure Needs

Infrastructure needs will include new logging road and firebreak construction in some areas and installing new gates to control access. Re-construction, re-furbishing, improvement, and maintenance of old roads and firebreaks will also be a significant infrastructure need.

- Management challenges

Management challenges include southern pine beetle, invasive species, and incompatible adjacent land uses.

Mesic Forest

- Current Extent and Condition

Mesic forest is found on about 2% (292 acres) of GRGL. This forest type generally occurs on lower or north-facing slopes, where topography creates mesic moisture conditions (NatureServe 2007). On the game land it is confined to the lower elevations in Green River Cove. Common species include yellow poplar *(Liriodendron tulipifera),* northern red oak (*Quercus rubra*), American beech *(Fagus grandifolia),* and red maple (acer rubrum). Herbaceous groundcover is often present on sites with basic soils and usually absent on sites with more acidic soil (NatureServe 2007). The age class distribution of this forest type is widely spread across all forest age classes but is generally clumped between 61 and 110 years of age.

- Desired Future Condition

DFC includes ensuring the presence of the northern red oak component in these stands along with a diverse composition of both over-story and understory and herbaceous ground cover species. Old growth stands will be present in this type also.

- Target game species

Target game species include white-tailed deer, wild turkey, and squirrel.

- Target non-game species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include whip-poor-will, chuck will's widow, cerulean warbler, worm eating warbler, wood thrush, Eastern wood-pewee, timber rattlesnake, spotted salamander, and Eastern box turtle.

- Management strategies and needs

Management strategies include timber harvest (primarily shelter-wood cutting but also some clear-cutting may be employed to achieve northern red oak regeneration goals), primarily natural regeneration (but also may include some planting, primarily of northern red oak), herbicide use to control competition with northern red oak regeneration, and possibly prescribed burning to promote northern red oak regeneration. Old growth stands will be managed for by excluding management on areas inaccessible and/or inoperable for active management. Old growth stands will be identified for less intensive management and on areas dedicated as primary areas or areas that are inaccessible or inoperable.

- Infrastructure needs

Infrastructure needs will include new logging road construction in some areas and installing new gates to control access as well as culverts, bridges, and fords for crossing streams and creeks. Re-construction, re-furbishing, improvement, culvert replacement, and maintenance of old roads and culverts will also be a significant infrastructure need.

- Management Challenges

Management challenges include invasive species, incompatible adjacent land uses, and climate change.

Early Successional

Early successional habitats are considered those on which the vegetation is ≤ 20 years of age. For purposes of this discussion early successional habitats are subdivided into grass/forb, shrub-scrub (woody vegetation ≤10 yrs.), and sapling (woody vegetation 11-20 yrs.). Early successional habitat currently occupies approximately 6% (799 acres) of GRGL.

Green River Game Land opening seeded to perennial clover

Grass/Forb

- Current Extent and Condition

Grass/forb habitat is comprised of grasses and forbs and lacking a significant woody component. At Green River Game Land approximately 1% (111 acres) of the land base is considered grass/forb. The majority of grass/forb habitat is located in maintained wildlife openings. Some additional grass/forb habitat is found along utility ROWs, roads, and other areas. This habitat is generally maintained using a variety of standard agricultural practices.

- Desired Future Condition

DFC includes maintaining currently planted openings and expanding the acreage of natural (especially in burned areas) and planted grass/forb vegetation across the game land where appropriate to create diversity across the landscape. Grass-forb types will be composed of a variety of both planted and natural vegetation, and will have a diversity of vertical structure and layers composition conducive to songbird and other wildlife use.

- Target game species

Target game species include white-tailed deer, wild turkey, rabbit, and mourning dove.

Target non-game species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include whip-poor-will, chuck-will's-widow, field sparrow, coal skink, and grasshopper sparrow. A major target in this type will be birds needing this specialized habitat.

- Management strategies and needs

Management strategies include maintenance of established openings (mowing, herbicide application, soil amendments, day-lighting, burning, and discing.) and establishment of new openings following timber sales (planting log landings, haul roads, and skid trails), as well as establishing native grass/forb openings by burning.

- Infrastructure Needs

Infrastructure needs will include installing new gates to control access as well as installation and maintenance of culverts, bridges, and fords for crossing streams and creeks. Construction and maintenance of firebreaks will be needed where this management technique is employed.

- Management Challenges

Management challenges include invasive species, incompatible adjacent land uses, and climate change.

Shrub-Scrub

- Current Extent and Condition

Scrub-Shrub habitat refers to those early successional habitats comprised mainly of low growing, multi-stemmed woody vegetation ≤10 years of age. Grasses and forbs can be a significant component of this habitat, especially during the first years of growth. Shrub-scrub habitat ranges from dense woody vegetation to a mix of woody vegetation interspersed with grasses and forbs. Mature trees may be present, but only at widely spaced intervals. The character of this habitat depends on its age, how it was established, site quality, aspect, and other factors. At GRGL approximately 5% (657 acres) of the land base is currently considered shrub-scrub. Of this, 639 acres were developed through timber sales or repeated prescribed fire. The remainder is located along utility ROWs, roadways, forest canopy gaps, etc.

Desired Future Condition

DFC includes a mix of shrub/scrub habitat created by both timber harvested areas and prescribed burned areas across the game land to create diversity on the landscape. An important DFC is to provide a continuous supply of this habitat type through time.

- Target Game Species

Target game species include white-tailed deer, rabbit, woodcock, and bobcat.

- Target Non-Game Species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include whip-poor-will, chuck-will's-widow, blue grosbeak, orchard oriole, and prairie warbler. Again, birds will be one important target for this habitat type.

- Management Strategies and Needs

Management strategies will include periodic timber harvests, mechanical treatments (e.g. Fecon), and repeated prescribed burning.

- Infrastructure Needs

Infrastructure needs will include new logging road and firebreak construction in some areas and installing new gates to control access. Re-construction, re-furbishing, improvement, and maintenance of old roads and firebreaks will also be a significant infrastructure need.

- Management Challenges

Management challenges include invasive species, incompatible adjacent land uses, and climate change, etc.

Sapling

- Current Extent and Condition:

Sapling habitats are those containing dense woody vegetation ranging in age from 11-20 years. At GRGL approximately <1% (31 acres) of the land base is considered to be in the sapling stage. On the game land, sapling habitat is most often found within regenerating timber sales although some may be found in canopy gaps or other disturbed areas. Groundcover depends on forest type, site quality, and other factors and ranges from herbaceous on higher quality sites to ericaceous thickets on dryer ones.

- Desired Future Condition Condition

DFC includes increasing dense sapling habitat across the game land to create diversity on the landscape. High stem density is an important structural component of this type.

- Target game species

Target game species include white-tailed deer and wild turkey.

- Target non-game species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. An example from the 2005 edition includes wood thrush.

- Management Strategies and Needs

Management strategies include periodic timber harvests and mechanical treatments across the game land.

- Infrastructure needs

Infrastructure needs will include new logging road construction in some areas and installing new gates to control access. Re-construction, re-furbishing, and improvement of old roads will also be a significant infrastructure need.

- Management Challenges

Management challenges include invasive species, incompatible adjacent land uses, climate change, etc.

Low Elevation Cliffs/Rock Outcrops

- Current Extent and Condition

This habitat consists of vertical cliffs and rock outcrops that vary in size. Vegetation is sparse and limited to plants growing on bare rock, small ledges, and crevices (NatureServe 2007). Vegetation is primarily bryophytes, lichens, and herbs, with sparse trees and shrubs rooted in deeper soil pockets and crevices (NatureServe 2007). At GRGL this habitat is found in the Green River Gorge, bluffs located on steep slopes, and rock outcrops embedded in forested habitat across the landscape. This community type is found on <1% of the game land (22 acres). This is likely a low estimate since the presence and location of much of this habitat can only be verified by ground truthing. Nonetheless, it is still found in low quantities across the game land.

- Desired Future Condition

DFC includes maintaining the undisturbed structure of cliffs and rock outcrops.

- Target Game Species

None

- Target Non- Game Species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include green salamander, timber rattlesnake, and coal skink.

- Management Strategies and Needs

Large cliffs and rock outcroppings that have little vegetation providing shade should be maintenance free. Recreational use of these types of outcroppings should be monitored so that impacts are minimized. Other outcroppings should be protected from soil disturbing activities and evaluated for buffering depending upon specific outcrop habitat attributes. For example, management for salamanders may require a forested buffer to protect salamander habitat, whereas another may be better suited to day-lighting for reptile conservation. These management strategies will often be dictated by the size of the outcrop and forest habitat in which the outcropping is embedded. Outcroppings should be surveyed and mapped as needed to provide baseline data.

- Infrastructure Needs

None.

- Management Challenges

Management challenges include recreational use (e.g. climbing and bouldering), invasive species, soil disturbance, incompatible adjacent land uses, and climate change.

Floodplain Forest

- Current Extent and Condition

At GRGL, floodplain forests occur in places along the Green River corridor and its tributaries and make up approximately 2% (307 acres) of the game land. Common species include sweetgum (*Liquidambar styraciflua)*, yellow poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), Sycamore (*Platanus occidentalis*), black birch (*Betula nigra*), and boxelder (*Acer negundo*), **(**NatureServe 2007). A well-developed groundcover ranging from herbaceous to shrubby is often present. The age class distribution of this forest type is widely spread across all forest age classes but is generally clumped between 61 and 110 years of age.

- Desired Future Conditions (DFC)

DFC is a relatively undisturbed forest providing important buffers along rivers and major streams and creeks but pockets of disturbed areas occurring that provide important habitat for woodcock and other species.

- Target game species

Target game species include white-tailed deer, wild turkey, raccoon, and woodcock.

- Target non-game species

Target non-game species include those outlined in the NCWAP that occur or potentially occur on the game land. Some examples from the 2005 edition include Swainson's warbler, yellow-billed cuckoo, spotted salamander, marbled salamander, bats, red headed woodpecker, and Kentucky warbler.

- Management strategies and needs

Management strategies include identifying and protecting these forests and retention of appropriate buffers along either side of the associated rivers and their tributaries.

However, riparian zones will not in all cases involve no management and management will be allowed for fish and wildlife purposes while ensuring there is no erosion or siltation. In some cases, and where feasible and appropriate, prescribed fire may be allowed to back into these corridors, especially where the rivers and associated tributaries are being utilized as natural firebreaks. In other cases, limited harvest may be used to create early successional habitat for species like the woodcock. Old growth stands will also be developed over time within these streamside management zones and riparian buffers.

- Infrastructure Needs

Infrastructure needs will include installing new gates to control access as well as installation and maintenance of culverts, bridges, and fords for crossing streams and creeks.

- Management Challenges

Management challenges include invasive species including tree-of-heaven, privet, bittersweet, incompatible adjacent land uses, and climate change.

Riverine/Aquatic Communities

- Current Extent and Condition

The GRGL contains the majority of the Green River that flows between Lake Summit and Lake Adger and several large tributaries including Cove Creek, Hungry River, Little Cove Creek, and Pulliam Creek, and other smaller tributaries.

The aquatic habitat in the Green River is altered by flow regulation from peaking hydropower generation at Duke Energy's Tuxedo dam and power house upstream from the game land. Daily and seasonal water flow regimes are substantially altered from natural conditions. Further alterations result from cold water withdrawn from deep in the lake and discharged from the dam during power generation. This produces artificially lowered water temperatures in the Green River, converting what would naturally be cool-warm water to cold-cool water habitats. . The Green River is impounded by Adger Dam (Lake Adger) at the lower end of the reach below the game land.

With the exception of the Green River below the gas pipeline crossing, all water bodies on the game land are designated as Public Mountain Trout Waters and managed under a variety of classifications. The Green River from the Tuxedo power plant to the upper game land boundary is classified as Hatchery Supported. The portion of the Green River from the upper game land boundary to the Fishtop access area is classified as Wild Trout waters. Below Fishtop access area, the Green River is classified as Delayed Harvest trout waters downstream to the confluence with Cove Creek. From the mouth of Cove Creek, Green River is classified as Hatchery Supported trout waters downstream

to the subterranean natural gas pipeline crossing. Big Hungry River is also classified as Hatchery Supported. All other tributaries to Green River on the game land are classified as Wild Trout waters.

After alterations to flow and temperature regime from hydropower generation, fine sediment pollution is the next leading cause of aquatic habitat degradation on the game land. Artificially high levels of fine sediment increase turbidity, fill interstitial spaces in streambeds, and reduce pool habitat by filling. Resulting ecological impacts include reduced habitat for fishes and macroinvertebrates, lower productivity, and reduced spawning success. Unfortunately, the watershed is dominated by highly erodible sandy loam soils. If not properly managed, ground disturbance of any kind can cause significant erosion and sedimentation. The majority of fine sediment sources are upstream of the game land. The overwhelming majority of these poorly managed disturbances occur off the game lands in the Hungry River, Cove Creek, and Little Cove Creek watersheds. However, there are some smaller scale sediment sources found on the game land, which are discussed in subsequent sections.

Despite the impacted habitat, the Green River maintains relatively high aquatic species diversity, primarily in the lower reaches downstream from Cove Creek, and is designated as a priority watershed in the NCWAP (N.C. Wildlife Resources Commission, 2005).

- Desired Future Conditions (DFC)

The desired future condition of aquatic habitat in on the GRGL is reduced levels of fine sediment in the Big Hungry River and Green River and their tributaries, more natural flow regime in the Green River, and no new introductions of invasive and injurious species.

- Target game species

The target cold water game fish species are rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*) and brown trout (*Salmo trutta*). These are stocked by the NCWRC in the Hatchery Supported and Delayed Harvest Public Mountain Trout Waters sections of the Green River and the Hatchery Supported section of Big Hungry River. In addition, wild rainbow trout and brown trout are found in the Wild Trout section of the Green River and in many of the tributaries.

Fishing opportunity for cool- and warm water fishes is limited on the game land. White bass (*Morone chrysops*) are present downstream in Lake Adger and make a spring spawning run up the Green River into the game land. In addition, beginning in 2013, the NCWRC began an experimental stocking of fingerling smallmouth bass (*Micropterus dolomieu*) in the Green River between Cove Creek and Big Rock access areas in hopes of creating a cool water fishery during summer months when water temperatures are lethal to trout. Given the slow growth rate of riverine smallmouth bass, it will be several years before we know if this management strategy is successful.

- Target non-game species

There are 31 native non-game fishes, three native mollusks, and six native crayfishes on the game land. The following species are priorities for monitoring and management: Quillback (*Carpiodes sp. cf. cyprinus*), Seagreen darter (*Etheostoma thalassinum*), Thicklip chub (*Cyprinella labrosa*), Santee chub (*Cyprinella zanema*), Foothills crayfish (*Cambarus johni*), and Chattahoochee crayfish (*Cambarus howardi*) (N.C. Wildlife Resources Commissoin, 2005).

- Management Strategies and Needs

Currently there is no direct mechanism by which we can influence hydropower operations. The NCWRC typically requests a flow regime improvement to benefit aquatic life from hydropower operations that are regulated by the Federal Energy Regulatory Commission (FERC) during the relicensing process (e.g., higher base flows, moderated peaking pulse flows, and more natural seasonally adjusted flow regimes). However, in 1989, the FERC ruled that the Tuxedo hydropower project on Lake Summit is not required to have a FERC license because the Green River does not meet the federal definition of a navigable waterway and there has not been post-1935 construction on the hydropower facilities. However, the NCWRC will advocate for these habitat accommodations from Duke Energy if the opportunity occurs.

Riparian buffers will be left at widths of no less than those recommended by North Carolina Forest Service Forestry Best Management Practices (50 feet.). In areas where topography and/or site conditions dictate further protection, riparian buffers may exceed these recommendations. Along the Green and Big Hungry Rivers minimum buffer width is recommended to be 100 feet. The NCWRC will seek to identify and to control any active sediment sources throughout the game land. Common erosion sources on forested land include foot trails, unimproved angler access with heavy fishing pressure, river access points (see public use – fishing), roads, fire breaks, and stream crossings. Stream crossings are common sources of fine sediment pollution because they often create bank erosion and can direct road runoff into streams.

A 2012 survey of potential erosion sources on the game land identified many problems related to trails. Erosion on foot trails was widespread throughout the game land, but Bradley Falls trail (and its spur trails), Pulliam Creek trail, and the trail from Gallimore Road to the Narrows are particular problems.

Road and trail crossings on many tributaries are created using corrugated metal pipes. Unless carefully designed, these crossings can create movement barriers for fishes and other aquatic life by being perched on the downstream end or having a steep slope. An inventory of these crossings is needed to identify and fully understand which locations are creating barriers and recommend engineering solutions.

- Infrastructure Needs

The game land needs infrastructure improvements to address erosion wherever it is occurring. Eroding foot trails, heavily used fishing areas and forest roads are the greatest sources of fine sediment pollution on the game land and some of these are in need of repair. In many cases, repair will require engineering designs and heavy equipment to out-slope roads, convert fords to dry crossings, and design effective water breaks. Less problematic trails need routine maintenance.

Two former hydropower dams on Hungry River will be removed. The N.C. Department of Environment and Natural Resources, Division of Energy, Mineral and Land Resources, Land Quality Section notified the NCWRC in 2009 that the upper dam on Hungry River was an intermediate hazard and needs repairs to meet safety standards. The NCWRC staff evaluated the cost of repairs and long-term maintenance versus complete removal of the structures and concluded that full removal was the best option. The demolition for both of these dams is scheduled for late 2014 (dam removal is further addressed in the Infrastructure section).

- Management Challenges

The primary management challenge to aquatic communities is the effects of hydropower generation and fine sediment pollution from erosion in the watershed. An additional concern is the Introduction of exotic species. For example, the rusty crayfish (*Cambarus rusticus*), is a likely future invader and may out-compete native crayfishes.

FOREST MANAGEMENT

Forest management practices are probably the most cost effective method available for affecting and achieving desired habitat conditions and diversity on the game land's landscape. Foresty practictices 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 landscape, reducing the risk of catastrophic wildfire, keeping forests healthy, and providing sustainable forest resources.

Forest Land Class, Types, and Conditions

As with much of the southern Appalachian region, the most abundant forest type on GRGL (55.8 %) is the southern Appalachian oak forest (Table 1). Cove forests (13.7%) are also a very important community type. Pine forests are limited (7.9%) although pines commonly occur in mixed pine/hardwood stands in the oak/pine forests (11%). Floodplain forests (2.2%) are

primarily restricted to the bottomlands along the Green River and other major tributaries on the game land. Mesic forests occur in some areas (2%) of Green River Game Land. A detailed description of the species composition, condition, structure, and extent of occurrence of these forest types is presented and discussed previously in the Habitats section of this management plan.

As timber harvests occur, stand replacement burning is implemented, and new wildlife openings are created on log landings, haul roads, and skid trails, additions to early successional wildlife habitat will occur. Current levels of this habitat type on the game land include grass/forb at 0.8 %, shrub/scrub at 4.6 %, and sapling stage at 0.2 %. Conversely, as these types mature, changes in their percentages will occur as they grow and advance into the other forest types.

TABLE 1: Forest Land Class/Types on Green River Game Land (see Appendix 2)

Forest Land Class/Type	Acres	Percent
Oak Forests	7,988	55.8
Oak/Pine Forests	1,583	11.0
Pine Forests	1,134	7.9
Mesic Forests	292	2.0
Cove Forests	1,968	13.7
Floodplain Forests	307	2.2
Grass/Forb	111	0.8
Shrub/Scrub	657	4.6
Saplings	31	0.2
Rock Cliffs	22	0.2
Open Water	18	0.1
Developed	220	1.5
Total	14,331	100.0

Based on the last complete forest inventory, the age class distribution is clumped between 61 and 110 years of age (see Table 2 – Note that the data presented in this table has been adjusted to reflect current year age of these forest stands as of 2013). Younger and early successional forests as well as older growth stands constitute a relatively small portion of the game land. Additionally, about 12.1 % of the game land's forests have not been inventoried.

TABLE 2: Forest Age Class Distribution on Green River Game Land (See Appendix 2)

Age Class (years)	Acres	Percent
0 - to - 10	657	4.6
11 - to - 20	31	0.2
21 - to - 30	87	0.6
31 - to - 40	39	0.3
41 - to - 50	10	0.1
51 - to - 60	404	2.8
61 - to - 70	1,561	10.9
71 - to - 80	2,531	17.7
81 - to - 90	2,682	18.7
91 - to - 100	2,009	14.0
101 - to - 110	1,470	10.2
111 - to - 120	447	3.1
121 - to - 130	160	1.1
131 - to - 140	25	0.2
141 - to - 150	75	0.5
151 - to - 160	0	0.0
161 - to - 170	0	0.0
171 and older	38	0.3
Un-inventoried Forest	1,734	12.1
Grass/Forb	111	0.8
Rock Cliffs	22	0.2
Open Water	18	0.1
Developed	220	1.5
Total	14,331	100.0

Site indexes (a measure of productivity) on GRGL range from as low as 37 on some of the rocky ridge sides to as high as 120 in some of the rich coves. This follows with the wide range in tree diameter growth rates which are as poor as 36 rings per inch to 4 rings per inch in some of the young yellow poplar stands. Tree heights range up to 135 feet in some locations and basal areas can be as high as 155 square feet per acre on some sites. This equates to as much as 20,000 board feet per acre in some timber stands.

Forest Resource Needs

Desired future conditions and management strategies and needs are discussed in detail previously in the Habitats section of this management plan. Given the high percentage of oak stands on the game land, the importance of oak mast (acorns) to a variety of wildlife species, the threat to oak forests from pathogens, inadequate advanced oak regeneration, and the threat of invasive species, forest management will continue to focus on oak and oak/pine forests. 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 on some sites will be emphasized.

Additionally, many of the cove and mesic forests and pine forest stands (which are generally shorter lived than the hardwood forests) are in need of harvest due to old age and decay, storm damage (ice, snow, and wind throw), past insect damage, and other factors. Pines in many stands are generally dropping out of the stand composition. These forest stands along with the oak and oak/pine forests constitute the majority of the clumped age class distribution (61 to 110 years of age) on the game land and harvest in many of these older stands is needed to better distribute stand age classes across the game land, provide greater habitat diversity on the landscape, and add to the limited amount of early successional wildlife habitat.

There is an immediate need to conduct and update the forest resources inventory and stand mapping for the entire game land, including the un-inventoried areas. This will provide important information for planning and directing forestry and wildlife habitat management on GRGL. Additionally, forest management and wildlife habitat research have been an important part of stewardship of this game land and should continue to be encouraged.

Timber Harvest

Timber harvests will improve stand age class distribution on the game land 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 for timber harvest on GRGL include:

- 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.
- Clear-cut units will generally be 25 acres or less in size and will be distributed across the game land to provide habitat diversity and early successional habitat needs on the landscape.
- 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 resources, non-game species, potential management conflicts, and other issues.
- 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).
- 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.

Tree Planting and Reforestation

Generally, clear-cut pine and mixed pine/hardwood stands that are planted back with pine (most likely shortleaf pine on appropriate sites) will occur on a wide spacing of 14 feet by 14 feet to encourage development of mixed pine/hardwood stands, which will provide better habitat diversity than pure pine stands. Additionally, sites to be planted with pines will be site prepared by prescribed burning, which will generally occur in summer immediately following the nesting season. Areas planted with oaks will be planted on a similar spacing to those areas planted with pines. Natural regeneration has and will continue to be the 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.

Prescribed Burning

Prescribed burning is an effective and efficient tool used on GRGL to improve wildlife habitat conditions, restore fire dependent and fire adapted ecosystems, reduce hazardous forest fuel loading minimizing the potential for catastrophic wildfire, prepare timber harvested sites (site preparation) and other forest stands for tree planting and natural regeneration, and manage fields and other wildlife openings.

Generally, understory burning is conducted during the winter and early spring and to a limited extent in the fall months. Burns are typically implemented every 3 to 5 years depending upon goals and objectives. In stands which include timber harvest (primarily shelter-wood cutting) where development of woodland conditions is desired, application of prescribed burning will be less frequent and less intense than usual. On areas selected for development of savannah conditions, application of prescribed burning will be more frequent and more intense than usual.

Aerial view of prescribed fire on Green River Game Land

Annual Forest Management Planning

Generally, an annual forest management plan is developed for forestry and prescribed burning projects on GRGL as part of the overall annual planning process for the Mountain Eco-Region. On Green River Game Land, this annual planning will be directed by this management plan and will address specific wildlife-forestry projects for GRGL including the game land's forest management prescriptions, estimated project acreages (timber harvest, herbicide use, prescribed burning, tree planting, etc. used to achieve wildlife habitat goals and objectives), costs, and forest product receipts (from the sale of timber, pulpwood, firewood, etc.).

INFRASTRUCTURE

Infrastructure Assessment

Assessments of existing infrastructure throughout GRGL were conducted by Engineering & Lands Management staff in 2013. The infrastructure maps included in Appendix 1 (Infrastructure Maps 1-9) of this document show the locations of existing public roads, administrative access roads, trails, parking areas, dams and gates within GRGL. The results of the assessments along with recommendations for maintenance and improvements based on public input and need are discussed by category below.

Road Assessment

The tracts that make up the GRGL are connected and accessed via a combination of improved roads maintained by the NCDOT and access roads that are maintained by the NCWRC. All of the NCWRC access roads except one (the White Oak Mountain Tract road) are closed to public vehicle traffic because of the erosive nature of the soils or because they are being maintained as wildlife openings. The roads are primarily used by NCWRC staff to access the game land for maintenance and conservation work, and are also used by the public as pedestrian pathways for access to hunting, fishing, wildlife viewing, bicycling, kayaking/canoeing and other activities. For the purpose of this infrastructure assessment, firebreaks have not been inspected, but are discussed in other sections of this management plan.

Many of the maintained access roads connect to trails that continue on to various locations and features of GRGL. The NCWRC does not maintain these trails, but two of them in particular (Gallimore Rd. and the Narrows Trail) are heavily used and identified as problem areas. These trails were inspected and are discussed in the recreation facilities section of this report.

Existing Road Conditions

Most of the NCWRC maintained access roads on GRGL are in good condition. Many were recently maintained or improved following timber harvesting. The major NCWRC maintained roads that are in the best condition include the following:

- Long Ridge Road

  The Long Ridge area of the game land was the site of recent forestry management. The road was subsequently re-graded and fresh gravel was applied beginning at the gate at Big Hungry Road and continuing for approximately 1.4 miles. At this point, the gravel road splits into several different trails. The majority of the road is out-sloped with water breaks for drainage. Ditch work is limited to areas adjacent to the culvert crossing near the head of the Turkey Gut trail.

- Chigger Ridge Road

The Chigger Ridge area was also recently harvested for timber. The first ½-mile of the access road from the gate at Big Hungry road was re-graded and surfaced with fresh gravel. This section of road is out-sloped with water breaks for drainage.

Future Road Improvements

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

High Priority

Based on assessments of the current condition, level of use and anticipated use of existing roads on the GRGL; the following should be considered the highest priority for upgrade over the next ten years:

- Gallimore Road/Trail

  This road/trail is closed to vehicle traffic, but is subjected to high levels of foot traffic since it serves as the canoe/kayak put-in and take-out for two popular sections of the Green River.

  The road/trail begins at a private gate at the end of the paved NCDOT maintained Gallimore Road, and runs 0.63 miles to its end at the Green River. The gate is not located on the GRGL, but the land owner has historically allowed foot access for game lands users and maintains an adjacent fee based parking area catering to kayakers. The game land boundary intersects with the road/trail approximately 150 ft. beyond the private gate, with the road/trail becoming the boundary between the game land and private land at that point.

  The first quarter of a mile beginning immediately beyond the gate consists of a 10' wide road bed with only a fair amount of gravel and minimal ditches or crowning. This road bed serves as the property boundary with five separate land parcels before the road completely enters the game land. The NCWRC does not have a right-of-way easement across the first 150 ft. of road beyond the gate or a maintenance agreement with the 5 land owners where the road serves as the property boundary in this section. None of the road/trail is currently maintained by the NCWRC.

  Shortly after the road completely enters the game land, the road bed narrows to a 3'-4' wide dirt foot path until it reaches the Green River. The first 0.2 mile section of the trail is badly rutted and washed out due to a combination of high foot traffic and the channeling of rainfall runoff that has progressed along the trail.

  The rutted section of the trail is the site of ongoing erosion, and should be a high priority for repair. In order to access this section for repairs, it will be necessary to

obtain permission or rights of way from the individual property owners that are crossed by the first section. If permission can be obtained, it may be beneficial to all parties to perform maintenance on the first 0.25 mile section in order to gain access to the critical trail section. Improvements to the first section are estimated to cost $20,000.

A summary of the problem areas and recommended improvements along the remaining portion that crosses GRGL is provided under the "Trails" heading of the "Recreation Facilities" section in this report.

- White Oak Mountain Tract Road

  This graveled access road begins at the gate on NC-1142 (Holbert Cove Rd.), and runs for 0.7 miles to a small parking area at its end. This is the only NCWRC maintained road on GRGL that is opened to seasonal public vehicular access. All but the last 300 feet of this access road runs through private land with right of way to NCWRC. The end section including a turn-around and small parking area are located on the White Oak Mountain tract of the eastern section of GRGL.

  The road is in overall good condition with the exception of the steeper sections that comprise less than one third of the total road length. A lack of adequate ditches has resulted in wash-outs along these steeper sections following heavy rains. In some cases, gravel has been washed off to expose bare earth on the road. One 24"Ø CMP culvert is in place that carries flow from an intermittent stream. The culvert appears to be adequately sized and in good condition, but has been known to clog with leaves following rain events in the fall months. Estimated repair cost for ditching, replacing gravel is $30,000.

<u>Medium Priority</u>

The following roads should be considered as medium priority for upgrade after completion of improvements to the listed high priority road projects:

- Walcott Tract Road

  The two mile road accessing the Walcott Tract can be discussed as three sections. The first 0.13 miles runs from Green River Cove Road on a right of way through private property to a gate at the game land boundary. NCWRC maintains a parking area for hunter and angler access located in front of this gate. This section of road and the parking area have a good gravel surface, and are well maintained.

  The second section runs for one mile from the gate to a ford of Cove Creek. Most of the road follows the Green River along fairly flat bottom land that is actively managed for wildlife and hunting/wildlife watching opportunity. This section of road has a fair amount of gravel, but with minimal crown and marginal ditches. There were no signs

of erosion or sediment issues along this section of road, but one 12”Ø RCP culvert is undersized and needs to be replaced. Since this section of the road is not open to public vehicle traffic, it has not required a high level of maintenance. Adding gravel and improving drainage will help keep this section in good shape for management and hunter/angler access. Estimated cost to add gravel, work ditches and replace the culvert would be approximately $60,000.

Section two ends at the approach to an existing ford through Cove Creek. This creek is a significant obstacle to foot access to the wildlife habitat improvements beyond the ford. The creek is approximately 50’-60’ wide at the tops of its banks, and is difficult to wade through except during low flow conditions. The existing ford has been used since before NCWRC acquired this tract. It crosses the creek at an angle, and is approximately 110’ from bank to bank. The creek bed at this location consists of large cobble. While generally passable for 4WD vehicles with high ground clearance, it can still be treacherous to drive maintenance vehicles through. The approaches on both banks have been graded back with 3” stone applied. The approaches will require regular maintenance to keep erosion impacts to a minimum. Maintenance of the ford should also include an effort to divert overland runoff on both sides away from the ford approaches.

This ford has been identified as a site for potential infrastructure improvements. Development of a foot bridge would provide safe and easy public access to the remaining section of the Walcott tract. This foot bridge could be developed separate from the ford in order to minimize the span. The estimated cost of building a pedestrian bridge would depend on the type of construction and the length of the span, and in this case should be in the $30,000-$50,000 range.

Improving the ford itself would provide better access to the game land beyond for management and timber harvest activities. It could also reduce environmental impact of the ford and the risk of damage to vehicles during crossing. Constructing a concrete ford would cost an estimated $20,000.

Another option would be to consider building a bridge across Cove Creek for vehicle and pedestrian traffic. The bridge would need to be designed and built to support loaded logging trucks, and would likely cost considerably more than the combined cost of the pedestrian bridge and ford improvement.

The third section of the Walcott Tract road runs for approximately 0.5 miles through an open bottom land area to the game land boundary along Little Cove Creek. It is currently a dirt & grass road bed with no ditches or crossings. The road is in good condition, but establishing a gravel surface may be needed if future management activities such as timber harvesting dictate.

- Chigger Ridge Road (Remainder)

The remaining 1.8 miles of the Chigger Ridge currently consists of a grass/dirt road grade with little or no ditching. The section of GRGL accessed by the Chigger Ridge road is managed as a linear wildlife opening. Allowing public vehicle access through this corridor is not compatible with this management approach. Additional road grading is needed to improve the access through the area that was logged in 2012. Management staff is planning to build a series of firebreaks in this area within the next year, and will address road improvements at that time.

Low Priority

The Long Ridge access road was previously mentioned as an example that is in good existing condition. A recommendation to add a parking area near the head of the Turkey Gut trail would open the first 0.6 miles of this road to public vehicle traffic. It may then be necessary to consider upgrades to this section of the Long Ridge road such as increasing its width or creating pull-offs along with the addition of gravel and improved drainage.

New Road Construction

Due to the extents of the designated areas throughout the GRGL, the steep topography and the presence of NCDOT and NCWRC access, there are few options for the development of new access roads. Some areas of the game land that do not currently have road access are isolated tracts that are cut off from existing roads by private property.

Road Maintenance

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

Typical Road Maintenance Practices

- Inspect Roads regularly, especially before the winter season and following heavy rains.
- Keep ditches and culverts free from debris (see also Culvert Maintenance Section of this Management Plan).
- Remove sediment from the road or ditches where it blocks normal drainage.
- 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 eleven identified parking areas maintained by NCWRC on GRGL. Some of these are pull-offs along the NCDOT maintained roads. Many others provide hunter access parking for 2-6 vehicles in proximity to the gates at the heads of access roads and trails.

The NCWRC maintains two larger parking areas adjacent to the Green River along Green River Cove Road. Both (Fish Top and Big Rock) were established to provide angler access to the river, but are also frequently used for canoe/kayak and tubing access. Each of these areas has capacity for 25-30 single vehicles. Both areas are well maintained gravel lots. Post and cable barriers around the perimeters could be improved. Both of these parking areas have been identified for potential accessible PFA platform development which will be discussed further in the recreation facilities section of this report. Both areas also show signs of erosion along the river bank resulting from heavy use by anglers, boaters and tubers. Developing improved launches at these two parking areas should be a high priority in order to reduce these impacts.

Seven sites have been identified for development of additional parking areas. These are shown on the 7 infrastructure maps in the appendix and are described as follows:

- Three pull-off parking areas are proposed along NCDOT maintained roads (Pot Shoals Rd., Guice Rd., & General Hill Rd.) to provide public access to the portion of the game land located in Henderson County on the southwest side of I-26. The Pot Shoals and Guice roads sites will require only minimal leveling and stone, and each should provide parking space for 2 to 4 vehicles. Combined cost for these 2 parking areas is estimated at $7,000. The General Hill Rd. location will require some significant site preparation in additional to stone. Estimated cost of this improvement is estimated at $20,000.

- A pull-off parking area is proposed along Big Hungry Rd. approximately 200 yards to the west of the Henderson and Polk County line. This development will add 2 to 4 hunter access parking spaces. Cost for this development is estimated at $3,000.

- A pull-off parking area is proposed along Holbert Cove Rd. where it borders the eastern boundary of the tract between I-26 and Holbert Cove Rd. This will also add 2 to 4 new hunter access parking spaces. Cost of this development is estimated at $3,000.

- A new parking area is proposed along the NCWRC maintained Long Ridge road near the head of the Turkey Gut trail. This will require some grading and gravel, and should provide 4 to 6 new parking spaces. Two new gates will need to be installed at this location. Cost of this development is estimated at $7,000.

A new parking area is needed adjacent to the gate at the head of the Gallimore road/trail. This access road/trail is heavily used as the canoe/kayak take-out for the upper section of the Green River and as the put-in for the popular Narrows section of the Green River. Public parking is currently limited to 2-3 spaces at the end of Gallimore Rd. and is not sufficient to meet demand. Currently, an adjacent landowner operates a fee parking area at the end of Gallimore Rd. that caters to kayakers. An area has been identified that is concurrent with the construction access proposed for the removal of the lower Big Hungry dam. It may be possible to develop an area that could accommodate 8 to 12 vehicles depending upon the limitations of the terrain. This plan should be investigated further and development of additional parking or possible acquisition of the existing fee parking area should be considered a high priority. Estimated development cost for the new parking area is $30,000.

In addition to these sites, needs for improvements have also been identified at the following areas:

- Existing parking along Big Hungry Road near the head of the Pulliam Creek trail is limited to only a couple of vehicles. This trail is popular with hikers, particularly spectators who use this trail to reach points where they can view the Green River race through the Narrows gorge. Options to expand parking are limited at this location, but should be evaluated.

- Gravel pull-offs are in place on both sides of Big Hungry Road on the west side of the bridge crossing Big Hungry Creek. These areas are not currently maintained by NCWRC, but they are subject to heavy use by anglers and swimmers in the summer. These areas are washed out in places and are in need of maintenance or improvement. These areas are likely to be used for staging during the proposed removal of the upper Big Hungry dam, and should be improved when those operations are concluded.

- The existing parking area at the end of the White Oak Mountain tract access road provides limited seasonal parking for two to three vehicles at best. Potential to develop additional parking at this location should be considered.

Gates

Lockable gates are installed at or near the entrance of each NCWRC maintained access road. These gates limit access in these areas to staff, contractors, and cooperators except for those areas where seasonal public vehicle access is permitted.

All gates are constructed of steel pipe with concealed locks, and are in good condition.

Drainage Structure Assessment

Dams

There are currently two large dams in place on Big Hungry River within GRGL. The upper dam is located (N35.300042°, W82.350471°) just upstream of the Big Hungry Road bridge where Big Hungry Road crosses the river. The lower dam is located (N35.293009°, W82.355773°) approximately 0.8 miles downstream of the upper dam. These dams were built during the 1920's and are relics of a power generation operation.

The upper dam is concrete and approximately 33 feet high. The dam's spillways consist of a 4' wide notch in the crest, and a 36"Ø steel pipe that was formerly the penstock for power generation. Both outlets have been prone to clog with sediment or debris following heavy rain events. The area below the upper dam is popular with anglers and swimmers due to its close proximity to Big Hungry Road. It is also easy for the public to access the top of the dam via the existing maintenance access road. This presents obvious public safety concerns.

The lower dam is the remnant of a concrete and timber structure that is approximately 20 feet high. The remaining concrete buttresses tend to act as a sieve catching much of the woody debris and sediment that wash downstream. Periodically, a portion of the debris jam will give way and release a slug of sediment that can eventually flow into the Green River.

In 2009, the N.C. Department of Environment and Natural Resources, Division of Energy, Mineral and Land Resources, Land Quality Section notified the NCWRC that the upper dam on Hungry River was an intermediate hazard and needed repairs to meet safety standards. NCWRC staff evaluated the cost of repairs and long-term maintenance versus complete removal of the structures. It was decided that full removal of both dams and restoration of the impacted sections of Big Hungry River immediately upstream of each was the best option. A consultant was hired to develop a removal plan for both dams along with plans to restore the impacted sections of Big Hungry River immediately upstream of both dams. The demolition for both of these dams is scheduled for late 2014. The design, permitting, dam removal and restoration activities are expected to cost approximately $1.5 million.

Dam Maintenance

The two existing dams on Big Hungry River are slated for removal during 2014-15.

The lower dam is cannot be accessed with equipment at this time, and should not require any maintenance before it is removed.

The two outlets of the upper dam have been subject to clogging at times. The 36"Ø penstock pipe and the 4' wide notch at the crest currently act as the outlets or spillways of this dam. The inlet of the penstock pipe is several feet lower than the crest notch and is located at the far river right side of the dam. This pipe has been known to plug with woody debris and sediment. Flow is then diverted through the crest notch at the center of the dam. When debris also obstructs the notch, water will back up and may pass over the top crest of the dam. At times, the pipe or notch may reopen temporarily releasing debris and accumulated sediment.

When a blockage of either or both outlets are identified, it is preferable to use an excavator to clean out sediment that may have accumulated near the pipe inlet and attempt to remove the blockage as soon as water levels are low enough. This will allow sediment to be applied to an upland area rather than having it released back into the creek.

Generally these types of blockage only occur after extended heavy rains. Following such events, management staff should visually assess the condition of both outlets. If a severe blockage is observed, engineering staff should determine the best course of action to remove the blockage.

Impoundments

There are no impoundments, ponds, or lakes located within the GRGL.

Culverts

Many of the NCWRC maintained access roads on GRGL are out-sloped with water breaks installed for drainage. In some locations, culverts were installed prior to NCWRC acquisition of the particular tract. Culverts with known maintenance issues were identified and assessed. Culverts recommended for replacement are described as follows:

- Walcott Tract Rd. (N35.27518°, W82.30285°) – A single, 12"Ø reinforced concrete pipe with evidence of blockage, damage and overtopping needs to be resized and replaced.

- Off Big Hungry Rd. (N35.29342°, W82.33301°) – A 36" Ø CMP culvert in and unnamed, intermittent tributary to Pulliam Creek between two wildlife openings is damaged and requires replacement.

Culverts have also been identified that appear to be adequately sized and in good condition but showed evidence of clogging or overtopping. These culverts should be maintained more frequently and replaced if problems persist:

- Long Ridge Rd. (N35.28635°, W82.31798°) - A 24”Ø CMP culvert near the Turkey Gut trail head with evidence of clogging near the outlet and overtopping. This culvert appears to be adequately sized for drainage, but needs to be maintained more frequently to remain clear of leaves and sediment.

- White Oak Mountain Tract Rd. (N35.27377°, W82.25616°) – A 24”Ø CMP culvert carrying flow of an intermittent stream which has clogged with leaves and overtopped following heavy rains during fall months. This culvert appears to be adequately sized for drainage, but needs to be maintained more frequently to remain clear of leaves.

- Bear Creek trailhead (N35.29020°, W82.31860°) - A 24”Ø CMP culvert between the Long Ridge access road and the beginning of the Bear Creek trail has been silted in and is currently stopped. This culvert should be cleaned out according to the maintenance standard, and inspected frequently. If it continues to clog, it may require resizing and replacement.

Culvert Maintenance

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

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

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

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

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

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

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

Flow overtopping the road at the culvert location generally indicates that the pipe is undersized and could warrant resizing and replacement. Any damage to the culvert, as described above, may also necessitate replacement of the pipe. If maintenance staff identifies any culverts that may need replacement, they should contact engineering staff to calculate the peak flow capacity and diameter of the new pipe. Any culvert upgrade consisting of a single pipe 36” and greater or a crossing utilizing multiple lines of pipe should include design considerations for fish passage.

Recreational Facilities

Green River Game Land provides a variety of opportunities for public recreation. This section will review existing recreation facilities and describe sites identified for potential new development.

Boating Access Areas

There are no boating access areas for registered motorized boats within GRGL. The creeks and rivers within the game land are not suitable for motor boat navigation. The Green River is frequently used by recreational paddlers of canoes and kayaks and to a lesser extent for float fishing. During summer months the section of the Green River that runs alongside Green River Cove Road is used extensively by commercial outfitters and private groups for tubing.

Recreational paddlers and anglers are known to access the Green River at the Fish Top and Big Rock public fishing access areas. A spot along the right bank of the Green River at the end of the Gallimore Road trail is also frequently used as a canoe/kayak take-out and put-in. There

are no improved facilities for the launch and retrieval of canoes, kayaks and tubes at any of these three locations. Evidence of bank erosion resulting from these activities has been observed.

The development of step or slide launches along with improved access trails at all three sites would help to eliminate further bank erosion and would make launch and retrieval of these vessels easier and safer for users. Each site should be further assessed to identify the optimal sites for these improvements. Estimated cost for each put-in/take-out improvement is $10,000.

Public Fishing Piers

There are currently no public fishing piers or platforms located on streams or rivers on GRGL. The parking areas at Fish Top and Big Rock were developed for public fishing access to the Green River. Most anglers that use these facilities wade into the river to fly fish. There are no improved facilities that provide bank fishing opportunities for disabled anglers at these sites.

NCWRC staff should assess these sites for potential to develop public fishing platforms with accessible routes connecting to designated ADA parking. Estimated cost to develop a fishing platform, accessible route and ADA parking at each location is $15,000.

Shooting Ranges

There are currently no designated shooting ranges on GRGL. Several sites were evaluated for potential development. These were each determined to be unsuitable either due to terrain or their proximity to designated areas or private residences.

Camping Areas

There are currently no designated camping areas on GRGL. A potential site to develop a primitive camping area has been identified on the game land off of Big Hungry Road. This proposed camping area is located (N35.29034°, W82.31958°) on a grassy spur ridge with approximately 0.25 acres of clear, flat land. This site would provide space for 2 to 3 individual campsites. Minimal grading or improvement to the area would include construction of 100’ of improved road and installation of one gate. A paddle sign indicating that primitive camping is allowed would be posted near the gate. Estimated cost for this improvement is $5,000.

Trails

There are over 14 miles of established hiking trails on GRGL. Sections of the Long Ridge and Gallimore Road trails coincide with the NCWRC maintained access roads mentioned above. The majority are established foot paths that are not maintained by NCWRC. These trails have historically been maintained by user group volunteers. Increased demand for recreational access to certain areas of the game land has given rise to concerns over environmental impacts and safety on the following trails:

- Gallimore Road

  This trail is also discussed in the "Roads" section of this report. The 0.63 mile access is heavily used by recreational kayak and canoe paddlers. It serves as a take-out for the upper section of the Green River below Lake Summit. This section is floated by recreational paddlers as well as anglers. This point on the Green river also serves as the put-in for the Narrows section of the Green River. This section is renown by whitewater paddlers as one of the premier Class IV-V+ runs in the eastern United States. Each paddler that intends to run the Narrows carries his or her boat down the Gallimore Road trail in order to launch.

  The first 0.25 miles of the road bed/trail crosses or shares a property boundary with five individual property owners. Without existing easements or rights of way, NCWRC staff will be limited in their ability to repair or maintain the trail section. Just beyond the point where the trail enters GRGL, a section of significant damage resulting from the combination of foot traffic and confined runoff has been identified. Ruts and gullies have formed and continue to worsen along a 0.2 mile section of the trail. Many of these ruts are several feet deep and carry runoff for considerable distances before it is able to escape the confines of the road bed. Below the rutted section, the trail narrows but is otherwise in relatively good condition until it ends near the river bank.

  When repairs are completed, the improved trail will be able to withstand the increasing volume of traffic from recreational paddlers and anglers. If easements or rights of way can be established, this road/trail could also provide potential access for fish stocking at this section of the Green River as well as improved access for enforcement. Repairs to the trail section should be considered a high priority in order to minimize the erosion impacts and provide a durable surface for these activities.

  Repair of the trail would require an engineered design to restore and stabilize the rutted section. The remaining sections could be widened as needed and resurfaced with gravel assuming NCWRC could obtain easements or rights of way through the first 0.25 mile that runs through private land. Estimated cost of repairs and improvements to the trail section would be approximately $38,000.

  In addition to the trail/access road repairs and stabilization, NCWRC should investigate the potential for providing an improved kayak/canoe launch to minimize bank erosion along the Green River and consider options to provide increased parking at the head of the Gallimore Road trail.

  Also, the development of an expanded parking area near the gate should be considered a high priority. Users must currently park along Gallimore Road, or pay for a membership to park in a privately owned field on the opposite side of Gallimore Road from the gate. Due to increased demand for access at this location, NCWRC should investigate the feasibility of either developing a new parking area on the Game Land or acquiring the existing private parking area.

- Pulliam Creek Trail

  The Pulliam Creek trail is an established foot path that runs for 2.32 miles. It begins at Big Hungry Rd. (NC-1154), and ends at a junctions with the Bear Branch and Green River Cove trails. The trail is used primarily by hikers and at times by spectators of whitewater paddling events through the Narrows. It is also used for mountain biking as well as hunting and angling access.

  Maintenance of the Pulliam Creek trail has historically been through the efforts of volunteer groups. No formal maintenance agreement currently exists between NCWRC and any of these groups.

  The section of the Pulliam Creek trail between Big Hungry Road and the junction of the Narrows trail was assessed following a mountain biking event in September of 2013. Impact from the event was minimal due in part to good weather conditions. Event coordinators installed several log water breaks at spring and tributary crossings.

  Use of this trail will continue to increase along with the demand for access to this section of the game land by non-traditional users. Since the trail runs through a Natural Heritage primary area, identifying sources of erosion for maintenance or improvement should be considered a priority. Any points along the trail where tributaries cross could be stabilized by installing culverts. Water breaks along steep sections of trail can also capture sediment.

  A primitive foot bridge has been constructed to cross a deep stream channel near the trail head at Big Hungry Road. Runoff appears to flow down the trail toward the point where the bridge timbers tie to the bank. Scour could potentially destabilize this bridge. Replacing this bridge is a high priority. Estimated cost to replace the foot bridge is $5,000.

  With increasing traffic on the Pulliam Creek trail, it is important that NCWRC pursue a formal trail maintenance agreement with a volunteer group. The NCWRC should be prepared to provide guidance and support to the volunteers in order to ensure that maintenance practices meet certain standards and do not impact sensitive areas. NCWRC staff should also perform routine inspections of the trail and any infrastructure improvement.

- Narrows Trail

  The Narrows trail is a short (approximately 600 feet) but very steep (grade > 50%) trail that starts at a point approximately 1.7 miles down the Pulliam Creek trail from its beginning at NC-1154 Big Hungry Rd. These trails provide the only access to the showcase drops along the Narrows section of the Green River. During the Green River race spectators numbering in the hundreds have descended this trail to find vantage points on the rocks along the river edge.

The steepness of the Narrows Trail and the level of use it is subjected to during certain periods have resulted in a treacherous, denuded swath from the Pulliam Creek trail down to the river edge. As spectators continue to try to find easier paths to the bottom, the impact area has increased.

The slopes on both sides of this section of the gorge are equally steep and rocky leaving few options to find a gentler path. NCWRC staff should investigate the feasibility of constructing a new path or stabilizing the existing Narrows trail in order to minimize the erosion impacts. The Natural Heritage primary designation, existing terrain and lack of access for construction equipment will limit these options. In any case, improving the Narrows trail will require a great deal of hand labor. This may best be achieved through cooperation with volunteer groups. NCWRC will explore design and construction possibilities.

- Bradley Falls Trail

  The parking area at the head of the trail to Bradley Falls is located on Holbert Cove Road. This trail is used heavily by visitors who wish to hike to the waterfall. A small tributary near the head of the trail must be crossed. This point has been identified as a source of erosion and construction of a small pedestrian bridge spanning this tributary is recommended. Estimated cost of this development is $4,000.

<u>Recreational Facilities Maintenance</u>

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.

PUBLIC USES

Primary public uses of state owned game lands include hunting, fishing, trapping, and wildlife viewing. All other uses of state owned game lands are considered secondary uses and are evaluated using the Game Lands Use Evaluation Procedure to determine their compatibility with primary uses (see Appendix 5).

A public input meeting regarding GRGL was held in Flat Rock on 8/1/2013. The public was also given the opportunity to provide input regarding GRGL via the agency website (see Appendix 6). Input received from the public as well as staff working knowledge was used to guide and prepare the sections below.

Hunting/Trapping

Hunters and trappers are considered primary users of GRGL. Management strategies should include those that help maintain the current number of hunters on the game land or increase hunter numbers in some relatively inaccessible areas that are lightly hunted at present. Trapping currently occurs at low levels on the game land. Any management strategies that encourage trapping should be implemented. Acquisition of properties or easements that provide for better access to remote areas of the game land will help increase hunting and trapping in those areas. The construction of several new parking areas, especially in the western portion of the game land will help provide better access (see Infrastructure section). In addition, the seasonal opening of some gated roads where feasible and appropriate will help address access concerns. The construction of a foot bridge on Cove Creek will address an access concern to one of the most heavily hunted areas of the game land (see Infrastructure section). It should be noted that approximately 60% of those that attended the public meeting felt that the current level of access to the game land is satisfactory; the remaining 40% requested additional access. This should be considered as plans for additional access are developed. Locations that will enhance disabled hunter opportunities will also be developed. A focus on active habitat management in heavily hunted sections of the game land will ensure that adequate numbers of game species are present and will keep hunter interest high. Challenges to providing a quality hunting and/or trapping experience include conflicts with hikers, bikers, and other hunters/trappers as well maintaining adequate levels of game species to provide for reasonable hunter success rates.

Fishing

Anglers are a primary user of GRGL and management strategies that increase the number of fishermen using the game land will be adopted. Although there were many requests at the recent public hearing to stock additional trout in the hatchery supported and delayed harvest sections of the Green River, these sections are already being stocked at their standardized rates.

Although summer temperatures of the Green River below Cove Creek and above Lake Adger are too warm to support trout, cool water and warm water sport fishes have been historically absent. In June 2013, the NCWRC began experimentally stocking smallmouth bass fingerlings in the hatchery supported section of the Green River. Due to the slow growth of smallmouth bass in streams, it will be several years before we know if this experiment is successful and increases angler opportunity by creating a smallmouth bass fishery.

Anglers access the Green River from Fishtop and Big Rock parking areas, several small unnamed parking areas, and roadside pull offs. Due to their close proximity to water and foot traffic, these access points are potential fine sediment sources and therefore they should be maintained and monitored. Problem locations may need to be improved with engineering solutions to control sediment.

A potential challenge to providing to a quality fishing experience on the game land is the high volume of recreational floaters using public fishing access areas to access and to float the Green River. However, we received very few comments over conflicts between the two user groups at the GRGL plan public input meeting. In the Green River anglers prefer low flows whereas the floaters prefer high flows. This inherent temporal resource partitioning minimizes conflicts between the user groups. An additional threat to the fishing experience is trash from anglers and floaters.

Wildlife Viewing

Wildlife viewing includes activities such as birding, wildlife photography, and general wildlife viewing. Wildlife viewers are considered a primary user group at GRGL. Management strategies to increase the number of wildlife viewers that utilize the game land should be implemented. Strategies to increase and enhance wildlife viewing opportunities include: directional signage along roads that provide access to the game land, informational signage regarding wildlife viewing opportunities at key access locations (i.e. parking areas), better publicizing the existing birding trail on the game land and identifying key waypoints along the trail, adding a new birding trail in the Green River Cove area, adding signage at kiosks that indicates the best times of the year for wildlife viewing, involving birding groups with special projects on the game land and directly publicizing the birding trails to birding groups in the region. Infrastructure improvements needed to better facilitate this user group includes 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 as outlined in the Habitat section of the plan will ensure that adequate numbers and a diversity of wildlife species are present on the game land and will serve to keep viewer interest high. Developing specific habitat improvements along bird trails and near parking areas will be explored. The primary challenge to provide a quality wildlife viewing experience include conflicts with other user groups on the game land.

Other Outdoor Recreation

Kayaker on The Narrows section of the Green River

The most popular outdoor recreational pursuits at GRGL include kayaking, hiking, and tubing. In addition swimming, mountain biking, and rock climbing occur at lower levels. All of these users are considered secondary users of the game land.

Kayaking is an extremely popular year-round pursuit mainly from the Fishtop access area upstream to the game land boundary. This section features several class V rapids. The most frequent request from kayakers at the public input meeting was to improve access at the end of Gallimore Road. To address this request and to ensure that kayakers are having as minimal an impact as possible on natural resources, improvements need to be made to the Gallimore trail that provides access to the upper river (see infrastructure section). Parking for kayaking access is currently being provided by a private landowner at the end of Gallimore Road. To better facilitate access to the upper Green River the construction of a parking area at the end of Gallimore road is also being explored (see infrastructure section). The annual Green Race is held in the Narrows section of Green River each November. A large number of spectators

(several hundred) access the Narrows via the Pulliam Creek trail to watch this event. Improvements to the existing trail need to be made to better facilitate not only spectators for this event but hikers that utilize the trail for access to the Narrows year round (most likely the biggest user of this problem "trail"). Due to extremely rugged and steep terrain from the Pulliam Creek trail down to the river (+/- 600 ft.) providing an environmentally sound access trail that goes all the way to the Narrows is problematic (see infrastructure section). Partnerships should be developed between WRC and kayakers or those with kayaking interests to maintain key access trails to the river. Conflicts between kayakers and tubers are minimal since each user group generally prefers different sections of the river. Conflicts between kayakers and fishermen are also currently minimal (see Fishing section above).

Tubing is a popular recreation pursuit during summer months on the Green River between the Fishtop and Big Rock access areas. Several businesses in the area provide tube rental and shuttle services that cater to tubers. Addressing tubing issues is challenging due to the ownership pattern of the river where tubing occurs. In this section, portions of the river lie entirely on the game land while in other sections the river serves as the boundary between private land and game land. In other areas the river lies entirely on private land. Key access points, however, are located on the game land. Stairs and/or steps should be constructed at selected access points to minimize erosion and bank degradation. Some conflicts between fishermen, tubers, and kayakers occur, but conflicts are relatively minimal since the flow rate of the river is controlled by hydroelectric generation upstream (see Fishing section). Partnerships between WRC and tubing/shuttle businesses should be developed to help resolve any future issues that arise from this use and to assist with access area maintenance.

Hiking is a very popular activity on the game land and occurs year-round. Approximately 13 miles of developed hiking trails are located between the Big Hungry section of the game land and Green River Cove. The primary requests from this user group at the public meeting include the development of partnerships between hiking groups and WRC that allow for trail maintenance and the construction of new hiking trails on the game land. The establishment of new trails will need to be made on a case by case basis to ensure that new trails do not create excessive erosion issues, are not in violation of the Natural Heritage dedication, and do not displace or create excessive conflicts with primary game land users. Improvements to the Pulliam Creek trail that reduce current levels of erosion should be made as soon as possible (see Infrastructure section). Development of an environmentally sound hiking trail from the Pulliam Creek trail down to Green River is being explored but will be difficult. Development of a trail in this area is problematic due to extremely rugged and steep terrain (see Infrastructure section). Conflicts between hunters and hikers occasionally occur. Providing information on kiosks at key access locations may help reduce this source of conflict among user groups.

Mountain biking currently occurs at GRGL, but not at high levels. While there are no plans to prohibit this activity, increased levels of mountain biking should not be encouraged due to the erosive nature of the soils found on the game land (see soil section) and a lack of suitable trails to ride on that do not create conflicts with hikers, hunters, and wildlife watchers. Increased levels of mountain biking should also be discouraged since it can degrade wildlife habitat

improvements especially in sensitive areas. Ample opportunities for mountain biking can be found on the nearby Pisgah National Forest and this activity should not be featured on GRGL.

Rock climbing currently occurs at very low levels on the game land. Due to the extremely sensitive nature of rock formations and the rare species that inhabit them, rock climbing should be discouraged on the game land.

Swimming occurs during summer months, mainly in the Green River Cove section of the game land. The current level of swimming should be maintained and no efforts to increase this use should be made. This activity, at current levels, generally creates few conflicts among game land users except at public fishing access areas.

Geocaching currently occurs at low to moderate levels on the game land. Geocaching is an activity where participants use Global Positioning Systems or other mobile devices to hide and seek containers called “caches”. Any caches located in hazardous locations can potentially put others in a dangerous situation trying to find the cache and brings up numerous liability issues. Geocaching can continue to occur at current levels, but some restrictions may need to be implemented. Conflicts between hunters and geocachers may occasionally occur. Providing information on kiosks at key access locations may help reduce this source of conflict between user groups.

Horseback riding is currently prohibited on GRGL due to a lack of suitable roads (graveled) of sufficient length for providing this activity. The highly erosive nature of the soils located on the game land makes horseback riding on dirt roads or trails problematic (see Soil section above). Allowing horseback riding on hiking trails would create additional erosion issues and conflicts with hikers, hunters, and wildlife watchers. Horseback riding also exacerbates the probability of introducing additional exotic species on the game land. Only 2 requests for horseback riding were received via public input. Due to the factors above and few requests for this activity on the game land coupled with ample opportunities for horseback riding on the nearby Pisgah National Forest and other public lands in the region horseback riding should continue to be prohibited.

Several local businesses offer guided trips featuring the above activities or are providing services to promote them (i.e. tube rental, shuttle services, etc.). In addition, large events such as the Green Race and the Green River Games are held on the game land. These events and commercial activities can create resource degradation and conflicts among event participants/clients of commercial businesses and other users on the game lands. A policy regarding commercial activities and large events on all game lands should be developed to better manage these uses. Many comments were received via public input regarding the requirement of a game lands use permit for all users. This requirement should be further explored at the statewide level.

INFORMATION NEEDS

Current State of Knowledge

- Biennial black bear bait station index
- Annual songbird survey
- Fire and Fire Surrogate Study - assessment of impacts and effects of fire on wildlife, insects, vegetation, fuels, and soils (NCWRC, USFS Southern Research Station, and Clemson University cooperating, study completed and ongoing)
- Wildlife Species List from Fire and Fire Surrogate Study (Appendix 6)
- Regional Oak Savanna Study - assessment of fire use and timber harvesting to create oak savannah, effects and impacts on wildlife, and oak regeneration response (NCWRC and the University of Tennessee cooperating, study ongoing)
- Fire Effects in Table Mountain-Pitch Pine on Vegetation and Wildlife Habitat - assessment of fire use in restoring table mountain and pitch pine forest communities, effects on wildlife habitat, and pine regeneration response (NCWRC and Clemson University cooperating, study completed)
- Annual bat survey
- Past small mammal surveys
- Past reptile surveys
- Big game harvest records

Ongoing efforts should be continued as long as they are providing relevant and useful information.

Wildlife/Habitat Inventory and Monitoring Needs

White-tailed deer and wild turkey are featured big game species on GRGL. 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 WRC 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 GRGL. General Surveys to inventory and monitor these species and their habitats are warranted. More specifically, surveys of rock outcrops to monitor green salamanders and surveys of vernal pools to monitor ambystomatids are needed. There is also the need to identify timber rattlesnake and coal skink hibernacula on the game land. With basic inventory

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

Cerulean warblers are found at low levels on the game land; however, surveys to monitor this priority species are warranted. When active breeding sites are found, management actions will be considered to increase numbers.

There are a number of invasive plants that are well established on GRGL. Control efforts for some of these plants are ongoing. Other invasive plants are so established and widespread on GRGL 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 GRGL 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 GRGL 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

- Enhance opportunities for wildlife watchers
- Better monitor numbers of deer and turkey hunters
- Monitor use of trails - who, how much, when?
- Monitor use by birders/wildlife watchers
- Develop list of all commercial users
- Monitor all commercial use on the game land
- Research to determine user group dynamics

- Research to monitor habitat degradation by game land users
- Perform comprehensive user survey

FINANCIAL ASSETS AND FUTURE NEEDS

Current Assets

The current level of staffing is adequate to meet the objectives of the plan. The current staffing is indicated below.

- 1 Ecoregion Supervisor
- 1 Wildlife Forester
- 1 Land Management Biologist
- 1 Conservation Technician Supervisor
- 3 Conservation Technicians
- 1 District Fisheries Biologist
- 1 Assistant District Fisheries Biologist I
- 1 Aquatic Nongame Coordinator
- 1 Aquatic Nongame Biologist
- 4 Faunal Wildlife Diversity Staff
- 5 Wildlife Enforcement Officers
- 1 Field Engineer
- 1 Temporary Technician

No staff are dedicated solely to GRGL or housed on the game land. The current technician staff is not adequate if routine trail maintenance is performed by WRC. Routine trail maintenance should be performed by conservation partners via MOU.

FUNDING NEEDS

Current and future estimated expenditures for managing GRGL through 2024 are presented in Table 1 on the following page.

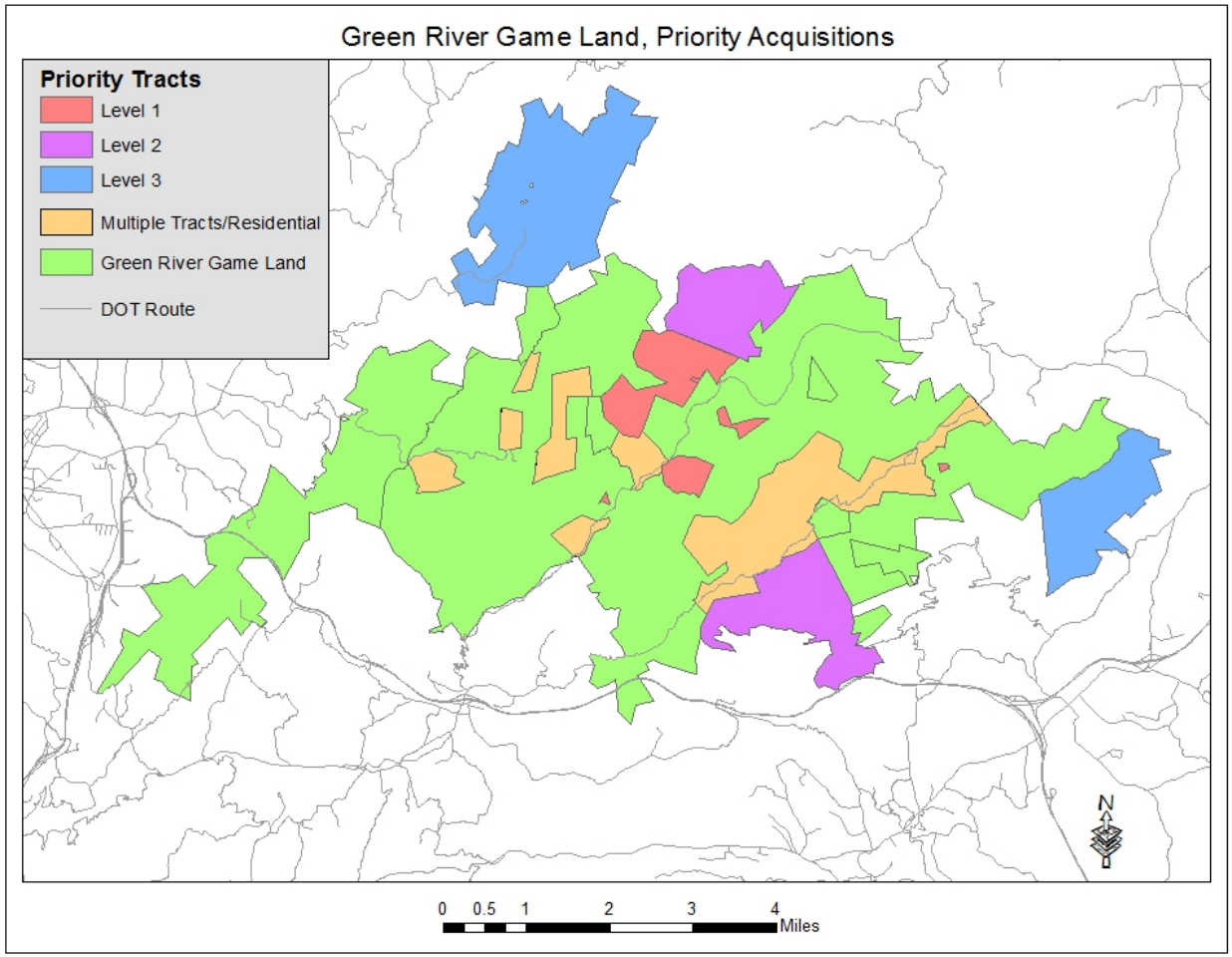
Table 1. Estimated current and future expenditures for managing Green River Game Land through 2024.

Green River Game Land																
Financial Summary of Activities																
Habitat Activities																
					Unit											
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Cost**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
H	Development of Clearings	Wildlife Opening Establish.	1	ac	$ 3,000	3000	3074	3151	3229	3309	3391	3475	3561	3650	3740	$ 33,579
H	Firebreaks	Construct firebreaks	2.2	mi	$ 3,000	6600										$ 6,600
H	Firebreaks	Maintain firebreaks	3	mi	$ 700	2100	2152	2205	2260	2316	2374	2433	2493	2555	2618	$ 23,506
H	Herbaceous Planting	Planting/Maintenance	70	ac	$ 200	14000	14347	14703	15068	15441	15824	16217	16619	17031	17453	$ 156,703
H	Nesting Structures	Nest Box Maintenance	5	ea	$ 25	125	128	131	135	138	141	145	148	152	156	$ 1,399
H	Trees and Shrubs	Planting/Maintenance	80	ea	$ 6	480	492	504	517	529	543	556	570	584	598	$ 5,373
H	Vegetation Control	Invasive Plant Control	6	ac	$ 200	1200	1230	1260	1292	1324	1356	1390	1424	1460	1496	$ 13,432
H	Vegetation Control	Prescribe burning	165	ac	$ 30	4950	5073	5199	5327	5460	5595	5734	5876	6022	6171	$ 55,406
															Subtotal	$ 295,998
Operation and Maintenance Activities																
					Unit											
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Cost**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
O & M	Bridges	Replace Culvert	1	ea	$ 2,500	2500	2562	2626	2691	2757	2826	2896	2968	3041	3117	$ 27,983
O & M	Public Use Facilities	Maintain parking areas/campgrounds	7	ea	$ 500	3500	3587	3676	3767	3860	3956	4054	4155	4258	4363	$ 39,176
O & M	Road and Trails	Maintain gates	4	gate	$ 150	600	615	630	646	662	678	695	712	730	748	$ 6,716
O & M	Road and Trails	Maintain roads	3	mi	$ 3,500	10500	10760	11027	11301	11581	11868	12163	12464	12773	13090	$ 117,528
O & M	Signs and Boundaries	Maintain boundary	8.5	mi	$ 400	3400	3484	3571	3659	3750	3843	3938	4036	4136	4239	$ 38,057
															Subtotal	$ 229,459
Development Activities																
					Unit											
Project	**Description**	**Activity**	**Quantity**	**Unit**	**Cost**	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**	**2023-2024**	**2024-2025**	**Total**
D	Camping Area Construction	Big Hungry	1	ea	$ 5,000	5,000										$ 5,000
D	Crossing Structure	Cove Creek, Ford	1	ea	$ 20,000			20,992								$ 20,992
D	Crossing Structure	Cove Creek, Pedestrian Bridge	1	ea	$ 50,000			52,480								$ 52,480
D	Parking Area Construction	Big Hungry Rd.	1	ea	$ 3,000					3,298						$ 3,298
D	Parking Area Construction	Gallimore Road	1	ea	$ 30,000	30,000										$ 30,000
D	Parking Area Construction	General Hill Rd.	1	ea	$ 20,000							22,976				$ 22,976
D	Parking Area Construction	Guice Rd.	1	ea	$ 3,500		3,587									$ 3,587
D	Parking Area Construction	Holbert Cove Rd.	1	ea	$ 3,000				3,223							$ 3,223
D	Parking Area Construction	Long Ridge/Turkey Gut	1	ea	$ 7,000		7,174									$ 7,174
D	Parking Area Construction	Pot Shoals Rd.	1	ea	$ 3,500			3,674								$ 3,674
D	PFA Upgrade	Big Rock	1	ea	$ 10,000		10,248									$ 10,248
D	PFA Upgrade	Fish Top	1	ea	$ 10,000			10,496								$ 10,496
D	Road Upgrade	Walcott Rd.	1	mi	$ 60,000			62,976								$ 62,976
D	Road Upgrade	White Oak Mtn. Rd.	0.7	mi	$ 30,000		30,744									$ 30,744
D	Road/Trail Upgrade	Gallimore Road/Trail	0.75	mi	$ 64,000	64,000										$ 64,000
D	Trail Construction	Narrows	1	ea	$ 200,000									239,600		$ 239,600
D	Trail Upgrade	Pulliam Creek, Foot Bridge	1	ea	$ 5,000				5,372							$ 5,372
D	Trail Upgrade	Bradley Falls, Foot Bridge	1	ea	$ 4,000					4,397						$ 4,397
															Subtotal	$ 580,236
														Grand Total		**$ 1,105,692**

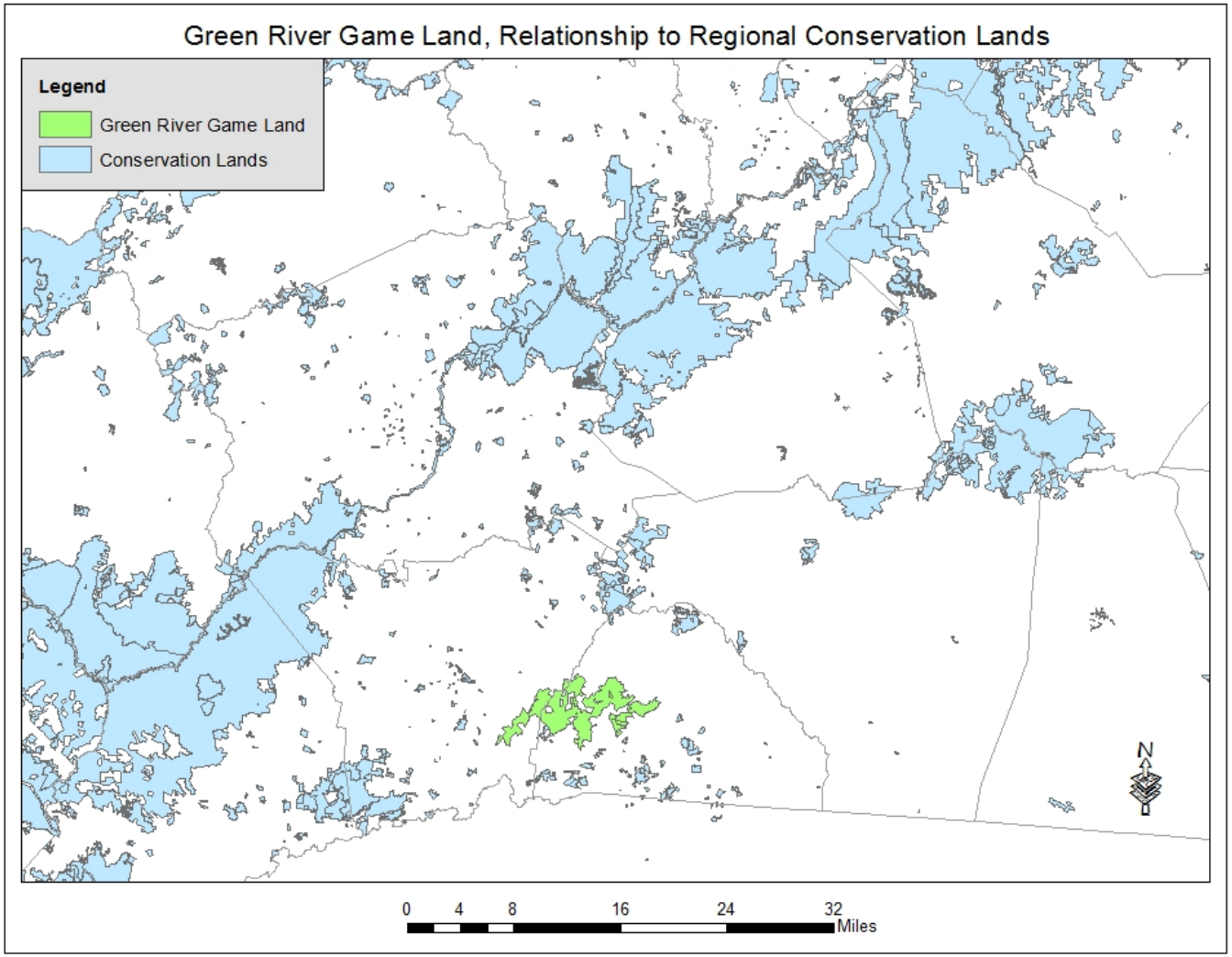
ACQUISITION PLAN

Priority property acquisitions at GRGL are identified in Map 1 below. 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. Level 3 tracts may, however, increase connectivity to other conservation lands in the area. Tracts identified as "multiple tracts/residential" are lands containing multiple tracts with many owners. Many tracts within these areas contain residential development. Acquisition of individual tracts within these areas may address an access need or partially dissolve a current inholding. These tracts, if available for acquisition, should be evaluated on an individual basis to determine their value as additions to the game land. 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 properties offered for acquisition should be evaluated in terms of their providing connectivity or a corridor among regional conservation lands identified in Map 2 below. Those tracts that significantly address this issue or that provide critical habitat for threatened or endangered species should be pursued.



Map 1, Green River Game Land, Property Acquisition Map.



Map 2, Green River Game Land, Relationship to Regional Conservation Lands.

REGULATIONS/ENFORCEMENT

The following regulations and enforcement issues are identified on GRGL.

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

PARTNERSHIPS

Partnerships with the groups identified below to accomplish plan objectives should be maintained or explored.

- Clemson University
- University of Tennessee
- Consortium of Appalachian Fire Managers and Scientists
- Southern Blue Ridge Fire Learning Network
- ECO, Carolina Mountain Land Conservancy, Carolina Mountain Hikers, other local hiking clubs (routine hiking trail maintenance)
- Green River Adventures, AmongstIt, Liquid Logic, American Whitewater (kayaking access trail maintenance)

- Local Birding Groups
- Trout Unlimited (currently assist with trout stocking in delayed harvest section)
- Wilderness Cove Campground, Silver Creek Tubing, Green River Adventures, Green River Cove Tubing, other tubing businesses (any issues related to tubing)
- N.C. Forestry Association
- Polk Coon Hunters
- N.C. Bow Hunters Association
- Falling Creek Camp, Camp Bob Hardin (any issues related to camp group use of game land
- Haywood Technical Community College
- Regional universities (research projects)

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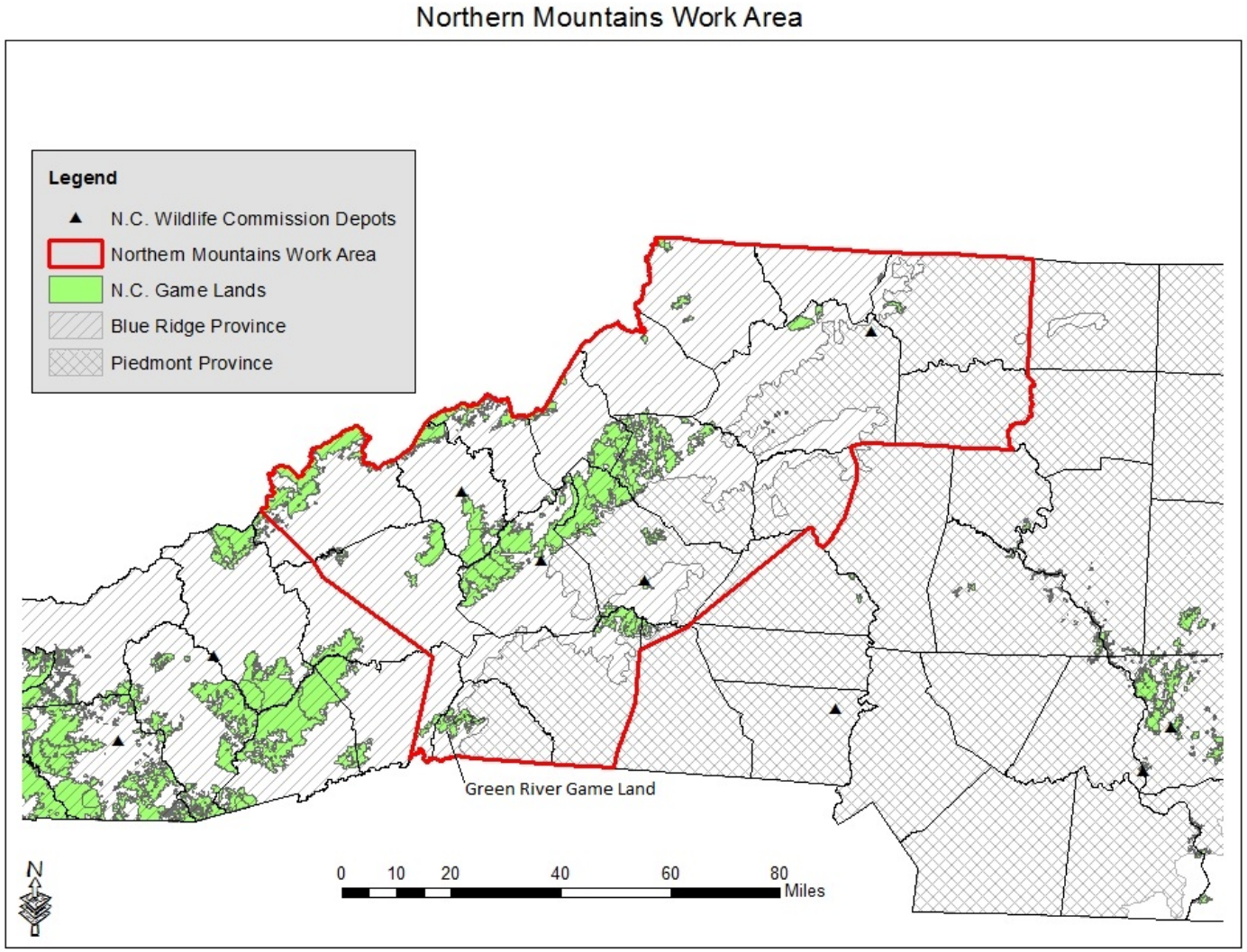
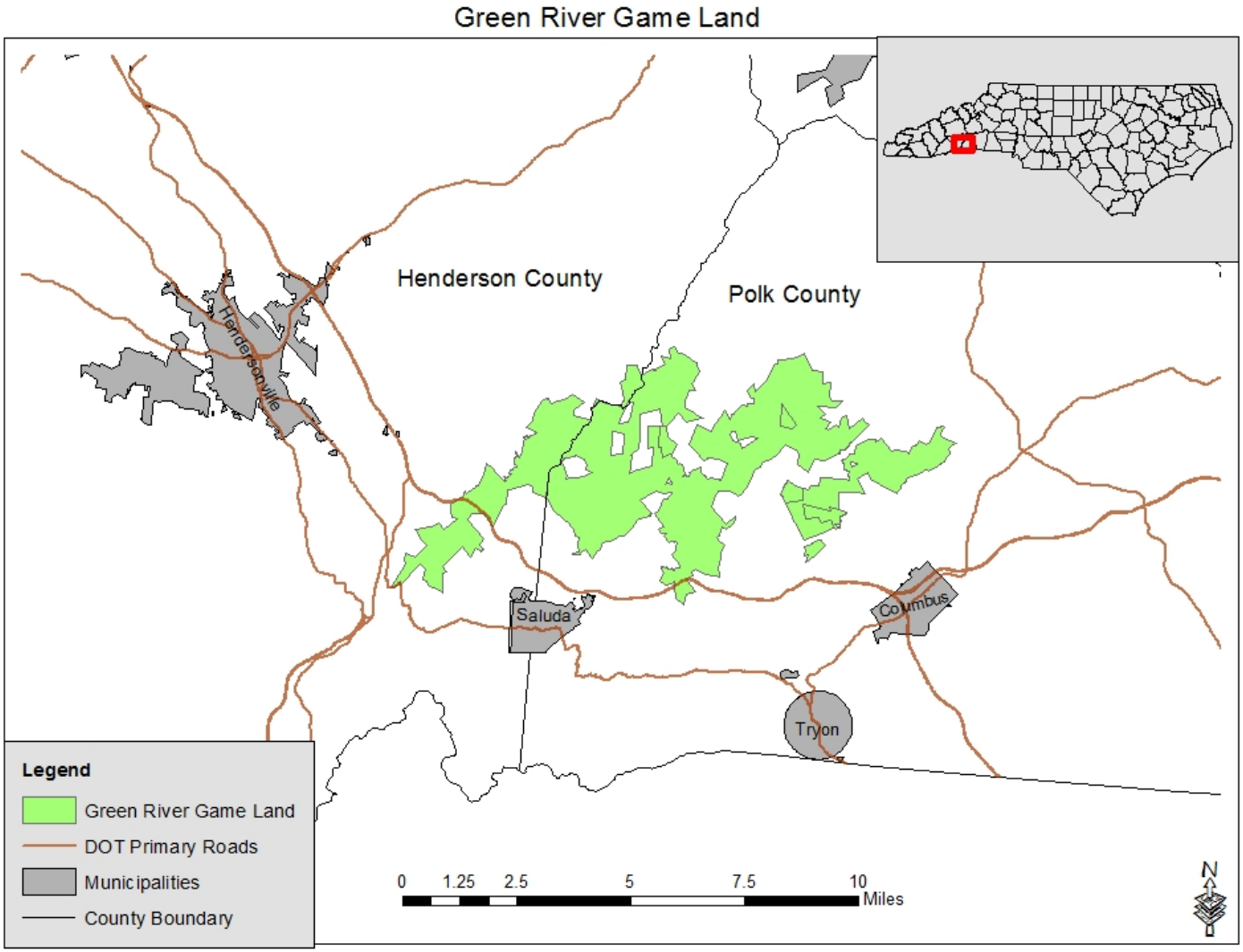
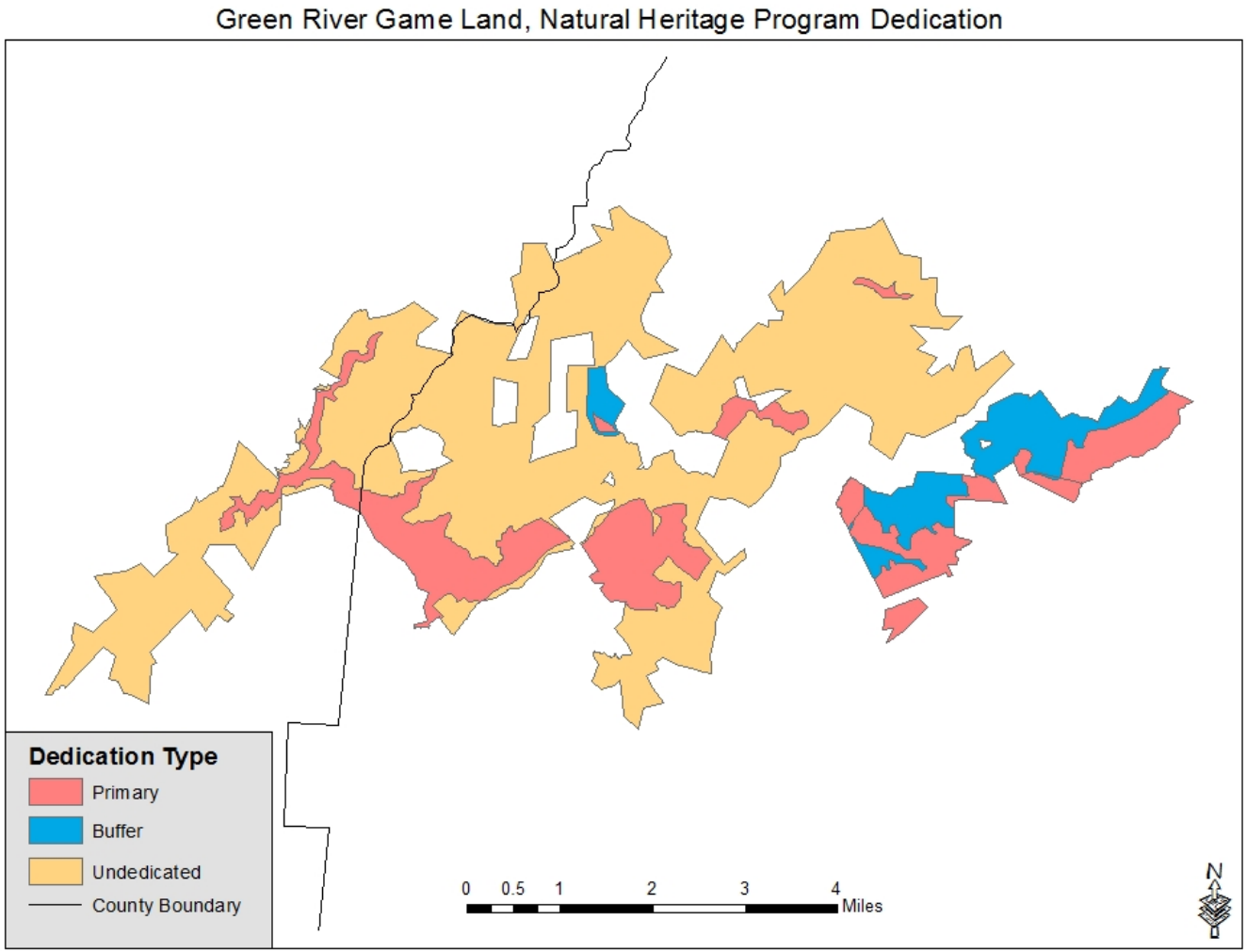
APPENDIX 1 - MAPS



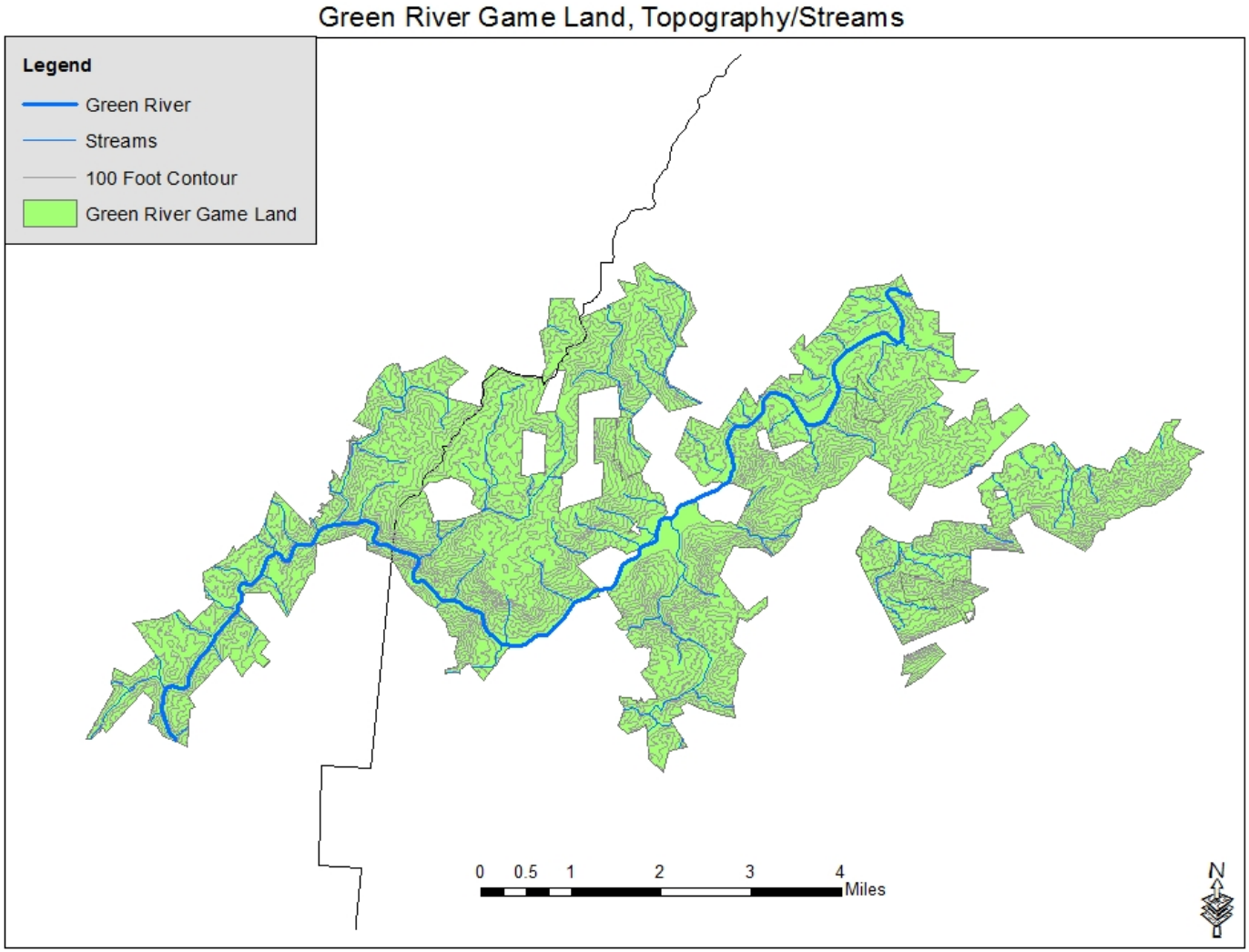
Map 1. Northern Mountains Work Area.



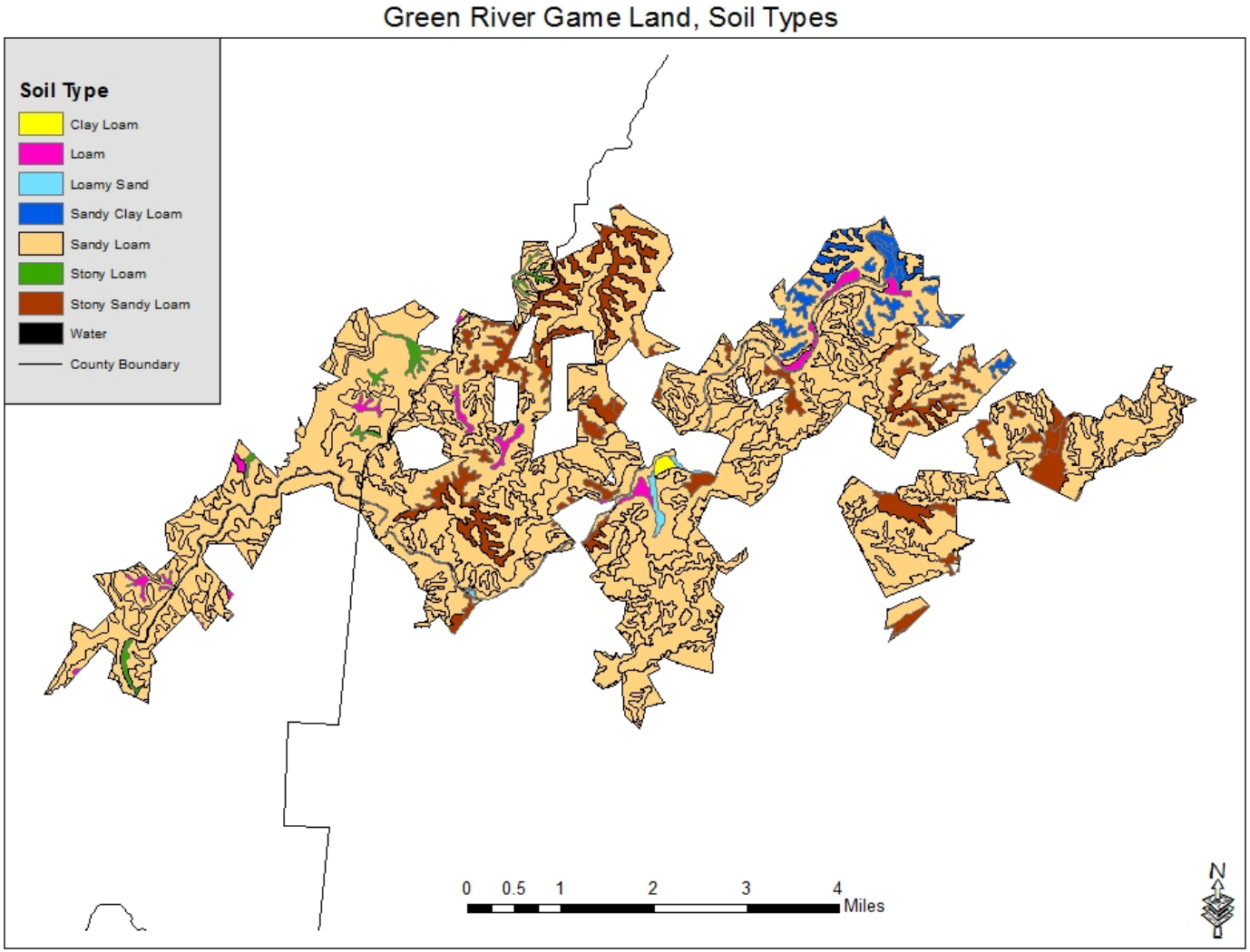
Map 2. Green River Game Land, Location.



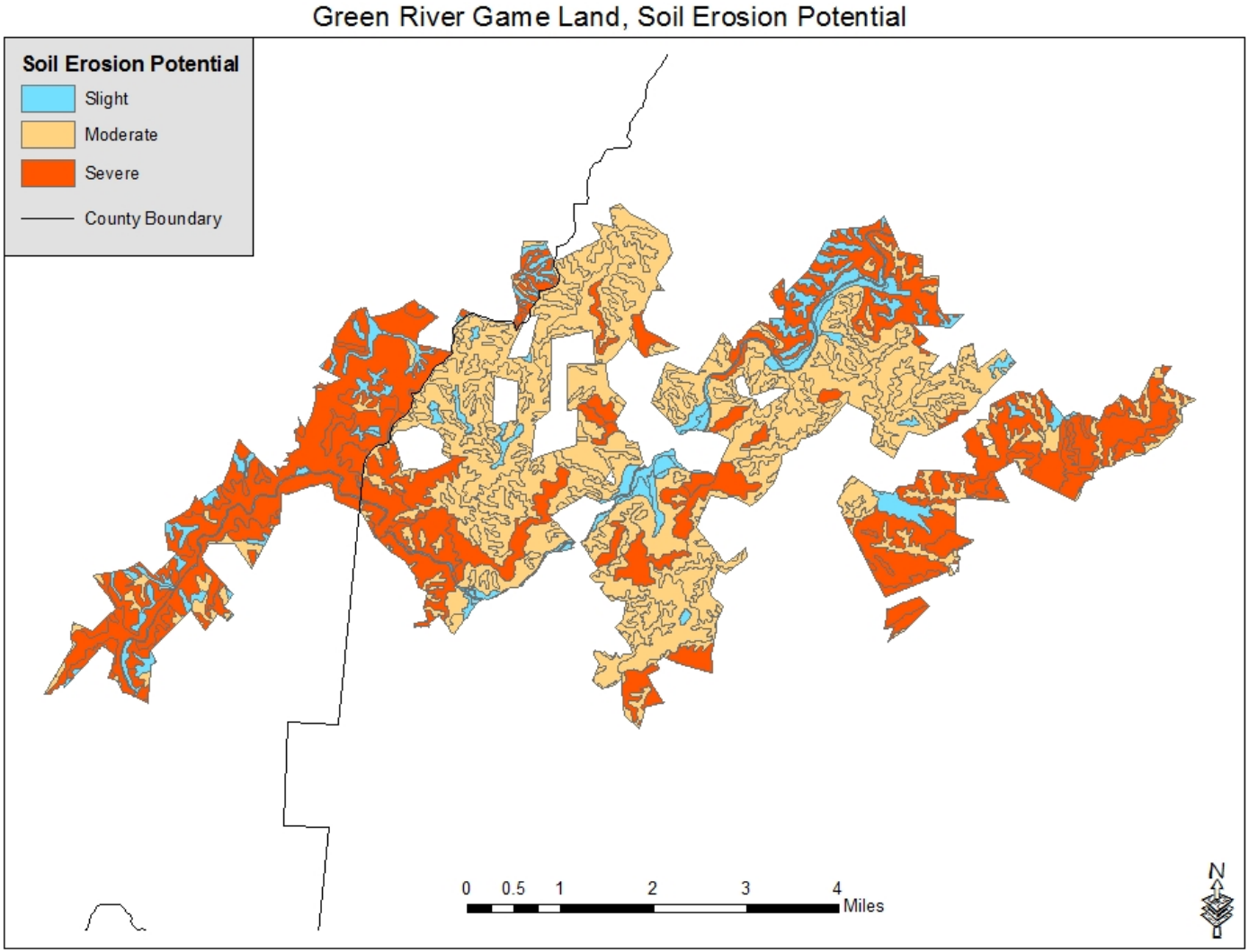
Map 3. Green River Game Land, Natural Heritage Dedication (also see Appendix 4).



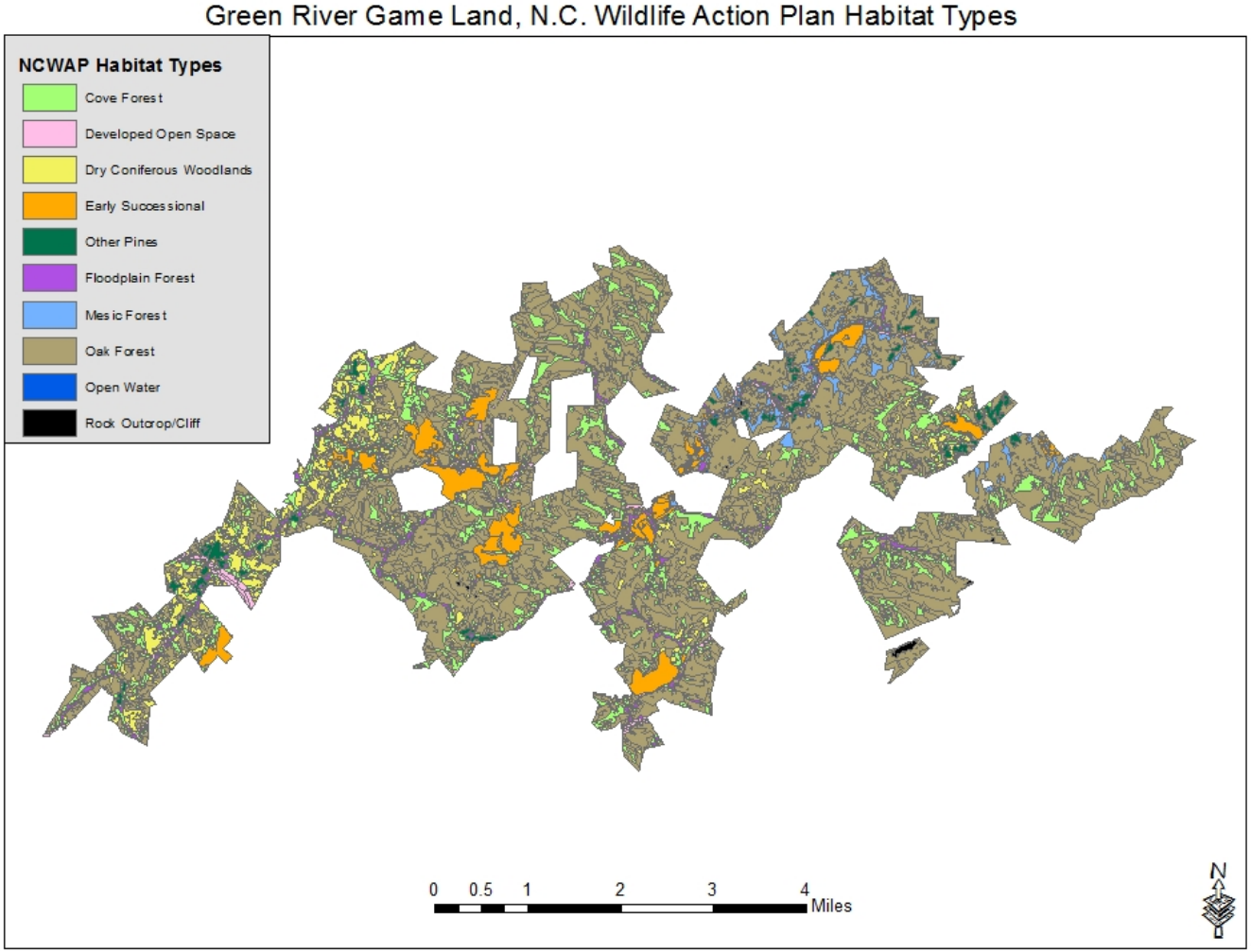
Map 4. Green River Game Land, Topography and Streams.



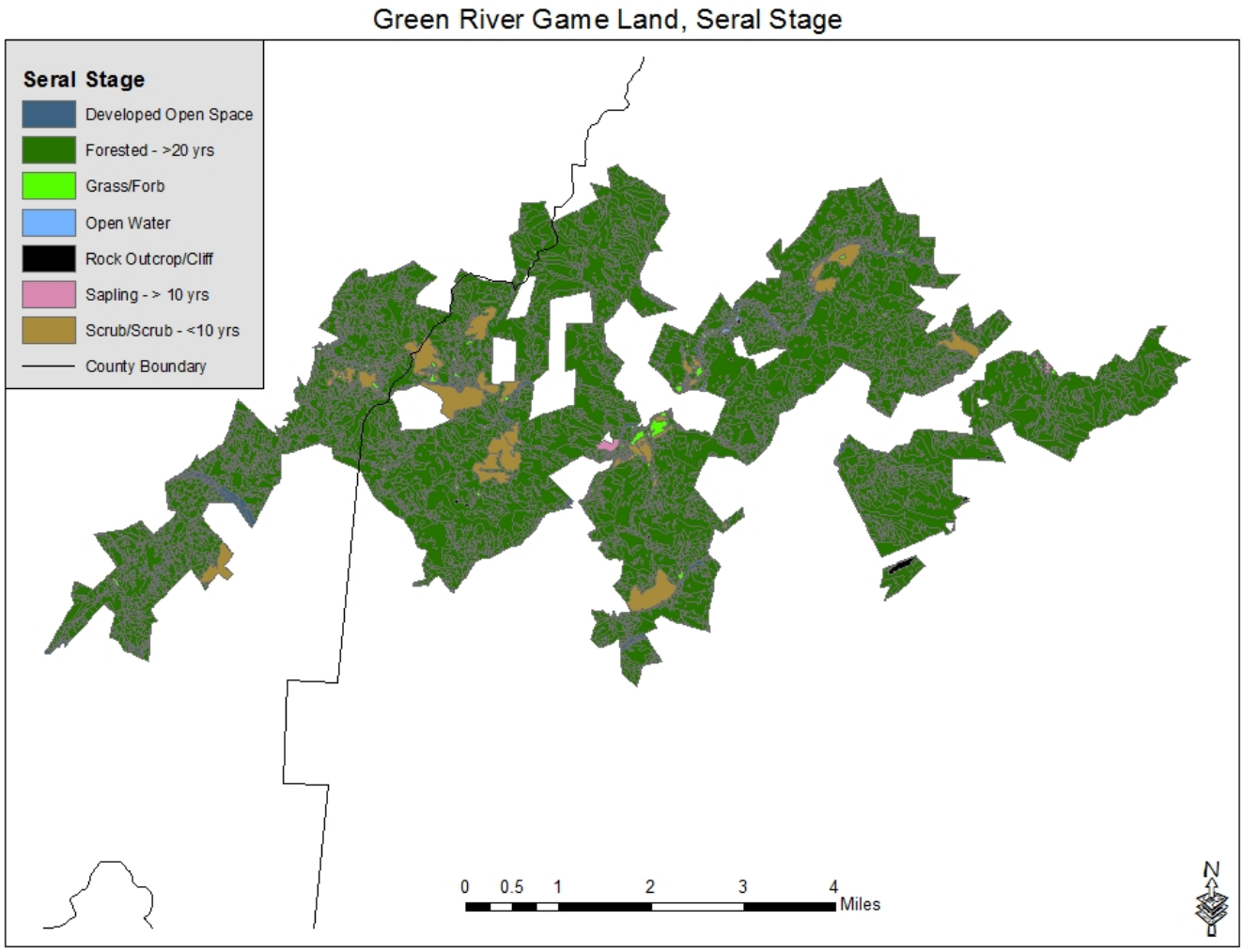
Map 5. Green River Game Land, Soil Types (King 1980, Keenan 1998).



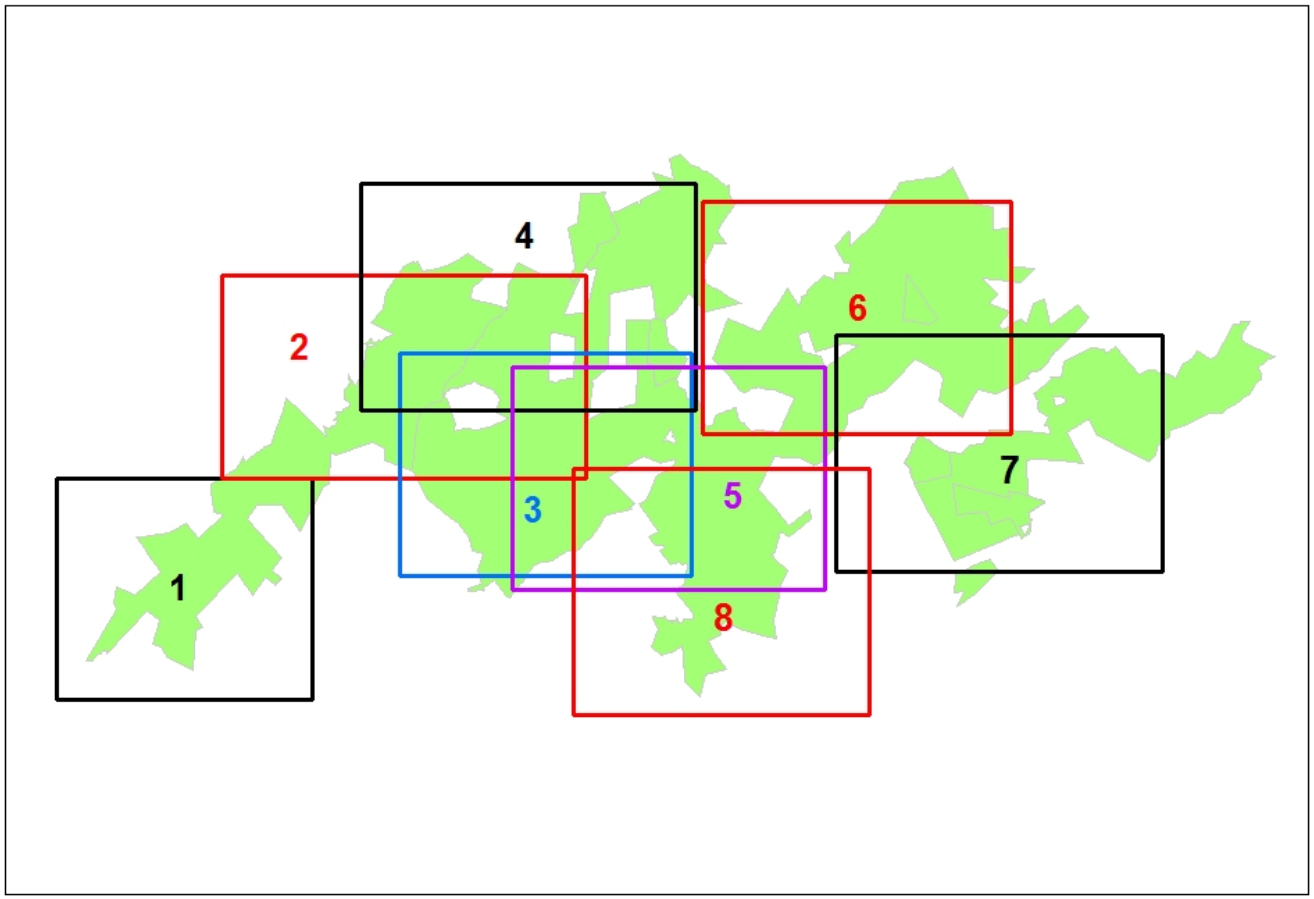
Map 6. Green River Game Land, Soil Erosion Potential (King 1980, Keenan 1998).



Map 7. Green River Game Land, N.C. Wildlife Action Plan Habitat Types (N.C. State University 2008) (N.C. Wildlife Resources Commission 2005).



Map 8. Green River Game Land, Seral Stage (N.C. State University 2008).



Infrastructure Maps Key

Infrastructure Maps Legend

Culvert

- ★ Frequent Maintenance
- ★ Replace

Gate

Public Fishing Access Area

Parking Area

Potential Green River Infrastructure Improvements

- Campground
- Foot Bridge
- Parking Lot
- New Road Construction

Green River Game Land Road Improvements

- High Priority
- Medium Priority
- Low Priority

Bradley Falls Trail

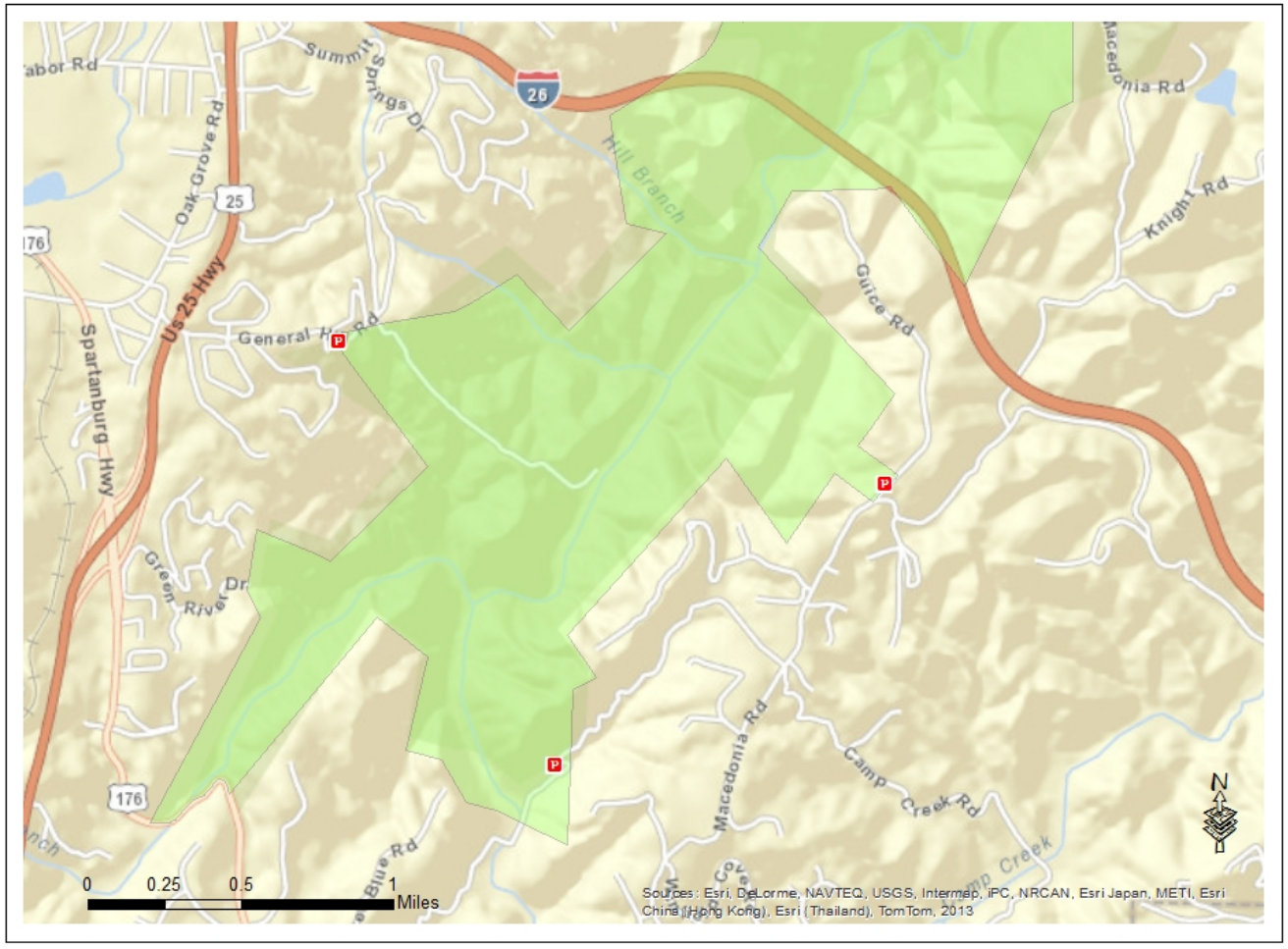
Narrows Trail

Gallimore Road/Trail

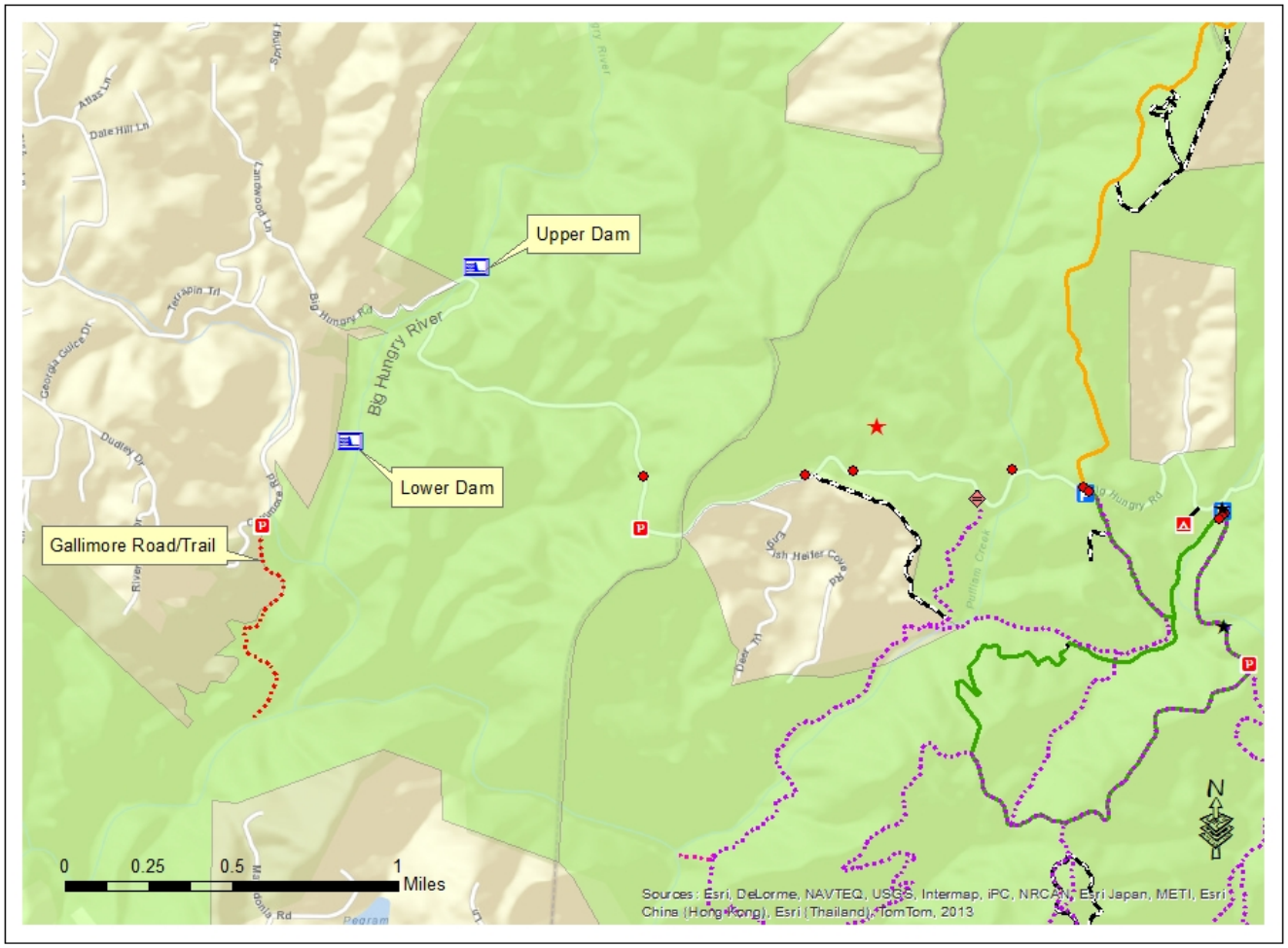
Other Maintained Trail

Firebreak

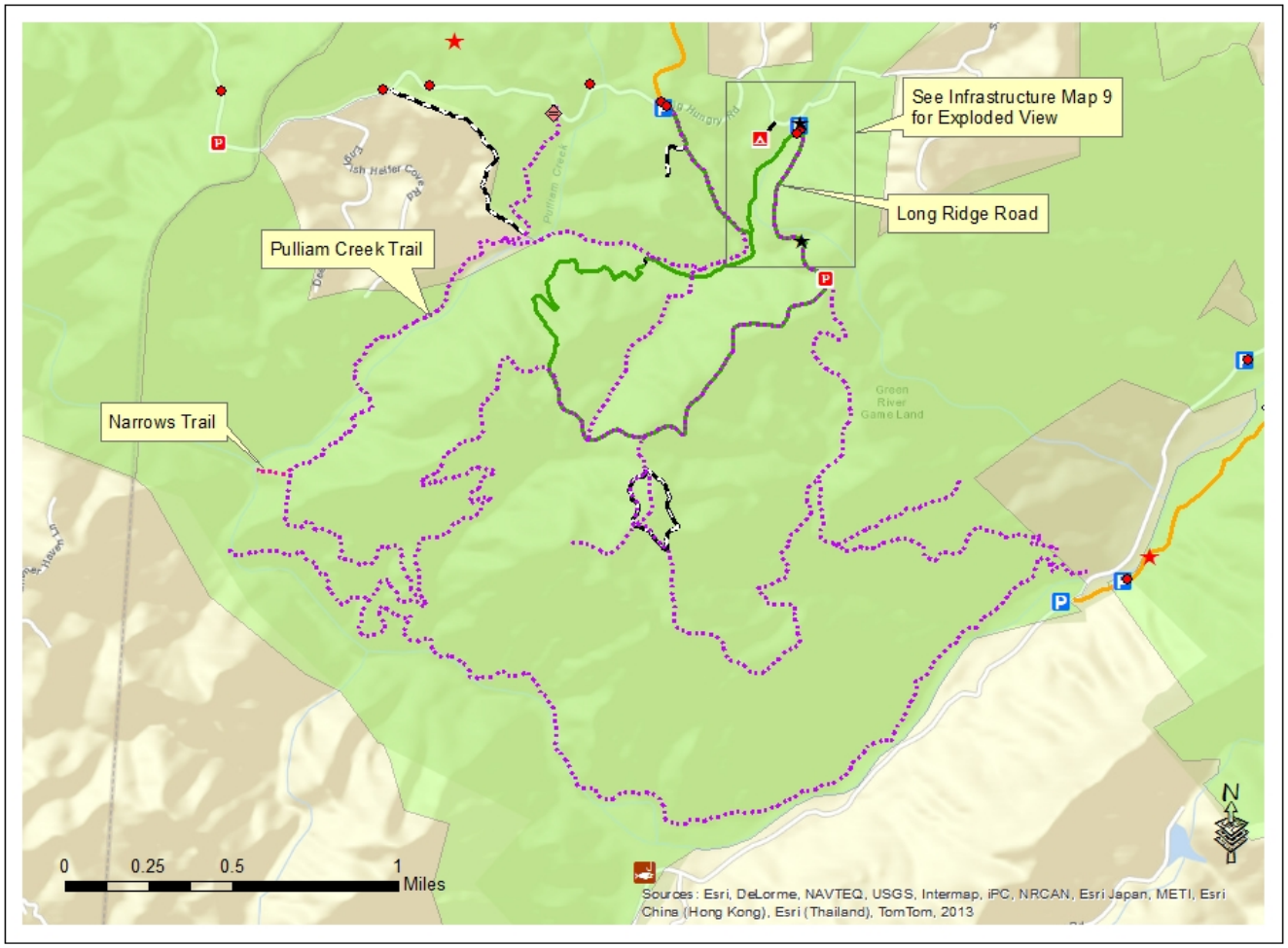
Green River Game Land



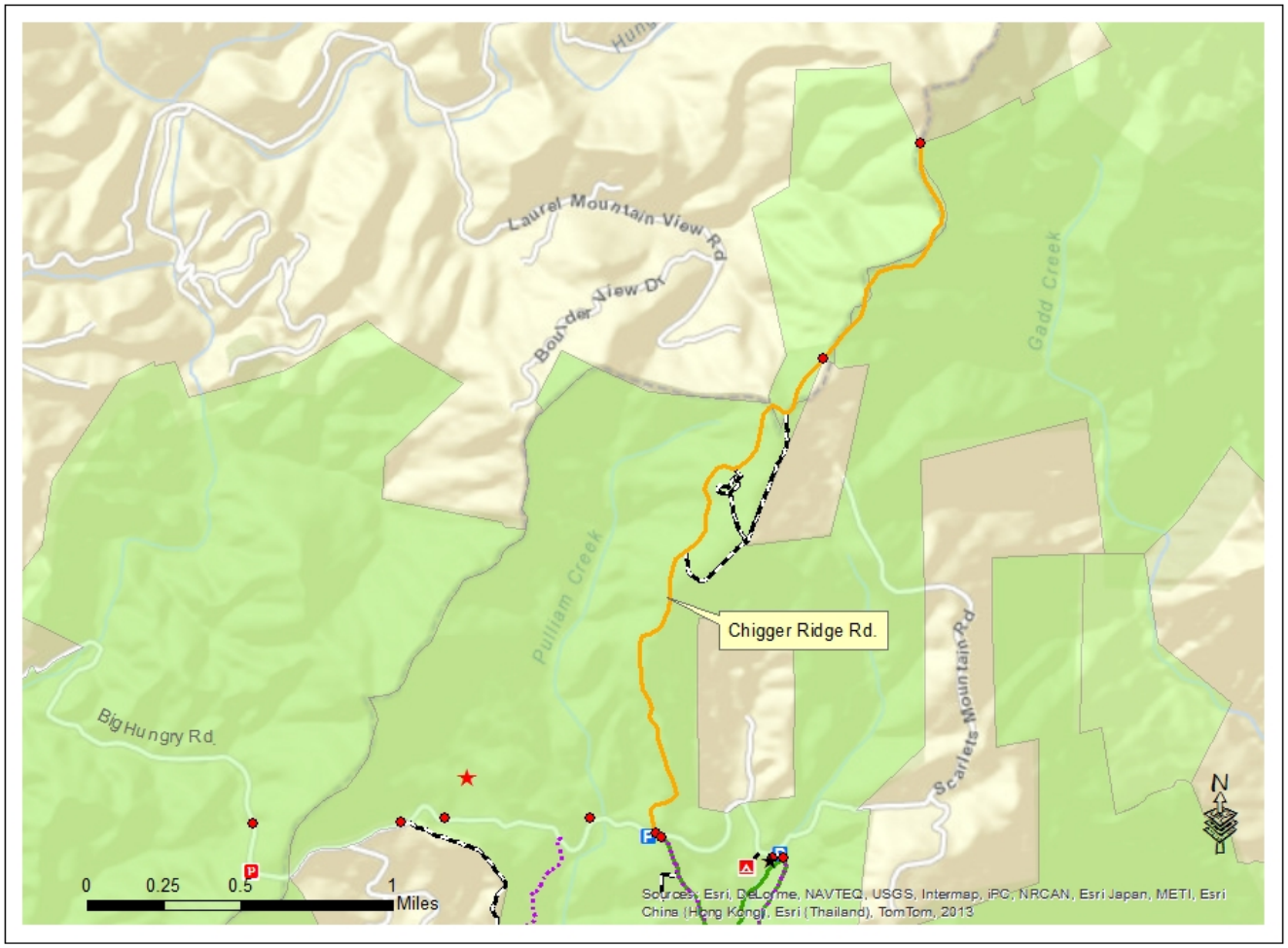
Infrastructure Map 1



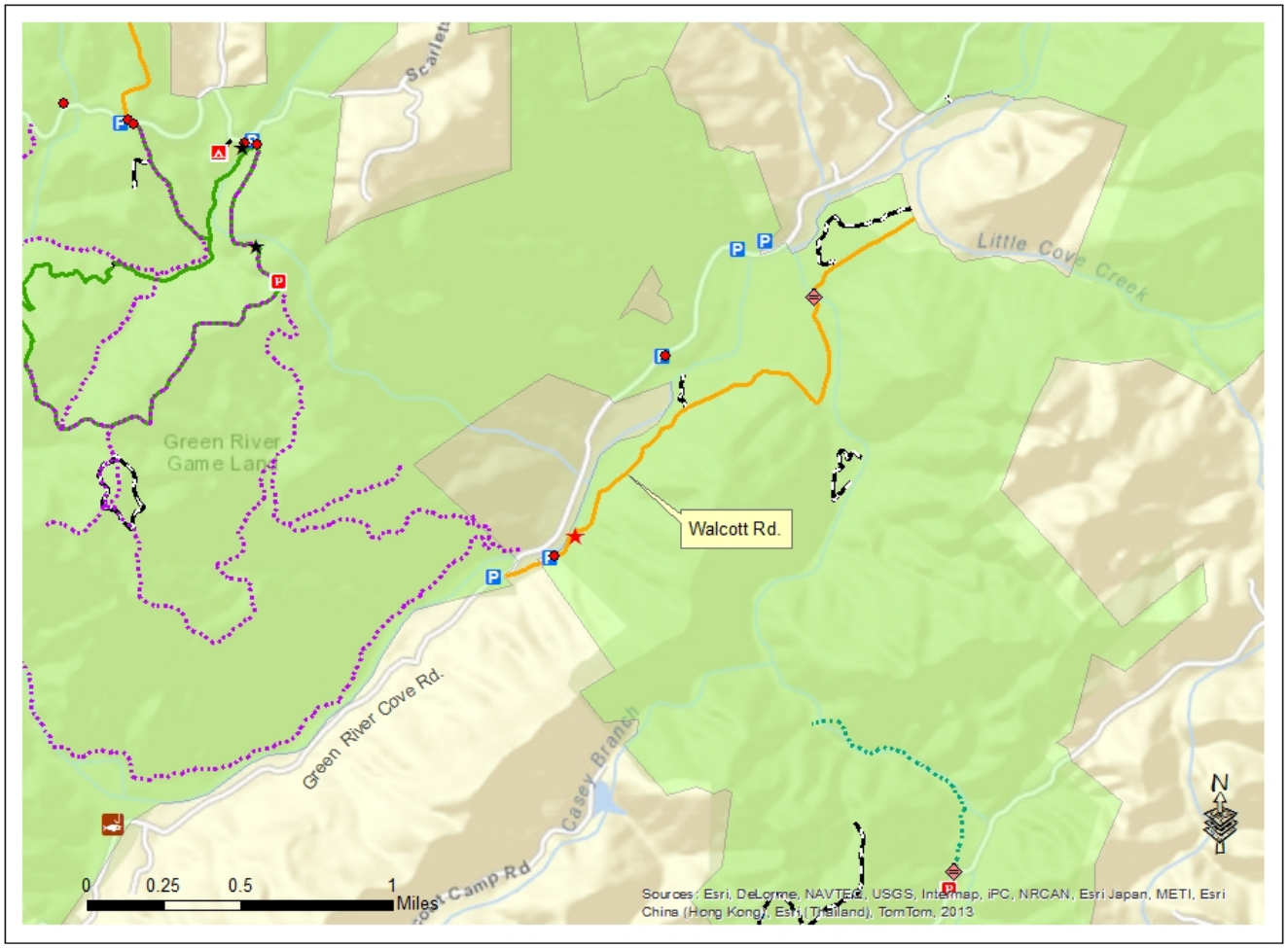
Infrastructure Map 2



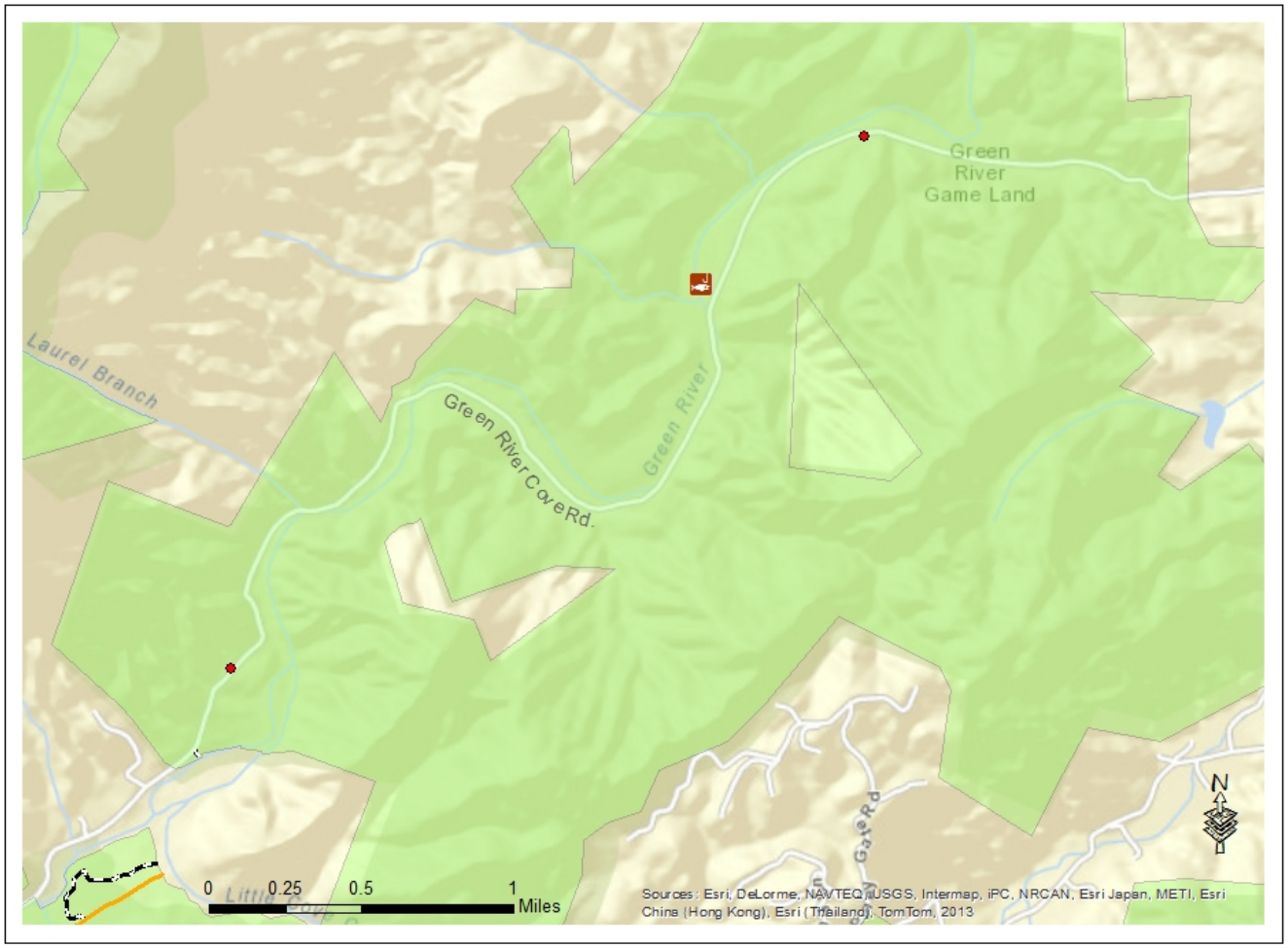
Infrastructure Map 3



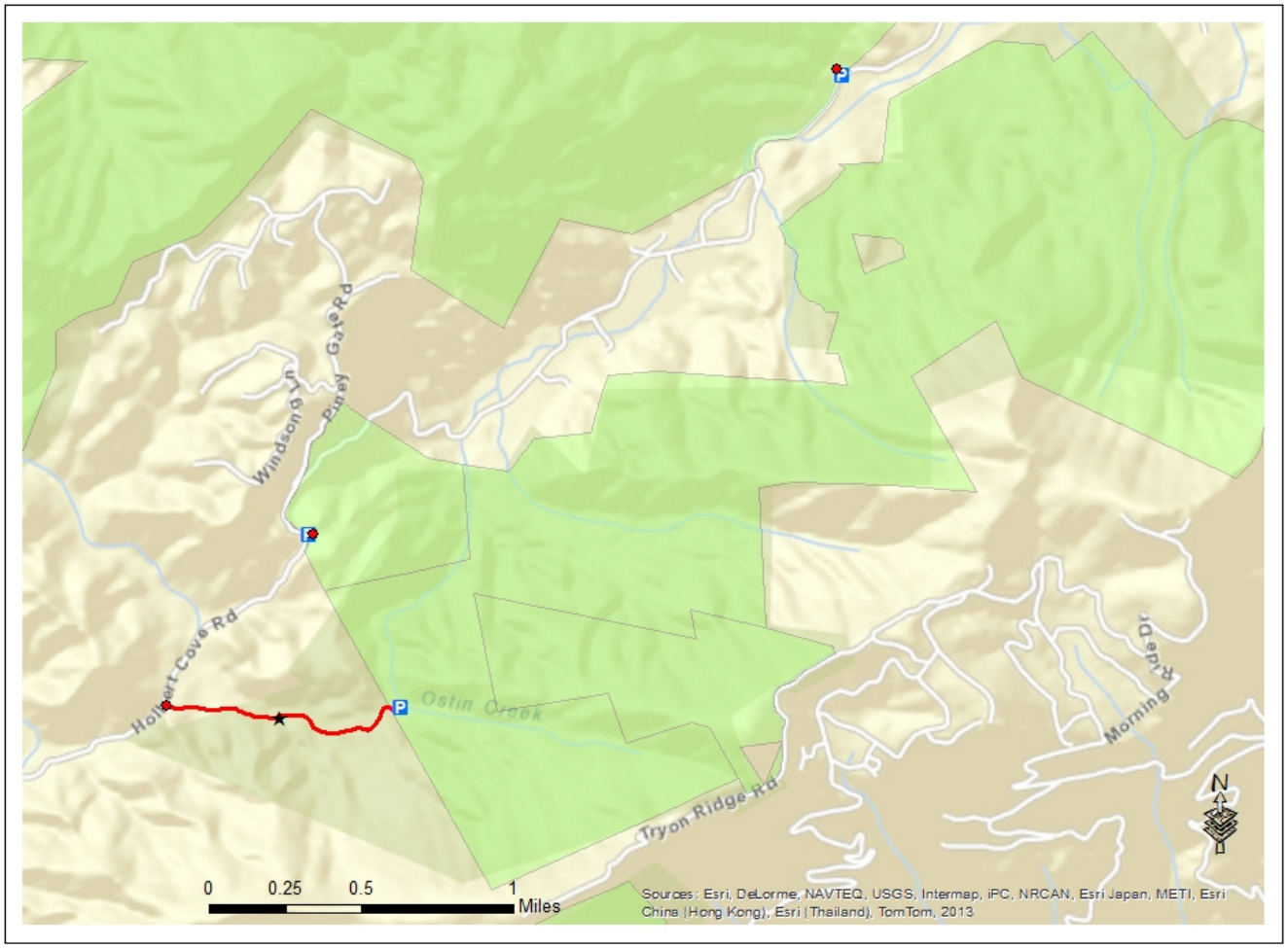
Infrastructure Map 4



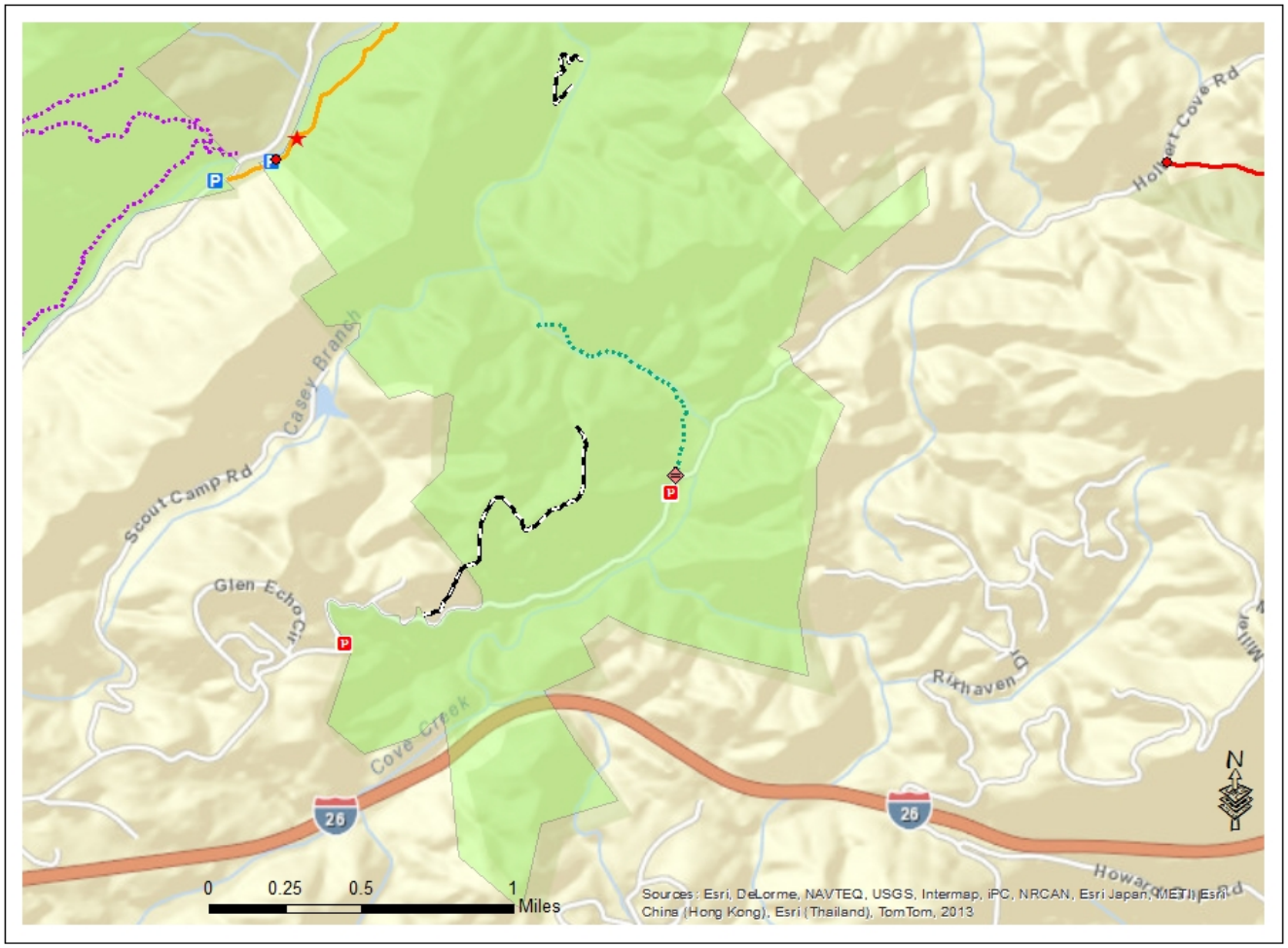
Infrastructure Map 5



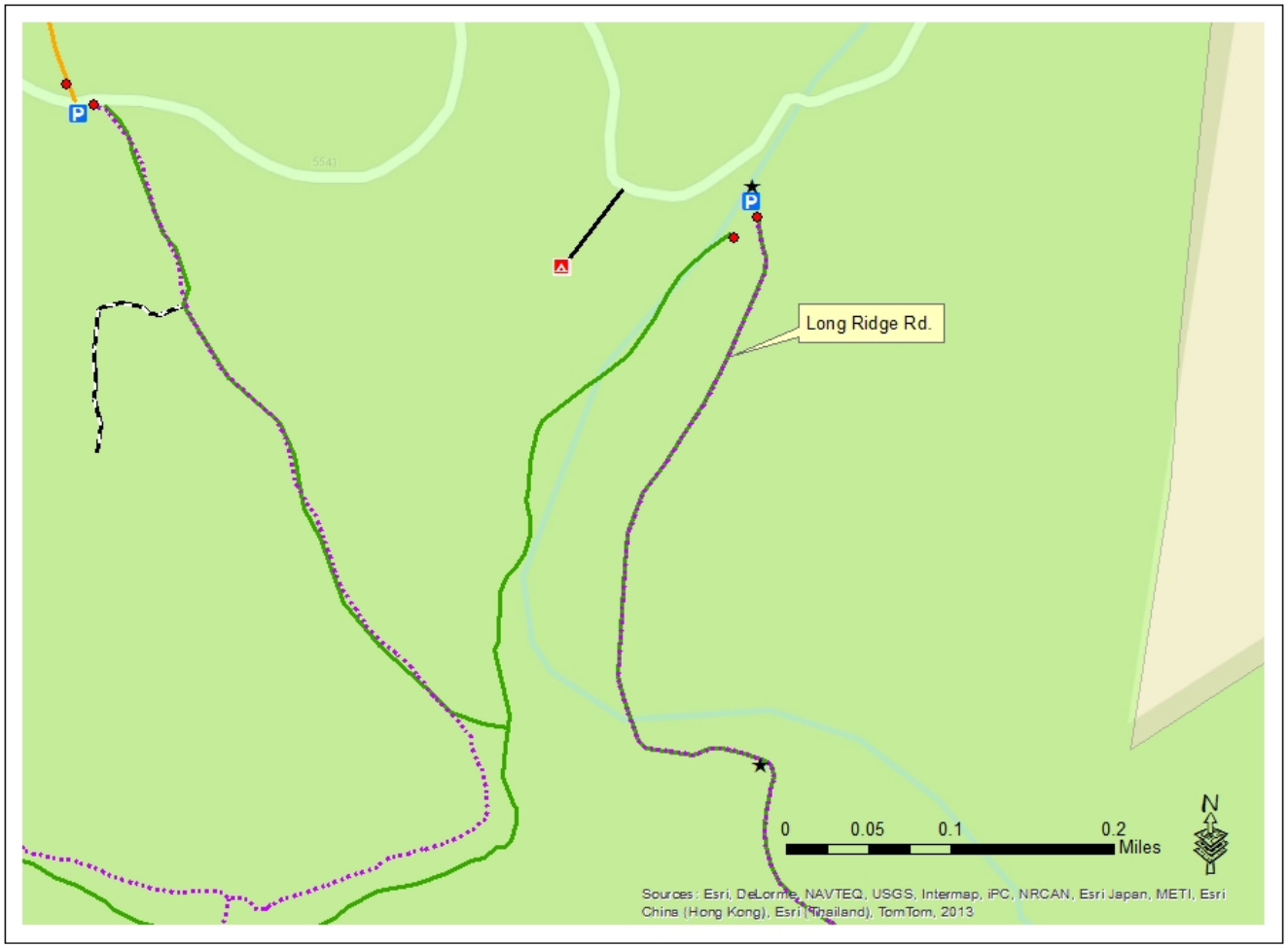
Infrastructure Map 6



Infrastructure Map 7

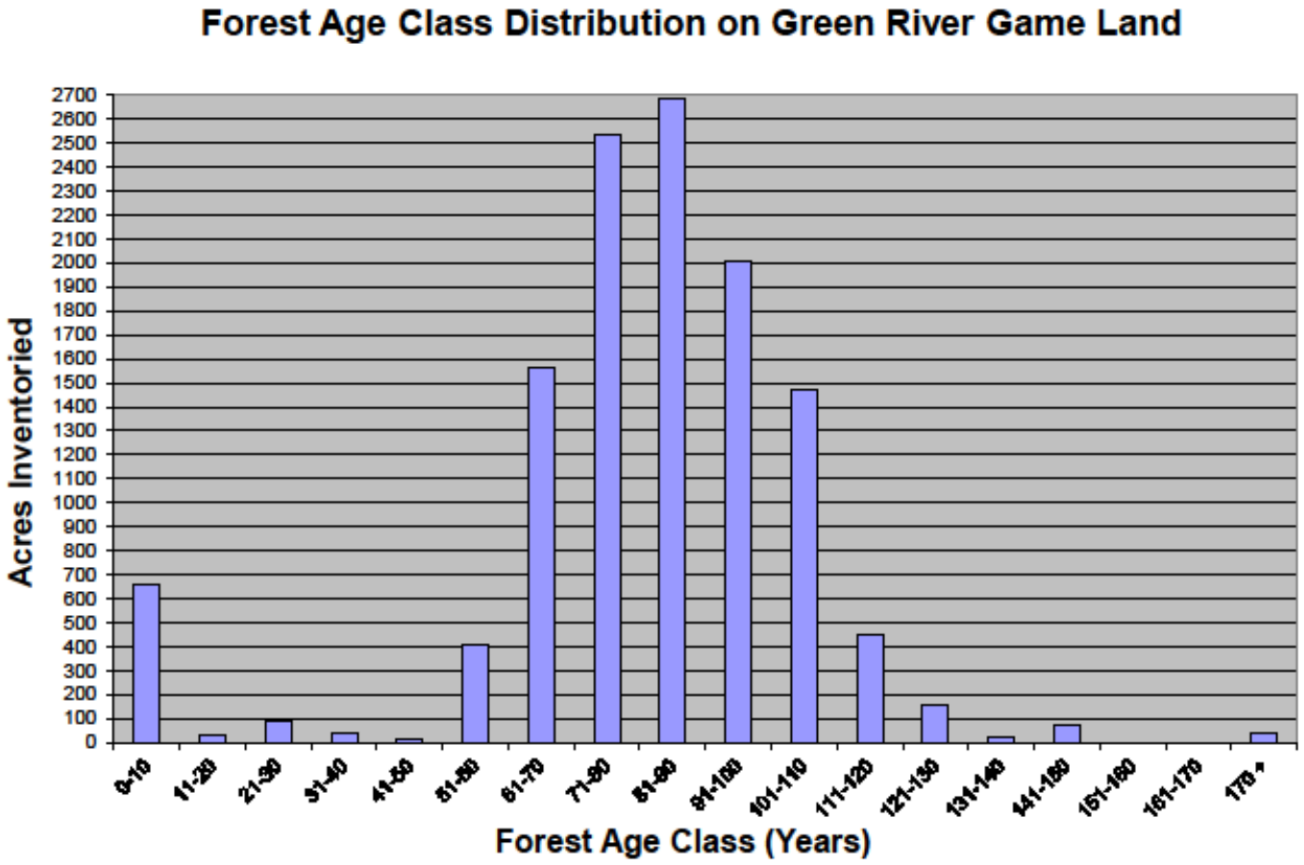


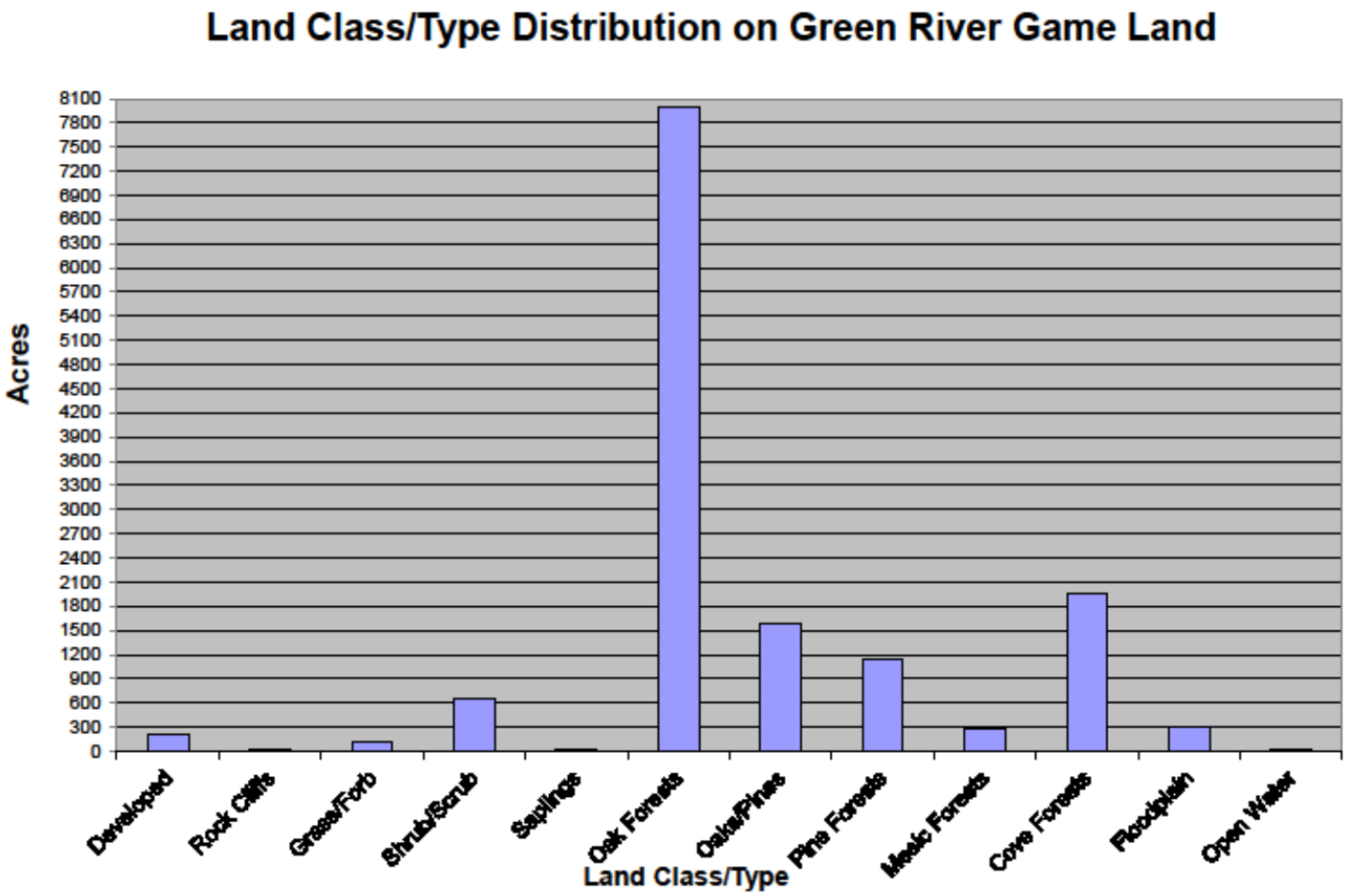
Infrastructure Map 8



Infrastructure Map 9, Exploded View of Infrastructure Map 3

APPENDIX 2 – FOREST AGE AND LAND CLASSIFICATION


Forest Age Class Distribution on Green River Game Land
Acres Inventoried
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
0-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
101-110
111-120
121-130
131-140
141-150
151-160
161-170
170 +
Forest Age Class (Years)


Land Class/Type Distribution on Green River Game Land
Acres
8100
7800
7500
7200
6900
6600
6300
6000
5700
5400
5100
4800
4500
4200
3900
3600
3300
3000
2700
2400
2100
1800
1500
1200
900
600
300
0
Developed
Rock Cliffs
Grass/Forb
Shrub/Scrub
Saplings
Oak Forests
Oaks/Pines
Pine Forests
Mesic Forests
Cove Forests
Floodplain
Open Water
Land Class/Type

APPENDIX 4 – NATURAL HERITAGE ARTICLES OF DEDICATION

North Carolina
Department of Administration

Michael F. Easley, Governor
Gwynn T. Swinson, Secretary

State Property Office
Joseph H. Henderson, Director

August 3, 2004

MEMORANDUM

TO: Wib Owen
Wildlife Resources Commission

FROM: D. Chad Guthrie
Real Property Agent

SUBJECT: Signed Copy of Letter of Allocation – Dedication as Nature Preserve
4,129 acres - Green River Game Land

Enclosed is a fully executed Letter of Allocation on the above-referenced tract of land. The State Property Office has completed its work on these projects, and therefore will be closing this file.

Should you have any questions regarding this matter, please do not hesitate to call.

DCG/

Enclosure

AUG 2004

Mailing Address:
1321 Mail Service Center
Raleigh, N.C. 27699-1321

Telephone (919) 733-4346
Fax (919) 733-1431
State Courier #52-71-78

Location:
116 West Jones Street
Raleigh, North Carolina

North Carolina
Department of Administration

Michael F. Easley, Governor

Gwynn T. Swinson, Secretary

April 19, 2004

Secretary William G. Ross, Jr.
Department of Environment and Natural Resources
512 N. Salisbury Street
Raleigh, North Carolina 27603-8003

Mr. Charles R. Fullwood, Executive Director
N.C. Wildlife Resources Commission
512 N. Salisbury Street
Raleigh, North Carolina 27603-8003

Subject: Dedication of Portions of the **Green River Game Land**, Henderson and Polk Counties

Dear Secretary Ross and Mr. Fullwood:

Pursuant to Article 9A, Chapter 113A of the North Carolina General Statutes, this letter of allocation is executed for the purpose of dedicating the State-owned lands hereinafter described as a North Carolina Nature Preserve. These articles of dedication replace the articles of dedication for Cove Creek Nature Preserve, dated January 19, 1994, and the articles of dedication for the Green River Dedicated Nature Preserve, dated November 6, 1996. The articles were amended to reflect additions of property to the preserve.

These real properties are currently administered by the **North Carolina Wildlife Resources Commission** as a portion of the Green River Game Land and consist of approximately 4,129 acres located in Henderson and Polk Counties and composed of:

1. Green River Gorge Segment (Primary Area) 1,941 acres
2. White Oak Mountain/Tryon Peak Segment (Primary Area) 924 acres
3. White Oak Mountain/Tryon Peak Segment (Buffer Area) 1,264 acres

which are shown in an overview map in Exhibit A, attached hereto and by reference made a part hereof. The Green River Gorge Segment is described in Exhibit B and a detailed map is provided as part of that exhibit. The description and detailed map for the White Oak Mountain/Tryon Peak Segment is provided in Exhibit C. The dedicated lands shall be known collectively as the **Green River Game Land Nature Preserve**.

Dedication of the qualified portions of these tracts fulfills the terms of any prior grant agreements, including those of the Natural Heritage Trust Fund.

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

Telephone: (919) 807-2425
Fax (919) 733-9571
State Courier #51-01-00
e-mail: Gwynn.Swinson@ncmail.net

Location Address:
116 West Jones Street
Raleigh, North Carolina

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

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

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

3. **Primary Custodian**: The primary custodian of the preserve will be the North Carolina Wildlife Resources Commission, which will be responsible for managing the preserve in accordance with State Administrative Code 15 NCAC 12H.300.

4. **Primary Classification**: The primary classifications and purposes of the preserve will be conservation, nature education, wildlife management, hunting, fishing, trapping, and other recreational uses authorized by the Primary Custodian. The ecological significance of the preserve is described in Exhibits B (Green River Gorge Segment) and C (White Oak Mountain/Tryon Peak Segment).

5. **Management Areas**: For the purposes of management, the preserve shall be considered to consist of a Primary Area (approximately 2,865 acres) and a Buffer Area (approximately 1,264 acres), as more particularly described in Exhibits A, B, and C, attached thereto and by this reference made a part hereof. The Primary Area consists essentially of Acidic Cove Forest, Rich Cove Forest, Canada Hemlock Forest, Chestnut Oak Forest, Montane Oak–Hickory Forest, and Rocky Bar and Shore communities, as well as three rare communities: Montane Acidic Cliff, Montane Alluvial Forest, and Montane Mafic Cliff. The Primary Area also includes associated rare species populations.

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

   The Buffer Area, which contributes to the management and protection of the Primary Area, consists of less mature, lower quality hardwood forests downslope from the Primary Area.

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

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

Activities and uses unrelated to those listed above are prohibited except as otherwise provided in these Articles or unless necessary to carry out the purposes of the preserve. Prohibited activities include, but are not limited to: construction; commercial activities and development; commercial silviculture; agriculture and grazing; gathering of native species of plants or plant products; the removal, disturbance, molestation, or defacement of minerals, archaeological and natural resources, except for research purposes as approved by the Custodian; and those activities specifically restricted in these Articles.

There shall be no fires, except as necessary for ecological management of the preserve or in conjunction with supervised educational activities of the Custodian, or further excepted as herein provided or otherwise expressly permitted.

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

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

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

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

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

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

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

I. Control of Populations: Any control of animal or plant populations on the preserve shall be for the purpose of correcting those situations where those populations are significantly affecting natural conditions on the preserve, and in accordance with the Custodian's established regulations for hunting, trapping, or fishing of designated game animals. The Custodian may, in consultation with the North Carolina Natural Heritage Program, apply biological controls, herbicides and pesticides, and other means deemed necessary or appropriate to control or eradicate exotic or native species of plant or animal that are degrading the natural character of the preserve. Because of potential impacts on native species, no exotic flora or fauna shall be introduced into the preserve.

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

K. Roads and Trails: Construction and maintenance of roads, trails, and other access structures within Primary and Buffer Areas of the preserve will be limited to the level necessary to appropriately manage the preserve. New roads shall not be constructed in the Primary Area. When necessary, the Custodian may construct and maintain access limited to staff use for management purposes, such as service paths (single lane vegetated paths) for patrol, right-of-way maintenance, and other management activities, within the Primary Area. Number and width of new paths will be minimized, and sensitive areas avoided when possible.

Existing roads that occur within or form a boundary of the Primary Area may be maintained by grading of the roadbed, replacing culverts, or adding stone as needed in order to maintain the integrity of the road for vehicular use. Daylighting of roads within the Primary Area should be minimized, but may be used if necessary to maintain the condition of the road. Access management and construction will be part of the overall management planning process and will include consultation with the North Carolina Natural Heritage Program.

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

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

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

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

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

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

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

The Governor and Council of State have approved the dedication of the State-owned lands hereinabove described as the **Green River 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 7th of October, 2003.

Sincerely,

Gwynn T. Swinson

CONSENTED AND AGREED TO:

William G. Ross, Jr.

Secretary William G. Ross, Jr.
Department of Environment and Natural Resources

Charles R. Fullwood

Charles R. Fullwood, Executive Director
Wildlife Resources Commission

EXHIBIT A

OVERVIEW MAP SHOWING LOCATION OF
GREEN RIVER GAME LAND DEDICATED NATURE PRESERVE
GREEN RIVER GORGE AND WHITE OAK MOUNTAIN/TRYON PEAK SEGMENTS

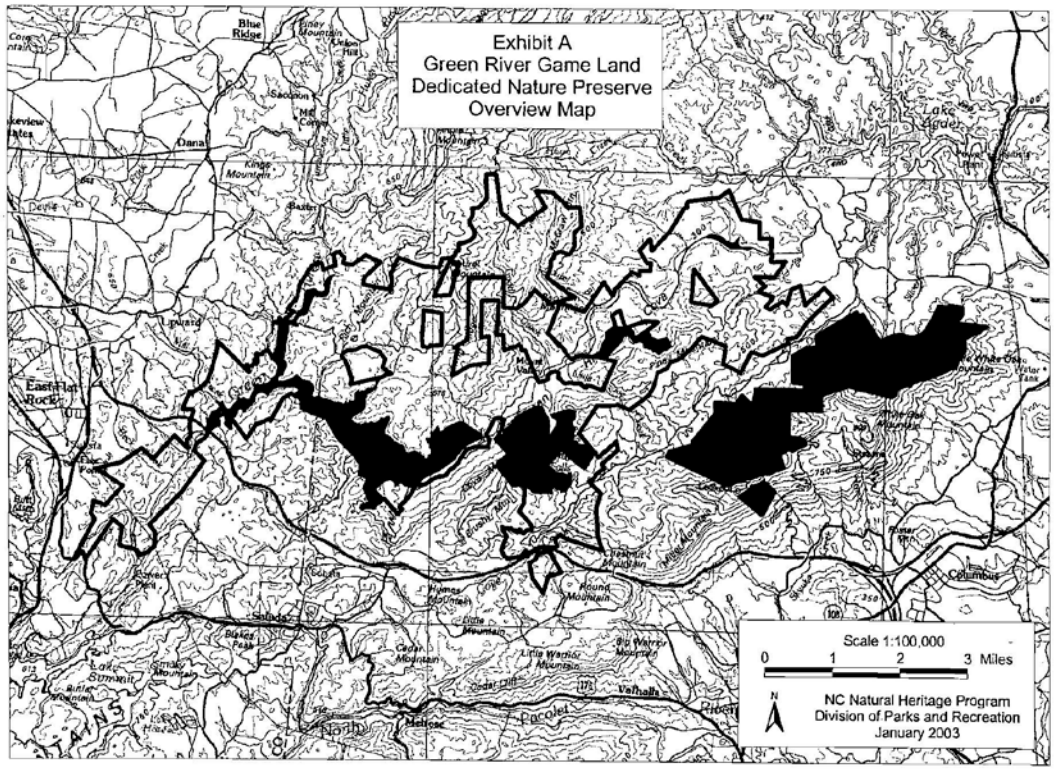


Exhibit A
Green River Game Land
Dedicated Nature Preserve
Overview Map
Scale 1:100,000
0 1 2 3 Miles
N
NC Natural Heritage Program
Division of Parks and Recreation
January 2003

EXHIBIT B

GREEN RIVER GAME LAND DEDICATED NATURE PRESERVE
GREEN RIVER GORGE SEGMENT

COUNTY: Polk, Henderson

TOPOGRAPHIC QUADS: Cliffield Mountain, Mill Spring

PHYSIOGRAPHIC PROVINCE: Blue Ridge

SIZE OF AREA: ca. 1,941 acres primary

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

DESCRIPTION: Green River Gorge is a deep gorge cut as the river descends the Blue Ridge escarpment. The upper portion is very deep and narrow, culminating in the part known as The Narrows, where the river is squeezed between steep cliffs. The site also includes smaller narrow gorges of major tributaries, Hungry River and Cove Creek with its well-known waterfall. The gorge walls include small to large rock outcrops, narrow ravines, spur ridges, and steep side slopes. Downstream the gorge widens somewhat and there is a band of floodplain along the river below steep mountain slopes.

The site supports an outstanding collection of natural communities of the Blue Ridge escarpment. Most are forest communities, including Acidic Cove Forest, Rich Cove Forest, Canada Hemlock Forest, Chestnut Oak Forest, and Montane Oak–Hickory Forest. Much of the forest area shows the effects of past logging but has matured and is of approximately natural composition. At least one area of old-growth Chestnut Oak Forest is present. A number of rare species are known from scattered places within the gorge, including multiple populations of French Broad heartleaf (*Hexastylis rhombiformis*), longstalk sedge (*Carex pedunculata*), and whorled horsebalm (*Collinsonia verticillata*). The area has also been noted for its interesting combinations of more common plants, including a mixture of species more typically found in the Piedmont and Mountain. The area has a diversity of wildlife, including abundant neotropical migrant birds. One rare species, the cerulean warbler (*Dendroica cerulea*) has been reported.

Rare and less extensive communities are scattered in the site. The floodplain in the lower Green River valley supports a good example of Montane Alluvial Forest community; intact examples of this community type are very rare in the state. The Green River bed, especially in the narrow parts of the gorge, supports well-developed Rocky Bar and Shore communities. These communities range from gravel and cobble bars to bare bedrock, with sparse to denser herbaceous vegetation kept free of trees by the scouring of floods. Higher up the gorge walls are Montane Acidic Cliff communities on open rock outcrops.

BOUNDARY JUSTIFICATION: The boundaries of the primary area are drawn to include the most significant areas in the gorge, and are mostly based on the extent of the exemplary communities, which correspond to the steeper topography. No buffer area has been designated in this preserve.

MANAGEMENT AND USE: The Green River Game Land is managed primarily to provide public hunting opportunities. The Green River is heavily used for boating and other water-based recreation. There is a system of public hiking trails in parts of the site, while other parts are quite remote. The Green River is controlled by hydroelectric dams upstream of the Game Land.

All of the forests should be allowed to mature without cutting. Prescribed burning, starting on an experimental basis, would be appropriate. Study of river hydrology and the effects of the operation of upstream dams would be appropriate. Monitoring of visitor impacts in the most popular areas is recommended. Invasive exotic plant species, including tree-of-heaven (*Ailanthus altissima*), princess tree (*Paulownia tomentosa*), Japanese stilt grass (*Microstegium vimineum*), and Japanese honeysuckle (*Lonicera japonica*) represent a threat to the natural composition of the forests. Monitoring and control are recommended, especially for the tree species, which show great potential for spreading in this region of the state.

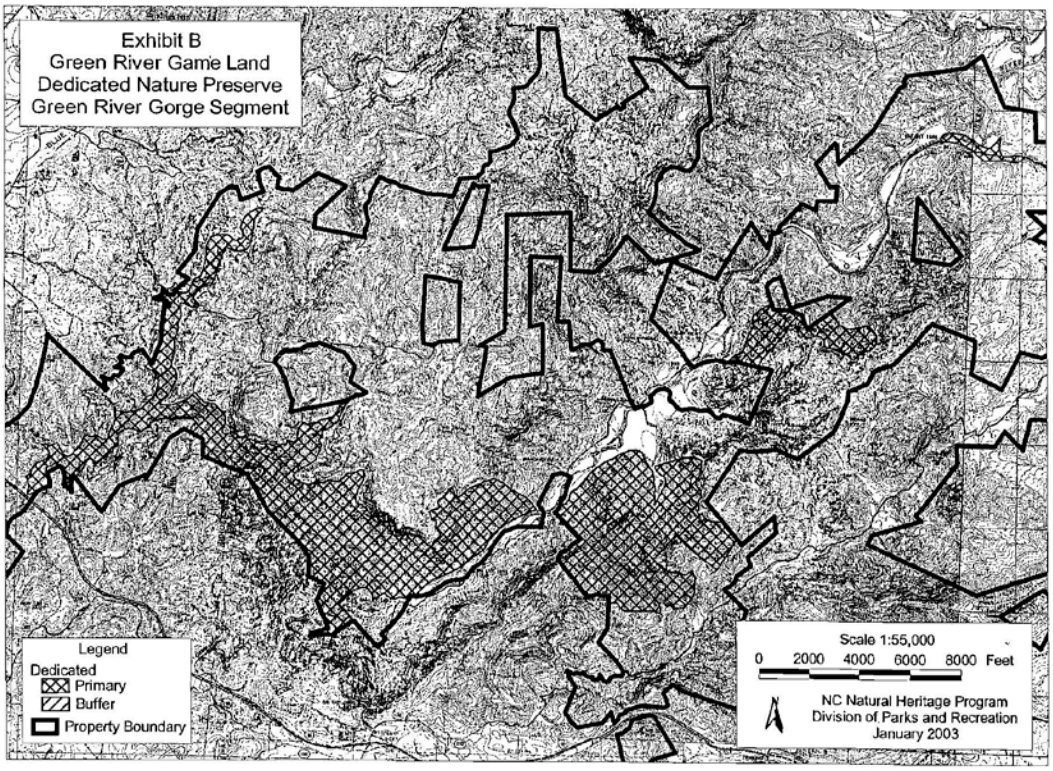


Exhibit B
Green River Game Land
Dedicated Nature Preserve
Green River Gorge Segment
Legend
Dedicated
Primary
Buffer
Property Boundary
Scale 1:55,000
0 2000 4000 6000 8000 Feet
NC Natural Heritage Program
Division of Parks and Recreation
January 2003

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EXHIBIT C

GREEN RIVER GAME LAND DEDICATED NATURE PRESERVE
WHITE OAK MOUNTAIN/TRYON PEAK SEGMENT

COUNTY: Polk

TOPOGRAPHIC QUADS: Cliffield Mountain, Mill Spring

PHYSIOGRAPHIC PROVINCE: Blue Ridge

SIZE OF AREA: ca. 924 acres primary and 1,264 acres buffer

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

DESCRIPTION: White Oak Mountain and Tryon Peak form a high ridge that extends eastward from the Blue Ridge escarpment. Extensive areas of basic or non-acid soil formed over amphibolite rock create unusual conditions for plant growth. The upper part of the area is a band of very steep slopes on the mountain face, broken by prominent spur ridges and narrow coves. At lower elevations the slopes are gentler, and broad coves reach up into the area. The small south-facing tract is very steep, with extensive cliffs and glade-like ledges and outcrops covering much of it. There are a few rock outcrops on the north slope.

Except for the rock outcrops, the primary area is covered by forest communities. All but the most inaccessible patches show the effects of past logging, but have retained natural composition and are mature. The most extensive forests are of the Montane Oak–Hickory Forest type. Several distinct subtypes are present, including the large expanses of the uncommon one influenced by basic soils, as well as the more typical acidic subtype. Chestnut Oak Forest also is extensive on the steeper acidic slopes, and includes some local areas with old-growth character. Rich Cove Forests are present in small patches in the primary area. Several populations of the rare broadleaf coreopsis (*Coreopsis latifolia*) are present, including one of the largest in the state. The very rare white irisette (*Sisyrhinchium dichotomum*) is known from near the Game Land on Tryon Peak, and may extend into it. Several uncommon plants of rich soils are also present. The extensive forests offer habitat for forest interior animals, including neotropical migrant birds. Two rare animals, cerulean warbler (*Dendroica cerulea*) and timber rattlesnake (*Crotalus horridus*), are known from the mountain and probably occur on the Game Land.

The large rock outcrop on the south side of Tryon Peak is one of the best developed Montane Mafic Cliff communities in the state, and is perhaps the largest in the state. It has a great diversity of physical types, including vertical cliffs, narrow ledges, and sloping glades. Vegetation ranges from sparse to moderate, with denser patches in soil pockets. A number of rare plant species are known from it, including the globally rare divided-leaf ragwort (*Senecio millefolium*) and the Biltmore sedge (*Carex biltmoreana*).

The buffer area has mostly young forests that were clearcut in recent years. Most are heavily altered in composition, with successional species predominating. These areas have extensive populations of the invasive exotic tree-of-heaven (*Ailanthus altissima*) and princess tree (*Paulownia tomentosa*) which have reached canopy size.

BOUNDARY JUSTIFICATION: The primary boundaries are drawn based on the extent of the older mature forests. Small areas of younger forest are included in the primary area where they contain rare plants or where they are needed for continuity. The small tract on the south side of Tryon Peak consists entirely of rock outcrop and closely associated forests. The buffer area includes all of the downhill portions of the Green River Game Land. This area increases the habitat area for wide-ranging forest animals and nearly completes a connection to other portions of the Green River Game Land. It also has influence on the primary area as a source of exotic plant invasion.

MANAGEMENT AND USE: The Green River Game Land is managed primarily to provide public hunting opportunities. All of the forests in the primary area should be allowed to mature without cutting. Prescribed burning, starting on an experimental basis, would be appropriate. The well-established invasive exotic plant populations, especially tree-of-heaven and princess tree, represent a threat to the natural character of the preserve. These species have demonstrated the ability to establish in natural canopy gaps as well as in logged areas, and to grow into the canopy. Consideration should be given to removing both the scattered individuals in the primary area and the extensive populations in the buffer area, and to establishing on-going control and monitoring.

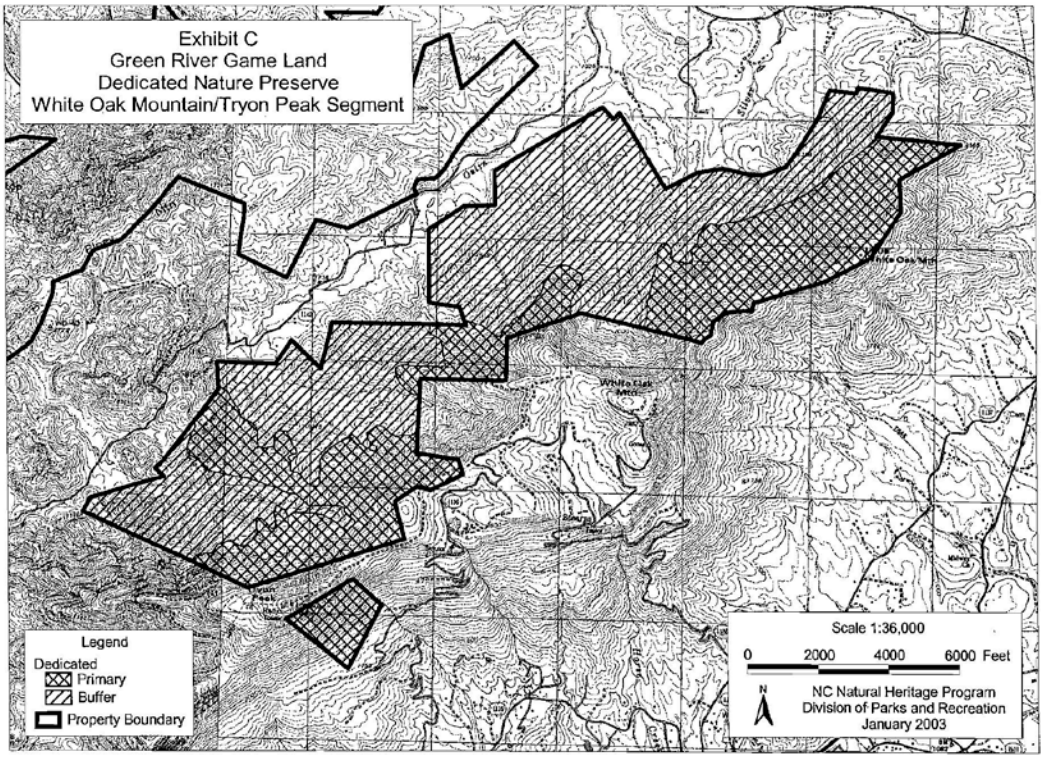
Exhibit C
Green River Game Land
Dedicated Nature Preserve
White Oak Mountain/Tryon Peak Segment
Legend
Dedicated
Primary
Buffer
Property Boundary
Scale 1:36,000
0 2000 4000 6000 Feet
N
NC Natural Heritage Program
Division of Parks and Recreation
January 2003

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APPENDIX 5 – GAME LANDS USE EVALUATION PROCEDURE

North Carolina Wildlife Resources Commission
Game Lands Use Evaluation Procedure

I. PURPOSE

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

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

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

II. ENABLING LEGISLATION

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

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

III. APPLICATION OF PROCEDURE

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

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

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

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

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

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

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

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

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

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

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

IV. DEFINITIONS

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

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

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

V. DETERMINING APPROPRIATE USE

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

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

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

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

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

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

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

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

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

VI. DETERMINING COMPATIBILITY

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

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

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

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

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

roads, parking areas, facilities)?

E. Is the requested activity not adequately provided for on other nearby public lands? *If a proposed use is available on other nearby lands, the NCWRC may not feel as strong an obligation to consider that use on Game Lands. Even if a use is 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: _____

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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: _____

APPENDIX 6 – SUMMARY OF PUBLIC INPUT

Seven questions were presented to the public for their input at a meeting held in Flat Rock on 8/1/2013. The public was also given the opportunity to provide input to the same questions via the agency website. A summary of input received is below.

1. Which habitats are most important to protect on GRGL?

Comment	Responses
Green River/Tributaries - Riparian Area	29
Habitat Diversity	20
Fields	12
Forest	11
Old Growth	11
Early Succession	8
Oaks	6
Hemlocks	3
Oak/Shortleaf Pine	1

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

Comment	Responses
Deer	45
Trout	29
Turkey	26
Bear	16
Fish	13
All Species	12
Grouse	8
Quail	5
Small Game	5

Otter	4
Plants	4
Rare/Endangered Species	4
Aquatic Species	3
Ducks	3
Salamanders	3
Squirrel	3
Birds	2
Herps	2
Snakes	2
Bald Eagle	1
Big Game	1
Bobcat	1
Carp	1
Coyote	1
Coyote Control	1
Crayfish	1
Crow	1
Elk	1
Feral Pigs	1
Game Fish	1
Heron	1
Honey Bees	1
Migratory Birds	1
Mink	1
N. Cardinal	1
Rabbits	1
Raccoon	1
Songbirds	1

3. How do you use GRGL?

Activity	Responses
Fish	78
Hunt	72
Hiking	64
Kayak	36
Boating	9
Tubing	7
Biking	4
Birding	4
Canoe	4
Don't Use	3
Live There	3
Parking	3
Swimming	3
Wildlife Viewing	3
Business	2
Camp	2
Climbing	2
Observation	2
Photography	2
River Access	2
Honeybees	1
Meditation	1
Multiple Use	1

Pick Berries	1
Private Sanctuary	1
Timber Harvest	1
Trail Run	1
Trap	1
Walking Dog	1

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

Approximately 60% of those that responded to question indicated that the current level of access was satisfactory, while approximately 40% of respondents felt that access could be improved.

A summary of public input and responses to those that would like to see access improved is below.

Comment	Response
1 or 2 crossings are needed to access north side of Green River particularly at Fish Top Falls and Big Rock parking areas	WRC will explore the possibility of a river crossing in this area. This may involve purchase of a ROW easement or a fee simple acquisition. Cost and/or topography could prove prohibitive
Bradley Falls parking expansion and trail maintenance needed	WRC will explore the possibility of parking area expansion. WRC will develop a plan for trail improvement and maintenance. Maintenance should be performed by a conservation partner through MOU.

Pulliam Creek parking expansion and trail maintenance needed	Little opportunity for parking expansion exists at the Pulliam Creek trailhead. WRC will explore possibilities, however. WRC will develop a plan for trail improvement and maintenance. Maintenance should be performed by a conservation partner through MOU.
Gallimore Road parking area needed	WRC engineer has visited the site and is exploring opportunities for a parking area.
General parking area expansion needed	WRC staff has identified 7 potential new areas where additional parking could be provided.
Better access needed at Piney and White Oak Mtn. areas	Current ownership and the Natural Heritage Dedication does not allow for the construction of additional access at these locations.
Need trails with no hunting allowed to make hikers feel safer	No known incidents have occurred that would necessitate providing a safety zone around trails. Hunters are primary users of the game land and sometimes use hiking trails for access to remote areas. Safety zones around trails are not provided on USFS properties. Signage at kiosks should encourage hikers to wear blaze orange during hunting seasons.
A trail should be constructed through the Green River Gorge	The Natural Heritage Dedication does not allow for the construction of new trails in primary areas. Rugged topography would also prohibit.
Trails need to be improved	Trail maintenance agreement(s) with conservation partners will allow for trail improvements to be made.
Need better access to remote areas	WRC will explore possibilities. Property ownership limitation, rugged terrain, and the Natural Heritage Dedication will preclude access to some areas.
Need better access and improved parking at Long Ridge and Chigger Ridge	WRC plans to install a seasonally open gate at Long Ridge to provide additional vehicular access and construct a new parking area
Provide parking area along Pot Shoal Rd.	WRC plans to construct a parking area in this location.
Reinstall foot bridge at Fish Top access area	WRC will explore possibility, high water events prove problematic.
Acquire ROW easements to isolated areas	WRC will review ROW easement possibilities as feasible and available.

Provide better emergency access	WRC will provide keys to gates to emergency/rescue services upon request. Improvements to access for emergency response will be reviewed on a case by case basis. Emergency response access will always be an issue due to the steep and rugged terrain where emergency incidents normally occur.
Provide horseback riding opportunities	Horseback riding is currently prohibited on GRGL due to a lack of suitable roads (graveled) of sufficient length for providing this activity. The highly erosive nature of the soils located on the game land makes horseback riding on dirt roads or trails problematic (see Soil section above). Allowing horseback riding on hiking trails would create additional erosion issues and conflicts with hikers, hunters, and wildlife watchers. Horseback riding also exacerbates the probability of introducing additional exotic species on the game land. Only 2 requests for horseback riding were received via public input. Due to the factors above and few requests for this activity on the game land coupled with ample opportunities for horseback riding on the nearby Pisgah National Forest and other public lands in the region horseback riding should continue to be prohibited.
Restrict access to secondary users and require fee for parking	Public input reveals that few conflicts occur on the game land between primary and secondary users. Additional restrictions aren't warranted at present. A user parking fee would prove extremely difficult to administer since no staff are stationed on the game land.
Improve trail to Green River from Gallimore Road.	The Gallimore trail has been reviewed by field staff and staff engineer. Plans for trail improvement are being made. Initial improvements will be made by WRC. Routine long term maintenance should be performed by a conservation partner through MOU.

Provide access from Deep Gap Rd.	Current ownership does not allow for providing public access from Deep Gap Rd. to the game land. WRC holds no ROW easement to address this request. Opportunities for fee simple or ROW easement acquisition will be reviewed as properties are made available for purchase.
All logging roads should be kept clear	Logging roads are cleared periodically.
Construct restrooms at Fishtop and Big Rock access areas	Lack of staffing prohibits WRC from establishing and maintaining developed facilities.

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

A summary of public input and responses is below.

Comment	Response
Generally pleased with management of game land	WRC will continue to conduct active habitat management and will promote public use of the property.
Provide a better map of the game land	Explore possibilities with staff GIS and IT specialists. Develop a game land application for mobile devices
Limit mountain biking on the game land	Mountain biking currently occurs at GRGL, but not at high levels. The current level of mountain biking should be maintained. Increased levels of mountain biking should not be encouraged due to the erosive nature of the soils found on the game land (see soil section) and a lack of suitable trails to ride on that do not create conflicts with hikers, hunters, and wildlife watchers. High intensity mountain biking should also be discouraged since it can degrade wildlife habitat improvements especially in sensitive areas. Ample opportunities for high intensity mountain biking can be found on the nearby Pisgah National Forest.

Require game land use permit for all users	This requirement should be explored at the statewide level.
Hikers should wear orange during hunting seasons	Install signage on kiosks encouraging hikers and other game land users to wear blaze orange during hunting seasons.
Close river a couple days per week to kayakers to allow for better fishing	Flow rate of the Green River is controlled by a hydroelectric dam upstream of the game land. Fishermen prefer low flows whereas kayakers prefer high flows. This minimizes conflicts between the user groups. Public input indicates little conflict is occurring currently.
Need cell tower on the game land	No requests from mobile providers have been made to install a cell tower on the game land. The Natural Heritage Dedication precludes this in those areas that are dedicated. WRC will review any future requests from mobile providers.
Trails should be better maintained	Maintenance agreements with conservation partners will be established to provide routine trail maintenance.
Seasonally close non hunting/fishing activity	WRC will explore if conflicts among user groups warrant.
Install barriers at Bradley Falls	Installation of safety barriers creates liability issues. WRC staff is not housed on the game land. Routine checks and maintenance of this type improvement would prove problematic.
Number bridges crossing Green River in Green River Cove to better facilitate emergency incidents	Only 2 bridges (upper and lower) are located in Green River Cove area. Bridges are maintained by DOT. Additional signage is subject to DOT regulations.
Distribute stocked trout more evenly	We scatter trout as evenly as possible. Current research indicates that stocked trout move much more that previously though and their heterogeneous distribution is likely a product of their behavior.
Establish a catch and release section for trout on the game land	The Green River is too warm in the summer to support trout, therefore if harvest was restricted, any stocked trout would die in the summer. The Delayed Harvest section of the Green River provides catch-and-release fishing from October until June.
Allow camping on the game land	WRC staff is currently reviewing potential locations for a camping area on the game land.

Implement a fee for commercial users of the game land	A policy should be developed at the statewide level.
Establish an archery only zone	The archery only season is currently 8-9 weeks on the game land. Establishment of an archery only zone is not warranted.
Better landowner communications during prescribed burning.	All game land adjoiners in the vicinity of a prescribed burn are currently notified.
Provide more law enforcement	Agency funding levels do not allow for the hiring of additional law enforcement personnel at this time.
Provide dove field on Holbert Cove Rd.	Opportunity for providing a dove field along Holbert Cove Rd. does not exist due to property ownership and steep/rugged terrain.
Create more wildlife openings	Additional wildlife openings will be established as opportunities and staff time allow.
NCWRC needs to be an active participant and advocate in the building of a comprehensive, protective watershed plan for the Green River Watershed. Without proper management/maintenance of the game land we will not have the protection these water resources so badly need.	Water quality is addressed in plan in context of GL ownership. WRC would be a willing participant in a comprehensive watershed plan that extends outside of the game land boundary. Contacts have been made with watershed protection citizen's group.
The game land should be managed and protected for all wildlife, not just game animals. Amphibians and reptiles in particular are important.	The game land is currently managed for all wildlife species. Additional wildlife inventories are in progress. Goals of the WAP will be implemented as applicable.
Boundary should be clearer	Boundaries are maintained (signed and repainted) per guidelines on a 5-7 yr. rotation.
Stock flathead and/or blue catfish	These are exotic/invasive species and could be detrimental to native species.

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

A summary of public input and responses is below.

Input	Response
Install a public shooting range on the game land	An extensive review of the game land was conducted in 2009 to attempt to locate an area suitable for a shooting range. A site could not be located near a DOT maintained or a game land road that provided a sufficient buffer from adjoining landowners. No property acquisitions have occurred since that time that would provide a suitable site for a public range.
Liberalize doe harvest on the game land.	Current harvest levels do not warrant a more liberal antlerless harvest on the game land.
Issue ATV permits to retrieve harvested deer	Disturbance of other hunters would create conflicts, administration would prove problematic (i.e. issuance of gate keys), limiting ATV use to suitable roads would be difficult to enforce.
Stock more trout	Hatchery supported and delayed harvest sections are already being stocked at their standardized rates.

Establish horse trails	Horseback riding is currently prohibited on GRGL due to a lack of suitable roads (graveled) of sufficient length for providing this activity. The highly erosive nature of the soils located on the game land makes horseback riding on dirt roads or trails problematic (see Soil section above). Allowing horseback riding on hiking trails would create additional erosion issues and conflicts with hikers, hunters, and wildlife watchers. Horseback riding also exacerbates the probability of introducing additional exotic species on the game land. Only 2 requests for horseback riding were received via public input. Due to the factors above and few requests for this activity on the game land coupled with ample opportunities for horseback riding on the nearby Pisgah National Forest and other public lands in the region horseback riding should continue to be prohibited.
Establish hiking trail from Walcott tract to Big Bradley Falls	Unmaintained trail already exists. A maintenance agreement with a conservation partner could be establishment to provide for routine trail maintenance.
Create more wildlife openings	Additional wildlife openings will be established as opportunities and staff time allow.
Conduct more prescribed burning and selective timber harvest	A number of rotational prescribed burn units currently exist on the game land. The establishment of additional prescribed burn units will be reviewed, however the current regional prescribed burning rotation coupled with current staffing levels will make this challenging. Timber harvest will continue on the game land at appropriate levels to meet habitat objectives.
Seasonally close non hunting/fishing activity	WRC will explore if conflicts among user groups warrant.
Provide better trail system	Maintenance agreements with conservation partners will be established to provide routine trail maintenance. Requests for new trails will be reviewed on a case by case basis.
Require game land use permit for all users	This requirement should be explored at the statewide level.

Need better access to remote areas	WRC plans to install a seasonally open gate, allow additional vehicular access, and construct a new parking area at Long Ridge. WRC will explore additional possibilities. Rugged terrain and the Natural Heritage Dedication may limit opportunities.

7. What additional comments do you have about GRGL?

A summary of public input and responses is below.

Input	Response
Non hunters should wear orange during hunting seasons	Install signage on kiosks encouraging hikers and other game land users to wear blaze orange during hunting seasons.
Require game land use permit for all users	This requirement should be explored at the statewide level.
Provide a better map of the game land	Explore possibilities with staff GIS and IT specialists
Install trash cans on the game land	No WRC staff are permanently stationed on the game land. Timely removal of trash from trash cans is not possible with current staffing levels.
Implement a fee for commercial users of the game land	A policy should be developed at the statewide level.
Better landowner communications during prescribed burning.	All game land adjoiners in the vicinity of a prescribed burn are currently notified.
The dams on Big Hungry River should be removed	Both dams are scheduled to be removed in 2014.
Stock more trout	Hatchery supported and delayed harvest sections are already being stocked at their standardized rates.
Everything planted and managed for should be native vegetation	Management of native vegetation if emphasized on the game land. Nonnative cultivars that are planted are limited to those that are not invasive.
Expand control of nonnative invasive species	Control of nonnative invasive species has and will continue to be performed on the game land as budgets and staffing allows.
Use genetically improved stock when replanting areas that have been cut	Genetically improved stock is currently used if available and appropriate.

WRC should address erosion issues that are occurring off of the game land but affecting the game land	Water quality is addressed in plan in context of GL ownership. WRC would be a willing participant in a comprehensive watershed plan that extends outside of the game land boundary.
Use volunteers for routine trail maintenance	Maintenance agreements with conservation partners will be established to provide routine trail maintenance.
Too much litter and drug related activity on game land. Need more law enforcement	Public should contact WRC or local law enforcement when violations are observed. Agency funding levels do not allow for the hiring of additional law enforcement personnel at this time.
Use smaller gravel on logging roads	Gravel of appropriate size has to be used to stabilize roads, keep maintenance costs as low as possible, and limit erosion potential.
Seasonally close non hunting/fishing activity	WRC will explore if conflicts among user groups escalate.
Expand parking at devil's tract. Make turn around for large vehicles and trailers	Not feasible due to limited area to operate outside of flood plain.
Expand deer hunting season to Jan. 1	Given current harvest levels, a longer deer season isn't warranted.
Liberalize doe harvest on the game land.	Current harvest levels do not warrant a more liberal antlerless harvest on the game land.

APPENDIX 7 – WILDLIFE SPECIES LIST GENERATED FROM FIRE AND FIRE SURROGATE STUDY

(K. Greenberg, Personal Communication, November 6, 2013)

1. **Birds**

Empidonax virescens	Acadian flycatcher
Corvus brachyrhynchos	American crow
Carduelis tristis	American goldfinch
Setophaga ruticilla	American redstart
Turdus migratorius	American robin
Strix varia	Barred owl
Mniotilta varia	Black-and-white warbler
Setophaga castanea	Bay-breasted warbler
Polioptila caerulea	Blue-gray gnatcatcher
Molothrus ater	Brown-headed cowbird
Vireo solitarius	Blue-headed vireo
Cyanocitta cristata	Blue-jay
Setophaga striata	Blackpoll warbler
Toxostoma rufum	Brown thrasher
Setophaga virens	Black-throated green warbler
Buteo platypterus	Broad-winged hawk
Poecile carolinensis	Carolina chickadee
Thryothorus ludovicianus	Carolina wren
Cardellina canadensis	Canada warbler
Bombycilla cedrorum	Cedar waxwing
Spizella passerina	Chipping sparrow
Chaetura pelagica	Chimney swift

Quiscalus quiscula	Common grackle
Accipiter cooperii	Coopers hawk
Oporornis agilis	Connecticut warbler
Picoides pubescens	Downy woodpecker
Sialia sialis	Eastern bluebird
Sayornis phoebe	Eastern phoebe
Pipilo erythrophthalmus	Eastern towhee
Contopus virens	Eastern wood-pewee
Baeolophus bicolor	Eastern tufted titmouse
Colaptes auratus auratus	Yellow-shafted flicker
Myiarchus crinitus	Great-crested flycatcher
Picoides villosus	Hairy woodpecker
Setophaga citrina	Hooded warbler
Passerina cyanea	Indigo bunting
Zenaida macroura	Mourning dove
Setophaga coronata	Yellow-rumped warbler
Cardinalis cardinalis	Northern cardinal
Setophaga americana	Northern parula
Seiurus aurocapilla	Ovenbird
Setophaga palmarum	Palm warbler
Setophaga pinus	Pine warbler
Dryocopus pileatus	Pileated woodpecker
Setophaga discolor	Prairie warbler
Pheucticus ludovicianus	Red-breasted grosbeak

Melanerpes carolinus	Red-bellied woodpecker
Vireo olivaceus	Red-eyed vireo
Archilochus colubris	Ruby-throated hummingbird
Piranga olivacea	Scarlet tanager
Catharus ustulatus	Swanson's thrush
Limnothlypis swainsonii	Swainson's warbler
Catharus fuscescens	Veery
Sitta carolinensis	White-breasted nuthatch
Helmitheros vermivorum	Worm-eating warbler
Melagris gallapavo	Wild turkey
Hylocichla mustelina	Wood thrush
Antrostomus vociferus	Whip-poor-will
Coccyzus americanus	Yellow-billed cuckoo
Vireo flavifrons	Yellow-throated vireo
Setophaga dominica	Yellow-throated warbler

2. Reptiles and Amphibians

Frogs and Toads	
Anaxyrus americanus	American toad
Hyla versicolor/chrysoscelis	Gray treefrog
Lithobates catesbiana	American bullfrog
Lithobates clamitans	Green frog
Lithobates palustris	Pickerel frog

Lithobates sylvatica	Wood frog
Lizards and Skinks	
Anolis carolinensis	Green anole
Plestiodon anthracinus	Coal skink
Plestiodon fasciatus	Five-lined skink
Plestiodon laticeps	Broad-headed skink
Scelopurus undulatus	Northern fence lizard
Scincella lateralis	Ground skink
Salamanders	
Desmognathus fuscus	Northern Dusky salamander
Desmognathus monticola	Seal salamander
Desmognathus quadrimaculatus	Blackbelly salamander
Eurycea wilderae	Blue Ridge two-lined salamander
Notophthalmus viridescens	Red-spotted newt
Plethodon cylindraceus	White-spotted slimy salamander
Plethodon metcalfi	Southern gray-cheeked salamander
Pseudotriton ruber	Northern red salamander
Snakes	
Agkistrodon contortrix	Copperhead
Carphophis amoenus	Worm snake
Coluber constrictor	Black racer
Crotalus horridus	Timber rattlesnake
Diadophys punctatus	Ringneck snake
Heterodon platirhinos	Eastern hognose snake

Nerodia sipedon	Northern water snake
Storeria occipitomaculata	Northern redbelly snake
Thamnophis sirtalis	Eastern garter snake
Elaphe obsoleta	Black rat snake
Turtles	
Chelydra serpentina	Common snapping turtle
Terrapene carolina	Eastern box turtle

3. Mammals

Glaucomys volans	Southern flying squirrel
Neotoma floridana	Eastern woodrat
Mapeozapus insignis	Woodland jumping mouse
Ochrotomys nuttali	Golden mouse
Peromyscus leucopus (could be *P. maniculatus* also)	White-footed mouse
Pitymys pinetorum	Pine vole
Sigmodon hispidus	Cotton rat
Tamias striatus	Eastern chipmunk
Blarina brevicauda	Northern short-tailed shrew
Sorex hoyi	Pygmy shrew
Sorex fumeus	Smoky shrew
Sorex longirostris	Southeastern shrew
Cryptotis parva	Least shrew

Mephitis mephitis	Striped skink
Spilogale putorius	Spotted skunk
Didelphis virginiana	Opossum
Sciurus carolinensis	Gray squirrel
Sylvilagus floridanus	Eastern cottontail
Procyon lotor	Raccoon