ECOLOGICAL ASSESSMENT

and

MANAGEMENT PLAN

for

HITCHCOCK WOODS

AIKEN COUNTY, SOUTH CAROLINA

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HITCHCOCK WOODS MANAGEMENT PLAN

Table of Contents

1. Introduction

1.1 Executive Summary

Hitchcock Woods, located in the heart of the community0 of Aiken, South Carolina, constitutes a regionally significant remnant of the original longleaf pine/wiregrass ecosystem that once dominated the southeastern coastal plain. It is one of the largest privately managed natural areas open to the public in the South, and is free of paved surfaces, manmade structures, and disruptive activities. As such, it provides a unique opportunity to preserve for future generations a large, ecologically viable remnant of the natural vegetation of the Carolina Sandhills region, while simultaneously providing for diverse recreation needs of the public and improving the general ambiance and lifestyle experienced by the residents of the City of Aiken.

Hitchcock Woods was originally part of a much larger tract purchased by Thomas Hitchcock and William Whitney around the start of the 20th century. In 1939 the Hitchcock Foundation was formed to protect and maintain the remaining 1,200 acres of this site. Through gifts and acquisitions, the area protected by the Foundation now includes approximately 2,000 acres, and is used primarily for equestrian recreation, though increasingly the land has been used for other forms of passive recreation as the city has grown and changed demographically. Over the past sixty years, a policy of fire suppression has caused the natural vegetation of the site to change from a predominantly open, species-rich longleaf pine savanna to dense mixed pine/hardwood forest, with substantially lower plant and wildlife diversity. In addition, fire suppression has resulted in the accumulation of fuels to the point of posing a potentially severe wildfire hazard to the adjacent Aiken community. These changes, which have taken place not just in Hitchcock Woods but throughout the South, have become more apparent and better understood over the past decade, and have prompted the Hitchcock Foundation to seek out new management strategies to restore and perpetuate the original landscape and its intrinsic biodiversity.

Recent management efforts, including selective timbering and prescribed burning, have initiated the process of restoration. However, these have occurred in the absence of a comprehensive management plan based on ecologically sound management principles designed to achieve specific, long-term objectives. The Hitchcock Foundation, having realized most of its land acquisition objectives and having hired a full-time Forest Manager, retained the authors to devise a management plan to assure long-term preservation of the biotic values of the land they undertook to preserve.

This Hitchcock Woods management plan contains:

- an assessment of the vegetation of the original, presettlement landscape, provided as a possible target for restoration and management activities;
- An assessment of the natural disturbance regime that was responsible for maintaining the original, presettlement vegetation;
- a detailed assessment of the current vegetation and existing conditions;
- a set of general recommendations for prescribed burning, selective timbering, management of threats, wildlife diversity enhancement throughout the site; and
- a detailed management prescription that addresses individually the conditions and management needs of forty-nine management compartments within Hitchcock Woods.

Throughout the background analysis and plan development, our intent has been to:

- characterize the factors that shaped this landscape originally, determine how those factors have been altered, and determine how those forces can best be restored, under the constraints of public use, urban proximity, and limited funds;
- to design a long-term management strategy that will sustain both the natural landscape and continued traditional human uses well into the future; and
- to present options for enhancing natural resources and cultural resources, and for adjusting management activities to address unforeseen future trends.

We are pleased to acknowledge the advice and assistance of Harry Shealy, Gary Burger, Bob McCartney, Courtney Conger, and Dacre Stoker, all of whom, among others, provided us with valuable background materials and personal insights concerning the desired future direction for Hitchcock Woods.

1.2 Scope of Study

This document describes and recommends management activities designed to maintain and enhance the natural and cultural values of Hitchcock Woods for the indefinite future.

Developing this document involved the following steps:

1. Meetings with the Hitchcock Foundation and other individuals to assess goals, objectives and vision;
2. Preliminary reconnaissance visits to achieve a good overview of the property and its needs;

3. Development of a general set of goals we desired to achieve, outlined here and elaborated further in the next section:
    A. Preservation of significant natural vegetation for conservation, natural heritage, and educational purposes;
    B. Accommodation and management of the current and anticipated recreational demands of the growing City of Aiken;
    C. Maintenance and enhancement of aesthetic values, both at the small-scale and the landscape-scale, to maximize enjoyment value and appreciation of Hitchcock Woods;
    D. Evaluation of threats to the property and its management, and development of strategies to moderate those threats (resolution of some of the threats is clearly outside our expertise and we can only serve to increase awareness of the problems);
    E. Provide modest opportunities for income that might be necessary to sustain management activities;
    F. Development of an achievable, financially-graded and prioritized implementation plan;
4. Thorough traversal of the property to assess the individual attributes and management needs of the 49 management compartments;
5. Development of a GIS (geographic information system) database to make the recommendations spatially explicit, to coordinate management activities, and to assess the interactions of management proposals for the various compartments;
6. Completion of a draft report for review by the Hitchcock Foundation board members;
7. Completion of final report.

The site was thoroughly traversed by foot, and an assessment was made on a compartment-by-compartment basis of current forest stand structure, floristic diversity, human use patterns, and management practices. Historic records and maps were examined, as were current stand records and other recent assessments. A geographic information system database was constructed, which was used to analyze the site's topographic, hydrologic, and edaphic characteristics, and to produce maps and other reference material presented herein. The authors have pooled their varied knowledge of and experience with similar ecosystems to devise a management strategy based on ecologically sound, naturally occurring processes. At the same time, they have listened to the concerns of Hitchcock Foundation Board members and citizens of Aiken, and have endeavored to provide for a harmonious relationship between recreational needs and ecological integrity.

Although this document describes the proposed management strategy in detail, along with alternatives to the plan itself, there are many pertinent issues that are not addressed. These relate to the legal and political aspects of plan implementation, including liability insurance for

prescribed burns, legal responsibility and management of storm water runoff, revenue generation, and regulation of public use. The focus of this document is to describe what needs to be done to achieve the goals outlined in the next section; the practical aspects of implementation, though continuously considered by the authors, are best left to those responsible for day-to-day operations.

1.3 Goals of Management Plan

The overall goal of this management plan is to assure the long-term natural biodiversity and ecological integrity of Hitchcock Woods. Towards this end we present various narrower, strategic goals that fall into three broad areas, which generally can be summed up in three words: restoration, preservation, and appreciation. These goals are an expansion of those included in the Forest Management Guidelines of the Conservation Easement (FMG) (1995).

Restoration of declining ecosystems

- To evaluate and articulate the regional significance of Hitchcock Woods and its potential role as a refuge for threatened species, associations, and ecosystems, so that its importance for conservation and heritage can be understood and appreciated by those responsible for its management and by the public at large.

- To identify and describe the original natural vegetation and ecosystems so that there is an appropriate target for restoration activities.

- To restore and conserve representative and high-quality native plant and animal communities found in Hitchcock Woods by recreating the natural processes to which they are adapted, when possible, or to devise management methods to mimic these processes.

Preservation of biologically significant associations

- "To maintain the biological diversity of Hitchcock Woods as a natural and essential feature of the forest landscape." (FMG)

- "To prevent fragmentation of Hitchcock Woods to preserve the integrity of the forest ecosystem." (FMG) This can be extended to include any excessive erosion or other human activity-related degradation.

- "To enhance the environmental quality of Hitchcock Woods to maintain its functional integrity and sustainability as an ecosystem by minimizing the impact of all forms of activity." (FMG)

- "To balance the economic and ecological values to ensure the long-term biological integrity and sustainability of Hitchcock Woods." (FMG)

- To provide appropriate habitat for appropriate forms of indigenous wildlife and unique plant associations, and maintain the potential to serve as a refuge for displaced threatened and endangered species.

Management of resources for sustainability of current human uses and anticipation of future uses

- To continue to provide an appropriate environment for the pursuit of equestrian activities.

- To make the aesthetic and ecological value of Hitchcock Woods apparent and accessible to all users.

- To provide an outstanding environment for educational pursuits and research opportunities.

- To balance the preservation of the historic character of Hitchcock Woods with its long-term viability.

2 Site Analysis

2.1 Ecological History

2.1.1 Regional Context

The Carolina Sandhills are a narrow, discontinuous belt of rolling hills along the inner edge of the coastal plain of the Southeastern United States. In South Carolina they are found in portions of Aiken, Lexington, Richland, Kershaw, Sumter, and Chesterfield counties. Consisting of a zone twenty to forty miles wide, this distinctive landscape was formed over 55 million years ago, when sands and clays carried here by rivers originating in the Blue Ridge and Piedmont provinces were reworked by wave action to form the dunes and beaches of the then existing shoreline. The highly erodible sandy soils of the Sandhills allow for a rapid downward drainage and, consequently, upland soils that, despite the region's plentiful rainfall (114 cm, or 45 in, per annum), are typically very dry. The rapid percolation of rain water through the soils also results in excessive leaching of mineral nutrients, with the results that most upland soils are highly acidic and nutrient-poor (Kovacik and Winberry 1989).

The Sandhills constitute a small but distinctive portion of the Southeastern Coastal Plain, which was once dominated by vast, grassy, open woodlands or savannas dominated by longleaf pine (*Pinus palustris*) and wiregrass (in this area, *Aristida beyrichiana*) (Peet 1993; Ware et al. 1993). The biota of the longleaf pine savannas evolved under the influence of frequent, lightning-ignited summer fires, and then expanded under the influence of nearly 10,000 years of native American burning. Despite the low nutrient availability of the soils in this region, such frequent disturbance resulted in the development of a savanna ecosystem with a high degree of floristic diversity, particularly in the ground cover stratum (Platt 1998).

Longleaf pine ecosystems have been reduced by as much as 98 percent since presettlement time (Clewell 1989; Noss 1989; Ware et al. 1993). These ecosystems once extended from southeastern Virginia to east Texas. The presettlement range of the fire-maintained longleaf pine/wiregrass savanna has been estimated at from 24 to 35 million ha (960,000 sq. miles to 1,400,000 sq. miles), but the present extent is no more than 2 million ha (80,000 sq. miles), of which most is in poor condition due to long-term fire suppression, silvicultural site preparation, and other development. Hitchcock Woods represents a significant remnant of this former ecosystem, a remnant which has experienced some fire suppression and limited timbering, but not the more devastating effects of soil disturbance and development. Additionally, Hitchcock Woods is unique in this regional context because its deeply divided topography, providing numerous fire-sheltered as well as fire-exposed sites, has resulted in a local biotic diversity even

greater than that found in more extensive longleaf pine savannas. Because of the pervasiveness of fire suppression and development, Hitchcock Woods, Peachtree Rock (Lexington County), and the Sandhills Wildlife Refuge (Chesterfield County) contain the only remaining high-quality examples of longleaf-dominated landscape open to the public that we have been able to identify within the Fall-line Sandhills of South Carolina and Georgia.

2.1.2 Presettlement Fire Regime

Numerous authors (e.g. Clewell 1989, Frost 1993) have suggested a naturally high frequency of lightning-set fires in longleaf pinelands prior to European settlement, usually ranging from a one- to four-year return interval. It is impossible to describe the presettlement fire regime of this area without describing the vegetation adapted to it. Longleaf pine is fire-adapted and extraordinarily fire-tolerant, unlike the hardwoods that invade longleaf pine stands under conditions of fire suppression. Several traits of longleaf pine that demonstrate its adaptation to frequent fire include its dependence on bare mineral soil for germination, the fire resistance and rapid vertical growth of seedlings, and the large, annual, highly flammable needle drop of mature trees (Ware et al. 1993). The other major component of this ecosystem, wiregrass, provides additional ground fuel for the frequent fires that keep fire-exposed upland sites dominated by stands of longleaf pine and scattered scrub oaks. The dense, flammable wiregrass once formed a near-continuous ground cover that, along with the annual needle cast, allowed fires to move across whole landscapes (Clewell 1989).

Hitchcock Woods is situated in a landscape where presettlement fire frequency averaged about 2-3 years. In the original landscape there were no effective firebreaks, other than the wide swamp/beaver pond complex in the lower reach of Sand River, with the consequence that normally much of the site would have burned in a single fire event. Some fires would have originated from lightning strikes within the site, but most probably originated in the larger flammable landscape outside and burned into the area now known as Hitchcock Woods. Most fires would have burned on the prevailing south and southwest winds, with perhaps every 5th or 10th fire (every 10-30 years) happening to burn within Hitchcock Woods during a cold front wind shift. This might drive hot fires up ravines and up into communities that ordinarily only burned with creeping downslope burns, such as the longleaf pine/mountain laurel community (Frost 1997).

Appendix A, Pre-Settlement Fire Regimes, shows the likely distribution in the original landscape of the four natural fire regimes described below. This map was derived through

landform analysis of the site and comparison with nearby sites with more intact disturbance regimes (Frost 1997).

A. The fire-exposed uplands were subject to growing season fires at frequent (2-3 year) intervals. These areas were dominated by pure longleaf pine/wiregrass-mixed savanna graminoids and forbs and were composed of only two strata, a canopy and a grass/forb layer, with few or no hardwoods or shrubs, other than dwarf savanna shrubs like huckleberry (*Gaylussacia dumosa)* and some scattered scrub oaks (*Quercus laevis, Q. incana*) on the coarser-textured soils.

B. More complex vegetation was found on slightly fire-sheltered slopes and areas transitional to bottomland wetlands. Fires reached these areas at about the same frequency as on higher uplands but fire effects were moderated by factors such as more moist fuel conditions and reduced wind effect. On shoulders above steep slopes, this led to natural longleaf-shortleaf mixed pine savanna, which graded into pure longleaf pine on uplands, and into mixed shortleaf pine-hardwood woodland on the slopes just below. These community types, now rare, had a grassy herb layer in the original landscape, and examples remain at Hitchcock Woods that can be restored with fire.

C. Somewhat more sheltered lower slopes supported a variety of communities, frequently dominated by white oak in the most sheltered places. None of the sites were completely fire-sheltered, however; fire scars and other evidence of past fires are evident at all sites. Because of shelter, most fires would have been light surface fires carried by leaf litter, with small hot spots caused by patches of cane (*Arundinaria gigantea*) or shrubs. Unusual species, such as Virginia pine (*Pinus virginiana)* and mountain laurel (*Kalmia latifolia*), found on partially fire-sheltered habitats where differential erosion of sand below kaolin (clay) outcrops caused sharp topographic breaks.

D. The extremely sheltered sites in the bottomlands formed a Sandhills wetland 'pyromosaic', a spotty and ever-changing configuration of burned, unburned, and partially burned patches. This would have comprised the most complex vegetation in Hitchcock Woods, ranging from beaver ponds to bottomland hardwoods, swamp forest and patches of pocosin, bay forest and canebrake. The most substantial fire influence would have been along the edges bordered by hardwoods, mixed pine savanna (a strip of longleaf, loblolly and shortleaf pines) or longleaf pine. The mosaic was attenuated upstream into partially fire-sheltered ravines through which fire passed readily.

2.1.3 Presettlement Vegetation

Assessing the presettlement disturbance regime is integral to attempting to determine the presettlement vegetation. Presettlement vegetation serves as an appropriate template for restoration and preservation, as it generally represents the most biotically stable and diverse historical condition. As already indicated, regular and frequent wildfires, as influenced by local topography, had the greatest impact on natural vegetation in this area. Soil characteristics, especially percolation and nutrient availability, also had significant influence (soils found in Hitchcock Woods are listed here with their associated vegetation types and are described in more detail in the next section). Most of the presettlement vegetation types described here were derived through extensive field surveys by R. Peet, R. Duncan, C. Frost, and others throughout the pine-dominated landscapes of the Southeast. Using the best remaining examples of each of these community types, they have created a preliminary classification of presettlement pineland vegetation, complete with their associated suite of attributes. This classification system, which is here applied to Hitchcock Woods, has the advantage of largely corresponding to The Nature Conservancy's National Vegetation Classification, which is becoming a recognized standard. However, this classification is by no means comprehensive, and would require many additional hours of field work in Hitchcock Woods for thorough treatment. It is presented here as a preliminary inventory of presettlement vegetation types to strive towards in the process of restoration.

In the following vegetation classification, based on the work of Peet and Duncan (*unpublished data)* and Frost (1997), presettlement vegetation communities that occurred in Hitchcock Woods are arranged from driest (most xeric) to wettest. Corresponding TNC Alliance designations are included in parentheses. In the Detailed Management Plan (Section 3.2), specific presettlement vegetation and presettlement fire regimes are identified on a compartment-by-compartment basis using this numbering system.

1 Fire-Exposed Uplands

1.1 Longleaf Pine / Oak species Woodland Alliance (II.A.4.N.a.130)

a. Longleaf Pine / Turkey Oak / Broomstraw species Woodland – Southern Wiregrass phase, found on coarse xeric sands; e.g., Lakeland sands

b. Longleaf Pine / Turkey Oak / Poison Oak / Broomstraw species Woodland, found on sub-xeric sandy uplands; e.g., Troup sands

c. Longleaf Pine / Broomstraw species – Goat's Rue Woodland – Southern Wiregrass phase, found on sub-xeric uplands on Vaucluse & Ailey soils

This alliance includes longleaf/wiregrass savanna, with scattered scrub oaks throughout, originally found throughout the higher uplands; it was probably the most extensive type in the original landscape. This vegetation type also occurred, in a more oak-dominated form, on upper slope shoulders and in gentle depressions, and in slightly fire-sheltered situations at edges of pure longleaf pine savannas. In Hitchcock Woods these communities would have been found throughout the western section, in the area of the Ridge Mile Track in the northern section, and in the areas of Cuthbert Ridge Line and Travers Line in the eastern section.

1.2 Longleaf Pine / Mountain Laurel – Sparkleberry Shrubby Woodland (No TNC analog)
This is an unusual community type, dominated by shrubs more common in the Piedmont and Southern Appalachians. In Hitchcock Woods it occurs on Troup, Vaucluse, and udorthent inclusions (poorly developed soils characteristic of kaolin outcrops), usually on steep, highly eroded cliffs. As such cliffs are often in fire-protected positions, Virginia pine (*P. virginiana*), here at the southern limit of its range, can also occur in this community type. This community type appears in six areas: Cetta's Ride in the western section, Kalmia Hill and Lover's Lane in the northern section, and Mrs. Knox's Trail, Swampy Cut Path, and Lee Field in the eastern section.

1.3 Rosemary Shrubland Alliance (III.A.4.N.a.020)
This is another unusual community type, more commonly found on xeric sands and dune ridges in Florida and coastal Georgia and Alabama. It occurs on highly xeric, narrow, exposed ridges on Troup and Vaucluse soils, and particularly on udorthent inclusions, and in Hitchcock Woods appears on Harry's Hill and Mrs. Knox's Trail.

2 Dry Woodlands

2.1 Longleaf Pine – (Shortleaf Pine, Loblolly Pine) Forest Alliance (I.A.8.N.b.080)
This type includes longleaf-shortleaf pine savannas and woodlands transitional between open longleaf pine savanna above and hardwoods below. Shortleaf pine co-dominates with longleaf pine on xeric ridges of deep sands and in drier sites. Loblolly pine is an infrequent co-dominant, usually occurring in more fire-protected sites. These communities are now greatly reduced in Hitchcock Woods through fire suppression, but would have been extensive on northeast-facing slopes in the western section (below Jack Rabbit Field), on many slopes in the northern section (above Peek-a-Boo Lane and around Pigeon Trap Loop), and on many slopes in the eastern section (above Bebbington Springs and Whitney Drive).

2.2 Longleaf Pine – Shortleaf Pine – (Loblolly Pine) – (I.C.3.N.a.140)
(Post Oak, southern Red Oak) Forest and Woodland Alliances (II.A.4.N.a.125)
This mixed pine – hardwood woodland type occurs on moderately steep slopes, in somewhat fire-sheltered topographic positions. Virginia pine also occurs in this community type on steep ridges and in protected sites. It would have been found frequently in close proximity to the previous community type.

3 Mesic Woodlands

3.1 White Oak – (Water Oak) Forest Alliance (I.B.2.N.a.250)
These mesic and dry-mesic community types occur, in Hitchcock Woods, on north- and east-facing, somewhat fire-protected slopes. They contain few hardwood species other than white and black oak, and have a sparse but diverse herb stratum.

3.2 White Oak – (Red Oak – Hickory species) Forest Alliance (I.B.2.N.a.280)
This community type is similar to 2.1, but occurs on richer soils and frequently on concave landforms. It contains a greater portion of hickory and other oak species, as well as a large number of cool, mesic slope-associated species more commonly found in the Piedmont and Southern Appalachians. This and the previous alliance are best represented in Hitchcock Woods near Whitney Drive, Hepatica Trail and Bebbington Springs.

4 Wet Woodlands

4.1 Longleaf Pine – (Slash Pine, Pond Pine) Saturated Woodland Alliance (II.A.4.N.f.050)
This alliance includes a wide range of wet pine savannas and flatwoods; in this application it represents the pine-dominated Sandhills seep, found in isolated areas on moderate to gently-sloping side slopes where clay or plinthite pans create a perched water table or divert water laterally to the surface. These side-slope bogs may have been habitat for carnivorous plants like sundews (*Drosera capillaris*) and pitcher plants (*Sarracenia* sp.) under the original fire regime. In Hitchcock Woods this community type is found in isolated, topographically diverse areas, primarily along Whitney Drive and throughout Bebbington Springs. (Slash pine does not occur naturally in this area, but is included in this TNC alliance.)

4.2 Swamp Black Gum – Red Maple – (Tuliptree) Saturated Forest Alliance (I.B.2.N.g.020)
Similar to the previous community type, these communities occur in wet peaty ravines, on saturated slopes, and at the edge of the floodplain, in locations where fire is infrequent. They differ from the previous type in that they are hardwood-dominated. Both of these types may

contain patchy canebrakes (*Arundinaria gigantea*), which may burn very hot when fire does occur.

4.3 Loblolly Pine – (White Oak, Southern Red Oak, Post Oak) Forest Alliance (I.C.3.N.a.180)
and Loblolly Pine Temporarily Flooded Forest Alliance (I.A.8.N.e.020)

These mixed wet pine woodlands were originally found in a narrow zone along margins of small stream bottomlands, on lower slopes, and in protected ravines. This was the principal habitat for loblolly pine in the original landscape, from which it has extensively escaped as a result of fire suppression. In some areas these were dominated by almost pure stands of loblolly pine, in others mixed oaks played a more important role. This community type is found throughout Hitchcock Woods, along bottomland margins. It is perhaps best represented along Peek-a-Boo Lane, Wood Cut, and Barton's Pond Path.

5 Bottomlands, or Sandhills Small Stream Mosaic

5.1 Pond Pine Saturated Woodland Alliance (II.A.4.N.f.090)

a. Pond Pine – Longleaf Pine / Blackgum – Titi Shrubby Woodland Seepage Bog
b. Pond Pine/ Longleaf Pine / Giant Cane Woodlands
Canebrakes on fertile, moist sites
c. Pond Pine / Cinnamon Fern / Short-leaved Witch Grass Saturated Woodlands
Open woodlands on saturated soils

These community types were formerly found in narrow bands along streams on peat or organic-rich coarse sands. Somewhat open and sparse, they burned relatively frequently despite the amount of moisture present. These communities have been extirpated from Hitchcock Woods through long-term fire suppression.

5.2 Water Tupelo / Swamp Blackgum Floodplain Seasonally (I.B.2.N.e.070)
Flooded Forest Alliance

This type includes frequently and infrequently flooded bottomlands, which could have been extensive in the original landscape depending on beaver activity. These communities would have contained a range of bottomland hardwoods and wet shrub and subcanopy species. Chinese privet now largely dominates these sites. (Water tupelo does not occur naturally in this area, but is included in this TNC alliance.)

Four species of pine dominate the canopy of Hitchcock Woods. These can be arranged along a gradient of exposure and fire-tolerance, which is a useful method of visualizing the

arrangement of these species in the landscape and understanding their respective natural habitats. Longleaf pine (*Pinus palustris*) is, of course, the most fire-tolerant, followed by shortleaf pine (*P. echinata*) and pond pine (*P. serotina*) (if any still exists in Hitchcock Woods), then loblolly pine (*P. taeda*), lastly by Virginia pine (*P. virginiana*), which was not a dominant species. Under the original fire regime, only longleaf pine would have been found on the most fire-exposed convex uplands and upper slopes. A mixture of longleaf and shortleaf pine would have dominated the mid to lower gentle slopes and those upper slopes found above abrupt topographic breaks. Mixed pines (all but Virginia pine) and fire-resistant hardwoods would have dominated lower slopes, whereas primarily loblolly pine would have been found in infrequently burned colluvial slope toes. In a fire-dominated landscape, Virginia pine would have been limited to its own specialized microhabitat: on steep dry slopes in the fire shadow around kaolinite cliffs, which create small local firebreaks. With long-term fire exclusion, Virginia pine is escaping from these refugia and spreading onto nearby uplands. Under natural conditions, loblolly pine would have been confined by fire to bottomland wetlands and lower slopes. Its current prevalence on side slopes and some uplands sites is an artifact of long-term fire suppression.

2.1.4 History of Human Use

Hitchcock Woods contains numerous archaeological sites, including 21 nineteenth century homesites, a commercial brickyard site, a pottery kiln site, and a grist mill site (Appendix B). Ten of the 35 archeological sites listed in the Conservation Easement are presettlement Native American sites. The original route of the Charleston and Hamburg Railroad ran through Hitchcock Woods in the mid-nineteenth century along a causeway now called Cathedral Aisle and through a cut that was the former Lover's Lane, now lost to overgrowth (Bebbington 1985). All of these historic sites have been deemed to have statewide significance, and are recognized and protected by the Conservation Easement which has been granted to the State of South Carolina. Together, these sites can be used to piece together a history of human use in this area.

The Native American sites in Hitchcock Woods range in age from 10,000 to 1,000 years old (Chris Judge, pers. comm.). These sites mostly consist of temporary campsites and seasonal basecamps. Prior to the construction of the Charleston and Hamburg Railroad, human use of the site was limited to homesteading, selective timbering, grist milling, and small-scale mineral extraction, specifically brick manufacture. Considerable alterations were made to the bottomlands of the site in the construction of the railroad bed in the 1830's, including extensive earthworks and trestle construction.

At the turn of the century, the Whitney and Hitchcock families purchased the land that would become Hitchcock Woods for use as a private hunting reserve. A map drawn at the height of the winter colony period (1927) shows a half-dozen homes still existing in the north section of Hitchcock Woods, and roughly a half-dozen open fields were scattered across the west section. These houses were all destroyed, either intentionally or accidentally, soon after the designation of Hitchcock Woods as a public park in 1939. In 1974, the last remaining building within Hitchcock Woods, the Tea Cottage, was destroyed by fire. Two other structures once existed within Hitchcock Woods: the dam at Robinson's Pond, and the dam at Barton's Pond (formerly a grist mill), both of which washed out in the 1960's and have not been rebuilt.

The management of Hitchcock Woods since its designation has had a significant effect on the vegetation structure evident today. Much information about early management practices comes from Harry Worcester Smith who described the winter colony lifestyle in Life and Sport in Aiken (Smith 1935). He noted that the Hitchcocks and the Whitneys used the existing roads and trails for logging the site, but that much of Hitchcock Woods remained unlogged, and fire suppression was rigorously practiced.

> "Mr. Hitchcock has had a tower erected near the Todd Cut where a watchman with telephone is stationed at all times, and this has helped greatly in locating fires by smoke before a real conflagration starts. . . . No motors are allowed in the woods except in case of fire, and on occasions it is wonderful to see how under the leadership of Mr. Hitchcock and Munroe Heath, the lovers of the forest work to save it. They hasten from far and near in their motors when the alarm is given, filled with stablemen carrying brooms, shovels and rakes to use in addition to those furnished by the wood brigade. With these they rake up the pine needles, dig trenches, help start back fires or spank the fire out along the line. . . . On fire days, like naughty children, everyone who runs a motor into the woods starts his Klaxon, and under the guidance of someone who knows the way about (as all saddle trails are not motor roads), the fire is reached and you will see bands of keen-hearted and strong-armed men, women, boys and girls dressed in the very clothes they wore when the call of fire reached them, armed with rakes, shovels, and brooms who never quit until 'Fire out!' is called."

This was fifty years before the ecological role of fire was widely understood and accepted. Although the early stewards of Hitchcock Woods meant well, the net result of their activities was decline of the fox squirrel, the red-cockaded woodpecker, wiregrass and most of the other grasses, flowering herbs and wildlife species associated with the original longleaf pine-dominated landscape.

2.2 Current Conditions

2.2.1 Geology and Soils

The five soil series that occur within Hitchcock Woods differ mostly in their texture and drainage characteristics and topographic position (Appendix C). These range from coarse, deep, well-drained upland soils to silty upland soils with subsoils characterized by clays and loams, to silty, poorly drained loams in the bottomlands. Arranged in this order, the five series occurring in Hitchcock Woods include Lakeland sands, Troup loamy sands, Ailey sands, Vaucluse loamy sands, and Bib loamy sands. Embedded within several of these soil types (especially Troup and Vaucluse soils) are small discrete patches of kaolin-rich Udorthents, which are usually found on highly eroded side slopes. All soils in Hitchcock Woods are highly acidic, low in nutrient content, and quite erodible. Although differences in soil texture and nutrient availability often have significant impact on the predominant vegetation pattern, that impact in Hitchcock Woods appears to have been overshadowed by the more significant roles of fire history, fire frequency, and topography. It must also be recognized that the soil survey presented here is highly generalized and coarse-scaled, and that the topographic complexity of Hitchcock Woods allows for a broad range of micro-site conditions.

Lakeland sands dominate Juac Hollow and the area north of Juac Hollow, and the Ridge Mile Track area. They are extremely course, deep (greater than 80 inches), and well-drained, and are commonly found associated with longleaf pine barrens throughout this region.

Troup sands are also quite common in Hitchcock Woods, dominating some areas in the eastern and northern sections, and the northernmost and southernmost portions of the western section. Troup soils are moderately deep (20 - 40 inches), well-drained sandy clays, often with a clayey hardpan just below the surface. Udorthent soils appear within this series at Mrs. Knox's Trail, and the Chalk Cliffs near Harry's Hill.

Ailey sands are loamy sands 20 - 40 inches deep, occurring over compact clayey subsoil. They occur only in a very small portion of the northern half of Pigeon Trap Loop.

Vaucluse sands are fine-textured, moderately loamy sands less than 20 inches deep that occur over compact clayey subsoil. They are found on narrow ridges and adjacent side slopes, and dominate most of the eastern and northern sections of Hitchcock Woods, and the area around

Whitney Drive in the western section. Udorthent inclusions occur within this soil series at two areas along the northern boundary of the Woods, near the railroad cut.

Bibb soils are poorly-drained, silty sediments associated with small streams and flood plains. In Hitchcock Woods, they are found underlying most of Sand River and its tributary branches.

2.2.2 Hydrology

Hitchcock Woods is trisected by Sand River, an intermittent that flows west into Horse Creek and ultimately the Savannah River. Although Sand River has remained intermittent, and is completely dry for many months of the year, it has undergone radical changes in the past thirty years due to steadily increasing influxes of storm water from the growing Aiken community. Five thousand acres are drained by Sand River, most of which lies beneath the City of Aiken, which now surrounds Hitchcock Woods on three sides. Storm events and the resultant high-volume outflow have resulted in extensive scouring and undercutting of creek banks, large areas of braided stream channels, and sediment deposition in the lower reaches of Sand River. The construction and subsequent removal of the two dams (Barton's and Robinson's) has had little long-term permanent impact on local hydrology. A beaver population has recently taken up residence in the lower reaches of Sand River; historically, beaver would have had an important role in the hydrologic character of this site and should be accepted as a natural and desirable attribute of the landscape.

2.2.3 Vegetation

Fire suppression has resulted in a number of predictable vegetation changes found nearly throughout the site. An unnaturally dense litter and duff layer has developed in almost all areas, suppressing longleaf pine seedling germination and thus pine regeneration and the regeneration of many other species as well. Apart from the obvious wildfire risks, should such a dense fuel accumulation burn during a dry period, the unusually hot fire created could cause significant tree mortality. There has been a loss of the natural bilayered (canopy/herb layer) structure that once dominated most of the site, and an associated conversion to a much denser, multi-storied woody vegetation. Owing both to reduced light at the ground layer and virtual elimination of seedling

establishment, there has also been a significant loss of species in the herbaceous layer, and consequently a loss of much of the animal and plant diversity. These losses are much more severe on moist lower slopes and sheltered sites, especially where exotic plant species, such as Chinese wisteria (*Wisteria sinensis*) and Chinese privet (*Ligustrum sinense*) have all but completely choked out the understory. On exposed, droughty, upland sites the establishment of a hardwood understory and the spread of exotics have increased much more slowly. Because of droughty, sterile soils, and the recent use of dormant season prescribed burns, the original character of much of the upland portion of the landscape is still evident, despite these losses.

We are fortunate that Hitchcock Woods was never ploughed or disturbed on a widespread scale by mechanical means. The longleaf pine ecosystem can tolerate long-term fire suppression and be restored to close to its original condition as long as the wiregrass-dominated ground cover has not been destroyed by ploughing or grading. Because of its limited reproductive potential however, once destroyed wiregrass rarely returns (Noss 1989; Clewell 1989). However, simple, low-cost options for restoration of the original vegetation are still available for upland areas with remnant wiregrass patches and relatively thin litter.

2.2.4 Human Use

The original motivation for preservation of Hitchcock Woods was to allow continued use for equestrian recreation and sports. Although horseback riding remains the major use of the property, other activities have risen in popularity in recent years, including carriage driving, hiking, jogging, dog-walking, photography, picnicking, nature study, and simple escape from the pressures of modern life to a place of quiet, beauty, and solitude. Hitchcock Woods has also been recognized as a valuable resource to the educational community, serving frequently as an outdoor classroom. There are no records of public use at this time, but by all accounts that use is growing steadily. Apart from a continuous need for trail maintenance, especially during the popular winter season, public use has thus far had little or no negative impact on Hitchcock Woods.

A list of public uses of Hitchcock Woods would not be complete without considering the use of Hitchcock Woods for storm water drainage from the surrounding Aiken community. Aiken's sanitary sewer system also runs through the bottomlands of Hitchcock Woods, and has been recently upgraded with negligible long-term impact. The alteration of Hitchcock Woods' hydrology by ever-increasing storm water runoff remains a persistent problem, however, which should be addressed (see Section 3.1.3).

Because of the geographic proximity of Hitchcock Woods to the adjacent Aiken community, no management activities planned for Hitchcock Woods can be implemented without considering their impact on the neighboring community (especially with respect to smoke management and prevailing wind direction), and conversely, no development activities planned for the community (especially those which influence hydrology and material transport) should be implemented without considering their impact on the integrity of Hitchcock Woods.

2.2.5 Current Stewardship Efforts

Until recently, stewardship efforts focused almost entirely on the maintenance of physical improvements such as trails and fences for equestrian sports, and the suppression and prevention of wildfire. Several factors have contributed toward a recent shift to a more comprehensive, ecologically-based management strategy. Increasing pressure from residential development adjacent to the property has accentuated the need to 1) preserve what little remains of the dwindling open space resources, 2) keep fuel levels low as a key tool in preventing catastrophic wildfire, and 3) address and manage erosion caused by storm water runoff. The shift away from an almost exclusively equestrian focus to the uses enjoyed by the wider community, as well as an increased interest in environmental preservation, has brought attention to Hitchcock Woods' considerable natural resources, including its rare plant communities and its role as a regionally significant preserve for the dwindling longleaf pine/wiregrass ecosystem.

In 1985, almost all of Hitchcock Woods experienced some degree of selective timbering, which was done to reduce excessive stand density, to control pine bark beetle infestation, and to raise capital for the purchase of additional adjacent land. This was followed by a series of large-scale, winter-season prescribed burns conducted in 1987 and 1993, to reduce fuel load and facilitate longleaf pine regeneration. Since acquiring a full-time Forest Manager in 1994, winter-season and growing-season controlled burns have continued on a somewhat limited basis, as funding, burning conditions, and timely Board approval have allowed. Several pine bark beetle salvage operations have occurred, with most areas being replanted with longleaf pine. Other management activities have included monitoring and leveling the beaver dam north of Cathedral Aisle to mitigate the threat of flooding of nearby trails, spot-removal of wisteria and some other exotic species, maintenance of trails and fences, and repair of erosion-damaged areas. A gabion system has been installed at storm water outlets by the City of Aiken, in a somewhat successful effort to moderate erosion damage to Sand River.

Although the management activities that have been employed over the past decade have been largely appropriate and successful, these activities have not been guided by a comprehensive management plan, nor has it been clear what overall principles should guide management activities. Timber management has followed guidelines established for timber production and maintenance of the status quo, not for the restoration of a natural stand structure and a biotically diverse landscape, or even for maintenance of vistas or other aesthetic aspects of the landscape. Prescribed burns have so far rightly focused on winter-season fuel reduction, and have not yet moved into regular and frequent growing season-burns, which would more closely mimic natural processes and encourage the return of the diverse natural biota. Although current erosion control methods on trails are more effective than ever in the history of Hitchcock Woods, erosion is still a serious concern on several of the smaller routes. Erosion control here requires some hard decisions about trail use, decisions which until now have been postponed until a comprehensive plan could be developed.

The Hitchcock Woods Foundation is more than adequately prepared to implement a comprehensive long-term management plan. Several areas have already been managed much as this plan prescribes, with promising results. These can serve as demonstration areas to educate the public about the goals of specific management activities. The recent employment of a full-time, well-qualified Forest Manager is a great advantage and will be key to organizing and implementing the plan. Finally, the recent development of a knowledgeable, interested, and supportive community of users will likely be critical in finding the resources to implement core components of the plan.

3 Management Program

The management program is divided into two sections. The first (Section 3.1, General Recommendations) outlines seven broad areas of management activity, with prescriptions that apply to Hitchcock Woods as a whole. This is followed by a more detailed section (Section 3.2, Detailed Management Plan, by Compartment), in which Hitchcock Woods is divided into 49 management compartments. The intent of dividing the management plan into these two sections is to first create a general framework for the overall management of Hitchcock Woods, through which issues that affect many parts of the Woods are addressed, then to follow this with detailed, specific guidelines for managing each portion of the site. The detailed, compartment-by-compartment section is informed and guided by the principles set out in the general section. The general section, in turn, follows and expands upon the Forest Management Guidelines set forth in the Conservation Easement.

3.1 General Recommendations

3.1.1 Restoration of the Natural Disturbance Regime

There is no single more important restoration and management recommendation than to restore, to the extent possible, the natural disturbance regime. The adoption and implementation of an appropriate regular prescribed burning program will alone accomplish most of the goals for restoration and preservation of natural community structure and species diversity, and enhancement of aesthetic qualities of the landscape. Major concepts behind prescribed burning are presented below; these and the discussion of timber management in the next section follow Frost (1990).

Fire is needed to maintain and enhance species diversity. Virtually all native understory species of Southeastern coastal plain uplands are fire-adapted. Most are perennials with underground storage structures, able to resprout quickly following fire. Reduction in fire frequency to intervals longer than 5 years leads to elimination of most herb layer species. The herb layer of the longleaf pine system provides critical food and habitat resources for numerous component animal species such as fox squirrels, rabbits, quail, and hundreds of other birds and small mammals like mice and voles which, in turn, support hawks, owls and mammalian predators. Much of this complex food web collapses when fire is eliminated from woodlands Platt 1998).

Growing season burns can reduce or eliminate the invasive woody understory, thereby facilitating the restoration of the natural biodiversity of the ecosystem. Lotti (1956) found that repeated growing-season fires eliminate understory shrubs and trees, whereas Taylor and Herndon (1981) found little change in woody understory species after 22 years of annual, cool-season burns. Other researchers have found that cool-season burns do have some favorable impacts (Glitzenstein et al. 1997), but, in general, cool-season burns have at least three drawbacks: 1) hardwood invasion is controlled very slowly, 2) many hardwoods remain and resprout quickly in the absence of fire, and 3) aggressive species such as bracken fern (*Pteridium aquilinum*) gain advantage over more desirable species, such as wiregrass, which, while it can bloom (and thus reseed) to some extent with winter burns, blooms most prolifically with growing season fires.

Burning to simulate natural fire movement in the landscape preserves natural vegetation structure. Fire effects are greatly influenced by topography, tending to be greatest on the exposed uplands and mitigated by topographic breaks. Prescribed burns can be planned and conducted to mimic these effects. For example, hotter fires conducted on exposed uplands will result in open savannas and near-pure stands of longleaf pine, as would be appropriate for these sites, while slopes dominated by longleaf pine/mountain laurel and longleaf pine-Virginia pine should be burned infrequently, and preferably from the top of the slopes on which they occur, as would have occurred under natural conditions. The mountain laurel-dominated communities are present largely because they occur on sites where fire from below was a rare event. Burning heavy fuels like mountain laurel from below creates fires hot enough to kill even longleaf pine, as happened on the Lee Field site in compartment E9 in 1993.

Patchiness in forest systems maintains biodiversity. Natural communities, and fire communities especially, are patchy by nature. Although it is difficult for the human psyche to accept, a tidy, clean burn is not the best kind of burn. Unburned areas can be critical as habitat in which animals, and especially invertebrate species, can persist. For these reasons, it is important to allow some areas to remain unburned during prescribed burning. These areas will likely burn in subsequent burns, as their fuel load increases between burns..

Species diversity is enhanced by burning across the whole moisture gradient. It has been frequent practice in many areas to burn uplands but to omit wetlands by ploughing firebreaks between the two. But, many of the rarest species in the South and many of the showy savanna orchids and bog species like pitcher plants and sundews depend on fire to keep shrubs out of their wet habitat. In Florida it is becoming common practice to burn against wetlands without a protecting ploughline barrier so that fire runs down the moisture gradient into the wetland until it goes out, keeping these critical wetland/upland ecotones open. In North Carolina many years of annual fire in the Green Swamp savannas have demonstrated the safety of burning against pocosins in January and February. Small wetlands included within savanna or woodland sites may

be safely burned in any season. To maximize species survival, a good prescription should avoid placing plough lines in wetland/upland boundaries and should include small wetlands like Sandhill seeps, swamps, moist swales, small stream bottomlands and streamhead sloughs within the burn compartment. As a general rule, ploughlines should not be run indiscriminately through the site, and already well-established trails and ploughlines should be used to define burn compartments. New plough lines should be designed in such as way as to be unobtrusive and to avoid critical habitats. Once ploughline locations are established, every effort should be made to use these repeatedly and not set up new ones for each subsequent burn.

The question of whether there is a well-developed ground cover of grasses and forbs is an overall rule of thumb for quality in longleaf pine and pyrophytic hardwood stands. A healthy longleaf pine community has fire char marks on the trunks and only 2 principal vegetation layers: the pine canopy, and a rich ground cover of grasses, legumes and other flowering herbs.

Guidelines and recommendations for prescribed burning throughout the site

- Burn all uplands on a 2 - 5 year rotation minimum, most slopes on a 4 - 8 year rotation, certain mountain laurel-dominated slopes using infrequent specialized back burns, and, without designating a particular rotation schedule, allow fire on uplands to move into the bottomlands at will (Appendix E, Restoration Fire Regimes). If a compartment is missed in its assigned year, reschedule it for the following year or for a different season.

- Prescribed burns should be scheduled such that adjacent compartments are rarely, if ever, burned in the same season, thus providing refugia for wildlife and diffusing the visual impact of burning throughout the Woods.

- Back-burns of mountain laurel slopes should be staggered over a long period, preferably burning only one of the 5 laurel slopes (Cetta's Ride, Mrs. Knox's Trail, Kalmia Hill, Lovers Lane, and Surrey Trace) every 4 years. This will result in a 20 yr-rotation for all of these sites, and insure that each site has recovered before the next is burned. Back-burning these slopes will generate some difficulties, in particular prolonged smoke production; these difficulties must be taken into account when scheduling prescribed burns in these areas.

- Prescribed burns should be conducted between March and September, preferably between April and August. Burning hardwood-dominated compartments should be avoided during the

songbird breeding season (April, May, and June), at least during the first several burns, until heavy fuel loads are reduced.

- Winter burns should be used primarily for initial fuel reduction and site preparation ('black-lining'), though if it appears the full schedule cannot be accomplished during the growing season it is better to burn some sites in the winter or fall than not at all. Several years of winter burns may be necessary to reduce litter to a depth safe for summer burning. Once a safe litter depth has been achieved, winter burns should be followed quickly by summer burns, preferably in the same year; otherwise much of the fuel reduction benefit of winter burning will be eliminated.

- Areas having wiregrass remnants should have highest priority for restoration via prescribed burning (Appendix H, Restoration Priorities). Presence of wiregrass is also a reliable indicator of presence of additional remnant savanna species, some of which may be dormant or persist only in the seed bank. Expeditious regeneration via prescribed burning for these areas is critical to regenerate species than may be on the verge of extirpation from the site.

- Duff mounds around the base of older longleaf pine, especially in areas of heavy fuel accumulation, should be raked away before burning. These duff mounds are artifacts of fire suppression and cool season burns. If ignited in summer these can sustain bole heating long enough to kill the cambium, effectively girdling and killing trees that have survived dozens of fires in the past.

- A burn plan for each compartment for each burn must be prepared by the Forest Manager and should include:
    a. Compartment delineation or graphic designation
    b. A stand description and fuels description
    c. Descriptions of advanced preparation and intended fire technique
    d. Desired burning conditions
    e. Detailed information as to available personnel, equipment, and emergency procedures
    f. Special precautions
    g. Date and procedure for notifying public and public safety personnel.

  These can be accumulated over time and kept on-file for future modification.

3.1.2 Timber Management

Although most restoration and management activities can be addressed through prescribed burning, selective timbering remains as an important and necessary tool for restoration of a natural stand structure. Long-term fire suppression has resulted in dense, overstocked stands that reduce vegetation diversity, shade out wildlife food plants, limit wildlife enhancement, and encourage pine bark beetle infestation. Selective timbering can reduce these problems and simultaneously provide revenue needed to offset some of the cost of initial restoration and long-term management.

Patchiness in forest stand structure promotes biodiversity. Historical photographs of similar sites and remnant longleaf pine savannas indicate that natural stands spanned a broad range of densities, but were usually sufficiently open to support a grass and forb layer beneath. In natural communities, there is a canopy density gradient ranging from very open and savanna-like on the dry upland sites, to grassy woodland with small canopy gaps around the periphery and on slopes, to closed-canopy forest in bottomlands, except where it was kept open by highly flammable wetland understory vegetation, such as canebrakes. On all dry sites, including all the ridge tops in Hitchcock Woods, a number of sunny treeless gaps of various sizes would have been natural and desirable. Patch regeneration may be the dominant way that longleaf pine reproduces under a natural fire regime (Platt et al. 1988). As a result, old-growth longleaf stands create a mosaic of light and shadow because of the natural clumping of trees, with treeless savanna openings between.

Traditional target stocking densities recommended by USFS, designed for commercial stands, are too high to allow significant diversity in the understory, and fully-stocked, closed-canopy stands are of little value to many kinds of wildlife or for maintenance of diversity of grasses and forbs. Diversity may be maintained, however, if islands of open, or nearly treeless savanna are left. Savanna species are notably slow to recolonize disturbed sites and any kind of site preparation other than fire is likely to lead to extirpation of many species. It is important that, during selective timbering and beetle salvage operations, managers strive to provide a variety of stand densities, including completely open areas. Use of timbering activities as a tool to return species composition to its natural composition can be highly effective and cost efficient. On the uplands this will involve eventual removal of most loblolly and large stature hardwoods, and reduction in scrub oak and shortleaf pine. On sideslopes, either through natural attrition or selective timbering, we anticipate eventual removal of most loblolly and a significant fraction of the broadleaf trees.

Guidelines and recommendations for timber management throughout the site

- The overall goal of selective cutting should be to reach a composition and structure over most of the property such that cutting is no longer needed and stand structure can be managed by fire.

- All selective timbering activities throughout the site should select for longleaf pine on the uplands, longleaf pine and shortleaf pine on upper slopes, and a mix of longleaf pine, shortleaf pine, loblolly pine, and oaks in slightly fire-sheltered sites. No particular pine species should be selected for in bottomland areas.

- With some exceptions (specified in individual compartment prescriptions, Section 3.2), hardwood species generally should be selected against, except on north and northeast-facing slopes currently dominated by white oak, on steep slopes of any aspect, and in all bottomland areas. Limited timbering should take place in bottomland areas, except in the case of significant disease or insect damage; in these sites, timbering should be conducted to thin out loblolly pine stands only. Limited timbering can occur in other hardwood stands, but only to minimize disease or insect damage, or eliminate potential threats to public safety.

- All longleaf pines greater than 100 years old should be retained, with the exception of those that may pose a threat to public safety, or in the event of a severe pine bark beetle infestation or other disease damage.

- Clearcutting should be permitted only in the event of extreme damage from disease, insect infestation, or other similar emergency situations. All clear-cut areas should be artificially regenerated with longleaf pine seedlings within a 2-year period, planted haphazardly to simulate a natural stand structure.

- Patch thinning should be used to create a mixed-aged forest structure containing small stands of varying density. The retention of seed-bearing mature trees and of shelterwood cutting (the retentionof some large trees to shade and protect seedlings) is highly recommended to insure adequate natural regeneration.

- No single thinning protocol can be recommended as appropriate for the entire site. Generally, dry, upland sites should exhibit a more open stand structure (significantly greater than an average 25-foot spacing interval), moist lower slopes and lowlands a more dense structure

(approaching average 25-foot spacing interval). This is necessarily a subjective process; therefore, all thinning personnel need to be well-supervised and well-aware of both the dry-to-moist density gradient and the species compositional gradient when carrying out midstory or canopy thinning.

- In restoring areas of upland longleaf pine/wiregrass savanna, all canopy-height hardwoods should be removed, as these are artifacts of fire suppression and would not occur in these communities under natural conditions. Subcanopy and understory non-oak hardwoods should be removed in the most dry, open sites, but scrub oaks, especially turkey oak (*Quercus laevis*), should be thinned only or fire-managed, especially on peripheral areas where they grade into slope communities. A sparse understory of scrub oaks, including not only turkey oak but also laurel oak (*Q. hemisphaerica*) (primarily on Lakeland sands), bluejack oak (*Q. incana*) (on Troup sands), and blackjack oak (*Q. marilandica*) (on Vaucluse sands) are appropriate where longleaf pine savanna grades into more mesic communities.

- All thinning activities should be done in accordance with Best Management Practices Guidelines (BMP's) for South Carolina to minimize erosion and site degradation.

- The Forest Manager should prepare and update specific timber harvest plans consistent with these recommendations and with the Forest Management Guidelines of the Conservation Easement. The Forest Manager should be responsible for supervising all aspects of timber harvesting, including marking trees, soliciting bids, assessing damages, and keeping timber inventory records.

- The Management Committee of the Hitchcock Woods Foundation should review logging bids solicited by the Forest Manager and recommend a selection for the Board's approval. The most important selection criteria should be the bidder's ability and willingness to adhere to the goals of the Management Plan. Specific standards for appropriate conduct should be at the Management Committee's discretion and may be detailed in the binding contract between the bidder and the Foundation.

3.1.3 Management of Threats

3.1.3 A. Storm water runoff and erosion

The continuing erosion of the banks of Sand River and its tributaries is the single greatest threat to the low lying areas of Sand River. Whereas stream banks are slowly being destroyed in the upper reaches, deposition of unusually high amounts of sand and silt in the lower reaches prevents the establishment and development of any sort of stable bottomland community. Further more, storm water effluent brings in large amounts of trash (posing a potential wildlife hazard and detracting from the site's pristine beauty), and propagules of undesirable, exotic plant species.

Solution of the storm water threat is beyond the scope of this management plan, and lies more in the domain of hydrologic engineers and city planners. In addressing this issue, we can only speculate on the results if the situation is not mitigated soon and on the extent to which it should be mitigated.

It is obvious that, to restore and maintain the ecological integrity of the Hitchcock Woods bottomlands, the majority of storm water, or at least most of the effluent from major storm events, must be either diverted to a retaining area and released into Hitchcock Woods over a longer period of time, or diverted around Hitchcock Woods altogether. Most of the severe erosion is caused by brief periods of storm-generated high rates of discharge, not by long-term average flow rates. Recent efforts to mitigate erosion, without controlling the flow itself, have largely served to shift the problem deeper into Hitchcock Woods. If the current trend continues, large areas of lowlands in the upper reaches will be lost to erosion, while the braided stream network and swamp conditions developing in the lower reaches will continue to spread. Structures such as bridges and culverts will need continual repair and replacement at considerable cost. Large storm events also wash large amounts of debris, seeds, and fruits from exotic ornamentals into the lowlands. Until the effects of such large events can be mitigated, trash removal and exotic species control will be largely futile.

Until storm water discharge is controlled, extensive restoration activities cannot be recommended for areas affected by storm water effluent. Management activities should be limited to:

a. allowing (encouraging) fire to encroach into the bottomlands;
b. removal of invasive exotic species that threaten to destroy specific resources, especially Chinese wisteria, which is strangling trees. Removal of large areas of Chinese privet is not recommended, as these shrubby stands may be having a positive effect on maintaining stream channel and bank integrity. English ivy (*Hedera helix*) growing on stream banks is likely to be having a similar positive impact and should likewise remain in these areas;

c. monitoring stream channel and bank erosion, to assess the rate and extent of damage (see section 3.1.7, Monitoring).

3.1.3 B. Control of invasive plant species

A substantial number of invasive exotic plant species have become established in Hitchcock Woods. Some of these have only locally significant impacts, such as English ivy, whereas others have widespread severe impacts, such as Chinese wisteria. Most of these are found in the moist, rich bottomlands, where they have been brought in by storm water effluent. Exotic species in the uplands are uncommon and not a threat at this time. The most significant exotics currently found in Hitchcock Woods include:

Tree of Heaven	*Ailanthus altissima*
Mimosa	*Albizia julibrissin*
Silverberry, or Russian Olive	*Elaeagnus pungens* and *E. umbellata*
English Ivy	*Hedera helix*
Chinese Privet	*Ligustrum sinense*
Japanese Honeysuckle	*Lonicera japonica*
Southern Magnolia	*Magnolia grandiflora*
Heavenly Bamboo	*Nandina domestica*
Bamboo	*Phyllostachys aurea*
Chinese Wisteria	*Wisteria sinensis*
Dwarf Periwinkle	*Vinca minor*

Of these, Chinese wisteria, Chinese privet, and silverberry are currently having the most detrimental impacts, by strangling trees (in the case of wisteria), and out-competing and shading out less aggressive native species. While Southern magnolia is native to South Carolina, its natural range does not extend this far inland; it has been spread by birds to Hitchcock Woods from nearby gardens. Many of these exotic species can and will be controlled through a regular growing-season, prescribed burning program, at least in the areas where burning takes place. Management of exotic species that prove more fire tolerant will require additional strategies. Managing exotics frequently requires the use of herbicides for effective control.

Guidelines for exotic species control

- Chinese wisteria and silverberry should be targeted for removal or control as a priority above other exotic species.

- Exotics control should become a routinely scheduled activity of the Forest Manager and staff. With appropriate tools kept conveniently at hand, exotics control may also take place in the course of other duties. Additionally, exotics control may also be considered as an important volunteer activity (see Section 3.1.6, Public Involvement). Exotics control should take place in the winter months when possible, or in the early growing season, when these species can be identified but before they set seed. The most invasive species (wisteria, silverberry, privet) are easily recognized in any season.

- Herbicides should be used on a limited basis, to remove woody exotic species that are not controlled by prescribed burning, or that are posing an immediate and urgent threat to trees and other resources. We recommend painting cut stumps as the preferred application method.

- The Forest Manager should maintain regularly updated records of the extent and degree of significant exotic species invasions, and efforts taken to reduce them, in order to determine the most effective and efficient methods of eradication.

3.1.3 C. Management of southern pine bark beetle

Numerous outbreaks of southern pine bark and ips beetle have occurred within Hitchcock Woods. Although unchecked infestations can have devastating results, the southern pine bark beetle is a natural part of the Southeastern coastal plain ecosystem, and plays an important role in maintaining appropriately low stand densities. Pine bark beetle outbreaks (and the less destructive ips and black turpentine beetle outbreaks) are infrequent and largely insignificant in stands that have been thinned and fire-maintained. Once restoration activities in Hitchcock Woods have reached their goal of a more natural stand structure, beetle outbreaks should rare.

However, the pinebeetle threat remains in any southeastern pine stand. Control activities used recently have been adequate to check pine bark beetle outbreaks and should be continued.

Pine bark beetle management options

- As a first step in control, fell and leave marginally infected trees.
- As needed for residual infestations, fell and leave infected and nearby trees.
- As a final control action, salvage clearcut the site (favoring the removal of loblolly pine over longleaf pine), and replant in longleaf pine.

3.1.3 D Pine straw raking

Commercial pine straw raking has already occurred on a limited basis within Hitchcock Woods. Though pine straw raking can provide a steady source of income to support other management activities, it promotes erosion and destabilization of trails and slopes. Raking disturbs soils, removes native vegetation, encourages the establishment of exotic weedy species, and interferes with effective prescribed burning, by removing ground fuel. It depletes legumes, the most beneficial herbs for wildlife, along with many other species in the herb layer and should be avoided where species diversity is valued. It has no ecological benefits, except when used to clear firebreaks in preparation for prescribed burning. Pine straw raking should be limited to level, open areas where it has previously occurred, and not be allowed in areas not previously raked. Where pine straw raking is practiced, permanently reserving some areas from raking may preserve species diversity by providing refugia for those species that cannot tolerate raking.

Guidelines for managing pine straw raking activities

- Pine straw raking should be coordinated with the prescribed burning program. Firebreaks and trails should be raked just prior to a prescribed burn. Non-trail areas where raking is permitted should not be raked in the year prior to a controlled burn. No trails or firebreaks should be raked except in conjunction with a specific prescribed burn, to minimize trail erosion.

- No area should be raked more than once every two years, except in conjunction with prescribed burning, as above.

- Raking contractors should be required to keep all vehicles on established roads and trails. No new trails should be created by raking contractors. Creation of new trails, raking in prohibited areas, and excessive soil and vegetation disturbance must result in the raking contractor's permanent expulsion from Hitchcock Woods.

- The Woods Manager should monitor all raking activities, and maintain records of areas raked, dates of raking, and amount of pine straw removed.

3.1.4 Enhancement of Natural Resources

3.1.4 A Wildlife habitat enhancement

For many years Hitchcock Woods has exhibited a low carrying capacity for most common wildlife, especially that typical of open, fire-maintained uplands. Dense undergrowth and the lack of a seed-producing herbaceous component has greatly limited small mammal and avian populations throughout the site. However, recent burning and thinning activities have already had a dramatic impact on wildlife populations, and songbirds, hawks, owls, fox squirrels, rabbits, and even foxes have all become common sites and sounds.

One of the greatest limitations to continued wildlife expansion within Hitchcock Woods is not necessarily a lack of suitable habitat, but a lack of variation in habitat structure. Many species, particularly small mammals and songbirds, depend on ecotones (transitional zones between closed-canopied forests and shrubby openings, for example) to provide a suitable range of foraging, nesting, and shelter resources. Natural ecotones are common in areas where the natural disturbance regime is still intact; that is, where forest fires create a patchy landscape with numerous openings in different successional stages. These natural ecotones are now largely absent in Hitchcock Woods, but can be easily and effectively replaced by a series of man-made and maintained artificial openings. The permanent timber loading decks created during the selective timbering operations of 1985, 1993, and 1994 are ideal for this use, and many of these have been appropriately planted with native fruiting shrubs and small trees along their boundaries. Others, however, have been planted with non-native gamebird food species, without careful consideration for the long-term goals of wildlife enhancement.

It is appropriate and advisable to consider what type of wildlife enhancement should be pursued. Although many species of mice, voles, song birds, game birds, raccoons, red and gray foxes, and even bobcats are native to this site, not all species are necessarily compatible with the

current uses and circumstances of Hitchcock Woods. For example, in the presence of appropriate habitat, bobwhite quail would have once been a common part of the Hitchcock Woods landscape. Quail, however, tend to flush dramatically from grassy borders and roadsides, potentially frightening horses and novice riders and thus posing a potential safety hazard. Because they are not an endangered species and are quite common throughout the region, there is no apparent reason why their presence in Hitchcock Woods should be encouraged through the planting of artificial food plots. A conscientious, ecologically-based restoration program does not include the planting of non-native species in food plots in most circumstances, and in fact, should not rely on regular plantings of any kind. If the series of openings within Hitchcock Woods are burned along with adjacent areas during prescribed burning activities, they will almost undoubtedly naturally revegetate in herbaceous species appropriate to the habitat and appropriate for small mammals, songbirds and other desirable forms of wildlife.

The white-tailed deer is another species once common on this site. Hunting and development have now apparently extirpated this species from Hitchcock Woods. Nonetheless, whitetail deer are rapidly becoming a pest species in many areas of eastern North America. So far, Hitchcock Woods has been fortunate not to have a deer problem. However, it should be expected that such a problem will eventually arise, at which time a plan for herd reduction will need to be in place. If the herd is not kept low, it is likely to cause significant damage to the vegetation, and to cause considerable consternation on the part of neighboring landowners who will want the deer removed, to say nothing of the potential for serious vehicular accidents on adjacent roads.

Other wildlife species, once abundant here, have been extirpated or greatly reduced through loss of habitat and also by their inability to disperse from or to the site, now that Hitchcock Woods has been effectively isolated from other forested areas by the surrounding urban development. Foxes, bobcats, raccoons, and many species of habitat-specific birds (such as Red Cockaded Woodpeckers) may fall into this category. Their management must take this genetic isolation into account, and reintroduction or population expansion will require careful planning. However, a comprehensive management plan for wildlife is beyond the scope of this document (but see section 3.1.8, Implementation and Review, for recommendations for such a plan). In the meantime, much can be done to enhance habitat for existing wildlife populations, and to restore and prepare the site for possible reintroduction activities.

Guidelines for managing and enhancing wildlife

- Burn all openings (the 15+ named and unnamed loading decks, and the 2 borrow pits in the north section) at the same time that adjacent compartments are burned. If non-native wildlife plantings in the areas are not killed by these burns, then remove them by hand following the first two prescribed burns.

- Mow these same openings infrequently, if at all, retaining a minimum 5 m (15 ft.) strip unmowed around all field boundaries.

- In those openings that exhibit a poor shrubby ecotone, plant their edges with native fruit-bearing shrubs, and remove a limited number of adjacent canopy trees if necessary. Appropriate shrub species include:

Serviceberry	*Amelanchier arborea*
Red chokeberry	*Aronia arbutifolia*
Redbud	*Cercis canadensis*
Flowering dogwood	*Cornus florida*
Persimmon	*Diospyros virginiana*
Chickasaw plum	*Prunus angustifolia*

  Keep the area clear around where these shrubs are planted until they are well established, to protect new plantings from fire damage.

- Whenever possible, retain all coarse woody debris (specifically standing dead snags and fallen logs) to provide habitat for small mammals, reptiles, insects, and ground nesting birds, among many species. Specifically allow dead trees, killed by natural causes, to stand in place if they are not hazardous, to provide forage and nesting habitat for cavity-nesting birds. Retention of all potential cavity sites is particularly important if reintroduction of red-cockaded woodpeckers is to be considered (see Section 3.1.4 C), to provide competitive species with cavity alternatives. Remove coarse woody debris only when it poses a hazard to public safety or interferes with other management activities. There is no data at this time from which to devise a guideline as to how much coarse woody debris is required to support a certain population size of any given wildlife species. Under a natural regime, however, all woody debris would have remained in place, and so it is logical to assume that a high degree of retention is appropriate.

3.1.4 B Beaver population control

At least one population of beaver (*Castor canadensis*) exists within Hitchcock Woods, and, until the winter of 1998, appeared to be thriving in the lower reaches of Sand River. Silt-laden stormwater destroyed the dam site, and the population has not yet become reestablished. However, the possibility that Hitchcock Woods could support populations of beaver is a significant asset on many levels: beaver are a natural part of Southeastern coastal riparian and palustrine ecosystems, and do a great deal to create and maintain a variety of dynamic wetland microhabitats, which will, in turn, help to diversify wetland vegetation and wetland-associated wildlife. Their dam-building activities retain sediments and organic matter, thus affecting water quality, downstream materials transport, local soil saturation characteristics, and ultimately plant and animal community diversity (Jones et al. 1994). Although tree mortality from flooding may initially be seen as detrimental, canopy gaps and dead snags created by such mortality greatly enhances the site's ability to support a wider range of bird species, including owls, woodpeckers, wood ducks, hawks, and neotropical migrants. Dam-building activities also help to mitigate the damaging effects of high rates of storm water outflow, and should, therefore, be encouraged, to the extent that these activities do not threaten existing structures or trails. Pond levelers may be used where flooding from beaver dams is critical; otherwise, their use is not warranted. Essentially, no management for or against beaver is necessary, aside from monitoring nearby structures for negative impacts and installing levelers if and when necessary.

Beaver and fire were the two great forces in structuring vegetation of the Sandhills bottomlands. The vegetation that has developed since elimination of fire and extirpation of beaver by trapping in the nineteenth century is less diverse than, and is not the same as, that which existed in Hitchcock Woods bottomlands in the past. Rearrangement of the bottomland by beaver should be appreciated as site restoration.

3.1.4 C Options for wildlife species reintroduction

Red-Cockaded Woodpecker

There is considerable evidence that red-cockaded woodpeckers (*Picoides borealis*) (RCWs) once inhabited this site: numerous relic cavity trees exist throughout the site, especially on the laurel-dominated slopes below the Ridge Track and Mrs. Knox's Trail. At this time, it does not appear than any active RCW colonies exist in Hitchcock Woods, and it does not appear likely that any active colonies exist close enough to Hitchcock Woods for natural recolonization. With appropriate restoration and management as prescribed in this plan, Hitchcock Woods provide

appropriate habitat for RCW reintroduction. Habitat for displaced RCWs is being sought for mitigation programs throughout the Southeast, and, with its protection insured for perpetuity, Hitchcock Woods would be an ideal candidate for participation in such a program. However, such reintroduction must be accompanied by a careful study of the potential effects of genetic isolation on a reintroduced population, as little or no dispersal would be possible to or from Hitchcock Woods.

Reintroduction of RCWs comes with a large number of legally-binding restrictions and regulations; these should be carefully considered before any commitment to reintroduction is made. These include strict and ongoing adherence to U.S. Fish and Wildlife Service Red-Cockaded Woodpecker management guidelines, which include specific directives as to tree density, stand structure, and prescribed-burn protocol in reintroduction sites, as well as recreational and management activities, which may or may not be permitted in such sites. Under the selective timbering and prescribed burning guidelines set forth in this plan, Hitchcock Woods should have no difficulty adhering to the federal guidelines, which currently allow for greater stand density than is herein recommended. RCW reintroduction comes with numerous benefits, including greater legal protection and possibly state funding opportunities. Another significant benefit is the potential for public interest and support of such an endeavor. As a RCW mitigation site, Hitchcock Woods would likely become regionally renowned as an important nature preserve, which would in turn stimulate the interest and support of national and international wilderness preservation groups.

It is recommended that restoration proceed as directed herein, and, once a majority of the site (especially Management Compartments Nos. W4, W5, W18, W19, E6, E7, E9, N1, N2, N4, N6, N7, and N8) reaches a stable maintenance regime, that the Board reconsider the pros and cons of offering Hitchcock Woods as a possible mitigation/reintroduction site. Until then, it is essential that no old-growth longleaf pines be removed unless they present a hazard to public safety or fall within a disease- or insect infestation-related timber salvage operation. The silvicultural term 'over-mature' does not exist in ecology. Trees in each age class and in every condition have their own ecological significance, and a large supply of old-growth longleaf pine is critical in providing RCW with living cavity trees for nesting. As long as these old-growth pines exist, reintroduction of RCWs is a possibility; if they are removed, then the possibility of reintroduction will be eliminated.

Gopher tortoise

The gopher tortoise (*Gopherus polyphemus*) is another Sandhills native also threatened with extirpation. It has been estimated that approximately 362 species of commensal invertebrates and vertebrates share its burrows, which thus provide additional important habitat to this already diverse ecosystem (Noss 1989). Though the gopher tortoise is considered a 'charismatic' species that would attract considerable attention and enthusiasm for Hitchcock Woods preservation, and its reintroduction would complement the Woods' natural diversity, it is not recommended at this time for the following reasons:

1) Though evidence of gopher tortoise activity has been found in other parts of Aiken County, there is no evidence that the species has ever occurred in Hitchcock Woods;
2) Until restoration is complete, and significantly large areas of wiregrass are in existence, appropriate foraging habitat for this species does not exist in Hitchcock Woods.
3) The gopher tortoise's habit of digging deep, extensive burrows in sandy areas, in this case likely to be on or near trails, presents a hazard to riders and the tortoises themselves.

3.1.5 Management of Cultural Resources

Although the ecological restoration and management of Hitchcock Woods is the impetus behind this plan as well as its organizing paradigm, the continued use and appreciation of Hitchcock Woods by the public is also an important goal and guiding factor. Fortunately these two goals are not at odds, and what enhances visitors' experience also enhances ecological integrity.

3.1.5 A Maintenance of trail system; erosion and overuse

The highly erodible soils of Hitchcock Woods frequently present challenges to trail establishment and maintenance. In the past, pooling of water on trails situated in bottomlands and erosion by foot and horse traffic on sloping trails have been frequent problems. Recent efforts to establish waterbars and turn-outs and to properly grade and crown trails have mitigated most of the pooling and gullying problems where mitigation is possible (the frequent influxes of storm water in the bottomlands limit the possibility of controlling trail damage in these areas). Crush-and-run gravel has been applied in a few critical spots without detriment. Trail closures have been appropriately implemented where trail reconstruction is not possible.

The construction of waterbars and turn-outs should be continued, as needed, along with the application of crush-and-run gravel in extreme cases when no degree of drainage construction will suffice. In addition, the following additional trail closures or use changes are recommended for trails where no amount of reconstruction will be beneficial or where critical habitats are threatened by erosion and traffic (letters correspond to trails shown in Appendix F):

Close these trails to horse traffic:

a. Hepatica Trail
b. Turtle Trail
c. Mrs. Knox's Trail
d. Trail from Harry's Hill to Tea Cottage Path
e. Bebbington Springs Trail

Remove from the current trail map entirely and close to all traffic:

f. Side trail off Mrs. Knox's Trail
g. Trail from top of Cleveland's Line to Sand River
h. Small loop at the bottom of Bear Pit Line
i. Side trail off Kalmia Trail to Horse Show Grounds
j. Trail crossing Lover's Lane to Peek-a-Boo Lane

All of these trails are exhibiting severe, uncontrollable erosion which threatens nearby significant plant associations or otherwise fragile environments. While closing footpaths may seem especially over-cautious, the closures recommended here are for paths which are unmarked and difficult to find; efforts to find these paths are resulting in the trammeling of a large amount of additional vegetation (especially along the edges of Lovers Lane and Kalmia Trail), a dramatic acceleration of erosion in fragile areas (again, most evident along Lover's Lane, Kalmia Trail, and Mrs. Knox's Trail), and the creation of hazardous conditions. All of these trails are redundant; that is, there are nearby trails to the same destinations that are much more capable of sustaining traffic. Monitoring trail conditions is necessarily a subjective process. These recommended trail closures should suffice for some time; however, an unexpected increase in visitor use, or a shift in preferred destinations, could result in the need for additional trail use alterations.

An earlier management plan prepared by H.O. Hillestad in 1994 recommended that the Foundation seek out a graduate student interested in pursuing a recreational use study of Hitchcock Woods for Master's level research, in a field such as Parks and Recreation or Leisure Studies. This recommendation is reiterated here, as a cost-effective and progressive method of determining current visitor usage and future needs.

Recommendations for trail use monitoring and maintenance

- Continue to construct waterbars and turn-outs as necessary to mitigate erosion and to keep sediments out of waterways.

- Post signs to notify riders of trails closed to horse traffic.

- Implement a user survey of trail use. This survey can be done either through local media, or by posting volunteers at entrances on certain days (perhaps the annual Thanksgiving Day Blessing of the Hounds), or on a volunteer basis with a drop-off box. The survey should include the following questions:

  How often do you visit Hitchcock Woods?
  How long do you spend in the Woods per visit?
  What are your major form(s) of recreation?
  What are your favorite trails and destinations?
  What do you like about Hitchcock Woods?
  What do you dislike?

  Decisions concerning future trail closings could benefit from the results of this survey; which could also be used to inform the activities outlined in the next section.

3.1.5 B Diversification of the visual landscape

Hitchcock Woods is a relatively small preserve, with a high density of trails and historic sites. The lack of hard-surface roads and paths or of other man-made structures leads one to assume that one has entered a wilderness, but in truth, other visitors, trails, and even property boundaries are quite nearby. Although the natural landscape (and also the result of comprehensive ecological restoration) would exhibit a more open stand structure with a high degree of visibility in all but bottomland sites, it is important to retain some of the excessive overgrowth in critical areas, "unnatural" as it is, in order to preserve some of the privacy and intimacy for which Hitchcock Woods is appreciated. Hitchcock Woods has the flexibility and opportunity to provide both a diverse, ecologically stable and sustainable natural environment in most areas, and a visually diverse, stimulating wilderness experience to its visitors.

In the Detailed Management Plan section (Section 3.2), restoration and management prescriptions have been appropriately modified to provide visual buffers in such critical areas as Devil's Backbone, Memorial Gate, the Horseshow Grounds, Cathedral Aisle Fences, the Tea

Cottage Path, Blue Ridge Ride, Willie Barton's Place, and Cavalry Charge. Under these recommendations, Hitchcock Woods will offer a variety of natural viewscapes, including longleaf pine savanna on the uplands, laurel and longleaf-dominated slopes, pine-turkey oak woodland, longleaf and Virginia pine-dominated chalk cliffs, white oak-dominated hardwood slopes, mixed pine/hardwood lowlands, and bottomland hardwood small stream complexes. Beyond this, however, there are at least two efforts that can be made to provide even greater visual diversity to the site and enhance not only its biodiversity but its ecological and educational value.

1.) **Restore and enhance Horseshoe Pond.** At the base of the slope below Low Country Ride, there is a small pond, Horseshoe Pond, which is currently choked with black willow, sweetgum, and exotics. This site could be easily and inexpensively planted with bald cypress (*Taxodium distichum*), water tupelo (*Nyssa biflora*), and other small stream swamp species, which would create a unique and undoubtedly romantic view from Low Country Ride. This process would involve approximately four man-days of site preparation, two man-days of planting, and one or two man-days per year for maintenance.

2.) **Make a beaver pond accessible with a boardwalk.** At the time of this writing, the beaver pond that had existed on the north side of Cathedral Aisle had been destroyed by the silt-laden heavy rains of the winter of 1998. In the future, however, it is anticipated that remediation of the stormwater problem will allow beaver activities to resume. A beaver pond can be quite beautiful in and of itself. Its potential for prime wildlife observation and nature study will go unfulfilled, however, because of its likely total inaccessibility from established trails. The construction of a boardwalk across the small stream complex separating a potential pond from Cathedral Aisle would greatly expand the suite of natural ecosystems available for observation, education, and enjoyment. Similar boardwalks have been constructed at other swamp sites in South Carolina, including the Francis Beidler Forest and Congaree Swamp National Monument. These sites may serve as models for construction and maintenance techniques.

3.1.6 Public Education and Involvement

The ecological restoration and aesthetic enhancement of Hitchcock Woods can be greatly enhanced by public voluntary involvement. Such involvement, in turn, heightens appreciation of the Woods' natural resources, thus encouraging public commitment to long-term preservation. This section is a list of suggested activities for organized groups of volunteers. It is recommended that a committee of the Foundation Board be formed to explore the possibility of soliciting existing groups for participation (e.g., Boy Scouts, 4-H clubs, the Ax Club), or forming new groups if warranted.

1.) Litter control. Once a year, volunteers could clean up the trash accumulating in Sand River which has washed in through storm water. This could be a cooperative effort with the City of Aiken, with the City providing trucks for hauling and free disposal. Even if the City can at some point install trash weirs to prevent trash from entering the Woods through storm water, this clean up is necessary, if Hitchcock Woods is to be considered pristine and regulations prohibiting littering are to be respected.

2.) Exotics control. A good winter or spring annual activity, volunteers could cut stands of silverberry, privet, and wisteria where they are doing the most damage and paint the cut stumps with herbicide, under the supervision of the Forest Manager.

3.) Seed collection. With regular burning, the existing remnants of wiregrass will once again bloom and set seed. These seeds can and should be collected and distributed to areas where wiregrass has been extirpated. Seed from other native plants in Hitchcock Woods, especially many of the herbaceous Sandhills endemics still extant on the western uplands and wildflowers throughout, can be redistributed to openings lacking these species. This is a restoration activity that would almost certainly be enthusiastically pursued by many amateur botanists and naturalists.

4.) Prescribed burn preparation. Raking accumulated duff and litter from the base of old-growth pines is a time-consuming task, for which Hitchcock Woods' limited staff may not be prepared. If volunteer groups exist that may be interested in and permitted to assist with prescribed burns, this would be an excellent task that may make a substantial difference in potential tree mortality.

5.) Nature trail. A volunteer-designed and constructed self-guiding nature trail, or guide to natural features and restoration activities along existing trails, would help build public support (and tolerance) for the prescribed burning and other restoration activities they will be seeing.

3.1.7 Monitoring

Regular monitoring should be implemented to both assess and guide management activities, and to provide a solid, predictable, standardized basis upon which to base future management decisions and to measure the degree of success of past activities. Although it is fully understandable that staffing limitations may preclude establishing regular monitoring while the time- and effort-intensive restorations activities are taking place, much can be gained by establishing monitoring practices beforehand, to better assess the impacts of restoration. Monitoring in Hitchcock Woods should include: 1) monitoring of forest structural changes as a response to restoration activities, to estimate the visual impacts of restoration; 2) monitoring of significant plant associations, to estimate the effects of restoration activities; and 3) monitoring changes within the streambed of Sand River, to measure the impact of storm water runoff, and the rate and extent of channel erosion. If time and staffing permit, monitoring could also include 4) monitoring of timber growth and forest health, to predict future timber management needs. These four monitoring activities require four different approaches, describe as follows:

1) Monitoring of forest structural changes, using photo-monitoring. Photo-monitoring (the making of photographs on an annual or bi-annual basis, from established, permanent points, using a pre-established focal length and film type) is an efficient, simple method of monitoring overall forest changes. The suggested locations of 44 photo-monitoring points distributed throughout Hitchcock Woods are presented in Appendix G. Installation of these points can be accomplished in approximately two days, using 2' lengths of metal pipe, notched on one side to indicate the intended camera angle, and hammered into the ground at inconspicuous, off-trail sites. Pipes should be carefully mapped, using compass direction and measured distance from one or two conspicuous landmarks. Landmarks could be prominent trees with an aluminum tag on one side. Annual or biannual monitoring will require two days and two rolls of film. If time and/or staffing are limited, the number of monitoring points can be reduced. In Appendix G, 12 critical monitoring points have been identified by asterisks. These 12 points, at least, should be re-photographed annually.

2) Monitoring of significant plant associations, using permanent reference plots. The condition of specific plant associations, especially in the herbaceous layer, can be best monitored by establishing small (0.1 ha or less) plots, marked by 2' lengths of metal pipe and placed in inconspicuous off-trail sites. A number of methods for establishing and analyzing these types of plots are well known, and will not be detailed here (but see Peet et al. 1998). Generally, these plots are used to collect data on the relative cover and density of plant species in all strata. Data taken annually can be regularly assessed to determine what, if any, changes are taking place in these sensitive areas. Suitable locations for such monitoring include: the wild rosemary sites on the Chalk Cliffs and at the top of Mrs. Knox's Trail; longleaf pine/wiregrass savannas in the west section, and near Cuthbert Ridge Line and Travers Line in the east section; upper-slope shortleaf pine savanna in the west section, and the unusual cool mesic slope herb communities of Hepatica Trail and Bebbington Springs (Appendix E). Establishing these plots will require at least 4 full days' effort by two persons (7 plots, 2 plots per day). Annual or biennial monitoring will require a similar amount of time.

3) Monitoring changes within the streambed of Sand River. Changes in the geometry (channel width, channel depth, angle between bed and banks, etc.) of the streambed of Sand River can provide significant information as to the effects of ongoing excessive storm water runoff. This monitoring can be accomplished by creating stream bed profiles on an annual or biennial basis at permanently established locations. These locations can be established with stakes or other markers installed in inconspicuous locations on opposite banks, at a distance of at least 20 feet from either bank edge. A line drawn between these stakes forms the cross section; vertical distance measurements (from line to surface below) are taken and transferred to graph paper. A minimum of three such monitoring points should be established; field-location of these sites by an experienced hydrogeologist is recommended. Monitoring should take one man-day annually or biennially.

4) Timber monitoring, using Continuous Forest Inventory Plots (CFI's). The use of CFI's at Hitchcock Woods has already been fully researched (G. Burger, pers. comm.). CFI's are used to monitor stand conditions and to assess changes in forest structure over time. It is recommended that 50 CFI's be established in Hitchcock Woods, arrayed on a grid system. These plots will require approximately 10 days to install, and should be 'read' once every 5 years, requiring about 5 days to complete each reading.

3.1.8 Implementation and Review

Implementation

Hitchcock Woods is a large and diverse site, and plan implementation will inevitably be influenced by practical considerations (trail conditions, smoke conditions, current public use, etc.). Nonetheless, it is prudent to assess the site in terms of restoration priorities so that sites requiring immediate attention get first priority. Areas identified as priorities for restoration (Appendix H) include those sites containing remnants of the original vegetation found here, such as wiregrass, which will be lost soon if restoration is not initiated in a timely manner. Additional areas specified as high priorities are those that are very close to restored now, and need very little additional effort to move them into a regular maintenance regime. These areas will serve as important demonstration areas and educational tools, increasing awareness in the community of the necessity and benefits of restoration through prescribed burning.

Identifying priority sites for restoration is a significant first step in implementation. A second, equally important activity is the establishment of a comprehensive record keeping system. A separate file for each management compartment should be established and maintained which contains the following records:

a. Site history, prior to 1995, including date of and other information pertaining to previous timbering, burning, exotics control, or other management activity.
b. Identification of any ecologically or archeologically significant sites within the compartment, require special attention during restoration activities.
c. Fixed management plan, with a proposed schedule for prescribed burns and a target date for shifting from restoration to management burning.
d. Timber inventory, updated after each significant timbering or thinning activity.
e. Exotic control activities, including date, method, and outcome.
f. For bottomland areas, the dates and consequences of significant flood events (bridge, trail, or beaver dam destruction). These records may be important in future efforts to estimate the cost of stormwater mitigation.

Review

Although the goals of this management plan are comprehensive and long-term, achieving those goals is an inherently incremental and iterative process. Much of the focus of this document has been on current conditions and immediate restoration concerns, whereas the long-term management program has been specified in only general terms. This is because most of the details

of future management depend on the success and character of restoration activities in the immediate future. For these reasons, it is recommended that after 10 years the Foundation formally review, both internally and through consultation with outside experts, this process of assessment and management planning and update the management plan as appropriate. By that time, most, if not all, compartments should have undergone the transition from preparatory winter burns to regular, maintenance-oriented, growing-season burns.

A ten-year review and update should include the following elements:

1) More precise prescriptions for appropriate floral composition and diversity are needed. Such prescriptions could be based in part on reports two of us (Frost and Peet) are currently preparing for the nearby Savannah River Site. The plan as written focuses largely on stand structure in terms of canopy and subcanopy tree density and composition. Prescriptions for understory composition would be difficult to develop at this time based on the current condition of much of Hitchcock Woods, and would not be significantly useful at this state of restoration as well. Ten years of prescribed burning will dramatically alter and diversify the understory and herb layer composition. Target understory and herb layer compositions should be developed, based on on-site assessment, historical records, and the assessment of similar sites, which is currently underway.

2) A comprehensive assessment of wildlife values, resources, shortfalls, and threats is also needed. After a decade of prescribed burning, it will be clearer what types of habitats and wildlife resources are emerging in Hitchcock Woods, and more advantageous at that time to assess faunal diversity and resource utilization. Special concern should be placed on two issues in particular. First, the populations of mammals that have potential for becoming nuisances should be assessed, and, where appropriate, control mechanisms put in place. Second, the possibility and desirability for reintroduction of regionally endangered species should be considered. Based on this assessment, a wildlife management program should be devised and included in this management program, with provisions for continued reevaluation and updating.

3.2 Management Program, by Compartment

This section of the Management Plan describes the 49 management compartments into which Hitchcock Woods has been divided. The mean compartment size is 42.3 acres (16.9 ha); the smallest is 2.5 acres (1 ha), the largest is 101.5 acres (40.6 ha) (see Appendix K for additional compartment size statistics). The compartments are grouped into 4 sections: the North Section includes 14 compartments located between Sand River, Dibble Road, and the Southern railroad bed; the East Section contains 12 compartments located south of Sand River and northeast of Cuthbert Branch; the West Section contains 19 compartments located south of Cathedral Aisle and west of Barton's Pond and Cuthbert Branch; and the Bottomlands consist of 4 compartments including all parts of Sand River and lower Cuthbert Branch (see Appendix I, Management Compartments, and Appendix D, Trails). The boundaries of these compartments were determined by assessing 1) the location and accessibility of roads, trails, and natural firebreaks, 2) the topography and orientation of the compartment and the consistency of the natural fire regime within the compartment, 3) the similarity of vegetation within the compartment, and thus the simplification of management, and 4) the historic character of the compartment, or specialized current human use. Each compartment is described in detail, with specific recommendations and prescriptions for management. Because many of the compartments share similarities, several compartments are described in groups. Each compartment(s) description includes the following elements:

1) a community type and current condition assessment;
2) a former community type assessment, including the specific presettlement community type (PSCT) and presettlement fire regime (PSFR) assigned to each compartment (see Section 2, Ecological History, for a full description of these categories).
3) a recommendation, in summary form, for the overall direction of management for the compartment;
4) the detailed rationale supporting the recommendation, including a discussion of the compartment's important characteristics, significant threats, and other related information;
5) a detailed prescription for management;
6) a list and discussion of options to the recommended management prescription, when appropriate. Most of these options address the prioritization of restoration and/or management activities to accommodate limited staffing or funding.

3.2.1 North Section

The North Section of Hitchcock Woods includes the area with the greatest public access, the greatest visitorship, the highest concentration of trails, and the greatest number of well-known, popular sites. For most visitors, when they think of Hitchcock Woods, this is the area that comes to mind. Because of its history and popularity, and because it receives more public scrutiny than any other section, management activities must be tailored to preserve the historic character.

Compartment No. N1 **Ridge Mile Track**

Assessment

Current community type: Even-aged (c. 80 yr) longleaf pine over loblolly pine; mixed successional hardwood understory approaching subcanopy height, with numerous pole-size loblolly pine. The northwest section contains a small 0-30 yr slash pine stand. The southern edge drops rapidly toward a longleaf pine/mountain laurel-dominated slope.

Former community type: Longleaf pine/wiregrass dry-mesic savanna, with a sparse understory and a dense grass/forb layer. The small slough on north side served as refugium for fire-tolerant hardwoods and loblolly pine.

PSCT: 1.1a PSFR: A

Recommendation

The Ridge Mile Track area has excellent potential for complete restoration to the original longleaf pine/wiregrass, fire-dominated community type formally found in this area.

Rationale

There is considerable evidence that this area once supported an exemplary longleaf pine/wiregrass community. The deep sandy soils found on the Ridge Track are best suited to longleaf pine and are typically found associated with longleaf pine. Several relic RCW cavity trees both within the interior of the Ridge Track and along the south edge indicate that this site was formerly an active RCW colony site, and, with restoration, could again provide suitable RCW habitat. There is limited longleaf pine regeneration occurring in the understory (more substantial in a few areas), and wiregrass and other typical savanna grasses and herbaceous species are present, though not abundant, throughout the compartment. The effect of opening of the understory and expanding the view from this area will be beneficial: the topography is such that the view from the ridge track should extend across the top of the canopy in the lower-lying, adjacent areas, but not directly into nearby trails. The Ridge Track itself will remain invisible to visitors on the trails below. Finally, the ridge track is easily reached from three of the Woods' most popular entrances; the ability of visitors to conveniently visit this site will contribute to a general appreciation of the area's natural beauty and diversity.

Prescription

1) Remove all slash pine (*Pinus elliottii*) (isolated stand on north side of Ridge Track). This species was artificially planted fairly recently and is not native to this site. Some individual trees may be left as shelterwood for plantings of longleaf pine seedlings in this area.

2) Remove most loblolly pine found on the fire-exposed. In the uplands, this species is a result of long-term fire suppression and, once established, aggressively competes with the more desirable longleaf pine.

3) Remove all Virginia pine (*P. virginiana*) on the high, open, fire-exposed portion of the compartment. Though this species is appropriate for the transitional steep slope environments found nearby, its presence here is evidence of long-term fire suppression. A fire sensitive species, Virginia pine will likely not survive regular warm-season fires, except in fire-protected microsites such as those found below chalk cliffs.

4) Retain all longleaf pine and shortleaf pine (*P. echinata*), bearing in mind the target spacing of at least 25 ft between trees.

5) Remove all subcanopy and canopy hardwoods on the uplands (again, leaving those in the small slough); hardwoods in shrub layer will be controlled by summer burns.

6) Initially burn 2 out of 3 summers, preferably raking duff and litter away from the base of mature longleaf pines, to prevent mortality from smoldering. Alternatively, the first burn could be a winter burn, to reduce the duff and litter layer.

7) Maintain thereafter by growing-season burns every 3 years.

Options

As an alternative for optimizing thinning activities over a longer period, remove all pole-size loblolly pine, but retain larger loblolly pine for future thinning, especially where no other canopy species exist, and remove a limited number of mature longleaf pine, over time, to restore the natural tree density. Criteria for selection of these trees include:

- An <u>average</u> spacing between trees of at least 25 feet, bearing in mind that longleaf pines are commonly found in cohort clusters.
- A wide range of ages and conditions are desirable, include overmature and boles of unusual form ('character' trees).

Compartment No. N2 **Rabbit Valley and Foxes' Den**

Assessment

Current community type: Partially a loblolly-dominated, fire-protected shallow slough (nearest Rabbit Valley), partially a longleaf-dominated upland slope (adjacent to Dibble Road and near Foxes' Den) in the process of being restored through prescribed burning. The slough area has only a few mature trees of any species, no pine regeneration, and a dense, viney understory dominated by heath species and scrub oaks. The upland areas demonstrate good pine regeneration, with a much reduced duff/litter layer (less than 1 in.), and numerous Sandhills grasses and herbaceous species, including wiregrass.

Former community type: In upland areas, longleaf pine/wiregrass dry-mesic savanna, with a sparse understory and a dense grass/herb layer. Slough area along Rabbit Valley would have been dominated by loblolly pine and fire-tolerant hardwoods.

PSCT: 1.1c, 2.1 PSFR: A/B

Recommendation

The upland areas have excellent potential for complete restoration to the original longleaf pine/wiregrass community type; the area adjacent to Dibble Road is well on its way toward that goal through current prescribed burning activities. Controlled burning in the slough area running through the center of the compartment will reduce fuel load and encourage pine regeneration, but to a much lesser extent than the uplands. This area should be allowed to retain a high stand density to serve as a visual and sound buffer, protecting the interior of the North section from Dibble Road.

Rationale

Restoring the area adjacent to Dibble Road is especially appropriate: it is highly visible from Dibble Road, and the visual impact of its restoration could be an important tool for community education and support. The maintenance of a low fuel load through regular burning along this stretch of Dibble Road would also protect Hitchcock Woods and nearby houses from wildfires. Restoring the uplands adjacent to Compartment No. 1 (the Ridge Track) would be a continuation of the restoration taking place in that compartment. Between these two areas, maintaining the slough (with its greater tree density and more dense understory) would limit sight from Dibble Road into the heart of this area and vice versa. However, maintaining the slough as a barrier still requires regular burning, to reduce duff and litter and restore loblolly pine regeneration, which is no longer occurring.

Prescription

Upland areas:

1) Remove all loblolly pine found in upland sites. Retain all longleaf pine and shortleaf pine. Prepare the site for burning by raking away duff mounds from the base of old-growth longleaf pines.

2) In the area around Foxes' Den, remove all subcanopy and canopy hardwoods.

3) In the area around Foxes' Den, burn two out of the next 3 summers, or alternatively, the first burn could be a winter burn, to reduce duff and litter. Allow fire to creep downhill (northward) into the slough at will. Then maintain by hot summer burns every 3 years.

4) In the area adjacent to Dibble Road, maintain by hot summer burns every 3 years, allowing fire to creep downhill (southward) into the slough at will.

Slough area:

1) Hand-thin loblolly poles to encourage sunlight, growth of larger loblolly pine, and a more varied stand age structure. Remove most canopy hardwoods, especially hickory.

2) Ensure that all parts of the slough experience summer burning at least once every 5 years.

Options

To optimize thinning activities over a longer period:

1) In upland areas, especially the area near Foxes' Den, retain larger loblolly pines for future thinning.

2) In both uplands and in the slough, remove a limited number of mixed-aged (but no old growth) longleaf pine and loblolly pine over time, to restore the natural tree density of an average spacing of 25 ft.

Compartments Nos. N3, N4, and N5 Pigeon Trap Loop, Candy Field, and Gravel Cut

Assessment

Current community type: Uplands (along the railroad cut, Candy Field, and the area just east of Candy Field) are dominated by mature longleaf pine (c. 80 yrs), with considerable hardwood and loblolly encroachment, sparse pine regeneration, and a dense duff/litter layer. The west end of Pigeon Trap Loop, the north end of Pioneer Trail, and the entire area north of Devil's Backbone Trail (N5) are more mesic, dominated by loblolly pine, water oak, red oak, and hickory, with a dense, mesophytic shrub layer. Invasion by exotics (wisteria, privet, honeysuckle) is especially severe in N5, but also a problem in N3, near the railroad cut.

Former community type: Dry pyrophytic woodland, dominated by longleaf pine, turkey oak, other scrub oaks, and wiregrass. The fire-protected, east-facing slope between Pigeon Trap Loop and Gravel Pit, and the area north of Devil's Backbone Trail were formerly mesic woodland, dominated by mixed pine (mostly loblolly and shortleaf), some fire-tolerant hardwoods, and mesophytic grasses and herbs.

PSCT: 1.1c, 2.1 PSFR: A/(B)

Recommendation

N3, Pigeon Trap Loop: Most of this compartment is well suited for restoration to the longleaf pine/turkey oak woodland formerly found here.

N4, Candy Field: Well suited for restoration to longleaf pine/turkey oak.

N5, Devil's Backbone: Burn to promote pine regeneration and to control exotics, otherwise maintain as a buffer against the railroad and nearby housing, and to retain a dense, forested appearance. Complete restoration to mesic pyrophytic woodland not necessarily advised.

Rationale

Pigeon Trap Loop and Candy Field represent the only areas of potential longleaf pine/turkey oak woodland in this portion of Hitchcock Woods. While large areas of longleaf pine savanna and longleaf pine/scrub oak woodland can be found in other sections, the pine/turkey oak woodland type is somewhat unique. While restoration will visually 'open' this area, especially toward the north toward Highland Park Golf Course, this potential drawback will be more than offset by benefits: burning will reduce and likely control exotic invasions (bamboo, wisteria) occurring here, as well as reduce wildfire hazard. The area lying between these two compartments (the

intersection of Pigeon Trap Loop, Border Line Cut, and Pioneer Trail) is a continuation of the slough running through Rabbit Valley (N2), and will retain a higher stand density. The steep east-facing slope to the east of Pigeon Trap Loop will retain a similar higher stand density, thus visually 'isolating' this upland area.

Stand density along Devil's Backbone Trail (N5) should be maintained as much as possible, to provide a buffer as stated earlier. More importantly, this is a highly trafficked, popular area, and extensive changes in this area would alter what is considered the densely forested character of Hitchcock Woods. Burning is necessary, however, to promote pine regeneration (pines in this area have reached maturity and there is no regeneration occurring), to control hardwood and exotic invasion, and to reduce wildfire hazard.

Prescription

N3, Pigeon Trap Loop, and N4, Candy Field:

1) Remove all loblolly pine and all canopy hardwoods in dry upland areas.

2) Growing-season burn in summer 2 out of the next 3 years, then growing-season burn every 3 years for maintenance.

3) After 2 years, cut and paint any wisteria that survives burning.

4) In low lying areas (west end near Border Line Cut in N3, north end of Pioneer Trail in N4) retain all canopy pine (loblolly and longleaf), thin canopy hardwoods, and allow fire from uplands to travel downhill at will.

N5, Devil's Backbone Trail:

1) Thin canopy hardwoods and a small portion of the canopy pine, to promote sunlight in the understory.

2) Burn every 3 years (growing season if possible) to reduce litter and suppress exotics.

3) Cut and paint any wisteria that survives burning.

4) Spot burn pine/hardwood knolls located north of Gravel Pit at least every 3 years, and allow fire to move through adjacent lowlands at will.

Options

In all three compartments, all canopy pines (loblolly and longleaf) can be retained at this time and thinned as needed, aiming for a final average spacing of 25 ft.

Burning in the Devil's Backbone Trail area can be replaced by hand-thinning to create sunlight gaps, hand-planting loblolly seedlings, and manually eradicating exotics, especially wisteria and silverberry. The most important needs in this area are exotics control and pine regeneration; this can be done either by hand or (more efficiently) by fire.

Compartments Nos. N6 and N7 **Kalmia Trail and Lover's Lane**

Assessment

Current community type: Upper slopes are dominated by mature longleaf pine, (possibly old-growth) and mountain laurel, with very little hardwood encroachment and with good pine regeneration. This area is close to its original community type. The slopes become increasingly hardwood-dominated below. At the bottom of the slopes, just above the Horse Show Grounds and Peek-a-Boo Lane, loblolly pine and shortleaf pine become increasingly dominant, the subcanopy and understory become increasingly dense, pine regeneration much reduced, and exotic invasion more widespread.

Former community type: Both compartments included three community types, upper slopes were dominated by longleaf pine/mountain laurel, mid-slopes by longleaf pine/scrub oak woodlands, and lower slopes by mixed pine/mesic woodlands.

PSCT: 1.2, 2.1 PSFR: A/B

Recommendation

Maintain upper slopes in their present natural condition. Restoration of lower slopes is not recommended because of proximity to popular historic sites (the Horse Show Grounds and the Manage). Manage lower slopes to control exotics and encourage regeneration, but maintain overall high stand density to serve as a buffer.

Rationale

Kalmia Trail and Lover's Lane are two of the most popular trails in Hitchcock Woods because of their picturesque old-growth longleaf pines and flowering mountain laurel. While this community type is somewhat naturally fire-maintained, the use of regular controlled burning in this area would be aesthetically undesirable because of mountain laurel's long recovery period. The same results (pine canopy, mountain laurel/heath understory, and adequate pine regeneration) can be obtained by occasional cool season burns to reduce litter accumulation and promote regeneration. There is also evidence of former RCW activity in this area (numerous relic cavity trees); retaining the old-growth longleaf pines would be critical to any reintroduction program in this area.

Though the slopes below both Lover's Lane and Kalmia Trail would benefit considerably by controlled burning, this, too, is adjacent to a much frequented part of Hitchcock Woods, the Horse Show Grounds and Peek-a-Boo Lane. Similar to Devil's Backbone Trail, changing this area would change the present character of Hitchcock Woods, which may not be desirable.

Again, like Devil's Backbone Trail, the minimum maintenance should be done, to control exotics, promote pine regeneration, and reduce the risk of wildfire.

The only specific threat to these two compartments is erosion of the trails that descend from Lover's Lane and Kalmia Trail to Peek-a-Boo Lane and the Horse Show Grounds, respectively. These trails are difficult to locate, and efforts to relocate them have resulted in a number of areas of erosion along the trails, which threatens their integrity.

Prescription

Upper slopes:

1) Cool season back-burns every 5 - 10 years, to control litter accumulation. Since these mountain laurel communities tend to occur in sites where fire can only approach from above, allow fire to run downhill from upslope fire communities.

2) Hand-cut any canopy/subcanopy hardwoods.

3) Retain all mature longleaf pines, unless their condition creates a direct threat to the public.

4) Close small foot trails perpendicular to slope.

Lower slopes:

1) Cool season back-burns every 5-10 years, to control exotics and litter accumulation.

2) Hand-cut any canopy/subcanopy hardwoods.

3) Thin canopy loblolly pines as needed to establish an average spacing of 25 ft.

4) Hand-cut and paint remaining exotics (wisteria, silverberry, English ivy) as needed.

Options

Burning can be replaced entirely on upper slopes by hand-raking small areas and hand-planting longleaf pine seedlings.

While leaving the main trails into this area (all of which are unnamed) well-protected by the dense vegetation currently surrounding them, the slopes directly above the Horse Show Grounds and the center portion of Peek-a-Boo lane could be thinned considerably to afford a view from below into the mountain laurel above. The privacy of Kalmia Trail and Lover's Lane would not be compromised, as these trails are on the nearly-level upper slope.

Compartment No. N8 **Chalk Cliffs**

Assessment

Current community type: Upper slopes are predominantly longleaf pine/mountain laurel-heath dominated ridges. The westernmost ridge, the Chalk Cliffs, supports a rare, highly xeric community type, with longleaf pine, Virginia pine, wild rosemary (*Ceratiola ericoides*), and prostrate juniper (*Juniperus communis*). These ridge top communities are largely intact, with many mature, even old-growth, longleaf and Virginia pines, little hardwood encroachment, and a fairly intact herb layer. Lower slopes show much greater encroachment from hardwoods and loblolly pine, and a dense duff/litter layer. Loblolly pine becomes the canopy dominant approximately half-way down the slope. Understory on lower slopes is dominated by various scrub oaks with some mountain laurel.

Former community type: A diverse compartment: upper slopes graded from longleaf pine/mountain laurel-heath community type toward the southeast, to a longleaf pine-Virginia pine/mountain laurel-heath-dominated ridge facing west. Lower slopes ranged from longleaf pine-shortleaf pine/scrub oaks above to mesic woodland with mixed pines and hardwoods at the base of the slope.

PSCT: 1.2, 2.1, 2.2, (1.3) PSFR: A

Recommendation

Maintain present natural condition of upper slopes. Complete restoration of lower slopes is not recommended to due proximity to popular historic sites (Tea Cottage and Cathedral Aisle Fences); this area should be maintained with hand-thinning and occasional cool-season burns.

Rationale

This compartment contains one of the most unusual community types within Hitchcock Woods, the longleaf pine-Virginia pine/rosemary/prostrate juniper association. Management in this area should be focused toward preserving this community type. Like Lover's Lane and Kalmia Hill, this upland area was formerly naturally fire-maintained, but this area also can be maintained with infrequent cool season burns, which would be more aesthetically acceptable.

The transitional community on the lower slopes is becoming more and more hardwood/loblolly dominated with a high degree of litter accumulation, creating a potential wildfire hazard for the slopes above. This area should be hand-thinned and infrequently burned, to promote longleaf pine

regeneration, reduction of litter, and exotics control. However, significant stand density reduction is not recommended, in order to maintain the privacy of the Cathedral Aisle Fences below.

Prescription

1) Maintain upper slopes with infrequent (5-10 year) cool season back-burns. Allow the fire to move downslope as would have been the case with natural wildfire on most such sites. Burning from below might generate intensity high enough to kill longleaf pine.

2) Monitor canopy species encroachment in the area adjacent to the chalk cliffs supporting the wild rosemary. Excessive shade can and will kill rosemary. Any canopy tree (pine or hardwood) which is providing excessive shade to this area should be removed.

3) Remove all canopy loblolly pines and all canopy/subcanopy hardwoods on lower slopes.

4) Control understory and exotics with infrequent (5-10 yr) cool season back-burns.

5) Hand-cut and paint exotics on lower slopes, especially wisteria, as necessary.

Options

Upper slopes can be maintained without fire, using minimal hand-raking and hand-planting of longleaf pine seedlings.

Thinning of canopy loblolly pines can be extended over a longer period time to optimize overall thinning activities.

This area is experiencing a considerable amount of traffic-induced erosion. The trail from the Tea Cottage to the Chalk Cliffs, and other trails leading from the Tea Cottage Path to the Chalk Cliffs, should be closed to horse traffic and stabilized with berms and water bars.

Compartment No. N9 **Tea Cottage Path**

Assessment

Current community type: Loblolly pine-dominated woodland, with a mixed hardwood/scrub oak subcanopy/understory on upper slopes, and a more mesic hardwood understory adjacent to the creek. Stream erosion and exotic invasion is quite severe in the old Robinson's pond site.

Former community type: Mesic-wet mixed pine woodland, dominated by loblolly and shortleaf pine, with sparse longleaf pine, scrub oaks on upper slope, and mixed hardwood understory on lower slopes.

PSCT: 4.3, 2.1 PSFR: A/B

Recommendation

Complete restoration not recommended. Retain high stand density as a buffer against Dibble Road and as erosion protection along creek banks. Maintain with minimal fire and hand-thinning to promote pine regeneration and control exotics.

Rationale

The path to the Tea Cottage is one of the most popular entrances to Hitchcock Woods. Like Devil's Backbone Trail, extensive changes to this area would alter the historic character of the Woods, which may not be desirable. Additionally, the dense vegetation adjacent to the creek serves as buffer to traffic noise from Dibble Road, and helps to protect the creek bank from ongoing stream erosion.

However, there are several reasons to control burn and hand-thin the area immediately adjacent to the Tea Cottage Path. Most of the pines are fairly mature, and there is no regeneration taking place. The invasion of exotics (honeysuckle, silverberry, wisteria) along the path should be controlled, which is most efficiently done with controlled burns. The slope above the path, towards the Ridge Track, has a large number of flowering dogwoods that would bloom more prolifically and be more visible if the subcanopy were thinned. Finally, this area supports a large population of an unusual shrub, *Nestronia umbellula*, which is more commonly found in the Piedmont. This species is adapted to a woodland environment, and would benefit by having this area restored to a somewhat more open stand structure.

Prescription

1) Back-burn from the top of the slope (the western portion of Rabbit Valley Line) every 5-10 years.

2) Back-burn from the Tea Cottage Path toward the Creek every 5-10 years.

3) Hand-thin canopy hardwoods and selectively cut loblolly pines as needed, to promote sunlight infiltration.

4) Hand-cut and paint any exotics, especially wisteria and silverberry, that survive burning.

Options

Apart from controlling exotics, this area could be left in its present state, or treated as a low-priority management area.

Compartments Nos. N10, N11, and N12

Cathedral Aisle Fences, The Horse Show Grounds, and the path to Memorial Gate

Assessment

Current community type: Very mature loblolly pines with a dense mixed mesic hardwood understory, dense duff/litter layer, and little pine regeneration.

Former community type: Wet mixed pine woodland, dominated by loblolly and shortleaf pine, with wet-mesophytic grasses and forbs.

PSCT: 4.3, 2.1 PSFR: B(A)

Recommendation

Complete restoration not recommended. These three areas are all candidates for micro-management, directed at promoting pine regeneration, reducing wildfire hazard, and controlling exotics, while preserving the historic character of these sites.

Rationale

The Cathedral Aisle Fences and the Horse Show Grounds are two of the most scenic and historic sites in Hitchcock Woods. The mature loblolly pines bordering these sites give these areas their stately character. However, these pines are approaching senescence, and there are no younger pines to replace them. While controlled burning would promote natural pine regeneration, it would irrevocably alter the character of these sites. At the Horseshow Grounds, prescribed burning would put at risk the pine fence and shelter. Planting pine seedlings also offers better control over the location of future canopy trees, which is critical in these two sites.

The path between Memorial Gate and the Horse Show Grounds is also a popular site, and it would be appropriate to maintain a high stand density to serve as a buffer between the path and the trails above. However, exotic encroachment from the adjacent Sand River is a serious concern, and would be best controlled by a combination of limited controlled burning and hand-cutting.

Prescription

Cathedral Aisle Fences and the Horse Show Grounds:

1) Cut all canopy and subcanopy hardwoods.

2) Retain all pines; no select-cutting in this area, except for safety hazards.

3) Rake pine straw as needed to reduce fuel loading.

4) At Cathedral Aisle Fences, hand-plant loblolly pine seedlings to replace mature loblolly pines; at the Horse Show Grounds, hand-plant a mix of loblolly and longleaf pines to replace mature pines.

5) At the Horse Show Grounds, protect planted seedlings from trampling with wire cages or other markers as needed.

6) Hand-cut and paint invasive exotics, especially wisteria and silverberry.

Path from Memorial Gate to Horse Show Grounds:

1) Cut all canopy and subcanopy hardwoods.

2) Retain all pines, except for safety hazards.

3) Infrequent (5-10 year) cool-season burns to control vines, exotics, and reduce litter.

4) Hand-cut and paint exotics as necessary following initial burning.

Compartments Nos. N13 and N14 **Chalk pit north of Devil's Backbone, and Chalk pit at Rabbit Valley Entrance**

Assessment

Current community type: Open pits of kaolin, perhaps man-made, with dense stands of young loblolly pine and diverse pole-sized hardwoods. Few, if any, canopy-sized trees. Highly diverse herb/grass layer, with large number of invasive exotics.

Former community type: Possibly longleaf pine/scrub oak/rosemary xeric ridges, or longleaf pine/mixed scrub oak dry, woodland.

PSCT: 1.1c PSFR: A

Recommendation

Appropriate sites for micro-management and possible experimental restoration to the longleaf/rosemary rare community type. Hot summer burns every 3 to 5 years.

Rationale

These two sites differ considerably from the surrounding landscape in their exposed chalk substrate, lack of a canopy and dense, shrubby character. These two sites appear to be man-made "borrow" pits or small-scale kaolin quarries, but their current character suggests they could support a vegetation community similar to the rare association found in N8, at the Chalk Cliffs. At the very least, the open canopy and dense shrub structure found here represent two of the few open sites in Hitchcock Woods, and could be important in promoting bird diversity, by providing habitat for shrub foraging and nesting species. These two sites should be maintained as open as possible and monitored for bird diversity and successional trends.

Prescription

Growing-season burns at least every 3 years. These two sites could be the ignition point for burns occurring in the compartments surrounding them (N5, Devil's Backbone, or N2, Rabbit Valley), but only on a south wind (a north wind could lead to a large conflagration).

Options

As both of these sites are close to the boundary and adjacent to populated areas, frequent hot burns may be met with public opposition. The burn regime can be modified to fit the less frequent burn regimes of the surrounding compartments if warranted, and these compartments no longer treated as separate areas.

3.2.2 East Section

Although the East Section is no less historic, it does not contain the high concentration of historic sites and popular destinations found in the North Section. The East Section represents instead the greatest concentration of ecologically significant sites, a result of the diverse topography and complex substrate underlying the area. The full range of ecosystems found throughout Hitchcock Woods can be found in less than half the area of the East Section, including several systems, such as white oak slopes, red cliffs, and boggy seeps, which are found nowhere else in Hitchcock Woods.

Compartment No. E1 **Whitney Drive SE**

Assessment

Current community type: Mixed pine/hardwood woodland, dominated by white oak, red oak, hickory, and loblolly pine, with small amounts of longleaf pine on the uppermost or more exposed slopes. Understory composed of mesophytic hardwoods, with several species more commonly found in Piedmont environments, such as witchhazel (*Hamemelis virginiana*), and sweetshrub (*Calycanthus floridus*). Base of slope (along Cuthbert Branch and Whitney Drive) also supports a patchy, diverse population of mesic herbs, including bloodroot (*Sanguinaria canadensis*), bellwort (*Uvularia perfoliata*), and phlox (*Phlox pilosa*). Major erosion is occurring along Cuthbert Branch with concomitant extensive sand deposition in the bottomlands.

Former community type: Complex slopes, with longleaf and shortleaf pine woodland on more level upper slopes, and a mixed pine/hardwood mesic pyrophytic woodland on mid and lower slopes. Numerous steepheads and ravines dominated by swamp tupelo (*Nyssa biflora*), red maple, and other wet-mesic hardwoods, with occasional small shrubby bogs and sandy-bottomed canebrakes in the Cuthbert Branch ravine.

PSCT: 2.1, 2.2, 3.2, (4.2) PSFR: B/C

Recommendation

Except for those areas affected by sand deposition, this area is already in a highly-sustainable, biotically diverse and stable condition. Maintain this area in its present state, with limited, patchy, controlled burning.

Rationale

Though this compartment faces southwest into the prevailing weather patterns and was thus more frequently exposed to fire, the complexity of the slope itself provides a considerable amount of protection. While the upper slopes support vegetation similar to other fire-dominated sites, the lower, more protected slopes are dominated by a diverse collection of 'cool slope' herbs and understory species not commonly found in the Sandhills. To enhance the overall vegetation diversity of Hitchcock Woods, these communities should be maintained as much as possible in their present condition. The occasional fire, allowed to burn down from the upper slopes where it is necessary for pine regeneration, will reduce dry litter (and thus wildfire hazard) and encourage herb regeneration in a patchy fashion, which is appropriate for this site. However, invasive exotics are increasing in this area, and will require separate control efforts (hand-cutting and painting) in the absence of more frequent controlled burning.

Prescription

1) Burn infrequently (c. 5 years), igniting at upper edge of compartment (Mr. Fletcher's Ride) and allowing fire to move downslope at will.

2) Control invasive exotics (especially silverberry) as needed with cutting and painting following initial burning.

Options

This is a low priority site for controlled fires, and burning could take place less frequently (or eliminated altogether) if resources are limited.

Selective timbering is not necessary, but would be acceptable on the mid to upper slopes. No selective timbering (except to reduce hazards) should be implemented on the lower slopes, to protect the herbaceous understory. No particular species should be targeted for removal on mid-slopes, as a broad range of tree species in this area is appropriate. Hardwoods and loblolly pine should be targeted for selective timbering on upper slopes.

Compartment No. E2 **Surrey Trace**

Assessment

Current community type: Mixed mesic pine/hardwoods (predominantly red oak and loblolly pine), with some longleaf pine on upland margins. Western slope below Swampy Cut Path is dominated by mountain laurel with a longleaf pine canopy; this slope is largely overstocked with mature pines, with little understory pine regeneration, and considerable hardwood encroachment into the canopy.

Former community type: A complex vegetation matrix, with longleaf pine/mountain laurel heath on main, west-facing, slopes, with mixed pine/hardwood woodland below and to the northeast, longleaf pine/mixed pine/scrub oaks on transitional slopes above, and mixed mesophytic hardwoods in protected, north-facing ravines.

PSCT: 1.2, 2.2, (2.1), (3.2) PSFR: B/C/(A)/(D)

Recommendation

Complete restoration of this diverse area is not recommended, due to the close proximity of trails within the compartment. However, its most attractive features (hillsides of mountain laurel, mesic hardwood slopes) can be enhanced and maintained through a variety of management techniques, including limited controlled burning, hand-thinning, and hand-planting.

Rationale

Like many of the other steep complex slopes in the Eastern section, the absence of fire in this compartment has allowed the various distinct community types found naturally here to become obscured, and the compartment as a whole has become overrun with loblolly pines and hardwoods escaping into the uplands. Restoration of all of the distinctive community types formerly found in this compartment is a desirable goal, but is not likely possible, given the constraints of current usage and close proximity of trails. The reintroduction of fire in the northeast portion of the compartment (above Blue Ridge Ride) will restore this area to its former pine woodland character. While fire would be the most appropriate management tool for restoring pine regeneration and reducing litter on the dense mountain laurel-dominated western slopes, the long recovery period of fire-managed mountain laurel is unacceptable, and these areas are best managed by hand. Finally, the high stand density of the lower slopes, between Surrey Trace, Swampy Cut Line, and Blue Ridge Ride, should be retained to serve as a visual buffer between these popular trails.

Prescription

1) Growing-season burns every 3 to 5 years between Bear Pit Line, Swampy Cut Line, and Blue Ridge Ride, ignited from upper slopes and allowed to travel downslope.

2) Between Surrey Trace, Swampy Cut Path, and Swampy Cut Line (the mountain laurel slope), remove all canopy, subcanopy and understory hardwoods, selectively remove loblolly pine.

3) Hand-rake litter in patches to expose mineral soil and promote pine regeneration. Hand-plant longleaf pine seedlings where regeneration is limited.

4) Infrequent (5-10 year) burns on lower slopes (below Surrey Trace and Blue Ridge Ride) to reduce wildfire hazard.

5) Retain high stand density on lower slopes to serve as visual buffer between trails. Selectively cut only to reduce hazards.

Options

Overall stand density for this compartment is still quite high. Selective timbering, if necessary, should focus on a) in upland areas and on the mountain laurel slopes, reducing longleaf pine density, aiming for an average spacing of 25 ft, and removing loblolly pine altogether; and b) on lower slopes, not targeting any species in particular, as this area should be characterized by a variety of hardwoods and pines.

The mountain laurel slope in this compartment is one of five major mountain laurel slopes in Hitchcock Woods, the others being Lover's Lane (N7), Kalmia Hill (N6), Cetta's Ride (W2), and Mrs. Knox's Trail (W19). This slope is perhaps the least frequented of the five, and might be an excellent area in which to experiment with various management scenarios, including cool season and warm season back-burns. While similar experiments can be conducted in the burn near Lee Field, which is also a mountain laurel-dominated slope, that area has been severely disturbed and has little or no canopy. This area is still an intact community, and could serve as a proving ground for developing appropriate, efficient, and long-term effective management techniques as alternatives to the hand-raking and hand-planting currently recommended for all mountain laurel slopes.

Compartment No. E3 **Hepatica Trail**

Assessment

Current community type: White oak/loblolly pine-dominated north-facing slope, with a diverse mesophytic shrub and herb understory, and severe exotic encroachment from Crazy Creek.

Former community type: Mixed mesophytic hardwoods, only lightly influenced by fire, with a diverse herb layer.

PSCT: 3.2 PSFR: B/C/D

Recommendation

Apart from exotic encroachment and trail erosion, this area is close to being in its natural state and should be maintained as it is, to preserve the unusual plant association found here.

Rationale

Naturally quite fire-protected, this site supports a diverse vegetation community with many species more commonly found in the Piedmont and mountains. It is perhaps the only site in Hitchcock Woods supporting populations of liverleaf (*Hepatica americana*) and chinquapin (*Castanea pumila*). Most of the conditions of this site (stand structure, litter depth, etc.) are consistent with the conditions of the presettlement community type, and so no management activities need to take place to alter the present community structure. However, the site is experiencing two major threats: first, the trail itself is showing signs of erosion, putting at risk many of the important species growing immediately adjacent to the trail, and second, there is a serious invasion of exotic species, primarily privet, honeysuckle, and silverberry, extending up the slope from Crazy Creek. While these exotic species are detrimental to the less-competitive herbs along Hepatica Trail, they form the tunnel of vegetation which gives Cavalry Charge, also located in this compartment, its special 'enveloping' character. This compartment, therefore, belongs in that small group of compartments which require judicious micro-management, including the removal of exotics in one area, and the retention of those in another.

Prescription

1) Remove all invasive exotics, including honeysuckle, silverberry, privet, and southern magnolia, within approximately 50 ft of Hepatica Trail.

2) Maintain vegetation bordering Cavalry Charge as a sheered hedge when necessary.

3) Close Hepatica Trail to horse traffic, with signage redirecting traffic to Cavalry Charge. As Cavalry Charge is also undergoing considerable erosion and degradation, reconstruction or relocation of this trail may be necessary in the future.

Options

A limited amount of controlled burning would likely be beneficial to the western portion of this compartment. Fire could occasionally be allowed to escape from burns taking place in E2 or E9, and allowed to travel downslope towards Crazy Creek at will.

Compartment No. E4 **Bebbington Springs**

Assessment

Current community type: Mixed mesic hardwoods (white, red, and cherrybark oak, sand hickory) with a significant mixed pine component (longleaf on upper margins, loblolly and shortleaf below), and a mixed mesic hardwood understory. Seeps and wet ravines are common near the base of almost every slope.

Former community type: Upper slopes: mixed pine/hardwood woodland, fire-influenced. Lower slopes: Mixed mesic hardwoods, with scattered seeps and wet ravines.

PSCT: 2.2, 3.2, 4.2 PSFR: B/C/D

Recommendation

The lower slopes of this compartment support one of the most floristically diverse communities of Hitchcock Woods, which is currently stable, self-sustaining, and very similar to its presettlement condition. Minimal active management, primarily infrequent controlled burning, is required to maintain most of this compartment in its present natural state.

The upper slopes were once dominated by longleaf pine-shortleaf pine savanna-woodland. Slightly more intense restoration activities could restore this now rare community type. Restoration of at least 1 or 2 longleaf-shortleaf savanna-woodland communities should be a conservation priority at Hitchcock Woods.

Rationale

Bebbington Springs, at the heart of this compartment, has long been known as an area of significant biodiversity within Hitchcock Woods. This is caused by the unique topography of the site: steep, north-facing slopes and deeply incised ravines have formed a number of unique microhabitats, each with slightly different hydrology and exposure characteristics, providing a wide range of conditions suitable for the Piedmont and mountain disjunct species frequently found here. This site has been, and continues to be, some of the most fire-protected habitat within Hitchcock Woods. Like Hepatica Trail (E3), Bebbington Springs is experiencing only two significant threats: exotic invasion and trail erosion. Because of the significant diversity of the site, and its similarity to the original community type, no active restoration activities are needed, and management can be greatly limited.

Prescription

1) Burn infrequently (5 to 10 years), igniting at upper edge of compartment and allowing fire to move downslope at will.

2) Control invasive exotics (especially privet at base of slope) as needed with cutting and painting.

3) Close the unnamed trail to Bebbington Springs to horse traffic.

Options

Selective timbering on the lower slopes is not necessary and not recommended. Selective timbering on upper slopes is acceptable, especially for hazard reduction. Hardwoods and loblolly pine should be targeted for selective timbering, leaving all longleaf and shortleaf pine.

As for the former longleaf pine/shortleaf pine community on the upper slopes, this is a low priority site for controlled burning, if one is only considering wildfire potential and encroachment of exotics and hardwoods. Burning here could take place less frequently (or eliminated) if resources are limited. Conversely, more frequent burns, ignited from upper slopes, would result in the restoration of an important example of this now rare longleaf pine-shortleaf pine savanna type. Physical reduction of loblolly and the midstory hardwoods, followed by burning every 3 - 4 years would be necessary for restoration. The original community had a continuous grass-forb layer. This would be the most challenging aspect of restoration, since litter buildup has essentially extirpated the herb layer except for a fringe along the trails. Turkey oak and an occasional other canopy hardwood stem are natural features of this community type.

Compartment No. E5 **Low Country Ride**

Assessment

Current community type: Mixed pines and hardwoods on upper and mid slopes, grading into more mesic hardwoods on lower slopes, with scattered steepheads and seeps. Exotic invasion is widespread and severe near the eastern boundary, adjacent to Palmetto Golf Course, and in all bottomland areas. A unique plant association, primarily of northern disjunct species, exists along the Low Country Ride. This is especially distinct due to the presence of Spanish moss.

Former community type: Below an upland area of longleaf pine/shortleaf pine woodland adjacent to Fox Field, this site was characterized by fire-influenced mixed-pine/hardwood woodlands on upper and exposed slopes, and mesic hardwoods on lower, more protected slopes.
PSCT: 2.1, 2.2, 3.2, (4.2), (5.2) PSFR: A/B/C/D

Recommendation

Management options are limited in this compartment because of its proximity to homes and the Palmetto Golf Course. Efforts should be directed at controlling exotic invasions, especially wisteria, entering Hitchcock Woods at this point. The high stand density of this compartment should be maintained as a sight-and-sound buffer, and maintenance activities in this area should be coordinated with Palmetto Golf Course maintenance activities.

Rationale

The Low Country Ride, which is only a small portion of this compartment, has long been one of the most interesting parts of Hitchcock Woods, because of its unique combination of northern disjunct species, including mapleleaf viburnum (*Viburnum acerifolium*), bloodroot, and sweetshrub, and the coincidence of Spanish moss (*Tillandsia usneoides*), appearing here at the western edge of its coastal range. This important portion of the compartment needs little restoration. However, like the other fire-protected, mesic, northeast-facing slopes (E3 and E4), this area is experiencing severe exotic invasion; large amounts of wisteria already threaten to kill many of the mature loblolly pines on the eastern edge along Palmetto Ride, and southern magnolias are common throughout the compartment. Also, Low Country Ride is showing signs of erosion, which puts trailside plant communities at risk. Because management opportunities are limited, efforts should focus on exotics control, trail maintenance, and minimal controlled burning in the uplands.

Until recently, the exact boundary between Hitchcock Woods and Palmetto Golf Course was unclear. Now that it has been surveyed, it may be appropriate to mark it, to make clear the division of responsibility between golf course grounds staff and Hitchcock Woods staff.

Prescription

1) Burn upland areas approximately every 5 years, igniting east of Fox Field and allowing fire to travel downslope at will.

2) Cut and paint all large wisteria along Palmetto Ride. Remove all silverberry throughout the compartment. Remove most if not all of the southern magnolias throughout.

3) Monitor Low Country Ride for erosion. If erosion cannot be controlled, consider closing this trail to horse traffic. Similarly, Palmetto Ride should be monitored for erosion and rerouted if necessary.

4) Monitor for ongoing illegal dumping, and post if necessary.

Options

Controlled burning could be entirely eliminated from this compartment, if there is public opposition.

A portion of Palmetto Ride departs from Hitchcock Woods property and circumnavigates a wooded section of golf course property. Within this wooded portion lies Horseshoe Pond, which is in plain view of Low Country Ride. At this time, this pond is in poor condition: it is choked by black willow (*Salix nigra*) and is collecting sediment and garbage and breeding mosquitoes. Improving this pond (by removing exotics and trash and drainage), would benefit both Palmetto Golf Course and Hitchcock Woods and may be suggested as a joint project of the two entities. An additional proposal for pond improvement is described in Section 3, Enhancement of Natural Resources.

The upper slopes of this compartment, like E4 (Bebbington Springs), once supported a longleaf-shortleaf savanna-woodland, now rare. Perhaps as a lower priority, after the bulk of the initially frequent burning activities have taken place throughout the Woods, these upper slopes should be burned more frequently in an effort to restore this dwindling community type.

Compartment No. E6 **Fox Field**

Assessment

Current community type: Longleaf pine/loblolly pine canopy on the uplands, with hardwoods encroaching into the canopy layer. Dense duff and litter have all but eliminated the herb and grass layer, and no pine regeneration is evident. Where controlled burns have taken place, stand density is appropriate and longleaf pine regeneration is occurring. Northwest of Fox Field is characterized by a hardwood-dominated woodland, with a remnant canopy of mature longleaf pine.

Former community type: The uplands, which is most of the compartment, were characterized by longleaf pine/wiregrass fire-dominated community, with a rich, somewhat mesic herb component. Less exposed sites (the north slope) were dominated by mixed pines and scrub oaks.
PSCT: 1.1c, 2.1 PSFR: A/(B)

Recommendation

This area is an excellent candidate for restoration to the longleaf pine/wiregrass community formerly found here. Controlled burns and other management activities which have already taken place here have resulted in good pine regeneration, good regeneration of wiregrass and other savanna grasses and forbs, and an appropriate stand structure. These efforts should be continued and expanded.

Rationale

Fox Field was likely a relatively isolated patch of longleaf pine/wiregrass savanna in presettlement times. This compartment, along with the adjacent upland compartment, Cuthbert Ridge Line (E9), once comprised a community quite distinct from the hardwood woodland communities abruptly bordering these to the south and north, and together these all formed an intricate mosaic of diverse vegetation types, rich in ecotones, fire refuges, and natural resources to support what would have once been a thriving wildlife population. Restoring these remnant longleaf pine/wiregrass communities is key to restoring the overall visual and biotic diversity of this portion of Hitchcock Woods. Further, Fox Field is the first upland area reached by visitors entering through Aiken Estates. Like the Ridge Mile Track (N1), it will have a great educational impact on visitors who travel only a short distance. Trails are few enough in this area that the resultant loss of privacy should not be significant. Visual barriers will remain to the north, east, and south.

Prescription

1) Remove all loblolly pine found in upland sites.

2) Retain almost all canopy-sized longleaf pine and shortleaf pine; selectively thin other pines to form a more patchy structure.

3) Remove all subcanopy and canopy hardwoods on the uplands; hardwoods in shrub layer will be controlled by controlled burns.

4) Burn two out of the next 3 summers, then maintain by hot summer burns every 3 years. Ignition point should be near the southwest portion of the compartment; fire should be allowed to travel downslope on the north side at will.

Options

As an alternative for optimizing thinning activities over a longer period, remove all pole-size loblolly pine, but retain larger trees for future thinning, especially where no other canopy species exist. Criteria for selection of include:

- An average spacing between trees of 20 feet, bearing in mind that longleaf pines are commonly found in cohort clusters.
- A wide range of ages and conditions are desirable, include over-mature and boles of unusual form ('character' trees).

This upland site, more than other upland sites in Hitchcock Woods, would have exhibited a higher overall stand density because of its greater relative degree of fire protection and generally more mesic conditions. A nearly closed, but patchy, forest canopy is a desirable goal for this site.

Compartment No. E7 **Yucca Valley**

Assessment

Current community type: Despite its topographic complexity, this compartment is now mostly dominated by mixed pine-hardwood woodland. On the upper margins (along 1977 Burn) longleaf pine is the primary canopy tree, with mixed oaks dominating the subcanopy. Lower slopes and bottomlands are dominated by loblolly pine, red oak, and hickory, with an understory of more mesic hardwoods. 'Red Cliffs', located on the northern border of the comparment, is an aesthetically, if not ecologically, significant highly eroded Vaucluse outcrop.

Former community type: A complex of several similar community types, including pure longleaf pine/wiregrass savanna on upper margin, longleaf pine-mixed scrub oaks on upper slopes, mixed pine-hardwood pyrophytic woodland on lower slopes and protected sites, and seeps and steepheads infrequently scattered throughout.

PSCT: 1.1c, 2.2, 3.2, (4.1) PSFR: A/B

Recommendation

This area should be restored to its former longleaf pine savanna/oak hickory woodland transitional vegetation structure, through controlled burning and selective timbering.

Rationale

This compartment is transitional between the pure longleaf pine/wiregrass community formerly found on the uplands in adjacent compartment E9 (Cuthbert Ridge), and the mesic hardwoods still extant on the lower slopes of compartment E1 (Whitney Dr. SE). Under a natural fire regime, its complex topography would have created a mosaic of habitat types, including pine/oak/hickory woodlands on lower slopes, longleaf pine/scrub oak woodlands on upper slopes, and a scattering of shrubby bogs, seeps, canebrakes and wet ravines throughout. This intricate environment would have had a much more active and diverse wildlife population than is currently present. Controlled burning in this area will not have a great impact on the character of Hitchcock Woods, as trails are particularly sparse in this area, and the highly dissected topography limits line-of-sight. This compartment should be considered a high priority restoration site, as wiregrass is still abundant here, especially in the vicinity of Red Cliffs.

Prescription

1) Remove most canopy and subcanopy hardwoods, especially hickory in the level upland areas close to Dove Field and Mockingbird Hill. An occasional older turkey oak is a natural feature of these sites, especially in the transitional zones between longleaf pine uplands and mixed species slopes, but hardwood should form no more than 10% of the overall canopy cover.

2) Remove all loblolly pine in these same upland sites.

3) Retain all longleaf pines throughout the compartment.

4) Thin dense stands of pole-sized longleaf pine near Red Cliffs.

5) Remove all woody exotic species, especially the silverberry bordering the trails in Yucca Valley (in the lower slope positions, killing exotics with controlled burning may not be successful).

6) Burn once in the winter to reduce fuel load, igniting from upper slope and allowing fire to travel downslope at will. Make special effort to thoroughly burn the wiregrass-dominated understory in the vicinity of Red Cliffs.

7) Burn every 3 years, in the growing season, again igniting from upper slopes and allowing fire to travel downslope at will.

Options

Selective timbering is not necessary in this area, apart from the removal of invasive hardwoods and loblolly pine on upper slopes and the removal of hazards as needed. But, as an alternative to hasten the development of a more natural stand structure and/or to extend thinning activities over a longer period of time, selective timbering could take place as follows:

- Remove all subcanopy loblolly pine on upper slopes, but retain individuals of canopy height until a later time.
- Selectively timber both loblolly pine and hardwoods on lower slopes (Yucca Valley), with no preference for either, aiming for an average spacing of 25 to 35 ft.
- Thin longleaf pines on upper slopes, aiming for a diverse age and stand structure.

Compartment No. E8 **Willie Barton's Line**

Assessment

Current community type: In transition, due to controlled burning and selective timbering activities which have taken place here recently. Before these activities were initiated, the compartment was largely longleaf pine-dominated, with loblolly pine and hardwoods encroaching into the canopy throughout, and with a dense woody understory and thick duff and litter layer. This compartment is now almost completely dominated by longleaf pine, and the loblolly pine and hardwood component is much reduced. More mixed pines are found toward the northeast end, and turkey oaks and remnant patches of wiregrass are found on the westernmost slopes, above Swampy Cut Path.

Former community type: Longleaf pine/wiregrass savanna on uplands to the east of Old County Road; longleaf pine/turkey oak woodland on west-facing slope above Swampy Cut Path; mixed pine/scrub oak woodland on slightly fire-protected northeast end, above Bear Pit Line.
PSCT: 1.1b, 2.1 PSFR: A

Recommendation

Continue and intensify restoration efforts already occurring here, to return this site to its original condition of a transition zone between the longleaf pine/wiregrass savanna-dominated uplands, and the mixed pine woodlands below.

Rationale

This compartment contains the southwestern-most slopes within the East Section of Hitchcock Woods, which would have experienced the most exposure to fire in this portion under natural conditions. More than any other compartment in this section, this area would have supported a longleaf pine-dominated community, ranging from xeric turkey oak woodland on the far western edge to pure savanna on the near level uplands. While recent management activities have been aimed toward restoration, burning has occurred too infrequently to restore pine regeneration and a natural herb and grass layer, and selective timbering activities have resulted in an overly homogeneous stand structure of evenly-aged, evenly-spaced longleaf pines. To restore this area to its presettlement condition, both of these activities need to continue, but be modified. Restoration to a savanna condition will result in greater visibility between trails, especially in the vicinity of Willie Barton's Place; however the density of trails in other parts of this compartment is moderate, and the topography is complex enough that the loss of privacy should not be significant

elsewhere. Since Willie Barton's Place is one of the most historic sites in Hitchcock Woods, special care should be paid to its management.

Prescription

1) Remove all canopy loblolly pines and all canopy and subcanopy hardwoods.

2) Burn once every 3 years in the growing season, igniting from the southwest (the natural direction from which fire would have entered the area), if prevailing wind conditions permit, and allowing fire to travel toward the far northeastern end at will.

3) Once regular maintenance burning is effected and fire-induced pine mortality has been assessed, selectively thin longleaf pines to promote a more mixed-aged, irregularly spaced structure. Aim for:
   - An average spacing between trees of 25 feet, bearing in mind that longleaf pines are commonly found in patchy cohort clusters.
   - A wide range of ages and conditions, include pole, subcanopy, fully mature ('flat top'), and poorly formed 'character' trees.

Options

As an alternative to extending selective timbering over a longer period of time, mature loblolly pines can be retained, especially where no other canopy is present. Ultimately, all loblolly should be removed. Restructuring the longleaf pine stands can similarly be extended over a longer period of time.

While Willie Barton's Place can be included in the collection of fields and open spaces whose general management is described in Chapter 3 (General Recommendations, Enhancement of Natural Resources), it is also one of the most historic sites in Hitchcock Woods. To retain its special character, it may be preferable to exclude Willie Barton's Place from burning activities, by creating a firebreak just beyond its southwestern edge (providing that the ignition source is to the southwest). All canopy pine trees, loblolly or longleaf, should be retained within a 50 ft. buffer surrounding Willie Barton's Place, and selective timbering in this area should be moderate.

Compartment No. E9 **Cuthbert Ridge Line**

Assessment

Current community type: Several community types in a variety of conditions: uplands dominated by mixed-aged longleaf pine with substantial scrub oak encroachment well into the canopy, except in the area of the 1977 burn, which is in a dense, 'dog-hair' stage of mixed pine regeneration. Western slopes are similar, with a much greater loblolly pine component, and similar low understory diversity. Several small seeps in this area have responded well to recent burning activities. The north slope (the 1993 burn site) also contains seep areas, dominated by a number of significant wetland herbaceous species. Otherwise the 1993 burn site is regenerating into a mountain laurel heath slope, with loblolly pine, sweetgum, red maple and similar aggressive successional species forming a potential canopy.

Former community type: A mix of communities: longleaf pine/wiregrass savanna on uplands in the area of the 1977 burn, mixed pine/scrub oak woodland on western slopes, longleaf pine/mountain laurel heath on north slopes in the area of the 1993 burn, with a number of small seeps and canebrakes on the north and west slopes.

PSCT: 1.1b, 1.1c, 2.1, 1.2, 4.1 PSFR: A/(B)

Recommendation

Most of this compartment has the greatest potential for restoration to the original longleaf pine/wiregrass savanna of any compartment in the East Section. This compartment also contains two severely burned areas, which are both in mid-early successional stages and represent significant opportunities for managed restoration to original presettlement vegetation types.

Rationale

The Cuthbert Ridge compartment can be divided into four sections for discussion: the eastern uplands section, the western uplands section (the 1977 burn), the western slopes, and the 1993 burn. The eastern uplands section would have formed the core of the longleaf pine/wiregrass savanna in this section of Hitchcock Woods. This area contains well-spaced mature longleaf pine in a variety of ages and conditions, including some potential old-growth 'flat tops'. Restoration is a straightforward matter of reducing hardwood encroachment and burning to restore the herb and grass diversity. Adjacent to it is the 1977 burn area, which has potential for becoming any of several community types, depending on management strategy. It would be most appropriately restored to the original longleaf pine/wiregrass savanna. Restoration of these two areas to longleaf pine savanna will provide the East Section of Hitchcock Woods with a significant share

of this important community type. Trail density in this area is low, therefore increasing visibility through restoration should have little or no impact on visitor use.

The western slopes (as well as the eastern margin) represent a slightly fire-protected zone between the savanna uplands above and the savanna/mixed pine woodlands below. These slopes, like so many throughout Hitchcock Woods, are becoming increasingly dominated by encroaching loblolly pine; management through controlled burning will favor longleaf pine, and will greatly enhance the vegetative diversity of the numerous seeps and canebrakes located throughout.

Finally, the area of the 1993 burn has great potential for restoration to a longleaf pine/mountain laurel slope, to complement the similar slopes found throughout Hitchcock Woods. At this time, however, the area is succeeding toward a less desirable mixed hardwood woodland, in which mountain laurel will be shaded out. Like the 1977 burn, this area represents an opportunity to manage its recovery towards a desirable goal.

Prescription

Eastern uplands:

1) Remove all canopy and subcanopy hardwoods. Remove all canopy-sized loblolly pine.

2) Burn two out of the next 3 summers, igniting from the southwest edge and allowing fire to travel northeast, towards Bebbington Springs, traveling downslope at will.

3) Maintain with hot growing-season burns every 3 years.

Western uplands (1977 burn):

4) Remove all loblolly pine. Thin remaining longleaf pine as needed to approximate an appropriate stand density when mature.

5) Burn during the cool season two out of the next 3 years. Cool season burns are preferred because of the density and young age of the pine.

6) Maintain with hot summer burns every 3 years.

7) When remaining longleaf pine reach canopy height, thin to an average (though clumped) spacing of 25 ft, maintaining cohort clusters when possible.

Western slopes (west of Cuthbert Ridge Line):

8) Remove all canopy hardwoods on upper slopes; selectively thin hardwoods in areas near seeps and canebrakes.

9) Remove canopy loblolly pines on upper slopes; selectively thin loblolly pine in areas near seeps and canebrakes.

10) Maintain with hot summer burns every 3 to 5 years.

North slopes (1993 burn):

11) Remove all loblolly, red maple, and sweetgum saplings, or as much as is possible.

12) Hand-plant longleaf pine seedlings throughout burn site.

13) Maintain with cool-season back burns every 5 to 10 years.

14) Protect seep area in western part of the burn from vehicular traffic of any type.

Options

In all sites, thinning of canopy-sized loblolly pine can be extended over a longer period of time to accommodate thinning activities.

The 1993 burn can be used as an experimental restoration area for mountain laurel, to test for appropriate burn regimes. Alternatively, controlled burning activities can be eliminated from this site, and restoration of longleaf pine by hand planting can proceed as outlined for the mountain laurel compartments in the North Section (N6 and N7).

Compartments Nos. E10, E11, and E12 Travers Line, Dolan Hill, and Newman Cut

Assessment

Current community type: Mixed pine/scrub oak woodland on all slopes and in the majority of E11 (Dolan Hill). A small portion of the uplands north of Travers Line remains dominated by mixed-age longleaf pine, but with a serious encroachment of loblolly pine and scrub oaks. Serious exotic invasion is occurring in all mesic areas (along Crazy Creek, Calico Creek, and in the former canebrake north of Turtle Trail).

Former community type: Longleaf pine/wiregrass savanna on uplands north of Travers Line, with longleaf pine/mixed scrub oak woodland on northwest-facing upper slopes, and with loblolly-dominated wet savanna and woodland on lower slopes adjacent to Doll Lane, Calico Creek, and east of Sand River. An extensive fire-influenced canebrake was located east of what is now Turtle Trail in E12.

PSCT: 1.1c, 2.1, 4.3, (4.2), (4.1) PSFR: A/B

Recommendation

These three compartments have all undergone extensive pine timbering as part of beetle salvage operations (less so in E10 than in the other two compartments). Because of the dramatic shifts in stand structure and composition resulting from this selective timbering, and because of its proximity to residences, restoration requiring large-scale prescribed burning is not recommended. Recommend small-scale restoration of the uplands, and management to reduce wildfire hazard and control exotic invasion.

Rationale

Apart from the remnant longleaf pine/wiregrass savanna along the north side of Travers Line and the canebrake north of Turtle Trail, very little of these three compartments have retained any of their presettlement character, and large areas have undergone extensive alteration during beetle salvage operations, including the removal of canopy-sized loblolly and longleaf pine along Doll Lane and on Dolan Hill. Also, apart from the remnant longleaf pine savanna and the canebrake along Turtle Trail, there are few if any vegetation associations of any great ecological value in these three compartments, at least none that are not better represented elsewhere in Hitchcock Woods. The canebrake and the remnant longleaf pine savanna area merit restoration, however: the canebrake because it is the only community of its type for some distance, the remnant longleaf pine savanna because Travers Line and Captain Gaylord's Fences are historic, popular sites, and

the longleaf pines already show a great deal of age and size diversity (including the presence of a number of old-growth 'flat tops'), and minimal effort is needed to restore this site.

Prescription

Uplands:

1) Remove all canopy and subcanopy hardwoods from upland sites (E10, north of Travers Line, east of unnamed trail from Travers Line towards Memorial Gate).

2) Remove all canopy and subcanopy loblolly pine from upland sites.

3) Burn upland sites once in winter season to reduce fuel, then maintain with growing-season burns every 3 to 5 years. Ignite from Travers Line and allow fire to move northeast.

Canebrake:

4) Remove invasive exotics, especially silverberry and southern magnolia.

5) Burn every 2 to 4 years in growing season, igniting from Newman's Cut and allowing fire to travel downslope into the canebrake at will.

Elsewhere:

6) Burn in cool season every 5 to 10 years, igniting from upper slopes and allowing fire to travel downslope at will.

7) Monitor Calico Creek and Morgan Cut for invasive exotics, especially silverberry, southern magnolia, and wisteria, and cut and paint as needed.

3.2.3 West Section

The West Section of Hitchcock Woods contains the xeric uplands dominated by longleaf pine savanna that once blanketed the entire southeastern coastal plain. With its limited public access, low concentration of trails and near absence of historic sites, it is perhaps the least visited section of Hitchcock Woods. It is also the least topographically and ecologically diverse section. However, the longleaf pine/wiregrass savanna still found here contains numerous remnant populations of unusual plant species endemic to this region -- species which are becoming increasingly threatened with regional extirpation as longleaf pine savanna is replaced by agriculture, silviculture, and other development. The West Section currently serves as an important regional refuge for these species, a role which can be enhanced through appropriate management.

Compartments Nos. W1, W4, and W5 **Hastings Line, Mrs. Allen's Ride, and Whitney Drive/Mr. Cooper's Ride**

Assessment

Current community type: Lower slopes dominated by a mix of longleaf pine and loblolly pine, with a dense, encroaching understory of mixed hardwoods (water oak, black oak, southern red oak, scrubby post oak, and sand hickory). Upper slopes dominated by pure longleaf pine, with a less invasive understory dominated by turkey oak, blue jack oak and gooseberry. All three compartments are in a wide range of conditions of stand age and structure, in response to different ongoing management activities.

Former community type: Transitional zone between fire-sheltered north-facing slopes and fire-exposed uplands: longleaf pine/mixed scrub oak woodland, with dry savanna grasses and forbs on lower slopes, longleaf pine/wiregrass slightly mesic savanna on upper slopes.
PSCT: 1.1b, 1.1c, 2.1, (4.3) PSFR: A/B

Recommendation

All three of these compartments have experienced some management activities in recent years, including controlled burning and selective timbering, and all have responded favorably, with renewed pine regeneration and wiregrass re-establishment. Recommend that these restoration activities be continued and coordinated, to restore these compartments to their former condition of a transition from woodlands on the lower slopes to savanna on the upper slopes.

Rationale

Five compartments (W1 through W5) form the transition between the fire-sheltered woodlands along the northern edge of the Western Section and the longleaf pine/wiregrass savanna once dominating almost all of the rest of this section. These three (W1, W4, and W5) are treated as one group, separated from the slightly more sheltered, more topographically diverse W2 and W3.

Restoration and management activities have already occurred to varying extents in these three compartments. W1 (Hastings Line) has had some encroaching hardwoods removed, was partially thinned as a result of 1995's beetle salvage operations, and has been burned once in 1993 and partially in 1996. W4 (Mrs. Allen's Ride) was selectively cut in1985. W5 (Whitney Drive and Mr. Cooper's Ride) was also selectively cut in 1985, and burned for the second time in the winter of 1997. Selective timbering in W4 and W5 has resulted in excessively evenly-spaced, evenly-aged longleaf pine stands, similar to some of those in the Eastern Section. In all three

compartments, pine regeneration and re-establishment of wiregrass show promise. Coordinating future restoration activities in these compartments should result in these slopes having a more cohesive, natural appearance appropriate to this setting.

Prescription

W1, Hastings Line:

1) Remove all canopy and subcanopy hardwoods, especially on the slope below Hastings Line.

2) Remove all loblolly pine from the slope above Hastings Line, and selectively cut loblolly pine from the upper margin of the slope below Hastings Line.

3) Burn once more in winter to reduce duff and litter, then burn every 3 years for maintenance.

W4, Mrs. Allen's Ride, and W5, Whitney Drive and Mr. Cooper's Ride

4) Burn once more in winter to reduce duff and litter, then burn every 3 years for maintenance.

5) Once regular maintenance burning is effected and fire-induced pine mortality has been assessed, selectively thin longleaf pines to promote a more mixed-aged, irregularly spaced structure.

Compartment No. W2 **Cetta's Ride**

Assessment

Current community type: Mature (possibly old-growth) and mixed-aged longleaf pine canopy, with dense mountain laurel, sparkleberry, and scrub oaks below.

Former community type: Longleaf pine/mountain laurel heath slope.
PSCT: 1.2, (4.3) PSFR: B

Recommendation

Potentially an exceptional longleaf pine/mountain laurel slope, which has been responding well to controlled burns. Continue with back burns from upper slopes, and control hardwood encroachment.

Rationale

This partially fire-sheltered slope is host to some of the most attractive mature longleaf pines in Hitchcock Woods, and recent burning activities have resulted in densely resprouting mountain laurel, and successfully regenerating pine seedlings. As it is the only potential longleaf pine/mountain laurel slope easily reached from the Cathedral Aisle entrance, its restoration would enhance the biotic and visual diversity of this portion of Hitchcock Woods. The advanced age of many of the longleaf pines and open stand structure suggest that this slope may have been and could potentially serve as excellent RCW habitat. Management activities already taking place have proven quite successful, and should be continued, modified only to reduce fire damage to the mountain laurel as it approaches blooming age (which should not be a problem as long as burns are initiated from above).

Prescription

1) Remove all canopy and subcanopy hardwoods; remove all canopy loblolly pine from upper slopes, above Cetta's Ride.

2) Cool season back-burns from upper slopes every 3 to 5 years.

Options

Longleaf pines in this compartment are fairly dense, and may be selectively thinned over time as needed, with a goal of retaining a variety of ages and conditions.

Compartment No. W3 **Wood Cut**

Assessment

Current community type: Longleaf pine canopy, oak/heath understory on upper slopes (in transition due to recent burning and timbering activities), loblolly pine and mixed mesic hardwoods on lower slopes.

Former community type: Longleaf pine/wiregrass slightly mesic savanna on uplands and upper slopes, mixed-pine hardwood woodland on lower slopes, and mixed pine (principally loblolly pine) mesic hardwood woodland in the extremely fire-sheltered ravine near the center of the compartment.

PSCT: 1.1c, 2.2, 4.3 PSFR: A/B/C/D

Recommendation

This compartment has experienced some management activity in recent years, including controlled burning and selective timbering, and has begun to respond favorably, with renewed longleaf pine regeneration and hardwood encroachment control. Recommend that these efforts be continued, modified only to more closely mimic the natural fire regime and to create a more diverse pine stand structure.

Rationale

Along with W1, W2, W4, and W5, this compartment represents the transition zone between the loblolly pine/mesic hardwood communities of the lower slopes and the longleaf pine/wiregrass savanna of the uplands. Continued burning and selective timbering will force the loblolly pine and hardwoods, which have escaped towards the uplands, back to their original place in the landscape, making the transition from lowland to upland more apparent and thus enhancing the visual and biotic diversity of this portion of Hitchcock Woods.

Prescription

1) On mid to upper slopes, remove all canopy-sized loblolly pine and all canopy/subcanopy hardwoods. Under natural conditions, these species would have been confined by fire to lower slopes and bottomlands. With long-term fire exclusion, stems get large enough to resist fire, so cutting is necessary for removal.

2) Burn once more in winter, to reduce fuel load, then burn every 3 years in summer for maintenance. Ignite from upper slopes, and allow fire to travel downhill into sheltered sites at will.

3) Thin longleaf pine to promote a less even stand and age structure.

Compartments Nos. W6, W14, W15, W16, and W17

Smith Cut, Chasin' and Hitchcock Parkway, Riviere Ride, Fulmer/Gas Line, and Bog Field

Assessment

Current community type: Longleaf pine canopy, with substantial hardwood understory encroachment and dense accumulation of duff and litter. Some areas (Bog Field in particular) are especially choked with encroaching hardwoods and loblolly pines, resulting in the extirpation of the formerly diverse herb layer and elimination of longleaf pine regeneration.

Former community type: Longleaf pine/wiregrass diverse mixed mesic savanna.
PSCT: 1.1a, 1.1b, 1.1c PSFR: A

Recommendation

Restore to former longleaf pine savanna community type, but as a low priority.

Rationale

These five compartments are the most fire-protected and topographically diverse part of the uplands of the West Section. The community type formerly found here differs from that of the remaining upland compartments (W7 through W13, and W18) in once having a more diverse herbaceous layer; thus, restoring them would add to the overall landscape diversity of the West Section. However, because these five compartments are so far from the original community type (due to prolonged fire suppression and lack of appropriate management), restoration will require more significant effort than in other compartments. Because these compartments do not contain especially important plant associations, and because they receive fewer visitors than most other parts of Hitchcock Woods, the restoration of these areas may be seen as a low priority, to be pursued after other compartments have reached a regular maintenance regime.

Prescription

1) Remove all canopy loblolly pine, and all canopy and subcanopy hardwoods.

2) Burn annually in winter for at least 3 years, to reduce duff and litter.

3) Maintain with hot summer burns every 3 years.

4) Depending on the degree of pine regeneration following initial burning, hand plant longleaf pine seedlings in areas devoid of longleaf pine canopy trees.

5) Thin longleaf pines as needed to achieve an average spacing of 25 ft. and a more diverse age structure.

Options

These five sites may offer an opportunity to experiment with different management strategies, perhaps including using herbicides on dense hardwood stands, varying burn regimes, and planting of herbaceous species.

Smith Cut (W6) has an extremely attractive area of bracken, surrounding the unnamed bridle path from Smith Cut to Brickyard Field. This field of bracken is likely a result of continuous winter burns. While a community of dense bracken is usually considered unnatural (in an area which would normally experience growing season burns), and bracken tends to exclude other herb layer species, the visual beauty of this section may warrant retention of the less appropriate winter burn regime in order to preserve the character of this site. It is the only such area within Hitchcock Woods, and thus augments the suite of landscapes found here.

Compartments Nos. W7, W8, W9, W10, W11, W12, W13, and W18

High Point Line and Mr. Cooper's Ride, Texas Field, Juac Hollow and Hitchcock Parkway, Juac Hollow and Todd Cut, Corley Pass, Mystery Field, Brickyard Field, and Jack Rabbit Field

Assessment

Current community type: Longleaf pine canopy, where canopy exists, otherwise dense regenerative longleaf pine, with a dense scrub oak understory, including turkey oak and bluejack oak.

Former community type: Longleaf pine/wiregrass dry savanna; the most extensive area of this community in the original landscape.

PSCT: 1.1a, 1.1b PSFR: A

Recommendation

Excellent potential for complete restoration to longleaf pine/wiregrass savanna. Restore, through controlled burning and selective timbering, to the original savanna landscape.

Rationale

These seven contiguous compartments, and the more isolated Jack Rabbit Field, were undoubtedly once dominated by what is now considered the classic longleaf pine savanna: a highly xeric community, with widely spaced 'flattop' longleaf pines, an open subcanopy and understory, and a dense carpet of wiregrass and diverse savanna grasses and forbs. This area would have supported one of the most botanically diverse communities within Hitchcock Woods, including a number of Sandhills endemics, now greatly endangered by the loss of the longleaf pine savanna ecosystem throughout the southeastern coastal plain. Many of these endemic species still exist in the West Section, despite the elimination of the natural disturbance regime over the past 100 years. They can be found along the sandy trails, where the lack of litter accumulation has allowed them to thrive.

Management activities which would normally be instituted to reduce fire hazard and promote continuous pine regeneration are also ideal for restoring this community type, as well as most of the pine-dominated community types in Hitchcock Woods. The residual wiregrass populations and other Sandhills endemic species which have been surviving in marginal areas will respond dramatically once regular growing-season burning has begun, by recolonizing the interior areas from which they have been extirpated by litter accumulation.

While it is true that restoring this area to the original longleaf pine/wiregrass savanna will have a major impact on the degree of between-trail visibility, this negative aspect is more than offset by the potential ecological value of this area as a significantly large-sized remnant of the original landscape. The isolation of this section of Hitchcock Woods (as compared to the relative accessibility of the other sections) and subsequent lower visitor use further supports the concept of restoring this area as a haven for rare Sandhills endemic species and a preserve for a dwindling unique community type.

Prescription

1) Though the duff layer is thin enough that winter burns to reduce fuel are unnecessary, in many areas, a wise precaution would be to conduct one more winter burn.

2) Following this, burn during the growing season every 3 years for maintenance.

3) Following two successive burns, remove all canopy and subcanopy hardwoods. Remove all loblolly pine and Virginia pine.

4) Also, following two successive burns, thin longleaf pine poles (where no canopy is present) to achieve an average spacing of 15 ft; following several more burns, thin to 25 ft.

Options

Pine thinning activities may take place over a longer period of time. Bear in mind that the ultimate aim of pine thinning is to promote as diverse an age structure as possible, with as much diversity in spacing as possible.

Brickyard Field is distinctly different from the rest of this area. Apparently extensive pine straw raking has destroyed the existing shrub and herb layer. The canopy here is excessively evenly-spaced and evenly-aged. Burning and thinning activities which have been recommended for other adjacent compartments would be appropriate here, to restore this site to a more natural savanna appearance. However, it may be desirable to retain the present condition of Brickyard Field, with its solid canopy of longleaf pine and its bare, open understory, to serve as an assembly area for hunt meets or a staging area for management activities, without fear of destroying a fragile rare herb and grass layer. In this case, commercial pine straw raking could be allowed to continue.

Compartment No. W19 **Gamekeeper's Lodge Hill**

Assessment

Current community type: Most of the original diverse community types found here are still intact today: all steep slopes are dominated by longleaf pine and mountain laurel, many of the pines being very mature, perhaps even old-growth, but with little pine regeneration. A small remnant of longleaf pine/mountain laurel/rosemary still exists on the chalk cliffs at the upper end of Mrs. Knox's Trail. The base of the slope is dominated by mixed pines with some hardwood understory encroachment. Barton's Pond Path is bordered by mixed-mesic hardwoods and diverse populations of mesic herbs. There is a remnant of longleaf pine/wiregrass savanna on a level upland site adjacent to Whitney Drive.

Former community type: A wide and highly diverse assortment of community types: most of the steep slopes were dominated by longleaf pine and mountain laurel, upper slopes by the more xeric longleaf pine/wiregrass community, the transition between these by longleaf pine/mountain laurel/rosemary. The base of the slope was dominated by mixed pine, especially loblolly, mesic hardwoods, and diverse mesic herbs.

PSCT: 1.1a, 1.1b, 1.1c, 1.2, 4.3, (1.3) PSFR: B/C/(A)/(D)

Recommendation

This diverse area is close to its natural state and requires little restoration and management. Management should focus on protecting against wildfire hazard and promoting pine regeneration where needed. Activities should include minimal controlled burning, hand planting of longleaf pine seedlings, and trail monitoring and maintenance.

Rationale

Mrs. Knox's Trail is arguably the most scenic area in Hitchcock Woods, and rivals Lover's Lane and Kalmia Trail for showy springtime displays of mountain laurel. Among the most biotically diverse areas in Hitchcock Woods, it has retained much of its natural character and interest (including a second population of wild rosemary) because of its steep, highly dissected topography, chalky outcrops, and great variety of environmental conditions. A large number of mature 'flat top' longleaf pines are found here, with several abandoned RCW nest cavities. The maturity of these pines and the open stand structure suggest that this site could still provide RCW habitat. Threats to this compartment are few, but include 1) a hardwood and loblolly encroachment from the lower slopes, 2) extreme erosion of the trail itself, and 3) lack of pine regeneration, due to litter accumulation.

Because of the popularity of this site, growing-season burning which may result in long mountain laurel recovery periods is not recommended. Extensive controlled burns are also not recommended because of the close proximity of private houses. Therefore, like other mountain laurel slopes in Hitchcock Woods, this site should be maintained by hand-planting of pine seedlings and limited cool season back burns.

The most significant threat to this site is trail erosion. Though Mrs. Knox's Trail is not officially closed to horse traffic, it is practically impassable, and horses and riders frequently trample the extremely fragile and rare wild rosemary population at the upper end in their efforts to find a passable trail. Similar trampling and erosion is evident where visitors on foot have attempted to locate other side trails.

Prescription

1) Cool season back burns every 5 to 10 years, with spot warm season burning, if possible, on the upland site to the south more frequently.

2) Woody succession on the rosemary-dominated cliff should be monitored for shading. Without regular fires, canopy species here will eventually increase in size until the rosemary is shaded out. If prescribed burning does not control this woody encroachment, then offending individuals will have to be removed by hand.

3) Hand-rake litter and hand-plant longleaf pine seedlings on slopes where regeneration is limited.

4) On mid to lower slopes, remove canopy and subcanopy hardwoods, and selectively cut loblolly pine.

5) Close Mrs. Knox's Trail to horse traffic, notifying riders well before they reach the top of the trail (posting preferably at the Gamekeeper's Lodge Hill). Remove smaller side trail from trail map, and close trail (see Chapter 3, Enhancement of Cultural Resources).

3.2.4 Bottomlands

Much of the overall character of Hitchcock Woods is determined by the dissecting bottomlands which provide so much topographic and visual diversity. These areas are some of the few undeveloped, natural wetlands to be found in Aiken County. These four compartments are treated as a group and rather briefly here; they are treated more comprehensively in the General Recommendations section.

Compartments Nos. B1, B2, B3, and B4 **Bottomlands**

Assessment

Current community type: Rich wet hardwood and mixed-pine/hardwood forests, with an extremely dense understory dominated by invasive exotics, especially privet, but with pockets of diverse mesic herbs, mesic shrubs, and other wetland plant species. Compartment B1, north of Cathedral Aisle contains an active beaver colony that has constructed a series of dams and small ponds, resulting in a complex ecosystem of braided streams, marshes, and swamps. Exotic invasion tends to be much worse in upstream compartments, especially in areas close to storm water outlets (Calico Creek, Sand River at South Boundary, Dibble Road and Robinson Pond Site). Compartment B4 is perhaps the least invaded area, and contains large areas of fetterbush (*Leucothoe axillaris*) and a highly diverse herb association.

Former community type: Bottomland hardwoods, including swamp tupelo (*Nyssa biflora*), water oak, sweetgum, and tulip poplar, and loblolly pine/hardwood, with mixed mesophytic hardwoods (white oak forests) on north-facing slopes. In presettlement times, beaver ponds and beaver marshes were almost certainly present in the floodplains of Sand River, especially in Compartments B1 and B2 (north of Cathedral Aisle and Barton's Pond Bridge).
PSCT: 4.1, 4.2, 4.3, 5.1, 5.2 PSFR: C/D

Recommendation

Until the increasing influx of storm water is regulated, contained, or reduced, extensive restoration of the bottomlands neither advised nor possible. Recommend efforts to control escape of exotics from these compartments to adjacent uplands, and management for trash removal and erosion control as warranted. Do not attempt to eliminate all exotic species at this time, as they have a significant, positive role in erosion control (especially privet).

Rationale

These are naturally the richest, wettest, most fire-protected areas in Hitchcock Woods. Historic maps show an extensive network of small drainages dominated with bottomland hardwoods throughout Hitchcock Woods. In the original landscape, these bottomland forests would have been much narrower than they are today; long term fire suppression has allowed many of the bottomland woody species to spread beyond their natural range. The beaver-maintained wetland complexes were an integral part of the presettlement landscape. Protected examples are now quite rare. There may be very few examples at present open to the public in South Carolina where beaver trapping is prevented. The small stream wetland mosaics, structured by fire on the

margins and by beaver in the center, were habitat for a number of endangered plants and animals. Beaver activity would have made these systems much more dynamic, with constantly shifting impoundments, marshes, and successional scrub scattered throughout the bottomlands.

Today these bottomlands are much larger, due in part to long term fire suppression, but also due to a much greater influx of storm water drainage from the now surrounding urban area. Restoration and management of these bottomlands cannot be effective until the various legal, political, and engineering issues affecting storm water effluent are resolved. At this time, the invasive exotics introduced by storm water and which now dominate the bottomlands are a prime defense against the greatly accelerated stream channel erosion which is now occurring. Reduction of the shrub layer, through prescribed burning and exotics removal, would result in a substantial increase of creek bank failure, bridge wash-outs, downstream siltation, and exotic invasion into areas which are not currently significantly affected.

It is likely that the level of storm water effluent will remain high indefinitely, and that engineering efforts will be focused on controlling the rate of influx, and not the quantity. The resultant altered hydrology should be viewed as an opportunity and not a detriment, as it allows Hitchcock Woods to support a number of additional ecosystems which were not present, or present in quantity, in the original landscape, such as bottomland hardwood floodplain forests and small stream swamps. However, the future quality of these aquatic ecosystems depends largely on the control of effluent-delivered exotics and trash.

Prescription

1) Monitor these four compartments for exotic species invasions, and control exotics (cutting and painting) where such control is feasible and erosion is not significant. In all compartments, cut and paint wisteria which threatens to strangle trees.

2) On a limited basis, again, where erosion is not a significant problem, controlled burning in cool seasons every 3 to 5 years is recommended. Allow fire to travel at will, burning some areas completely and some not at all to form a complex 'pyromosaic'.

3) Continue to monitor all compartments for erosion and attempt control where feasible.

4) Continue to monitor beaver population in Compartment B1. The pond levelers currently in use are not necessary. Though there is no need to remove the existing levelers, no other

should be installed. As long as no public structures are threatened, the beaver population should be allowed to freely conduct its activities, to create a real, natural beaver ecosystem.

Options

Options for restoration and enhancement of these systems have been covered in Section 3.1.3, Management of Threats, and Section 3.1.6, Public Education and Involvement; however, two of these will be highlighted here.

1) The beaver pond offers an excellent opportunity to broaden the public's experience of the diversity of Hitchcock Woods. Construction of a boardwalk to the beaver pond is recommended, to make the pond accessible to the average visitor.

2) A considerable amount of trash flows into Hitchcock Woods with storm water. While the trash does little harm, it does diminish the impression of Hitchcock Woods as a pristine natural area. The installation of trash weirs at storm water outlets and a community-based volunteer trash collection effort would do much to both control trash and to encourage a sense of community responsibility for Hitchcock Woods. The control of trash in Hitchcock Woods also provides an opportunity to establish a mutually beneficial partnership with the City of Aiken.

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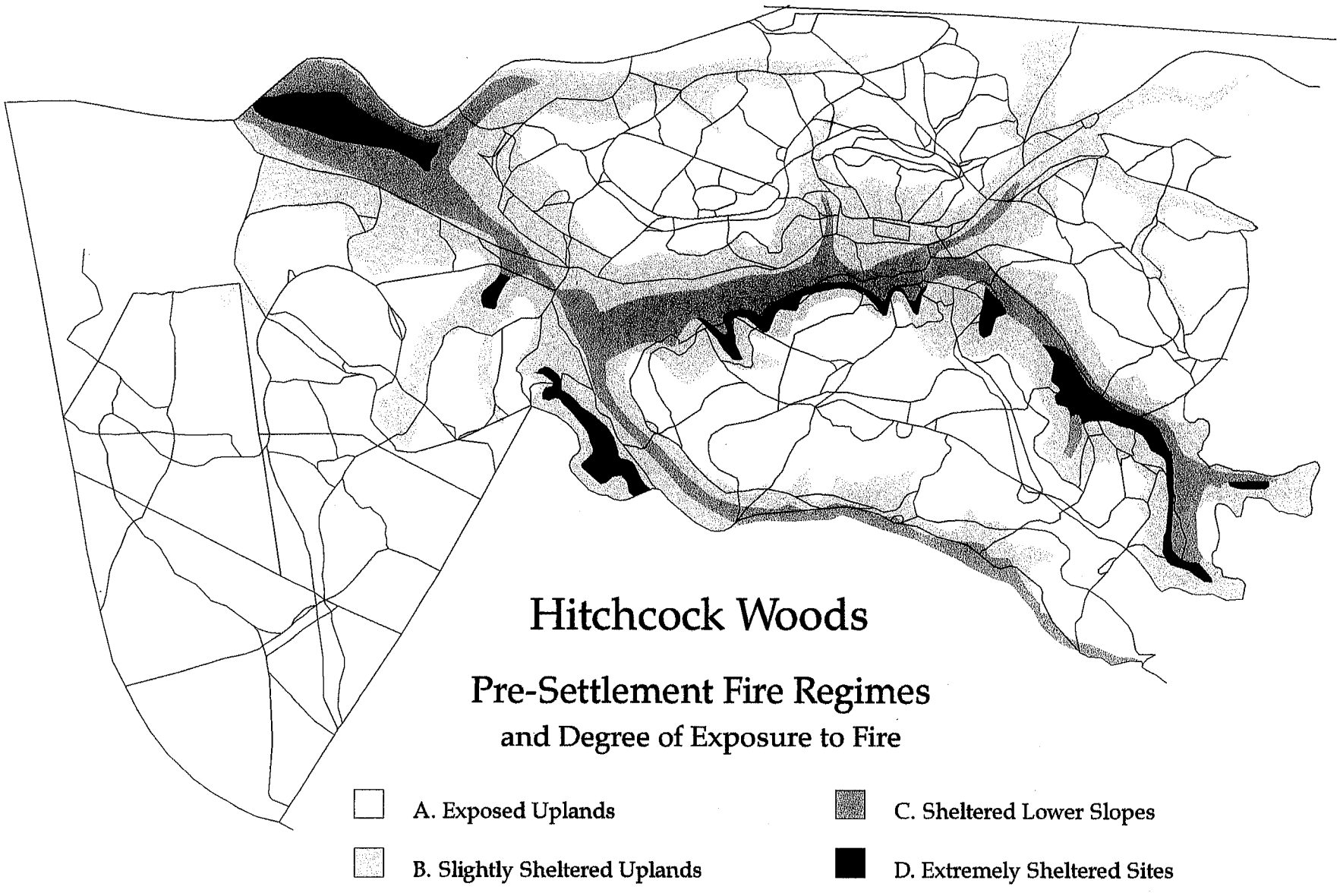
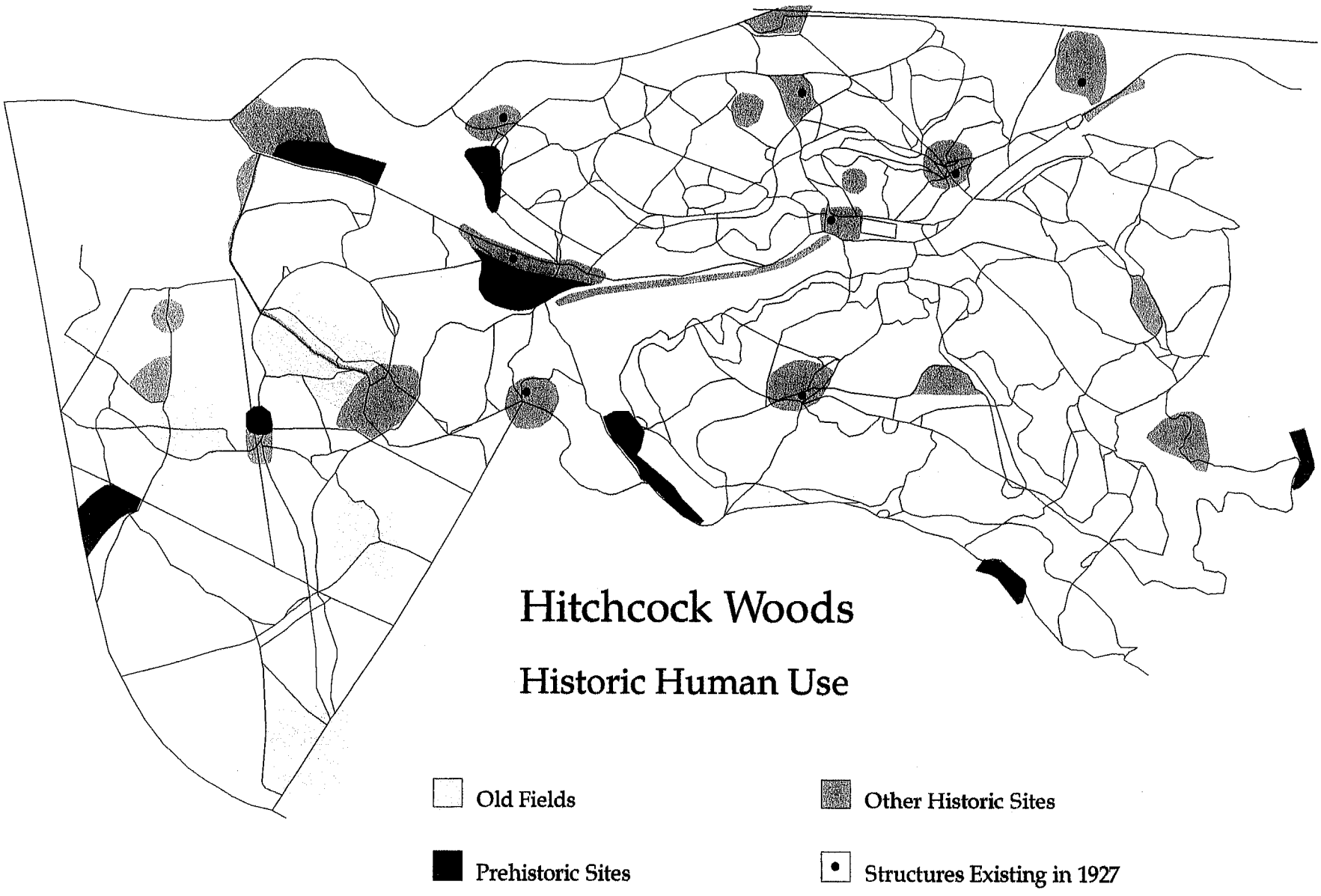
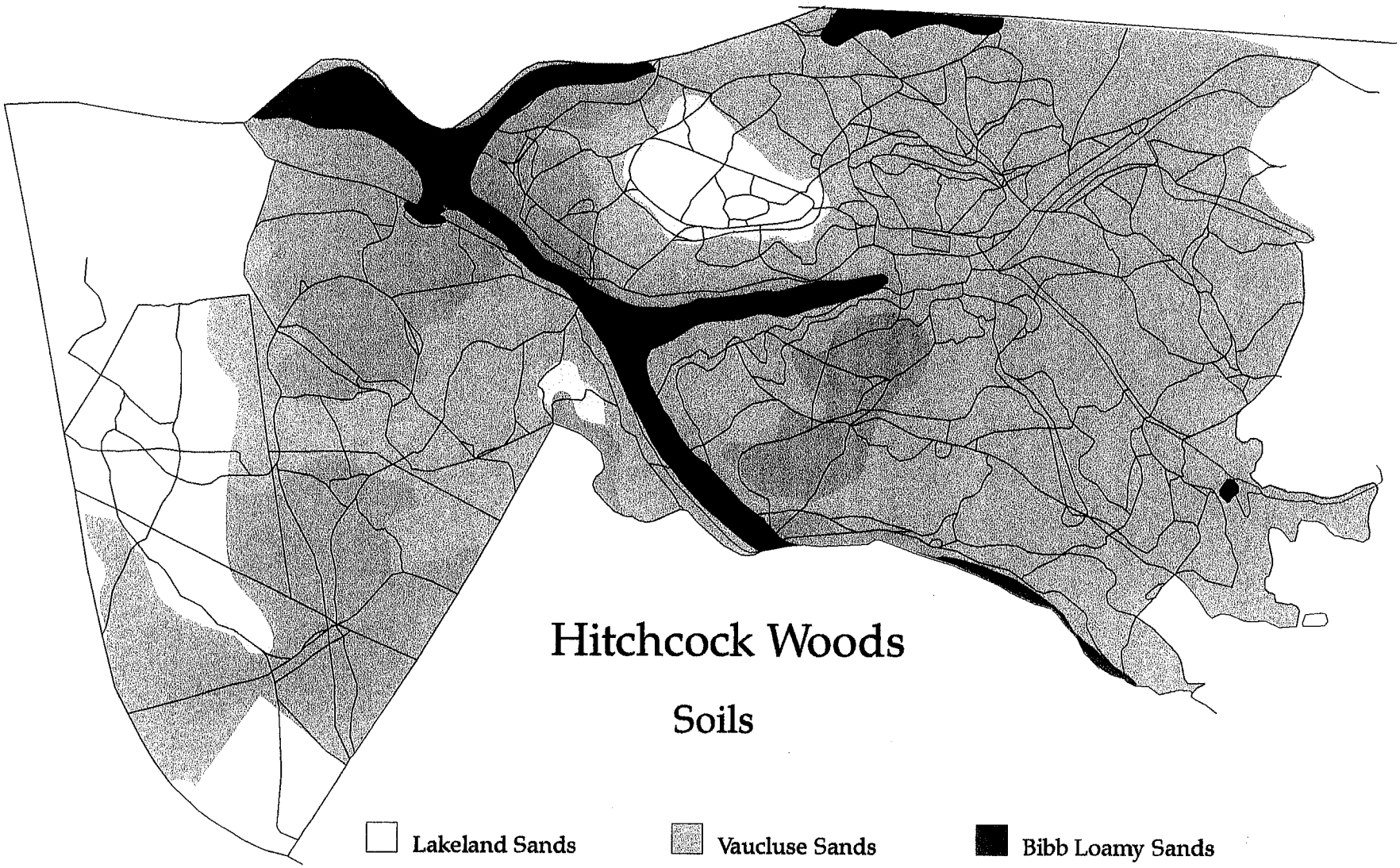
APPENDIX A


Hitchcock Woods
Pre-Settlement Fire Regimes
and Degree of Exposure to Fire
A. Exposed Uplands
B. Slightly Sheltered Uplands
C. Sheltered Lower Slopes
D. Extremely Sheltered Sites

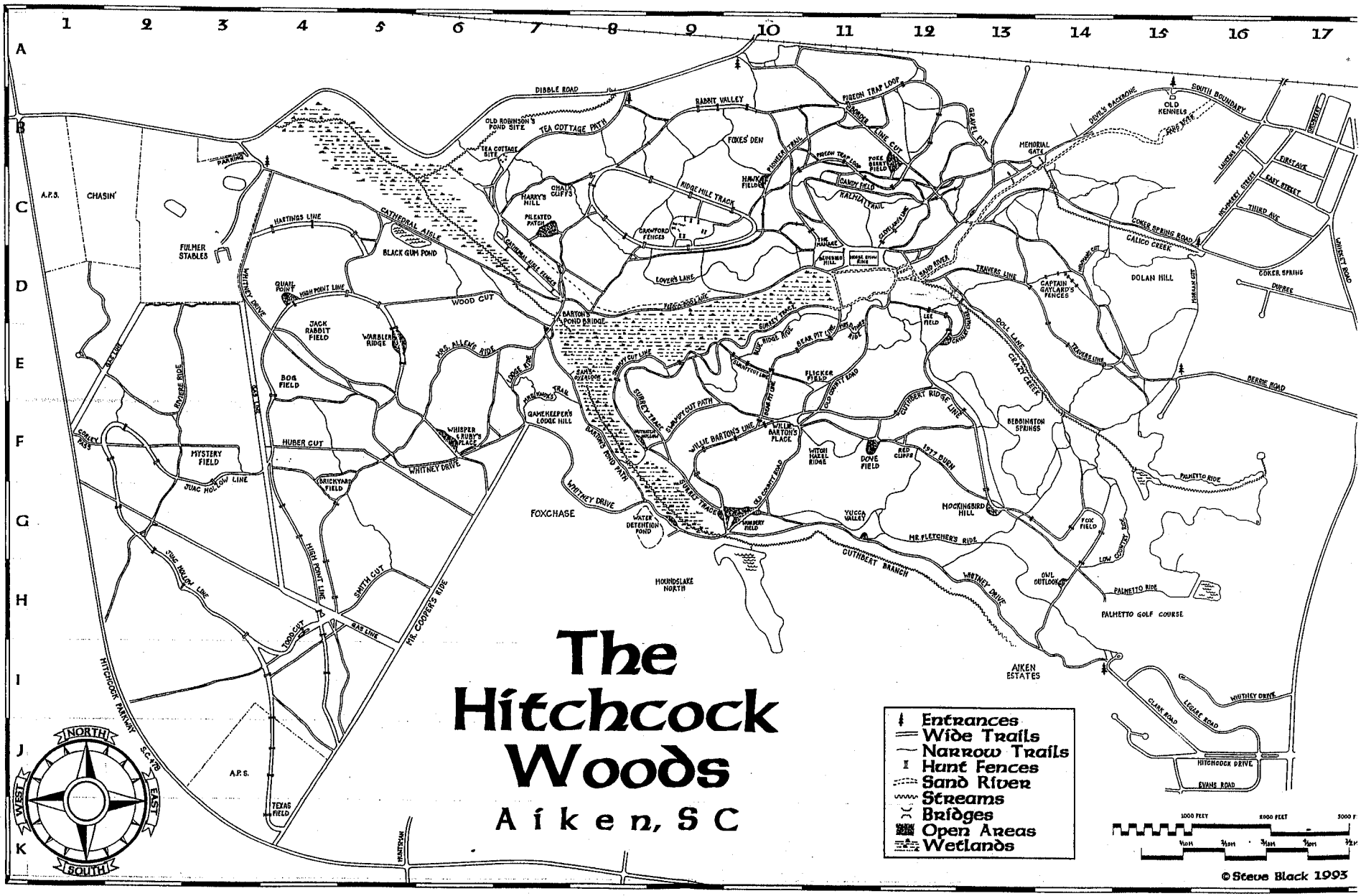
APPENDIX B


Hitchcock Woods
Historic Human Use
Old Fields
Other Historic Sites
Prehistoric Sites
Structures Existing in 1927

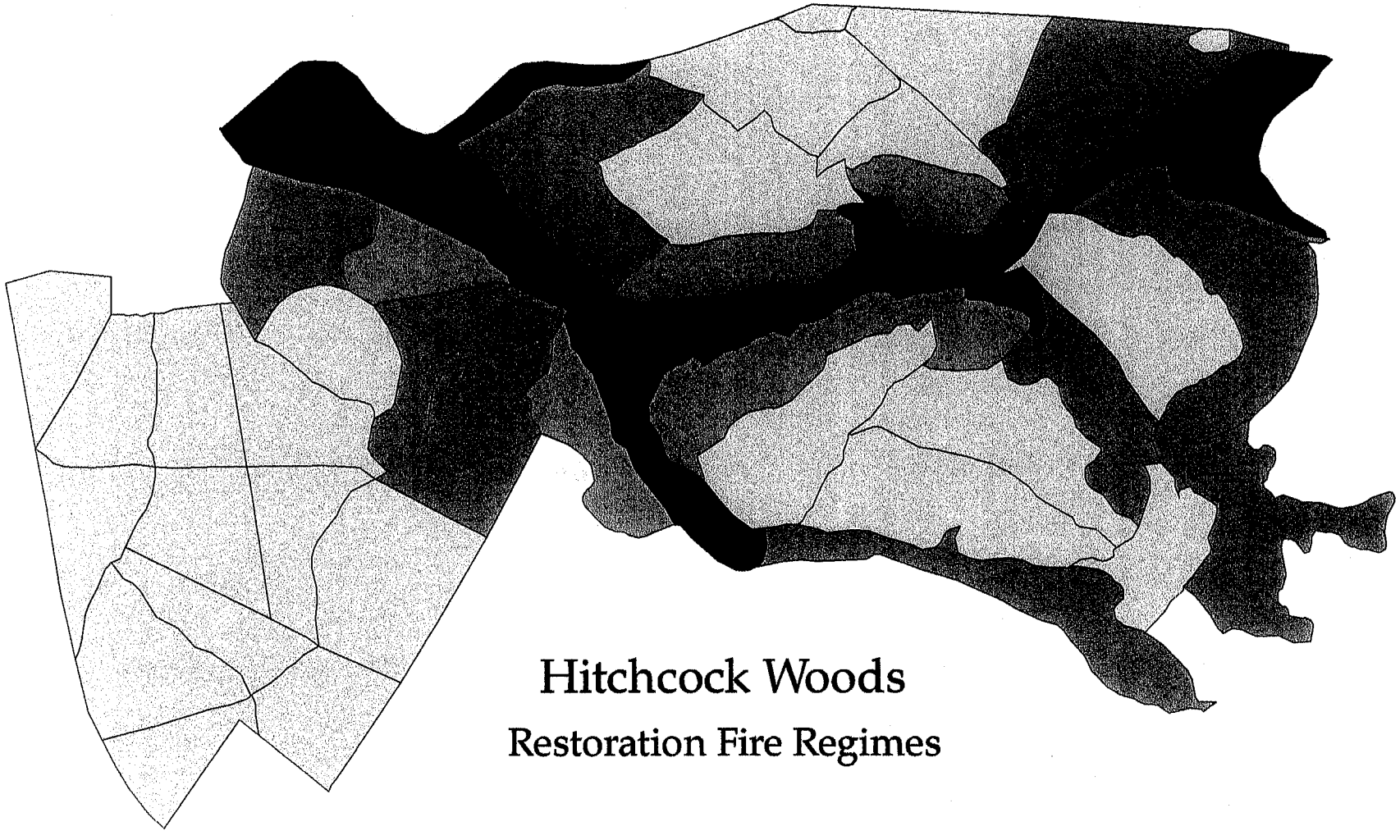
APPENDIX C


Hitchcock Woods
Soils
Lakeland Sands
Vaucluse Sands
Bibb Loamy Sands
Troup Sands
Ailey Loamy Sands
Water

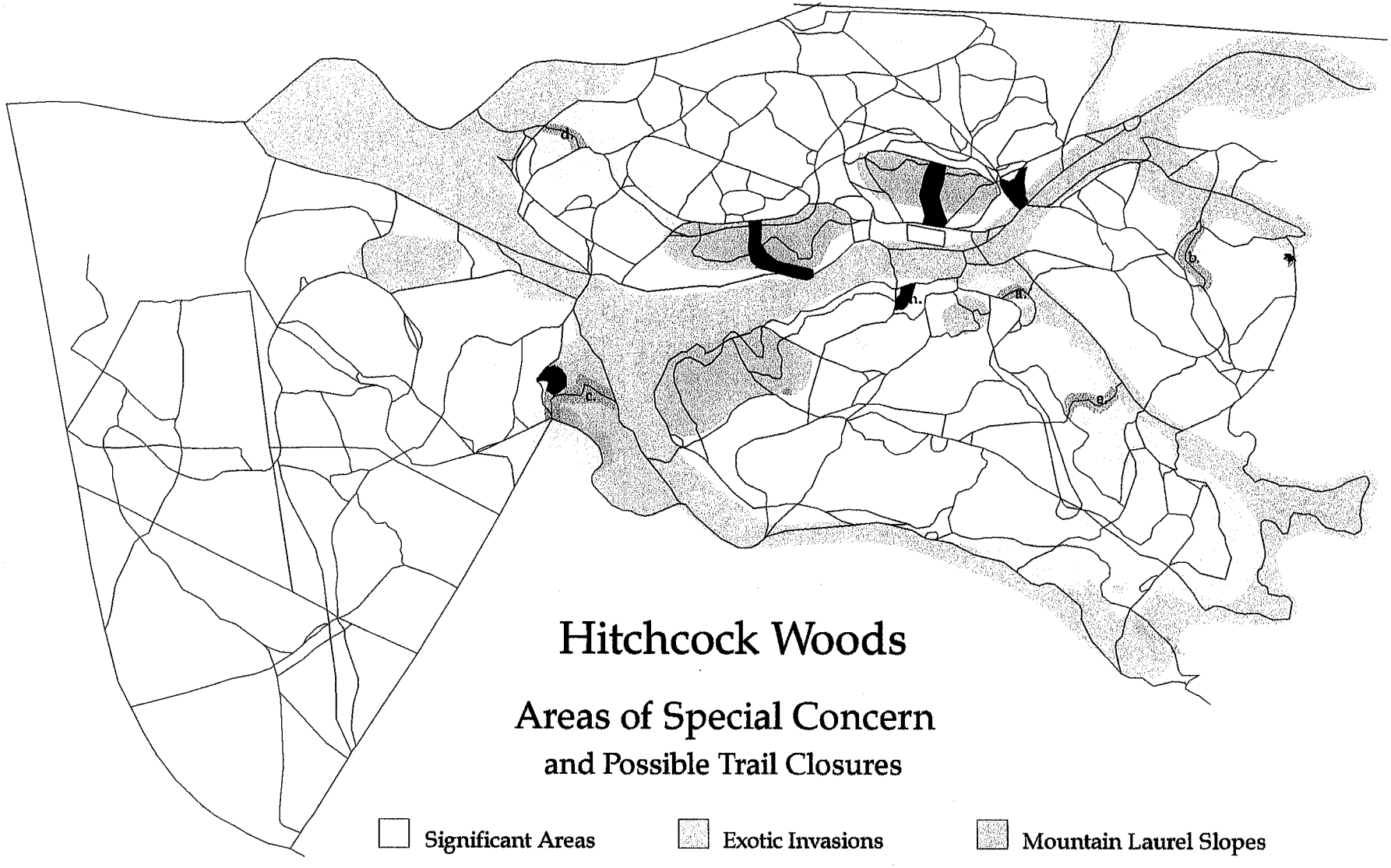
APPENDIX D


The Hitchcock Woods
Aiken, SC
Entrances
Wide Trails
Narrow Trails
Hunt Fences
Sand River
Streams
Bridges
Open Areas
Wetlands
NORTH
SOUTH
EAST
WEST
© Steve Black 1993

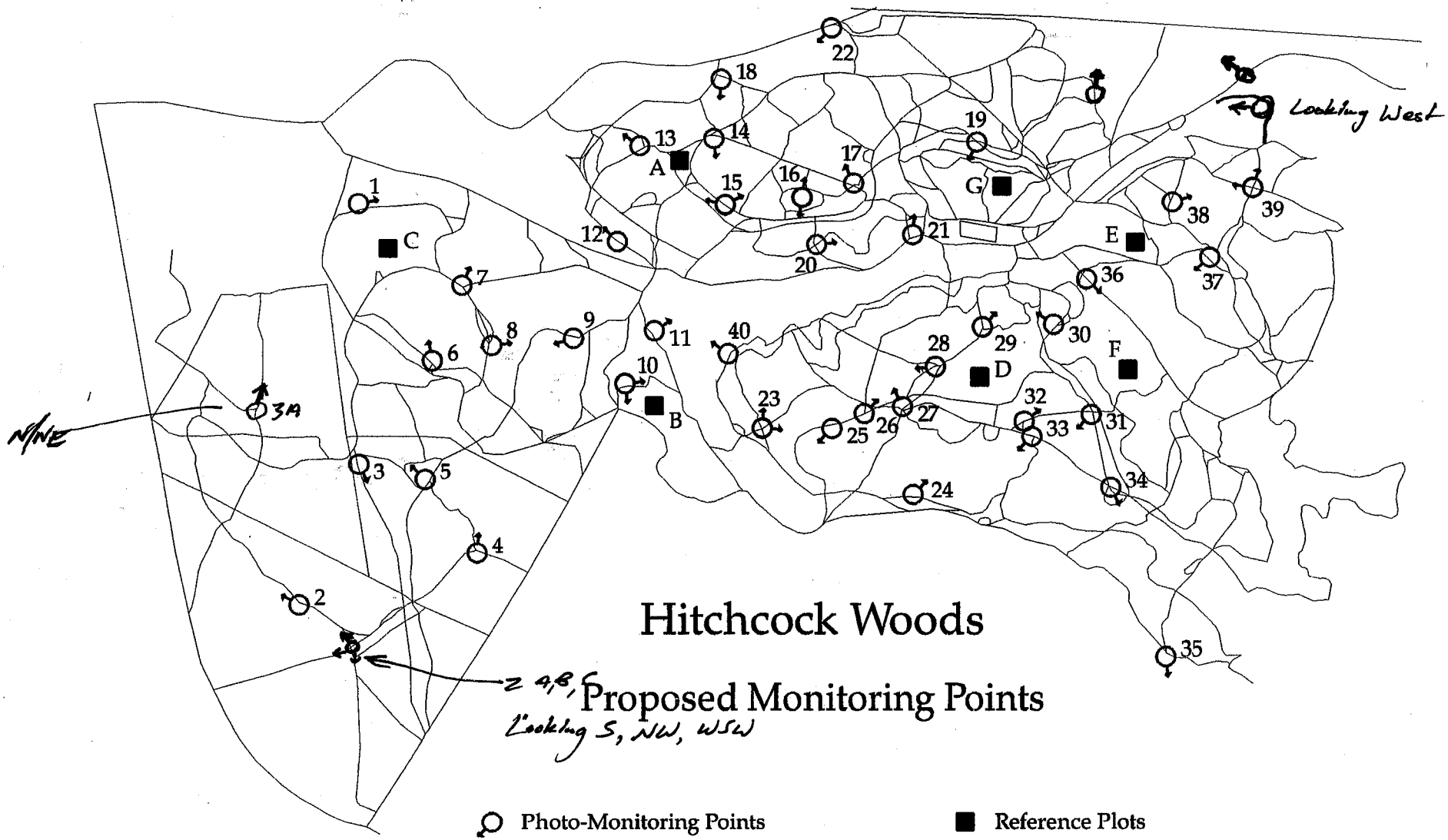
APPENDIX E


Hitchcock Woods
Restoration Fire Regimes
2 - 5 yr intervals
4 - 8 yr intervals
Specialized back burns
No regular burns

APPENDIX F


Hitchcock Woods
Areas of Special Concern
and Possible Trail Closures
Significant Areas
Exotic Invasions
Mountain Laurel Slopes
Closure to All Traffic
Closure to Horse Traffic

APPENDIX G


Looking West
N/NE
Looking S, NW, WSW
Hitchcock Woods
Proposed Monitoring Points
Photo-Monitoring Points
Reference Plots

APPENDIX G

SUGGESTED PHOTO-MONITORING POINTS

West

1 W1: Hasting Line, First fence from Whitney Drive, looking E

2 W9: Juac Hollow Line, middle fence in this compartment, looking NW

3* W13: High Point Line, first fence S of intersection with Juac Hollow, looking SSE

4 W6: Smith Cut, intersection of trail to Brickyard Field, looking N

5 W13: Brickyard Field, intersection of trail from Smith Cut, looking NW

6 W18: Jack Rabbit Field, intersection of short connector to Whitney Field, looking NW

7* W2: High Point Line, middle of five fences around Jack Rabbit Field, looking NE

8* W3: High Point Line, fence just below Warbler Ridge, looking E

9 W4: Mrs. Allen's Ride, from trail to Whisper & Ruby's Place, first big oak (*Q. falcata*) in bend of road, looking W

10 W19: Mrs. Knox's Trail, from large mass of Ceratiola at top of cliffs

a. Looking E (60°)

b. Looking S (180°)

North

12 N10: Cathedral Aisle Fences, middle fence, looking NW

13* N8: Harry's Hill, looking NW

14 N1: Intersection of Rabbit Valley and Ridge Track (W end), looking S

15 N1: Ridge Track, at 2nd fence E of Lover's Lane entrance

a. Looking E

b. Opposite track from fence, looking W

16 N1: Crawford Fences

a. Looking N from blank sign in center

b. Looking S from blank sign in center

17* N1: Ridge Track, fence at NE end, looking WNW

18 N9: Tea Cottage Path, intersection with first trail to Rabbit Valley, looking S across slope

19* N4: Pigeon Trap Loop and Candy Field Trail, looking SW into Candy Field

20 N7: Lover's Lane, intersection with crossing trail from Ridge Track, looking E

21* N7: Lover's Lane at Peek-a-Boo, looking N

22 N2: Rabbit Valley from Dibble Road

East

23 E2 & E8: Swampy Cut Path and Surrey Trace
   a. Looking N
   b. Looking E

24 E7: Yucca Valley Trail

25* E8: Willie Barton's Line, middle jump of straight-a-way, looking SSW

26 E8: Willie Barton's Line and Bear Pit Line, looking N

27 E8: Willie Barton's Place, under juniper

28* E8: Flicker Field, looking W from County Road

29* E9: Old County Road and trail to Lee Field (across south end of new burn), 25 paces E to white oak at crest, looking NE into burn.

30 E9: Intersection of trails just south of Lee Field, looking NW into burn

31* E9: Cuthbert Ridge Line and trail across 1977 burn, looking SW into burn

32 E9: Intersection of trail from Red Cliffs and trail across 1977 burn, looking ENE into burn

33 E7: Red Cliffs

34 E7: Cuthbert Ridge Line and trail from Red Cliffs, at large pine tree at base of Red Cliffs trail, looking S across Mockingbird Hill

35 E5: Erosion of Cuthbert Branch, at intersection of Whitney Drive and trail to Owl Outlook

36 E10: Doll Lane, at bridge from Cavalry Charge, looking ESE along Doll Lane

37* E10: Intersection of fence lines at Capt. Gaylord's fences, looking SSW

38 E12: Intersection of N side of Travers Line and trail to Memorial Gate, looking E towards Newman's Cut

39 E12 & B3: Bridge from Newman's Cut,
   a. looking downstream at erosion
   b: looking N towards wisteria on Coker Spring Road

Bottomland

11 B2: Sam's Overlook, looking E

40 B2: Surrey Trace, farthest west point, base of large longleaf pine 70 paces N of westernmost fence, looking W into beaver pond

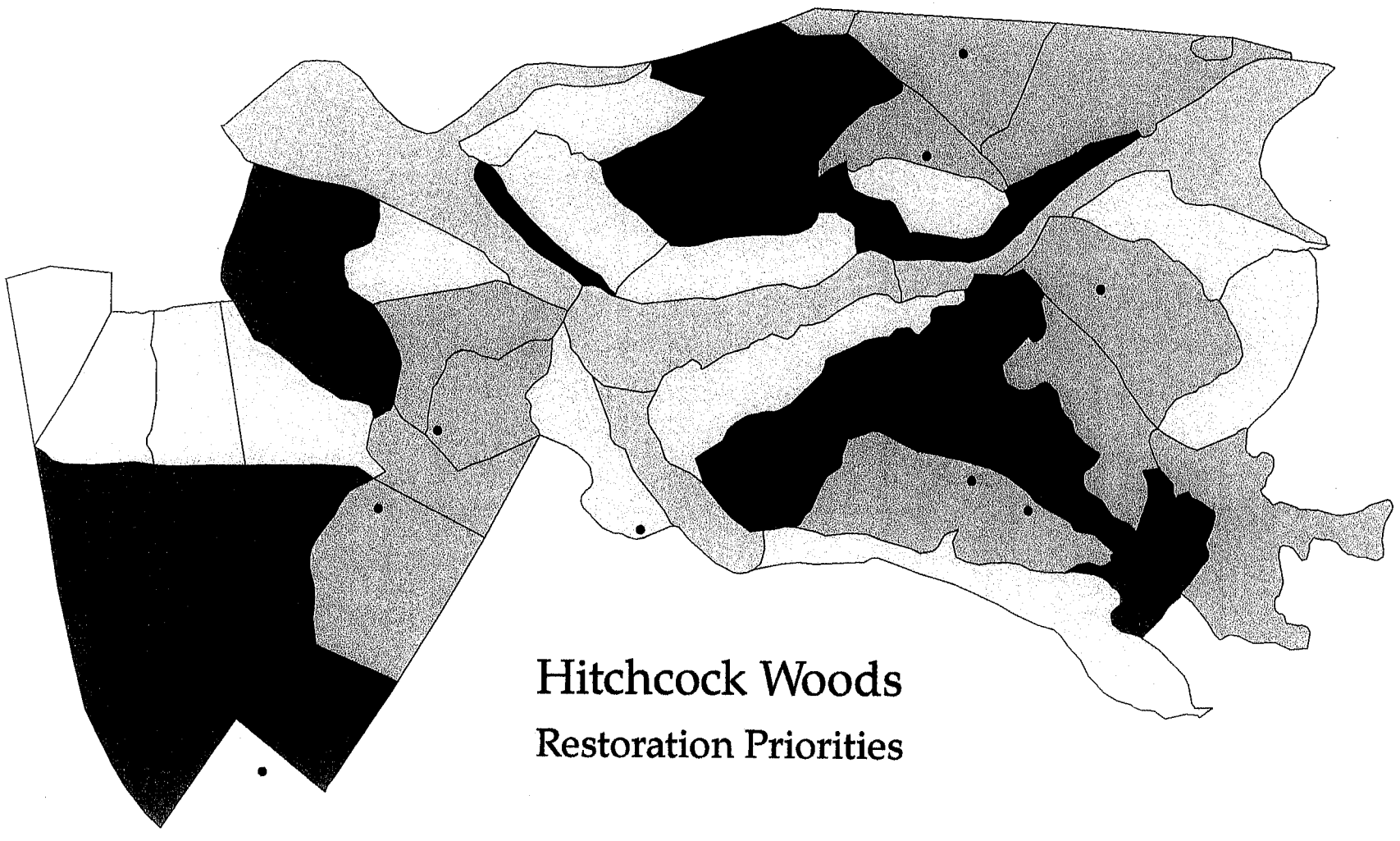
45 TOTAL

SUGGESTED PERMANENT REFERENCE PLOTS

A The wild rosemary and *Juniperus communis* site on the Chalk Cliffs
B The wild rosemary site at the top of Mrs. Knox's Trail
C Intact longleaf savanna/mixed pine woodland near Jack Rabbit Field
D Intact longleaf pine/wiregrass savanna near Cuthbert Ridge Line
E Intact longleaf pine/wiregrass savanna near Travers Line
F Mesic slope herb communities of Hepatica Trail and Bebbington Springs
G Shortleaf pine savanna on slopes above the Horse Shoe Grounds

7 TOTAL

APPENDIX H


Hitchcock Woods
Restoration Priorities
Highest priority
Moderate priority
Low priority
Ongoing micro-management
No restoration at this time
Known wiregrass site

human_use

Digitized from Exhibit B, Archeological Sites, of the Conservation Easement, and georeferenced to the Trails map. (polygon coverage)

monitoring

Digitized by hand and georeferenced to the Trails map. (point coverage)

priorities

Management compartments organized into five categories of priority for restoration (high, medium, low, none, and micromanage). Coverage is based on the compartments coverage.

roads

All paved and unpaved roads in Aiken County, provided by State of South Carolina, Department of Natural Resources, online GIS data access. (line coverage)

soils

Derived from published county surveys, transferred to quadrangle basemaps, and digitized by State of South Carolina, Department of Natural Resources. Available through its online GIS data access. (line coverage)

streams

Digitized from Steve Black's 1993 Hitchcock Woods Trails map simultaneously with Trails (see below). Separated into a separate coverage after digitizing.

trails

Digitized from Steve Black's 1993 Hitchcock Woods Trails map, georeferenced using the Roads coverage by S. Wilds. (line coverage)

photos

Aerial photography, scanned by staff of State of South Carolina, Department of Natural Resources, and georeferenced to the Roads coverage by S. Wilds. (GRID coverage, or TIF image)

APPENDIX K

AREA MEASUREMENTS OF BURN COMPARTMENTS

Compartment	Area (ha)	Area (acres)
N1	27.7	69.3
N2	22.5	56.3
N3	19.1	47.8
N4	10.6	26.5
N5	27.3	68.3
N6	9.8	24.5
N7	15.0	37.5
N8	15.8	39.5
N9	14.8	37.0
N10	4.0	10.0
N11	6.1	15.3
N12	5.4	13.5
N13	1.0	2.5
N14	1.9	4.8
E1	24.7	61.8
E2	21.7	54.3
E3	3.5	8.8
E4	17.5	43.8
E5	26.2	65.5
E6	12.5	31.3
E7	28.1	70.3
E8	24.8	62.0
E9	31.5	78.8
E10	28.6	71.5
E11	18.3	45.8
E12	14.9	37.3
W1	19.1	47.8
W2	11.4	28.5
W3	15.4	38.5
W4	13.0	32.5
W5	11.7	29.3
W6	27.0	67.5
W7	14.6	36.5
W8	10.6	26.5
W9	19.8	49.5
W10	12.6	31.5
W11	13.8	34.5
W12	16.3	40.8
W13	13.6	34.0
W14	13.3	33.3
W15	14.9	37.3
W16	15.2	38.0
W17	16.4	41.0
W18	14.2	35.5
W19	13.7	34.3
B1	40.6	101.5
B2	24.2	60.5
B3	29.3	73.3
B4	11.8	29.5

	(ha)	(acres)
Total Area	825.7	2064.3
Mean Area	16.9	42.3
Maximum Area	40.6	101.5
Minimum Area	1.0	2.5

The Hitchcock Woods

Aiken, SC