

**REPORT TO THE NATIONAL COUNCIL OF  
SCIENCE AND SUSTAINABLE FORESTRY**

**on**

**THE SOUTHEASTERN OLD  
GROWTH FOREST WORKSHOP**



The Wade Tract on Arcadia Plantation, Thomas County, Georgia. Photograph by Julius Ariati.

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## I. EXECUTIVE SUMMARY

The rediscovery of the Ivory-billed Woodpecker (*Campephilus principalis*) in the Big Woods of Arkansas drew new attention to old-growth forest conservation in the southeastern Coastal Plain. We organized a workshop to address four questions: (1) What is the extent of old forests in the present day landscape? (2) What are the conservation values of old-growth southeastern forests? (3) What social values are derived from these forests? (4) What strategies can be practically applied to increase their value to future generations?

The workshop was held on 30-31 March 2006 in Thomasville, Georgia. The location was significant, because the Red Hills region of south Georgia and north Florida has some of the finest examples of old-growth forest in the Southeast—all on private land. Forty-five participants--land managers, land owners, philosophers, artists, scientists, administrators, and politicians--attended, and 200 people from the general public came to a photography exhibit/reception and lecture by John Fitzpatrick on the re-discovery and conservation of the Ivory-billed Woodpecker. The workshop format was anchored by three keynote talks, followed by panel discussions, followed by three breakout sessions.

We chose to direct our attention to focus on two forests at opposite ends of the fire frequency continuum. The longleaf pine ecosystem dominated uplands in much of the southeastern Coastal Plain and provided a “keystone” function as a conduit for fire into other vegetation types along moisture gradients. Bottomland hardwood and cypress-tupelo experienced the lowest frequency of fire of forests in the southeast.

Efforts to define and inventory old-growth forests in the Coastal Plain of the southeastern U.S. come primarily from two sources: the U.S. Department of Agriculture Forest Service and a grassroots effort compiled by Mary Byrd Davis. The Forest Service developed quantitative definitions of old-growth for 13 southeastern forest types and listed some of the better-known examples. The Davis inventory listed about 424 sites in 10 southeastern states. Based on an estimate of approximately 274,000 ha, old-growth communities in the southeastern states make up approximately 0.5% of the total forest area in the Southeast. Much of this total is located in the Appalachian Mountains—not the Coastal Plain. Using an estimate of 37.2 million ha as the extent of the Pre-Columbian longleaf and longleaf-oak forests, the current old-growth longleaf pine forest (approximately 5,000 ha) is likely 0.013% of its original area. There are roughly 29 well-known old-growth longleaf pine sites. In this dataset, approximately 74% of the tracts are in public ownership, 87% of the acreage is in public ownership, and only one of the tracts (Eglin Air Force Base) is large (>1,000 ha). A total of 67 old-growth cypress/tupelo and bottomland hardwood sites was mostly in public ownership (61%), 28% in private ownership (including non-profits such as The Nature Conservancy), 3% in combined private/public ownership, and 7.5% whose ownership was not determined. This inventory and these summary data must be considered provisional, not definitive.

The conservation values associated with the biodiversity of old-growth forests can be found in the following old-growth attributes: relatively undisturbed ground cover, old

trees, coarse woody debris, forest area, intact ecotones, and relatively natural disturbance regimes (i.e., flooding cycles and fire). Not unlike the Spotted Owl in the Pacific Northwest, two woodpeckers--the Red-cockaded Woodpecker and the Ivory-billed Woodpecker--have drawn attention to old-growth in these forest types, because both woodpeckers depend on aspects of old-growth. Unusual species combinations and overall species richness may be the unique features of old-growth forest biological diversity in southeastern forests rather than truly obligate old-growth species.

Values of old-growth forests ranged from their potential for spiritual, mystical, and religious encounters, their irreplaceable role in heritage and identity, their function as scientific benchmarks for biodiversity, and their economic values to provide recreational opportunities (e.g., hunting, ecotourism), unique timber products (heartwood), and clean air and water. Keynote speaker, Bryan Norton, advocated using a pragmatic approach to conservation of old-growth that would depend on listing all values and deciding via a democratic process how conservation should proceed.

Old-growth conservation strategies must include recognition that most of the forest land in the Southeast is in private ownership and that conservation of some, but not all, characteristics of old-growth may be more practical than trying to preserve all sites according to a set formula for old-growth. Participants listed significant threats to, and opportunities for, conservation of old-growth forests in the Southeast. A suite of incentives accompanied by a public education effort must be developed for old-growth conservation on private land.

## II. INTRODUCTION

The rediscovery of the Ivory-billed Woodpecker (*Campephilus principalis*) in the Big Woods of Arkansas refocused energy on old-growth conservation in the southeastern Coastal Plain after a decade of declining public interest. The national attention given to the Ivorybill by birdwatchers, conservationists, and scientists illustrated the many ways old growth forests--and the biodiversity contained therein--captivate our imagination and inspire our awe. With this complex and deep social connection, the southeastern old-growth workshop sought to rediscover its own old-growth resources and develop conservation strategies to expand our understanding and appreciations of them.

Forests, and specifically old forests, have influenced the culture, economic development and the ecology of the southeastern Coastal Plain even before the founding of the nation. These forests have, in turn, been shaped by humans for thousands, if not tens of thousands of years (Carroll et al. 2002). The future value of these forests, to the extent that it can be assessed, will have to be viewed relative to their impact on people in the region, and people's impact upon them.

The southeastern U.S. is home to many forest types, but two forested communities are critically important to the southeast: upland coastal plain longleaf pine and bottomland hardwood/cypress-tupelo forest types. These forests represent critical challenges to conservation of biological diversity, particularly two charismatic endangered bird species, the Red-cockaded Woodpecker (*Picoides borealis*) in the longleaf pine ecosystem and the Ivory-billed Woodpecker in bottomland forests. In addition to their conservation value, southeastern forests, though of considerably different character than the first forests Europeans encountered, remain the wood basket of the country (Ware and Greis 2002). Old forests, both upland pine and bottomland, produce valuable wood products, and in a landscape dominated by private land, economic realities of managing old forests must be understood if they are to be sustained in ways that serve conservation.

Notwithstanding the dramatic and nearly complete loss of old forests from the landscape, the high levels and critically important components of biodiversity supported by these small remnant stands provide the most compelling testimony to their past greatness. These rare, but valuable forests also speak to the need for an assessment of how their future contributions might further enrich the region from a wider range of views than those that have shaped land use in the past, including the values derived from conserving native biodiversity.

To address these challenges, we organized the workshop to address four simple, but critical, questions. What is the extent of old forests in the present day landscape? What are the conservation values of old-southeastern forests? What social values are derived from these forests? What strategies can be practically applied to increase their value to future generations?

### III. SOUTHEASTERN OLD-GROWTH FOREST DEFINITIONS AND EXTENT

Efforts to define and inventory old-growth forests in the Coastal Plain of the southeastern United States<sup>1</sup> come primarily from two sources: the United States Department of Agriculture Forest Service (Forest Service) and a grassroots effort compiled by Mary Byrd Davis that culminated in the first inventory of old-growth forests in the eastern U.S. (Davis 1993). The Forest Service formed the Old-growth Definition Task Force Group in the late 1980's, and the Southern Region of the Forest Service took steps to define and provide consistent standards for inventory of old-growth forests on National Forest land for use during land management planning (Gaines et al. 1997; Tyrell et al. 1998). The first Eastern Old-growth Conference, held in 1993 in Charlotte, North Carolina, was sponsored by academic, governmental and non-profit environmental groups. This conference series continued and recently held its seventh conference in Little Rock, Arkansas in March 2006. As an outgrowth of the second Eastern Old-growth Conference, a book was published on old-growth forests in the eastern United States (Davis 1996). The original inventory (Davis 1993) has recently been updated (Davis 2003).

#### A. Old-growth Definitions

Defining old-growth, like defining most vegetation types, is an attempt to impose something discrete on something continuous, and this can cause endless confusion and debate. Leveritt (1993) listed these general indicators of old-growth: number of large, old trees; presence of coarse woody debris (standing and down); gaps in the canopy; forest floor topography; presence of vegetation growth layers; undisturbed soils; a well-developed herbaceous layer; abundant lichens and fungi; absence of human disturbance; a majority of tree species that fall into the late successional class; a lack of multi-stemmed (coppice) trees; and a mosaic of age groupings of canopy trees. Some of these characteristics are applicable to some old-growth forests more than others. Quantitative measures of variables such as these can be derived from existing old-growth stands or historical records, but it is critical to consider geographic variation and site index to develop stand-specific management goals. Further, identifying a minimum size that a forest must be to be called old-growth is highly problematic, because the importance of size varies with the organism under consideration.

The Southern Region of the Forest Service set several objectives for old-growth forests in the National Forests (Gaines et al. 1997):

- To develop definitions of old-growth forests that are found on National Forests in the Southeast based on scientific information;
- To provide guidelines for inventory of old-growth forests on National Forests to be used in land management planning;

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<sup>1</sup> For our purposes: Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, and Texas.

- To consider the area and spatial distribution of old-growth forests at different spatial scales;
- To develop procedures to identify existing and future old-growth forests; and
- To provide regional standards for data on old-growth forests.

The definitions adhered to a standard list of quantifiable attributes of old-growth forests that included:

- tree density (no./ha),
- basal area (m<sup>2</sup>/ha),
- age of large trees (years),
- number of 10 cm size classes (regeneration),
- density of snags (no./ha),
- volume of downed logs (m<sup>3</sup>/ha),
- number of canopy layers, and
- percentage of tree canopy in gaps.

To date the Forest Service has published definitions for 13 forest types found in the Southeast (Table 1). The Forest Service has used these definitions to inventory old-growth in some National Forests (e.g., Jefferson and George Washington National Forests in Virginia) within the context of Land and Resource Management planning.

**Table 1.** U.S.D.A. Forest Service old-growth forest definitions for the SE U.S.

<b>Forest Type</b>	<b>Citation</b>
Mixed mesophytic and western mesophytic	(Greenberg et al. 1997)
Southern mixed hardwoods	(Batista and Platt 1997)
Seasonally wet oak-hardwood woodlands	(Kennedy and Nowacki 1997)
Red river bottom forests in the Eastern United States	(Shear et al. 1997)
Cypress-tupelo communities	(Devall 1998)
Xeric pine and pine-oak woodlands	(Murphy and Nowacki 1997)
Dry and dry-mesic oak-pine forests	(White and Thomas 1998)
Upland longleaf and south Florida slash pine forests, woodlands, and savannas	(Landers and Boyer 1999)
Eastern riverfront	(Meadows and Nowacki 1996)
Wet pine forests, woodlands, and savannas	(Harms 1996)
Evergreen bay forests and related seral communities	(McKevlin 1996)
Tropical and subtropical forests in Florida	(Outcalt 1997)
Sand pine	(Outcalt 1997)

## **B. Davis Inventory**

Davis (1993, 1996, 2003) provides the first attempt at a comprehensive inventory of old-growth forests in the eastern United States. This inventory was largely based on responses by government agency personnel, state natural area inventory biologists, and knowledgeable local naturalists to inquiries by Davis. No standard criteria were applied in determining many of the old-growth sites listed in this compendium. Rarely, the USDA-FS Continuous Stand Inventory program was used to locate stands of old timber. Some small sites were briefly listed at the beginning of each state summary then larger sites were given their own headings. The sites listed had data (the vegetation community, dominant species, land ownership, and stand size) to varying degrees. For this reason, summarizing the inventory might be misleading, but, in general, Davis (2003) identifies 34 old-growth sites in Alabama, 29 in Arkansas, 67 in Florida, 48 in Georgia, 50 in Louisiana, 21 in Mississippi, 60 in North Carolina, 40 in South Carolina, 36 in Texas, and 39 in Virginia. Most of the old-growth forest sites in Virginia, North Carolina, South Carolina, and Georgia are in the Appalachian Mountains. Based on an estimate of approximately 274,000 ha, old-growth communities in the southeastern states make up approximately 0.5% of the total forest area in the Southeast (Davis 1996, Gaines et al. 1997).

## **C. Old-growth Longleaf Pine**

The longleaf pine ecosystem dominated the uplands of the southeastern coastal plains from Virginia to central Florida to eastern Texas. Using an estimate of 37.2 million ha as the extent of the Pre-Columbian longleaf and longleaf-oak forests (Frost 1993), the current old-growth longleaf pine forest (approximately 5,000 ha) is likely 0.013% of its original area. Based on a recent review of old-growth longleaf pine sites (Varner and Kush 2004), there are approximately 29 well-known old-growth longleaf pine sites. In this dataset, approximately 74% of the tracts are in public ownership, 87% of the acreage is in public ownership, and only one of the tracts (Eglin Air Force Base) is large (>1,000 ha). Davis (1993, 2003) provided an additional group of 27 sites that have mixed documentation, but deserve further examination. Landers and Boyer (1999) provide a summary of quantitative characteristics of old-growth longleaf pine forests and list several of the well-known tracts.

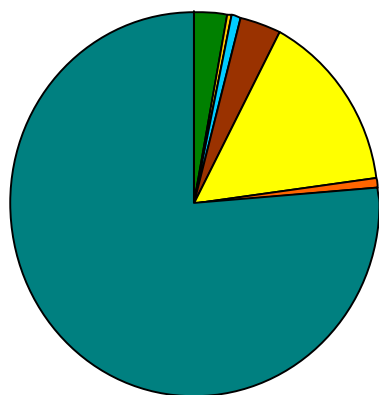
## **D. Old-growth Bottomland Hardwoods and Cypress-Gum Swamp**

Forested wetlands (e.g., cypress-tupelo [*Taxodium* spp.-*Nyssa* spp.]) and bottomland hardwoods along the major rivers of the Southeast were extensively harvested in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. In Louisiana, Turner and Craig (1980) estimated that 51% of the acreage of forested wetlands at the time of European colonization had been eliminated by 1974. Almost all forested wetlands and bottomland hardwoods have been harvested at least once since the 19<sup>th</sup> century. Based on a preliminary review of the sites listed in Davis (2003), the number of old-growth bottomland hardwood or cypress-gum swamps in the southeastern U.S. is: Alabama 3, Arkansas 8, Florida 14, Georgia 5, Louisiana 16, Mississippi 8, North Carolina 4, South Carolina 3, Texas 4, and Virginia 2. The total of 67 sites was mostly in public ownership (61%), 28% in private ownership

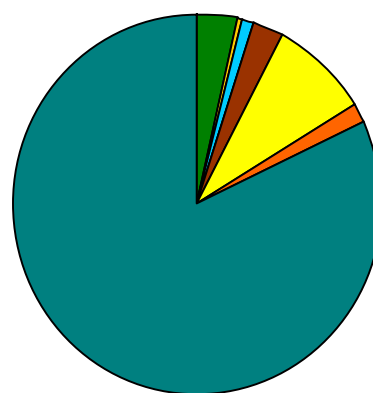
(including non-profits such as The Nature Conservancy), 3% in combined private/public ownership, and 7.5% whose ownership was not determined.

The area of old-growth bottomland hardwoods and cypress-tupelo swamps based on Davis (2003) should be considered first estimates. More than 90% of the old-growth in these forest types was publicly owned. However, when an analysis was conducted on USDA-FS Forest Inventory and Analysis data (Figure 1), a very different picture emerges. In this analysis approximately three-quarters of the land having bottomland hardwood forest types with trees >11" diameter was in private ownership. It must be noted, however, that this FIA category included many stands that have been previously harvested, but, nevertheless, contain trees of relatively large size. Thus, these stands might not be considered to be true old growth. Obviously, some additional analysis needs to be conducted to better understand both the definition of old bottomland hardwood forests in the Southeast and their ownership.

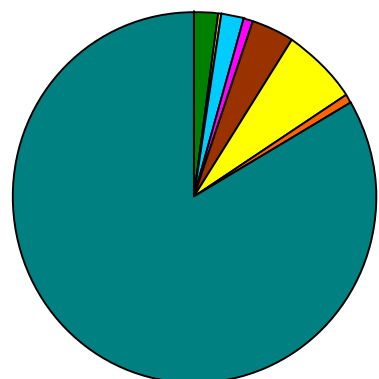
### Baldcypress-Water Tupelo



### Sugarberry-Elm-Ash



### Oak-Sweetgum



**Figure 1.** Ownership of stands cypress-tupelo and bottomland hardwood forests with large diameter trees (11"+) based on USDA-FS Forest Inventory and Analysis data. (Summarized by R. Sharitz.)

#### **IV. BIODIVERSITY OF OLD-GROWTH FORESTS IN THE SOUTHEAST**

The scarcity of extant upland and bottomland old-growth resources across the south represents a challenge for connecting biodiversity and old-growth forests, since the natural range of variation across sites or scales no longer exists and fragmentation long ago drove old-growth obligates to the brink of extinction. Instead of characterizing old-growth biodiversity as a discrete assemblage, we discuss old-growth forest characteristics and their impact on components of biodiversity in upland and bottomland systems.

##### **A. Forest with Old-Growth Characteristics**

Some structural and functional features of southeastern old growth forests uniquely contribute to regional biodiversity because of their rarity in the present landscape. Identification of these attributes is central to developing conservation options that will significantly affect biological diversity by promoting such traits throughout the region, including management or protection of sites that may not harbor old trees. Similar to those provided by Leveritt (1993), characteristics include (1) the presence of large diameter, older legacy trees persisting in the canopy (or the potential to become old through time and management), (2) the persistence of dead and dying large-diameter trees in the canopy, (3) intact ground cover flora, (4) history of appropriate disturbance (fire regime for uplands, flooding in bottomlands), (5) minimal fragmentation within the forested landscape, and (6) stratification of the canopy (structural and size class diversity). In addition, the presence of certain species or landscape configurations, which can predict a diverse and ecologically functional ecosystem, can elucidate the linkages between past land use and biologically rich stands that may be instructive in developing management priorities and operational guidelines for conservation.

##### **B. Groundcover**

In the longleaf pine ecosystem, the presence of undisturbed frequently burned ground cover is a critical feature. Ground cover vegetation that has not been subjected to intense below-ground disturbances (mechanical or chemical), or a history of intense grazing has appreciably higher species occurrences than that of disturbed sites, even after decades of “recovery” (Hedman et al. 2000, Kirkman et al. 2004a). Ground cover flora of the longleaf pine ecosystem is characterized as the most species-rich vegetation in North America (Peet and Allard 1993) and also contains numerous rare, threatened, and endemic species (Hardin and White 1989). Thus, the protection of ground cover from management activities that disrupt the root systems of perennial plant species is critical for the maintenance of the diverse plant community.

Wiregrass-dominated ground cover reflects a history of frequent fire that is needed to maintain the pine grassland structure (e.g., reduce the stature and abundance of hardwoods). In sites with a low abundance of hardwoods, high species densities can occur in small areas (8-15 species per 0.1 m<sup>2</sup>) (Kirkman et al. 2001). Frequent fire encourages high levels of floral diversity due to increased light levels that are transmitted

to the ground cover in well-burned pine savannas (Battaglia et al. 2003). With proliferation of hardwood species following fire exclusion, fire-adapted herbaceous species decline because of shading and litter accumulation (Lemon 1949). Continuous wiregrass-dominated ground cover in old-growth or second-growth stands is a desired conservation attribute that suggests a history lacking root disturbance, such as those associated with agricultural activities. Not only is wiregrass (*Aristida stricta*) vulnerable to root disturbance, it has an extremely slow rate of re-establishment as a dominant into sites following soil perturbation (Clewell 1989, Outcalt 1992). The critical components of managing for plant diversity can be observed in second-growth savannas with undisturbed ground cover, as well as in stands in which the trees are primarily old-growth.

An open canopied pine forest lacking a hardwood mid-story is critical for maintaining Red-cockaded Woodpecker (*Picoides borealis*) habitat, particularly within woodpecker cavity tree clusters (Conner et al. 2001). James et al. (1997) found a positive relationship between ground cover characteristics (abundance of wiregrass and natural longleaf regeneration) and woodpecker productivity within the Apalachicola National Forest (Florida). They hypothesized that fire history strongly influenced the balance between herbaceous and woody vegetation, and that arthropod abundance, particularly ants, was affected by changes in the ground cover composition. Red-cockaded Woodpeckers forage primarily on arthropods on living or dying pine trees (Conner et al. 2001), but the dynamics of ground cover quality and arthropod abundance on pine trees is poorly understood.

In contrast to old-growth longleaf ecosystems, bottomland hardwood forests tend to have sparser herbaceous layers due to regular flooding and scouring, and reduced light penetration (Conner and Sharitz 2005). The diversity of ground cover varies with elevation and hydrologic conditions, consisting predominantly of perennial wetland herbs, grasses and sedges. Lianas (vines) are abundant and can grow into the crowns of canopy trees. The understory in bottomland forests also contains a variety of rare and endemic flora.

### **C. Old Trees**

Advanced tree age engenders traits that are rare or absent in younger trees. Tree size, shape, primary branch size, and proportion of heartwood are several such characteristics.

Old pine trees (>100 years) with substantial heartwood development provide the essential structural component for the endangered Red-cockaded Woodpecker in pine forests. Heartwood, either softened by the red-heart fungus or sound, can be excavated by the woodpeckers for nesting and roosting cavities. The presence of heartwood is critical to minimize the challenge of resin flow that is present in sapwood (Conner et al. 2001)

In all forests, old trees with heartwood and rotten spots allow for development of natural cavities or cavity excavation that is not as specialized as the techniques used by the Red-cockaded Woodpecker. Such natural or excavated cavities in living trees provide

valuable roosting and den sites for many birds, mammals, reptiles, amphibians, and invertebrates.

Old trees in bottomland hardwood forest stands are usually represented by several species. Over 50 different canopy species have been reported in southern bottomland forests (Conner and Sharitz 2005). This diversity of tree species provides for a greater diversity of arthropods (Drumtra and Cooper 2005). Also, as trees age they develop dead large branches and/or tops, which provide additional wildlife habitat.

Retention of old trees throughout the landscape also provides quality foraging habitat and potential cavity trees. In upland pine forests the Red-cockaded Woodpecker prefers to forage on the largest, oldest trees available (Engstrom and Sanders 1997). In bottomland hardwood forests, the Ivory-billed Woodpecker appears to require large old trees for its cavities and recently dead trees and portions of trees for foraging. On the Singer Tract, Tanner (1942) found that Ivory-billed Woodpeckers foraged on a variety of tree species, with some species selected over others, but that larger trees were consistently selected over smaller ones for all species of trees. Moreover, dead portions of large, old trees apparently were important to Ivory-billed Woodpeckers, providing sites for foraging and cavity excavation (Tanner 1942).

#### **D. Coarse Woody Debris**

Old trees make coarse woody debris that is larger and more persistent than young trees (primarily because of heartwood). Standing dead trees (snags) and downed dead woody material (logs, limbs, and stumps) provide cavity and foraging substrate and escape cover for many animals. Lanham and Gynn (1996) list 57 bird species that use woody debris in some form within southern forests. Lohr et al. (2002) found that total breeding bird abundance and abundance of selected bird species were reduced when snags and downed coarse wood debris were removed from pine forests. In bottomland hardwoods, the Ivory-billed Woodpecker apparently needs many recently dead and dying trees to obtain an important food, large beetle larvae (e.g., *Cerambycidae*). Woody structure in flooded bottomlands provides basking habitat for numerous reptiles (Bailey et al. 2006).

Means (2006) suggests that rotting stumps are an important, but overlooked, refuge for many fossorial vertebrates in the longleaf pine ecosystem. He has documented use of stumpholes by many species of amphibians, reptiles, and mammals. Birds also will readily use downed logs and stumpholes for refuge from predators.

#### **E. Forested Area**

The importance of area of old-growth conditions depends on the species under consideration. Depending on habitat quality, a small population of Red-cockaded Woodpeckers (20 clusters) would likely require approximately 800 to 2000 ha of upland pine forest (Engstrom and Sanders 1997). Habitat requirements of numerous other species of conservation concern further reinforce the necessity for significant sizes of fire-maintained forest. For example, Eubanks et al. (2002) found that approximately 40

ha of fire-maintained habitat would be necessary to viably sustain 50 gopher tortoises (minimum viable population size), based on home ranges. Likewise, the home range of a single male Sherman's fox squirrel is approximately 40 ha in mature pines or mixed pine and hardwood stands (Conner 2000).

In bottomland hardwoods, the area necessary to support a viable population of Ivory-billed Woodpecker is still open to question, but Tanner (1942) found 7 woodpecker territories on the 32,375-ha Singer Tract. Individual territories were as large as 17 square miles. The quality and area of habitat necessary to support Ivory-billed Woodpeckers is currently under debate in the Fish and Wildlife Service sponsored Recovery Team. Other target bottomland forest patch sizes in a large-scale bird conservation plan focusing on forest interior species were 4,000, 8,000 and 40,000 ha (Twedt et al. 2006).

## **F. Ecotones**

The condition of an undisturbed and fire-maintained ecotonal area between longleaf pine-wiregrass uplands and depressional wetlands suggests that a high diversity of both plants and amphibians is likely to be present. From a landscape perspective, highest species richness is associated with frequently burned mesic sites (Provencher et al. 2003, Kirkman et al. 2004b). Open, herb-dominated depressional wetlands and associated frequently burned ecotonal zones support especially species rich floras (Sutter and Kral 1994, Kirkman et al. 1998b) and some endangered plant species are found only within the ecotone (Kirkman et al. 1998a, Aleric and Kirkman 2005). In addition, these wetlands are uniquely important habitats for breeding amphibians (Moler and Franz 1987, Semlitsch 1987, LaClaire and Franz 1991, Dodd 1992, Jensen et al. 1995, Semlitsch and Bodie 1998) and invertebrates (Mahoney et al. 1990, Golladay et al. 1997) because they typically lack large fish. Thus, contiguity of longleaf pine uplands to wetlands through a fire corridor that maintains open wetlands and between-habitat diversity is an essential management component where conservation of regional biodiversity is a goal (Means 1996).

At a larger scale, juxtaposition of old-growth bottomland hardwoods and longleaf pine forest may have been important for the Ivory-billed Woodpecker. Apparently the woodpecker will forage on recently dead trees in both habitats where they are in close proximity. The Apalachicola River area (Florida) and the Altamaha River and Ochlockonee River areas (Georgia) are notable sites where upland and riparian old-growth forests occur together or where conservation of large scale ecotones could be developed.

## **G. Disturbance**

A characteristic of southeastern forests that particularly augments opportunities for conservation is that they can be perpetually maintained through frequent disturbance in contrast to forests in which stands are completely replaced following intensive disturbance, such as those forests of the Pacific Northwest. Retention of forest structure through time permits a greater range of options for incorporating the critical features of

old growth forests into management operations. The exceptionally high regional biodiversity of the Southeast that is dependent on features of old growth indicates that significant impacts in sustaining diversity may be gained from the promotion of these structural and functional traits in existing forests across the landscape.

## V. VALUES OF OLD-GROWTH FORESTS IN THE SOUTHEAST

How one defines old-growth and how old-growth is valued will dictate the approach and effectiveness of conservation efforts. It was through this recognition that the workshop sought to explore how society values old-growth, and given the diversity of those values, we sought to develop a practical framework for guiding old-growth conservation in the human context. To help us connect the biological and social sciences, we hosted an old-growth art exhibit of regional photographers at the galleries in the Thomasville Cultural Center. More than 200 members of the local public visited the artwork over a two week period culminating in a reception the night of John Fitzpatrick's keynote address on the Ivory-billed Woodpecker.

### A. Values

The preservationist ethic is the dominant voice in the conservation of old-growth resources. Nearly all preservationists will rely on some environmental theory that advocates nature having intrinsic value.<sup>1</sup> This ethic relies on the intangible values of ancient forests to justify their protection and non-consumptive human use. The southeastern landscape has few extant examples of undisturbed forests such as those found in the Pacific Northwest or elsewhere. The long history of human use and disturbance in the Southeast challenges the efficacy of a narrow definition of old-growth forests, and, as such, challenges us to think more critically about what values southeastern old-growth forests provide to conservation efforts and society at large.

Since many of the remaining old growth forests occur on public lands with a multiple-use mandate (e.g., military reservations), effective conservation strategies and values must go beyond the traditional preservationist model of valuation. As the previous section demonstrated, the conservation values of old-growth resources in the Southeast are best thought of as a set of attributes that occur along a continuum of forest conditions. We outline a continuum of values related to southern old-growth forests provided by workshop participants, and explore a new ethical framework for bringing these values together into one decision-making model, continuing to challenge the "preservation only" model as a means of conserving values in southern old-growth forests.

The tangible and intangible values of old-growth forests presented by workshop participants were widely varied, ranging from scientific benchmarks and safe harbors for biodiversity to emotional and spiritual places for personal growth and renewal. Through a panel discussion, the workshop participants enumerated the values of old-growth forests from several perspectives.

Some participants presented arguments for the intrinsic value of old-growth forests. Simply knowing that there exists old-growth forests in the Southeast, regardless of whether or not they ever get to experience more of such areas, is reason enough for their preservation. This approach rejects the quantification of tangible and intangible benefits as old-growth forests have intrinsic value and need no external justification.

For economist Robin Gottfried, who has written on the intersection of religion, conservation and economics (Gottfried 1995), the intrinsic value of old-growth forests lies in their potential for spiritual, mystical, and religious encounters: old-growth forests carry beauty, mystery, moral regeneration, spiritual revival, meaning, oneness, unity, wonder, awe, inspiration and a sense of harmony with nature. Old-growth forests are like an icon in which we see value clearly; people with religious sensibility hear and see God in the act of creation. The basic thrust of his message is that those who would destroy old-growth forests in the act of dominating nature are not free to appreciate nature and are leading inferior lives.

In our break-out session on values, attendees further described symbolic and aesthetic value of old-growth forests as connections between people and their past, examples of the beauty of nature for literary inspiration. They inspire awe in people and people will respond to examples in specific areas with regional pride; all are arguments for the intrinsic value of old-growth forests.

It was also brought out in this discussion that if we destroy old-growth forests, we deny future generations of valuable resources and services: we are taking away their heritage and identity; we are subjecting them to the consequences of our irreversible land-use decisions. If we do not take into account the value of old-growth forests, we are acting unjustly toward future generations.

Scientifically, old-growth forests in their rarity provide important 'baselines' against which ecological processes can be measured, our only benchmarks for forests not disturbed by contemporary society. Contrary to this notion was the fact that all forests in the SE have been impacted by human management of fire and hydrology—the two critical processes that drive the function of upland and bottomland forest ecosystems. Nonetheless, ecological processes and biodiversity associated with old-growth characteristics provide a fecund area for scientific research and investigation.

Finally, the economic value of old-growth resources was briefly discussed. The rarity of these resources has limited the reliance of forest industry on their forest products in the South, with some notable exceptions. Old-growth heart pine continues to be a highly valued product for wealthy homeowners, placing continuous demands and pressure on private landowners with old-growth resources. Bottomland forests and old-growth cypress are subject to large clear cuts for specialty lumber and chipping for landscaping. The sustainable harvest of salvaged heart pine from old-growth forests in and around the Thomasville area has in previous decades been one of a few models of sustainable forestry in the Southeast. The game plantation culture which valued aesthetics for hunting gave rise to the Stoddard-Neel method of individual tree selection which has retained some of the finest examples of old growth in the Southeast. Unlike that model, clearcuts of bottomland forests in floodplain forests and chipping of coastal plain cypress for mulch have no sustainable silvicultural model.

## B. Environmental Pragmatism: an Ethical Framework

Our keynote speaker in our section on environmental ethics, Bryan Norton<sup>2</sup>, presented a practical framework that provides an alternative to the standard separation of old-growth values into tangible and intangible benefits to society. Distinctions between tangible and intangible values and use and non-use suffer from lack of clarity, he argued. He proposed an approach to conserving old-growth forests that he called “adaptive management.” Adaptive Management--in the social science sense of the term--encourages communication and cooperation as opposed to “ideological environmentalism,” a position that is primarily adversarial. He rejected any purely economic approach, which holds that only human preferences determine value, as well as the environmental ethical non-anthropocentric approach, which holds that natural objects, like old-growth forests, deserve moral consideration because they have intrinsic value. Adaptive management means three things:

- ❖ Using experimental methods to respond to uncertainty by undertaking reversible actions;
- ❖ Using multi-scaled space-time systems;
- ❖ Addressing the problem of conserving old-growth forests from a “place”: that is, addressing problems of conservation from within local, natural, and political contexts. Norton calls for “environmental pragmatism.”<sup>3</sup>

Environmental pragmatism recognizes that the methods or tools that will be appropriate in solving conservation problems will depend on the specifics of each situation. No single approach can be known to be correct *a priori* or in the abstract, apart from the particular context. Environmental pragmatism shifts attention from what is true to what is practical; it is process-oriented. It is understood that practical reasoning and commitment to the democratic process may not always offer unambiguous advice or support favored positions. Environmental pragmatism supports democratic process because it tolerates and respects diverse and plural opinions and is committed to engaging in free and open procedures for deciding, rather than seeking the single one or true decision. Norton noted that the movement to conserve old-growth forests stands a much better chance of succeeding where environmental pragmatism is practiced than where the alternatives are practiced, namely: assigning an economic, quantitatively determined “existence value” to old-growth forests, or, holding a murky theory of the intrinsic value of old-growth forests.

Norton’s process of adaptive management emphasizes the need to make a list of all values along a continuum without distinction to properly value environmental resources and to make decisions about their use, protection, and conservation. This dialog begins with activities such as this series of workshops, and continues within the political process. Clear expression of those values is a fundamental step to influence society to consider old-growth conservation on a broader scale.

The Adaptive Management-Environmental Pragmatism approach proves its value in its promise of reaching a consensus and solution on hotly debated issues surrounding old-growth forest debates. People of diverse backgrounds, holding diverse environmental values are brought together to discuss specific and concrete issues that divide the community. Progress in discussion begins when participants start to realize that things need to get done and that a starting point is needed on specific issues on which people agree. Groups tend to become energized when a group leader lists issues on which there is general agreement. Participants are usually surprised by the results. The point here is that, as the Adaptive Management- Environmental Pragmatism approach predicts, theory follows practice, in the sense that a final, mutually agreed upon governing principle emerges out of the agreed upon starting points. Participants begin to agree on what should be done but disagree on why. The solution represents a practical compromise.

It should be acknowledged, however, that Norton's Adaptive Management-Environmental Pragmatism approach has its critics. One criticism is that sustainable practices such as community-based conservation processes offer no guarantees to those committed to the intrinsic value of old-growth forests. Norton answers that this is true, that there are no guarantees, only likelihoods of success. Trade-offs are inevitable, which means that the democratic process, which is fundamentally driven by those who hold wealth and power and who treat old-growth forests as an economic resource only, will value compromise only because they know they will win. But this criticism assumes that people are *only* self-seeking power-maximizers, or that they are *absolutely* bound by custom and tradition, that they do not seek ways of living together that are mutually beneficial. For Norton, this characterization of human nature and human society is a distortion of how people really act when they come together to solve problems. Much discussion at the social following the second day of the workshop focused on these opposing views of human nature.

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1. The classic statement and defense of the preservationist ethic—also known as “the land ethic” and “ecocentrism”—is that of Aldo Leopold, *A Sand County Almanac with Essays on Conservation from Round River*. New York: Ballantine, 1966. Defenders of the land ethic and of nature having intrinsic value, in addition its instrumental value, are the following major environmental ethicists: Paul W. Taylor, *Respect for Nature: A Theory of Environmental Ethics*. Princeton, N. J.: Princeton University Press, 1986. Holmes Rolston III, *Environmental Ethics: Duties to and Values in the Natural World*, Philadelphia: Temple University Press, 1988. J. B. Callicott, “The Search for An Environmental Ethic,” *Matters of Life and Death* by Tom Regan (3<sup>rd</sup> Ed.) McGraw-Hill, 1993. *In Defense of the Land Ethic: Essays in Environmental Philosophy*. Albany: State University of New York Press, 1989.
  2. Bryan G. Norton is Professor of Philosophy at the Georgia Institute of Technology in Atlanta, GA. He has authored *Ecosystem Health: new goals for Environmental Management*, *Searching for Sustainability: Interdisciplinary Essays in the Philosophy of Conservation Biology*, and *Why Preserve Natural Variety* among others.
  3. The best work on environmental pragmatism is undoubtedly Bryan G. Norton's *Sustainability: A Philosophy of Adaptive Ecosystem Management*. Chicago: The University of Chicago Press, 2005. His presentation at this conference and the summary given here is based on this work. For a good treatment of how environmental pragmatism works out in practice we would recommend Joseph R. DesJardins's *Environmental Ethics* (4<sup>th</sup> ed). United States: Wadsworth, 265-269.

## VI. STRATEGIES FOR OLD-GROWTH CONSERVATION ON PUBLIC LANDS: ENHANCING ECOSYSTEM PROCESSES.

One of the most striking characteristics of southern old-growth forests is their rarity and the small, fragmented nature of these remnants found on the landscape. Any conservation strategy must focus on preserving and managing those stands that remain. Although this focus is necessary, it is insufficient. Stands possessing old growth characteristics but that would not be classified as old-growth forest *per se* also provide rare and important habitat.

Old growth characteristics that should be considered include intact understory plant communities (some understory species may be among the oldest biological entities in the forest), stands with long history of frequent burning (in pine uplands) providing variable open canopy structure with grass dominated herbaceous ground story community, scattered old individuals that are live providing variation in ages and size structure, or dead (providing persistent coarse woody debris standing or down on the soil surface) providing variation in vigor. Old growth characteristics that play a more critical role when considering strategies in bottomland forests include variable open canopy structure and a few scattered old, large, super-emergent trees. Also, there should be variation in tree vigor in the stand, including standing dead trees and tree branches that provide a steady supply of coarse woody debris. In addition to strategies that focus on stands that contain old growth characteristics, management that encourages retention and development of those characteristics in stands also needs to be a part of any strategy. Time should be an ecological factor that is considered in management.

The challenges of managing for old growth forests in the southeast are daunting, particularly in the light of how little public land is found in most states in the southeast. Even on large public ownerships, examples of old-growth are small, isolated and often embedded in a landscape context of short-rotation timber management, incompatible recreation, or military testing and training. Often, small remnants border private lands in a fragmented landscape of agriculture, suburban development, and short-rotation fiber production. Threats and strategies vary considerably from upland to wetland old-growth forest types (e.g., head cutting in major river drainages dredged for navigation vs. altered fire regime in upland pine habitats) and the diversity of ecosystems represents a challenge for old-growth management region-wide. However, strategies that are grounded in realities of the regional threats, but creative in their solutions can contribute to regional conservation of the biodiversity of the Southeast. In this section we approach strategies by listing threats and suggesting innovative approaches to mitigate threats and improve regional conservation efforts.

### A. Threats

- ❖ Improper fire regime represents the greatest management challenge for the protection of existing upland old-growth upland pine forests on public lands. Longleaf pine forests require frequent fire (Wahlenberg 1946, Lemon 1949,

- Robbins and Myers 1992). Inadequate fire regimes over the last 50 years have lead to dangerous accumulations of fuels and the formation of duff, an O-horizon of humus not normally found in longleaf pine ecosystems (Varner and Kush 2004, Varner et al 2005). These novel fuel beds lead to catastrophic mortality of large trees from smoldering fires when prescribed burns are reintroduced to old-growth stands (Varner et al 2005).
- ❖ Similarly, old growth bottomland forests are threatened by altered hydrology resulting from levees, channelization, dams and other alterations (Frederickson et al. 2005 and references therein). Like fire in longleaf pine forests, flooding patterns largely determine the species that occupy or will occupy the site. In some cases, sites formerly occupied by bottomland forest do not flood as often or as long as they historically did, altering community composition in favor of more upland species. In other cases, the opposite is true, with sites flooding more frequently and for prolonged periods compared with historical patterns.
  - ❖ Natural disturbance scale is altered in time and space. Because of the small size of most remnant old growth patches, natural disturbances such as wind storms, tornadoes, and hurricanes have the potential to affect those patches either not at all (by missing them) or entirely. In some bottomland forests, beavers can have a similar effect. Although they are a historical component of many southern bottomland systems, their effect in small remnants can be devastating.
  - ❖ Incompatible forestry. This threat is particularly acute on state and national forest lands that are not allowing for the development of long-rotation forest stands to grow into old-growth. Although high-grading practices are largely a thing of the past, stands with old-growth characteristics (individual old-trees with multi-aged structure) are not prioritized for managing towards future old-growth in terms of the time needed to attain true old growth status.
  - ❖ Invasive species. In bottomland systems, a number of exotic and invasive plant species have caused problems, especially in understories. These include Chinese privet (*Ligustrum sinense*), Chinese tallow (*Sapium sebiferum*) and china berry (*Melia azedarach*). Animal species include zebra mussels (*Dreissena polymorpha*), nutria (*Myocastor coypus*), and wild hogs (*Sus scrofa*).
  - ❖ With increased development across the Southeast, the wildland-urban interface represents a fundamental threat to the ability of land managers to apply frequent fire, and an increased pressure to alter hydrology for flood control. Increasing development pressures have caused changes in land use on private lands buffering the old-growth on public lands increasing fragmentation, contributing to invasive exotic infestations, and decreasing fire frequency.

## **B. Shortcomings in Management and Policy**

- ❖ There is no comprehensive inventory of old-growth forests based on quantitative measures of their condition that would help managers set priorities for conservation of old-growth resources that they have. Without a detailed old-growth inventory that includes smaller degraded remnants, many managers of public parks, forests, and preserves simply are unaware of the presence of old-growth resources.
- ❖ A lack of knowledge about old-growth has led to a failure to appreciate forests that contain some, but perhaps not all, old-growth characteristics or forests that have small scattered patches of old-growth. The recognition of old-growth features in second-growth forests should be considered in any effort to set priorities for the restoration of future old-growth on public lands.
- ❖ A significant amount of the upland old-growth longleaf pine forest and forest with old-growth characteristics are found on military and Forest Service lands, yet there is no mandate for their continued protection unless endangered species are present. Forestry programs in the military are typically self-sustaining, creating the potential pressure to cut longleaf to fund natural resource programs. The USFS's restrictive old-growth definition counters the old-growth continuum approach that recognizes forests with old-growth characteristics.

## **C. Proposals from workshop participants**

- ❖ Complete inventory of old-growth forest remnants and forest with old-growth characteristics on public and conservation lands.
- ❖ New inventories of large patches of mature bottomland forest, some of which are likely to contain actual old growth, are possible in conjunction with field efforts to search for the Ivory-billed Woodpecker in many locations in the southeast. Habitat inventories must be included in these search efforts.
- ❖ Buffer old-growth remnants through long-rotation forestry on public lands.
- ❖ A broader recognition of old-growth characteristics and components of old-growth forests is needed given the long-term disturbance of forested habitats across the SE. Recognizing gradations of old-growth will allow managers to prioritize restoration efforts and ensure their proper restoration management. Part of this effort would be to recognize the value of old-growth understory, which may represent some of the oldest components of these forests that are the most difficult to restore after soil disturbance.
- ❖ Using this concept of old-growth characteristics, the USFS Region 8 should review and expand old growth policy (current concept is too narrow) on USFS lands.

- ❖ Proper fire management of old-growth upland forests is essential. Nearly all of the large remnant stands of longleaf pine old-growth on public lands have experienced excessive mortality from inappropriate prescribed fire. Burning prescriptions for long-unburned old-growth stands should be established and promulgated to fire managers. Experimental research to refine management techniques is needed.
- ❖ Encourage alteration of hydrologic patterns, where possible, to mimic historic patterns. This can be done, to some extent, by restoring channelized water courses to their original meanders, and by timing dam releases to mimic historical patterns. True restoration of hydrologic patterns to historic conditions, however, is seldom possible.
- ❖ Increase education and training of public resource managers. Enhance the training of foresters who are responsible for the management of these old-growth stands and their buffers.
  - In long-unburned old-growth longleaf pine stands, fire managers should receive education on the dangers of smoldering fire and prescriptions for avoiding it. The community should generate an expectation for managers to apply proper fire regime to remnants that are long-unburned, since there may be as much as a third of the remnant stands in this fire-excluded condition (Varner and Kush 2004).
  - Work with land grant universities and federal agencies to develop continuing education opportunities for foresters, particularly in ecological forestry and long-rotation timber management—current continuing education programs concentrate on commercial, short-rotation fiber production. Promote ecosystem approaches to management and management for biodiversity, which is an increasingly common objective for private non-industrial landowners as well. Develop guidelines for forest managers to promote old growth conditions on their lands, such as those developed by the Forest Resources Working Group of the Lower Mississippi Valley Joint Venture (LMVJV).
  - Increase recognition of old-growth and its management needs by state agencies who manage remnants, including, but not limited to, Georgia Department of Natural Resources, Florida Park Service, and state heritage programs. Specifically, state agencies should be engaged to participate in the inventory, identify forests with old-growth characteristics, and assess conditions of stands relative to their potential for old growth.
- ❖ Develop partnerships among land management agencies with old-growth. These partnerships should share information about old-growth restoration and management. They could be geographic in nature such as the Gulf Coastal Plain Ecosystem Partnership in the Florida Panhandle and the LMVJV, or they may be formed around similar habitat types, like the Department of Defense-sponsored Fall Line Sandhills Partnership.

- ❖ Military lands contain a disproportionate amount of old-growth upland habitat, primarily due to Eglin Air Force Base in the Florida Panhandle which may contain more than half of all remnant old-growth longleaf pine stands. The public and conservation community should continue to be informed of decisions made by the natural resource leadership on military lands, including a schedule of proposed activities that may impact old-growth resources on military lands.
  
- ❖ A critical component of some of these strategies for old-growth conservation on public lands is the concept of growing old-growth forest from forests that possess old-growth characteristics. In forests with multiple use mandates, this may be accomplished through long rotation timber management or set asides of forest stands. Across much of the range of sites in the region, this “growing old-growth forests concept” may require acquisition of public lands across the region, especially in light of recent divestitures of land holdings by large timber companies throughout the Southeast. Unfortunately, most states (except Florida) do not have resources to pursue acquisition of stands with old-growth characteristics. Coordination of state, federal, and private acquisition programs will be essential for rapid response to buy forests with the potential to become old-growth as they become available.

## VII. STRATEGIES FOR OLD-GROWTH CONSERVATION ON PRIVATE LANDS: MODEST REVISIONS TO FARM BILL INCENTIVE PROGRAMS

### A. Threats to Farmers, Forest Landowners, and Conservation

Most remaining old-growth longleaf pine forests in the Southeast are on public land according to the only published inventory (Davis 1996; Table 2), yet some high quality old-growth tracts remain on private lands. Some high quality old growth bottomland and cypress-tupelo stands also remain in private ownership, although such stands have been poorly inventoried (Davis 2003). Based on data from the Forest Inventory and Analysis, many remaining stands of large trees of bottomland hardwoods and cypress-gum occur in private ownership..

**Table 2.** Ownership patterns of old-growth longleaf pine forests in the Southeast.

- 39% small (1-99 ac.; n=9)
- 57% medium (100-2,299 ac.; n=13)
- 4% large-sized tracts (>2,500 ac.; n=1)
- 74% of tracts in public ownership
- 87% acreage in public ownership

In many bottomland or wetland old-growth forest types, incompatible logging has continued to reduce old-growth remnants and forests that have old-growth characteristics. Chipping of cypress for mulch continues to be a major problem in parts of the South, while clearcutting of bottomland hardwood forests in major river basins such as Georgia's Altamaha River exceed 10 square miles.

Moreover, changes in the forest products industry and increasing development pressure throughout the South are driving dramatic changes in land use and ownership patterns. In areas of the South dominated by private landowners, the conservation impacts of this trend are potentially severe without thoughtful changes to existing conservation efforts on private lands.

While a variety of conservation approaches are needed to protect remnant tracts on private lands, the primary focus for old-growth conservation on primary lands is the

promotion of long-rotation timber management (growing and restoring old-growth stands) and promoting ecological forestry in a conservation context.

Participant discussion targeted government incentives as the primary vehicle for conservation of these tracts. The Farm Bill is the only comprehensive legislative framework designed to work towards conservation strategies through voluntary participation in incentive programs. The results of the regional workshop on Old-Growth Conservation held in Thomasville, Georgia, identified several changes to the Farm Bill Incentive Programs that would greatly enhance the conservation impact of existing programs at little to no additional cost. It was proposed that these recommendations be implemented in a pilot study in the South Georgia region.

## **B. Shortcomings of Existing Programs**

- ❖ Currently there are *no programs that help landowners to retain older forests* under longer timber rotations in critical conservation areas. CRP and other forest incentives only give incentives to reforest agricultural fields. Since the intent of that program is to improve water and soil quality, including and prioritizing areas of longer rotation forestry would potentially have a much greater conservation impact than only taking land out of cultivation. With the ever increasing value of old-growth timber, there is great incentive to remove old-growth resources still remaining on private lands, despite the desire of many landowners to retain that rare forest condition.
- ❖ There is currently *no broad focus on all the elements of healthy southern forests*, including the use of prescribed fire and native groundcover. A looming question for conservation in the south is, “what will happen to the thousands of acres of trees across the South that were planted under Farm Bill Programs?” Certainly a significant percentage of the participants enrolled solely for the incentive payments will probably liquidate their trees as soon as financially feasible. There are, however, a significant number of landowners who may see this as a longer-term prospect and would take a long-term view on managing a forest. One progressive effort under the Safe Harbor agreement for the endangered Red-cockaded Woodpecker pays landowners for burning habitat enrolled in the program. Other programs that could be developed to support retention of old-growth forest features include: The Natural Resources Conservation Service (NRCS) Healthy Forests Reserve Program and the Florida Forest Stewardship Programs (<http://www.nrcs.usda.gov/Programs/HFRP/ProgInfo/HFRPProgramInfo.html>; [http://www.fl-dof.com/forest\\_management/cfa\\_steward\\_index.html](http://www.fl-dof.com/forest_management/cfa_steward_index.html)).
- ❖ There is *no transparent, consistent set of criteria that prioritize* who will receive farm bill incentive programs. A shotgun approach for reforestation or watershed protection will have much less impact than a targeted approach based on the landscape being conserved. If farm bill programs were targeted to land adjacent to conservation priorities, such as rivers, wetlands, state or federal properties, or

- conservation easements, then conservation objectives would be achieved across the landscape more efficiently.
- ❖ *There are no priorities given for the protection of bottomland old-growth forests or cypress domes through the WRP or mitigation banks.*
  - ❖ *Farm bill programs are very cumbersome and difficult to work through, but represent the only consistent funding for private lands. Coordinated landowner education and outreach is a necessary component of success for any program under the farm bill.*

### **C. Modifications Needed**

We propose that a modest set of changes to existing Farm Bill programs for private landowners would have a significant impact on conservation objectives at minimal cost. This set of recommendations could be phased into existence after a trial period as a pilot project in a region such as Southwest Georgia that has a mosaic of farming, forestry, and conservation interests.

- 1) *Long-rotation forest restoration:* Working within existing programs, we can encourage long-rotation management of longleaf pine acreage in CRP plantings, by creating a modular program of incentives to take land towards an ecological restoration path. Beginning with longleaf CRP planting (1-30 y), we propose adding groundcover restoration (when stands reach 15-40 years), and a long-rotation incentive payment for stands maintained at a basal area of >40 BA (when they reach 40-100 y). Adding these incentives for restoration of native groundcover could be treated as an addendum to existing CRP contracts and be an enticement to continue to manage and restore the longleaf system beyond the life of the current contract. There is growing interest in native plant material and commercial efforts to supply this material here in the southeast at present. Longer rotation forests would provide substantial benefits to regional game and non-game species alike, and it would ease the transition from the pulp economy to the sawtimber economy for lands in the Southeast.
- 2) *Prioritization of Programs:* Working with Partners (USFWS, USDA, Departments of Natural Resources, Heritage Programs, The Nature Conservancy), we propose to create a meaningful prioritization process that will target farm bill dollars to the portion of the landscape that will have the greatest benefit. By buffering conservation lands and taking watershed protection into account when applying funds to private lands, we can more efficiently achieve the program goals through voluntary participation.
- 3) *Education and Outreach:* In the Farm Bill revisions, an education component including state and private conservation organizations should be funded within the pilot project areas to ensure access to program funds to improve regional conservation goals. Such a program would help to identify and educate private

landowners who fall within priority conservation areas, as well as help them to navigate the process of application for property enrollment. In a Southwest Georgia pilot project, The Jones Ecological Research Center, The Longleaf Alliance, and The Nature Conservancy have infrastructure and contacts to develop a successful outreach project.

- 4) *Upland Reserve Program*: For the most significant tracts of forested habitat, streamside buffers, and high-quality native ecosystems, there should be a small and very targeted incentive program for private landowners to set aside significant conservation areas. Similar in principle to the Wetland Reserve Program (WRP), this Upland Reserve Program would provide payments to private individuals to enroll their forests into a program for a specified length of time. In many instances, these remnant forests belong to families who want to conserve their forests, but have to face the difficult economic realities competing against conservation.

#### **D. Additional Private Land Proposals**

An additional impediment to conservation of old-growth forests on private lands identified by workshop participants included the lack of access to ecological forestry crews, equipment, and expertise.

##### *Explore the Concept of Forest Bank:*

A forest bank is an evolving program developed by The Nature Conservancy whereby a landowner cedes forest management responsibility to the Conservancy in return for an annualized monetary return in lieu of harvest. The Conservancy would then conduct harvests at their discretion and according to their standards. This program is active in southwestern Virginia where the Conservancy is mainly concerned about siltation and erosion following timber harvest affecting rare mussels in the mountain river systems.

*Promotion of Sustainable Forestry Network*: For landowners already interested in practicing sustainable timber management, access to logging crews or equipment that minimizes disturbance to native groundcover and the residual stand is an issue. There is interest among participants to form a consortium of landowners who represent sufficient timber product to provide incentive to logging crews to invest in equipment and sustainable practices to gain access to consortium property. This idea would seek to improve operational sustainability through the network of large landowners.

## VIII. RESTORING OLD-GROWTH LANDSCAPES

There are few landscapes in the Southeast that are extensively composed of old-growth vegetation. Building landscapes to buffer current tracts of old-growth forest on public land could be achieved by developing a vision, soliciting partnerships, and using incentives to encourage different land owners to participate in long-rotation forestry is one strategy that would increase the size and utility of existing old-growth forests.

One example of such large-scale thinking is currently underway in the Florida Panhandle. Originally called the Greenways Project, this landscape effort is anchored by Eglin AFB and seeks to connect properties all the way to the Apalachicola National Forest. The linchpin in the proposal is the large private landowner, M.C. Davis, whose roughly 50,000 acre Nokuse Plantation represents a large piece of the puzzle.

Another example is the large-scale bird conservation plan developed by the LMVJV (Twedt et al. 2006). The plan is to develop large patches of bottomland forest from small ones by connecting, buffering and enhancing them, primarily through an enormous reforestation effort. In excess of one million acres are targeted for reforestation under this plan, largely through the Wetland Reserve Program. Within patches, old growth characteristics are to be encouraged based a set of management guidelines currently under development by the LMVJV Forest Resources Working Group.

Through the incentive programs described above, large and small private landowners can be brought voluntarily into the development of these large landscapes through incentives that promote the protection and restoration of old-growth characteristics. Fragmentation will always remain a part of the SE conservation landscape, but large coordinated efforts that address public forestry practices and private land use as the primary means of buffering the core of old-growth remnants will be the only means of long-term old-growth protection. As Hurricanes Ivan and Katrina reminded us of the role of large stochastic disturbances, we also saw first hand that the current configuration of small remnant stands of old-growth like the Flomaton Tract in Brewton, AL, disappear quickly forever.

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## XI. APPENDICES, PARTICIPANTS AND MEETING AGENDA

### APPENDIX A – Participants List

<b>Old-Growth Workshop Steering Committee</b>		<b>Affiliation</b>
Bob Mitchell		JJERC
Todd Engstrom		FSU
Kevin Hiers		TNC-GA
Kay Kirkman		JJERC
<b>List of Participants</b>		<b>Affiliation</b>
Matt	Aresco	Florida State University
Jimmy	Atkinson	Jones Ecological Research Center
Wilson	Baker	Naturalist
Joe	Beverly	Private Landowner
Mary Jo	Beverly	Private Landowner
Lindsay	Boring	Jones Ecological Research Center
Don C.	Bragg	USDA Forest Service
Susan	Cerulean	Writer
Andy	Colonino	USDA Forest Service
Bob	Cooper	University of Georgia
M. C.	Davis	Private Landowner
Todd	Engstrom	Florida State University
Jack	Ewel	University of Florida
Kathy	Ewel	University of Florida
John	Fitzpatrick	Cornell Laboratory of Ornithology
Jerry	Franklin	University of Washington
Doria	Gordon	The Nature Conservancy--FL
Robin	Gottfried	University of the South
Dennis	Hardin	Florida Division of Forestry
Mike	Harris	GA Dept. of Natural Resources
Larry	Hedrick	USDA Forest Service
Kevin	Hiers	The Nature Conservancy--GA
Jim	Hill	Valdosta State University
Fran	James	Florida State University
Kay	Kirkman	Jones Ecological Research Center
Gary	Knight	Florida Natural Areas Inventory
Cody	Laird	Private Landowner
Cliff	Lipscomb	Valdosta State University
Alison	McGee	The Nature Conservancy
Bruce	Means	Coastal Plains Institute
Bob	Mitchell	Jones Ecological Research Center
Leon	Neel	Private Consultant
Bryan	Norton	Georgia Institute of Technology

Janisse	Ray	Author/Activist
Skippy	Reeves	US Fish & Wildlife Service (Ret.)
Rebecca	Sharitz	Savannah River Ecology Lab
Jonathan	Stober	Jones Ecological Research Center
Loyce	Turner	GA Dept. of Natural Resources— Board Chairman
Doug	Zollner	The Nature Conservancy--AR

## **APPENDIX B –Workshop Agenda**

**SOUTHEAST OLD-GROWTH FOREST WORKSHOP**  
**Sponsored with support from the NCSSE, Williams Family Foundation, and**  
**Greentree Foundation to the J. W. Jones Ecological Research Center and The**  
**Nature Conservancy**  
**Thomasville, Georgia**  
**March 30-31, 2006**

**All workshop activities take place at the Cultural Center in Thomasville except for the field trips.**

### **Thursday, 30-Mar-06**

- 11:00 AM            Depart from Cultural Center for field trip
- 11:30 AM -3:30 PM   Lunch (in the Big Woods) and field trip - Greenwood  
Introduction – George Patterson  
Management of Old-Growth – Leon Neel
- Wade Tract, Beech-Magnolia at Pebble Hill  
Old-Growth Variation – Todd Engstrom
- 5:00-6:45 PM        Cultural Center Reception: Reading by Janisse Ray and  
photographs by Kathryn Kolb (wine and heavy hors d'oeuvres in  
place of sit down dinner)
- 6:45 PM             Welcome and Introduction – Bob Mitchell
- 7:00 PM             What Specific Conservation Values do Old-Growth Forests  
Provide to Regional Conservation: Lessons from the Ivory-billed  
Woodpecker - John Fitzpatrick
- 8:00 PM             Panel Discussion  
                            Jerry Franklin  
                            Bryan Norton  
                            Doug Zollner

**Friday, 31-Mar-06**

- 8:00 AM Introduction – Kevin Hiers
- 8:30 AM Old-growth Longleaf - Todd Engstrom
- 9:00 AM Old-growth Bottomland Hardwood Forests - Rebecca Sharitz
- 9:30 AM Discussion
- 9:45 AM Break
- 10:00 AM The Tangible and Intangible Benefits to Society of Old-Growth Forests - Bryan Norton
- 11:00 AM Panel Discussion  
Robin Gottfried  
Cliff Lipscomb  
Jim Hill  
Susan Cerulean
- 12:00 PM Lunch
- 1:30 PM What Strategies would Increase the Conservation Potential of Old-Growth Forests in the Southeast - Jerry Franklin
- 2:30 PM Panel Discussion  
Bruce Means  
Todd Engstrom  
M. C. Davis  
Rob Sutter
- 3:30 PM Break Out Sessions
- 4:45 PM Wrap-up - Fran James
- 5:00 PM Final Comments - Bob Mitchell
- 6:00 PM Steering Committee Dinner and Meeting on implementing strategies –Greenwood Plantation