

Range-Wide Conservation Plan for Longleaf Pine



Prepared by the
Regional Working Group
for *America's Longleaf*



03.19.2009

Preface

This Range-wide Conservation Plan for Longleaf Pine was developed under the leadership of the Steering Committee of the Regional Working Group for *America's Longleaf*.

The Conservation Plan represents a first-ever effort to frame conservation activities across the entire range of longleaf pine forests in a way that supports, improves and accelerates the cumulative success and effectiveness of longleaf conservation. It is written for resource professionals representing organizations whose active participation is essential for further refining and ultimately delivering the recommendations of the Conservation Plan. The Conservation Plan and *America's Longleaf* are founded on the premise that effective conservation of longleaf forests will require a multitude of partners working collaboratively in a strategic, coordinated, and sustained fashion.

The Conservation Plan was developed with review and input of more than 120 resource professionals and is intended to guide efforts by participating agencies, organizations and individuals in the near future.

We appreciate the contributions of all involved to date and are eager to have your input, advice, and help to achieve the vision of *America's Longleaf—A Restoration Initiative for the Southern Longleaf Pine Forest*.

This Plan will continue to evolve as we gain knowledge and experience. Please go to www.americaslongleaf.org to get the latest version of the Conservation Plan, additional information and new developments on *America's Longleaf*.

Steering Committee

Regional Working Group for *America's Longleaf*

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Executive Summary

Longleaf pine forests once covered an incredibly vast range. From the Atlantic Coastal Plain of southeastern Virginia to the West Gulf Coastal Plain of Texas, these systems encompassed more than 90 million acres of the North American landscape. These forests represented an extraordinary diversity of cultural, ecological and socio-economic values, making them some one of the great coniferous forests of the world.

Today, longleaf pine forests are a mere remnant of their former majesty—less than three percent of the original acreage remains. A number of threatened or endangered species depend on these remnant areas for their existence.

In 2005, a group of longleaf conservationists articulated the need for a focused, range-wide restoration approach which they named *America's Longleaf—A Restoration Initiative for the Southern Longleaf Pine Forest*. A Regional Working Group of diverse organizations was formed in October 2007 to develop the *America's Longleaf* Initiative. The vision of *America's Longleaf* is sustaining functional, viable longleaf pine ecosystems with the full spectrum of ecological, economic and social values inspired through a voluntary partnership of concerned, motivated organizations and individuals.

This Conservation Plan was developed by a Writing Team assigned by the Steering Committee of the Regional Working Group. The foundation for the Conservation Plan was built through a Charrette workshop of over 80 professionals in March of 2008.

Goals

The 15-year goal for this Conservation Plan is an increase in longleaf acreage from 3.4 to 8.0 million acres, with more than half of this acreage targeted in the range-wide “Significant Geographic Areas”¹ in ways that support a majority of ecological and species needs.

Within this overall goal, the Conservation Plan calls for:

- ▷ *Maintaining* existing longleaf ecosystems in good condition

- ▷ *Improving* acres classified as “longleaf forest types” and with longleaf trees present, but missing significant components of understory communities and fire regimes to support representative communities of longleaf ecosystems, and
- ▷ *Restoring* longleaf pine forests to suitable sites currently in other forest types or land classifications.

Guiding Principles

Guiding principles that shape how *America's Longleaf* will approach the range-wide conservation of longleaf ecosystems and this Conservation Plan include:

- ▷ **Strategic, Science-based Approach**—The success of *America's Longleaf* hinges on a strategic, science-based approach to conservation
- ▷ **Site-based Conservation Efforts in the Context of Sustainable Landscapes**—All habitat-based conservation actions must ultimately affect habitat availability and condition at the site level
- ▷ **Involvement by Public and Private Sectors**—The conservation of longleaf pine forests demands the combined interest and attention of public and private entities and individuals that manage land or otherwise affect land use
- ▷ **Partnerships and Collaboration**—A successful Initiative will require ongoing cooperation, collaboration and a perspective that is firmly focused on longleaf conservation at the range-wide level.

[1] This plan uses the term Significant Geographic Areas to encompass both (1) Significant Landscapes for Longleaf Pine Conservation for the sustainability of biodiversity and species richness at a range-wide scale, and (2) Significant Sites for Longleaf Pine Conservation, smaller important areas for the conservation of longleaf communities and longleaf-dependent species. For more information on definition and selection of these areas, see the Significant Geographic Areas discussion in this Plan.

- ▷ **Conservation Plan as a Framework and Catalyst—**
The Conservation Plan is intended to provide a range-wide framework for longleaf ecosystem conservation, by identifying the most significant actions to conserve these systems, and by serving as a catalyst to further conservation actions in a strategic and outcome-oriented fashion.

Strategies and Cross-cutting Approaches for Longleaf Conservation

Within the Conservation Plan are sections that detail the strategies, objectives and key actions to achieve the goal for maintaining, improving and restoring longleaf forests range-wide.

Six strategies are articulated, but just as with ecosystems, many are interconnected. The strategies identify objectives and key actions to address issues, opportunities and challenges for

- ▷ Public Lands
- ▷ Private Lands
- ▷ Economic and Market-Based Financial
- ▷ Fire Management
- ▷ Understory and Overstory Regeneration
- ▷ Climate Change

In addition, three cross-cutting approaches that relate to all six strategies are described.

- ▷ The Significant Geographic Areas approach is a first attempt to identify those areas, from a range-wide view, that should receive focused and targeted attention in order to achieve the conservation goals of the Conservation Plan
- ▷ The Communication, Education and Outreach approach is designed to support the six strategies
- ▷ The Evaluating Conservation Outcomes approach also applies to all actions called for in the Conservation Plan.

Conservation Plan Implementation

Implementation of this Conservation Plan is intended to be accomplished through voluntary collaborative efforts of the organizations represented on the Regional Working Group and many others associated with longleaf across the range. Participants in of the Regional Working Group and others will work regionally and nationally to advocate on behalf of longleaf conservation, and also will support and encourage local, on-the-ground efforts which will ultimately be the key to success.

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America's Longleaf

Longleaf pine forests were once incredibly vast. From the Atlantic coastal plain of southeastern Virginia to the West Gulf Coastal Plain of Texas, these forests encompassed more than 90 million acres of the North American landscape, and represented an extraordinary wealth and diversity of cultural, ecological, and socio-economic values. The tree itself, longleaf pine, literally sustained the growth of America with an abundant source of timber and naval stores. It built homes, bridges, ships, and railroads, and symbolized the bounty of natural resources that made the nation prosperous. Although longleaf pine remains a highly valuable commodity in markets today, the value of these forests runs far deeper than economics and trees.

Longleaf pines and the systems they support are woven into the cultural fabric of America. The open, fragrant, “piney woods” are as much a part of southern culture and folklore as cornbread. Their beauty, diversity, and humble intimacies have been the inspiration for some of the country’s most honored writers, artists, and naturalists. Long before European colonization, generations of Native Americans sustained themselves with the natural and spiritual riches these lands offered—lands which they revered through their customs and rituals. Throughout time, nature lovers, sportsmen, photographers, and outdoor enthusiasts have enjoyed an endless array of recreational and aesthetic pursuits tied to the abundance and splendor of these systems.

Conservation Imperative

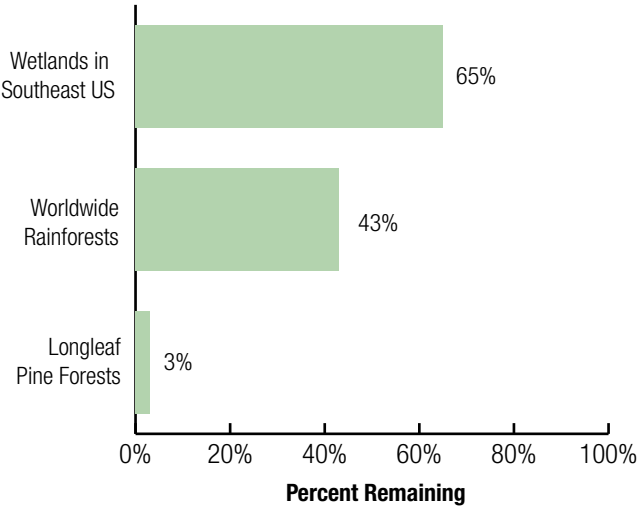
Today, longleaf pine forests are a mere remnant of their former majesty. Less than three percent or an estimated 3.4 million acres remain (USDA Forest Service, Forest Inventory and Analysis, 2008 and additional agency records Appendix C).

Fragmentation, unsustainable harvest, conversion to other land uses and vegetative types, invasive species, and exclusion of natural fire regimes have cumulatively resulted in alarming declines in the extent, condition, and future sustainability of these systems.

The loss of 97 percent of the longleaf forests is a stunning change in the landscape, even compared to the highly publicized loss of the world’s tropical rainforests or the Southeast’s wetlands (Figure 1).

Still, today’s remnants of the longleaf pine forests are some of the most biologically diverse ecosystems outside of the tropics. More than 140 species of vascular plants can be found in a 1,000 m² area, with as many as 40 to 50 different plant species in one square meter. Nearly 900 endemic plant species—species found nowhere else—are found in these systems across the Southeast U.S. One hundred and seventy of the 290 reptiles and amphibians occurring in the Southeast are found in longleaf pine ecosystems, with 30 reptile and amphibians that are specialists to the longleaf system. Coupled with the extensive decline of this forest type, 29 species associated with longleaf are Federally-listed as threatened or endangered.

Figure 1 Loss of Longleaf Pine Forests compared to other threatened ecosystems.



This species diversity is distributed across 12 longleaf pine ecological systems, as defined by NatureServe,² ranging hydrologically from sandhills to mesic wet savannas and geographically from the Atlantic Coastal Plain to the West Gulf Coastal Plain. These 12 ecological systems provide an effective and efficient process of capturing the species diversity of longleaf ecosystems by conserving representatives of each of these different longleaf systems. They are distributed across the historic range of longleaf pine and represent different soils, hydrology, and assemblages of species. To see where these systems are represented within “Significant Landscapes” see Appendices A and B.

“Culture springs from the actions of people in a landscape, and what we, especially Southerners, are watching is a daily erosion of unique folkways as our native ecosystems and all their inhabitants disappear. Our Culture is tied to the longleaf pine forest that produced us, that has sheltered us, that we occupy. The forest keeps disappearing, disappearing, sold off, stolen.”

—Janisse Ray, *Ecology of a Cracker Childhood*

Of course, it is the ecological wealth that is the fundamental basis for all of the values we attribute to longleaf pine ecosystems. From flatwoods and pocosins, to sandhills and “montane” communities, longleaf pine systems occur in a variety of uniquely diverse ecological assemblages. Literally thousands of species of fungi, lichens, grasses, forbs, shrubs, trees, arthropods, amphibians, reptiles, birds, mammals, and more comprise these ecosystems. Many of these species are mutually interdependent, and wholly reliant upon an attribute or aspect of longleaf pine systems for at least a portion of their life cycle. In turn, overall ecosystem health and functionality are intimately linked with these same species.

Mutual interdependencies notwithstanding, the sustainability of all longleaf systems are ultimately dependent upon one thing... fire. Longleaf pine simply cannot be sustained without periodic fire. And without longleaf pine, there can be no longleaf pine ecosystem. Indeed, the sustainability of many other plant and animal species associated with these systems is dependent on fire as well.

The cumulative worth of longleaf ecosystems simply can't be measured, but certainly has to be exceptional. This worth includes values associated with buffering against disastrous wildfires and storms; maintaining intact, undeveloped landscapes; cleaning and filtering surface and ground water; sequestering carbon; providing food, materials, livelihoods, and diversions; and enriching the soul and enlivening the spirit. The future likely holds unrealized benefits (e.g., pharmaceuticals), that only increase the worth.

The changing landscape of the Southeast over the past 50 years continues to impact longleaf ecosystems. This includes a dramatic shift in much of the South from large intact forests to non-forest land uses like housing and roads which has created fragmented landscapes.

More changes are on the horizon—large-scale shifts in forest land ownership, the emergence of woody biomass for energy, and accelerated global climate change, to name a few.

In recent years, many agencies, organizations, institutions and individuals have been involved in longleaf forest restoration. Efforts have included the development of effective regeneration techniques, introduction of fire as an ecological tool, technical assistance to landowners and practicing foresters, funding and program initiatives to promote longleaf reestablishment, research on the ecological and economic aspects of longleaf management, and larger ecosystem assessments of condition and trends of the forest.

Yet, the forestry, wildlife, and biodiversity conservation communities from the grassroots levels to those in the most senior positions have come to recognize that in spite of significant restoration efforts, it hasn't been enough. More strategic restoration and collaborative efforts are needed—and needed soon—while the window of opportunity is still open.

A Restoration Initiative

In 2005, a group of leaders convened by the Longleaf Alliance articulated the need for a focused, range-wide restoration approach which they named *America's Longleaf—A Restoration Initiative for the Southern Longleaf Pine Forest*.

At the same time, a partnership of several states and federal agencies in the Southeast formed to promote better collaboration in making resource-use decisions. Known as the Southeast Regional Partnership for Planning and Sustainability (SERPPAS), the group identified “Sustaining the Land of the Longleaf Pine” as one of its top conservation priorities.

This convergence of interests generated tremendous enthusiasm and momentum. To harness this interest in longleaf restoration, under the leadership of the USDA Forest Service, Department of Defense, and U.S. Fish and Wildlife Service, a Regional Working Group of diverse organizations was formed in October 2007 to develop *America's Longleaf*.

A Steering Committee of the Regional Working Group was tasked with developing this Conservation Plan and launching the *America's Longleaf* Initiative as an umbrella for the collaborative efforts by many stakeholders to ensure the Conservation Plan's implementation. The Initiative is also a vehicle for raising the profile of longleaf as a conservation concern, regionally and nationally, and for generating broad public support.

[2] NatureServe is a non-profit conservation organization whose mission is to provide the scientific basis for conservation. See www.natureserve.org for more information.

Vision

The vision of the *America's Longleaf* Initiative is to have functional, viable, longleaf pine ecosystems with the full spectrum of ecological, economic, and social values inspired through a voluntary partnership of concerned, motivated organizations and individuals.

Meeting this challenge will require the strategic coordination of conservation actions among many partners and sectors that influence land use, with the goal of ensuring long-term sustainability and resiliency of these systems, and their constituent biodiversity.

The Regional Working Group is a collaborative network that includes federal agencies, state forestry and wildlife agencies, coalitions and associations, non-governmental organizations, and individuals (see sidebar). The Group serves as a forum for discussion and action on a number of range-wide issues regarding longleaf conservation.

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Individuals participating in the Regional Working Group represent the following organizations:

American Forest Foundation

Cooperative Extension Service, Southern Region

Department of Defense

East Gulf Coastal Plain Joint Venture

Environmental Defense Fund

Environmental Protection Agency

Jones Ecological Research Center

Longleaf Alliance

National Wild Turkey Federation

National Wildlife Federation

NatureServe

Southeastern Association of Fish and Wildlife Agencies

Southeast Regional Partnership for
Planning and Sustainability

Southern Environmental Law Center

Southern Group of State Foresters

The Conservation Fund

The Nature Conservancy

U.S. Fish and Wildlife Service

USDA, Forest Service

USDA, Natural Resources Conservation Service

U.S. Geological Survey

Wildlife Mississippi



The Conservation Plan

This Conservation Plan was developed by a Writing Team assigned by the Steering Committee of the Regional Working Group. However, the foundation for the Conservation Plan was built through a Charrette workshop involving over 80 professionals in March of 2008 at Auburn University (see Appendix D).

In June, 2008, an initial draft of the Conservation Plan was compiled and reviewed within the Steering Committee. A second draft was completed in August and distributed to Charrette participants and other longleaf conservation professionals for review and comment. Twenty-four sets of detailed reviewer comments were received and considered by the Writing Team in producing the draft of the Conservation Plan released in October, 2008. Since then, the Writing Team has actively solicited and received over 150 additional suggestions. This March, 2009 version of the Conservation Plan reflects changes based on those comments.

Fundamentally, the Conservation Plan calls for strategic coordination of science-based conservation actions among many partners and stakeholders, with the goal of ensuring long-term sustainability and resiliency of the diverse longleaf systems—socially, economically, and ecologically. The Conservation Plan spans complex and inter-connected activities, programs, policies, and research that operate from the local level to the national arena. Organizing such an endeavor within a written document to catalyze and deliver range-wide strategic actions and on-the-ground results is a daunting task.

Many organizations have developed conservation planning frameworks that organize and present an iterative process to help identify the what, where, who, when, how, and why of strategic landscape conservation work. This Conservation Plan borrows from those frameworks with a strong understanding of the urgency and “why” range-wide conservation of longleaf is so vital, it is organized in the following way:

- ▷ **Goals**—what implementation of the Conservation Plan is designed to achieve
- ▷ **Guiding Principles**—what approach the Initiative and Conservation Plan will take
- ▷ **Strategies for Longleaf Conservation**—why and how conservation actions are recommended

- ▷ **Cross-cutting Approaches**—where focused, how communicated, and how evaluated
- ▷ **Implementing the Conservation Plan**—who will bring the Conservation Plan to life and when
- ▷ **Appendices**—additional information.

This Conservation Plan is intended as a dynamic document, subject to revisions, particularly as local efforts are more fully developed and additional information is considered during implementation of the Conservation Plan. It will ultimately be Web-based for easy access by all interested parties.

Goals

Today, it is estimated that there are 3.4 million acres in longleaf forest types (USDA Forest Service, Forest Inventory and Analysis, 2008 and agency records described in Appendix B).

Appendix C shows private landowners own about 55 percent (1.9 million acres) of the current longleaf acreage. National Forests, Department of Defense installations, and a handful of state forests, National Wildlife Refuges, and parks manage roughly 45 percent (1.5 million acres) of the current acreage. With a few exceptions, much of these longleaf forests are widely fragmented, existing as islands within a matrix of modified lands.

The 15-year goal for this Conservation Plan is an increase in longleaf from 3.4 to 8.0 million acres, with half of this acreage targeted in the 16 range-wide “Significant Landscapes” (identified in Appendix B) in ways to support a majority of ecological and species’ needs. The remainder will be either in Significant Sites or distributed across the range.

The goal is a first approximation using best professional judgment and will be refined as more focused and rigorous inventories and analysis are completed and as local goals are defined. This is expected to occur both range-wide and within

Significant Geographic Areas during implementation of the Conservation Plan.

Achieving this ambitious 15-year goal would increase longleaf forest acreage to about nine percent of its historic acreage and require three-fold increases in restoration from current levels.

Within this overall goal, the Conservation Plan calls for three levels of management (summarized in Table 1):

- ▷ **Acres to Maintain**—The goal of *America’s Longleaf* is to have, within 15 years, about three million of the eight million acre total in or moving toward this condition. The focus of this category is to maintain forest conditions that reflect both the forest canopy and understory conditions that currently or will provide ecosystem functions, processes and assemblages of representative species of plants and animals. Current inventory systems are not in place to provide range-wide data on the number of acres in this category, but based on limited sampling and professional best judgment, estimates are that about 1.5 million acres have fire regimes and current ecological conditions representative of this desired condition. **Retention of forests within this condition is a priority.** Restoration of representative understories is a slow and costly process. This goal will support moving many of the target acres in a trajectory toward that condition.
- ▷ **Acres to Improve**—The best estimate is that over half of the acres classified as “longleaf forest types” have longleaf trees present, but may be missing significant components of understory communities and fire regimes to support representative communities of the longleaf ecosystems. Other areas may have relatively intact understory but lack adequate tree cover. Today about 1.9 million acres are estimated to exist in this category. An emphasis will be to move 1.5 million of these acres into the “maintain” category.
- ▷ **Acres to Restore**—Active restoration efforts have added about one million acres in longleaf forest types in the last decade. Expanded efforts are needed to continue adding longleaf acreage from other land uses and forest types to meet the eight million acre, 15-year goal. Much of such forest type conversions to longleaf in the immediate future are likely to occur on public lands where agencies have identified restoration as a high priority, particularly to support endangered species recovery. Private lands initiatives will need to play a key role to achieve the 15-year goal where acres will be increased from other land uses such as agriculture.

The distribution of acre goals between “improve” and “restore” is uncertain at this time, but will need to total about five million acres to meet the Conservation Plan’s eight million acre ultimate goal.

While this Plan sets forth range-wide goals, it is important to recognize that more detailed assessments at the state and landscape levels are needed to improve these estimates, as discussed in subsequent sections of the Conservation Plan.

Table 1 Acreage goal for longleaf by management category

Management Category	Estimated Existing Acres	Acerage Goal (Range-Acres)
Maintain	1.5 million	3.0 million
Improve/Restore	1.9 million (Improved)	5 million Improved and Restored
Total All Categories	3.4 million	8.0 million

Guiding Principles

There are several guiding principles that shape how the *America’s Longleaf* Initiative proposes to approach the range-wide conservation of longleaf ecosystems. Accordingly, these guiding principles are intrinsic to shaping the thoughts, recommendations, organization and content of the Conservation Plan:

- ▷ **Strategic, Science-based Approach**—The success of *America’s Longleaf* hinges on a strategic, science-based approach to conservation. This approach serves as a framework for identifying, prioritizing, integrating and evaluating the efforts and activities of the partnership with the purpose of targeting conservation efforts in ways that most effectively contribute to stated objectives.
- ▷ **Site-based Conservation Efforts in the Context of Sustainable Landscapes**—All habitat-based conservation actions must ultimately affect habitat availability and condition at the site level. Site-specific, local scales are where habitat conservation “hits the ground.” However, local habitat projects need to be planned and implemented in the context of their role in most effectively contributing to objectives (e.g., population viability, biodiversity, ecosystem services, or socio-economic values) that will only be realized at much larger spatial scales. Through a strategic, science-based approach, *America’s Longleaf* hopes to guide, coordinate and support the site-based habitat conservation efforts of its partners and link them across spatial scales.



Photo by Jack Culppeper, U.S. Fish and Wildlife Service, Carolina Sandhills National Wildlife Refuge

- ▷ **Involvement by Public and Private Sectors—**

The conservation of longleaf pine ecosystems demands the combined interest and attention of public and private entities and individuals that manage land or otherwise affect land use, and provide labor and material to conserve longleaf. Success in conserving and restoring longleaf ecosystems will depend on it being an economically viable, socially acceptable, and otherwise practical option for private and public land stewards alike. In addition to more traditional conservation partners, success will require that *America's Longleaf* actively engage important private land-use communities and businesses (*e.g.*, agriculture, timber products, home builders associations, *etc.*), as well as local, state, and federal governmental organizations that represent a comprehensive cross-section of land-use interests.
- ▷ **Partnerships and Collaboration—**A successful Initiative will require ongoing cooperation, collaboration, and a perspective that is firmly focused on longleaf conservation at the range-wide scale. The Initiative does not attempt to start anew, but will build on the work previously initiated by other landscape-based partnerships. It will integrate its actions and align them with the goals and objectives of other existing plans, initiatives, and efforts including Joint Venture Implementation Plans, State Wildlife Action Plans, Endangered Species Recovery Plans, National Forest and Wildlife Refuge Management Plans, Northern Bobwhite Conservation Initiative, Partners for Amphibian and Reptile Conservation as well as plans developed by international and national bird initiatives. State Forest Assessments and Strategies will be taken into account as developed in the next two years.
- ▷ **Conservation Plan as a Framework and Catalyst—**

The Conservation Plan is intended to provide a range-wide framework for longleaf ecosystem conservation, identify the most significant strategic actions to conserve these systems, and serve as a catalyst to further conservation and restoration actions in a strategic and outcome-oriented fashion. The Conservation Plan does not intend to be prescriptive, but rather acknowledges that the true work of identifying and addressing specific conservation activities will occur through subsequent efforts, with as many stakeholders as possible working collaboratively under the umbrella of the *America's Longleaf* Initiative.

Strategies for Longleaf Conservation

The following sections detail the strategies, objectives, and key actions to achieve the goals for maintaining, improving and restoring longleaf forests range-wide. Six strategies are listed, but just as with ecosystems, many are interconnected.

The six strategies identify objectives and key actions to address issues, opportunities and challenges. They are:

- ▷ **Public Lands** (page 9)
- ▷ **Private Lands** (page 10)
- ▷ **Economic and Market-Based Financial** (page 13)
- ▷ **Fire Management** (page 15)
- ▷ **Understory and Overstory Regeneration** (page 16)
- ▷ **Climate Change** (page 18)

Key actions in the following sections shown in **bold** text represent those actions identified by the Steering Committee as priority actions from a range-wide perspective. The criteria for prioritization were:

- ▷ Importance of action to Longleaf conservation
- ▷ Doable/realistic
- ▷ Takes advantage of opportunity (funding, planning windows, people, partners, politics)
- ▷ Urgent—needs to start implementation in next 18 months.

Public Lands Strategy

Issues, Opportunities, and Challenges: State, federal, and local public lands, and lands under publicly held conservation easements offer significant opportunities to contribute to landscape level longleaf conservation. Inventories currently show that an estimated 45 percent of the existing acres in longleaf forest type are public lands (Appendix C, Table 2). By statute, federal lands are managed for endangered species and accordingly on appropriate sites in the Southeast, management to conserve longleaf may be included as part of the management objectives. In addition, many southern state and local public land managers have also identified longleaf conservation as a management objective where appropriate. Expanded restoration

opportunities exist on many of these lands, but are not explicitly targeted in existing management plans. Increased capacity in training and staffing is needed to enable public land managers to more effectively conserve lands suitable for longleaf.

Many publicly owned tracts are administered by different agencies, are somewhat fragmented, are of insufficient size to fully contribute to restoration goals or are inefficient to manage at landscape scales. Opportunities exist to connect and build upon “core” public lands through interagency collaboration and purchase of key additional lands from willing sellers and/or through establishment of conservation easements through public or private efforts.

To date, an explicit multi-agency effort has not been defined, adopted, and financed to implement management actions necessary to achieve and accelerate conservation practices in a targeted, landscape approach. Public lands typically provide the “core” of areas targeted as Significant Geographic Areas and thus offer opportunities for making substantial gains in longleaf conservation. These opportunities exist within National Forests, Department of Defense lands, State Forests and Wildlife Management Areas, National Wildlife Refuges, and other federal lands, but the specific opportunities have not been analyzed at a range-wide scale or within the context of contributing to Significant Geographic Areas.

For example, the National Forest System in the South has an estimated 808,000 acres currently in longleaf forest types. Many of these longleaf acres have fire regimes that are in desired conditions. An additional 601,000 acres are projected to be restored to longleaf forests under existing USDA Forest Service Land and Resource Management Plans if such forest plans are fully implemented (Appendix C, Table 1). Similar data and plans are needed regarding the status of restoration on wildlife refuges, military installations and state forests, among others. Restoration on all appropriate public lands needs to be accelerated under fully funded, appropriately aggressive management plans. These areas will need to be managed as part of a land ownership matrix comprising

“Significant Geographic Areas.” Public lands can also serve as important demonstration areas for longleaf conservation and thus showcase opportunities for private land managers.

Frequently, agencies manage programs like fire control, prescribed burning, wildlife habitat, and timber management or plant ecology as separate, segregated programs without explicitly planning and delivering program accounting for the interrelated nature of land management. Opportunities exist to better integrate programs to achieve common desired conditions, gain efficiencies, and improve program delivery within longleaf forests. Integration of programs should reflect a commonly defined set of desired conditions on a landscape or site. Program execution includes developing budgets to support necessary conservation efforts.

Many of the forests with intact groundcover exist on public lands. These areas provide important ecological values and can serve as seed sources for understory plant material and sources of donor populations of species like Red-cockaded Woodpeckers and gopher tortoises. Areas with intact groundcover need to be inventoried and managed to maintain their values and serve as sources of plants and animals for restoration.

Agencies can play an important role in stimulating or participating in local efforts involving both public and private lands to bring coordinated conservation to the ground. Most detailed inventory, implementation, and monitoring will occur at the Significant Geographic Area level through stakeholder groups working collaboratively.

Objective A Inventories and assessments are in place by agencies managing public lands suitable for longleaf conservation. Managers have assessed the current conditions of existing longleaf forests, and have developed restoration plans for those acres. Plans reflect the need to target conservation action to achieve landscape-level outcomes. Inventories capture current conditions geospatially and determine opportunities for management for longleaf forests across lands administered by multiple agencies.

Key Actions

1. *Agencies will determine ongoing and planned management and restoration on public lands. Common definitions and metrics for forest conditions will be developed and a common repository of the information will be established (See the Evaluating Conservation Outcomes section of this Conservation Plan).*

Objective B Land management agencies support longleaf conservation on public lands and support budgets via appropriate management structures to accomplish work consistent with their mission.

Key Actions

2. *Integrate public lands programs to prioritize and support longleaf conservation, particularly in the fire management, smoke management, silviculture, nursery*

operations, and invasive species control. Target outreach and communications to key policy makers and lead managers of public land programs to adopt and integrate conservation of longleaf in their programs.

3. Expand training for resource professionals in management and restoration techniques for longleaf.
4. *Place a priority on inventorying and maintaining those forests with intact ground cover.*
5. Develop public land demonstration areas for longleaf conservation and thus showcase opportunities for private land managers.
6. *Support increased public land and easement acquisitions from willing sellers, especially where such acquisitions would enable management at the landscape level.*

Objective C Public land managers in Significant Geographic Areas play a leadership role in implementing collaborative landscape planning and management of longleaf at the landscape scale.

Key Actions

7. Support local teams under *America’s Longleaf Initiative* as a structure and mechanism to guide restoration through public/private coordination within Significant Geographic Areas. Establish or expand efforts in two to four Significant Geographic Areas in the next three years in order to demonstrate implementation of and accelerate conservation efforts on the ground. Institutions such as the Gulf Coastal Plain Ecosystem Partnership (GCPEP) can serve as a model of public/private coordination at a sub-regional, landscape scale.
8. Work with federal agencies at the regional and/or national level to support increased and improved cooperation and coordination for planning and management. Amend policy or authorities restricting management activities across jurisdictional boundaries by public and private parties.

Private Lands Strategy

Issues, Opportunities, and Challenges:

The vast majority of forestland potentially available for restoration across the longleaf range is privately held. Increasingly, the significant holdings of the industrial timber companies have been acquired by timber investment management organizations (TIMO’s) or real estate investment trusts (REIT’s) over the past decade or so. Despite these changes, some two-thirds of the forest land in the South remains in the hands of individuals and family forest landowners also called non-industrial private forest landowners. Accordingly, the success of the Conservation Plan requires making a persuasive case for retaining and restoring longleaf with these landowners and the service and consulting foresters who serve them. Additional efforts for engaging the remaining industrial owners and the TIMO’s/REIT’s must also be pursued.



Photo by J. Bachant-Brown, Longleaf Alliance

Conservation easements (whether purchased or donated with tax credits) are effective tools in enabling private landowners to maintain forestland. Federally funded easement programs such as the Forest Legacy Program, Healthy Forest Reserve Program, and the Readiness and Environmental Protection Initiative (REPI) and supporting military service programs, e.g., the Army's Compatible Use Buffer (ACUB), as well as similar state programs can help ensure the long-term stewardship of significant longleaf forests. These programs usually focus on addressing development threats but some have supported longleaf conservation. Efforts to place appropriate lands under easements could be expanded and more effectively targeted to support goals of this Conservation Plan, including requiring active management and targeting toward Significant Geographic Areas.

In addition, inventories of relevant longleaf acres under conservation easements have not been conducted on a range-wide scale. Management of longleaf forests under conservation easements has not been systematically evaluated. The diverse and varied jurisdictional, mission, and administrative structures of easements in the South present substantial challenges to assess and target longleaf conservation.

The front-end costs of longleaf restoration are significant as is the need for technical assistance from those knowledgeable about longleaf systems. Many landowners would find these costs prohibitive but for some form of public support. Fortunately, an array of publicly funded landowner assistance and incentive programs also exists (many authorized in the federal Farm Bill) to improve stewardship of forestland. In some cases, actions are needed to optimize the programs' utility for the non-industrial landowners seeking to restore longleaf. Some programs are inadequately funded while others have not been designed or implemented in ways that maximize participation or effectiveness. The recent reauthorization of the federal landowner assistance programs in the Farm Bill of 2008 reflects more explicit recognition of the needs of forestland owners. Various programs

to assist in hurricane recovery also offer opportunities for financial assistance in restoring longleaf.

The State Technical Committees of the Natural Resources Conservation Service (NRCS) are especially important insofar as they help make decisions on the priority uses of the largest such program, the Environmental Quality Incentives Program (EQIP), as well as the Wildlife Habitat Incentives Program (WHIP), and others. Neither program requires a "cropping history" for eligibility (see next paragraph), making them potentially available to a wide range of landowners interested in longleaf restoration. The U.S. Fish and Wildlife Service's Partners for Fish and Wildlife is another significant federal effort that has carried out voluntary longleaf habitat improvement action on approximately 100,000 acres of private lands since 2004. On the state level, landowner programs implemented by the state fish and wildlife agencies and the State Foresters also play key roles. All these agencies which administer the key programs are encouraged to take a number of specific actions, described below, to support landowners interested in longleaf restoration, with an emphasis on those owning land in the Significant Geographic Areas described elsewhere in this Conservation Plan.

Of particular note among the landowner assistance programs is the Conservation Reserve Program (CRP) administered by the USDA Farm Services Agency. Private landowners participating in CRP have committed to restoring some 300,000 acres of agricultural land to longleaf, making CRP perhaps the most significant program for longleaf restoration to date. Despite the severe limitations that the statutory requirement of "cropping history" imposes, utilizing all available acres under the continuous sign-up (Conservation Practice 36) would provide eligible landowners essential payments. (Past efforts to remove the "cropping history" requirement to enable extensive pasturelands to be eligible for enrollment in CRP have been unsuccessful.) Appropriate CRP re-enrollment policies that give priority to longleaf maintenance, improvement, and restoration are also important.

The 2008 Farm Bill also established the Forest Resource Coordinating Committee at the national level to direct and coordinate achievement of national priorities which were concurrently established in this legislation. The Secretary of Agriculture has yet to appoint its members, but it will be chaired by the Chief of the Forest Service and comprised of an important array of stakeholders representing State Foresters, State fish and wildlife agencies, non-industrial private forest landowners, forest industry, conservation organizations and others. A persuasive case can be made that achieving range-wide longleaf restoration would directly contribute to the achievement of the overall national priorities insofar as this regional effort operates at the landscape level to restore a native forest type and engages private lands to a significant degree. The Committee will provide advice on the allocation of competitive federal funds.

By May 2010, all State Foresters must prepare an assessment of forest resources along with strategies for addressing identified issues. Participating in the development of these assessments at the state level is an excellent opportunity for calling greater attention to threats to the longleaf system, as well as for enlisting the further support of State Foresters in taking positive actions consistent with the range-wide Conservation Plan. Particularly significant will be the identification by State Foresters of priority areas within each state, as well as multi-state areas that constitute regional priorities.

Many of the federal and state agencies involved in longleaf restoration also offer programs that fund cooperative conservation and innovation, often on a multi-state or landscape scale. These programs are, in addition to the landowner assistance and incentive programs, designed to support individual forest landowners. Some focus on forestland while others more broadly support habitat restoration. Examples include the Conservation Innovation Grants and Payments Program, the Cooperative Conservation Partnership Initiative (both administered by NRCS), the Cooperative Forest Innovation Partnership Grants Program (administered by the USDA Forest Service), and the State Wildlife Grants Program (administered by the U.S. Fish and Wildlife Service). Projects involving forest management qualify for many of these programs; having a high percentage of non-industrial private forestland involved may even make the project a priority for funding. Also, many of the Comprehensive Wildlife Conservation Plans/Strategies from states within the longleaf range feature pine habitats, including longleaf, thus potentially creating related grant opportunities.

Objective A Conservation easements to support longleaf restoration are more effectively utilized.

Key Actions

1. ***Increase funding for easement programs that contribute to longleaf restoration and management. For other easement programs, and where compatible with the easement program mission, work with agencies and organizations to develop longleaf restoration as a goal, particularly in Significant Geographic Areas.***

2. Develop and widely disseminate a comparative summary of all conservation easement programs in a format readily understandable by individuals and family forest landowners.
3. Actively pursue targeted forest landowners for education, outreach, and solicitation of conservation easements.
4. Develop a robust system to inventory those lands under publicly held conservation easements and determine their current and potential support for active management and restoration of longleaf with particular attention to those easements within Significant Geographic Areas.

Objective B Both Farm Bill and other habitat restoration programs are fully taken advantage of to ensure that private landowners have ready access to a suite of appropriately designed and adequately funded programs providing technical advice and/or financial assistance.

Key Actions

5. ***Encourage federal and state agencies, (e.g., State Technical Committees), that provide technical assistance and cost-share to forest landowners to increase support for landowners (especially those in the Significant Geographic Areas) willing (a) to improve poor quality longleaf stands through thinning and burning, (b) to convert forests back to longleaf on appropriate sites and (c) to plant new acres of longleaf trees and restore understories.***
6. ***Take full advantage of the many opportunities for longleaf restoration under the Conservation Reserve Program, including continuous sign-up and re-enrollment policies.***
7. With the ultimate goal of “more boots on the ground,” increase funding to those state and federal agencies and private entities essential to educating landowners and encouraging their participation in longleaf restoration activities, and ensure their longleaf conservation expertise by providing enhanced training to their natural resource professionals.
8. Because the array of state, federal, and privately funded programs is often confusing and daunting to landowners, develop a targeted education and outreach effort within the Significant Geographic Areas to match landowners with assistance programs. On a region-wide basis offer a clearinghouse or other means to assist all landowners in better accessing programs. The matrix of programs developed by NRCS/FWS in Florida is an excellent start on an important tool, and should be updated and widely circulated.
9. Develop alternative means of assisting landowners in meeting the cost-share and/or matching requirements in various programs as these can pose a substantial financial challenge to landowners and conservation groups interested in longleaf. Options include raising funds from the private sector, from state and local governments and, to the extent permitted by law, from other federal agencies.

10. Ensure that landowners are aware of available regulatory assurances and “safe harbor” agreements that are designed to protect them from any “take” issues under the Endangered Species Act. Continue to improve these programs from landowners’ perspectives and for enhanced benefits to protected and candidate species.
11. *Develop a comprehensive database capturing in a spatially explicit manner the longleaf-related activities of all federal and state agencies administering landowner assistance as a means of promoting coordination and measuring success within the Significant Geographic Areas and across the range. If feasible, include restoration activities sponsored by non-governmental organizations and other private entities, for example, the plantings funded by the outstanding partnership between the National Fish and Wildlife Foundation and the Southern Company.*

Objective C The newly created Forest Resource Coordinating Committee (yet to be appointed) is engaged in order to promote national interest in longleaf.

Key Actions

12. Inform the Secretary of Agriculture who will establish the committee of the benefits of having person(s) knowledgeable in longleaf restoration issues serve. Coordinate with the Southern Group of State Foresters (SGSF), the Southeastern Association of Fish and Wildlife Agencies (SEAFWA) and others to seek early opportunities to inform the full Committee about the longleaf restoration efforts, including the ways in which the regional effort could contribute to achievement of national priorities, such as climate change mitigation and adaptation, and providing habitat for “at-risk” species.

Objective D Longleaf conservation is fully considered in the State Forest Resource Assessments, response strategies and identification of priority areas.

Key Actions

13. *Engage immediately with the Southern Group of State Foresters and the USDA Forest Service, Southern Region, in efforts to prepare for the upcoming development of assessments and strategies in individual states.*
14. *Encourage longleaf advocates to participate on a state-by-state basis in the development of the assessments and strategies to ensure that threats to longleaf are identified, that the Significant Geographic Areas identified in this Conservation Plan are considered as priority areas in the assessments and strategies for supporting longleaf restoration are included.*
15. Support State Foresters who develop assessments and strategies consistent with longleaf restoration in securing competitive funding to enable their planned activities.
16. Where state assessments and strategies encourage

longleaf restoration, support their use by State Technical Committees in prioritizing eligibility for conservation program participation by forest landowners.

Objective E State wildlife agencies are engaged to highlight and accelerate implementation of the longleaf-related components of the Comprehensive Wildlife Conservation Plans/Strategies (CWCP/S) within single states and across the region.

Key Actions

17. *Gain a more in-depth understanding of the longleaf restoration activities called for in CWCP/S's across the range.*
18. *Work with both the Southeastern Association of Fish and Wildlife Agencies and individual state agencies to identify common priorities.*

Objective F Multiple programs are tapped that support cooperative conservation efforts and/or innovative approaches to support local implementation efforts as well as the range-wide *America's Longleaf* Initiative.

Key Actions

19. Identify all potentially useful federal and state programs that support cooperative conservation efforts and/or innovative approaches that will contribute to implementation of this Conservation Plan.
20. Identify the best “matches” between the available funding programs and the various activities called for at both the local and range-wide level under this Conservation Plan for range-wide application, and assist local area efforts in identifying applicable funding sources.
21. Encourage and support partners in the *America's Longleaf* in applying for and securing funding for cooperative and/or innovative approaches.

Objective G Interest and opportunities for longleaf management are identified within the TIMO/REIT community.

Key Actions

22. *Engage with the industrial forestry community and with timber TIMO's and REIT's to share this Conservation Plan and determine which elements may be adopted or otherwise engaged in by them. Cooperative activities already underway with some TIMO's/REIT's include inventory of significant ecological sites, agreements to share natural resources databases, and identifying significant sites for conservation status, easements, land transfers and acquisition, as well as for mitigation and mitigation banking.*

Economic and Market-Based Financial Strategy

Issues, Opportunities, and Challenges:

Longleaf pine forests provide landowners and managers with a variety of economic opportunities. Private sector markets include returns from high-value solid wood products, quality pine straw and higher real estate values. Additionally, private and public funds are available for conservation easements and ecosystem services including conservation banking payments or mitigation, and premiums for wildlife hunting leases. From the public sector, landowners also receive preference on many cost-share and landowner incentive programs, including the Conservation Reserve Program. Landowners also benefit from reduced risk from wild fires, most insects and diseases, and hurricane and wind related events/storms.

Local communities can benefit from their close association with longleaf forests through enhanced real estate and recreational values, and lower fire, storm, and insect/disease risks. Planned sustained green space, intact watersheds, lower fire suppression costs, ecotourism, and hunting all can support local economies and societal values.

Markets for traditional pine forest products are changing rapidly. Pine pulp markets have moved offshore in record numbers in the last five years. Pine sawtimber markets traditionally fluctuate with the housing market. High value solid pine product markets are variable across the longleaf range, but generally are more stable and offer financial premiums for the seller. Urban/suburban areas offer markets for pine straw. Local markets offer other opportunities for specialty products like honey, ecotourism and hunting opportunities. Silvopasture systems are being tested and installed as demonstrations and research efforts to test and promote longleaf/forage production. Silvicultural options (phased conversion, uneven-aged management systems and others) have been explored, but are not widely known and practiced by resource managers. These options may provide a broader range of economic models consistent with landowner objectives. Training of consulting and service foresters can be expanded. Opportunities to evaluate those options and increase technical service training exist.

The emerging biofuels market is also a potentially significant development for landowners and longleaf restoration supporters alike. Efforts to produce more of the country's domestic energy from renewable sources, including woody biomass, are accelerating. Ambitious national goals for production of liquid biofuels and renewable portfolio standards adopted by some states will increase the demand. In addition, the Farm Bill of 2008 added a number of landowner incentives, tax credits, and other measures to stimulate renewable energy production, complementing a range of loan programs and incentives available from the Department of Energy.

The technology to convert woody biomass into biofuels is operational for pellets and co-generation while cellulosic bio-refineries in the development stage are expected to come on line by 2012. Much of the feedstock for these woody biomass facilities is expected to come from the Southeast, including the

historic range of longleaf pine. No comprehensive study has been done of the potential impacts of significantly increased use of woody biomass on efforts to restore longleaf pine. Some point to the need for thinning and removal of offsite vegetation on many poorly maintained longleaf sites. Developing a biomass market may assist in such thinnings which otherwise offer little or no commercial value. Others observe that large-scale biomass facilities could result in localized over harvesting within the sourcing area. Or, they may compete with longleaf restoration if landowners seek short-term profits from so-called purpose-grown tree plantations to supply biomass facilities. Lively debates have already begun on how to ensure the sustainability of forests even as renewable fuels are produced. Management schemes that are economically, socially, and environmentally viable—especially for longleaf forests—will need considerable work as this industry segment grows.

Payments to landowners for ecosystem services are emerging through a variety of public/private market schemes and philanthropic investments. Payments to private landowners willing to manage for imperiled or “at-risk” species have seen accelerated interest. Examples involve restoration and management of longleaf forests as key habitats. Trading schemes or payments for Red-cockaded Woodpecker and gopher tortoise habitat have been or are under development in some locales. Private funding has also recently emerged for cost-share payments to landowners engaged in ecosystem restoration.

Carbon offset payments and other potential funding is covered under the “Climate Change Strategy” in this Conservation Plan.

Conversion of forests to other uses is the greatest threat to southern forests. Forest land ownership is undergoing rapid changes in the South. For example, vertically integrated forest industries who have owned and managed a significant portion of the southern forest since World War II have sold most of their lands in recent years. REITS and TIMOs have purchased much of this land and their long-term forest management objectives vary and have yet to be determined. With these changes, there is a need for a better understanding of landowner economic objectives and goals, particularly of those with large ownerships in Significant Geographic Areas, and for new forest landowners.

Landowners currently face economic barriers in longleaf as with other forest management. Despite higher returns for traditional high value solid wood products that come from longleaf forests, the greatest financial returns usually come from trees harvested when stands are 40 or more years old. These valuable stands generally require greater initial investments in establishment, greater management costs, particularly with fire, and longer investment horizons to recover these costs. Carrying these costs must be offset by early or periodic income to make management of longleaf forests economically attractive. Specialty and emerging markets, perhaps coupled with public/private payments for public values, can offer economic returns in a manner to overcome the cost of management. New models of public/private ventures are needed to support greater private sector management of longleaf systems.

Objective A Economic opportunities for longleaf forest products and ecosystem services are enhanced for landowners, local communities and society.

Key Actions

1. Support local communities and communities of interest to determine economic and related objectives and where compatible, assist in the development of new markets to produce premium longleaf products.
2. Support and promote development and/or updating growth and yield models for longleaf forests as an essential economic tool.
3. Develop tools for actuarial analysis of risk avoidance for wildfire, insects, diseases and wind as well as alternate silvicultural treatments.
4. Support and supplement studies of landowners (non-industrial, investment and industrial owners) that are key to longleaf restoration including demographic characteristics and values as well as investment and other objectives.
5. *Promote development, acceptance, and use of various and/or “stacked” ecosystem market payments, for example, hunting leases and watershed quality trading credits for longleaf forests and their values. Provide relevant information to service foresters, consulting foresters, and other resource service providers.*
6. *Promote development of conservation banking instruments for longleaf forests, for example, gopher tortoise and wetlands. Provide outreach to landowners to develop and clearly communicate these incentives.*
7. *Promote development, application, and acceptance of new economic models that incentivize longleaf restoration at landscape scales, models that can capture public/private ventures, cross multiple ownerships and provide longer-term stability to restoration efforts.*
8. *Assess development of wood-to-energy industries, their potential effects on longleaf restoration efforts, and opportunities to make them more compatible and/or less competitive.*

Fire Management Strategy

Issues, Opportunities, and Challenges:

Fire is one of the most essential components of natural longleaf ecosystems. Its many benefits include scarifying and enriching soils, promoting seed germination, reducing vegetative competition, controlling disease, diversifying forest structure, enhancing wildlife habitat, moderating fuel loads, and diminishing the potential for catastrophic events. For many years, fire has been excluded from much of the fire-adapted forests of the South. Applying appropriate fire regimes in longleaf forests at site and landscape scales is essential in achieving the goals of this Conservation Plan. In addition,



Photo by John Maxwell, U.S. Fish and Wildlife Service

broader application of fire management can lessen wildfire threats, and thus reduce the burden on states and localities to provide wildfire fire protection to private landowners.

Restoring natural fire regimes at scale involves many challenges. Some are regulatory in nature such as the need to address air quality. Other challenges such as applying fire to an increasingly urban and fragmented landscape where landowner objectives vary are more practical in nature. Even more fundamentally, a lack of public understanding of the positive role of fire is widespread. Neither the essential, ecological role of fire nor the tradeoffs between fire management smoke and wildfires are universally recognized. In order to meet the goals of this Conservation Plan, each of these challenges must be addressed and solutions found to allow the expanded use of fire management.

States are required by the Clean Air Act to prepare air quality plans called State Implementation Plans (SIPs). The SIP includes the regulations and actions that the State decides are necessary to protect air quality. Under federal and state standards, states evaluate and establish limits on air emissions from many sources including power plants, industrial sources and automobiles. There are currently no federal regulations which directly limit the use of fire management. However, smoke from wildland and fire management contains significant levels of particulate matter and other pollutants which may impact air quality. Therefore, in the

process of developing their SIPs, states may evaluate the air quality impacts of current and projected future prescribed burning activities and will decide if limitations are needed.

Smoke management issues may restrict prescribed burning. Some significant landscapes are located where they impact areas currently classified as federal Class I areas for visibility protection or non-attainment areas for one or more criteria pollutants regulated under the Clean Air Act. Uniform procedures for determining the base data necessary for predicting prescribed fire emissions production by regulatory agencies need to be improved. To address these issues, many states in the Southeast have developed, or are in the process of developing, Smoke Management Programs (SMP). The goals of an SMP are to: allow fire to function in its natural role in maintaining healthy wildland ecosystems, while also protecting public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility. The U.S. EPA has developed guidance which provides recommendations on what should be included in SMPs. EPA's "Interim Air Quality Policy on Wildland and Prescribed Fires," April 23, 1998, is available on the EPA's Web site at <http://www.epa.gov/ttn/oarpg/t1/memoranda/firefnl.pdf>, and efforts are underway by the Agency to update the guidance. A current inventory of the existing longleaf communities, *i.e.*, acreage estimates in map-capable units, is not readily available. In addition, estimates of the condition of existing acreage with desired, fire-maintained, ecological conditions are also lacking. These inventories are needed to plan, implement, and monitor goals for fire under this Conservation Plan. These inventories are also essential for addressing the potential air quality impacts discussed above.

Restoring fire use is expensive and unfortunately financial incentives for landowners are lacking in most federal and state programs to help offset repeated fire management treatment costs. For most private landowners, the repeated costs of applying fire at the frequency required to maintain longleaf ecosystem condition is not recovered until a traditional timber harvest is conducted well into the future. While the social and ecological services provided by private landowners who apply fire management are significant, not enough is being done to incentivize these treatments and address the costs borne by these landowners. (Also see economics section.)

Liability for escaped fires and smoke is significant in many states in the longleaf range. Many states have no system to manage liability exposure from escaped fire management. Specific legislation exists in some states to provide fire management service providers, either public or private, some protection from liability, provided those service providers are trained, certified, and conduct their activities in accordance with acceptable standards. This legislation has not been widely tested in courts nor is it in place in many of the longleaf states.

A shortage of prescribed burning practitioners and services exists in the South. The capacity to conduct prescribed burning rests mostly with the federal and state agencies and select NGO's. Although private family forest owners and managers

may conduct their own burning, the necessary training and experience can be difficult for them to obtain. Consultants and other service providers are not numerous and/or not trained for application of fire management to achieve restoration/maintenance goals. They too are faced with obtaining liability insurance that is too often prohibitively expensive. Opportunities may exist to increase capacity to conduct fire management by expanding ecoregional fire management strike teams (modeled after ones in Florida), and organizing and participating in local fire management "cooperatives."

Increasing the acreage of longleaf that is maintained by fire is not only a matter of increasing practitioners and resources, but also increasing the ability to burn larger acreages over time. Strategically developing fire plans over time can include increasing the acreage burned with the same resources by reducing fuel loads, eliminating interior fire breaks, using innovative ignition techniques, and taking advantage of wildfire.

While control of wildfire is a major effort of federal, state, and local entities, their strategies often fail explicitly to address the relationship of wildland fire control and prescribed burning. Assessments of capacity and funding for wildfire control offer opportunities to leverage resources and provide for more integrated planning to achieve multiple objectives.

Prescribed burning services offered by state agencies are often limited by budget constraints. Opportunities exist to make the case for additional funding through this Initiative and better to integrate wildfire suppression and application of prescribed burning.

Objective A Determine the level, location, and capacity to apply fire management in longleaf ecosystems to maintain, improve, and restore longleaf in Significant Geographic Areas.

Key Actions

1. **Work with USDA Forest Service (Forest Inventory and Analysis), State forestry and State wildlife agencies and others to develop estimates of longleaf acres by ecological condition class and management category. Support Geographic Information Systems (GIS) mapping and on-the-ground verification. Establish information tracking systems to determine where and when agencies, organizations, and individuals have burned.**

Objective B Social awareness, economic incentives, and institutional capacity for fire management are increased, particularly in Significant Geographic Areas, to maintain, improve, or restore longleaf.

Key Actions

2. **Build a strong partnership with state and regional fire councils, state and federal fire and resource management agencies, and other natural resource conservation and management organizations to achieve cooperatively the**

fire management goals of the Conservation Plan. Use and expand LANDFIRE and The Ecological Classification System for longleaf systems where appropriate.

3. Through education and outreach, advance awareness of fire's influence in shaping and sustaining native ecosystems, as well as the benefits of frequent fire management as opposed to wildfire. The target audience will include state and federal air quality regulators, key policy makers, and planners at the state and local levels. Expand ongoing efforts to reach the public with similar messages. Build upon and target "messaging campaigns" designed to increase understanding, acceptance, and application of fire management in Significant Geographic Areas.
4. ***Work cooperatively with the U.S. EPA and the state air quality agencies to address smoke management for fire management and to facilitate increased burning while complying with state air quality laws. Recognize the positive aspects of fire management on air quality in state plans. A key activity is the participation in the development and/or updating of Smoke Management Programs prepared by state air quality and land management agencies.***
5. ***Increase the capacity to apply fire management by providing the training, services, and financial incentives to facilitate landowners' ability to apply fire management treatments. Expand and leverage wildland fire control resources to expand planning and application of fire management. Address capacity particularly in the wildland-urban interface within Significant Geographic Areas for longleaf. These areas are facing increased human population density, and need technical assistance and local and community planning. Develop and maintain online databases of certified burn managers by state.***
6. Analyze and identify any appropriate changes in federal, state, and local laws and policies (including liability) needed to address constraints or impediments in application of fire management for longleaf maintenance, rehabilitation and restoration.

Understory and Overstory Restoration Strategy

Issues, Opportunities, and Challenges:

Understory communities in longleaf forests are not only the heart of the rich species diversity, but also play the key role in providing the fuel for fire management. We know little collectively about the current floristic condition of much of the 3.4 million estimated acres of longleaf. However, given the lack of fire management and the fire adapted nature of the longleaf understory, many of these longleaf acres are likely in poor condition. Major challenges exist in making major strides in understory restoration.

Understory management, improvement, and restoration have been adopted widely as conservation goals in the public and private sectors, but historically this component of the forest has received much less attention in research and development compared to overstory management. This disparity is an

important consideration because many rare, threatened, and endangered species occur in this component of longleaf forests.

The use of plant material that is the correct species and from appropriate plant zones is important to ensure that plants are adapted to live on specific restoration sites and will maintain the integrity of the biodiversity. Information exists for guiding understory plant material targets (species and zones), planting decision aids and related information, but the information has not been compiled in a central place for use by professionals, the nursery industry, and others. Moreover, this information has not been brought forward into policy and commonly applied management practices. (Also see discussion on understory under Private Lands Strategy.)

Invasive species threats can pose significant challenges to maintaining, improving, or restoring sites. Controlling invasive species is a key component to restoring either longleaf pine or the understory species. Cogongrass is a major threat to longleaf forests in substantial parts of its range. Feral hog disturbance and fire ants are problems in some areas as well.

Supplies of ecologically appropriate native seed are unavailable for most longleaf pine communities and/or insufficient to meet demands for ground layer restoration or re-establishment. Further, there are no accepted standards for quality and provenance of native ground layer species. The institutions, equipment, and knowledge exist (e.g., with the USDA Forest Service National Seed Laboratory) to work on native plant seed protocols, but limited funding has been available to work on species associated with longleaf pine.

Powerline and other rights-of-ways can serve as areas of seed collection for native species either as propagation areas when managed appropriately or as "salvage areas" of plant material where construction occurs.

Longleaf pine tree seed is frequently in short supply or not available from the proper source. Infrequent seed crop years are common in longleaf. Good seed crop years may occur once in five to ten years. It is critical to ensure that an aggressive effort is underway in good seed years to collect, process, test, and store seed.

Existing understory seed production areas and tree seed orchards are being abandoned or underfunded. Seed orchards play a critical role in ensuring seed from appropriate zones is available for restoration. They represent years of investment in selection and propagation that is currently threatened. Similarly, nurseries have been abandoned or substantially underused in recent years with the decrease in loblolly and slash pine plantation establishment. These nursery resources represent a substantial untapped capacity for both understory and tree seedling production for longleaf restoration efforts. To meet the conservation goals for acres of tree seedling reestablishment, a tripling of seedlings from current annual production is needed. This will require additional resources and take several years to ramp up.

Communications, technical assistance, and demonstration of best practices can play a substantial role in achieving the goals of this understory/overstory strategy. Inventories of demonstration

and reference sites as well as contact information are needed to assist landowners and technical service providers with learning opportunities. Communications efforts should include the impacts of pine straw harvest and sustainable practices relative to site productivity and understory communities.

Objective A Information is developed and transferred to landowners, managers and private suppliers to stimulate production of appropriate plant material needed for management.

Key Actions

1. *Develop the seed and plant production technologies, standards, and guidance needed to produce understory plant materials. Identify species important in the ground layer of the longleaf pine communities throughout the range with the goal to help guide development efforts for commercial production.*
2. Implement accreditation standards for producers of seeds and seedlings to assure genetic and physiological quality of seeds and plants used in restoration.
3. Develop guidelines for collection methods and frequency in longleaf sites with high quality groundcover for use by public and private sectors.
4. *Compile information related to groundcover/restoration research and implementation that has been developed by institutions over the last 20 years (e.g. the Northwest Florida Program, Disney Wilderness Reserve, Joseph W. Jones Ecological Research Center and the U.S. Forest Service).*

Objective B Provide sound technical advice and communications to resource managers and landowners to gain support and increase efforts to maintain, improve and restore longleaf understories and overstories.

Key Actions

5. Access and communicate the values added by restoring the native groundcover in longleaf pine forests targeting landowners and policy makers.
6. *Compile and communicate well-known effects of common management practices on high quality ground cover (“best practices”) with the goal to help guide the maintenance of existing high quality communities, avoid continued loss, raise awareness of the significance of existing habitats, and influence management policy development. Emphasize the extreme importance of retaining groundcover horizontal continuity as fuels for fire and the effects of various silvicultural/site preparation treatments on soil disturbance and related effects on fuels continuity. Address pine straw harvest impacts and practices.*
7. Develop guidance for area-specific feasible restoration goals to communicate the concept that feasible goals must be

defined relative to area and spatial context for landowners and resource managers.

8. Compile a contact list of botanical information identifying public sources for ground layer restoration. Include the names and site preferences of native species as well as Native Plant Societies, Botanical Gardens, Garden Clubs, other NGO’s, and university-based resources.
9. Catalog existing demonstration projects and ecological reference sites where land managers can see what reference sites and restoration projects look like at various stages and can talk with someone who is restoring a site. Such opportunities will help land owners and managers develop realistic expectations for restoration efforts and site potential.
10. *Compile sources of information for the identification, potential threat, control, and removal of non-native invasive plants and animals.*
11. Engage with people/programs dealing with invasive species, e.g., Cogongrass taskforces and Invasive Plant Councils within the longleaf range, to ID areas of mutual interest.
12. Work with oil, gas, and power companies as well as conservation partners to provide seed and plant material from and on rights-of-ways.

Objective C Plant material capacity and delivery are substantially increased to meet the goals of the Conservation Plan. Financial assistance and incentives for landowners, agency, and private sectors are increased.

Key Actions:

13. *Dramatically increase longleaf tree seed and seedling production in the public and private sectors. This requires support for existing nurseries, expanding capacity of existing or new nurseries, coordinating seed collection and related seed collection work, and exploring new technologies in seedling production.*
14. *Encourage seedling producers to advertise seed origin by ecosystem type.*
15. *Coordinate the development of a native seed market in the longleaf pine range. Encourage private landowners to participate in efforts to provide additional incentives for landowners to manage, improve, and restore longleaf.*
16. *Develop or expand funding efforts to implement invasive species detection and control as well as to accelerate production of understory plant material.*

Climate Change Strategy

Issues, Opportunities, and Challenges

Much additional scientific study needs to be done to understand the effects to date and likely future effects of climate change on forests generally and longleaf in particular in order to better

inform our restoration efforts. Currently available information includes the Climate Change Tree Atlas (2007) developed by the USDA Forest Service which considered the relative frequency, density, and dominance of various tree species under future climate conditions predicted through 2100. The conclusion is that longleaf pine is the clear “winner” among all the southeastern pines (including loblolly, shortleaf and slash) by a very wide margin in terms of response to climate change. Some southern oaks (e.g., post, blackjack, turkey, and southern red) also fair as well or better than longleaf pine. This is consistent with the fact that these favored species are more resistant to drought and high temperatures. Nonetheless, many questions remain, e.g., effects on canopy closure conditions and hardwood encroachment.

The Climate Change Tree Atlas also predicts shifts in the distribution of various tree species. With respect to longleaf, the extension of the range to the north is noteworthy (depending on the model) and may present establishment opportunities. Interestingly, despite the extension northward, the Atlas does predict longleaf to lose no or minor parts of its current southerly range. This is in contrast to other pine types, like slash, which in the future may no longer grow on some existing sites. Note, however, that at least one of the models (Hadley Centre model) suggests that savanna and grasslands may expand and replace southeastern pine forests on some sites along the coastal plain due to increased moisture stress.

Effects of climate change on plant and animal communities on longleaf ecosystem structure and function have received even less study. One investigation concluded that the longleaf pine tree itself may perform well in a high CO₂ world but that other members of the community in the herbaceous layer may not compete as well, thus altering community function. The influence of climate change on invasive plants and on pollinators in the longleaf ecosystem is also inadequately understood. Additional study is needed to inform restoration strategies.

The USDA Forest Service Climate Change Bird Atlas (2007) also shows responses in potential range expansions for species such as Bachman’s Sparrow and Northern Bobwhite when different scenarios of climate change were modeled.

The role that longleaf restoration could play in affirmatively mitigating climate change, or perhaps in easing adaptation to it, also needs greater attention from the scientific community. It is known that a significant portion of the world’s carbon is stored globally in forests and thus forests undeniably play a significant role in moderating climate change. Nonetheless, quantifying carbon storage across the many forest types, including longleaf, and the multiple management regimes is still problematic. Several factors suggest that longleaf could play a positive role in sequestering carbon or at least will be well adapted to climate change relative to many other tree species. These factors include that it is the longest living pine of the southern yellow pines with the lowest mortality, that it can sustain growth at older ages (over 150 years), that it is tolerant to fire and most insects and diseases, and is also more resilient to hurricane damage relative to other pine types. Further, some data (K. Robertson,

Tall Timbers) suggests that charcoal from fires constitutes a significant source of soil carbon and that frequently burned sites may store more carbon than other sites. This information should be considered along with the levels of CO₂ emissions produced by the fire management. Nonetheless, because of the insufficiency of scientific information, e.g., on the overall carbon budget of this fire maintained system, no precise conclusions can be reached about the net value of longleaf restoration to addressing climate change.

Another area of uncertainty is how forest carbon may be treated in any climate change or related legislation that may be enacted by the U.S. Congress or at the state level. Note, for example, that North Carolina has established a Legislative Commission on Global Climate Change to examine “the emerging carbon economy,” among other issues. Some investors in the Chicago Climate Exchange³ and elsewhere are already betting that carbon stored in forests could play a role in a voluntary carbon market or as an offset in a future cap-and-trade system. However, several challenging issues exist with respect to quantifying carbon in diverse forest types under different management regimes, demonstrating “additionality” and assuring “permanence” of the sequestration. Even if forest carbon is not legitimized as part of a cap-and-trade system other aspects of the likely legislation, including a proposed adaptation fund, may provide avenues for supporting restoration of longleaf. Moreover, new legislative proposals may emerge to reward forest landowners who manage with an aim of storing more forest carbon. Ongoing monitoring of federal legislative proposals will be necessary to evaluate opportunities, either for private landowners or for the regional restoration initiative itself.

While Congress weighs various climate change proposals some agencies, private landowners, and public land managers are already moving ahead to address climate change. For example, the U.S. Fish and Wildlife Service has identified longleaf pine as one of the major ecosystems for promoting carbon sequestration in the Southeast. Recent hurricanes, like Katrina and Rita, as well as extensive fires, including those near the Okefenokee, appear to be prompting more private landowners to reconsider longleaf due to its greater resilience to these threats, as well as pests. The U.S. Forest Service’s planning documents supporting the proposed Land Management Plan for the Uwharrie National Forest explicitly identifies longleaf restoration on appropriate sites as a climate change strategy, citing both its adaptation to fire and reduced vulnerability to disturbances such as storms. These forward-looking developments in a small way reflect the great promise of societal benefits to be gained by the extensive restoration of eight million acres of the climate-adapted longleaf forests across nine states, as called for in this Plan.

Note: Carbon markets and biomass are addressed in the Markets and Financial Incentives section of this Conservation Plan.

[3] The Chicago Climate Exchange is the largest voluntary trading system for six greenhouse gasses in the voluntary U.S. carbon market.

Objective A Seek better understanding of the likely effects of climate change on the longleaf pine ecosystem as well as the role longleaf restoration could possibly play in mitigating climate change or adapting to such change.

Key Actions

1. *Promote more extensive scientific study of the potential effects of climate change on the longleaf ecosystem, including the tree species, plants and animals, and ecosystem function.*
2. *Promote further study of the contributions that longleaf restoration and management could play in carbon sequestration and adaptation to climate change. Such study should include development of a standardized carbon accounting system and baseline inventories for longleaf systems to promote marketing and crediting of longleaf sequestration efforts.*
3. Promote further study of the potential climate change impacts from the increased level of prescribed burning done to restore and maintain healthy longleaf ecosystems. Also, promote further study to gain a better understanding of the climate change impacts of frequent fire management versus catastrophic wildfires.
4. *Monitor federal legislative proposals to assess opportunities (as well as possible constraints) presented to private landowners and to the landscape-level initiative to restore longleaf.*
5. *Promote and demonstrate range-wide and site-based conservation planning for longleaf restoration to support ecosystem adaptation (resilience and resistance) and integrate the results with other climate change planning efforts.*

Cross Cutting Approaches

The following three topics, 1) Significant Geographic Areas, 2) Communications, Education, and Outreach, and 3) Evaluating Conservation Outcomes apply or guide actions related to the above six strategies.

- ▶ **The Significant Geographic Areas**—the first attempt to identify those areas, from a range-wide view, that should receive focused and targeted attention in order to achieve the conservation goals of the Conservation Plan
- ▶ **The Communication, Education and Outreach**—designed to support all of the strategies
- ▶ **Evaluating Conservation Outcomes**—calls for monitoring efforts and actions and adapting to achieve longleaf conservation.

Significant Geographic Areas

Issues, Opportunities, and Challenges:

A major guiding principle of this Conservation Plan is that, in the absence of unlimited resources, the conservation of longleaf pine needs to be spatially focused to reach the ultimate goals of biodiversity conservation at meaningful scales. A targeted approach capitalizes on the greatest opportunities and maximizes the potential for success. A geographically scattershot approach to protecting and restoring longleaf pine will not reach the goal of conserving viable longleaf ecosystems or populations of longleaf dependent species. While all areas with a canopy of longleaf pine and/or an intact ground cover are important, the Conservation Plan identifies Significant Geographic Areas where resources, expertise, partners, and policy implementation, can optimally be focused to conserve longleaf pine ecosystems. It is at these Significant Geographic Areas that more detailed conservation planning, implementation and evaluation must take place through a collaborative approach with partnerships of public agencies, conservation organizations, and private landowners. See discussion of local teams to be assembled to lead local, on-the-ground conservation efforts in the Conservation Plan Implementation section below.

Efforts to identify a first iteration of these Significant Geographic Areas at a range-wide scale were initiated by the Focal Area Technical Team of the Regional Working Group. (See Appendix D for discussion of the Focal Area Team and its work.) The team

gathered spatial data from a range of sources. This included:

- ▶ Occurrences of intact longleaf pine systems from various sources (NatureServe and state Natural Heritage data on longleaf community occurrences, mapped longleaf pine locations in several states)
- ▶ Conservation areas including longleaf pine ecological systems from The Nature Conservancy's Ecoregional Assessments and state Comprehensive Wildlife Conservation Strategies, commonly known as state Wildlife Action Plans
- ▶ County occurrence data on longleaf pine from the USDA Forest Inventory and Analysis information
- ▶ Occurrences of rare and imperiled longleaf pine dependent species from NatureServe and state Natural Heritage Programs and data on Red-cockaded Woodpecker populations from the U.S. Fish and Wildlife Service
- ▶ Existing protected areas from the Conservation Biology Institute's Protected Areas Database.

Additionally, to assess the human environment and its relation to potential longleaf areas and opportunities to manage with fire management, spatial data were obtained on current housing density in the range of longleaf pine, as well as roads and urban areas..

For this planning exercise, the team recognized two distinct types of Significant Geographic Areas for longleaf pine conservation. First, Significant Landscapes for Longleaf Pine Conservation are intended to focus conservation efforts to establish or maintain functional landscapes with adequate connectivity for large-area dependent species and complex matrices of natural communities. Second, Significant Sites for Longleaf Pine Conservation are smaller areas that contribute to conservation of all extant examples of longleaf communities and longleaf dependent species. Both are important to the conservation of the range of longleaf pine communities and species diversity.

The criteria used to identify Significant Landscapes for Longleaf Pine Conservation are:

- ▷ A landscape greater than 100,000 acres with one or more longleaf natural community types and related ecosystems (e.g., pocosins, baygalls, swamp forests)
- ▷ A core of significant acreage of intact longleaf pine with an owner/manager who has a long-term commitment to management and conservation
- ▷ The potential, through maintenance, improvement, and restoration to establish functional connectivity across a large enough geographic area of public and private ownership to conserve large-area dependent species and resilience to known and potential environmental stresses (e.g., hurricanes, catastrophic fire and future climate change)
- ▷ The lack of constraints for protection (land use change) and management (restrictions on fire management) into the foreseeable future, and
- ▷ Known opportunities (funding, partners and stakeholders) for longleaf conservation.

The criteria used to identify Significant Sites for Longleaf Pine Conservation are:

- ▷ Smaller areas from 100,000 to only a few hundred acres containing ecologically significant longleaf communities and/or longleaf dependent species
- ▷ The potential to protect and manage an area of an adequate size to conserve the ecologically significant longleaf communities or longleaf-dependent species for the near future, but with less assurance that the site would be resilient to broader scale environmental stresses, and
- ▷ Known or potential opportunities (funding, partners and stakeholders) for longleaf conservation.

The team developed maps that were reviewed and edited by participants at the Charrette held in March 2008 and a first iteration of 16 Significant Landscapes for Longleaf Pine Conservation was identified. See Appendix B for maps of the Significant Landscapes. All of these have a core of federal land that is being managed for longleaf pine, including lands managed by the USDA Forest Service, the Department of Defense, U.S. Fish and Wildlife Service, state lands, and private conservation groups.

Numerous examples of the smaller-scale Significant Sites for Longleaf Pine Conservation were also identified, but more work is needed before this list can be considered comprehensive. These areas are equally important as the Significant Landscapes and include sites like the Carolina Sandhills National Wildlife Refuge in South Carolina and the Mountain Longleaf National Wildlife Refuge in Alabama. With additional analysis, the Worth-Colquitt County longleaf sites in Georgia and the Red Hills on the border of Georgia and Florida could be considered as a potential additional Significant Landscape in the

future, but at a minimum, is a Significant Site. Further work is needed to identify areas to capture intact longleaf communities and old growth longleaf stands, locations of rare and imperiled species, and meet range-wide goals for rare species. Longleaf sites with intact natural ground cover, no matter what the size, are essential to protect.

This first iteration combined quantitative spatial data with expert input and was built on the work done in other conservation planning efforts at a range of scales (regional, ecoregional, state) like TNC's Ecoregional Assessments and the Red-cockaded Woodpecker Recovery Plan. This first iteration of Significant Landscapes needs to be assessed to determine how the areas capture diversity of longleaf ecosystems and the rarest and most irreplaceable species and communities. A first iteration of Significant Sites also needs to be developed.



Photo by John Maxwell, U.S. Fish and Wildlife Service

Additional efforts are needed to determine range-wide goals for species and to refine the spatial extent within Significant Areas necessary to maintain sustainable populations of imperiled and socially important species as well as desired conditions for longleaf habitat. Both the U.S. Fish and Wildlife Service with its Strategic Habitat Conservation Framework and The Nature Conservancy with its Ecoregional Assessments and Conservation Action Planning Process have approaches that develop this information. Both approaches more finely tune the on-the-ground implementation activities and help develop and support on-site and range-wide monitoring and research activities. Appendix E lists the U.S. Fish and Wildlife Service's species of conservation concern or management, organized by ecological system and conservation category. A list of the globally imperiled species that occur within each of the Significant Landscapes for Longleaf Pine Conservation is on the *America's Longleaf* web site.

Specific challenges that have been identified include:

- ▷ Lack of focus on spatially defined Significant Geographic Areas for the conservation of longleaf pine ecosystems and populations of longleaf dependent species. Current work and available resources are geographically dispersed and fall short of significant ecological success at any one site

- ▷ Ensuring that the suite of Significant Geographic Areas (Significant Landscapes and Significant Sites) are representative of the range of longleaf pine ecosystems, capture the rarest and most irreplaceable species and communities, and assess areas for their ability to sustain these ecological values over time
- ▷ Incomplete knowledge of the location and condition of remaining longleaf pine stands
- ▷ Lack of the ability to assess the value of a protection or restoration project to the larger goal of conserving the longleaf pine ecosystem and longleaf pine dependent species
- ▷ Decision support tools that allow evaluation and mapping of existing and potential conservation and restoration sites for species, as well as prioritization of fire management and other restoration activities, are rare and have not been tested range wide.

Objective A The first iteration of 16 Significant Landscapes for Longleaf Pine Conservation is assessed to determine how well the currently identified landscapes conserve the range of longleaf ecosystems, natural communities and longleaf dependent species. These assessments also consider how sustainable each landscape is over the long-term in the face of changing threats (land conversion, fire suppression, invasive species), ecological processes (fire) and climate change. A second iteration of Significant Landscapes for Longleaf Pine Conservation has been refined by an expert review process.

Key Actions

1. *Complete an assessment of the first iteration of 16 Significant Landscapes for Longleaf Pine Conservation to determine how well they capture the range of ecosystem and species diversity.*
2. *Complete a long-term sustainability assessment of the first iteration of 16 Significant Landscapes for Longleaf Pine Conservation for:*
 - a. *ecologically appropriate boundaries, landownership, current condition, and management needs (maintain, improve, restore)*
 - b. *long-term sustainability in the face of population growth, climate events, and climate change.*

Objective B A suite of Significant Sites for Longleaf Pine Conservation are identified that, along with the Significant Landscapes, capture the representative range of longleaf pine ecosystems and natural communities, and the rarest and most irreplaceable species and communities. Assess these sites for their ability to sustain these ecological values over time.

Key Actions

3. *Complete a more thorough remote sensing assessment and ground validation of extant stands of longleaf pine throughout the historic range of the species.*
4. *Identify sites that contain significant populations of rare and imperiled species and unique longleaf community types.*

Objective C Assessments are completed that determine range-wide goals for priority species and refine the spatial extent needed within Significant Geographic Areas to maintain sustainable populations of these species as well as meeting desired conditions for longleaf habitat. These spatially-explicit assessments will focus on-the-ground implementation activities to address specific habitat and population goals.

Key Actions

5. *Assess the habitat/species matrix within the significant communities of the range-wide longleaf ecosystem types identified. Select corresponding priority species to represent the habitat components of these communities. Identify sustainable population objectives of priority species and needed habitat condition to support population objectives.*
6. *Prioritize areas on the landscape for implementation of conservation and management projects to address population goals and needed habitat using decision support tools and remote sensing technology. These tools should integrate resource conditions and help in evaluation of specific sites and landscapes to bring desired conservation actions to the ground in a targeted and science based way, with leadership from local teams, as discussed in the Conservation Plan Implementation section below.*

Communications, Education, and Outreach

Issues, Opportunities, and Challenges:

Communications, education, and outreach (referred to collectively below as “Communications”) play an important role in virtually all longleaf conservation efforts. Indeed, many Key Actions identified in the previous sections of this Conservation Plan explicitly reflect various communications needs. For example, landowners may need to learn more about available incentive programs while policy-makers may require more information about the relationship of fire management and wildfire as they make decisions. The wide range of communications related to implementing the conservation actions of this Plan constitutes a first category of essential communications activity.

In addition, a second but parallel communications effort focusing on creating awareness and support specifically for the *America’s Longleaf Initiative* itself has been developed and is being implemented. This additional category of communication

activity is aimed at raising the regional and national profile of longleaf restoration as an essential element of the country's broad conservation agenda to conserve our iconic forests.

In support of *America's Longleaf*, a web site (www.americaslongleaf.org) has been launched to provide information on the Initiative. It also offers information on the Conservation Plan and progress in implementation of key actions. It also serves as a link to additional resources and partners.

A considerable amount of communications related to longleaf conservation has and is being done by state forestry and extension agencies, state fish and wildlife agencies, federal agencies, NGOs such as the Longleaf Alliance, and partnerships like the Southeast Regional Partnership for Planning and Sustainability (SERPPAS). Activities range from working face-to-face with individual landowners to developing brochures and websites. Most of this work is local or state-based, with some notable exceptions where coordinated messaging campaigns are adopted across multiple states. For example, one such large-scale communications effort addressing the fire management issue is now gearing up. Often, however, a lack of expertise, funding, and staffing limits the reach and effectiveness of longleaf communications efforts.

Relatively little quantitative data exist on the awareness, knowledge, attitudes, and behaviors of various target audiences specifically toward longleaf ecosystems and issues important to longleaf conservation (fire management, ecosystem services, motivations from providing financial incentives, *etc.*) especially at a range-wide scale. The data that do exist have not been systematically organized and analyzed. This information is critical to developing and monitoring effective communications efforts.

Objective A Communications tools, programs, and capacity are available to influence behaviors of a wide range of target audiences relative to engaging in the priority conservation actions identified in this Conservation Plan.

Key Actions

1. Gather and summarize existing qualitative and quantitative longleaf-specific information on various target audiences (awareness, knowledge, behaviors, *etc.*) *via* literature review and interviews with experts.
2. Conduct scientifically valid survey(s) of key target audiences *via* phone, mail, and/or online to fill-in gaps identified above.
3. **Develop an education and outreach plan to guide both local/state level and range-wide efforts that includes:**
 - a. **A summary of existing communications, education, and outreach programs and efforts range-wide**
 - b. **Goals, target audiences, and objectives**
 - c. **Key messages and media**
 - d. **Highest priority communications, outreach, and education actions**

- i. **The actions developed at the Charrette in March 2008 provide a solid foundation on which to build actions (see americaslongleaf.org for a list of those actions)**
- ii. **Will need to include additional outreach staffing on-the-ground.**
- e. **Geographically-based database and information systems for tracking ongoing communications projects and partnerships**
- f. **Evaluation metrics and processes.**

Objective B Awareness, understanding and support among target audiences for the *America's Longleaf* Initiative as a collaborative effort to raise the regional and national profile of longleaf restoration.

Key Actions

4. **Continue implementation of the comprehensive communications strategy detailing target audiences, objectives, key messages, actions, and evaluation metrics focused on creating the awareness and institutional and financial support needed for the America's Longleaf Initiative.**
5. **Provide information to key audiences through a dynamic web site.**

Evaluating Conservation Outcomes

Issues, Opportunities, and Challenges:

Evaluating the progress and outcomes of conservation actions is currently a major emphasis in conservation biology, as well as a focus of publicly funded agencies and some of the largest conservation organizations. Not only is evaluating progress and outcomes necessary to determine if conservation actions are successfully implemented and ecological goals are being met, it is also necessary to better inform management and decision-making at all levels of a project or program.

At the stand or site level, evaluating outcomes is an essential component for any longleaf project—how else would one know if the management or restoration has been effective and worth the resources invested? Equally important are the insights that evaluating outcomes provide for adapting and improving management actions, such as the use of fire and herbicide application. For example, monitoring the results of these treatments will let the manager know if the density of the understory is being reduced, the composition of the groundcover is improving in native diversity, or an invasive species is being reduced in abundance. While evaluating outcomes seems an obvious need, the majority of restoration efforts, including longleaf projects, are not monitored, leaving land managers and landowners to assume that progress is being made.

At the programmatic level, evaluating outcomes allows the assessment of a project (defined here as a landscape with multiple site-based conservation efforts), an agency program, or a larger scale initiative to determine if it is meeting its stated objectives. Some of the potential indicators of progress include acres protected, acres managed for longleaf biodiversity, acres restored to a longleaf canopy, the improved status of a species and a habitat, successful implementation of a policy strategy, improved knowledge of the effectiveness of a specific strategy, increased funding for longleaf management within a specific agency, and the efficient use of funding (restoration success per dollar). Some of these indicators are a roll-up of monitoring at the site level, while others are measured across sites at the programmatic level.

Developing a monitoring program has proven extremely difficult both in institutions and for individual landowners. The reasons for this are many, including a lack of:

- ▷ Financial resources available for monitoring
- ▷ Technical knowledge and expertise to implement effective and efficient monitoring
- ▷ Institutional support and culture for monitoring
- ▷ Identifying the right monitoring questions, and
- ▷ Understanding of how to determine the appropriate type and level of monitoring needed to obtain adequate data to assess management and programmatic progress.

Substantial experience in monitoring of longleaf pine exists throughout the region in individuals and institutions. Sharing this experience, including monitoring plans, and maintaining a network would greatly facilitate the implementation of monitoring as part of longleaf conservation.

Collaboratively utilizing this knowledge base would minimize the amount of monitoring needed for many management activities, since their outcomes would be well understood. But there still exists some key management questions and uncertainty about the impacts of particular management actions. Rather than having every land manager address these questions, a collaborative approach could be developed that involves self-selected sites to test and monitor specific management actions at locations throughout the range of longleaf. These could include the use of fire in the removal of deep duff layers or burning in urban interfaces. The results would be distributed through the network to practitioners allowing them to adopt new management actions and minimize their monitoring efforts.

Objective A Measures are integrated into conservation outcomes for the maintenance, improvement, and restoration of longleaf pine at both the stand/site/landscape and programmatic levels through a collaborative approach.

Key Actions

1. Develop guidance and training and share “best practices” for monitoring the maintenance, improvement, and restoration of longleaf pine at both the stand/site/landscape and programmatic levels by building on the experience of practitioners and institutions.
2. Develop a network of practitioners to share methodologies and results.
3. Identify the most important monitoring and research questions for longleaf maintenance, improvement, and restoration and develop a collaborative approach for determining the answers.
4. Support an increase to adequate funding levels for monitoring by all land managing agencies.

Objective B Conservation outcomes are evaluated for all key actions identified in the Conservation Plan, where appropriate.

Key Actions

5. Identify measures for all appropriate key actions developed in this Conservation Plan.



Photo by Jack Culppeper, U.S. Fish and Wildlife Service, Carolina Sandhills National Wildlife Refuge

Conservation Plan Implementation

The goals set forth in this Conservation Plan are ambitious and achieving them will require an exponential acceleration of conservation activity by many parties. Implementation is to be accomplished through voluntary collaborative efforts of organizations represented on the Regional Working Group and many others, including landowners, other agencies and organizations, private businesses, and research and extension institutions associated with longleaf efforts across the range.

While action at the regional or national scale is important, most implementation of this plan will occur through local and sub-regional actions. It will require active involvement by many landowners, resource managers, scientists, and policy makers. This Plan envisions local teams within Significant Geographic Areas as the leaders to assess priorities, conduct more local inventories, establish locally-based priorities and involve other local players important for maintenance, improvement and restoration for longleaf. In many cases, locally-led efforts have been underway for years and *America's Longleaf* aims to bolster those pre-existing efforts by raising the profile of longleaf conservation. Select local teams would also be supported by the Regional Working Group through efforts to secure resources for implementation, address policy, capacity, or other priority actions as well as to facilitate coordination with broader or sister efforts.

The Regional Working Group intends to continue functioning as a forum for collaboration and coordination at least through late 2009. During this year, the group will help evaluate and make recommendations to identify more permanent institutional structure(s) which would constitute a “home” for the *America's Longleaf* Initiative in future years.

OBJECTIVE A A formal structure for coordinating longleaf activities is in place to ensure mutual and multiple benefits for promoting longleaf restoration and implementation of key actions are expanded in the coming year.

Key Actions


1. Outline and implement a formal structure for institutionalizing *America's Longleaf* Initiative.
2. Initiate actions to stand up local teams within Significant Geographic Areas to further area-specific planning and on-the-ground actions.

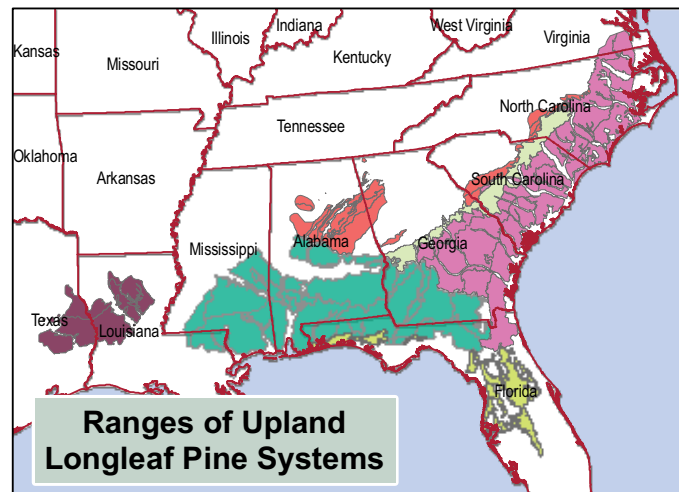


Photo by John Maxwell, U.S. Fish and Wildlife Service

Appendix A: Ecoregion Maps and Distribution within Significant Landscapes

Legend

-  Atlantic Coastal Plain Fall-line Sandhills Longleaf Pine Woodland
-  Atlantic Coastal Plain Upland Longleaf Pine Woodland
-  Florida Longleaf Pine Sandhill
-  East Gulf Coastal Plain Interior Upland Longleaf Pine Woodland
-  Southeastern Interior Longleaf Pine Woodland
-  West Gulf Coastal Plain Upland Longleaf Pine Forest & Woodland








These range maps were developed by NatureServe using data from a variety of publications and other sources. Their development was supported by the SE Regional GAP Analysis Program, Raleigh NC. We have received comments and review by Ecologists from the following programs: Southeastern Regional Office, Durham, NC; Alabama Natural Heritage Program, Montgomery AL; Florida Natural Areas Inventory, Tallahassee, FL; Georgia Natural Heritage Program, Social Circle, GA; Louisiana Natural Heritage Program, Baton Rouge, LA; Mississippi Natural Heritage Program, Jackson, MI; National Forests in Florida, Tallahassee, FL; North Carolina Natural Heritage Program, Raleigh, NC; and the South Carolina Heritage Trust, Columbia, SC. Descriptions of the Systems themselves are available at <http://www.natureserve.org/explorer/>. Additional comments, suggestions, and corrections regarding their contents are solicited and should be directed to Milo Pyne, NatureServe Senior Regional Ecologist, Durham, NC <milo_pyne@natureserve.org>. Map production is by the Southern U.S. Region of The Nature Conservancy in Durham, NC (8/4/08).

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Legend

-  Central Atlantic Coastal Plain Wet Longleaf Pine Savanna & Flatwoods
-  Southern Atlantic Coastal Plain Wet Pine Savanna & Flatwoods
-  Central Florida Pine Flatwoods
-  East Gulf Coastal Plain Near-Coast Pine Flatwoods
-  West Gulf Coastal Plain Wet Longleaf Pine Savanna & Flatwoods

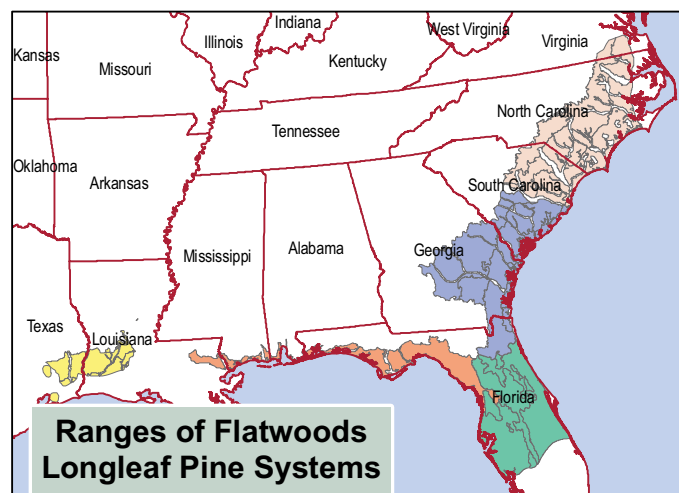


Table 2 Select Characteristics of Significant Landscapes

Landscape	Location	Primary Ownerships	LLP Type>> Longleaf Pine Ecosystem Type (NatureServe)	Type Code	EPA Ecoregion
Onslow Bight	NC	DOD USFS TNC NCWRC	Central Atlantic Coastal Plain Wet LLP Savanna and Flatwoods	CES203.265	63h
			Atlantic Coastal Plain Upland LLP Woodland	CES203.281	
Bladen Lakes/Cape Fear	NC	NCParkes, NCWRC	Atlantic Coastal Plain Upland LLP Woodland	CES203.281	63h
NC Sandhills	NC	DOD NCWRC	Atlantic Coastal Plain Fall-Line Sand-hills LLP Woodland	CES203.254	65c
Francis Marion	SC	USFS SCDNR TNC Private CE	Atlantic Coastal Plain Upland LLP Woodland	CES203.281	63
			Central Atlantic Coastal Plain Wet LLP Savanna and Flatwoods	CES203.265	
Ft. Stewart/Altamaha	GA	DOD GADNR	Southern Atlantic Coastal Plain Wet Pine Savanna and Flatwoods	CES203.536	75f 65l
Ft. Benning	GA AL	DOD	Atlantic Coastal Plain Fall-Line Sand-hills LLP Woodland	CES203.254	65c 65d
			East Gulf Coastal Plain Interior Upland LLP Woodland	CES203.496	
Apalachicola/St. Marks	FL	USFS USFWS FLDOF FLDEP NFWFMD	Florida Longleaf Pine Sandhill	CES203.284	75a
			East Gulf Coastal Plain Near-Coast Pine Flatwoods	CES203.375	
			East Gulf Coastal Plain Interior Upland LLP Woodland	CES203.496	
Osceola NF	FL	USFS USFWS FLFWC	Atlantic Coastal Plain Upland LLP Woodland	CES203.281	75e 75g
			Southern Atlantic Coastal Plain Wet Pine Savanna and Flatwoods	CES203.536	
Ocala	FL	USFS	Florida Longleaf Pine Sandhill	CES203.284	75c 75d
			Central Florida Pine Flatwoods	CES203.382	
Talladega	AL	USFS	Southeastern Interior LLP Woodland	CES202.319	67
			East Gulf Coastal Plain Interior Upland LLP Woodland	CES203.496	
Eglin Blackwater Conecuh	FL AL	DOD FLDOF USFS NFWFMD Private CE	Florida Longleaf Pine Sandhill	CES203.284	65
			East Gulf Coastal Plain Interior Upland LLP Woodland	CES203.496	
Desoto	MS	USFS	East Gulf Coastal Plain Interior Upland LLP Woodland	CES203.496	65f
			East Gulf Coastal Plain Near-Coast Pine Flatwoods	CES203.375	
N. Kisatchie	LA	USFS	West Gulf Coastal Plain Upland LLP Forest and Woodland	CES203.293	35e
			West Gulf Coastal Plain Wet LLP Savanna and Flatwoods	CES203.191	
Ft. Polk Kisatchie	LA	DOD USFS	West Gulf Coastal Plain Upland LLP Forest and Woodland	CES203.293	35e
			West Gulf Coastal Plain Wet LLP Savanna and Flatwoods	CES203.191	
Sabine/Angelina	LA TX	USFS	West Gulf Coastal Plain Upland LLP Forest and Woodland	CES203.293	35a 35e
Big Thicket	TX	NPS	West Gulf Coastal Plain Stream Terrace Sandyland LLP Woodland	CES203.891	35f

Appendix B: Significant Landscapes for Longleaf Pine Conservation

Figure 1 Significant Landscapes for Longleaf Pine Conservation: Range-wide

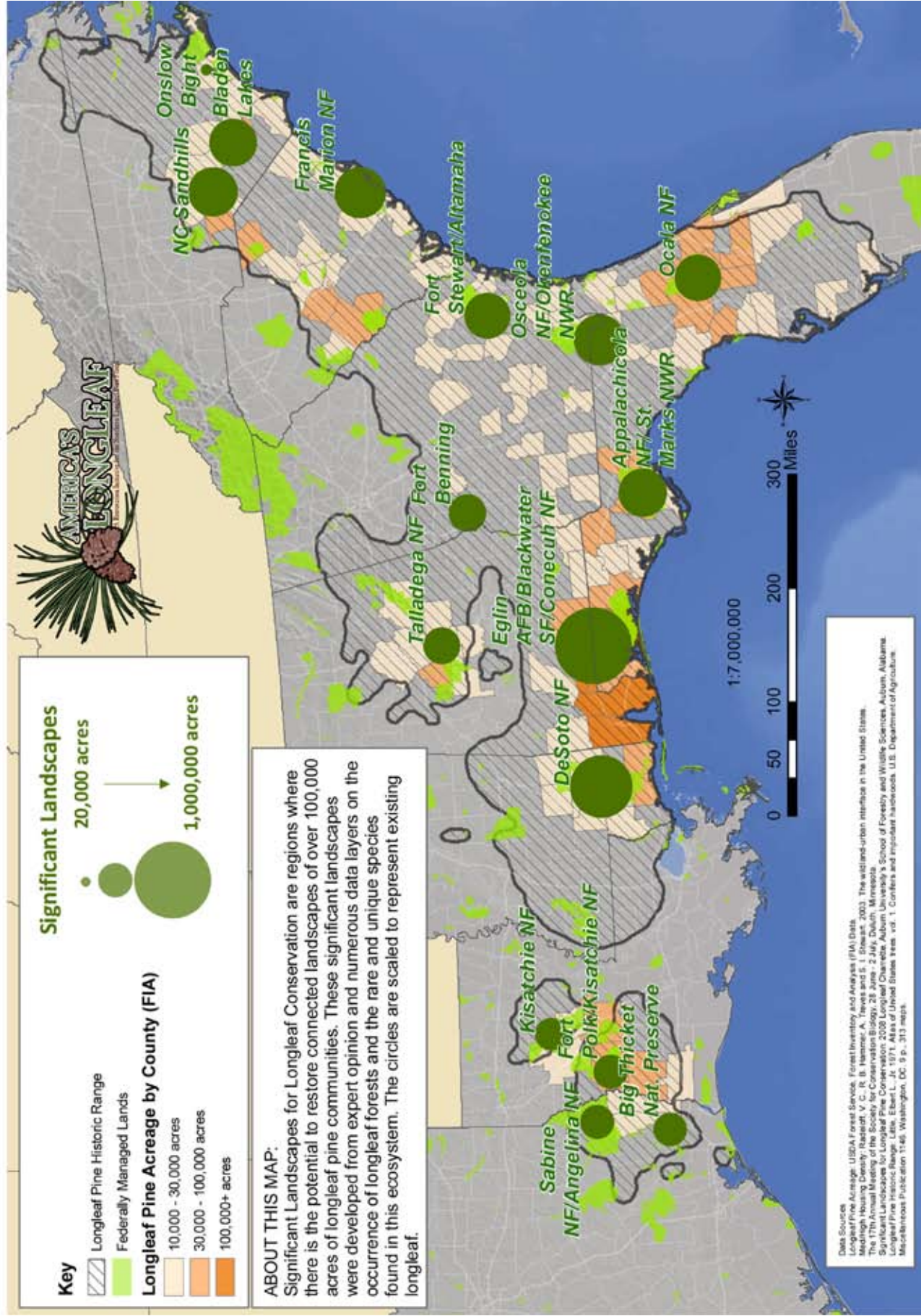


Figure 2 Significant Landscapes for Longleaf Pine Conservation: North Carolina and South Carolina

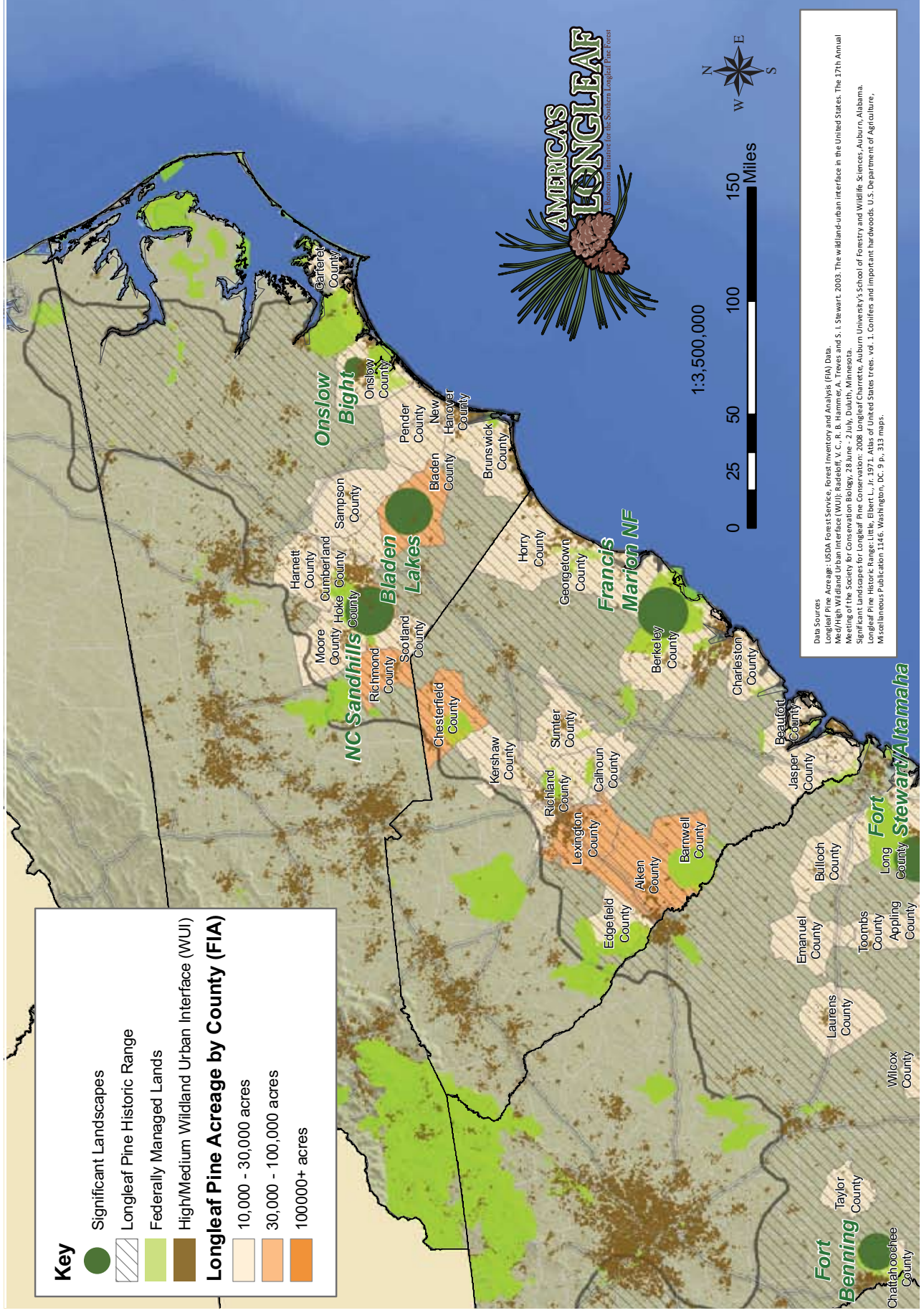


Figure 3 Significant Landscapes for Longleaf Pine Conservation: Georgia and Florida

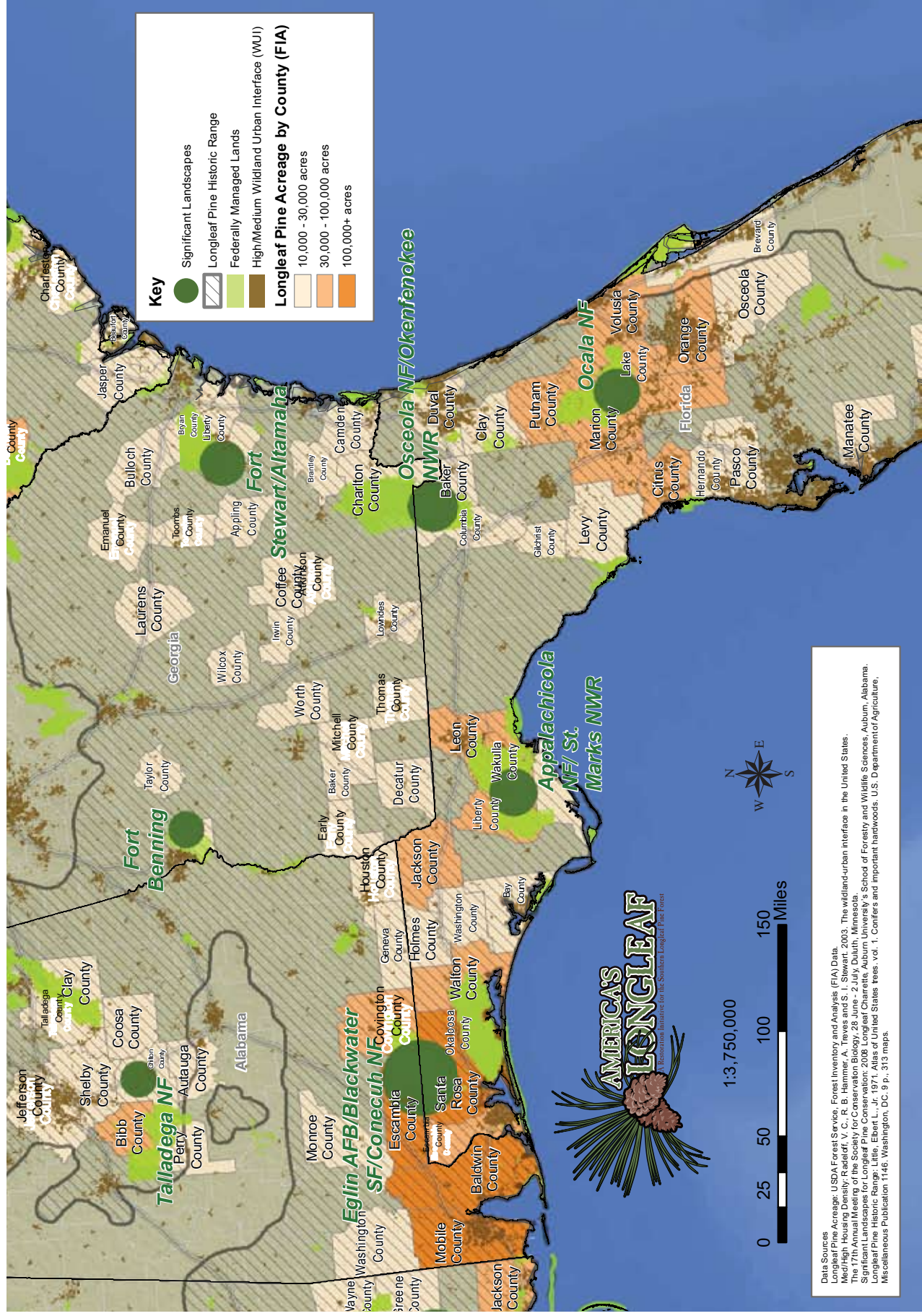
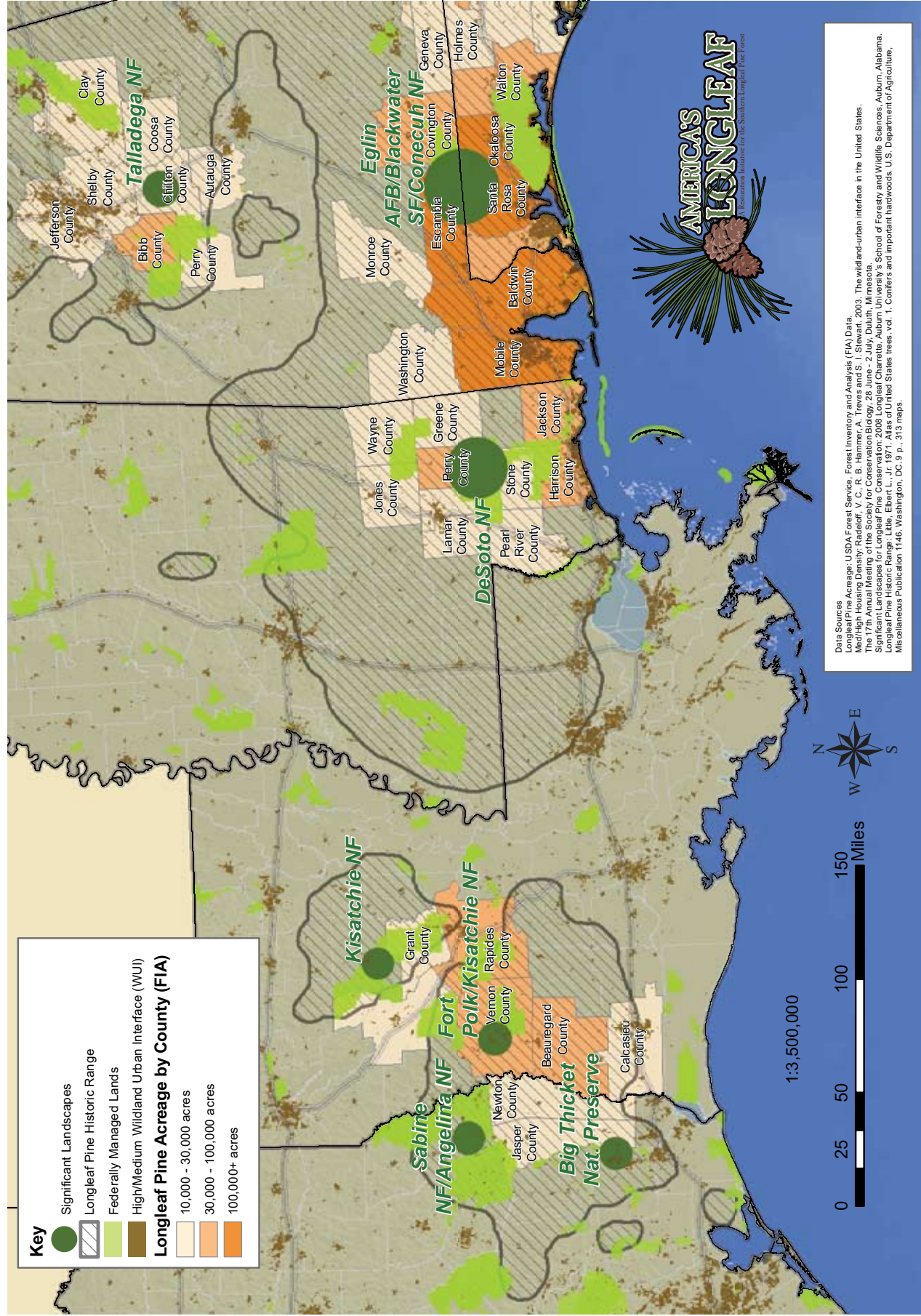


Figure 4 Significant Landscapes for Longleaf Pine Conservation: Alabama, Louisiana, Mississippi, and Texas



Appendix C: Summary of Acreages for Longleaf

Table 1 National Forest System Acres for Forests with Longleaf Forest Types

National Forest	Total Acres National Forest System Lands	Existing Acres of Longleaf Pine	Desired Acres of Longleaf Pine
NF in North Carolina	211,368	15,088	34,300
NF in South Carolina	611,503	36,980	53,501
Oconee (Georgia)	1,030,538	609	1,100
NF in Florida	1,153,583	206,413	220,548
NF in Alabama	665,226	150,824	201,400
NF in Mississippi	884,194	249,784	580,345
NF in Texas	675,574	24,800	138,180
Kisatchie (LA)	606,745	123,645	263,000
Regional Total for Longleaf Forests	5,838,731	808,143*	1,492,374

* Acres totaled from stand level inventories conducted on each National Forest. Total acres based on direct measure and show 243,909 additional acres above the sample estimate from FIA.

Source: Ennis, K. 2008. Compiled from Land and Resource Management Plans—Southern Region, USDA Forest Service.

Table 2 Estimates of Existing Acres of Longleaf Forest Type by Ownership Category¹

State	Total	Ownership						
		National Forest ²	Fish & Wildlife Service ³	Department of Defense	Other federal	State	County & Municipal	Private
AL	716,824	150,824	10,000	6,000	6,000	25,000	13,000	506,000
FL	927,413	206,413	20,000	115,000	0	202,000 ⁴	13,000	371,000
GA	460,109	609	10,500	40,000	6,000	6,000	0	397,000
LA	240,845	123,645	200	10,000	0	2,000	6,000	99,000
MS	383,784	249,784	13,000	0	0	0	5,000	116,000
NC	220,338	15,088	300	34,000	0	33,000	2,000	136,000
SC	401,980	36,980	42,000	46,000	3,000	51,000	0	223,000
TX	52,800	24,800	0	0	0	0	0	28,000
Total	3,404,143	808,143	96,000	251,000	15,000	319,000	39,000	1,876,000

1 Unless otherwise noted, source of acreage estimates are from Forest Inventory and Analysis data rounded to nearest 1,000. Web citation: Miles, Patrick D. Sep-17-2008. Forest inventory mapmaker Web-application version 3.0. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. (Available only on Internet: www.ncrs2.fs.fed.us/4801/fiadb/index.htm)

2 National Forest acreage supplied by stand level inventories conducted by the National Forest System staff.

3 National Wildlife Refuge acreage estimates supplied from USFWS Refuge personnel based on local inventories and assessments.

4 FL estimates supplied by FL Division of Forestry (DOF) for only those lands managed by DOF based on stand level inventories.

Appendix D: Charrette Summary

On March 18–20, 2008, more than 75 people representing an array of state and federal agencies and NGOs from across the longleaf range gathered at Auburn University’s School of Forestry and Wildlife Sciences in Auburn, Alabama to participate in a Longleaf Charrette hosted by the Longleaf Alliance.

The purpose of the Charrette was to bring the longleaf experts and interests together to:

- ▷ Identify priority actions
- ▷ Build a framework for the Conservation Plan
- ▷ Further develop the *America’s Longleaf* Initiative, and
- ▷ Develop a sense of common purpose.

To some people, Charrette is a fancy name for a “workshop.” However, it is an approach that has been around for many years and refined for specific purposes by various professional fields. The approach to the Longleaf Charrette was that:

1. Pre-Charrette advance work would be done largely by Technical Teams
2. Expertise would be found within Technical Teams and Charrette participants
3. It was a customized process—both the agenda and the process of the Charrette were adjusted in the course of the Charrette based on feedback from the participants
4. Multiple methods of work and input were used
5. It was a NOT a conference of presentations—it was a work session driven by a diverse group of experts and interests
6. It was designed to be beneficial to longleaf conservation—it was not just a planning exercise
7. It was iterative—presentation, discussion, feedback, presentation
8. Issues were talked about at a big picture level, but also were looked at in detail.

In order to communicate with participants prior to the workshop, all participants were given access to a Web-based “collaborative workspace.” Through this workspace, participants

were able to learn more about the Regional Working Group (RWG) and review background information that had been developed by the RWG, Steering Committee, and Technical Teams in advance of the Charrette.

Also, participants were engaged before the Charrette by being asked to begin identifying relevant maps, documents, and other data that would be useful to share and review at the Charrette. A tremendous amount of advance planning and work was completed by the Technical Teams.

The collaborative workspace was also used during the Charrette to share files for presentation to the full group and to keep a record of our work.

The Focal Areas Technical Team (led by Rob Sutter/Kevin McIntyre) made a series of presentations on Day One (note that “focal areas” are now referred to as “Significant Landscapes and Sites”). That evening, break out groups met to discuss and give feedback to the Focal Areas Technical Team.

On Day One, each of the other Technical Teams also provided updates on their work to date and what they have planned for the Charrette.

Seed/Regeneration	George Hernandez
Understory	Joan Walker/Alix Cleveland
Fire	Bruce Davenport
Policy/Landowner Programs	Rick Hatten/Lark Hayes
Education and Outreach	Bill Hubbard and Longleaf Alliance
Inventory and GIS	John Gilbert /Eric Schmeckpeper

On Day One, the group also did a quick assessment of issues outside the scope of existing Technical Teams that participants

believe were priorities to address during the Charrette and in the subsequent Conservation Plan. Starting with a list generated in advance by the Steering Committee, the group added to it, determined priorities, and identified potential break out groups or work teams for Day Two.

Day Two began with reports from evening break out groups to full group, and then instructions and assignments for next set of break out groups were given. The breakouts were for Technical teams and other issues. The breakout groups then came back and reported to the full group.

On Day Two, participants broke into breakout groups to address outstanding issues and refine previous work.

On Day Three, break-out groups reported to the full group, reviewed results, and filled-in gaps. Then, next steps were summarized and fine-tuned for:

- ▷ Priority actions
- ▷ *America's Longleaf Initiative*
- ▷ Framework and Conservation Plan

The Charrette results were used as the foundation for developing the draft Conservation Plan.

Appendix E: Federal Species of Conservation Concern and Species of Management Interest

Groups of Ecosystem Types (USFWS)	Ecosystem Types (NatureServe)	Endangered Species Act Federally Listed Threatened and Endangered Species	Endangered Species Act Designated Candidate Species and Species of Conservation Interest	Migratory Birds of Conservation Concern or Management Interest (not otherwise listed under ESA, Candidate for listing, or Potential candidate)	Resident and Migratory Wildlife in State Wildlife Conservation Strategies (not otherwise listed under ESA, migratory bird of concern, etc.)
Longleaf woodlands (includes ephemeral ponds)	Atlantic Coastal Plain Upland Longleaf Pine Woodland (CES203.281), East Gulf Coastal Plain Interior Upland Longleaf Pine Woodland (CES203.496) West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland (CES203.293)	Red-cockaded Woodpecker (<i>Picoides borealis</i>), Gopher Tortoise (<i>Gopherus polyphemus</i>) (LA, MS, AL), Eastern Indigo Snake (<i>Drymarchon corais couperi</i>), Frosted Flatwoods Salamander (<i>Ambystoma cingulatum</i>), Reticulated Flatwoods Salamander, Mississippi Gopher Frog (<i>Rana capito sevosae</i>), (<i>Ambystoma bishopi</i>), White Birds-in-a-nest (<i>Macbridea alba</i>), American Chaffseed (<i>Schwalbea americana</i>), Hairy Rattleweed (<i>Baptisia arachnifera</i>), Navasota Ladies'-tresses (<i>Spiranthes parksii</i>), Texas-trailing phlox (<i>Phlox nivalis ssp. texensis</i>)	Gopher Tortoise (<i>Gopherus polyphemus</i>) (SC, GA, FL, AL), Striped Newt (<i>Notophthalmus perstriatus</i>) Black Pine Snake (<i>Pituophis melanoleucus lodingi</i>), Louisiana Pine Snake (<i>Pituophis ruthveni</i>), Southern Hognose Snake (<i>Heterodon simus</i>), Gopher Frogs (other than MS) (<i>Rana capito</i> , <i>Rana capito aesopus</i> , <i>Rana capito capito</i>), Eastern Diamond-backed Rattlesnake (<i>Crotalus adamanteus</i>)	Bachman's Sparrow (<i>Aimophila aestivalis</i>), Chuck-will's-widow (<i>Caprimulgus carolinensis</i>), Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>), Brown-headed Nuthatch (<i>Sitta pusilla</i>)	Florida Black Bear (<i>Ursus americanus floridanus</i>), Northern Bobwhite (<i>Colinus virginianus</i>), Wild Turkey (<i>Meleagris gallopavo</i>)
Longleaf-slash flatwoods (includes ephemeral ponds)	Central Florida Pine Flatwoods (CES203.382) East Gulf Coastal Plain Near-Coast Pine Flatwoods (CES203.375) South Florida Pine Flatwoods (CES411.381) West Gulf Coastal Plain Flatwoods Pond (CES203.547) Southern Atlantic Coastal Plain Wet Pine Savanna and Flatwoods (CES203.536) West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.191) Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.265)	Red-cockaded Woodpecker, Gopher Tortoise (LA, MS, AL), Eastern Indigo Snake, Frosted Flatwoods Salamander, Reticulated Flatwoods Salamander, White Birds-in-a-nest, Beautiful Pawpaw (<i>Deeringothamnus pulchellus</i>), Rugel's Pawpaw (<i>Deeringothamnus rugelii</i>), Hairy Rattleweed, Chapman's Rododendron (<i>Rhododendron chapmanii</i>)	Gopher Tortoise (SC, GA, FL, AL), Panama City Crayfish (<i>Procambarus econfinae</i>), Camp Shelby Burrowing Crayfish (<i>Fallicambarus gordonii</i>), Gopher Frogs (other than MS), Eastern Diamond-backed Rattlesnake	Bachman's Sparrow, Chuck-will's-widow, Red-headed Woodpecker, Brown-headed Nuthatch, Henslow's Sparrow (<i>Ammodramus henslowii</i>), Southeastern American Kestrel (<i>Falco sparverius paulus</i>), Loggerhead Shrike (<i>Lanius ludovicianus</i>)	Northern Bobwhite, Wild Turkey, Florida black bear

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Longleaf-slash savanna (includes ephemeral ponds)	Southern Atlantic Coastal Plain Wet Pine Savanna and Flatwoods (CES203.536) West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.191) Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (CES203.265) East Gulf Coastal Plain Savanna and Wet Prairie (CES203.192)	Red-cockaded Woodpecker, Mississippi Gopher Frog, Eastern Indigo Snake, Frosted Flatwoods Salamander, Reticulated Flatwoods Salamander, Mississippi Sandhill Crane (<i>Grus Canadensis pulla</i>), American Chaffseed, Canby's Dropwort (<i>Oxypolis canbyi</i>), Rough-leaved Loosestrife (<i>Lysimachia asperulaefolia</i>), Cooley's Meadowrue (<i>Thalictrum cooleyi</i>), Golden Sedge (<i>Carex lutea</i>), Godfrey's Butterwort (<i>Pinguicula ionantha</i>), Harper's Beauty (<i>Harperocallis flava</i>), Florida Skullcap (<i>Scutellaria floridanus</i>)	Swallow-tailed Kite (<i>Elanoides forficatus</i>), Hirsts' Panic Grass (<i>Dichantheium hirstii</i>), Apalachicola Aster (<i>Eurybia spinulosa</i>), Gopher Frogs (other than MS)	Bachman's Sparrow, Chuck-will's-widow, Red-headed Woodpecker, Brown-headed Nuthatch, Henslow's sparrow, Southeastern American Kestrel, Loggerhead Shrike	Florida Black Bear, Northern Bobwhite, Wild Turkey
Longleaf turkey oak sandhills (includes imbedded wetlands and seepages)	Atlantic Coastal Plain Dry and Dry-Mesic Oak Forest (CES203.241) Atlantic Coastal Plain Fall-line Sandhills Longleaf Pine Woodland (CES203.254) Atlantic Coastal Plain Sandhill Seep (CES203.253) Atlantic Coastal Plain Streamhead Seepage Swamp, Pocosin, and Baygall (CES203.252) East Gulf Coastal Plain Sandhill Lakeshore Depression (CES203.292) West Gulf Coastal Plain Stream Terrace Sandyland Longleaf Pine Woodland (CES203.891) Florida Longleaf Pine Sandhills (CES203.284)	Red-cockaded Woodpecker, Gopher Tortoise (LA, MS, AL), Apalachicola Rosemary (<i>Conradina glabra</i>), Scrub Buckwheat (<i>Eriogonum longifolium</i> var. <i>gnaphalifolium</i>), Telephus Spurge (<i>Euphorbia telephioides</i>), Michaux's Sumac (<i>Rhus michauxii</i>), Gentain Pinkroot (<i>Spigelia gentianoides</i>), Florida Torreya (<i>Torreya taxifolia</i>)	Gopher Tortoise (SC, GA, FL, AL), Black Pine Snake, Louisiana Pine Snake, Southern Hognose Snake, Striped Newt, Gopher Frogs (other than MS), Eastern Diamond-backed Rattlesnake,	Bachman's Sparrow, Chuck-will's-widow, Red-headed Woodpecker, Brown-headed Nuthatch, Southeastern American Kestrel	Northern Bobwhite, Wild turkey, Eastern Fox squirrel (<i>Sciurus niger</i>) (east of the Appalachians), Florida Black Bear, Short-tailed Snake (<i>Stilosoma extenuatum</i>), Southeastern Pocket Gopher (<i>Geomys pinetis</i>), Florida mouse (<i>Podomys floridanus</i>), Eastern Spotted Skunk (<i>Spilogale putorius</i>)
Mountain longleaf	Southeastern Interior Longleaf Pine Woodland (CES202.319)	Red-cockaded Woodpecker, Schweinitz's Sunflower (<i>Helianthus schweinitzii</i>)	White Fringeless Orchid (<i>Platanthera integrilabia</i>), Georgia Aster (<i>Symphyotrichum georgianum</i>)	Bachman's Sparrow, Chuck-will's-widow, Red-headed Woodpecker, Brown-headed Nuthatch, Red Crossbill (<i>Loxia curvirostra</i>)	Eastern Fox Squirrel, Northern Bobwhite, Wild Turkey

Compiled from USFWS Southeast Region Strategic Landscape Conservation: Species by Habitat Assessment working document (as of February 17, 2009) with additions. (Chuck Hunter and Cynthia Bohn)

