Forests at the Crossroads

Alabama's Forest Assessment and Resource Strategy

ALABAMA FORESTRY COMMISSION

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Executive Summary

Alabama's 22.7 million acres of forestland accounts for 70% of the total land area of the state and 80% of these forested acres are owned by non-industrial private landowners. Alabama has the third most forested acreage in the 48 contiguous states, behind only Georgia and Oregon. The forest is comprised of six major forest type groups with "loblolly pine/shortleaf pine" and "oak/hickory" groups comprising the two largest components of the forest. Recent Forest Inventory Analysis (FIA) data estimates that growth has exceeded removals since the 1950s and the volume of timber continues to increase. The forest encompasses a wide range of ecological conditions ranging from mountainous terrain in the northern reaches of the state to coastal plains in the south. The forest provides important habitat that contributes to the rich biological diversity of both flora and fauna found in the state. While Alabama's forests produce a wide range of services that are essential to wildlife and human well-being, they support a forest products industry that makes an important contribution to the state's economy by supplying wood products, employment, income, and tax revenue.

This document represents the concerted effort of the Alabama Forestry Commission, its partner organizations, and many citizens to assess our forest and address the threats facing this resource and develop strategies to address those threats. Two legislative mandates are driving the timing and format for the document. First, the Forestry Commission is, by statute, the state agency responsible for producing studies and reports on Alabama's timber and forest resource. Second, the 2008 Farm Bill requires state foresters to develop and submit to the Secretary of Agriculture a "state-wide assessment of forest condition." Mandates contained within the 2008 Farm Bill acted as the catalyst for this endeavor. From its commencement, this task was perceived as an opportunity to develop a strategic plan for the future that would ensure sustainability and enhance the forest resources for future generations through partnership and collaboration and input from the citizens and other agencies and organizations throughout the state. Our vision is that this document will (1) serve as a common strategic plan by all involved in the development of this assessment and response plan, and (2) be used by all our partners to develop joint strategies and actions that will result in successfully addressing threats identified in this document.

Collaboration with this network of private and public partners identified nine different threats to the forest resources of Alabama: urban growth and development, fragmentation and parcelization, invasive species, changing markets, insects and diseases, wildfire, catastrophic natural events, air quality, and climate change. These threats were identified after exhaustive research into the conditions and existing trends that were influencing the current status of the resource.

Identification of threats to the forest resources represents half of the equation. To achieve balance, response strategies and their associated asset requirements were developed to address individual threats. During the development of this Forest Assessment and Resource Strategies it was recognized that three ubiquitous goals existed: to facilitate communication among stakeholders, to expand the public's awareness, and to increase Alabama's forest resources.

Striving to achieve these goals will require a continual reassessment of the conditions, trends, and threats impacting forest resources and measuring how successful our strategies address these threats. These goals do not recognize administrative boundaries or land ownership patterns but must allow for cooperation at a landscape level. Looking beyond the borders of land ownership, as well as state boundaries, should facilitate cooperation at a landscape level. Collaboration at the local, state, regional and national levels will be required to assure the future enhancement and sustainability of Alabama's forest resources.

Linda Casey

Linda Casey
State Forester

June 2010

Shortleaf and loblolly pines, Bullock County

"The functions and duties of the (Alabama Forestry) Commission shall be as follows: … To make exploration, surveys, studies and reports concerning the timber and forest resources and to publish such thereof as will be of general interest."

1975 Alabama Code; Section 9-3-4. (Acts 1969, No. 764, p. 1354, §4.)

Introduction

John H. Foster has a unique place in Alabama's forest history. Only a year after graduating from Yale's School of Forestry, he traveled to Alabama in 1908 to become the first professional forester to study the condition of Alabama's forest resources. Gifford Pinchot, the first Chief of the U.S. Forest Service, personally sent Foster to Alabama following a request from the state's governor asking for help to assess the state's declining forest. Conditions at the time supported the idea that an assessment was warranted. As in other parts of the country, Alabama's timber was underutilized as logging operations often left more waste on the ground than wood harvested. Wildfires ravaged the countryside. Cutover forests were abandoned with little or no replanting. People lacked the incentives or knowledge to sustain the true potential of Alabama's forest resource.

In short, there was a growing sense at both the national and state level that this "inexhaustible" natural resource was finally reaching its limits and that failure to respond to these trends would threaten people's livelihood and the nation's prosperity. What Foster saw reflected this alarm. In his report, he recommended that the State hire a technically trained forester, develop a fire control program, aim for a one million acre forest reserve, pass laws to keep forests hog-free, and pass laws to prevent unnecessary forest waste and destruction.

Today, Alabama's forest is one of the most productive and sustainable resource treasures in the nation. This success story is the result of the State's remarkable combination of fertile soils, abundant rainfall and long growing season as well as the efforts of past generations of Alabamians who promoted resource conservation, created markets and other economic incentives, and practiced professional forest management. In many ways, Foster would not recognize Alabama's current forest. He might even marvel at areas that were once barren landscapes, but today are fully stocked with healthy and productive forest stands. But, just as a century ago, he would see a forest resource that is facing new and emerging threats. And, just as his 1908 examination produced recommendations, he might urge us to look closely at Alabama's current forest conditions and take appropriate steps to sustain and enhance this valuable resource.

This document represents the concerted effort of the Forestry Commission, its partner organizations, and many citizens to assess our forest and address the threats facing our state's forest resource. Two legislative mandates are driving the timing and format for the document. First, the Forestry Commission is, by statute, the state agency responsible for producing studies and reports on Alabama's timber and

forest resource. Second, the 2008 Farm Bill includes language that encourages state foresters to develop and submit to the Secretary of Agriculture a "state-wide assessment of forest conditions."

This document is the Forestry Commission's attempt to blend both mandates into a comprehensive assessment. It begins by looking at the status of Alabama's forest. A non-scientific public survey (Appendix 2) began the process. Then, balanced and evidence-based data was collected to make the results technically accurate, relevant, and representative. Some of this data is forest resource based while some is nontraditional. Next, a credible group of experts with broad disciplinary and geographical experience were asked to develop strategies for each assessed threat. They also helped identify the resources needed to carry out each strategy. Because many of the assessed threats were landscape in scale, sections of the document look at state and multi-state opportunities.

The goal of this document is to produce focus and direction that will help coordinate federal, regional, state, and local efforts that sustain Alabama's forest resource for present and future generations. Its success depends on its being used. Anyone interested in Alabama's forest resource should be able to read the document and become more knowledgeable about how they can help maximize the many forest benefits we enjoy and use (Figure 1).

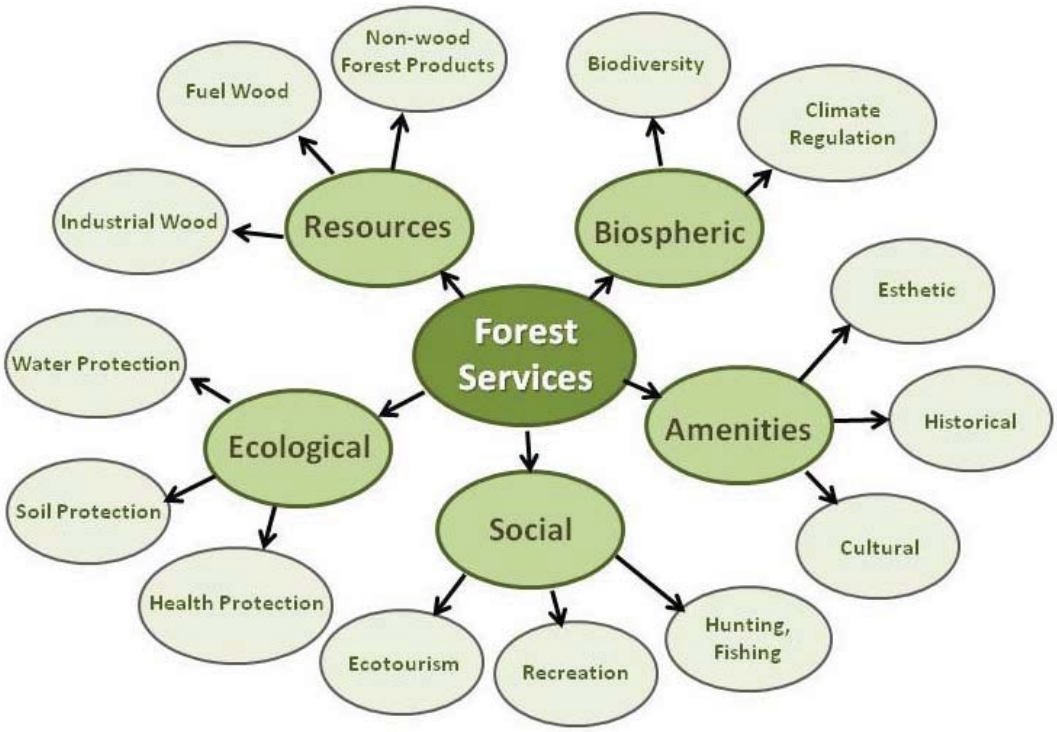

Figure 1. Major Classes of Forest Benefits. Modified from Hassan, et. al., 2005

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CHAPTER 1

CONDITIONS AND TRENDS AFFECTING ALABAMA'S FOREST RESOURCE

Alabama's forest is a complex and diverse assemblage of trees and other organisms interacting within the environment. Ever changing, this dynamic forest has evolved and adapted over time in response to a variety of internal and external natural pressures. But the advent of human settlement in Alabama's current landscape brought additional pressures to which the forest cannot readily adapt. Understanding how and why the forest is changing is the key to sustaining it for future generations.

Three major periods have characterized the effect of past land use on forests in Alabama and the South (Wear 2002): (1) the era of agricultural exploitation, which peaked in the late 19th century, when forests seemed an endless resource and were regarded as a hindrance as most farmable lands were devoted to cotton and other crops; (2) the era of timber exploitation, which extended into the first part of the 20th century as the extensive southern timber stocks were depleted with little or no consideration of sustainable use, and (3) the era of renewal and conservation, which took hold following the Great Depression, resulting in the forest resource being sustainably managed for multiple benefits and values.

Alabama is now entering a fourth era of land use trends with forest sustainability at risk. External forces are now shaping our forests in new and sometimes irreversible ways, with some emerging uses threatening sustainability and others enhancing it.

Without a full understanding of Alabama's forests, we risk taking them for granted and worse, we risk not doing what is needed to sustain this valuable resource. Alabama's forests are an abundant, diverse, and treasured resource that provides tremendous economic, environmental, and social benefits. These forests have been and continue to be shaped by natural and human influences. Natural phenomena such as fires, hurricanes, tornadoes, droughts, insect, and disease outbreaks generally have short-term impacts on the resilient forest. However, factors that threaten long-term forest integrity and sustainability include land use changes, urban growth, invasive species, climate change, and in some cases, fire exclusion. Prior to Alabama's original settlement, the landscape was nearly completely forested except for scattered prairies, glades, rocky outcrops, and dunes. Today, large areas of former forestland are devoted to agriculture, population centers, industry, transportation corridors, utility transmission rights of way, water reservoirs, and other uses. As Alabama's population growth and urban development continues, the pressures on its forests will increase.

Less than a century ago Alabama's forest resources were vanishing at an alarming rate, but the trend was reversed by farsighted individuals and agencies working together to restore our forest. In 1922 the Alabama Democratic Committee passed the following resolution in Montgomery:

> "A wise policy of conservation of the natural resources of Alabama, and the preservation without waste and damage of the gifts so abundantly given us in trust by the all-wise Creator, is not only our duty but should engage our most serious and

> thoughtful consideration. Our vanishing forests must be replaced and given care; state forest reserves must be created to protect our watersheds and supply our rainfall. All to the end that we may as good tenants deliver over to succeeding generations this land more beautiful, more useful and more tolerable in which to live than when we received it in trust as mere sojourners here for a time."

Our forests are a conservation success story, but they are still in a state of recovery, especially those on depleted soils. Species and age compositions have changed and continue to change. This section examines the condition of today's forest: the area of forested land, the types of forest found in the state, and the diversity of plants and animals they support.

Forest Area

According to the 2008 Forest Inventory and Analysis (FIA) data there are approximately 22.7 million acres of commercial forestland in Alabama. Forests comprise 70% of Alabama's land area. The only states that have more forestland than Alabama are Georgia, Oregon, and Alaska. Up to 30 million acres of forest may have existed within the state's present borders at the time of European settlement, but clearing for agriculture as well as unsustainable forest management practices resulted in steady losses of forestland that lasted into the 1920s. The tide began to turn once again in the 1930s due in large part to the planting of trees by the Civilian Conservation Corps (CCC). Thousands of acres of devastated forestland were restored. During this same period the field of "professional forestry" began to emerge. With this emergence, government, corporate and individual forestland owners were influenced to implement sustainable forest management practices. Since the first FIA survey was conducted in Alabama in 1936, FIA data indicates that Alabama's forestland area has increased by nearly 20%. However, there is some cause for concern as 2008 FIA data indicates there has been a decrease in Alabama's forest of approximately 225,000 acres since the 2000 survey. The northeastern quarter of Alabama where many counties have shown an 8% or greater decrease in forestland since 2000 is an example. There appears to be a correlation between large cities and interstate highways and loss of forestland. Anticipated urbanization and industrialization in the future are likely to further reduce the amount of forestland and urban, non-commercial, forests will constitute an increasing proportion of the state's forestland in the years to come.

Forest Origin

Forests originate either "naturally" or by "artificial" means. "Natural" forest stands are those that develop from the seed of parent trees, or stump/root sprouting; whereas, "artificial" forest stands develop as a result of seeding or planting of nursery-grown seedlings. Generally speaking, natural forest stands are characteristically different than artificial forest stands. In most cases natural stands are comprised of multiple species types, several age classes, and several canopy layers; whereas artificial stands are more likely to be comprised of a single species, are even-aged, and have a single canopy layer.

In 1972 there were approximately 1.7 million timberland acres comprised of artificial stands and 19.8 million acres of natural stands. According to 2008 FIA data, Alabama's timberland is comprised of 6.8 million acres of artificial stands (plantations) and 15.9 million acres of natural stands. It is logical to assume that most timberland is lost due to development. In the future, this loss will likely come from "natural" stands since the primary purpose of artificial stands is to provide wood for Alabama's timber industry and are therefore more likely to remain in forestry uses.

Forest Types

Forty-six forest types are recognized in Alabama by FIA (Appendix 4). More than half (57%) of the state's forestland is hardwood or mixed pine-hardwood. Loblolly pine is the largest single forest type, comprising a third of all forestland, and is increasing. Oaks, hickories, sweetgum, and yellow poplar are among the most prevalent hardwoods. Loblolly, longleaf, slash, Virginia and shortleaf are the principal pines.

Alabama's 46 forest types comprise seven major forest type groups (Figure 2). The "loblolly pine/shortleaf pine" forest type occupies 8.2 million acres of timberland; more than any other group. The "oak/hickory" group ranks second and covers 7.3 million acres. Contrary to popular belief, there are more acres in Alabama comprised of hardwood forest type groups than softwood forest type groups.

Forest types and land use varies by *ecoregion*s, or areas of relative ecological similarity. The State Assessment Team modified the Environmental Protection Agency (EPA) ecoregional delineations (Omernik *et al*. 2001) depicted in Figure 2 to better relate the county-based FIA data to ecoregions (see Appendix 3). In addition to providing an ecological perspective on forest distribution, ecoregions cross state lines and can be useful in dealing with multi-state issues.

Wood Volume and Biomass

Wood volume, woody biomass, and total live biomass are important indicators of the potential of forests to provide various products and services, including carbon sequestration. In 2008, Alabama's total standing volume (aboveground volume of all standing trees, living or dead, with diameter at breast height over 5 inches) was estimated to be 34.1 billion cubic feet, more than twice the 1953 volume, and a 3.3% increase since 1990. Because growth has exceeded removals since the 1950s, the volume of Alabama's timber has increased.

Forest Products and Industry

While Alabama's forests produce a wide range of services that are essential to wildlife and human well-being, their major direct financial contribution is from wood and fiber that is used for a variety of manufacturing, building, paper and other purposes.

Alabama's forest products industry makes important contributions to the state's economy by supplying wood products, employment, income, and tax revenue. The value of forest products shipments in Alabama reached a high of $15.6 billion in 2005, but has declined somewhat due to the recent severe industry recession. Industry payrolls at that time totaled $2.5 billion, and Alabama landowners and

loggers delivered $1.4 billion of timber to manufacturing facilities. While consumption has been relatively stable, domestic timber production has been declining since the early 1990s. From 1997 to 2007, the state lost nearly a third (32%) of its primary forest industry mills (Table 1). The gap between roundwood timber production and forest products consumption has been filled with rising imports, greater utilization of recycled fiber, and higher product yields from the raw material.

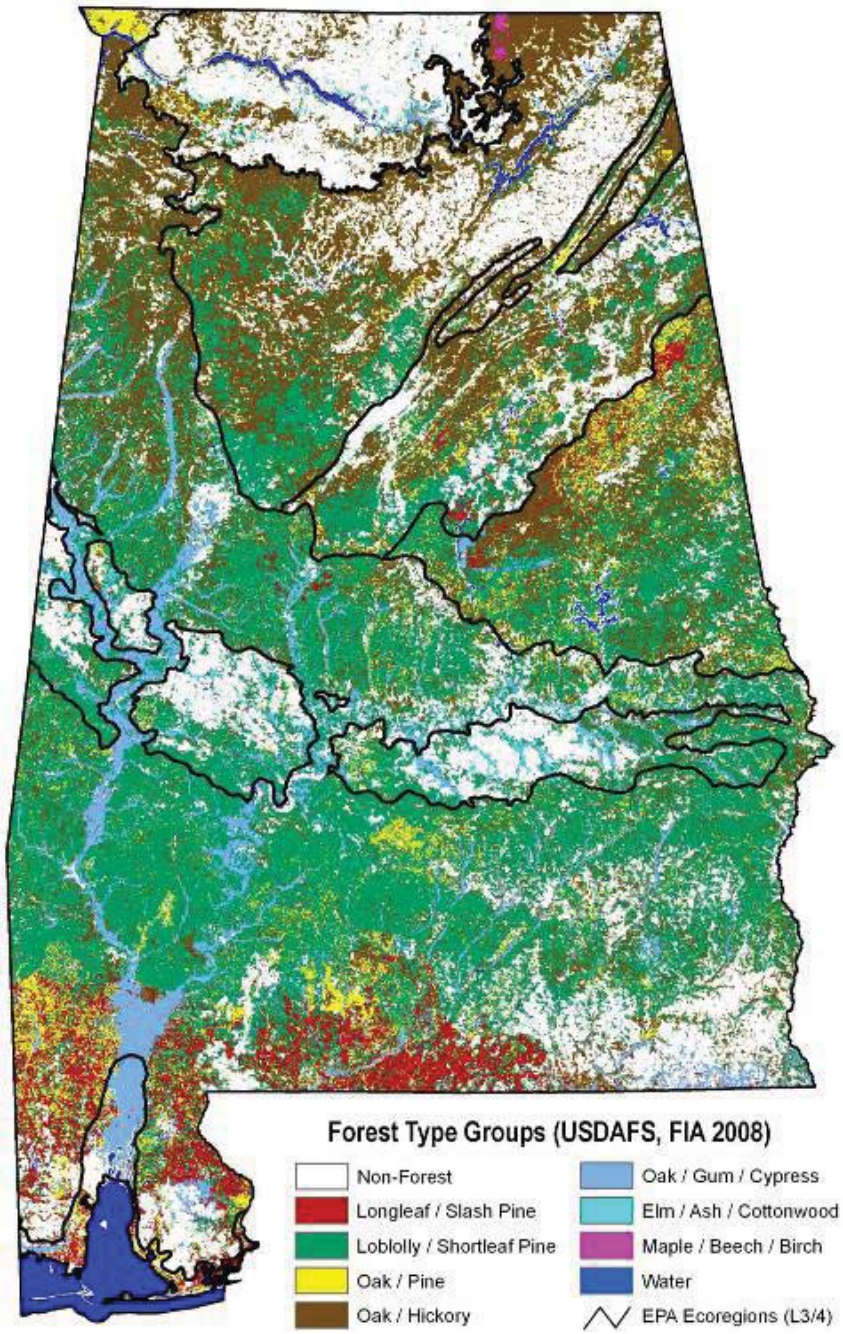


Figure 2. Forest Cover of Alabama by Forest Type Group

Table 1. Alabama's Timber Industry - Timber Product Output (Source: AFC timber industry survey)

Year	Number of Primary Mills	Total Roundwood billion cu. ft.	Total Pulpwood million cu. ft.	Total Sawlog million cu. ft.	Veneer Log million cu. ft.	Other Products million cu. ft.
1997	212	1.35	765	450	93	37
1999	181	1.21	641	426	109	35
2003	178	1.08	521	404	107	45
2005	145	1.14	563	426	93	61
2007	144	1.10	574	413	75	39

Due to a number of factors, including an economic recession and the aftermath of severe hurricanes in 2004 and 2005 (Ivan, Katrina, Dennis, Rita), Alabama's timber industry is in a state of flux. The FIA 2008 harvest volumes for all forest products combined (sawtimber, pulpwood, poles, veneer logs) decreased by 12% over the previous five-year average. Hardwood sawtimber harvests decreased the most (36.6%). There was a 4% increase in harvest volume of hardwood pulpwood in 2008, the only forest product showing an increase compared to the previous five-year average (AFC 2009).

An emerging factor impacting the forest products industry is the globalization of capital markets. A key change has been the expanded use of intensively cultivated, short-rotation, tree plantations in the Southern Hemisphere. Capital investments by many North American wood products corporations have shifted to these plantations in response to their high productivity, as well as other competitive advantages. At the same time, as a tax management strategy, these companies have sold huge tracts of land in Alabama and elsewhere in North America. In the future, imports will likely comprise a significant share of U.S. wood and fiber consumption (Franklin and Johnson 2004).

Forest Ecosystem Services

Aside from direct economic benefits that Alabama's forest provide (timber, non-timber products, biofuels, etc.) there are other values that forests provide to society. Placing a dollar-value on these "ecosystem services" is often difficult. However, these "ecosystem services" are forest functions that are critical to our well-being. For instance, Alabama forests are important for regulating air quality, climatic conditions, water quality, and biodiversity. Forests are capable of trapping soot and other particles emitted from automobile exhaust or factories that can induce respiratory problems in people. Forests also absorb many airborne pollutants such as nitrogen dioxide and sulfur dioxide. Urban forests may be particularly valuable in this regard. On a larger scale, Alabama forests contribute to the regulation of atmospheric carbon. Through photosynthesis, forests absorb carbon and store it over long time periods in both above ground and below ground biomass. Forest cover in urban settings has been shown to lower power costs through the shading of houses and buildings. Shading and temperature regulation are also important and contribute to maintaining the health of adjacent aquatic habitats.

Water regulation is another important service derived from Alabama's forests. Intact forestlands allow for the interception, storage, and slow release of water back to streams. When forests are removed from the landscape, water that is normally intercepted and transpired by trees (or stored in their spongy

leaf litter) more often runs off the land rapidly and can lead to downstream flooding. Forests also provide the best water quality of any land cover type. Water quality in forested watersheds is maintained by a combination of physical and biological processes that filter water and remove sediments, nutrients, and other potential pollutants before it reaches streams. Further, many of Alabama's soils are highly erodible. When forests are removed, these soils can become exposed to rainfall and excessive runoff resulting in erosion and sedimentation.

The State of Alabama encompasses a wide range of ecological conditions ranging from mountainous terrain in the northern reaches of the State to the coastal regions in the south. Forests occur in all regions of Alabama and contribute to a diverse assemblage of flora and fauna. Forests provide important habitats that support some of the most diverse regions in North America. Maritime forest along the coast, mountainous hardwood forests, remnant longleaf pine forests, pine-hardwood forests, and bottomland hardwoods support a diverse assemblage of flora and fauna and contribute to Alabama's incredible biodiversity. Trees provide the key structural components of forest habitats along with a range of secondary attributes (stream shading, detrital matter, wildlife food) that support both terrestrial and aquatic organisms.

Finally, Alabama forests are valuable for providing recreational opportunities and tourism. These forests provide a setting for a wide array of outdoor activities such as hiking, camping, biking, wildlife watching, and canoeing. The habitat provided by forests and the water quality maintained by forests are important for supporting Alabama's hunting and fishing heritage. Hunting and fishing, activities strongly identified with Alabama, generate tourism and are important contributors to the State's economy.

Biodiversity

Forests are critically important storehouses of the variety of interdependent terrestrial life forms within ecosystems. This biodiversity is also an essential factor in sustaining ecosystem functioning and hence the ecosystem services that forests provide (Naeem et al. 1999). Every species influences the chemical composition of our waters, land surfaces, and atmosphere. If we lose biodiversity, ecosystems can change dramatically in the way they function, especially if we lose species that play significant roles in ecosystem function. Biodiversity thus provides the underpinning for many of the other forest resources.

The classifications of *pine*, *hardwood* and *mixed* are simple but are only "coarse filter" descriptions of Alabama's diverse and complex forests. Ecologists recognize 345 unique associations of trees, shrubs, vines, and herbaceous plants in the state and have grouped them into 63 distinct terrestrial ecological systems (NatureServe 2009). Of these, 56 are forested to varying degrees (Appendix 5).

Alabama has nearly 200 native tree species. This is more than twice than found in all of New England (Phillips 2006). Alabama has roughly 4,000 species of vascular plants, including trees, shrubs, vines, grasses, legumes, ferns, and other herbaceous forms (ADCNR-DWFF 2005). No plant species native to Alabama is known to be extinct or extirpated. Most plants are secure, but at least 96 species in Alabama

Box 1. Forests and Water Quality

Alabama's forests are a vital factor in maintaining and improving water quality. Forested watersheds have consistently been shown to have lower sediment and nutrient yields with better aquatic biological conditions than non-forested watersheds. The primary factor affecting the future of water quality in Alabama is control of nonpoint-source pollution from agriculture and urbanization, primarily urban sprawl. The leading sources of water quality impairment in the South from 1988 to 1998 were agriculture and urbanization; silviculture ranked ninth out of the ten major sources of impairment during this time (West 2002).

Mobile-Tensaw Delta, Baldwin County

are globally imperiled (NatureServe 2009). Outside of nature preserves or on lands managed under conservation easements, natural plant communities are seldom specifically managed to perpetuate their species compositions. Conserving natural forest types and mimicking natural processes such as fire benefits many sensitive and rare plant species.

Most species of mammals, birds, amphibians and reptiles that occurred in Alabama at the time of European settlement are still present, but three bird species are extinct and two other birds and four mammals no longer occur in Alabama. Most citizens are unaware that bison and elk roamed over much of Alabama as recently as 250 years ago. Alabama is also a global hotspot for aquatic diversity, with more species of fish, mussels, snails and crayfishes that any other state. These stream-dwelling species have been heavily impacted by human activity, particularly the impoundment of most of Alabama's major rivers. Sixty-three species of fish, mussels and snails are extinct and 37 species no longer occur in Alabama. Many aquatic species cannot survive long periods of elevated temperatures or heavy siltation, highlighting the importance of restoring and maintaining forested buffers along streams. Alabama's Nongame Species Regulations (Code of Alabama, Section 220-2-.92 and 220-2-.98) list 150 vertebrate and invertebrate species that receive state protection. Although the decline of terrestrial forest-

dwelling species has been less pronounced than that of aquatic groups, pressures remain and in many areas are increasing.

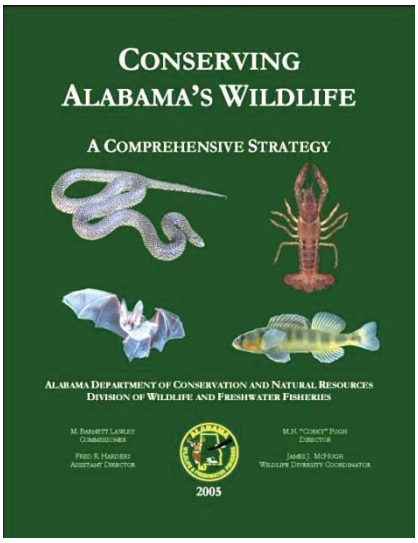
Alabama's State Wildlife Action Plan, or SWAP (ADCNR-DWFF 2005) assigns native wildlife species to conservation priority levels (Table 2). Species in the top three priority classifications are recognized as Species of Greatest Conservation Need (SGCN). The SWAP identified 303 SGCN including 24 mammals, 26 reptiles, 14 amphibians, 28 birds, 57 fish, 92 mussels, 34 aquatic snails, and 28 crayfishes.

Table 2. Conservation Status of Alabama's Native Vertebrates, Selected Invertebrates, and Plants.

Taxa	Total Species	Extinct	Greatest Conservation Need			P3 [3]	Federally Listed [4]	G1-G2 Ranked [5]	S1-S2 Ranked [6]
			Extirpated	P1 [1]	P2 [2]				
Mammals	64	0	4	7	13	11	5	2	13
Birds	247 [7]	3	2	7	19	53	6	0	36
Reptiles	93	0	0	9	17	18	9	7	24
Amphibians	73	0	0	6	8	11	3	5	14
Fishes	308	2	9	21	27	33	14	34	91
Mussels	175	22	24	51	17	24	43	71	90
Aquatic snails	174	39	4	17	13	71	10	66	56
Crayfishes	83	0	0	3	25	28	0	12	19
Vascular Plants[8]	4,000	0	0	N/A	N/A	N/A	18	102	485
Total	**5,217**	**66**	**43**	**121**	**139**	**249**	**108**	**299**	**828**

Table adapted from ADCNR-DWFF.

[1] Highest Conservation Concern (ADCNR-DWFF).
[2] High Conservation Concern (ADCNR-DWFF).
[3] Moderate Conservation Concern; considered the "watch list" (ADCNR-DWFF).
[4] Listed as Threatened or Endangered by U.S. Fish and Wildlife Service.
[5] Critically imperiled (G1) or imperiled (G2) across its entire range (NatureServe-Natural Heritage Rank).
[6] Critically imperiled (S1) or imperiled (S2) within Alabama (NatureServe-Natural Heritage Rank).
[7] This figure is for regularly-occurring birds only and excludes several species that may wander into the state.
[8] Plants are not addressed in the SWAP.



Alabama's State Wildlife Action Plan, 2005

Box 2. Restoring Longleaf

Longleaf-dominated forest (see map, page 47) is a diverse ecosystem that historically covered millions of acres in Alabama and has declined more than any other forest type, and is now among of the most endangered ecosystems in North America. Only about three percent of pre-European settlement longleaf pine forest area (natural stands) remains. Although pine forests comprise 41 percent of the state's total forest cover, only three percent of the forest is classified today as longleaf pine. Those few areas remaining in natural condition harbor a number of rare and imperiled species, including Bachman's sparrow, red-cockaded woodpecker, pine snake, and gopher tortoise.

Longleaf pine forests and savannas were one of the most extensive woodland ecosystems in North America prior to European settlement. Spanning approximately 90 million acres of the Southeast, this ecosystem covered much of what would become Alabama. Longleaf pine forests are rich in biodiversity, particularly due to species richness in the groundcover. These forests include 191 species of rare plants and an understory that can contain 130 species of plants in less than one-quarter of an acre.

Longleaf pine forests adapted over millennia to fire triggered naturally or by Native Americans. Each stage of the tree's life cycle relates to fire, from the mineral soil required for seedlings to the thick bark that provides insulation and dissipates heat. Because periodic low-intensity fires clear undergrowth, natural longleaf forests are open, airy, grassy savannas, in contrast to dense, closed-canopy hardwood forests.

Thanks largely to the efforts of the Longleaf Alliance, public awareness of both the value and plight of longleaf pine has been raised, improved techniques for planting have been developed, and public funds have been made available for replanting. In 2006, the U.S. Farm Service Agency (FSA) unveiled a Conservation Reserve Program (CRP) Longleaf Pine Initiative designed to reforest up to 250,000 acres of longleaf pine forests in nine southern states including Alabama. In 2009, the AFC was awarded a $1.757 million American Recovery and Reinvestment Act grant to restore longleaf pine on state forestlands. In 2009, The Wildlife and Freshwater Fisheries Division of ADCNR was awarded a $300,000 American Recovery and Reinvestment Act grant to continue longleaf pine restoration efforts on private lands in Alabama through a partnership with the U.S. Fish and Wildlife Service.

Fire-maintained longleaf woodland, Coosa County.

Carbon Sequestration

The buildup of carbon dioxide (CO_2) in the earth's atmosphere has generated much interest in using strategies to capture and hold carbon in non-atmospheric formats. One topic receiving significant attention is the ability of trees and forests to sequester atmospheric CO_2 through the photosynthetic process. Alabama has one of the largest forest resource acreages in the nation with a tremendous capacity to store carbon. According to the 2008 FIA, Alabama's forests sequestered an estimated 452.5 million tons of total carbon in live trees. This continues an upward trend in carbon storage beginning in 1936, when the first forest inventory was completed in Alabama.

Several dynamics impact the ability of Alabama's forest to sequester carbon. An Auburn University School of Forestry & Wildlife Sciences study (Chen and Tian 2007) showed that "ecosystem carbon storage has changed as a result of multiple stresses and interactions among those stresses including land-cover change, climate variability, atmospheric composition (carbon dioxide and tropospheric ozone), precipitation chemistry (nitrogen composition), and natural disturbances such as fire." The replacement of forests following cropland abandonment and natural storm events has increased carbon sequestration in the state, while growing urban land use change and rising tropospheric ozone pollution will reduce the capacity of Alabama's forest to store carbon.

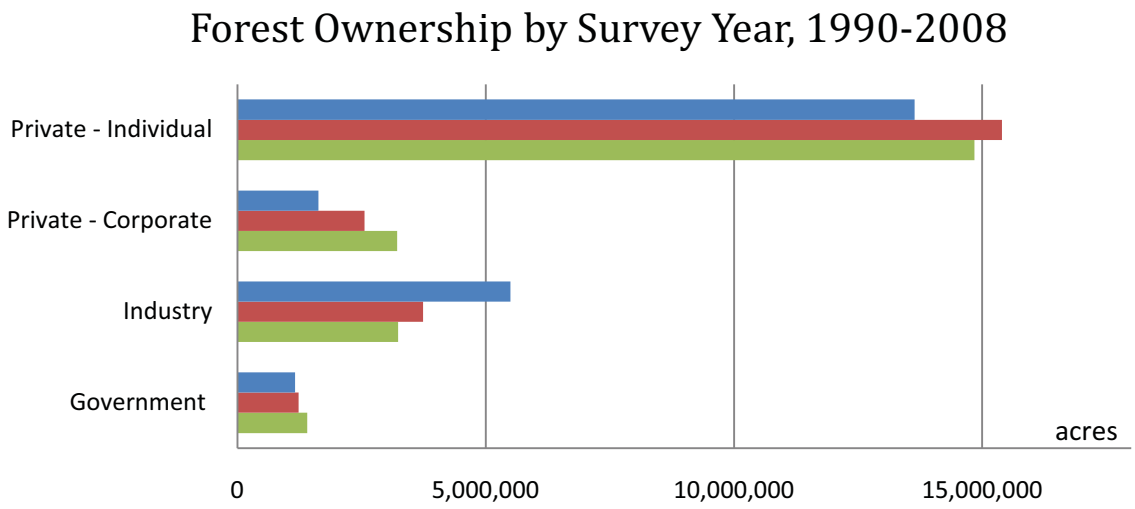
Forest Ownership

Forest ownership in Alabama can be divided into four classes (Figure 3): private small-scale (non-industry) family, non-industrial private corporations (i.e., a company or individual without a mill or wood-processing plant), forest industry, and public. From 1990 to 2008, private non-industry lands, by far the largest ownership category, have increased. The forest industries have continued to divest their lands as part of a national trend, which is closely mirrored by the increase in private corporate lands. There has been a steady but almost overlooked increase in public lands, up 21% since 1990.

Private Non-industry Forestlands

In 2004, an estimated 432,000 family forest owners in Alabama controlled 67% of the state's forestland (Pan et al. 2007). From 1994 to 2004, recreation and investments became more important objectives of ownership, whereas timber production as a primary ownership objective decreased. The probability of an owner harvesting trees, having a management plan, or having sought forest management advice increased as the size of the forest holding increased.

Owners of Alabama's family forestland cite a number of reasons for having their land, and often have overlapping economic, environmental, recreational, and aesthetic objectives. These include passing on land to heirs, enjoying natural beauty or scenery, privacy, investment, protecting nature and biological diversity, hunting, fishing, or other recreation, and production of timber products (National Woodland Owner Survey).



	Government	Industry	Private - Corporate	Private - Individual
1990	1,162,400	5,499,500	1,634,200	13,636,200
2000	1,229,800	3,740,300	2,560,100	15,395,600
2008	1,405,500	3,239,200	3,218,600	14,844,500

Figure 3. Alabama Forest Ownership, 1990-2008. Source: FIA.
"Private non-industry" includes conservation and natural resources organizations, unincorporated local partnerships/clubs, and Native American lands.

During the past decade, protecting private land from development through voluntary donations of conservation easements has escalated. This is due to the passage in 1997 of the Uniform Conservation Easement Act, Title 35-18-1, Code of Alabama, 1975 and because of increased incentives for income and estate tax savings. The area protected by conservation easements is expected to keep growing. Many of the private lands under easement are managed as working forests and continue to contribute forest products and other revenues to local communities.

Forest Industry Lands

Due to changing markets, the vertically integrated forest industry (i.e., those with mill processing facilities) has recently divested itself of vast tracts in Alabama and the Southeast. From 1990 to 2000, forest industry lands in Alabama decreased 22% to 3.7 million acres (Hartsell and Brown 2002). From 2000 to 2008, industry lands decreased an additional half million acres, a 15.6% decline (FIA data).

Corporately Owned Forestlands

Over the past decade, significant changes in forest ownership have occurred as the large-scale divestiture of landholdings by forest industry has resulted in the shift of vast areas of land from the

forest industry to timber investment management organizations (TIMOs), real estate investment trusts (REITs), pension funds, and others. From 1990 to 2008, corporately owned forestlands in Alabama nearly doubled to 3.2 million acres.

Box 3. TREASURE Forest

In the 1970s, forestry was under siege in Alabama and across the country. The public was questioning traditional forest practices. Natural resource professionals quarreled over management objectives. Landowners often found themselves caught in the middle of competing values, agencies, and professionals. It was in this turmoil that former Alabama State Forester C. W. (Bill) Moody developed the idea of a program to recognize landowners managing their properties for **t**imber, **r**ecreation, **e**nvironment, and **a**esthetics all as a **s**ustained **u**sable **re**source. He called it TREASURE Forest. In 1973, the Alabama Forestry Planning Committee (today the Alabama Natural Resources Council) adopted the program and became the official sponsor.

Alabama's TREASURE Forest program continues to fulfill its mandate as a voluntary program seeking to promote sound and sustainable, multiple-use forest management. It encourages landowners to use their forests wisely to meet their own needs while at the same time protecting and enhancing the environment. The TREASURE Forest program promotes this management ethic through education and recognition. Education is provided through information and on-the-ground technical assistance from the member agencies and groups of the Alabama Natural Resources Council.

Nationally, the TREASURE Forest program has made an impact. In the late 1980s the U.S. Forest Service was eager to start its own landowner recognition program, and met with Alabama representatives to learn how and why this program works. In 1991, the U.S. Forest Service unveiled its own Forest Stewardship program which is modeled after TREASURE Forest.

Publicly Owned Forestlands

Six percent of Alabama's forestland is publicly owned, with roughly half of that in the six Ranger Districts of four National Forests. Federally owned forestland is also held by the U.S. Department of Defense, Tennessee Valley Authority, and U.S. Fish and Wildlife Service. The Alabama Department of Conservation and Natural Resources (ADCNR) State Lands Division manages approximately 60,000 acres of forested state-owned lands that are not being used for other specific purposes. The State Lands Division also administers the Forever Wild public land acquisition program. Less than one percent of forestland is owned by counties and municipalities.

Federal and state acquisition for permanent protection of conservation lands has increased in recent years as opportunities to purchase intact forest systems remain good. Two programs, one federal and one state, have been particularly effective in purchasing properties for public use.

The Forest Legacy Program (FLP) is a program of the U.S. Forest Service supporting state efforts to conserve environmentally sensitive forestlands, particularly working forests in areas threatened by fragmentation, urban expansion, and conversion to non-forest uses. In Alabama, the AFC is the lead agency for FLP. Since Alabama began participating in FLP in 2002, the state has acquired through FLP seven tracts covering 13,354 acres. These lands are held and managed for forestry, wildlife habitat, and public access by the State Lands Division of ADCNR. Chapter 5 includes a revision of the FLP Assessment of Need for Alabama.

The Forever Wild Program (Box 4) provides for the purchase of public recreational lands in Alabama. The Forever Wild Land Trust is administered by the ADCNR State Lands Division. With the exceptions of nature preserves and parks, Forever Wild acquisition does not take lands out of traditional forest management.

Box 4. Forever Wild

The Forever Wild Program was established by constitutional amendment in 1992 and conserves forestland with funding from interest earned from Gulf oil and gas leases. Since its inception, the program has purchased 74 tracts totaling 212,792 acres lands for general recreation, nature preserves, and additions to Wildlife Management Areas and state parks.

Prescribed burning Forever Wild land in Bullock County

Forest Resource Management Practices

A 2008 region-wide survey of pubic, industrial, and private forestland managers provided insight into the ten most common forestry practices in the South (Barlow et al. 2009). Of those practices, managers reported 1) chemical herbicide treatments, 2) timber cruising, 3) tree planting, 4) mechanical site preparation, and 5) prescribed fire, as most commonly occurring forest management practices in the region. Table 3 shows 10-year price trends for these practices.

Table 3. Average cost of forestry practices in $/acre or $/seedling in the South from 1998-2008 cost of practices surveys. All costs are per acre except for planting which is dollars per seedling planted. Tree seedling costs are not included.

Forestry Practice	1998	2000	2002	2004	2006	2008
Chemical control of undesirable trees	72.32	68.12	70.18	69.45	79.41	48.82
Prescribed burning	16.58	17.70	14.41	21.08	24.94	29.31
Mechanical site preparation	122.14	136.03	166.50	105.23	119.72	157.32
Planting						
by hand	0.0670	0.0641	0.0800	0.0668	0.0863	0.1079
by machine	0.0593	0.0770	0.1100	0.1162	0.1168	0.1386
Timber cruising	4.10	3.45	5.40	3.32	6.01	6.28

Use of chemical treatments for the control of herbaceous and woody plants has increased in recent years, while the cost per acre has decreased. Acres reported included both ground and aerial herbicide application. These treatments may be prescribed for stand treatment prior to planting, for site preparation, or as early or mid-rotation release.

Timber cruising, or forest inventory, is a common forest management activity used to identify the volume and worth of forest and timber assets. Depending on landowner objectives a timber inventory may be conducted to determine size and value of standing timber for management purposes, or prior to selling or purchasing a parcel.

Tree planting is the artificial regeneration of a stand with tree seedlings after all the overstory trees have been removed. Loblolly and longleaf pine were the most often planted seedling species in 2008. Seedlings may either be planted by hand or with a machine, and may be bare root or container grown.

The use of mechanical site preparation before planting has shown region wide declines since 2006. However multiple pass operations, such as shear-rake-pile-bed, are gaining in popularity for those who continue mechanical site preparation operations. Multi-pass operations were reported for over half the site preparation acres in 2008 although these operations were consistently more expensive per acre than single pass treatments.

Finally, prescribed fire continues to be an important management tool in the region. With an increase in acres reported over the prior period, prescribed fire is a cost effective tool for controlling unwanted

vegetation and understory debris whether used following a chemical site preparation treatment, or for mid-rotation hardwood control. Prescribed fire also has many ecological and wildlife habitat benefits.

The forest management practices outlined above are just five of the most commonly reported practices in the Southeast. Many other options are available to landowners. Whether land ownership objectives are for timber, wildlife, recreation, or maintaining your family farm, active management is vital to a healthy and productive forest.

Prescribed Burning

Alabama's upland forests are fire dependent. Fire has been used as tool to manage the forest for thousands of years, first by Native Americans and subsequently by European immigrants. In recent years, prescribed fire has been used in a safe way to apply a natural process, ensure ecosystem health and reduce wildfire risk. Prescribed burning is a management tool that is employed statewide (Figure 4). In addition to forest products, controlled burning promotes healthy forests which in turn provide clean air, clean water, and conserves soil as well as providing recreational opportunities for Alabama's citizens and visitors. Prescribed burning is necessary to maintain healthy ecosystems, particularly longleaf pine, and in many cases to meet requirements of the Endangered Species Act. For example, the red cockaded woodpecker is federally endangered, and federal property managers must use prescribed fire to enhance its recovery. Prescribed fire is an important tool to maintain habitat for popular and economically important game species, such as the northern bobwhite quail, wild turkey, and white-tailed deer. Fire plays a vital role in statewide wildlife management goals and has been recognized as one of the highest priority conservation actions in Alabama's State Wildlife Action Plan.

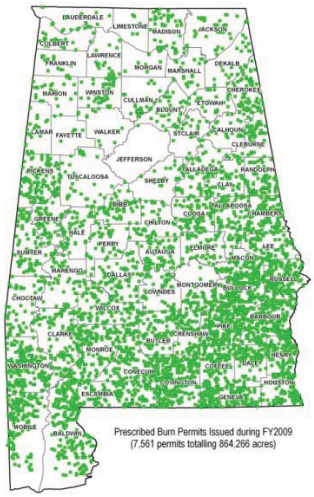


Figure 4. Prescribed Burning Permits Issued by AFC, FY 2009.

Reforestation

Tree planting trends in Alabama tend to mirror the economy. The area planted annually rose steadily through the 1970s and into the late 1980s peaking in 1986 at 393,000 acres planted. In recent years, however, softwood tree planting in Alabama (primarily loblolly pine) has been at approximately the same level as in the late 1950s and 1960s, about 100,000 acres per year (Figure 5). Cost Share programs such as the Forest Incentive Program (FIP) started in the mid 1970's and contributed significantly to reforestation efforts. The Conservation Reserve Program (CRP) began in 1986, taking highly erodible cropland out of agricultural production and converting many acres to woodlands to help promote wildlife habitat. Factors such as stricter cost share eligibility, changing emphasis in reforestation programs, and large scale divestiture of land by the forest industry have all contributed to the drop in acres planted in recent years.

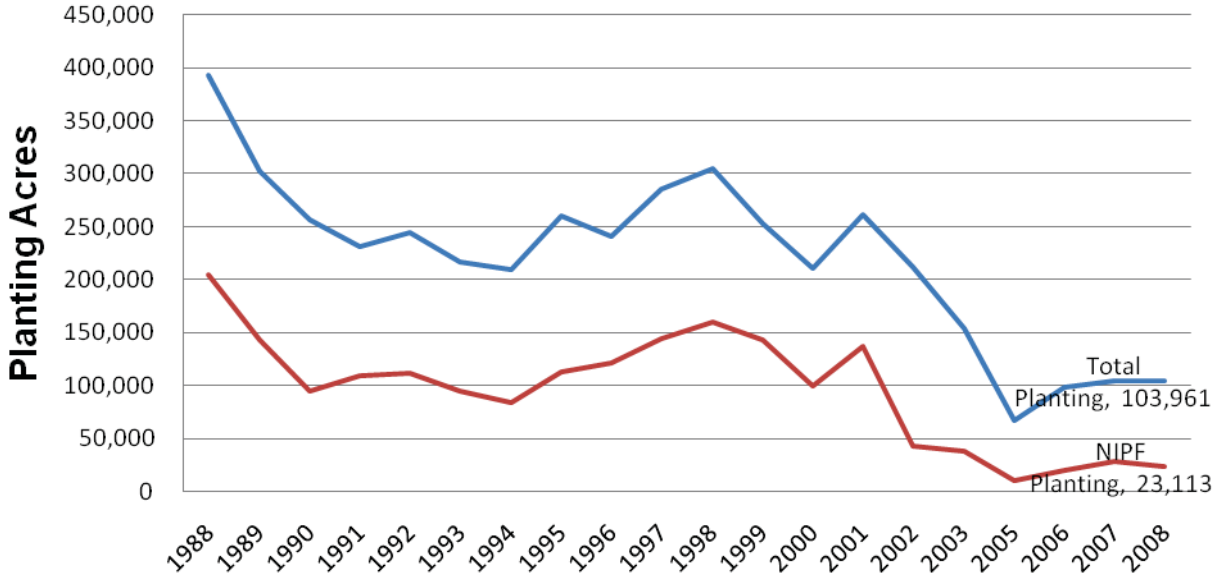


Figure 5. Tree Planting in Alabama: 20-year trend (NIPF = Non-industrial Private Forest)

Urban Forest

Alabama has the fourth largest number of urban trees of any state (Table 4). This distinction is more a reflection of the state's extensive rural forest being encompassed by urban growth and development than of an intentional tree planting effort. According to the U.S. Forest Service (Nowak and Greenfield 2010), "Urban or community land in Alabama comprises about 9.7 percent of the land area in 2000, an increase from 8.1 percent in 2000. Statewide tree canopy cover averages 56.9 percent and tree cover in urban or community areas is about 40.1 percent, with 7.7 percent impervious surface cover and 43.5 percent of the total green space covered by tree canopy. Statewide, urban or community land in Alabama has an estimated 243.4 million trees, which store about 46.4 million metric tons of carbon

($1.1 billion), and annually remove about 1.5 million metric tons of carbon ($34.9) and 46,030 metric tons of air pollution ($342.5 million)."

As our state's cities and towns grow, so will the size and acreage of our urban forest. Projections show that the scope Alabama's urban forest will continue to increase as the state maintains its shift toward an urban landscape.

Table 4. Urban Forest Summary Data for Alabama

State	Number of Urban Trees	Urban Trees per capita	Urban Tree Cover (%)
GA	293,090,818	35	42.6
FL	291,958,602	18	26.7
NY	253,608,736	13	21.0
AL	243,365,418	55	40.1
TX	237,530,548	11	14.8

Source: Nowak et. al. 2009.

There is growing evidence that the urban forest provides tremendous value. Research is showing that urban forests make for healthier lifestyles, improve the environment, sequester carbon, boost the economy, and enrich the human experience. Alabama's urban forest is no exception. Local government, nonprofit organizations, and individual citizens all have a role in managing the urban forest to help make Alabama a better place for people.

Alabama's citizens place a great value on urban trees. Three quarters (74.5%) indicated that the presence of trees on a property would be very important when choosing a new residence, and 77% stated that having trees in the community would be very important in selecting a town or city to live (Center for Governmental Services, Auburn University 2003). As Alabama continues to urbanize, a higher percentage of our state's population will live in towns and cities.

Only in the last thirty years have local governments in the state have taken steps to actively manage this natural resource by investing local tax dollars and resources. This is witnessed by the steady growth of organized community tree programs springing up across the state. One particularly strong measure is Tree City USA certification. This Arbor Day Foundation program gives national recognition to communities that have a tree ordinance, tree board, active work plan, and celebrate Arbor Day. In 1979, Mobile became the first Alabama city to attain Tree City USA status. Today, the state boasts eighty-three Tree City USA communities. And the trend is growing. In 1985, Huntsville and Mobile became the first two cities in the state to hire urban foresters. These two acts demonstrated that cities and towns were beginning to realize a need to hire professionals to manage their urban forestry programs. Today, 63 Alabama communities have professional staffing that oversees the management of their urban forests (Figure 6). Many of these communities are now looking at developing urban forest management plans based on inventories and assessments.

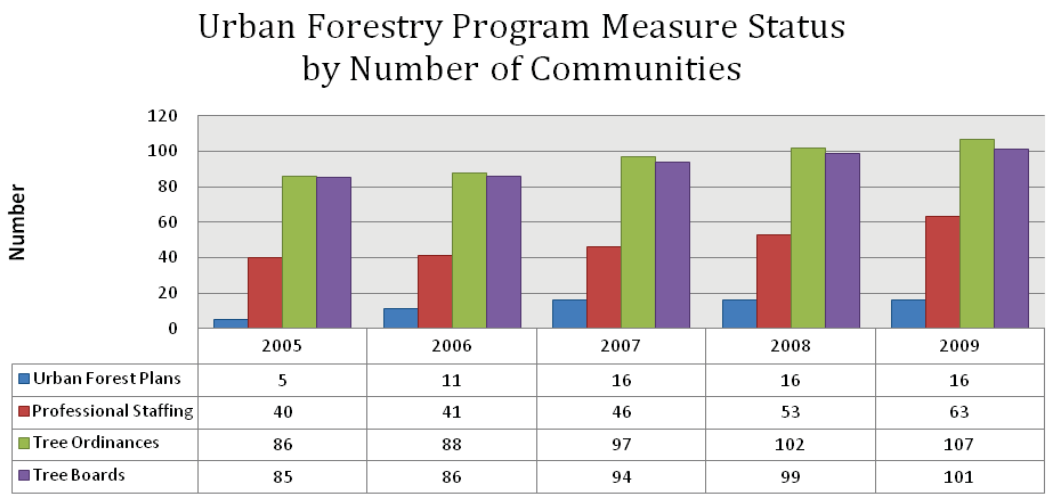


Figure 6. Urban Forest Performance Measures

In 2005, 62.53 percent of Alabama's urban population lived in a community that had an organized tree program. In 2009, that number increased to 68.71 percent. As Alabama communities continue the trend of building and expanding their community tree programs, an increasing number of urban citizens will see and feel the positive benefits of a healthy, well-managed urban forest.

Box 5. Montgomery's Urban Forest

In 2002, the City of Montgomery contracted to produce its first ever Comprehensive Urban Forestry Plan. The plan recommended that the city adopt a goal that would "incorporate, manage, and protect trees as a component of the city's infrastructure." The plan also identified individual tasks including revising the planning, zoning and landscape ordinances, developing a tree ordinance, and hiring a professional urban forester. By 2006, all of these things were done. During this process, the city used a U.S. Forest Service Urban & Community Forestry grant to measure land cover types to determine impacts on air and water through AMERICAN FOREST and Landsat TM imagery (30-meter resolution) satellite imagery.

From 1986 to 2001, the ecosystem assessment concluded that the city's urban area increased 8.1 percent while the urban tree canopy decreased by 6.1 percent. The urban forest canopy occupied 33,620 acres and provided ecosystem services totaling 227 million cubic feet in storm water benefits, valued at $454 million. Another 3.2 million pounds of air pollutants were removed annually at a value at $7.9 million. The city's urban forest sequestered 11,263 tons of carbon annually and served to store a total of 1.45 million tons. The assessment determined that nine of ten water quality contaminants would worsen by 9 to 38 percent if urban trees were removed from the land.

Montgomery, Alabama

Forest Health

A healthy forest is capable of renewing itself and recovering from disturbances while meeting current and future human needs for desired levels of values, uses, products, and services. Forest pest insects, invasive species, disease, wildfire, air pollution, catastrophic events, and climate change can all impact forest health, and are addressed in detail along with other factors in Chapter 3. The following is modified from the AFC bulletin, *Alabama Forest Health Highlights, 2009*.

Weather conditions for the second consecutive year were relatively mild for Alabama in 2009. The state was finally recovering from the two-year drought of 2006 and 2007, with cooler temperatures and significant amount of precipitation. No major damaging storms occurred in the state, expediting the recovery from the drought.

Cogongrass continued to be one of the most recognized non-native, invasive plant species in Alabama. With collaborative efforts from several organizations to assess and identify cogongrass, additional accomplishments were achieved. In September, a 6.3 million-dollar 2009 American Recovery and Reinvestment Act Grant was awarded to AFC to assess, control, and possibly eradicate this noxious weed in the state.

Southern pine beetle (SPB) is generally one of the state's most destructive insects, but it was not a serious threat to Alabama's forests in 2009 due to cool spring temperatures and sufficient precipitation. The 7-year to 9-year cycle of the beetle's population may have had an impact on the level of infestation as well. In August and September, during the height of SPB activity, only 18 spots with 445 infested trees were detected statewide. No spots were reported on National Forest or other federal land.

Pine engraver beetle also exhibited a decrease in number of detected attacks in 2009. During the August/September aerial surveys, 4 spots with 350 infested trees were initially recorded as SPB spots, but later identified as engraver beetle infestation.

Black turpentine beetle infestation is generally rather low. Virtually all of the trees affected were mature pines in a residential or commercial area and damaged by some type of mechanical equipment. Declining and weak from attack, surprisingly none of these infested trees succumbed to the pest.

Emerald ash borer, a non-native invasive insect that is wreaking havoc on ash trees in the Midwestern states, has recently extended its range into the Southeast. Detected in Virginia and Kentucky, this pest has spread rapidly primarily through the transportation of untreated and unregulated ash firewood. Faced with this unexpected and alarming situation, the southeastern states implemented a campaign to halt the transportation of untreated firewood. The Alabama Department of Agriculture and Industries has deployed emerald ash borer detection traps throughout high-traffic, forested areas in the state. No emerald ash borers have yet been detected in Alabama.

Redbay ambrosia beetle is a non-native invasive insect that kills redbay, sassafras, and other species of the laurel family. First detected in Georgia in 2002, it was detected in July 2009 in Jackson County, Mississippi, just west of Mobile County, Alabama. With its rapid spread, control methods are limited. Believed to have been introduced into Mississippi by untreated firewood, this exotic forest pest now has become a serious threat to Alabama.

Fusiform rust is quite common in Alabama, but genetic improvements of pine seedlings have reduced the occurrence of this disease. Besides occasional reports from landowners about this infection on loblolly pines, this disease has not caused significant death to trees in the state.

Nantucket pine tip moth was particularly evident in 2009, especially from March through August on planted loblolly pines. The majority of these pine stands received intensive site preparation, reducing understory vegetation and ultimately reducing the habitat of the tip moth's predators. With most of the available systemic insecticides to control pine tip moth banned from the market, a new systemic insecticide by BASF called PTM was recently introduced as one that can potentially control this pest.

Loopers such as the linden looper and the cypress looper increased in 2009. A periodic pest, loopers do not generally cause death to a significant number of trees unless the attack is severe. With natural predators around to reduce the presence of loopers, the hardwood trees that were attacked by the linden looper started to recover by the end of the summer. The baldcypress trees that were attacked by the cypress looper received more damage. Approximately 200 acres of baldcypress were affected.

Pine sawflies, also a defoliator, caused significant damage to pines in 2009. The Virginia pine sawfly devastated several acres of Virginia pines in the spring while the redheaded pine sawfly attacked loblolly pines in the latter part of the summer. Pine trees in both infestations recovered by control methods or natural means.

Annosus root disease occurrences were few in 2009. The AFC places strong emphasis on awareness to landowners about the importance of monitoring pine stands for annosus root disease. Pertinent information about good management practices for pine stands (harvesting during the summer months, the use of Borax after harvesting, etc.) contributed significantly to the prevention of annosus root disease in the state.

Sudden oak death surveys were conducted in early spring 2009, with surprising results. Traps baited with rhododendron leaves were deployed in streams neighboring seven selected nurseries. The sudden oak death pathogen *Phytophthora ramorum* was detected from three of these nurseries. Secondary surveys were conducted at these positive sites to determine if the pathogen had escaped. The pathogen was detected, but the disease had not moved into the surrounding environment.

CHAPTER 2
KEY DRIVERS OF CHANGE TO ALABAMA'S FOREST RESOURCE

A driver is any natural or human-induced factor that directly or indirectly causes a change to the forest resource. As a rule, such changes are a result of interactions among many factors—social, ecological, economic, climatic, and biophysical.

Direct Drivers

Direct drivers unequivocally influence the forest. Important direct drivers include land conversion and climate change.

Land Use Change

The most important direct driver of change in forest ecosystem services in the past century has been land cover change (conversion to cropland [and sometimes back to forestry] and development). Figure 7 shows Alabama's current land use pattern.

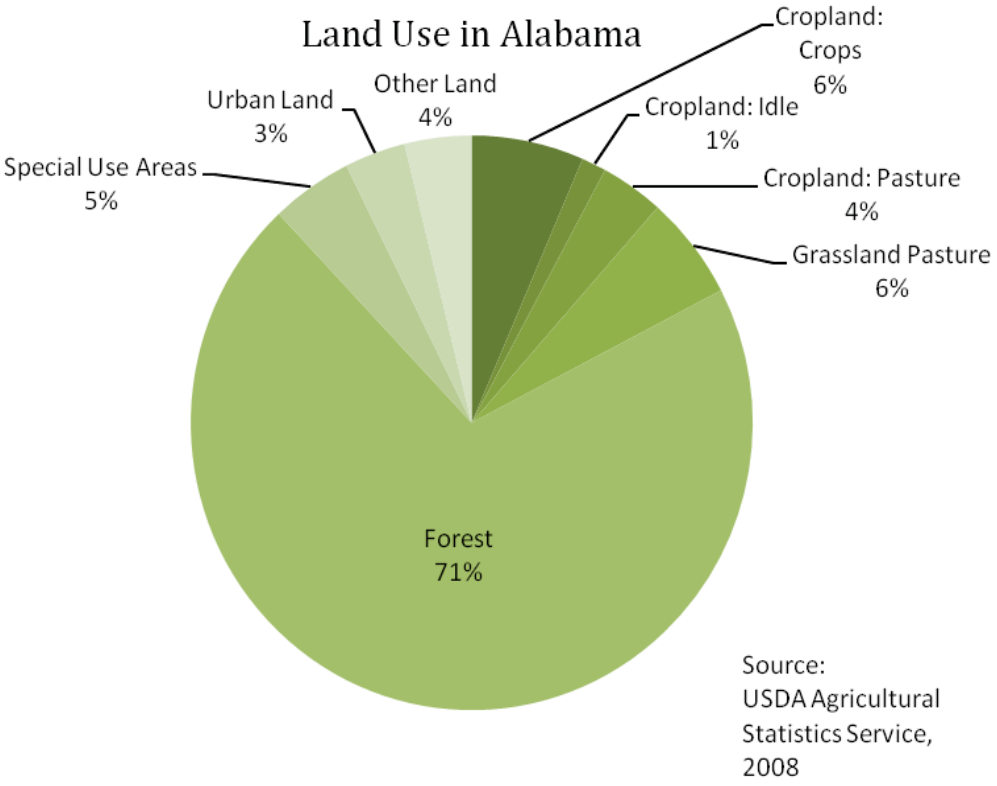


Figure 7. Land Use in Alabama

(Urban land totals differ from Table 4 due to differences in classification criteria used)

Climate and Weather

Climate Change

Climate change is a concept that describes variations in the earth's climate over many time scales, ranging from decades to millions of years and includes the possible causes of such variations. Climate change may result from factors such as changes in solar activity, long-period changes in the Earth's orbital elements, natural internal processes of the climate system, or anthropogenic forcing (for example, increasing atmospheric concentrations of carbon dioxide and other greenhouse gases).

The National Oceanic & Atmospheric Administration has documented that atmospheric greenhouse gases have risen dramatically since the onset of the Industrial Age. Models project varying changes in climate, especially warmer regional temperatures that will affect biological systems in many parts of the world. These same models project this warming trend to continue through the twenty-first century. If this occurs as projected, changes will affect species distributions, population sizes, and the timing of reproduction or migration events, as well as an increase in the frequency of pest and disease outbreaks in Alabama's forest ecosystems. Other models do not show significant temperature increases in the Southeast but rather more extremes in temperature fluctuations and increased intensity of storms, droughts, flooding, hurricanes, etc. Either way, Alabama's forests will be impacted.

Hurricanes

The most severe weather-related events affecting Alabama's forests are hurricanes, which usually enter along the Gulf Coast region either directly into the state or through Mississippi or the Florida panhandle. The intensity of hurricanes can vary along with their impact on the state's forest resource. Rainfall, floods, and high winds associated with hurricanes have a can have profound effects that can result in tree mortality, storm damaged trees, and a stressed forest ecosystem. The state's extensive coastal urban forest is highly vulnerable to ocean driven hurricanes. High population densities and urban built infrastructure within the urban forest increases the risk associated with storm damaged trees. In the case of both urban and rural forests, hurricane impacts are both economic and ecological and can linger well beyond the storm event itself. Alabama has been affected by 26 hurricanes in the past 150 years (United States Landfalling Hurricane Probability Project). Hurricane Ivan in 2004 was one of the three most significant hurricanes to hit the Alabama coast in more than a century. Only Frederic (1979) and an unnamed 1926 hurricane were as destructive. Then the following year, Hurricane Katrina struck coastal Mississippi as a near Category 4 storm, causing severe damage in Alabama as well. Table 5 shows the impact of Ivan and Katrina on Alabama's timber resources.

Table 5. Effect of Hurricanes Ivan and Katrina on Alabama's timber resources

	Ivan, 2004	**Katrina, 2005**
Softwood timber mortality	603 million ft^3	126 million ft^3
Hardwood timber mortality	414 million ft^3	91 million ft^3
Total timber mortality	1017 million ft^3	217 million ft^3

Source: U.S. Forest Service Forest Inventory and Analysis

Tornadoes

Like hurricanes, tornadoes are capable of major rural and urban forest disturbances, but usually on a smaller scale. Unlike hurricanes, tornadoes occur with greater regularity and are as likely to affect the northern part of the state as well as the southern portion. From 1950 through 2002, Alabama averaged 23 tornadoes per year. The greatest number in a single year was 55 in 2001. Tornadoes occur on an average of 11 days per year (U.S. Weather Service, Birmingham).

Drought

Rainfall (and on rare occasions, snow) varies seasonally, annually, and geographically. Unusual dry periods sometimes affect specific portions of Alabama more than others. Such dry periods are a normal component of the climate system. Forests are adapted to survive episodic droughts. In normal conditions, the impact may be slower growth, susceptibility to certain insects, and increased fire risk. Under more severe conditions, drought impacts are magnified and can even affect healthier trees. In urban situations, drought is especially a concern, because of added urban stresses which reduces a tree's resilience.

Droughts affect trees by decreasing resistance to disease and insects, decreasing growth rates, and increasing wildfire risk. Frequent droughts may influence forest species composition. Most droughts in Alabama begin with decreased precipitation during the winter and spring, when soil moisture is being recharged. The combination of decreased precipitation and cloudiness, increased solar radiation, and extreme heat resulting from decreased evaporation dries and hardens the soil. When rainfall occurs, the hardened soil hinders recharging of the soil moisture.

Using tree ring analysis, Cook et al. (1999) demonstrated that prolonged droughts have impacted southeastern forests several times since 1680. Analysis of this data by Georgia's state climatologist led to the conclusion that on average, the region experiences a major drought lasting three or more years about once in 40 years (Stooksbury 2003).

Although there is little evidence so far supporting a trend in increased drought frequency or severity, the worst drought in Alabama since recordkeeping began was also the most recent. In 2007, Alabama recorded its driest January-August in the last 100 years. Montgomery, Alabama had 12 consecutive days (August 6 to 17, 2007) above 100 degrees Fahrenheit, breaking the previous record by five days (Fuchs 2008).

In one recent study (Klos et al. 2009), data from Alabama, Georgia, and Virginia were examined for drought effects on mortality and growth rate of three species groups: pines, upland oaks, and mesophytic species (those adapted to moderately moist environments). The pines and mesophytic species were found to be sensitive to drought, while upland oaks were significantly more drought tolerant. These differences among species groups may alter the composition of Alabama forests if drought episodes become more frequent and/or intense in the future. Because stand conditions can have significant effects on drought responses, forest management may be used as a tool to mitigate drought effects.

Indirect Drivers

Indirect drivers operate by altering one or more direct drivers. Indirect drivers of change include demographic, economic, and technological factors.

Demographic

The characteristics of Alabama's human population, especially its size, growth, density, distribution, and statistics regarding birth, marriage, disease, and even death has an impact on the state's natural resources. As the population increases, so does urban land use patterns which not only degrade natural resources, but restrict traditional forest benefits and uses.

The 2000-2009 decade witnessed continued change for Alabama's population that reflects a moderate growth rate which is expanding municipal jurisdictions outward into rural undeveloped land. This trend will continue to have an impact on Alabama's forest resource. In 2009, Alabama's population was 7.23 % larger than it was in 2000. During that same period, our state's population grew from 4.447 million to 4.768 million. Most of this growth centered around, but not necessarily in, the state's four major population centers – Birmingham, Mobile, Huntsville, and Montgomery.

Despite a decline in population of almost six percent from 2000 to 2009, Birmingham remains the most populous city in Alabama (228,978). Montgomery closed the gap in second place by seeing its population remained virtually unchanged (202,696). Mobile retained the third spot on Alabama's largest city list (198,915), but saw its population drop by four percent.

Numerically, the greatest population gains in Alabama cities were in Huntsville (18,429) and Auburn (13,101). Calera's growth rate of 201.3 percent was by far the largest rate increase of any city in the state. Gulf Shores (78.1%), Moody (65.1%), and Foley (61.3%) had the next fastest rates.

From 2000 to 2009, the 15 most populous counties grew by 182,129 persons, accounting for 56.7 percent of all population growth in the state. Only one had any significant decline from 2000 to 2009 (Jefferson County, at only 0.4 percent). The largest percentage growth occurred in Shelby, Baldwin, Russell, and Elmore Counties. All have conditions that are attracting continued new development and net migration of residents.

From 2000 to 2009, the seven most populous counties in Alabama remained unchanged in their ranking, except Shelby County switching positions with Tuscaloosa County. The ranking order is Jefferson (659,503), Mobile (406,309) Madison (319,510), Montgomery (224,810), Shelby (187,784), Tuscaloosa (179,448), and Baldwin (174,439). The greatest population increases were in Shelby (43,213), Madison (41,654), and Baldwin (33,085) counties.

Alabama's population is aging. From 2000 to 2009, the median age of Alabama residents increased from 35.8 to 37.3 years. Alabama's largest subpopulation is 45 to 54 year olds (667,814), which comprised 15.4 percent of the state's residents in 2009. This concentration of residents was also the largest in 2000 when they were 35 to 44 years old. The smallest subpopulation of Alabama residents is those 85 years old and older (76,355). A little more than one in five Alabamians is 60 years of age or older.

Culture, as represented by the beliefs, customs, practices, and social behavior of particular groups of people, is another piece of the demographic puzzle that can influence or shape the way Alabama's forest resource is perceived and utilized.

Alabama is beginning to see a move toward a more diverse population. In 2009, whites continued to comprise the largest proportion of Alabama residents (3,303,253) at 70.4 percent, followed distantly by blacks (1,233,865, or 26.7 percent). Although the number of whites in Alabama grew by 140,445 from 2000 to 2009, their proportion of the population dropped by 0.7 percent as several minorities—particularly Hispanics, American Indians and Asian/Pacific Islanders saw their populations increase.

Economic

Economic change across Alabama has far-reaching implications for the future of our forests and forest resources. Both short-term and long-term factors are combining to reduce the economic importance of the traditional timber industry in Alabama and to change the composition, average acreage owned, and management objectives of private landowners. In the short-term, the sharp downturn in the national economy has brought housing construction virtually to a standstill. Since lumber is a major component of new housing construction, this has considerably depressed timber prices. As the national economy improves and home construction picks up, timber prices should recover somewhat. However, it is doubtful that rising timber prices will generate sustained recovery in Alabama's timber industry. The principal agents of change, creating both challenge and opportunity, in the future are: (1) rising interest rates, (2) globalization, (3) a growing industrial base, (4) continued population growth and (5) continued urbanization.

Industrial forestland owners have been divesting themselves of their timberland for the past decade. Domestic pulp mills have been closed, with operations now conducted in Asia and Latin America where land and labor prices are significantly lower than in the U.S. and where pulpwood grows significantly faster. As these factors are unlikely to change in the foreseeable future, this is, essentially, a permanent shift. Simultaneously, the rate of return on timber is falling, driven by both the decline in timber prices and increasing prices for rural land. The price of timberland, especially land located near urbanizing areas, has risen dramatically over the past 20 years. Prices are considerably higher than can be justified on the basis of rates of return from growing timber. In part, this reflects investor belief that the highest and best use for this land is urban-related development. Oddly, as urbanization continues in Alabama, the price of rural land climbs, reducing the real rate of return on timber operations. And urbanization can be expected to continue in Alabama, due to our expanding industrial base and in-migration.

In the future, an increasing amount of land in Alabama that historically has been managed for timber will be managed for other purposes, by private, non-industrial landowners. Average parcel size is declining; this trend likely will continue. This will create new challenges and opportunities for agencies such as the Alabama Forestry Commission.

The forest economy is part of the overall state and regional economy, which is turning more and more toward manufacturing and industry and away from agriculture and forestry. Other industries are being attracted to the relatively cheap forestlands of rural Alabama.

Energy and Mineral Development

An undetermined area of Alabama forestland is impacted every year by oil and gas drilling and surface mining of coal, sand, gravel, and other natural resources. Access road construction to these extraction sites further contributes to forest fragmentation. More than 17,000 oil and gas wells are scattered across Alabama's landscape, primarily in the west-central and southwestern portions (Figure 8). Currently, about two-thirds of Alabama's coal comes from deep underground mines in the Warrior Coal Field of the Southwestern Appalachians ecoregion, with the remainder coming from surface mines.

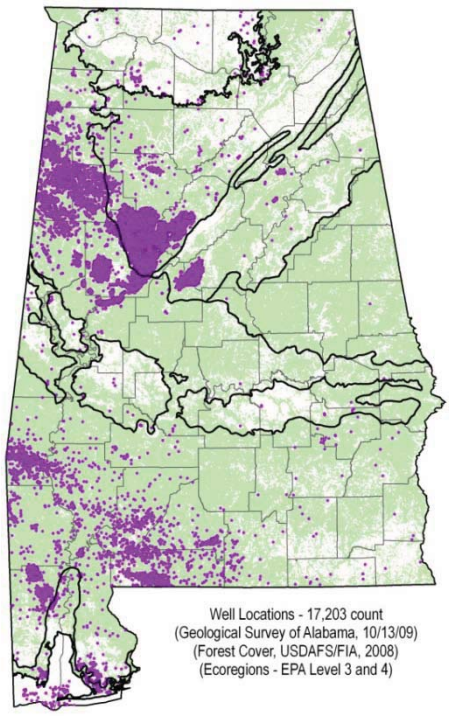


Figure 8. Gas and Oil Well Distribution in Alabama

Recreation

Forest-related recreation is important to Alabama's citizens. The tenth National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Fish and Wildlife Service and U.S. Census Bureau 2003) found that 423,000 Alabamians hunted and 1 million participated in wildlife-watching activities, including observing, feeding, and photographing wildlife.

The U.S. Fish and Wildlife Service maintains ten National Wildlife Refuges in Alabama, most of which support forest recreation activities such as nature study, fishing, hunting, picnicking and hiking. Through the concept of multiple use management on National Forests, the Forest Service is very much involved in outdoor recreation on the 665,981 acres of its land in Alabama.

The Alabama Department of Conservation and Natural Resources maintains 23 state parks, most of which feature forest-related activities such as hiking trails and nature photography. ADCNR's Wildlife Management Area program provides 37 areas managed for public hunting. These areas provide recreational opportunities for a large number of resident and non-resident hunters. In addition to hunting, the WMA's also offer primitive camping, hiking, nature study and photography. Most of the management areas are located on lands that are leased from other government agencies, corporations, or private individuals, with the state owning approximately 27% of the land involved. A large portion of that 27% is thanks to Forever Wild, Alabama's successful program to acquire and manage natural lands. Over the past few years, there has been a dramatic increase in the value of hunting leases on lands in Alabama. Thousands of acres of corporate lands, formerly leased to the state for the Wildlife Management Area Program, have been withdrawn as a result (ADECA 2008).

The commercial timber and paper industry has traditionally been a significant recreation provider, although this land base has decreased markedly in recent years with corporate divestiture. Lands owned by such corporations are generally open for hunting on a lease basis. Several of the wildlife management areas operated by the Wildlife and Freshwater Fisheries Division of the Department of Conservation and Natural Resources are located on corporate timber lands.

Transportation

Development of new roads and expansion of existing transportation corridors consumes land and impacts forest sustainability through increased sprawl, fragmentation, impervious pavement, air pollution, reduced water quality. Alabama has 201,729 total improved road miles throughout the state (US DOT, Federal Highway Administration "Highway Statistics 2007"). Huge sums of federal, state, and local dollars are spent each year to improve, develop, and expand the state's transportation network. The Alabama Department of Transportation (ALDOT) projects $9.8 billion in funding levels from 2008 to 2017. The primary objectives for transportation investments are to provide safe, reliable, and convenient transportation for the state's increasingly mobile and growing population. In recent years, another driving force has been to use transportation investments as an engine for economic and social development. Many economically depressed areas of the state have limited access to transportation corridors which are critical to their economic prosperity. Many of these areas are also where Alabama's best and most intact forest resource can be found. Connecting these economically depressed areas to regional and national transportation corridors is viewed as a strategic tool to stimulate employment, education, leisure, and other services. This strategy is receiving increased support at the state and local level.

ALDOT includes an economic development strategy in its Statewide Transportation Plan (2008). By 2035, ALDOT projects that population and job growth will result in a statewide increased vehicle miles of travel of 32 percent. The ALDOT plan also identifies economic corridors that are priorities for transportation investments. One example is ALDOT listing of the West Alabama Corridor for Feasibility/Alignment Studies. This potential project would construct a major transportation corridor connecting Mobile and Florence. This is in part due to the 2010 opening of the massive new ThyssenKrupp steel plant in north Mobile County where strategic north-south routes are lacking. Although much of the raw materials and products from the plant are anticipated to be transported by rail and on the waterways, the growth in truck movements and increased commuter trips will place significant demands on the road network and future economic expansion.

According to the Alabama Statewide Transportation Plan (2007), the Alabama Department of Transportation (ALDOT) carries out an Environmental Impact Statement (EIS) when a proposed undertaking is known to have significant and direct impact on the quality of the environment. New highways, highway re-alignments, and other projects that involve acquisition of large amounts of new right-of-way require an EIS. The EIS fully documents the purpose and need of a new project, alternatives, the affected environment, impacts and consequences of proposed alternatives, extensive feedback from affected agencies and citizens, justification of the final project decision, and proposed impact mitigation activities. A broad array of potential impacts are discussed including: land use, social and economic, bicycle and pedestrian interactions, air quality, noise, water quality, wetlands, wildlife and endangered species, and sites of cultural or historic importance.

Tupelo gum and baldcypress swamp, Monroe County

CHAPTER 3
THREATS TO ALABAMA'S FOREST RESOURCE

A variety of forces are shaping our forests and its sustainability. How we respond depends first on how well we determine what those threats are. This document identifies major threats that will determine how future generations will continue to enjoy this rich resource: Urban growth, fragmentation and parcelization, invasive species, changing markets, wildfire, insects and diseases, catastrophic weather events, air pollution, and climate change.

Urban Growth and Development

Urbanization effects on natural resources extend well beyond the boundaries of urbanized areas into surrounding wildlands and other rural environments (Macie and Hermansen, 2002). Researchers found that the probability of managing forests approaches zero at population densities of about 58 people per square kilometer (Wear et al. 1999). Past, current, and projected housing density is depicted in Figure 9.

Alabama 1940, 2000, and 2030 Housing Density
Census partial block groups

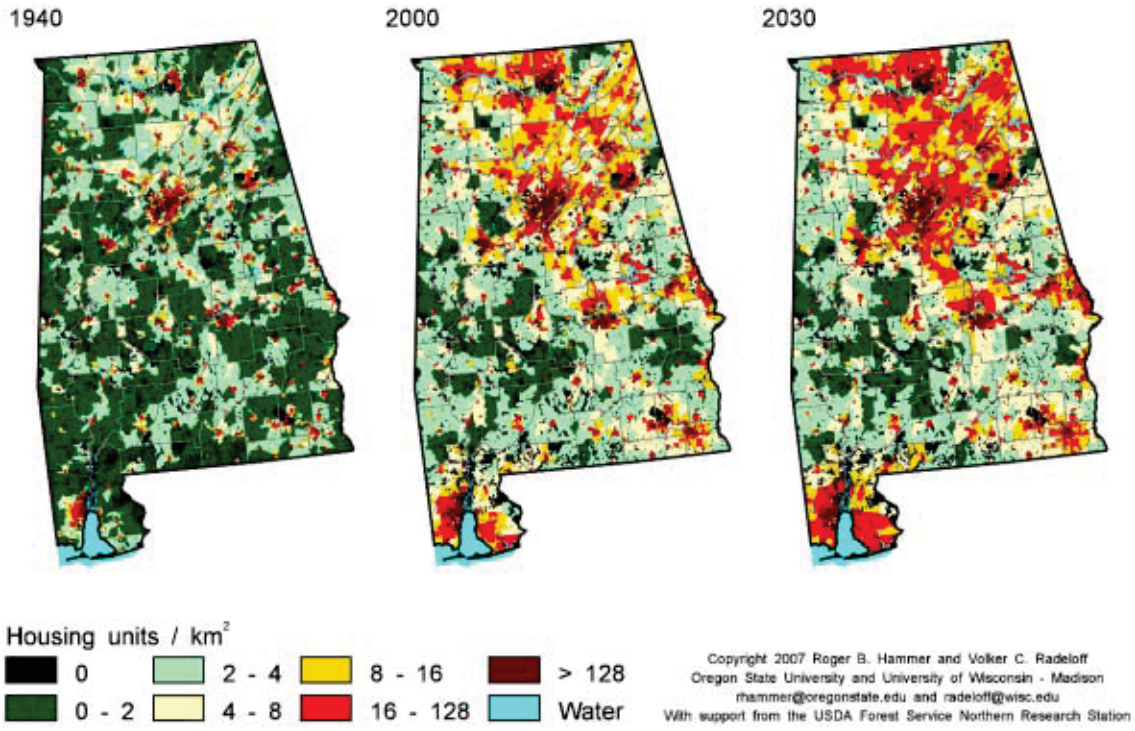


Figure 9. Historic and Projected Housing Density in Alabama

Urbanization affects Alabama's forest resource in many ways. Urban development directly eliminates some forestland while it increases population density, human activities, and urban infrastructure, all of which affect adjacent and nearby forests and their management. As urban landscapes increase across Alabama, greater pressures are placed on the ecosystem services derived from forest vegetation and wildlife. The amount of land conversion associated with urban growth varies across the state, but is correlated with the expanding metropolitan areas which are often adjacent to areas that are losing population. Nineteen counties exhibited greater than 4.5% population growth since 2000 (Figure 10). Seven counties, impacting five ecoregions, had growth rates of 14.8% or more. The fastest growing counties are not necessarily those with the largest cities (see Jefferson, Mobile, Montgomery).

Between 1990 and 2000, most of the urban expansion across the United States occurred in forested (33.4% of the expansion) or agricultural (32.7%) land. Forests near urban communities face a special set of challenges that will only intensify as these communities grow in area, population, and complexity (Nowak et al. 2005).

Percent Population Change, 2000-2008

Major Metro Areas

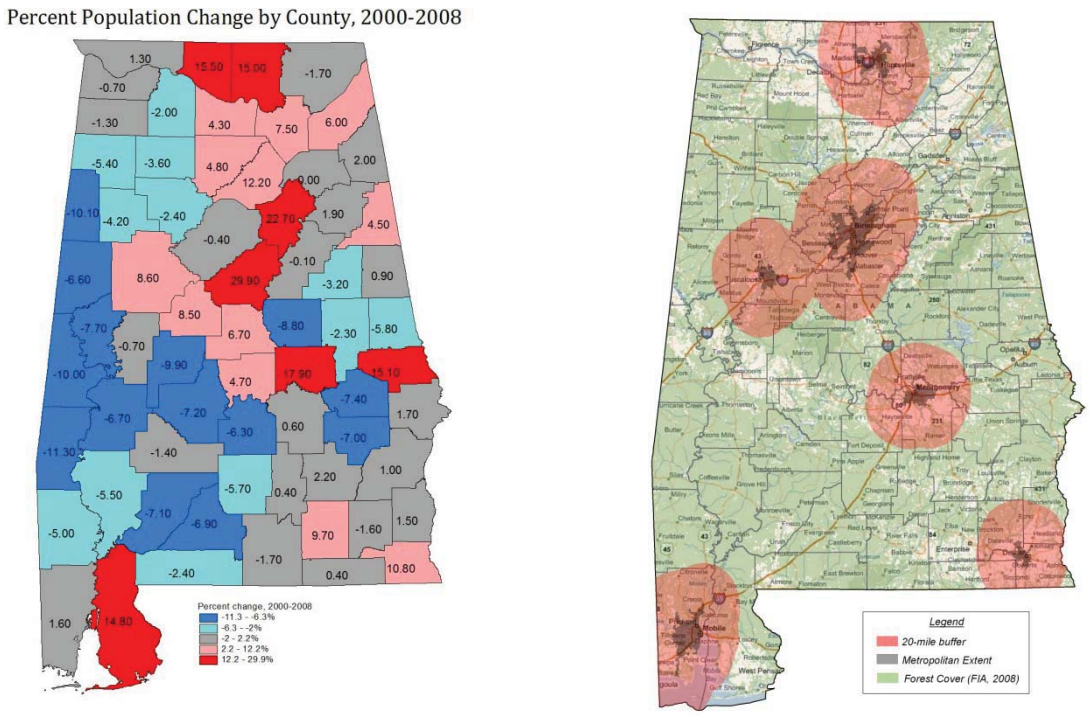


Figure 10. Population Change by County (left), major metropolitan areas (right).

Urbanization is a serious concern due to its rapid pace and wide ranging ecological impacts. Since 1940, housing has grown faster than population due to decreasing family size, a rising home ownership rate, and the popularity of second homes. Particularly around thriving towns and cities, the private working land base of Alabama's forests is being converted to other uses. Without proper planning, housing can have a very negative impact on the forest resource, altering its value and use. Increases in housing density and associated development such as roads, power lines, septic systems, and shopping centers can be linked to decreases in native fish and wildlife and their habitats, changes in forest health, reduced opportunities for outdoor recreation, poorer water quality, altered hydrology, greater loss of property to wildfire, changes in traditional uses of forests, and decreases in the production of timber and other forest products (Stein et al. 2005).

Housing growth on the edge of or within public forestlands has influenced or altered management of the timberland asset. The increase in dwellings, schools, and other population needs has directly impacted the ability to use prescribed burning, decreased or altered timber harvesting, and curtailed other forest management practices that are known to increase productivity, such as forest fertilization and site preparation.

Fragmentation and Parcelization

The 2002 Southern Forest Resource Assessment defined forest fragmentation as the breaking up of large, contiguous forested tracts into smaller or less contiguous tracts. This means that forests become islands and peninsulas--patches of woods disconnected from one another by roads, farms, suburbs, cities, and other human activities. Forests are becoming increasingly fragmented as they become increasingly parceled into smaller sizes. Parcelization of forestland is normally a precursor to fragmentation and often occurs when land ownership changes. In Alabama, forest parcelization and fragmentation are increasingly common along the periphery of towns and cities, particularly in the piedmont and coastal regions where urban growth is most common. The U.S. Forest Service estimates that up to 31 million acres of forest in the Southeast U.S. will be converted to urban land use by 2040 (Wear 2002) and identified the piedmont and coastal Alabama as examples where urban growth may be most intense. Along with reduced forest area, fragmented forests are further altered by their proximity to new human-dominated land uses. For instance, fragmented forests may have increased fire suppression, pollutant exposure, and hydrologic alterations. Consequently, parcelization and fragmentation represents a critical threat to Alabama forests.

Estate tax laws often have the effect of forcing forest fragmentation. A generation changes roughly every twenty five years. When large land tracts are inherited by the next generation they are often parceled out to the owner's offspring. Inheritance taxes have to be paid so keeping the land as a working forest may, without proper planning, no longer be economically feasible. The new land owners are faced with selling the parcel or using the land for some other "highest and best use," thus forests often become fragmented and converted to non-forest uses.

Fragmentation of Alabama forests can have significant effects on biodiversity. When forests become fragmented, wildlife populations become increasingly isolated which may lead to inbreeding and in some cases local extinction. Increasing fragmentation also changes the condition of forests by increasing the amount of edge habitat and reducing the amount of forest interior. When edges are created, forests become increasingly drier (due to increased solar radiation and wind), and the incidence of predation and parasitism increases. These conditions often favor edge-adapted species (e.g., deer, raccoons) at the expense of forest-interior species (e.g., ground-nesting birds). Wildlife in fragmented forests is often exposed to other animals associated with human-dominated conditions (e.g., feral cats/dogs, pigs) that can increase predation pressures and sometimes change habitat conditions. In addition, fragmented forests become increasingly less suitable for larger fauna by decreasing habitat space, reducing food supplies, and increasing their exposure to road mortality.

Forest fragmentation can also alter water flows and reduce water quality. Forests provide excellent water quality however where forests are fragmented by urban lands there can be a reduction in the water-filtering processes that they provide. The increased impervious surface that accompanies urbanization can increase surface runoff and substantially impact aquatic habitats. Water flows can also be altered when forests become fragmented. It has been shown that forested landscapes provide for rainfall interception, water transpiration, and the gradual release of water to streams. When forests become fragmented and replaced by other land uses, the capacity of these lands to regulate water is reduced. For instance, when forestland is converted to urban lands, there is normally an increase in impervious land surface which reduces water storage and can lead to increased surface runoff thereby increasing the potential for downstream flooding and habitat degradation.

Invasive Species

Invasions by alien organisms (and pathogens) have resulted in a huge loss in ecosystem services. In the United States, invasions of non-native plants, animals, and microbes are thought to be responsible for 42% of the decline of native species now listed as endangered or threatened (Hassan et al. 2005). The threats that biological invasions pose to biodiversity and to ecosystem-level processes translate directly into economic consequences including losses in forest production capacity.

The term *invasive species* can be defined as “a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health” (National Invasive Species Council 2008). Today some of the greatest threats to Alabama’s forests come from a number of invasive plants, as well as diseases, vertebrates and invertebrates (insects).

A sense of urgency has grown over the past decade as the ravages of invasive exotic plants on Alabama’s forest sustainability have accelerated. Of the 37 noxious invasive plants the Alabama Invasive Plant Council has identified as threatening managed forests and/or natural areas, there are nine trees, eight shrubs, seven vines, seven forbs, and six grasses (ALIPC 2007).

Alabama has more forestland impacted by invasive species than any other southeastern state. Approximately 19% of Alabama's forest acres have been infested with invasive non-native species. Mississippi and Tennessee both have 16% invasive coverage, and Georgia is at 5% (Miller et al. 2008). The most widespread invasive trees in Alabama are silktree, or mimosa (covering about 35,000 acres); tallowtree, or popcorn tree (22,500 acres), and Chinaberry (13,500 acres). The most widespread invasive shrubs are the Chinese, European, and Japanese privets, which together cover over a million acres. Of the vines, Japanese honeysuckle covers nearly three million acres, kudzu covers over 60,000 acres, and Japanese climbing fern covers about 40,000 of forestland. Cogongrass is rapidly expanding and is estimated to now infest nearly 40,000 acres of forestland. A federally funded $6.281 million control program was begun in 2009 to halt the northward spread of cogongrass in Alabama.

The feral hog (*Sus scrofa*) has been in the Southeast since the 1500s when it was introduced by Spaniards. In more recent times sportsmen have introduced populations of Russian boar and deliberately moved feral hogs into unoccupied areas. The hog's high reproductive rate and adaptability have allowed populations to soar, posing serious problems for landowners and managers. Hogs have devastating effects on forest ecosystems. When rooting, wild hogs overturn large areas of ground leaving a considerable area without vegetation. Understory vegetation in forests is greatly affected as are ground nesting birds, reptiles, amphibians, and invertebrates.

Imported fire ants (*Solenopsis invicta* and *S. richteri*) have been in the United States since about 1940, when they presumably entered the Port of Mobile on shipments from Brazil. Impacts to forested ecosystems are difficult to measure, but the ants are known to kill ground-nesting birds and reptiles. Along with the Argentine ant (*Linepithema humile*), these invasive species have also impacted the native ant fauna, but because they thrive best in open disturbed habitats, forested areas may be affected less than non-forested ones.

Changing Markets

The threat of a weakening forest-based economy poses a financial incentive risk for landowners managing their forests. Because forests are a renewable resource, when managed in a sustainable manner, they can continue to provide a variety of products and services while simultaneously enabling landowners to meet their economic objectives. The existence of a forest products market provides an incentive for landowners to manage their forestland rather than sell it to buyers who may potentially convert it to non-forestry uses (Alvarez 2007).

Alabama's forestland owners are being challenged with assessing today's weaker market conditions and attempting to find out whether it represents a cyclical or fundamental decline. How landowners make their determinations with this issue will likely affect the decisions they make regarding the retention and management of their lands.

Although markets for lumber and plywood are not expected to return to pre-recession levels anytime soon, an extended cyclical rebound in demand is expected. The U.S. South, including Alabama, is likely

to participate more strongly in this recovery than other producing regions in North America. Canadian lumber producers, in particular, were severely impacted by a confluence of unfavorable economic factors that have permanently, and significantly, reduced production capacity. The U.S. Pacific Northwest also suffered greater capacity losses than experienced by their Southern industry counterparts. Therefore, southern producers are poised to capture an increasing market share as product demand returns, allowing the area's producers to achieve good operating rates even in the face of what is expected to be a smaller overall market. Further enhancing the industry's prospects are a comparatively favorable cost structure that is likely to be buoyed by an abundant availability of sawtimber.

For Alabama landowners, a recovering lumber and panel industry should help expand markets for quality timber, with improving prices. However, a shift in the age class distribution in Alabama's pine inventory will likely mean that an abundance of sawtimber over the next ten years will keep real stumpage prices contained to levels below that realized in the pre-recession era. The positive side of this outlook, however, is that the business environment should be conducive to healthy growth in industry demand for sawtimber in Alabama due to the cost-competitive manufacturing dynamics.

Although pulpwood demand from the traditional pulp and OSB industries is only expected to rebound slowly from the recession's impacts, rapidly developing wood-based energy applications appear to offer a promising market development for traditionally low-valued wood. The use of pulpwood, mill residues and forest residues for pellet production, power generation, industrial thermal uses, and liquid fuels conversion represents a series of expanding markets with collectively very significant growth prospects. The potential wood volumes required for these applications could be very large, and should benefit landowners and loggers both in the near and longer terms.

From a forest management standpoint, the development of markets for previously non-commercial woody biomass should be helpful in providing options for upgrading forest conditions and inventories. With improving prices for pulpwood appearing to be a likely occurrence in the coming years due to new energy-based demands and somewhat lower supplies, landowners will have new economic incentives to manage their forests more intensively. The development of a strong market for "energy wood" may also change management regimes as landowners seek ways to take advantage of a market that did not previously exist in any meaningful sense. Short-rotation dedicated energy plantations may become a viable option, as well as managing timber stands for a combination of both energy and conventional timber products. Landowners who can adapt to these new market developments should have the opportunity to benefit both economically and operationally.

Alabama has the opportunity to spur economic development by pursuing strategies that target and capitalize on these changing markets. Utilizing existing expertise and resources within the State's agencies and universities, it should be possible to facilitate the prudent development of Alabama's manufacturing assets and the timber base upon which it depends. Retention and expansion of existing businesses is a first priority, as this avenue is always the most cost-effective route to creating economic growth and job creation. A parallel strategy, however, should be a focus on new industry recruitment

and development, with a special emphasis on high value-added energy businesses. As with any new developing industry, the bioenergy sector contains both opportunities and pitfalls, so care and expertise is required to make decisions that will be in Alabama's best long-term interest.

Further developing and enhancing Alabama's forest resources to meet the demands of these changing markets will primarily be driven by economics. Changing market incentives, and disincentives, will ultimately lead the state's landowners in the proper direction with regard to meeting the needs of the market. However, programs that inform, educate, and assist landowners can be effective in helping them to expedite and improve their ability to capitalize on these opportunities. In this respect, the State can certainly play a positive role in assisting Alabama's timberland owners in adapting and prospering in a changing market environment. Once again, Alabama's existing agencies and universities can play a pivotal role, with the Alabama Forestry Commission clearly positioned to take the lead.

Insects and Disease

Insects and disease (Table 6) can have a significant impact on the growth and yield of our native forests through the effects of excessive defoliation, decay, species alteration, or outright mortality. In Alabama, southern pine bark beetles (southern pine beetle, Ips engraver beetle, and black turpentine beetle) are the most destructive insects to pine stands, while annosus root rot is the most detrimental disease. Numerous pests affect the vigor, health, and composition of hardwood ecosystems. Insects and diseases can interact with other threats (e.g., invasive plants, climate change, environmental catastrophes, and wildfires) to prevent forests from remaining healthy, sustainable, and functional. One factor can affect one or more of the others. For example, current predictions of climate change may result in altered forest composition as stressed trees succumb to insect or disease attack. Climate change may also contribute to changes in frequency and intensity of hurricanes, tornados, floods, wildfires, and droughts. These natural phenomena directly and indirectly kill trees; those not killed immediately may be susceptible to insects and disease.

Alabama's native pests have in some instances decreased in their incidence and severity. Over the last ten years, and especially during the last four, the number of southern pine beetle infestations has declined. Native pests and disease seldom cause large-scale tree mortality. The greatest future threats to Alabama's forests from insects and disease will come from non-native forms. With few if any natural enemies and lack of host resistance, these exotic pests may result in uncontrollable infestations or epidemics with high levels of damage and tree mortality.

New threats are always on the horizon. One example is the redbay ambrosia beetle (*Xyleborus glabratus*), associated with laurel wilt disease. It was first discovered in a survey trap in the southern part of the United States at Port Wentworth, Georgia, in 2002. Like many others, this insect was believed to have been introduced into Georgia on untreated wood packing material from Asia. Since that time, the redbay ambrosia beetle has spread into other areas of Georgia, South Carolina, and Florida killing trees in the laurel family. In 2009, a new introduction was discovered in Jackson County,

Mississippi, just west of Mobile County, Alabama. With its rapid, uncontrollable, and extensive spread, this exotic ambrosia beetle will soon exist in Alabama.

Table 6. Major Insect and Disease Threats

Native	Type
Annosus root rot	Disease
Brown Spot needle blight	Disease
Decay	Disease
Fusiform rust	Disease
Littleleaf disease	Disease
Loblolly pine decline	Insect/disease combination
Oak decline	Insect/disease combination
Pine tip moth	Insect
Pitch canker	Disease
Reproduction weevils	Insect
Southern pine/bark beetles	Insect
Non-native	**Type**
Asian long horned beetle	Insect
Emerald ash borer	Insect
Gypsy moth	Insect
Hemlock wooly adelgid	Insect
Laurel wilt disease	Insect/disease combination
Sirex woodwasp	Insect
Sudden oak death	Disease

Wildfire

A total of 29,593,963 acres—91.7% of Alabama's total surface area—are subject to wildfire threat (Figure 11). In the past five years the AFC documented 16,129 wildfires statewide totaling 230,000 acres. In the fire-adapted ecosystems of Alabama, the issue is not whether an area will burn but when it will burn and at what intensity. Wildfires regularly burned across great expanses of the landscape during the South's prehistory. The vegetation in many parts of Alabama is adapted to fire, with many plant species requiring fire for regeneration. Periodic wildfires helped to keep the buildup of vegetation low.

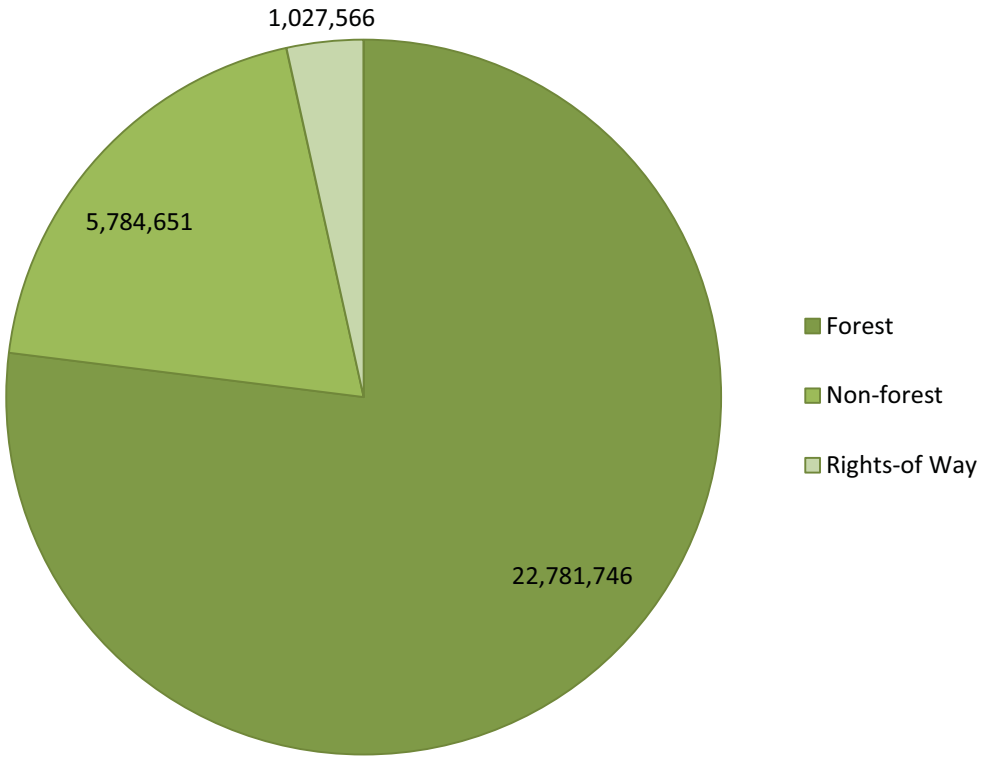


Figure 11. Land Area (in acres) Subject to Wildfire. Source: FIA 2008.

Forest: at least 120 feet wide and one acre in size, minimum tree stocking of 10%, or with the intent to be in a forested setting.
Non-forest: cropland, pasture, orchards, wildlife openings, rangeland, and idle farmland.
Rights-of-way: transmission lines, road margins, and roads themselves.

Fire suppression programs were developed in the 1930s to protect regenerating forests, but the suppression of fires in many areas has created an increase in fuel load for eventual wildfires, putting large numbers of people in the wildland-urban interface at risk.

To reduce these increased fuel accumulations and the risk of high intensity wildfires, managers now use prescribed fires and other fuel reduction techniques to reduce fuel loads. These actions help mitigate wildfire hazards that might otherwise cause catastrophic losses to forest stands, nearby structures, and other resource values at risk. Because Alabama's wildfire problem is so widespread and the fuels grow back so quickly, resources are stretched thin leaving many areas in need of fuel reduction treatments. Fire managers in Alabama face complex challenges regarding current and future fire risk assessment and management. These challenges are compounded by increasing fire intensities due to accumulation of vegetation, continued residential growth into fire-prone areas, and increasing firefighting costs.

As important as it is to suppress wildfires, the need for prescribed burning is greater now than ever. Prescribed burning reduces dangerous fuel buildups, reducing the severity of wildfires, and many forest

ecosystems, including but not limited to those characterized by longleaf pine, require regular burning for natural regeneration and maintenance of biodiversity. Responsible prescribed burning has both environmental and safety benefits.

Catastrophic Natural Events

Storms, floods and droughts all affect forests. As natural phenomena that have shaped our forests over millennia, their ecological impacts may be considered normal dynamics. They can result in significant economic losses to forestland owners. Compared to storms and droughts, ordinary flooding has little economic impact to bottomland forests, and is not discussed further in this section. There is increasing concern that if future climate conditions are warmer, the severity and frequency of these natural phenomena could significantly increase.

Air Quality

Alabama's air quality status can impact its forest resources both directly and indirectly. Directly, air pollution can injure foliage and slow the growth of vegetation. Deposition of sulfur and nitrogen pollutants can also affect water and soil chemistry which changes nutrient availability, thereby affecting plant vigor and growth. Forest ecosystems in urban and urbanizing areas are exposed to many sources of localized air pollution and may be impacted more than those in more rural areas (Styers and Chappelka 2009). Negative effects of air pollutants on vegetation are not entirely restricted to areas close to pollution sources however. Ground-level ozone (O_3) is the most widespread air pollutant in Alabama, and interferes with plants' ability to produce and store food, which makes them more susceptible to disease, insects, other pollutants, and harsh weather. Although air pollution has not yet resulted in obvious alterations in forest structure in Alabama, the fact that it has impacted high-elevation red spruce in eastern North America (acidic deposition) as well as several conifer species in California (ozone and excess nitrogen) suggests that the effects of air pollution could become more significant over time (Chappelka 2000).

Indirectly, air quality can impact the forest resources by constraints applied to various forest resource management programs in order to comply with air quality regulations. For example, the prescribed burning program is important to maintaining healthy forest ecosystem and restoring important forest ecosystems such as the longleaf pine – savannah ecosystems. Where air quality may not be meeting regulatory levels, any constraints to programs such as prescribed burning could reduce the State's ability to achieve its goals of ecosystem restoration and maintenance.

In this assessment, primary concerns identified in terms of air quality are deposition of nitrogen and sulfur compounds across the forest landscapes and the potential impacts to forest health. Also, the ambient concentrations of ground-level ozone are of concern due to its impacts to vegetation. Details about the potential impacts to forest ecosystems from these pollutants are summarized in the U.S.

Forest Service's 2009 Air Quality Values Monitoring Plan for Wilderness Areas in the Bankhead and Talladega National Forests (USDA-FS 2009). That report is incorporated by reference into this Statewide Assessment.

Climate Change

Regardless of the cause, observations show that, currently, warming of the climate is taking place, and it is prudent for resource managers to prepare for the potential for warming and how it may affect Alabama's forests.

Potential impacts to Alabama's forest include regional changes in product yields, increased insect outbreaks, and increased encroachment and spread of invasive species. Climate change will also most likely lead to a preponderance of vines in Alabama's forests, because greenhouse studies reveal that vines grow more vigorously under elevated CO_2 levels.

Although the *net* impacts of climate change on the U.S. forest industry may be small, gains and losses will not be distributed evenly through the country. The Southeast, which is currently a dominant region for forestry, is likely to experience net losses, as tree species migrate northward and tree productivity declines. Climate change may increase the intensity, extent, and frequency of forest fires. Under warmer climate scenarios, catastrophic fire could be a major change agent for southeastern forests. The ecoregions of the northern half of Alabama would be most severely affected by climate change (Davenport 2007). These hardwood forests are composed primarily of temperate zone families, including pines, maples, oaks, beeches, hickories, and walnuts, which are all projected to migrate north--perhaps out of the state entirely. Only minor or subcanopy elements of these forests show tropical affinities and thus might be enhanced: poison ivy, pawpaw, persimmon, various magnolias, mulberry, basswood, and various grapes.

Multi-State Areas of Regional Priorities

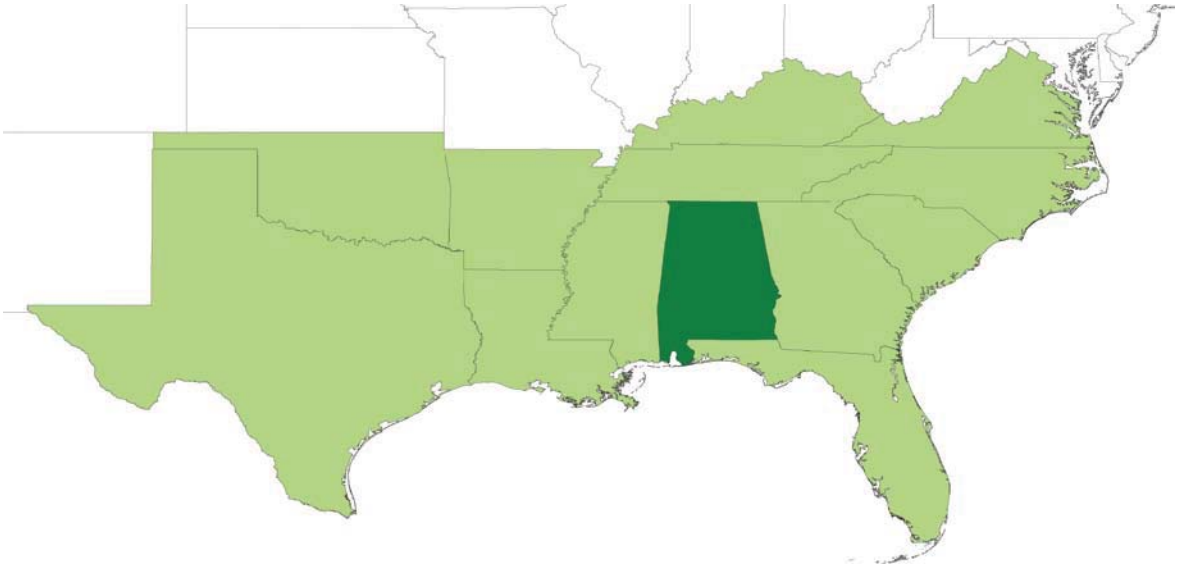
Many of the threats facing Alabama's forest resource are the same ones facing other southeastern states. In the past, these problems could be addressed individually. But today that is no longer true. If Alabama or any other southeastern state is to make progress against today's threats, then they must find common ground to work together. To do so will require collaboration in ways never done before. This collaboration begins with identifying multi-State areas of regional priority. That's what the matrix box in this section attempts to do for our state. It compares the nine Alabama threats with those identified among our sister states. From there, Alabama can work with other states to share data and resources in a more cost-effective way. It also means developing strategies that can be standardized and extended beyond state boundaries and other traditional legal jurisdictional lines. By creating an atmosphere of collaboration, the results can be immediate.

Finally, no one should underestimate the value of the local-state-federal relationship in addressing multi-State areas of regional priority. While most decisions will be made locally (i.e. at the landowner or municipal level), there is an important federal role in providing guidance and resources to help the states support and ensure that these decisions are effective.

Table 7. Regional Priorities Shared with Alabama

	Southeastern States											
Threats to Alabama's Forests	AR	FL	GA	KY	LA	MS	NC	OK	SC	TN	TX	VA
Urban Growth and Development	●	●	●	●	●	●	●	●	●		●	●
Fragmentation and Parcelization	●	●	●	●				●	●	●	●	●
Changing Markets		●	●	●	●	●	●	●			●	
Invasive Species	●	●			●	●			●			●
Insects and Disease		●		●			●		●	●	●	
Wildfire	●	●	●	●	●	●	●	●	●	●	●	
Catastrophic Weather Events				●			●	●			●	
Air Quality		●	●	●			●	●				
Climate Change	●	●		●		●	●	●		●	●	
Specific Issues												
Longleaf		●	●		●	●	●		●		●	●
Cogongrass		●	●		●	●			●		●	

Source: Draft Forest Assessment Documents posted to U.S. Forest Service Base Camp website (subject to revision)



Appendix 6 provides information on how the following four regional priority maps were developed.

Multi-State Priority Area: Cogongrass

Description: Cogongrass (*Imperata cylindrica*) is a warm-season, perennial grass that originates from Asia. It was first introduced into the United States through Mobile in the early 1900's as packing material for oranges. Cogongrass is one of the 10 worst weeds in the world. It is steadily marching through Alabama and into neighboring states (Mississippi, Louisiana, Florida, Georgia, South Carolina, and Tennessee). This highly invasive pest permanently alters plant and animal communities, increases fire frequency and intensity, and requires extensive investment to control. In other areas of the world cogongrass has destroyed entire landscapes, creating a 'sea' of cogongrass with no other plants. Domestic food and fiber supplies are negatively impacted by cogongrass through reduction in wildlife food sources and killing or injuring valuable cash crops such as corn, cotton, and trees. Cogongrass exists on rights-of-way, forests, and agricultural, residential, commercial, and industrial areas. Because it is found in so many areas, there is a need for a large-scale, concerted effort to effectively control it.

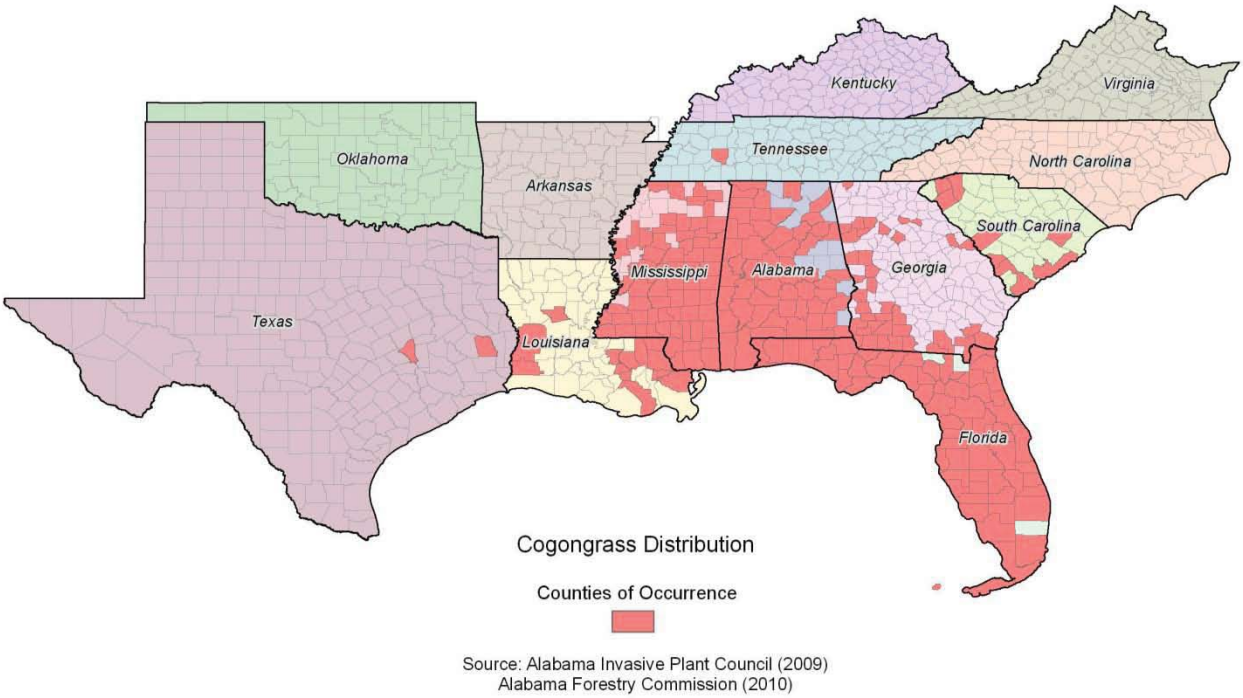


Figure 11. Cogongrass distribution

Multi-State Priority Area: Longleaf Pine

Description: Longleaf pine (*Pinus palustris*) was once a dominate fixture of the early south east American forest ecosystem. At one time, the longleaf pine forest is estimated to have occupied 60 million acres, stretching from eastern Texas through Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, before ending at the very south east corner of Virginia. Its adaptation to conditions in its natural range made it less vulnerable to normal pests, strongly resistant to fire, and a relative low risk to manage.

Because of intensive harvesting practices during the late 19th and early 20th centuries and follow-up displacement by other pine species during reforestation, the natural range of the Longleaf pine remains in roughly three percent of its former landscape. The reduction in acreage has produced fragmented longleaf pine stands, reduced forest product opportunities, lower populations of wildlife dependent on longleaf pine, and increased forest management costs of replacement pine species.

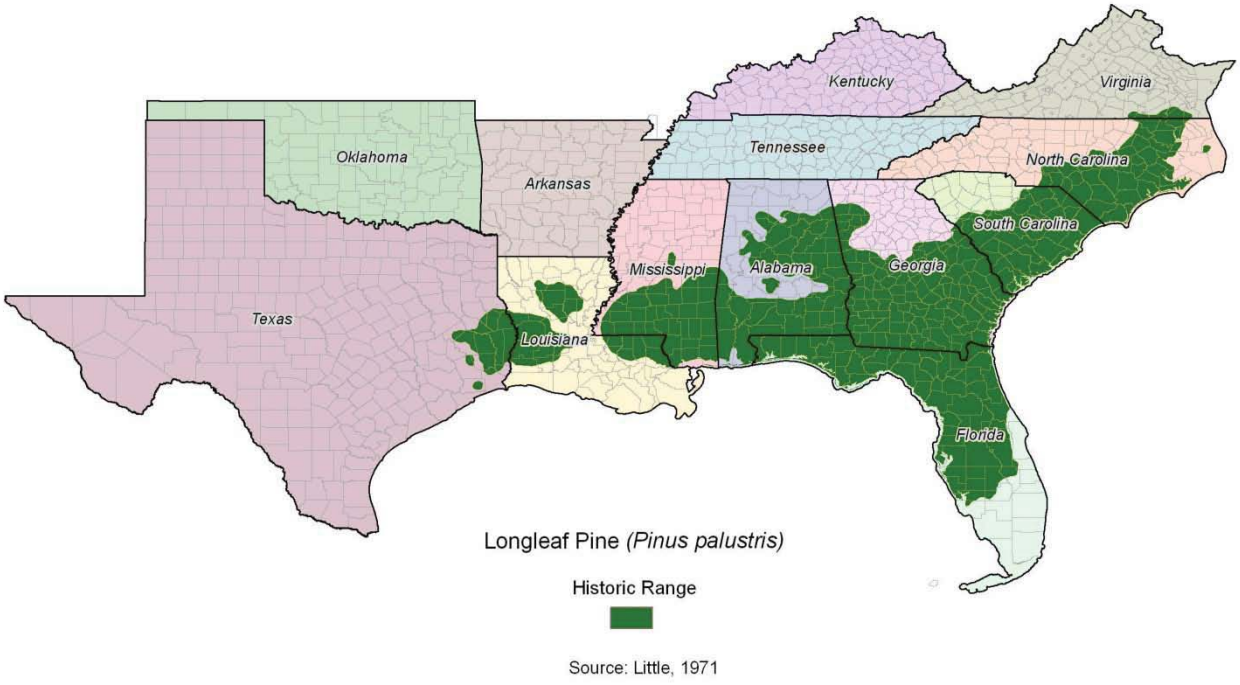


Figure 12. Distribution of Longleaf Pine

Multi-State Priority Area: Water Quality

Description: Alabama's river basins and abundant water resources makes it one of the state's most valuable natural resources. The Mobile-Tombigbee and Alabama River Basins, which covers some two-thirds of the state, has a greater yield of water per square mile of land than any other basin in the United States, including the Mississippi River. Alabama's springs, streams, rivers, lakes, and wetlands are home to more species of aquatic and semi-aquatic animals than any other state in the union. The abundance and high-quality of Alabama's water resources have contributed significantly to the economic development of the state, and will be a catalyst in Alabama's future growth and prosperity.

The six major drainage basins of Alabama have linkages to all four surrounding states (Mississippi, Tennessee, Georgia, and Florida). Efforts to sustain working forests will become increasingly important as pressures build to provide clean and dependable water so as to support watershed ecosystems and satisfy the demands of a rapidly growing human population.

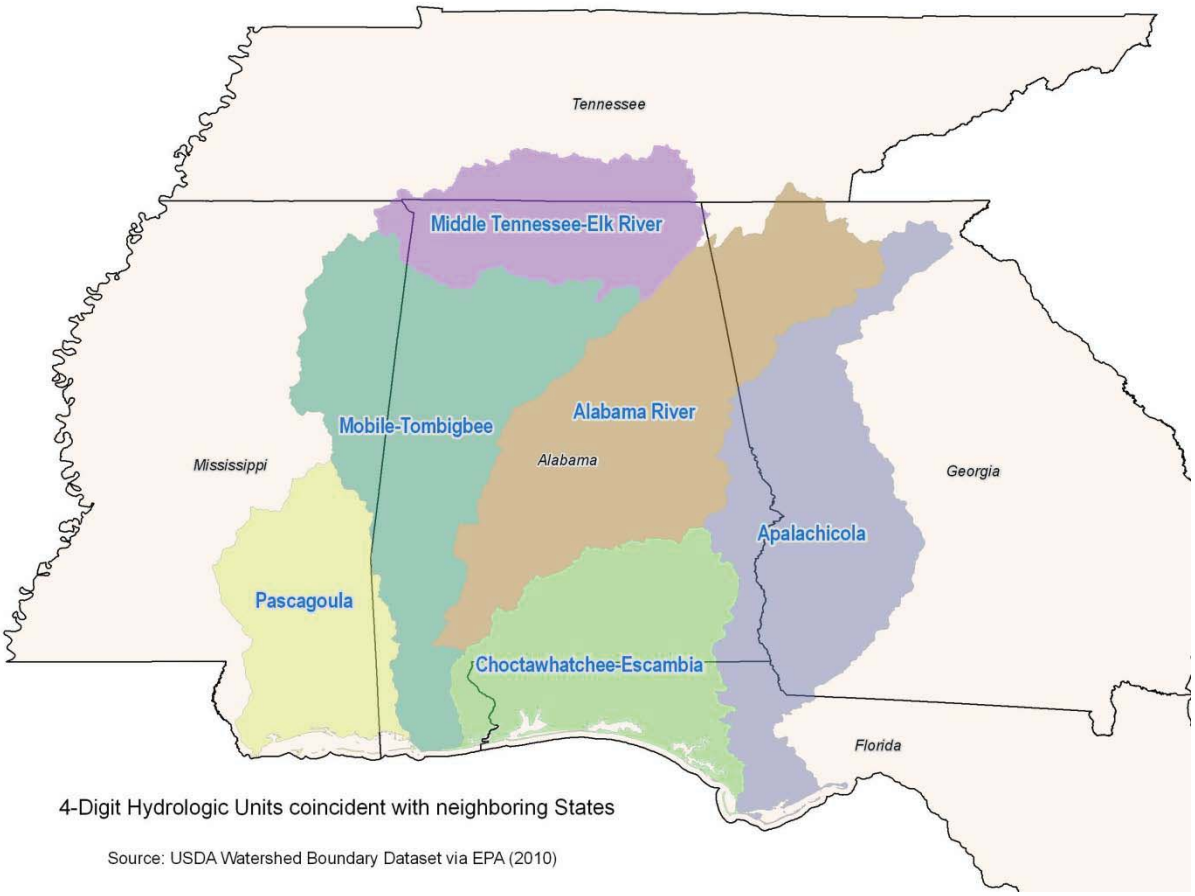


Figure 13. Major River Basins of Alabama

Multi-State Priority Area: Urban Mega-regions

Description: Urban growth and development is primarily driven by economic progress. It is a process that influences social interactions and migration patterns. As a result, the nation is witnessing urban growth and development at regional scales far beyond traditional municipal, county, and state boundaries. In the US, this demographic trend has been classified into eleven (11) distinctive mega-regions. The purpose is to provide a new way to better define regionalism and to help policymakers make good land use decisions. The concept also recognizes that large scale urban growth and development patterns is an engine driving future expansion that is land consumptive and threatens forest resources. Alabama shares two mega-regions with other contiguous states.

The Piedmont Crescent is a geographical region running from Birmingham, Alabama through Georgia, South Carolina, North Carolina, and parts of Virginia. As expected, some of the highest population growth in the southern region has occurred in metropolitan areas located within this area (Birmingham, Atlanta, Columbia, Charlotte, and Raleigh-Durham). The Piedmont Crescent has a high concentration of forest loss due to urban land growth. It is also at risk to forest fragmentation. The Gulf Coast Corridor runs west from the Florida panhandle through Alabama, Mississippi, Louisiana, and Texas before ending at the Mexican border. Projected urban growth and development in this mega-region poses great threats to wetlands and imperiled species, increased air pollution, and alteration of rare forest communities. Recent hurricanes are displacing coastal populations further stretching this mega-region northward into the interior forested landscape.

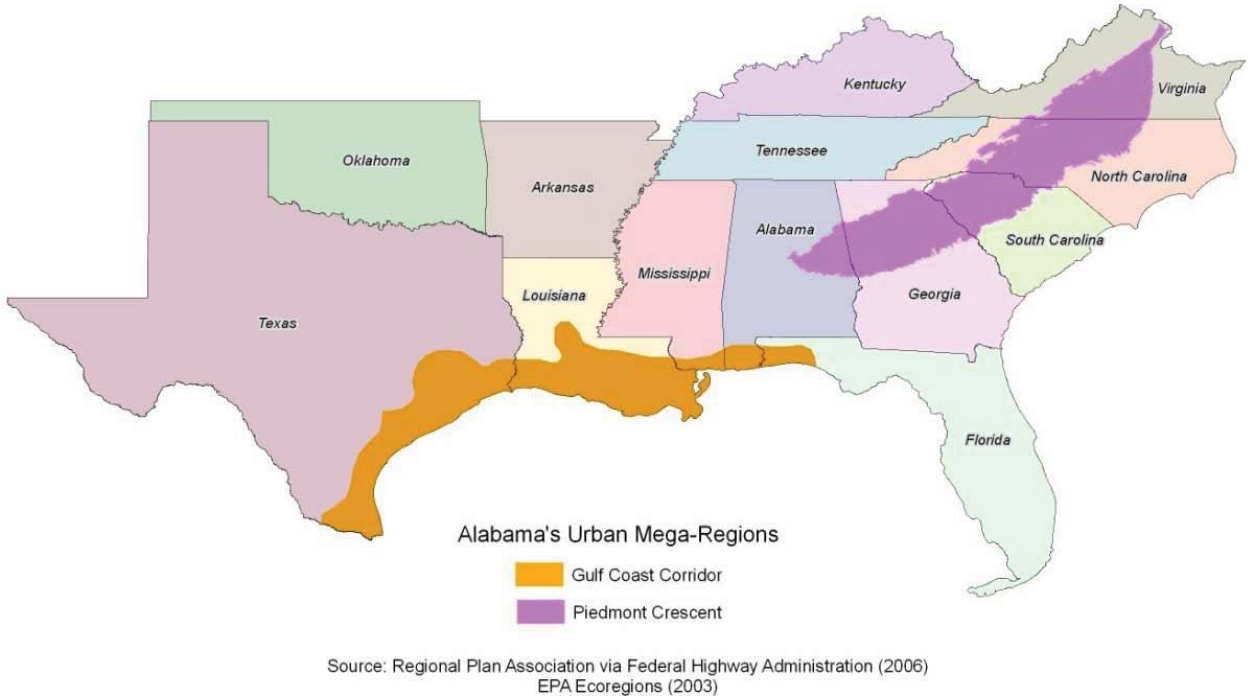


Figure 14. Alabama's Urban Mega-regions

CHAPTER 4
LONG-TERM STRATEGIES TO ADDRESS THREATS

State Priority Area

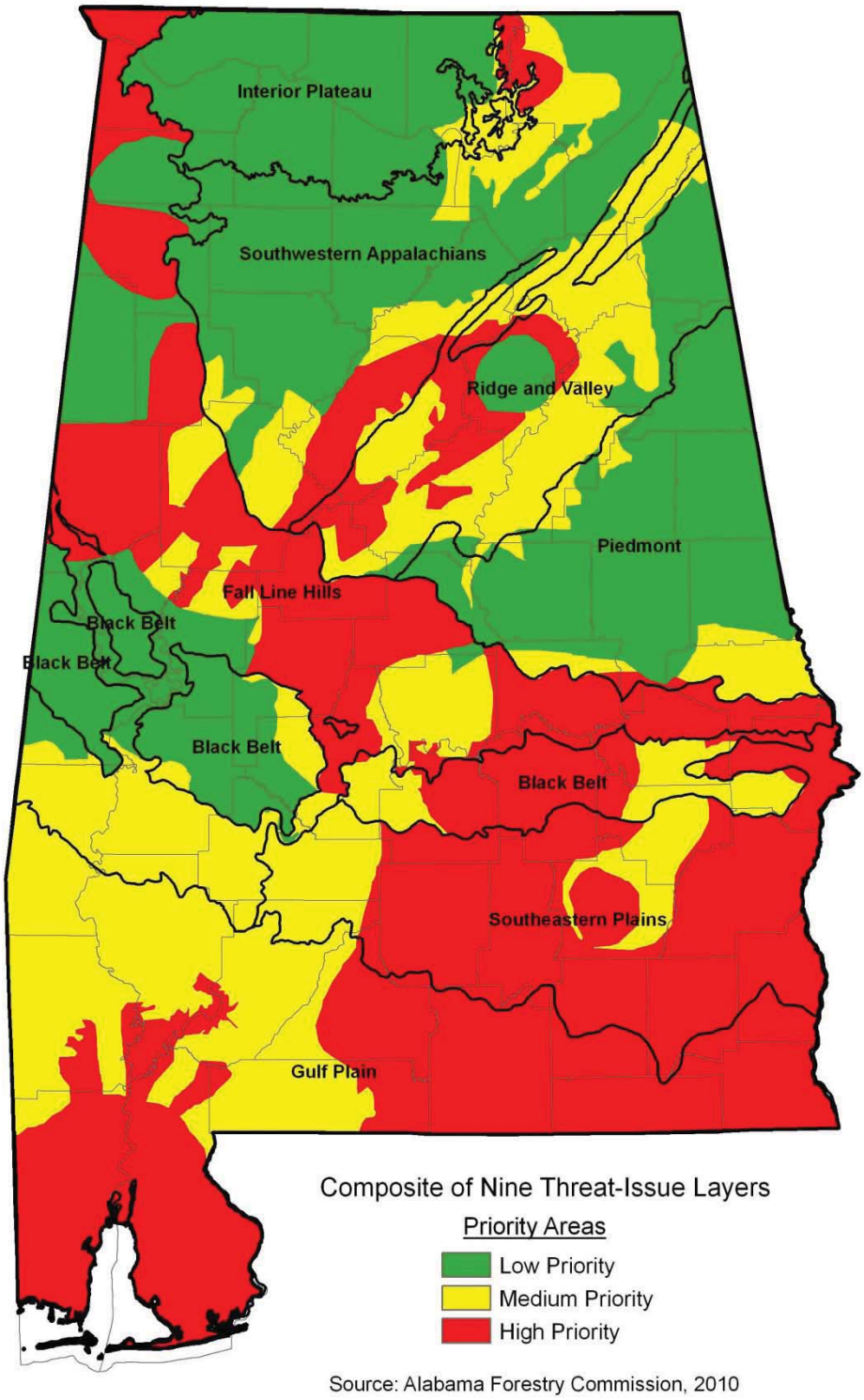
Statewide assessments will identify"...any areas or regions of that State that are a priority…"

(Farm Bill 2008)

This Plan calls for an all-lands approach because every acre of forest is vulnerable to alteration, degradation, or loss. However, attempting to accomplish all objectives at once and in all regions is not reasonable due to limited resources. Effectively addressing the many challenges threatening our forest resource requires knowing where best to prioritize resources, assets, and personnel.

In this chapter, long-term goals, objectives, and strategies are provided for dealing with each of the nine threats identified in Chapter 3. Although many elements of this Plan can and will be implemented statewide, Priority Area Map 1 highlights the most important areas for focusing our strategies and resources. This composite map was derived from the nine individual threat layers. Appendix 6 provides information on how each of the threat layers was created.

An additional resource that complements the Priority Areas Maps is the Southern Forestland Assessment, a 2008 cooperative project of the Southern Group of State Foresters to identify important *rural* forest lands across the southern landscape (Appendix 7).



Priority Area Map 1. Overall State Priority Area Map

A key part of the Statewide Assessment is the development of long-term strategies for investing state, federal, and other resources to manage priority landscapes identified in the assessment, focusing where federal investment can most effectively stimulate or leverage desired action and engage multiple partners. Strategies are presented below. Appendix 8 relates these strategies to the three national State & Private Forestry Redesign themes. Where strategies clearly support or enhance other state plans identified in Chapter 5, the following acronyms are provided in parentheses.

Plan (see following chapter)	Acronym
Alabama State Wildlife Action Plan	SWAP
A Management Guide for Invasive Plants of Southern Forests	IP
MOU between ADEM and AFC	ADEM
NRCS State Plan	NRCS
Range-Wide Conservation Plan for Longleaf Pine	LLP
Alabama Emergency Management Agency Hazard Mitigation Plan	EMA
Alabama NFS Land and Resource Management Plan	NFS
Alabama Consolidated Economic Development Strategy	CEDS
Alabama Statewide Comprehensive Outdoor Recreation Plan	SCORP
Alabama Forest Legacy Program Assessment of Need	FLP
MOU between AFC, AACD, AS&WCC, and NRCS	AAAN
Alabama Association of Regional Planning and Development Councils	AARPDC
Alabama's Five-year Strategic Plan: Urban and Community Forestry	UCF

Statewide Strategies

A number of goals, objectives, and strategies share common overarching requirements such as long-term planning, stewardship, adaptive management, and cooperation between agencies. These affect the entire state and are listed below. Following these, strategies will be listed that more specifically target individual threats.

Goal 1 – Implement an ongoing comprehensive approach where all stakeholder groups can address forest issues statewide.

Objective 1.1: Enlist a new "Statewide Multi-Agency Forest Resource Task Force" representing the full spectrum of forest stakeholders and has as its primary responsibility ensuring that this Plan is an active, living document.

Strategy 1.1.1
The State Forester selects members of the Task Force that reflects a diversity of interests.

Strategy 1.1.2
Task Force oversees the incorporation of other organizations' state and regional plans (see plans and applicable strategies for incorporation below) into this Plan.

Strategy 1.1.3
Task Force will develop annual work plan to accomplish priority strategies.

Objective 1.2: Coordinate with state level stakeholder groups to ensure that this Plan is an active, living document.

Strategy 1.2.1
Involve the following stakeholder groups for their input during each revision of this plan:

- Alabama Forest Stewardship Coordinating Committee
- Alabama Department of Conservation and Natural Resources
- Alabama State Technical Committee
- Forest Legacy Program
- Applicable Federal Land Management Agencies

Strategy 1.2.2
Work with Regional Councils (see strategic actions under Urban Growth and Development). These provide a ready statewide mechanism to facilitate delivery of assistance in promoting planning for sustainability among regional and local networks (AARPDC).

Strategy 1.2.3
The State Forester will work with the Forest Legislative Study Committee to address strategies in this plan that require legislation.

Strategy 1.2.4
Collaborate with the Alabama Department of Public Health to encourage joint efforts between local governments and local health departments to create programs and activities in parks and outdoor recreation areas promoting "healthy lifestyle choices (SCORP)."

Objective 1.3: Use technology, forums, and other venues to create a system of transparency, public participation, and collaboration that assures this Plan is active, being utilized, and produces results that sustains Alabama's forest resource.

Strategy 1.3.1
Create a State Assessment page on Alabama Forestry Commission website

Strategy 1.3.2
Create real time dashboard that that tracks accomplishments, data, and outcomes

Strategy 1.3.3
Produce an "Annual Report to the People of Alabama" that details accomplishments

Goal 2 – Achieve no net loss of forested acres by the completion of the next Forest Inventory Analysis.

Objective 2.1: Improve forestland through professional forest management programs.

Strategy 2.1.1
Increase number of acres under Stewardship Plans by five percent.

Strategy 2.1.2
Increase number of acres certified by accredited national programs, such as Stewardship and Tree Farm, by five percent.

Strategy 2.1.3
Increase number of Stand Management recommendations by five percent.

Strategy 2.1.4
Collaborate with other Department of Conservation and Natural resources and other agencies to provide landowners information on both forest management and improvement of wildlife habitat (SWAP).

Strategy 2.1.5
Support full implementation of the USFS Revised Management Plan and all applicable management plans developed within the next ten years that promote conservation of priority species and their habitats (SWAP).

Objective 2.2: Increase acres converted from marginally productive lands to forestlands.

Strategy 2.2.1
Optimize forest practice cost-share assistance to landowners.

Strategy 2.2.2
Develop standards and specifications that are approved for use in forest management practices on local 319 watershed plans (ADEM).

Objective 2.3: Increase Silvopasture as a land management approach on Alabama farms, ranches, and forestlands.

Strategy 2.3.1
Develop short courses to help landowners learn how to implement Silvopasture concepts on their properties.

Strategy 2.3.2
Increase number of small acreage (100 acres or less) landowners who apply Silvopasture concepts on their properties.

Strategy 2.3.3
Expand research projects that improve application of Silvopasture concepts

Strategy 2.3.4
Increase use of non-traditional Silvopasture production values, such as wildlife, longleaf pine restoration, and pine straw production.

Strategy 2.3.5
NRCS to emphasize providing forestry assistance to NIPF landowners apply agroforestry on agricultural lands (AAAN).

Objective 2.4: Restore longleaf pine to a significant functioning role in Alabama's landscape.

Strategy 2.4.1
Focus cost-share programs that promote longleaf pine establishment and management (LLP).

Strategy 2.4.2
Develop outreach programs to educate landowners on longleaf pine management (LLP).

Strategy 2.4.3
Increase technical proficiency and competency among natural resource professionals.

Strategy 2.4.4
Remove constraints that limit the use of prescribed burning (LLP).

Strategy 2.4.5
Participate in America's Longleaf assessment of Alabama's portion of the 16 Significant Landscapes for Longleaf Pine (LLP).

Strategy 2.4.6
Participate in America's Longleaf priority landscape areas to implement conservation and management projects (LLP).

Strategy 2.4.7
Wherever feasible, retain existing natural longleaf pine stands.

Goal 3 – Expand forest resource contribution to the Gross Domestic Product.

Objective 3.1: Increase consumption of forest related durable and non-durable goods.

Strategy 3.1.1
Promote the use of certified products from forestland.

Strategy 3.1.2
Expand existing value-added manufacturing sector of wood products (CEDS).

Strategy 3.1.3
Create new value-added traditional and non-traditional market opportunities (CEDS).

Strategy 3.1.4
Strengthen image of recreation as an industry and educate public leaders (SCORP).

Objective 3.2: Increase general knowledge of the contributions working forests make to Alabama's economy.

Strategy 3.2.1
Influence policy and decision makers to acknowledge the importance of Alabama's forest resources (CEDS).

Strategy 3.2.2
Establish awareness of the general public's direct and indirect dependence on Alabama's forest resources.

Objective 3.3: Increase protected areas that qualify as "working forests."

Strategy 3.3.1
Increase publicly owned lands through Forest Legacy and Forever Wild programs.

Strategy 3.3.2
Increase use of conservation easements to protect economic productivity of forest.

Objective 3.4: Enhance the sustainability of Alabama's forest resources.

Strategy 3.4.1
Implement and support programs afforestation and reforestation programs.

Strategy 3.4.2
Implement and support programs to manage all forestlands.

Objective 3.5: Facilitate forestry and allied professionals' adjustment to changing forest resource market opportunities.

Strategy 3.5.1
Develop capacity to offer work force training to help natural resource professionals (CEDS).

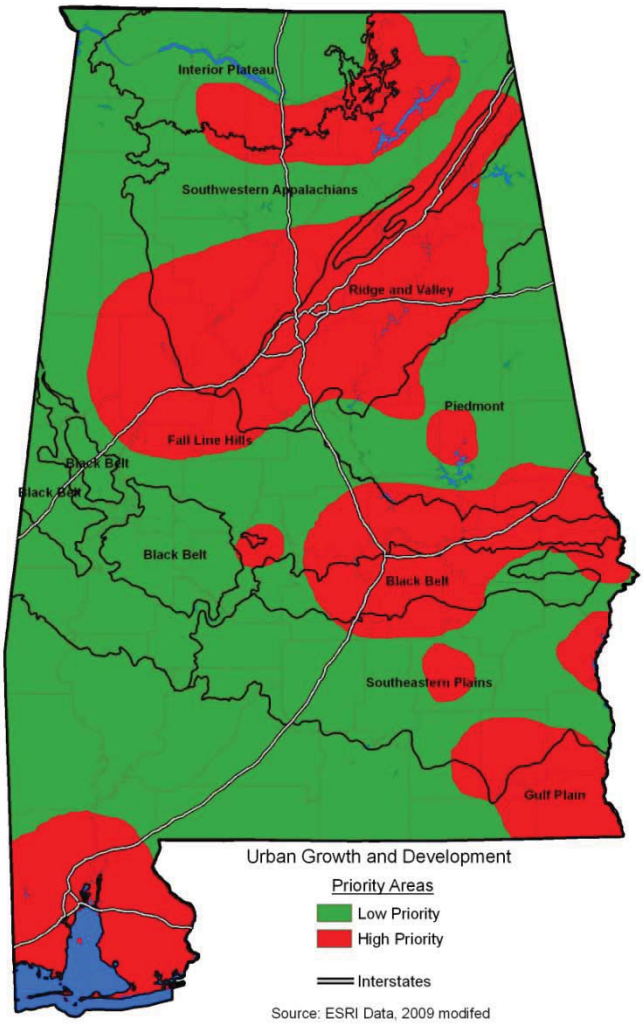
Strategy 3.5.2
Identify and utilize financial and technical incentive programs to assist creation of natural resource-related employment.

RESOURCES NEEDED FOR STATEWIDE STRATEGIES
Collaborations: Agreement to coordinate natural resource groups' efforts (Forest Resource Task Force)
Regulations: State policies, procedures, and guidelines to streamline and link resources
Personnel: Foresters, biologists, Regional Extension Agents, Extension Specialists, researchers, consultant foresters, natural resource professionals
Legislation: State laws to enhance agency roles in sustaining forest resource
Research: State university-driven studies to better understand value and management of forest resource
Funding: Grants, state funding, cost-share programs
Other: Educational materials, mapping, demonstration projects, technical assistance, training

Strategies Addressing Individual Threats

Urban Growth and Development

Alabama's forests declined by nearly 225,000 acres from 2000 to 2008, the first decrease in forest area since 1936. Suburban development is the principal cause of the recent forest losses. Though slowed by recession, this trend is expected to resume once the economy improves, with urban land in Alabama projected to increase from 2.4% in 2000 to 10.7% in 2050. This land use change will continue to have an impact on the distribution, composition, and function of the state's forest resource.



Priority Area Map 2. Urban Growth

Goal 1: Reduce the impact of urban development on Alabama's forest resource.

Objective 1.1: Better educate the public on the existing "Green Infrastructure" format utilized by the partnering groups of the State Clean Water Partnership (CWP) to promote, encourage, and support the utilization of ecosystem services in new and old urban development.

Strategy 1.1.1
Utilize the CWP of Alabama and its ten major watershed basins to address sustainable growth and address multiple issues and cooperation among agencies (ADEM).

Strategy 1.1.2
Advertise "*green solutions*" demonstration sites, such as zero runoff parking lots and bio-swales for tree plantings that retain storm water onsite as is already being demonstrated by CWP, AFC, ACES, and ADEM projects (ADEM).

Strategy 1.1.3
Analyze for current and potential areas of connectivity for forest tracts and corridors across the landscape.

Strategy 1.1.4
Rank existing forestland for ecosystem service value, such as wildlife habitat, and water and air quality. Utilize the CWP and the Geological Survey of Alabama to study specific problem areas/watersheds (ADEM, SWAP).

Strategy 1.1.5
Evaluate alternative landscape development patterns that maintain healthy watersheds. (ADEM).

Strategy 1.1.6
Conduct a Public Awareness and Education Campaign that targets statewide officials, raises the awareness of the general public statewide, activates community leaders, and provides education and outreach on the benefits of trees within communities.

Strategy 1.1.7
State Forester to write a series of informational editorials for use in Sunday newspapers throughout the state on the nine forest resource threats.

Strategy 1.1.8
Promote and participate in "Your Town Alabama."

Objective 1.2: Support natural resource professionals' involvement with the Alabama Association of Regional Councils.

Strategy 1.2.1
Revisit and modify ordinances where appropriate to encourage more tree canopy (AARPDC).

Strategy 1.2.2
Train local governments in tree care and maintenance (AARPDC).

Strategy 1.2.3
Design best management practices that preserve natural landscapes in new developments (AARPDC).

Strategy 1.2.4 Provide GIS based information on the existing urban forest canopy cover and forest distribution across the rural landscape (AARPDC).

Strategy 1.2.5
Provide information on trees and alternative best management practices in order to help communities and rural areas to develop more sustainably (AARPDC).

Strategy 1.2.6
Provide information on tree species site requirements and tolerances for such things as periodic flooding or soil compaction (AARPDC).

Goal 2: Develop capacity of communities to manage their urban forests.

Objective 2.1: Increase the number of communities with professional urban forestry staffing.

Strategy 2.1.1
Identify all priority communities and nonprofit organizations in need of an urban forester staff position (UCF).

Strategy 2.1.2
Develop educational materials to explain how and why communities and nonprofit organizations should and can create urban forester staff positions.

Objective 2.2: Increase the number of communities with urban forest management plans.

Strategy 2.2.1
Identify all priority communities in need of an urban forest management plan (UCF).

Strategy 2.2.2
Develop educational materials to explain how and why communities and nonprofit organizations should and can develop an urban forest management plan.

Objective 2.3: Increase the number of communities with tree ordinances.

Strategy 2.3.1
Identify all priority communities in need of a tree ordinance (UCF).

Strategy 2.3.2
Develop educational materials to explain how and why communities should and can enact a tree ordinance.

Objective 2.4: Increase the number of communities with local tree boards.

Strategy 2.4.1
Identify all priority communities in need of a local tree board (UCF).

Strategy 2.4.2
Develop educational materials to explain how and why communities and nonprofit organizations should and can establish a local tree board.

Objective 2.5: Increase the annual number of urban forestry volunteer hours.

Strategy 2.5.1
Support the Alabama Cooperative Extension System's role in promoting, increasing, and documenting citizen participation through its community forestry volunteer program.

Goal 3: Develop urban forestry partnerships among groups, agencies, and organizations.

Objective 3.1: Implement a unified multi-organizational agreement to collaborate and address urban growth and development threat to state's forest resource.

Strategy 3.1.1
Identify list of prospect organizations to form collaborations (UCF).

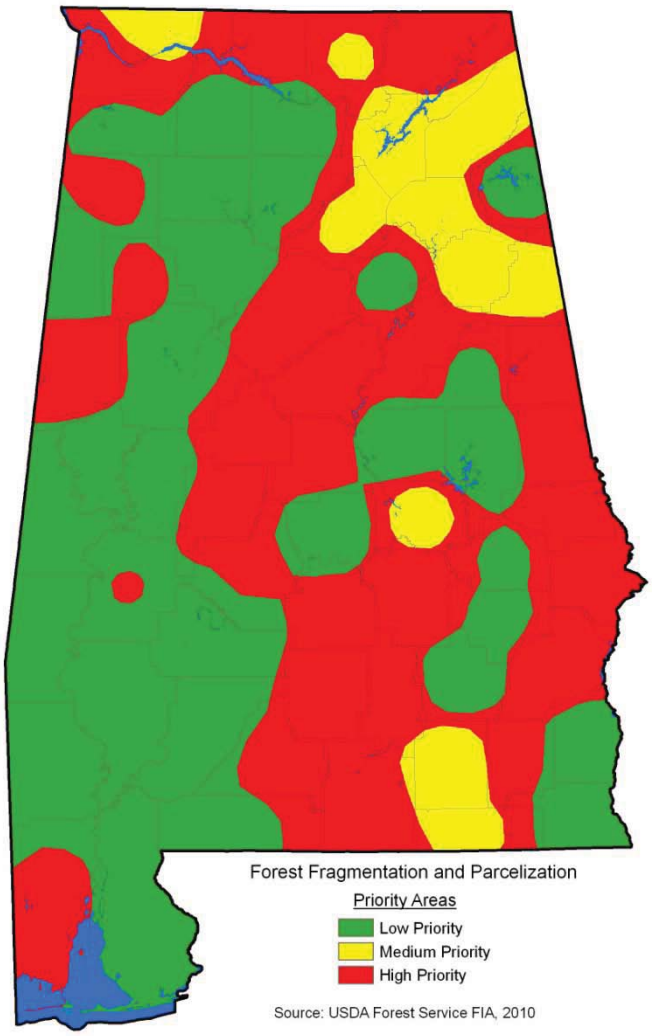
Strategy 3.1.2
State Forester convenes meeting to discuss framework for collaboration.

Strategy 3.1.3
Develop and initiate strategy to involve organizations in state's urban forestry program.

RESOURCES NEEDED: URBAN GROWTH
Collaborations: Agreement to incorporate forest resources (State Clean Water Partnership)
Regulations: State and local planning guidelines to sustain forest resources during development
Personnel: Foresters, natural resource professionals, urban planners, hydrologists, Extension.
Legislation: State laws to guide urban development and natural resource conservation
Research: State university studies to determine methods and values of sustaining forest resources during development
Funding: Grants, state funding, cost-share programs
Other: Educational materials, mapping, demonstration projects, technical assistance, training

Fragmentation and Parcelization

Alabama's increasing population density is a leading cause of fractured forest stands. It also contributes to a reduction in the average size of landowner holdings. When forests are fragmented into smaller and smaller parcels, biological diversity is diminished, water cycles are altered, non-native invasive plants and animals are introduced, and air and water quality are affected. Forests weakened by fragmentation become more susceptible to damage from insects and diseases, and come under stress, often degenerating into a condition of chronic ill health.



Priority Area Map 3. Fragmentation and Parcelization

Goal 1: Incorporate forest resource sustainability in land use development.

Objective 1.1: Ensure that forest resource perspective is part of land use policy and decision making.

Strategy 1.1.1
Work with local policy and decision makers to retain intact forest stands corridors through Smart Growth principles.

Strategy 1.1.2
Develop and provide forest resource maps and data to local land use decision makers with details on the benefits they provide to their community.

Strategy 1.1.3
Provide assistance to communities so that they include maintaining and managing intact forest stands in their land use planning.

Strategy 1.1.4.
Establish a relationship with ALDOT to incorporate forest sustainability with road construction projects.

Goal 2: Establish statewide awareness of fragmentation threat to Alabama's forest resource.

Objective 2.1: Implement comprehensive education campaign.

Strategy 2.1.1
Prepare educational materials regarding the benefits of maintaining forestlands for urban planners and other pertinent decision makers.

Strategy 2.1.2
Develop materials to educate landowners, planners, and legislators about what fragmentation is and how it affects the forest.

Strategy 2.1.3
Develop technical assistance guides for woodlot management in the form of guide sheets, brochures and website information.

Strategy 2.1.4
Promote field days, demonstration sites, and workshops to teach and train owners of fragmented forests.

Strategy 2.1.5
Work with regional planning commission to provide a list of potential speakers and develop a short PowerPoint presentation for the speakers to use that will explain fragmentation to

landowners, planning commissioners, legislators, forestry planning groups, various landowner groups, watershed groups and clean water partnerships.

Goal 3: Improve state and local policies to encourage forest retention.

Objective 3.1: Work toward a change in estate tax law so that heirs can afford to maintain land as working forest.

Strategy 3.1.1
Organized forest and conservation groups need to support changes in tax policy that give greater incentives to land owners to leave their land forested.

Strategy 3.1.2
Educational material and presentations should be conveyed to state and federal legislatures regarding the need to revise tax policy to reduce the parcelization and fragmentation of forests.

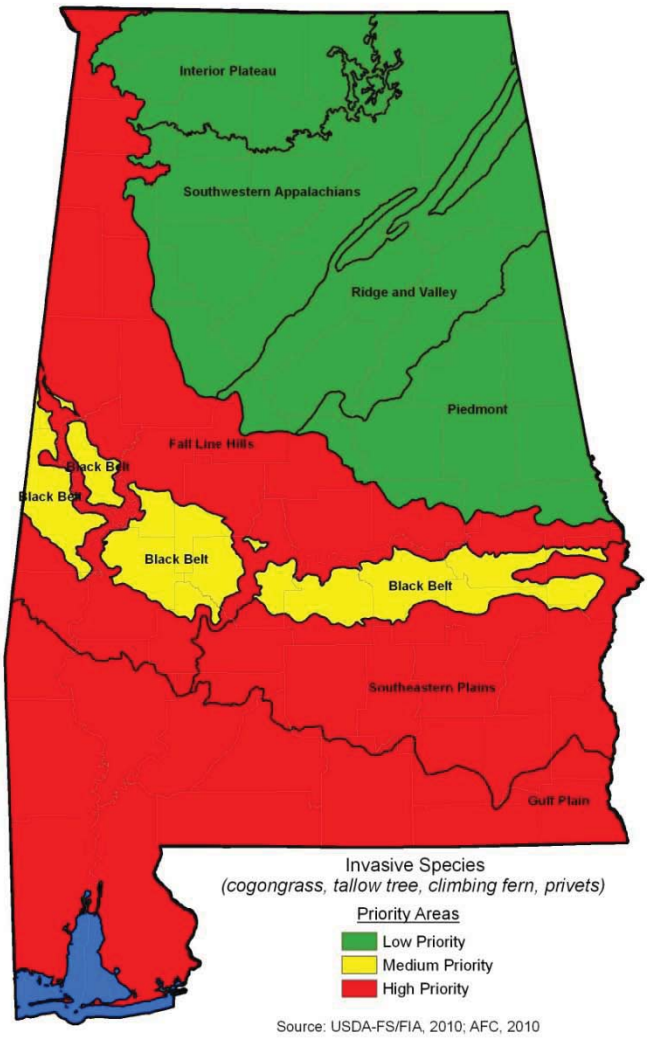
Strategy 3.1.3
Protect existing smaller, fragmented tracts through voluntary land protection strategies such as the use of Conservation Easements – especially in priority at-risk areas, Forest Legacy, and General Cost Share Programs.

Strategy 3.1.4
Protect existing large, unfragmented significant tracts of forest. Acquire or purchase conservation easements to protect significant blocks (>1,000 acre parcels) of high quality examples of this habitat. Provide incentives and information to landowners for long-term conservation (SWAP).

RESOURCES NEEDED: FRAGMENTATION AND PARCELIZATION
Collaborations: Agreements with ALDOT and local policy and decision makers
Regulations: State and local planning guidelines to sustain forest resources during development
Personnel: Foresters, Extension Regional Extension Agents, wildlife biologists
Legislation: State level tax incentive policies
Research: State university studies to determine methods and values of sustaining forest resources during development
Funding: Grants, state funding, cost-share programs
Other: Educational materials, mapping, demonstration projects, forest resource maps, training

Invasive Species

Alabama has more forestland impacted by invasive species than any other southeastern state. The state's rich biological diversity is a result of natural ecosystem conditions that are also favorable to an increasing number of invasive species. A warm climate, riparian corridors, and expanding network of roads will compound this problem. Invasions of non-native plants and animals into forests continue to spread and include new species, increasingly eroding forest productivity, hindering forest use and management activities, and degrading diversity and wildlife habitat.



Priority Area Map 4. Invasive Species Density by Ecoregion

Goal 1: Reduce the impacts of invasive species in Alabama.

Objective 1.1: Eradicate, reduce, or (at minimum) contain existing plant infestations.

Strategy 1.1.1
Support effective Early Detection and Rapid Response networks to identify and map sites of new high-risk introductions, verify the invasive species, communicate to others about the newly identified sites, and eradicate the infestations (IP).

Strategy 1.1.2
Support maintenance of a Web-accessible survey, inventory, and mapping system to corporately track existing and spreading invasions. Such a system with retrievable maps is invaluable for identifying and communicating information about zones of high infestations, advancing fronts, outliers, and weed-free zones. As an example of the value of current survey results, the FIA unit of the U.S. Forest Service Southern Research Station works with state partners to develop the Non-native Invasive Plant Database (IP).

Strategy 1.1.3
Improve communications through development of cooperative knowledge networks that link stakeholders, land managers, scientists, policy makers, and political representatives at the national, regional, state, multi-county and county levels and that provide real-time information and connectivity. Critical to how well the network functions is the timely actions and communications by all the people involved, whether they are working in voluntary, delegated, or assigned roles (IP).

Objective 1.2: Eradicate, reduce, or (at minimum) contain existing feral hog infestations.

Strategy 1.2.1
Support research into improved control strategies, including trapping, toxicants, vaccination, and contraception (NRCS, ADCNR, USDA/APHIS).

Strategy 1.2.2
Encourage and assist landowners in forming landscape-scale partnerships employing persistent, adaptive, and integrated management programs (NRCS, ADCNR, USDA/APHIS).

Objective 1.3: Restore impacted plant communities to be resistant to re-invasion.

Strategy 1.3.1
Conduct restoration treatments to dovetail with control and eradication efforts that guarantee suppression of invasive plants and maintenance of ecosystem functions and services. Adaptive information cycles are especially needed in this rapidly developing field of ecosystem restoration. Continued surveillance and monitoring with timely re-intervention are essential for successful rehabilitation and restoration (IP).

Strategy 1.3.2
Encourage those cost share programs providing landowner assistance to consider funding reestablishment of resilient forest ecosystems (IP).

Objective 1.4: Develop and promote standardized protocols and procedures.

Strategy 1.4.1
Formulate coordinated control, containment, and eradication programs, including cycles of integrated vegetation management treatments along with monitoring and corporate sharing of both successes and mistakes. A coordinated multi-state control and eradication program that targets outliers is necessary to stop the spread, contain advancing fronts, and protect special habitats in severely infested zones (IP).

Objective 1.5: Raise public and professional awareness.

Strategy 1.5.1. Foster collaborative strategies and programs for spread prevention through: (1) Improved laws, policies, and public education; (2) Promotion of new corporate and personal ethics to not sell, buy, and plant invasive plants; (3) Sanitization of personnel, equipment, and animals that move from or among infested sites; and (4) Prohibitions against the sale and transport of contaminated products such as extracted native plants, potted plants, fill dirt and rock, pine straw, hay, and mulch (IP).

Strategy 1.5.2.
Create an Alabama Invasive Species Board to include all state agencies that manage lands and waters within the state (IP).

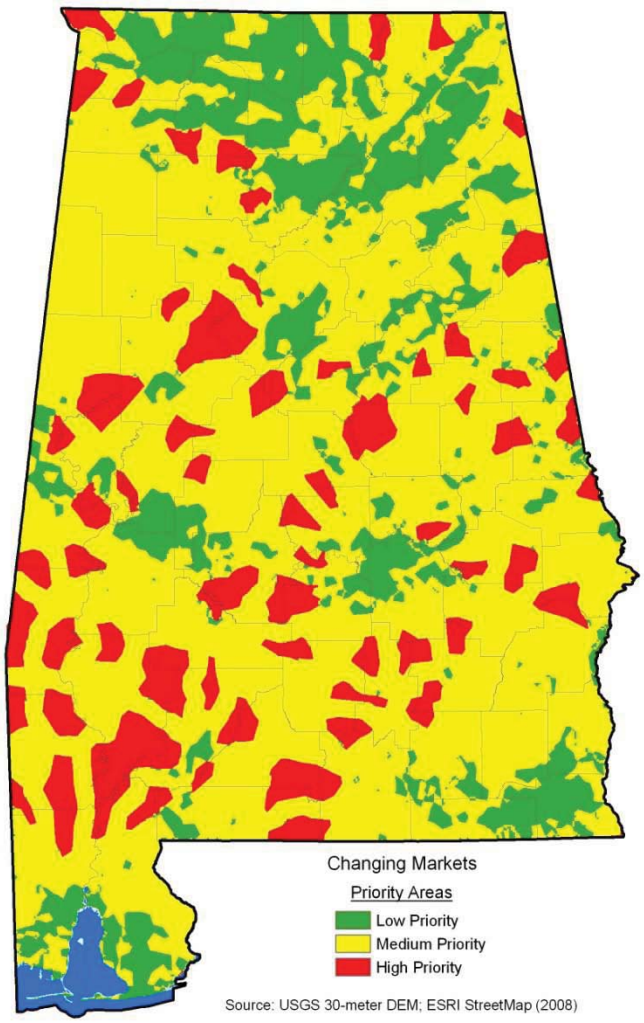
Objective 1.6: Support continued research.

Strategy 1.6.1
Dedicated invasive plant research and research syntheses are required, followed with rapid technology transfer of findings through effective knowledge networks with feedback from the field on additional research needs (IP).

RESOURCES NEEDED: INVASIVE SPECIES
Collaborations: Agreement to coordinate natural resource groups' efforts (Alabama Invasive Species Board)
Regulations: State level prohibition of importation and sale of recognized invasive species
Personnel: Invasive Species Coordinator position, trained lead individuals in each state natural resource agency
Legislation: The Alabama Invasive Species Board and its duties and limits should be grounded in law.
Research: State university driven studies to address the most damaging invasive species
Funding: Grants, state funding, cost-share programs
Other: Education materials, mapping, demonstration projects, technical assistance, training

Changing Markets

A weakening forest-based economy poses a financial incentive risk for landowners managing for traditional forest products. The existence of a market for forest products gives landowners an incentive to retain their forestland rather than sell it to developers who may convert it to other uses.



Priority Area Map 5. Changing Markets

Goal 1: Promote traditional forest industry markets.

Objective 1.1: Restore and utilize the cooperative benefits of the Forestry Team to include all forestry-related organizations, federal and state agencies, universities, and other interested parties in order to provide information and assistance to forest industry and potential investors. This should be considered a rapid response team.

Strategy 1.1.1
Identify and contact potential domestic purchasers of Alabama's forest products.

Strategy 1.1.2
Evaluate expanding market opportunities and assist investors in building new and/or expanding facilities where feasible.

Strategy 1.1.3
Identify locations of sites in Alabama where sufficient biomass supply and processing infrastructure exists to support new wood energy ventures without impacting supplies to existing facilities (radius studies). Map potential utility users over current wood users on a forest resources map to locate potential sites. Work with local industrial development offices.

Strategy 1.1.4
Support existing forest industry facilities. Gather input from a broad spectrum of existing industry leaders in order to determine what, if anything, could be changed or implemented (outside generally uncontrollable economic conditions) to assist and enhance industry's status. This research would be delivered to policy-makers, industry leaders, etc. to implement as appropriate.

Strategy 1.1.5
Promote re-opening of closed forest industry facilities as markets allow.

Objective 1.2: Develop and provide technical and financial assistance.

Strategy 1.2.1
Assist landowners in certifying their forestland in order to become more marketable.

Strategy 1.2.2
Work with energy companies to promote woody biomass product use for energy production (assist by providing information on purchase, transportation, collection, and use of woody biomass).

Strategy 1.2.3
Work with local schools, government, and industrial facilities to replace boiler systems with woody biomass boilers. In many cases, these facilities are heated by aging boilers and are prime

candidates for conversion to bioheating, especially with government financial assistance. Provide information on grants, revolving low-interest loans, tax advantages/credits, technical assistance available, "turn-key" vendors, and cost-benefit analysis. Help users obtain long-term wood supply contracts. Help users obtain grants through ADECA's Energy Division. Work with cities to implement programs to utilize woody debris rather than sending to landfill.

Strategy 1.2.4
Provide producers/users with research conducted by USFS National Forest Products Labs and Southern Research Stations and various universities to apply new technology as applicable, especially relating to bioenergy, composite forest products, and other new product opportunities.

Objective 1.3: Support state and local level initiatives.

Strategy 1.3.1
Evaluate, recommend, and support legislation that creates incentives for expanding markets while minimizing impacts to existing forest industry. Promote legislation that includes a broad range of forest materials in the national definition of "renewable biomass."

Strategy 1.3.2
Evaluate current domestic transportation avenues, and make recommendations for improvements that are warranted while minimizing environmental impact (example: improved water route links with rail sites, or transportation improvements to potential industry sites.)

Goal 2: Promote emerging markets

Objective 2.1: Promote use of residual woody biomass for large-scale energy and pellet production to further utilize our forests, which will provide financial incentives for forestland owners to manage their forests, reduce site preparation costs, and reduce destructive wildfires from long-term fuel buildup.

Strategy 2.1.1

Publish information on emerging market opportunities, including cost-benefit analysis of producing new bioenergy products (biofuels, pellets, combined heat-power).

Strategy 2.1.2

Identify sites in Alabama where sufficient biomass supply and processing infrastructure exists to support new wood energy ventures without significantly impacting raw material costs for existing facilities. Identify these locations by overlaying existing utility facilities with primary forest industry facilities on a biomass availability map.

Strategy 2.1.3

Provide site analysis studies to potential investors using the Forestry Team approach. Include an evaluation of the infrastructure network and raw material available to identified sites, as listed on the ADO website.

Strategy 2.1.4

Work with energy companies to promote woody biomass product use for energy production (assist by providing information on purchase, transportation, collection, and use of woody biomass).

Strategy 2.1.5

Conduct comparison analysis of pellet production costs (fop port) plus shipping costs to various world ports from the Mobile Port as opposed to other eastern seaports. If cost-competitive, expand marketing efforts to increase export trade of pellets through the Port of Mobile.

Objective 2.2: Promote use of residual woody biomass for heating or combined heating and electrical production in facilities to further utilize residual harvesting products to reduce fuel buildup and provide additional financial incentives for forestland owners to manage their forests.

Strategy 2.2.1

Partner with universities, USDA, the Alabama Department of Agriculture and Industry, and ADECA's Energy Division to educate the public about available grants and low-interest loans, tax advantages/credits, technical assistance available, "turn-key" vendors, and cost-benefit analysis to install wood-using boilers. Maintain current information on AFC's website.

Strategy 2.2.2

Work with local schools, government, and industrial facilities to replace boiler systems with woody biomass boilers. (In many cases, these facilities are heated by aging boilers and are prime candidates for conversion to bioheating.) Help user obtain long-term wood supply contracts.

Strategy 2.2.3

Work with municipalities to implement programs to utilize woody debris rather than sending to a landfill.

Objective 2.3: Promote use of forests for providing "ecosystem services."

Strategy 2.3.1

Promote the use of forests and wetlands adjacent to or near municipalities to serve as stormwater runoff collection centers.

Strategy 2.3.2

Promote the use of forests in green infrastructure urban planning and low-impact designs.

Strategy 2.3.3

Promote the use of forests and wetlands for clean water and air (ADEM).

Strategy 2.3.4

Promote the use of forests to store atmospheric carbon. Provide information to decision-makers involved in creating federal and state laws and regulations relating to renewable portfolio standards, carbon credits, taxes, and trading platforms.

Strategy 2.3.5

Promote and help forestland owners receive financial rebates and/or tax credits for providing ecosystem services.

Goal 3: Provide forest resource information.

Objective 3.1: Continue to provide forest resource information (forest inventory analysis, forest industry trends, harvest/growth analysis) both in general publications and for specific requests.

Strategy 3.1.1

Publish the annual ***Alabama Forest Resources Report*** and distribute to key partners and associates, legislatures on the forestry review committee, partnering agency representatives, resource analysts, members of the Alabama Natural Resource Council, and the forest industry. Also publish on the AFC website.

Strategy 3.1.2

Produce and publish a series of brochures to include Alabama's forest resource information, current status of forest industry, potential investment opportunities, and Alabama's business advantages. Include a state listing/map of potential project sites. Also publish on AFC's website.

Strategy 3.1.3

Continue to conduct FIA Inventory and harvest utilization studies in order to assist the U.S. Forest Service with maintaining current forest inventory information for Alabama.

Strategy 3.1.4

Continue to conduct timber product output reports (TPO) and primary and secondary industry surveys and maintain a current database of active wood-using facilities.

Objective 3.2: Maintain up-to-date information, resources, and links on pubic websites.

Strategy 3.2.1

Maintain up-to-date web resources relating to Alabama's forest resources on the AFC website.

Strategy 3.2.2

Maintain current directory of forestry vendors, forestry consultants, and timber purchasers on the AFC website.

Strategy 3.2.3

Maintain a current directory and map of primary and secondary forest industry facilities on the AFC website.

Goal 4: Educate forestland owners and the general public.

Objective 4.1: Provide information (publications and on-line resources) on forest management techniques that landowners can readily access and easily understand and apply.

Strategy 4.1.1

Provide landowners with online resources produced by universities, extension, USDA, ADCNR, AFC, AFA, and landowner associations to create a virtual website for forestland owners.

Strategy 4.1.2

Complete and publish ***Alabama's Forests*** book. Publish on the web both the ***Alabama's Forests*** book and companion ***Alabama's Wildlife*** book.

Strategy 4.1.3

Provide information to implement low cost practices. Provide information on cost-share assistance available.

Strategy 4.1.4

Educate landowners on the need to obtain a forest management plan and assist landowners in obtaining plans and reaching certification status in order to expand market opportunities of their timber.

Strategy 4.1.5

Provide information on selling timber and tax considerations relating to forest management practices.

Objective 4.2: Provide forestland owners with one-on-one professional assistance.

Strategy 4.2.1

Provide forestland owners with tools to create a virtual forest management plan based on their specific goals and the general forest conditions on their property, and prepare stand management recommendations and forest management plans to landowners.

Strategy 4.2.2

Provide individualized professional landowner assistance (including cost-share assistance) through a team-coordinated approach from ADCNR, AFC, and USDA.

Strategy 4.2.3

Promote the establishment of local forestland owner cooperatives and landowner groups that can pool resources to better access market opportunities.

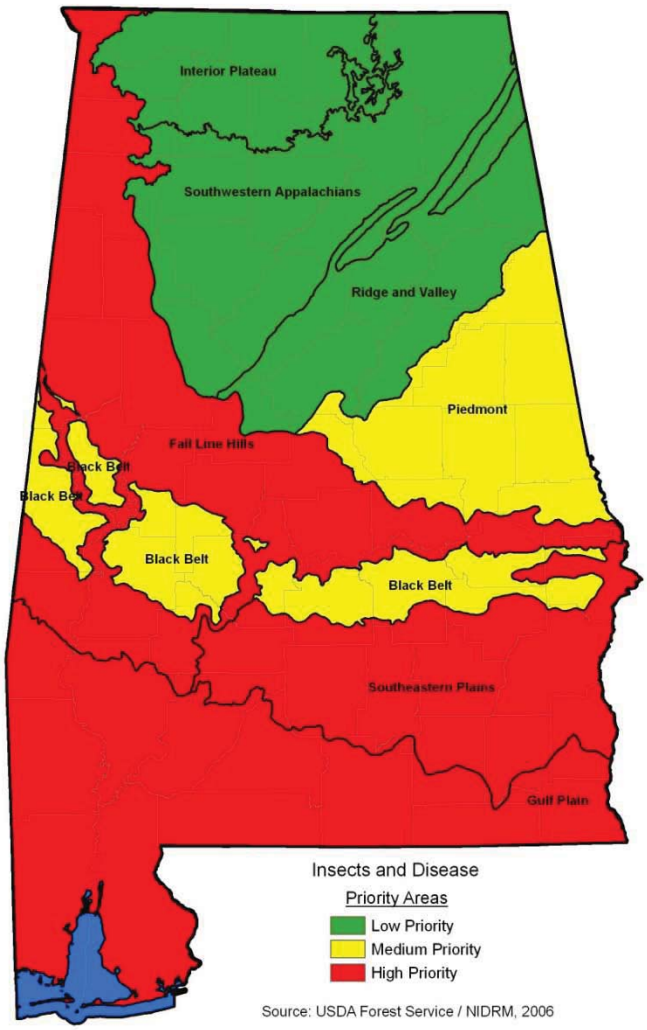
Strategy 4.2.4

Provide forestland owner tours, seminars, workshops, and online training opportunities, such as the Master Forester Program.

RESOURCES NEEDED: CHANGING MARKETS
Collaborations: Restored agreement with agencies to promote forest markets (Forestry Team)
Regulations: State and local policies to address transportation avenues
Personnel: State level Forest Market Economist, forestry vendors, forestry consultants, timber buyers
Legislation: State laws to create incentives for forest-based markets, and equitable forest severance tax
Research: State university-driven studies to assist local policy makers, industry leaders, and state agencies
Funding: Grants, state funding, cost-share programs, low-interest loans, rebates
Other: Educational materials, mapping, demonstration projects, technical assistance, training

Insects and Disease

Insects and disease are natural components of forested ecosystems. Under certain circumstances they can have a significant impact on forest health and productivity through the effects of excessive defoliation, decay, species alteration, or outright mortality.



Priority Area Map 6. Insects and Disease, by Ecoregion

Acre summary by county from the "National Insect and Disease Risk Map" (NIDRM). The source of this layer measures risk of mortality. These acre summaries represent the expectation that 25% or more of the live standing basal area will die over the next 15 years.

Goal 1: Develop comprehensive statewide approach to address priority insect and disease threats.

Objective 1.1: Catalog current and emerging insect and disease threats.

Strategy 1.1.1
Identify and list all insect and disease threats.

Strategy 1.1.2
Rank by threat, using current maps and models.

Objective 1.2: Establish forest pest detection protocol.

Strategy 1.2.1
Develop early detection/rapid response systems with regard to monitoring and trapping efforts.

Strategy 1.2.2: Use **S.M.A.R.T**. acronym as guidelines for forest pest strategic planning

S – Specific: monitor for the exotic forest insect, the redbay ambrosia beetle, by establishing survey traps in identified susceptible areas to evaluate population levels

M – Measurable: count the number of redbay ambrosia beetles collected in the traps during the survey period

A – Attainable: deploy traps in the field, collect data from the survey, and retrieve traps from the field

R – Realistic: enter survey data into a web-based database for cooperators to analyze

T – Time: complete all survey work, data analysis and technology exchange within one year.

Strategy 1.2.3
Increase collaboration and sharing of funds and other resources to implement strategies that address priority forest pest threats; eliminate duplication of efforts (i.e., surveying and trapping).

Goal 2: Establish statewide awareness of forest pest threat to Alabama's forest resource.

Objective 2.1: Develop a comprehensive education campaign.

Strategy 2.1.1
Coordinate dissemination of survey result information to forest pest professionals, resource managers, and landowners.

Strategy 2.1.2
Continue education efforts for the public with regard to overall forest health specifically with new insects and diseases.

Objective 2.2: Increase resiliency of forest to better withstand forest pests.

Strategy 2.2.1
Improve overall health of our forests—strategic thinking rather than tactical planning for threats—Yield Target: diverse, healthy, native functioning ecosystems.

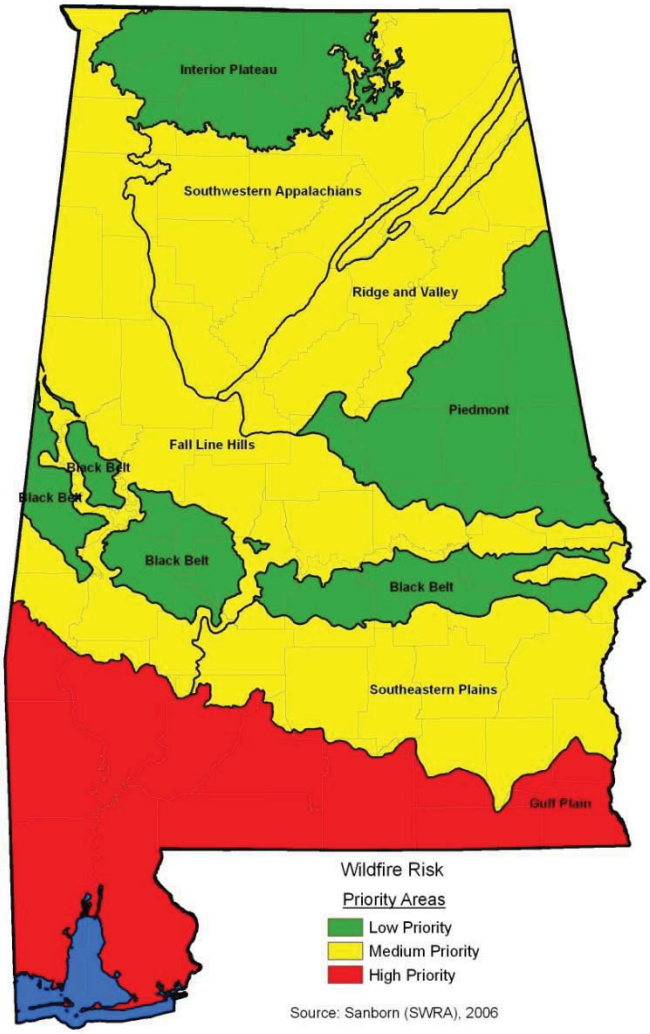
Objective 2.3: Establish interstate awareness of common threats.

Strategy 2.3.1
Develop communication and education protocols to share information and leverage educational opportunities.

RESOURCES NEEDED: INSECTS AND DISEASE
Collaborations: Agreement among AFC, Extension, APHIS-PPQ, Ag & Industries, SFWS to coordinate efforts
Regulations: Federal and state controls to identify and eradicate introduced pathogens
Personnel: Entomologists, pathologists, foresters
Legislation: State laws to support state agencies role in protecting natural resource from forest pests
Research: State university-driven studies to increase state's forest resiliency
Funding: Grants, state funding, cost-share programs
Other: Educational materials, mapping, demonstration projects, technical assistance, training, remote sensing detection

Wildfire

In the fire-adapted ecosystems of Alabama, the issue is not whether an area will burn but when it will burn and at what intensity. A total of 29,593,963 acres—91.7% of Alabama's total surface area—are subject to wildfire threat.



Priority Area Map 7. Wildfire Risk by Ecoregion

Based on county acre summaries of the three highest risk levels of the Southern Wildfire Risk Analysis (SWRA) data layer "Wildfire Susceptibility Index" (WFSI).

Goal 1: Limit the number of wildfires that have a negative impact on Alabama's forest.

Objective 1.1: Target wildfire prevention education in high wildfire occurrence areas and in communities at risk from damages of wildfire.

Strategy 1.1.1
Encourage public understanding of prescribed burning, forest management, wildfire hazard mitigation, and the benefits of becoming Firewise communities.

Strategy 1.1.2
Increase training for wildfire prevention and hazard mitigation; integrate all aspects of wildfire management in prescribed fire and forest management training.

Strategy 1.1.3
Incorporate wildfire hazard identification in forest management plans and urban forestry plans where structures or other priority values are at risk.

Goal 2: Enhance capacity of organizations that have authority to control wildfires in Alabama.

Objective 2.1: Create, develop, and utilize new resources.

Strategy 2.1.1
Develop regional fuels management teams (prescribed burning or mechanical). Multi-partner teams, meeting a statewide standard, emphasizing the need for fuel management in the wildland urban interface and ecologically sensitive areas.

Strategy 2.1.2
Develop localized cooperatives to mitigate wildfire hazards through equipment caches, training resource managers, training the general public, provide professional assistance, and encourage limited liabilities.

Objective 2.2: Improve efficacy of existing resources, programs, and services.

Strategy 2.2.1
Identify communities at risk to wildfire; complete a minimum of one (1) Community Wildfire Protection Plan in all 67 counties (EMA).

Strategy 2.2.2
Utilize and update the Southern Wildfire Risk Assessment collaborating with partners to help determine the areas that need wildfire hazard mitigation.

Strategy 2.2.3
Adapt equipment and training to meet challenges of the wildland urban interface and other areas where traditional wildfire suppression equipment has limitations.

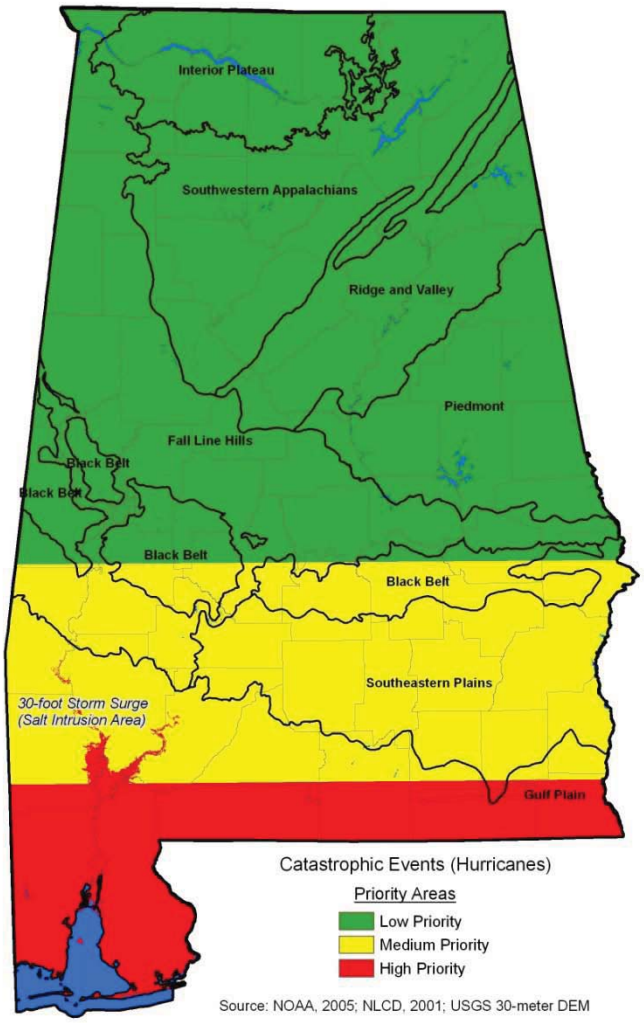
Strategy 2.2.4
Increase use of water and foam fire equipment, low ground pressure tracks, mulching machines, and aerial water delivery operations.

Strategy 2.2.5
Install pre-suppression control lines by using low environmental impact equipment and firebreak construction methods in sensitive areas.

RESOURCES NEEDED: WILDFIRE
Collaborations: Agreements with the Alabama Prescribed Fire Council, the Board of Directors of the Alabama Wildland Fire Academy, home owner associations, volunteer and municipal fire departments
Regulations: State and local policies to allow rapid detection and response to wildfire
Personnel: Fuel management teams, trained natural resource managers, trained forestland owners, certified prescribed burn managers
Legislation: State laws to support state agencies role in protecting natural resource from wildfire
Research: State university-driven studies to integrate safe fire in forest ecosystem
Funding: Grants, state funding, cost-share programs
Other: Educational materials, mapping, demonstration projects, technical assistance, training, water/foam fire equipment, low ground pressure tracks, mulching machines, customized firefighting dozers and transport trucks, remote sensing detection, helicopters, water buckets, and single engine air tankers (SEATs).

Catastrophic Weather Events

Alabama is prone to numerous natural weather events such as hurricanes, tornadoes, ice storms, and droughts. No part of the state is immune. When storm events occur, there is often extensive damage and loss to our state's forest resource. There is increasing concern that if future climate conditions are warmer, the severity and frequency of these natural phenomena could significantly increase.



Priority Area Map 8. Catastrophic Weather Events (Hurricanes)

Goal 1: Mitigate the impact of catastrophic storm events on Alabama's rural forest.

Objective 1.1: Increase outreach efforts.

Strategy 1.1.1
Educate landowners to protect natural resources via proper forest management practices (i.e. management plans [including detailed forest inventory], and thinning).

Strategy 1.1.2
Educate government agencies to encourage some level of cross-training between their staff with AFC's (i.e. AEMA and local fire departments).

Objective 1.2: Continue collaboration with Alabama Emergency Management Agency.

Strategy 1.2.1
Incorporate forest resource issues in emergency management planning.

Strategy 1.2.2
Periodically update state and local plans (i.e. State Mitigation Plan, Emergency Operations Plan).

Strategy 1.2.3
Involve natural resource agencies in training exercises (i.e. Governor's Hurricane Workshop, State Preparedness Workshop).

Objective 1.3: Prioritize services after the storm.

Strategy 1.3.1
Decide ahead of time which groups will be served first.

Strategy 1.3.2
Implement triage protocol to help forestland owners salvage downed timber.

Goal 2: Mitigate the impact of catastrophic storm events on Alabama's urban forest.

Objective 2.1: Help communities develop plans to prepare urban forest before storm events.

Strategy 2.1.1
Adapt lessons learned from impacts of previous storms: what worked well, what needs improvement before the next storm.

Strategy 2.1.2
Plan for debris removal and the most efficient way to get communities in functional order.

Strategy 2.1.3
Identify and prioritize urban development and infrastructure at risk to storm damaged forests (EMA).

Strategy 2.1.4
Work through Regional Planning Councils to incorporate urban forest issues in local Hazard Mitigation Plans (AARPDC).

Strategy 2.1.5
Develop and prepare resources to address invasive plant species movement during post-storm activities (i.e. cleanup, area contractors' moving equipment).

Objective 2.2: Help communities to utilize urban forestry and arboricultural professionalism in emergency management program.

Strategy 2.2.1
Promote urban forest management as a means to mitigate, prepare, respond to, and recover from catastrophic storm events.

Strategy 2.2.2
Employ more urban foresters on the local level (city and county) to create management plans for municipalities and to choose and plant species better suited for respective areas.

Strategy 2.2.3
Encourage smaller towns to collaborate and create agreements to hire one urban forester to travel a circuit to handle urban forestry planning and projects for those in the agreement. Can be paid using CDBG funding.

Strategy 2.2.4
Provide public information about mitigating losses from storm damaged urban forest (UCF).

Goal 3: Integrate forest resources in state emergency management network.

Objective 3.1: Explore opportunities to collaborate with other groups, organizations, and individuals.

Strategy 3.1.1
Form partnerships with other agencies (i.e. AEMA, Alabama Power and electric cooperatives, National Weather Service, ADCNR, National Guard).

Strategy 3.1.2
Incorporate forest resources in Smart Growth development and emphasize the "trees in construction" concept by working with builders, local officials and land/home owners.

Objective 3.2: Create a learning environment that improves resiliency of Alabama's forest resource to catastrophic storm events.

Strategy 3.2.1
Educate landowners on the importance of protecting our natural resources.

Strategy 3.2.2
Educate local officials on the importance of planning urban forests.

Strategy 3.2.3
Encourage areas prone to storm events to utilize and manage tree species with proven wind force resilience (EMA).

Objective 3.3: Improve operational effectiveness of natural resource organizations' response to catastrophic weather events.

Strategy 3.3.1
Develop state-level natural resource response protocol to catastrophic storm events.

Strategy 3.3.2
Establish natural resource team to local, state, and federal representatives to develop interface protocols that will result in more effective response to landowners and urban communities.

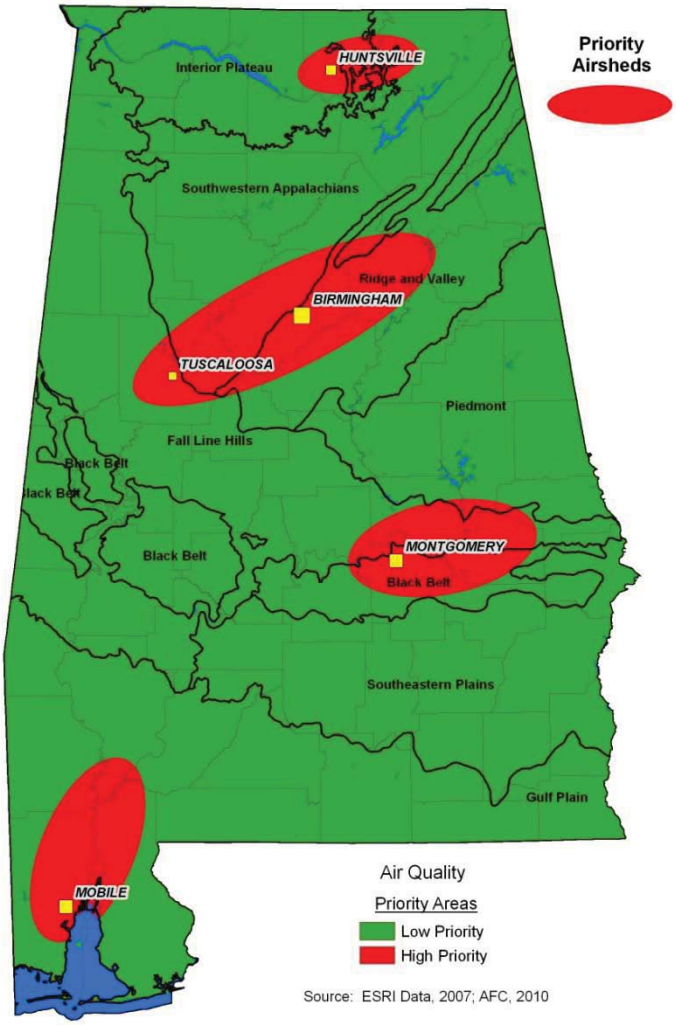
Strategy 3.3.3
Increase accessibility to new information, such as Tree Emergency Plans, at local level to address trees as a major source of damage and injuries during and after storm events (EMA).

Strategy 3.3.4
Utilize Incident Command System process.

RESOURCES NEEDED: CATASTROPHIC WEATHER
Collaborations: Partnerships between natural resource agencies and Alabama Emergency Management Agency
Regulations: State and local policies that incorporate forest resource issues in emergency management protocol
Personnel: Foresters, natural resource professionals, urban foresters, Extension
Legislation: State laws to support state agencies role in protecting natural resource from storm events and responding to storm events and natural disasters
Research: State university-driven studies to increase forest resiliency due to storm events
Funding: Grants, state funding, cost-share programs
Other: Educational materials, mapping, demonstration projects, technical assistance, training, remote sensing detection and damage assessment

Air Quality

Air pollution has impacted high-elevation conifers in the eastern U.S., but Alabama has not experienced serious problems. However, barring a significant shift to non-hydrocarbon energy sources, the effect of air pollution on Alabama's forests may become more pronounced as urbanization and population density increase.



Priority Area Map 9. Air Quality *(Nitrous Oxide – Sulfur Dioxide)*

Goal 1: Determine how atmospheric pollution affects Alabama's forest resources.

Objective 1.1: Monitor atmospheric deposition of nitrogen and sulfur.

Strategy 1.1.1
Partner with the U.S. Forest Service and ADEM Air and Water Divisions to review current deposition data and evaluate the results of the U.S. Forest Service stream water chemistry monitoring in wilderness areas (to be conducted in 2010) as well as other data that already may have been collected by other partners (NFS).

Strategy 1.1.2
National Forests in Alabama will collect water samples in wilderness areas in 2010 to begin analyzing nitrogen and sulfur levels, acid neutralizing capacity (ANC), base cations, acid anions, and pH. This water chemistry inventory will aid in determining how atmospheric deposition is impacting resources in the wilderness areas (NFS).

Objective 1.2: Review adequacy of the atmospheric deposition sampling.

Strategy 1.2.1
Forestry Commission works with the USDA Forest Service, ADEM, and others to evaluate whether additional deposition monitoring may be warranted across forest landscapes to validate sampling and improve on baseline data and trends of atmospheric deposition and impacts (NFS).

Strategy 1.2.2
The agencies will work together on whether additional monitoring stations are warranted in rural areas to measure nitrogen and sulfur deposition in forested landscapes; and whether water chemistry sampling is sufficient or if soil chemistry also should be sampled (NFS).

Strategy 1.2.3
Forestry Commission will work with ADEM and Universities to evaluate and report out on the state of impacts to forest resources resulting from atmospheric deposition. The report would include recommendations for how Alabama could address future atmospheric deposition to maintain and improve forest resources.

Goal 2: Monitor ground-level ozone.

Objective 2.1: Utilize ADEM's network of ozone monitors and data to evaluate the ambient concentrations of ground-level ozone and progress in improving ozone levels.

Strategy 2.1.1
This stage of the strategy is essentially a "screening" of trends to evaluate whether additional

monitoring of ground-level ozone concentrations, particularly within more rural, forested landscapes is warranted. Continued progress of lowering the ozone concentrations is also a desired outcome for protecting the health of the forested landscapes.

Strategy 2.1.2
AFC and ADEM evaluate whether monitors located within rural areas would be needed to get representative ozone readings for forested landscapes.

Strategy 2.1.3
If additional monitoring sites are warranted, AFC and ADEM could partner with the U.S. Forest Service or other landowners to determine the best location of rural monitors and how to invest in the maintenance of those monitors (NFS).

Strategy 2.1.4
Forestry Commission will work with ADEM and Universities to evaluate and report out on the state of impacts to forest resources resulting from ozone. The report would include recommendations for how Alabama could address future ozone levels to maintain and improve forest resources.

Strategy 2.1.5
The strategy recognizes that EPA is proposing to lower the primary NAAQS standard for ground level ozone and also proposing a new secondary standard. If these are finalized, then the strategy would be evaluated (through coordination with ADEM) to reflect the newer standards and potential effects to forest health and to determine whether the strategy should be modified.

Goal 3: Promote the use of prescribed fire.

Objective 3.1: Promote the continued use of forest resource management partnerships.

Strategy 3.1.1
Working with the Alabama Prescribed Fire Council (which includes Federal and State agencies, private landowners, and representatives of state universities) and ADEM, ensure prescribed fire is maintained and supported as the state moves forward with improving air quality (NFS).

Strategy 3.1.2
Use the “One Message – Many Voices” informational/educational program for prescribed fire to understand the program’s benefits relative to effects on air quality.

Strategy 3.1.3
Work in partnership with ADEM and the Alabama Prescribed Fire Council in maintaining a strong prescribed fire program as part of the State's Implementation Planning work.

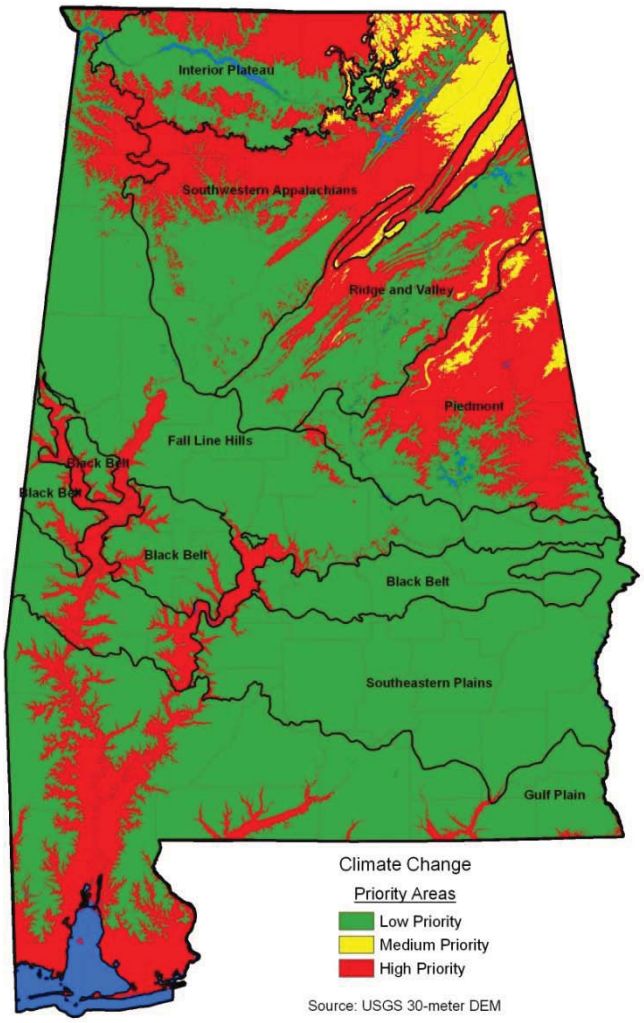
Strategy 3.1.4
Work in partnership with landowners, U.S. Forest Service, National Weather Service, researchers, and others in providing training and information on scheduling prescribed burning when smoke dispersion will minimize air quality impacts (NFS).

Strategy 3.1.5
Work in partnership with ADEM, USDA Forest Service, National Weather Service, and others in on-the-ground monitoring of prescribed fire smoke concentrations (NFS).

RESOURCES NEEDED: AIR QUALITY
Collaborations: Agreement to coordinate AFC, ADEM, Alabama-National Forest System air pollution efforts
Regulations: State and local policies that mitigate impact of atmospheric pollution on forest resource
Personnel: Foresters; Alabama National Forest staff, ADEM air and water quality staff
Legislation: State laws to support state agencies role in protecting natural resource from atmospheric pollution; promote the use of safe fire
Research: ADEM, Forest Service, and state university-driven studies to increase understanding data collected from atmospheric deposition monitoring
Funding: Grants and state funding
Other: Additional monitoring stations, educational materials, mapping, demonstration projects, technical assistance, training

Climate Change

Potential impacts of climate change to Alabama's forests include changes in yield of forest products, increased insect outbreaks, and increased encroachment and spread of invasive species.



Priority Area Map 10. Climate Change

Goal 1: Improve our understanding of climate change and its potential impact on Alabama's forest.

Objective 1.1: Support development of state level policies that are science-based and address threat.

Strategy 1.1.1
Select representative group of people who have climate change, natural resource, and public policy expertise to serve on study group. Study group will submit report to State Forester.

Strategy 1.1.2
State Forester presents study report to Alabama Natural Resources Council (ANRC) for comments, input, and discussion.

Strategy 1.1.3
State Forester uses study report and input from ANRC to update climate change strategies in Alabama's state forest resource assessment.

Objective 1.2: Gather, use, and stay current on climate change and its potential impact on Alabama's forest resource.

Strategy 1.2.1
Support in-state and regional level research to stay current on potential forest ecosystem and species responses to climate change.

Strategy 1.2.2
Establish relationship with the Southeastern Climate Consortium.

Strategy 1.2.3
Develop educational program to inform public of the importance of climate change to Alabama's forest composition, health, and productivity.

Goal 2: Strengthen capacity of Alabama's forest to reduce greenhouse gas emissions.

Objective 2.1: Work with ADO and ADECA to promote Alabama's forest value in preventing greenhouse gas emissions.

Strategy 2.1.1
Encourage production of wood products as a substitute for fossil fuel intensive products.

Strategy 2.1.2
Encourage use of woody biomass as a replacement for fossil fuel generated energy.

Strategy 2.1.3
Encourage efficient commercial forest rotations to displace fossil fuel-intensive products sooner and reduce life-cycle carbon emissions.

Strategy 2.1.4
Encourage management for longer forest rotations where the goal is to sequester carbon.

Strategy 2.1.5
Increase production of wood products to store carbon for lengthy periods of time.

Objective 2.2: Promote the role of Alabama's landowners, managers, and users in reducing greenhouse gases.

Strategy 2.2.1
Implement programs that encourage landowners to professionally manage their forest stands at fully stocked levels.

Strategy 2.2.2
Include climate change management options in Alabama's Stewardship plans for landowners.

Strategy 2.2.3:
Implement programs to encourage Alabama communities to professionally manage their urban forests.

Strategy 2.2.4:
Improve sustainable forest management on all state-owned resource lands.

Strategy 2.2.5:
Implement programs to help land use decision makers reduce conversion of forests to non-forests.

Goal 3: Increase ability of Alabama's forest to adapt to climate change.

Objective 3.1: Promote specific management practices that will improve resiliency of forest to adjust to climate change.

Strategy 3.1.1
Expand fire prevention, suppression, and law enforcement program to reduce destructive forest wildfires.

Strategy 3.1.2
Develop and approve list of management practices that can help forest adapt to climate change.

Strategy 3.1.3
Incorporate adaptive management practices in Alabama's Forest Stewardship plan in the form of a Management Information Sheet.

Strategy 3.1.4
Encourage the planting and management of more diverse forests to better anticipate and mitigate future climate change.

Objective 3.2: Use recognition programs to encourage landowners to manage their forests according to forest management principles.

Strategy 3.2.1
Promote third-party forest certification programs.

Strategy 3.2.2
Increase number of landowners who qualify for Stewardship, Tree Farm, and Treasure Forest approval.

CHAPTER 5
INCORPORATION OF OTHER PLANS

"In developing or updating the state-wide assessment and state-wide strategy …the State Forester shall incorporate any other forest management plan of the state, including community wildfire protection plans and state wildlife action plan."

(Farm Bill 2008)

Because each threat confronting Alabama's forest resource produces almost overwhelming challenges, it is vital that all appropriate agencies and groups find common ground to collaborate and share resources. This will not only result in more efficient and effective delivery of services, it will also make them more relevant to the many people, professions, and organizations that depend on and benefit from a sustainable forest resource.

An all-lands vision for conservation must recognize the value of all forests and trees—rural and urban, public and private. It also requires strong support for the Forest Service State and Private Forestry (S&PF) mission, interagency collaboration, effective delivery of Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) forestry funding assistance, and a commitment to state and private partnerships.

An effective way to foster agency collaboration is through the planning process. While most agencies have strategic plans, there are relatively few examples of linking collaborative efforts through planning. This section lists examples of existing planning documents that can complement the focus of this Plan. Each is listed separately with information on its purpose, plus a list of achievable activities that offer specific opportunities to work together.

While all of the organizations listed below no doubt recognize the value of collaboration, nothing meaningful will happen without commitment. To obtain commitment, there must be communication. It is hoped that this section will serve as a catalyst for dialogue and agreement to result in a more coordinated and effective approach to leveraging resources as we address the threats facing Alabama's forest resources.

Alabama State Wildlife Action Plan

This document describes a strategy for the comprehensive conservation of Alabama's wildlife by addressing specific components required by the State Wildlife Grants federal program through the U.S. Fish and Wildlife Service (USFWS), Office of Federal Assistance.

Alabama's State Wildlife Action Plan (SWAP) identifies the need for numerous forest-related conservation actions as well as those agencies with which it may partner to achieve conservation goals for species identified as being of greatest conservation need (Table 3). A summary of those actions for which the AFC and/or USFS are identified as potential partners is presented below.

Opportunities for Collaboration

- Protect existing large, unfragmented significant tracts of forest. Acquire or purchase conservation easements to protect significant blocks (>1,000 acre parcels) of high quality examples of this habitat. Provide incentives and information to landowners for long-term conservation.
- Avoid/discourage conversion of natural forest to other types.
- Promote low-intensity controlled burns where ecological, safety, and property protection considerations allow.
- Control exotic plant and animal species.
- Support full implementation of the USFS Revised Management Plan and all applicable management plans developed within the next ten years that promote conservation of priority species and their habitats.
- Encourage, through educational outreach and tax incentives or credits, managers and landowners to favor mature and old-growth stands (because these are most often in shortest supply on a landscape scale).
- Avoid or minimize plowed fire lines when possible; place fire lines where disturbance to sensitive natural groundcover can be avoided or minimized. Restore topography and natural vegetation where emergency plowed fire lines disrupt natural areas.
- Investigate effects of season and intensity of prescribed fire as a management technique.
- Collaborate with other agencies to provide landowners information on both forest management and improvement of wildlife habitat.

Forest Legacy Program

This section, plus information contained elsewhere in the Strategy, serves as Alabama's revision to the 2002 Forest Legacy Program Assessment of Need

The purpose of the Forest Legacy Program (FLP) is to identify and protect environmentally important forestland from conversion to non-forest uses. Conservation easements as well as fee purchases may be employed. In 2000 the Alabama Forestry Commission was appointed as the state lead agency to develop and administer a Forest Legacy Program (FLP) in the state. In 2002 the AFC prepared an Assessment of Need (AON) document. The 2008 Farm Bill requires that the FLP AON be incorporated into the state's Forest Assessment. The 2002 AON serves as an invaluable tool to focus attention on the conservation needs of Alabama's forest resource. The 2002 AON is the primary document that defines the FLP in Alabama. Its general concepts are incorporated into this Assessment and updates and modifications to it are described below. Two modifications are noteworthy; 1) priority areas within the Forest Legacy Areas have been further refined and 2) the application and nomination process has added flexibility to encourage a greater number of nominations. The 2002 AON can be accessed at the AFC's website (www.forestry.alabama.gov).

The FLP offers landowners an opportunity to voluntarily protect environmentally important forest resources. Landowners that participate in FLP may choose to donate or sell fee title to their lands. Additionally, donation or sale of conservation easements may be used to protect important forestlands. In this way the Program can help maintain the forestland base, protect special forest resources, and provide opportunities for traditional forest uses for future generations. Limited federal funds will in many cases be better utilized through easements and there are certain advantages to landowners and local communities to the land remaining in private ownership. FLP acquisitions involve willing sellers only, and will be based on federal appraisal standards.

As of 2010, eight tracts totaling 13,780 acres have been conserved through the FLP in Alabama.

Program Goals and Objectives

Purpose

According to the enabling Federal legislation, the Forest Legacy program mandate is to **ascertain and protect environmentally important forest areas that are threatened by conversion to non-forest uses** and to **promote forestland protection and other conservation opportunities**, including the protection of important scenic, cultural, fish, wildlife, and recreational resources, riparian areas, and other ecological values.

Within this framework, Alabama's FLP objectives were derived from input from a public participation process in 2001-2002 and are used to determine which eligible tracts will receive priority for

participation in the program. Additional public input was obtained in 2009 through the online survey (Appendix 2). Objectives are aimed at protecting forest resource values that constituencies and the public consider of greatest concern. It should be emphasized that although the FLP includes timber production potential when significant forestland conversion threats exist, the primary focus of the FLP is on protecting non-timber resources and values considered to be most threatened.

While the primary goal of the Forest Legacy Program in Alabama is to lessen conversion of environmentally important forestland to non-forest use, secondary goals include:

- Protection of tracts that fit into a larger conservation effort, including tracts that augment and complement other conservation initiatives by federal and state agencies, land trusts, and other private conservation organizations.
- Protection of forest resources that have a federal nexus, either because they are adjacent to federal lands, or because they provide habitat for migratory birds or other federal trust species.
- Protection of tracts with significant biodiversity, because they are more likely to protect Alabama's natural heritage on the minimum acreage and thus in the most cost-effective way possible. Also, the more focused on biodiversity "hot spots," the greater the likelihood that the program will head off the listing of additional species under the Endangered Species Act.
- Preserving and protecting fish and wildlife habitats, rare plants, and biological diversity.
- Preserving and protecting riparian habitats.
- Preserving and protecting water quality, fisheries, and water supplies.
- Preserving and protecting natural beauty.
- Preserving and protecting forest-based recreation opportunities.
- Preserving forestlands for current and future wood production.

The AON identifies environmentally important forests as those possessing one or more of the following attributes:

- globally, regionally, or nationally significant concentrations of biodiversity values;
- rare, threatened, or endangered ecosystems;
- provides critical ecological functions (e.g., watershed protection); or
- offers cultural, ecological, economic, or spiritual significance to the local community.

Alabama's Uniform Conservation Easement Act became effective August 1, 1997. It provides that an easement may be created on real property to preserve the land for conservation, recreation,

agriculture, forest, archaeological, or cultural purposes. This supplements provisions of Alabama's "Forever Wild Amendment", Constitutional Amendment No. 543, by adding the following:

- The holder of the conservation easement may be a governmental body or a charitable association or trust;
- A third party right of enforcement exists when expressly provided in easement; and,
- The owner of the property, the holder of the easement, and the holder of a third party right of enforcement may bring an action affecting a conservation easement.

The Forest Legacy Program, in combination with the constitutionally provided property tax relief described above, can provide additional economic benefits to landowners to help forestall the conversion of forests to urban sprawl and other non-forest uses.

Implementation

I. The protected properties may be held in perpetuity.

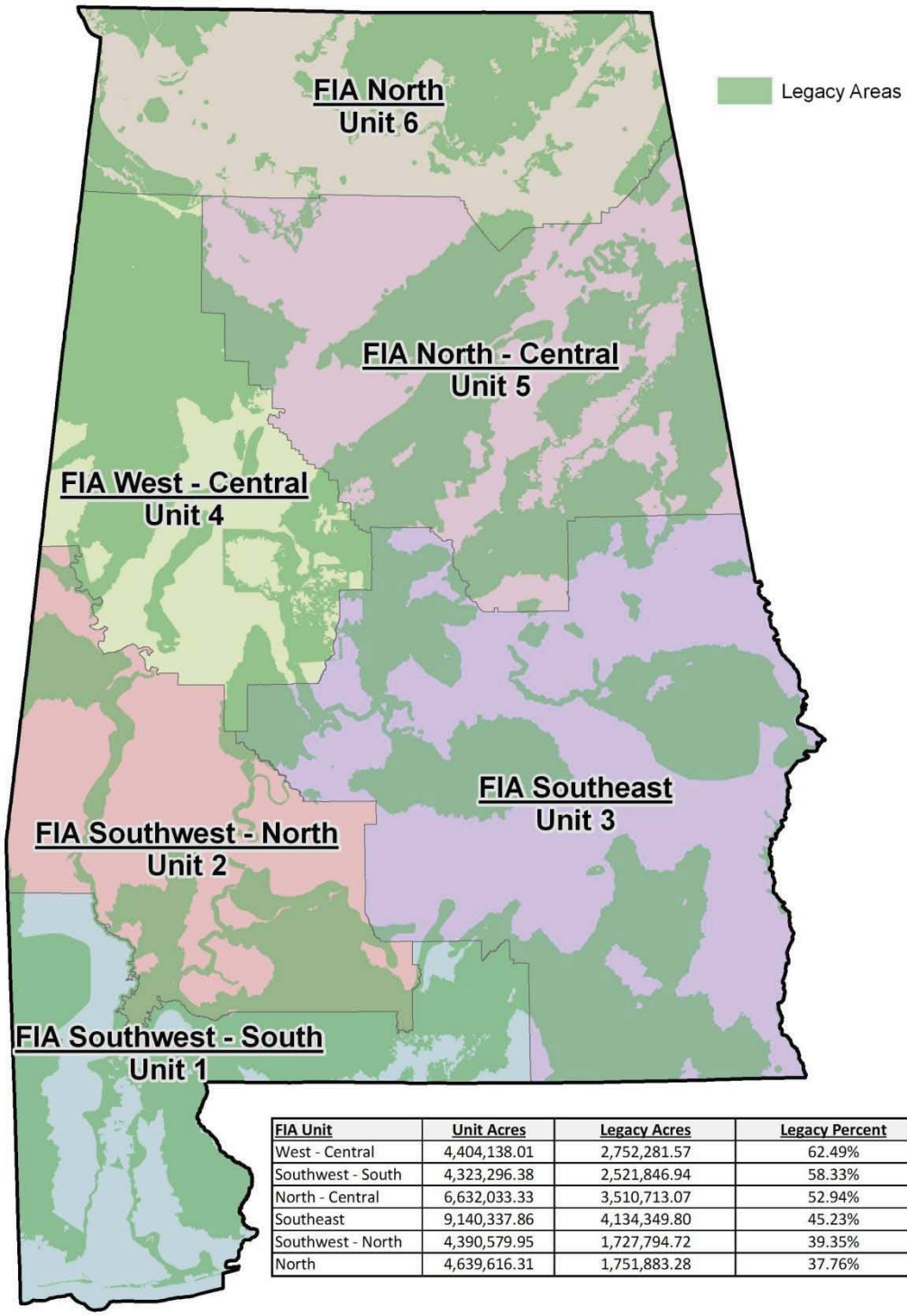
II. The State as empowered by the Federal government:

- shall identify the environmental values to be protected by entry of the lands into the program, management activities which are planned and the manner in which they may affect the values identified, *and*
- obtain from the landowner other information determined appropriate for administration and management purposes.

Establishment of conservation easements and/or fee simple acquisition must begin with interested landowners. Eligible landowners that may be interested in the FLP may submit applications to the State Forester through the Forest Legacy Coordinator at any time.

Forest Legacy Areas

Alabama's Forest Legacy Areas (FLAs) originally included the entire state, broken down by region. A redesign of the FLAs was conducted in 2007 to focus effort more strategically (Figure 15). This process incorporated the "Priority Areas for Conservation" data layer developed by The Nature Conservancy (TNC) and used in Alabama's State Wildlife Action Plan.



FIA Unit	Unit Acres	Legacy Acres	Legacy Percent
West - Central	4,404,138.01	2,752,281.57	62.49%
Southwest - South	4,323,296.38	2,521,846.94	58.33%
North - Central	6,632,033.33	3,510,713.07	52.94%
Southeast	9,140,337.86	4,134,349.80	45.23%
Southwest - North	4,390,579.95	1,727,794.72	39.35%
North	4,639,616.31	1,751,883.28	37.76%

Figure 15. Alabama's Forest Legacy Areas

Forest Legacy Area Priority Counties

Designation of priority counties (Figure 16) is based on 2000 census data and is intended to aid in weighting the scoring criteria so that all other things being equal, tracts within the more rapidly developing and/or most densely populated counties will receive a scoring advantage. Only the Upper Southwest FLA has no priority counties.

Priority 1 counties (shaded red on map) experienced greater than 20 percent population growth in the 1990s and/or have a population density of greater than 150 people per square mile.

Priority 2 counties (shaded orange on map) experienced 10 to 20 percent population growth in the 1990s and/or have a population density of 50 to 150 people per square mile.

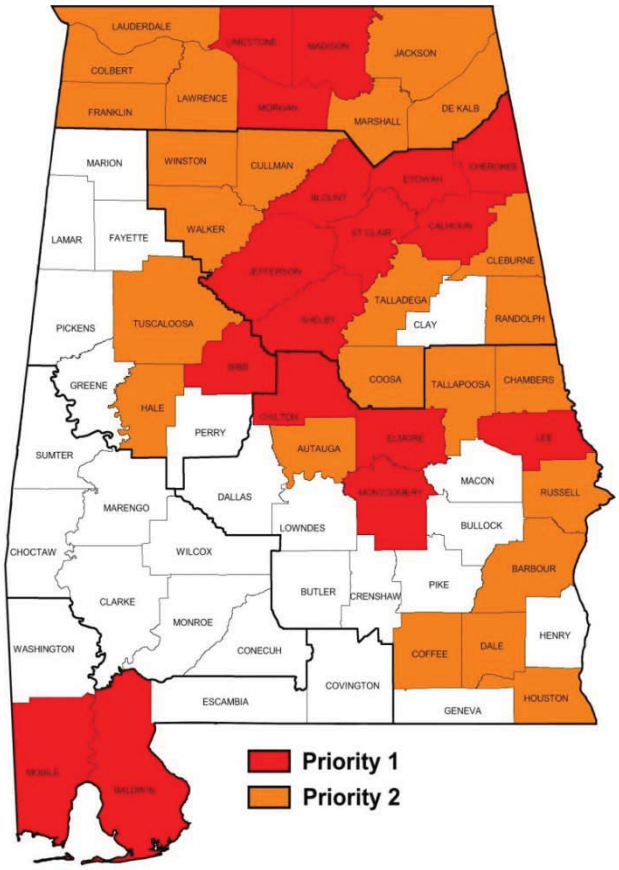


Figure 16. Forest Legacy Program Priority Counties

Parcel Eligibility Criteria

According to the Federal legislation, Forest Legacy Areas shall have significant environmental values or shall be threatened by present or future conversion to non-forest uses. Priority will be given to lands that can be:

1) effectively protected and managed, and
2) which have:
   - important scenic or recreational values;
   - riparian areas;
   - fish and wildlife values, including threatened and endangered species; or
   - other ecological values.

In addition, recent (2001) U.S. Forest Service directives related to regional and federal funding Forest Legacy priorities make it clear that candidate tracts must be:

1. **Important** (they contribute in a quantifiable way environmentally and/or economically to the area and State);
2. **Threatened** (there is an urgency to the threat of conversion or loss of conservation value that can be quantified);
3. **Ready** (there is local support for the project, it is known to be able to be completed and the organization has the means and capacity to complete it);
4. **Strategic** (the project is located in an area that enhances previous conservation investments, advances multi-state conservation initiatives, or contains ecological values of national or regional significance).

The parcel eligibility criteria below reflect both U.S. Forest Service Program Implementation Guidelines and the State Forest Stewardship Committee's objectives for the FLP. To be eligible for inclusion in Alabama's FLP, private forestland tracts must:

- Be threatened by conversion to non-forest uses.
- Be owned by landowners that are willing and interested in donating or selling conservation easements, reserved interest deeds, or fee title through the FLP.
- Possess at least one environmental value of special concern to the public and the State, such as important fish and wildlife habitat; rare animals, plants or plant communities; biological diversity; riparian habitats; scenic beauty; forest-based recreation opportunities; forest products

production capability; or lands which directly affect water quality and other watershed values.

- Provide for continuity of one or more traditional forest uses.
- Possess environmental values that can be protected and managed effectively through conservation easements or fee simple acquisition at reasonable cost.

When judging whether a tract has environmental values that can be protected and managed efficiently, AFC, the AFSAC, and the FLP Committee should consider:

- The nature of environmental values proposed for protection and whether they can be monitored effectively and economically.
- Whether the tract is likely to become isolated from other areas maintained for important forest resources by development on adjacent tracts.
- Whether the landowner's management objectives are compatible with the protection of resources they propose.
- Whether a land trust, conservancy, public agency, or other appropriate organization has expressed an interest in working with AFC and the landowner to establish and monitor the easement.
- Whether other sources of funding for tract acquisition, easement closing, monitoring, and other associated costs are available.

Forest Legacy Strategic Focus

Examples of environmentally sensitive forest types and natural communities in need of special protection within the different FLAs are provided below. 1999 and 2000 FIA data used in the original 2002 AON is repeated here.

Lower Southwest Forest Legacy Area

Black bear habitat (e.g. Hells Swamp Creek, Sullivan Creek, Bassett Creek), maritime live oak-pine forest (critical fallout habitat for migratory songbirds), longleaf pine forests/flatwoods/savannas and associated wet pitcher plant seeps, dry longleaf pine-oak sandhill woodlands with gopher tortoises, red-cockaded woodpecker, and/or other rare species, riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Escatawpa River, Perdido River).

Upper Southwest Forest Legacy Area

Red Hills and Lime Hills beech-magnolia bluff and ravine forests (including Red Hills salamander habitat), forests associated with coastal plain caves; Black Belt chalk prairie/forest mosaic, riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Conecuh River).

Southeast Forest Legacy Area

Fall Line Hills longleaf pine forest and associated Alabama canebrake pitcher plant seeps, Red Hills beech-magnolia bluff and ravine forests (including Red Hills salamander habitat), dry longleaf pine-oak sandhill woodlands with gopher tortoises and/or other rare species, limesink pond areas, longleaf pine - wiregrass flatwoods/savannas; riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Pea – Choctawhatchee River).

West Central Forest Legacy Area

Dolomite glades, Fall Line Hills longleaf pine forests, riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Sipsey River, Cahaba River).

North Central Forest Legacy Area

Mountain longleaf pine forest, relatively unfragmented blocks of old growth and mature deciduous hardwood forest; Coosa Valley flatwoods and associated prairies; hardwood-pine-cedar forests/woodlands associated with sandstone, granite and limestone glades/outcrops; forests containing caves and karst areas with globally rare species; riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Cahaba River, Locust Fork).

North Forest Legacy Area

Relatively unfragmented blocks of old growth and mature deciduous hardwood forest, hardwood-pine-cedar forests/woodlands associated with sandstone and limestone glades; forests containing caves and karst areas with globally rare species; riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Paint Rock River, Little River).

Lower Southwest Forest Legacy Area

FLA Priority I Counties: Baldwin, Mobile

FLA Priority II Counties: None

2000 Population: 636,426

Forest Area: Timberland area increased 1 percent from 1990 to 2000 to 2.78 million acres.

Timberland covers 74 percent of the land area of this FLA.

Strategic Focus Areas: Black bear habitat in Mobile and Washington counties (e.g. watersheds of Hell's Swamp, Cedar, Armstrong, and Bassett creeks, Paul's Bayou, Bayou Sara and similar tributaries to the Mobile-Tensaw delta), maritime live oak-pine forest (critical fallout habitat for migratory songbirds), river bluff forest along the Mobile-Tensaw delta, longleaf pine forests/flatwoods/savannas and associated wet pitcher plant seeps, dry longleaf pine-scrub oak sandhill woodlands supporting gopher tortoises and/or other rare species, Atlantic white cedar swamps (e.g. Blackwater and Styx rivers, Big Escambia Creek), and riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Escatawpa River, Perdido).

Public Lands: Conecuh National Forest, Bon Secour NWR, Grand Bay NWR, Weeks Bay National Estuarine Preserve, Gulf SP, Florala SP, Frank Jackson SP, Meaher SP, Baldwin SF, George Washington SF, Little River SF, Panther Creek SF.

Threats: Urban sprawl from Mobile is impacting areas of north and west Mobile County as well as much of Baldwin County. Coastal development is impacting southern Baldwin County. Proposed toll roads and hurricane evacuation routes threaten additional forested areas.

Upper Southwest Forest Legacy Area

FLA Priority I Counties: None

FLA Priority II Counties: None

2000 Population: 134,722

Forest Area: Timberland area increased 4 percent from 1990 to 2000 to 3.6 million acres.
Timberland covers 83 percent of the land area of this FLA.

Forest Area Cleared for Agriculture and Development, 1990-1999: 27,000 acres.

Strategic Focus Areas: Red Hills and Lime Hills beech-magnolia bluff and ravine forests (including Red Hills salamander habitat), forests associated with coastal plain caves; Black Belt chalk prairie/forest mosaic, riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Conecuh River).

Public Lands: Choctaw NWR, USACOE Lands along Alabama and Tombigbee rivers, Bladon Springs SF, Chickasaw SF, Claude D. Kelley SF, Roland Cooper SF.

Threats: Of the six FLAs, this has the highest percentage of forested land, the lowest population density, and the least imminent threat of conversion of forest to non-forest use.

Southeast Forest Legacy Area

FLA Priority I Counties: Chilton, Elmore, Lee, Montgomery

FLA Priority II Counties: Autauga, Barbour, Chambers, Coffee, Dale, Houston, Russell, Tallapoosa

2000 Population: 1,030,523

Forest Area: Timberland area increased 8 percent from 1990 to 2000 to 6.4 million acres.

Forest Area Cleared for Agriculture and Development, 1990-2000: 170,000 acres.

Strategic Focus Areas: Fall Line Hills longleaf pine forest and associated Alabama canebrake pitcher plant seeps, Red Hills beech-magnolia bluff and ravine forests (including Red Hills salamander habitat), dry longleaf pine-scrub oak sandhill woodlands with gopher tortoises and/or other rare species, limesink pond areas, longleaf pine - wiregrass flatwoods/savannas; riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Pea – Choctawhatchee River).

Public Lands: Eufaula NWR, Horseshoe Bend NMP, Tuskegee NF, Fort Rucker, Maxwell AFB, Gunter AFB, USACOE lands along Alabama, Chattahoochee rivers, Geneva SF, Tuskegee SF, Blue Springs SF, Chattahoochee SF, Chewacla SF, Paul Grist SF, Lakepoint SF, Wind Creek SF

Threats:
Sprawling development, especially near Dothan, Montgomery, Auburn-Opelika; conversion to agriculture

West Central Forest Legacy Area

FLA Priority I Counties: Bibb

FLA Priority II Counties: Hale, Tuscaloosa

2000 Population: 313,283

Forest Area: Timberland area increased 1 percent from 1990 to 2000 to 3.34 million acres. Timberland covers 78 percent of the land area of this FLA.

Forest Area Cleared for Agriculture and Development, 1990-1999: 84,000 acres.

Strategic Focus Areas: Dolomite glades, Fall Line Hills longleaf pine forests, riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Sipsey River, Cahaba River).

Public Lands: Oakmulgee District, Talladega NF, Bear Creek Development Authority Lands, USACOE lands along Tombigbee, Black Warrior rivers, Lake Lurleen SP.

Threats: Eighty percent of the land diverted from timberland was cleared for urban and related land uses (Hartsell and Vissage 2001). Sprawling development, especially near Tuscaloosa, is the greatest threat.

North Central Forest Legacy Area

Fifteen counties comprise the North Central FLA:

FLA Priority I Counties: Blount, Calhoun, Cherokee, Etowah, Jefferson, Shelby, St. Clair

FLA Priority II Counties: Cleburne, Coosa, Cullman, Randolph, Talladega, Walker, Winston

2000 Population: 1,479,121

Forest Area: Timberland area increased 4 percent from 1990 to 2000 to 4.5 million acres.

Forest Area Cleared for Agriculture and Development, 1990-1999: 259,000 acres.

Strategic Focus Areas: Mountain longleaf pine forest, relatively unfragmented blocks of old growth and mature deciduous hardwood forest; Coosa Valley flatwoods and associated prairies; hardwood-pine-cedar forests/woodlands associated with sandstone, granite and limestone glades/outcrops; hemlock ravine forests; forests containing caves and karst areas with globally rare species; riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Cahaba River, Locust Fork).

Public Lands: Bankhead NF, Talladega NF (Shoal Creek, Oakmulgee districts), Watercress Darter NWR, Little River Canyon NM, Anniston Army Depot, Fort McClellan (closed), Choccolocco SF, Weogufka SF, Cheaha SP, Oak Mountain SP, Rickwood Caverns SP.

Threats: This is a densely populated and rapidly growing region of Alabama. Of the 15 counties, only Clay County has less than 10 percent growth and a density of less than 50 people per square mile (23.6).

North Forest Legacy Area

Ten counties comprise the North FLA:

FLA Priority I Counties: Limestone, Madison, Morgan

FLA Priority II Counties: Colbert, DeKalb, Franklin, Jackson, Lauderdale, Lawrence, Marshall

2000 Population: 865,025

Forest Area: Timberland area increased 8 percent from 1990 to 2000 to 2.3 million acres.

Forest Area Cleared for Agriculture and Development, 1990-1999: 95,200 acres.

Strategic Focus Areas: Relatively unfragmented blocks of old growth and mature deciduous hardwood forest, hardwood-pine-cedar forests/woodlands associated with sandstone and limestone glades; forests containing caves and karst areas with globally rare species; riparian corridors and associated forested wetlands along ecoregional priority river/stream reaches (e.g. Paint Rock River, Little River).

Public Lands: Bear Creek Development Authority Lands, Russell Cave NM, Natchez Trace, Wheeler NWR, Blowing Wind NWR, Fern Cave NWR, TVA lands along Tennessee River, Buck's Pocket SP, Cathedral Caverns SP, DeSoto SP, Joe Wheeler SP, Lake Guntersville SP.

Threats: Sprawling development, especially near Huntsville, Decatur, Tuscumbia, Muscle Shoals; conversion to agriculture.

Submitting Forest Legacy Nominations

Submission forms and scoring information are publicly available on the AFC website. Landowners interested in FLP participation should decide whether they prefer to donate an easement, apply to have the easement purchased through the Program, or convey a fee simple interest to the FLP. Donated easements may be held either by government or non-government entities where the donee agrees to accept the donation and the donor agrees to manage the lands for Forest Legacy purposes. Organizations eligible by law to hold easements donated to the Program include U.S. Forest Service, State or local agencies, and nonprofit trusts and conservancies. The State or a unit of local government must hold easements or lands purchased with federal funds under the Forest Legacy Program.

Competition for Forest Legacy dollars is high within Alabama and across the nation, and funding is limited. Only the most significant forest properties are likely to receive program dollars. Program history suggests that only one or two properties in the state will likely be protected via purchased easements or fee purchases each year - depending upon tract size, development value, landowner interest and future funding. The potential for donated easements is much broader; Forest Legacy dollars can be applied to the transactional costs associated with donations of working forest conservation easements. Because funding may be limited in a given year, larger tracts may need to be broken into phases to adequately fund their conservation easement acquisition.

Because Forest Legacy is federally funded, it is subject to annual appropriations. In order to assess the need for FLP dollars, Congress asks for a list of potential Forest Legacy projects a year in advance of the next fiscal year. Nominations in Alabama are due by the end of October.

Selection Procedure

Applications will be reviewed for recommendations to the Alabama Forest Stewardship Advisory Committee (AFSAC) regarding the value of tracts to Alabama's FLP. The selection process will produce a list of landowner applications that will be prioritized for inclusion and potential funding. The prioritized list will, in turn, be considered and approved by the AFSAC, in consultation with the State Forester, the Commissioner of ADCNR and the ADCNR State Lands Division. Recommended tracts will be appraised using federal appraisal standards with the appraisal being reviewed by an appropriate review appraiser, and landowners will be informed of their fair market value.

The AFSAC approved tract(s) will then be submitted to the U.S. Forest Service through the Forest Legacy Information System (FLIS). The Forest Service will make the final determination as to which conservation easements or lands will be acquired with federal funds, or, in the case of donations, will be approved for inclusion in the Program under cost-share agreements. All acquisitions will be made subject to availability of federal funds.

Following completion of the prioritization and approval process, easements will be purchased or conveyed as charitable donations, or tracts will be purchased from the willing seller(s).

Other Plans and Documents

A Management Guide for Invasive Plants of Southern Forests

This U.S. Forest Service book provides information on accurate identification and effective control of the plants or groups invading the forests of the 13 Southern States. It lists and explains control recommendations and selective application procedures.

Opportunities for Collaboration

- Cooperative knowledge networks that link stakeholders, land managers, scientists, policy makers, and political representatives at the … state, multi-county and county levels and that provide real-time information and connectivity.
- Collaborative strategies and programs to prevent spread through: (1) laws, policies, and public education; (2) promotion of new corporate and personal ethics to not sell, buy, and plant invasive plants; (3) sanitization of personnel, equipment, and animals that move from or among infested sites; and (4) prohibitions against the sale and transport of contaminated products such as extracted native plants, potted plants, fill dirt and rock, and mulch.
- Effective and efficient early detection and rapid response networks to identify and map sites of new high-risk introductions, verify the invasive species, communicate to others about the newly identified sites, eradicate the infestations, and restore plant communities resistant to re-invasion.
- Creation and maintenance of a Web-accessible survey, inventory, and mapping system to corporately track existing and spreading invasions (e.g., Southeast Exotic Pest Plant Council's Early Detection and Distribution Mapping System, http://se-eppc.org/).
- Formulation of coordinated control, containment, and eradication programs, including cycles of integrated vegetation management treatments along with monitoring and corporate sharing of both successes and mistakes.
- Restoration treatments to dovetail with control and eradication efforts that guarantee suppression of invasive plants and maintenance of ecosystem functions and services.
- Dedicated invasive plant research and research syntheses are demanded, followed with rapid technology transfer of findings through effective knowledge networks with feedback from the field on additional research needs.
- The spread of invasive plants from state to state means that every state (including Alabama) must have in place an invasive plant management plan.

Range-Wide Conservation Plan for Longleaf Pine

This plan describes conservation activities to restore longleaf pine to as much of its natural range as possible. It is written for the natural resource professional and their organizations.

Opportunities for Collaboration

SIGNIFICANT GEOGRAPHIC AREAS 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.

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.

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.

COMMUNICATIONS, EDUCATION, AND OUTREACH 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

EVALUATING CONSERVATION OUTCOMES 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.

Alabama Emergency Management Agency Hazard Mitigation Plan

This document lists goals, objectives, and mitigation actions to reduce risks through collaborative actions and policies that limit the effect of natural hazards on the citizens and physical assets of Alabama.

Opportunities for Collaboration

- Identify communities at risk to wildfire; complete a minimum of one (1) Community Wildfire Protection Plan in all 67 counties.
- Identify and prioritize urban development and infrastructure at risk to storm damaged forests.
- Increase accessibility to new information, such as Tree Emergency Plans, at local level as trees are a major source of damage and injuries during storm events.
- Develop inventory of repeater sites without backup electricity.

Alabama NFS Land and Resource Management Plan

The 2005 Revised Land and Resource Management Plan guides all natural resource management activities and sets management standards for the National Forests in Alabama for the following 10 to 15 years.

Opportunities for Collaboration

Goal 3 – Manage existing forest communities to reduce risks from insects and diseases

Goal 4 – Watersheds are managed and/or restored to provide salient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial water users

Goal 5 – Maintain or improve water quality to meet state and federal standards and to provide for the beneficial uses of water

Goal 8 – Riparian ecosystems, wetlands and aquatic systems are managed and/or restored to protect and maintain soil, water, vegetation, fish and wildlife associated resource values

Goal 10 – Lakes, ponds, and reservoirs support balanced, productive recreational fisheries to the extent appropriate native aquatic species viability, threatened and endangered species, State and federal water quality standards, funding, and public demand

Goal 12 – Contribute to the conservation and recovery of the red-cockaded woodpecker (*Picoides borealis*), a federally listed, endangered species through the implementation of forest population and management practices described in the Revised Recovery Plan and RCW ROD

Goal 17 – Achieve a balance between suppression, to protect life, property, and resources, and fire use, to regulate fuels and maintain healthy ecosystems. Use wildland fire to protect, maintain, and enhance resources, and, as nearly as possible, allow fire to function in its natural ecological role

Goal 21 – The Forest Service will annually review the status of counties near the National Forest regarding their attainment of NAAQS. Where a non attainment area is formally recognized, the Forest Service will participate in SIP modification to bring the area back into attainment status

Goal 47 – Increase public awareness, knowledge, understanding, appreciation, and involvement in Forest Service natural resource management activities

Goal 48 – Engage the public and other agencies in cooperative, collaborative efforts that win their trust and support while helping to meet the desired future conditions

Goal 49 – Encourage cooperation and partnerships with individuals, nonprofit organizations, other agencies, special interest groups, clubs and others to achieve the Forest's interpretive activities

Alabama Consolidated Comprehensive Economic Development Strategy

State law mandates regional councils to "prepare regional plans consistent with state comprehensive planning." The Alabama Department of Economic and Community Affairs and the Alabama Association of Regional Councils collaborated to develop this plan for state economic development.

- In Regions 5 and 6, timber resources are an important part of the local economy with vast areas of pine forests and wood processing plants.
- Region 8 has many significant environmental issues including water pollution in and adjacent to Mobile Bay, the alteration and destruction of saltwater marshes and shallow bay bottoms, loss of natural habitats, and the effects of land utilization and oil and gas exploration. The area contains specific environmentally sensitive areas that warrant the attention of special environmental programs.
- Timber, agriculture, forestry, raw materials, and environmental assets, particularly rivers, are consistently listed by the regions as strengths.
- One of the most commonly mentioned threats (by the regions) is continued growth and its effect on urban sprawl and the demands it places on infrastructure.

Alabama Statewide Comprehensive Outdoor Recreation Plan (SCORP)

This statewide strategy identifies recreation opportunities in order to ensure relevant, influential and timely planning for the State's use of Land and Water Conservation Fund (LWCF) apportionment.

Opportunities for Collaboration

Partner, as appropriate, with other agencies and groups to achieve Alabama's outdoor recreation goals as defined by the SCORP:

Explore Alabama's Outdoor Resources:

- Ensure proper protection against loss of state's resources.
- Identify and preserve natural and/or ecologically important sites.
- Protect natural water features.
- Utilize a trail system to access natural areas.
- Identify and prioritize key lands for acquisition.
- Explore and expand partnerships to protect green space.
- Encourage the development of multi-jurisdictional projects.
- Provide interpretation, education and outdoor recreation programs.

Provide Quality of Life Opportunities:

- Encourage the provision of higher quality and more diverse recreation programs and facilities.
- Improve the level of cooperation in planning and implementing recreation programs and services.
- Encourage the development of recreational trails to increase access to outdoor recreation facilities.
- Coordinate with other agencies to encourage joint recreational opportunities when possible.

Promote Healthy Lifestyles:

- Improve access to outdoor recreation resources and facilities by providing locations near where people live and work and exploring ways to connect existing facilities for pedestrians and non-motorized vehicles.
- Collaborate with the Alabama Department of Public Health to encourage joint efforts between local governments and the local health departments to create programs and activities in parks and outdoor recreation areas promoting 'healthy lifestyle choices.'

Develop Active and Passive Recreational Opportunities:

- Investigate available sources of funding, which can be used by local government to develop new outdoor recreation facilities and improve existing facilities.
- Improve knowledge of new maintenance techniques available in the industry.

- Investigate conducting an inventory of existing recreational facilities to further determine outdoor recreation needs.

Ensure Accessibility of Outdoor Recreation to All Citizens:

- Identify and reduce barriers that prevent the use of outdoor recreation facilities (e.g., safety concerns, cost of participation, incorporation of public transportation networks and accessibility by those with physical limitations).
- Ensure that segments of Alabama's population that are underserved receive opportunities to improve existing facilities.
- Encourage communities to monitor capacity levels of recreational facilities in comparison with actual use.

Recognize and Promote the Economic Impact of Recreation in Alabama:

- Strengthen the image of recreation as an industry and educate public leaders on the importance of recreation to the state.
- Develop a public awareness to promote the SCORP goals.
- Facilitate, fund and collaborate in efforts to advance SCORP goals.
- Further individual agency goals by leveraging efforts of state and local partners.
- Investigate the creation of a "one-stop" shop for outdoor recreation and recreational trail information in the State of Alabama.

MOU between ADEM and AFC

This Memorandum of Agreement provides a framework for both agencies to work together to prevent and abate nonpoint source impairment of water quality during forestry operations in Alabama.

Opportunities for Collaboration

Section 2 (A)
To meet annually to discuss, among other topics, water quality priorities; problems; concerns; opportunities for cooperation and assistance; promoting communications, team work and coordination: agency plans and initiatives to abate and control nonpoint source pollution to the maximum extent practical; general assessments of BMPs and water quality protection.

Section 3
To schedule randomly selected representative physiographic or ecosystem area silvicultural sites for concurrent joint agency assessments (on-site field reviews) in order to promote and reinforce both agencies' understanding of resource management and water quality contraventions, and to aid in both agencies' discernment of the appropriateness and adequacy of in-place BMPs in meeting requirements of State and federal water quality regulations and objectives.

Section 4 (A)
That if a contravention of water quality standards or a discharge of pollutants should occur during or as a result of silvicultural operations, compliance with Alabama's Best Management Practices for Forestry will serve as a strong indicator that the landowner and other parties involved were attempting to operate in good faith.

Section 9
Each agency will provide to the other, upon request and to the extent possible, technical and professional expertise and support. Requests may involve, but not be limited to: NPS technical advisory committee representation; training; educational outreach activities; development and implementation of BMPs; water quality compliance; monitoring, regulations, use designation and classification criteria; input into, guidance, and evaluation of the state NPS Program; and reviewing of draft plans, policies, laws and regulations to achieve the goals of the Federal Clean Water Act and the Alabama Water Pollution Control Act.

MOU between AFC, AACD, AS&WCC, and NRCS

This MOU is between the AFC, the Alabama Association of Conservation Districts (AACD), the Alabama Soil and Water Conservation Committee, and the USDA Natural Resources Conservation Service in Alabama.

Opportunities for Collaboration

Work together to address the following barriers to the delivery of forestry-related conservation assistance:

1. The availability of technical expertise and assistance to private non-industrial forestland owners is insufficient to meet the need;

2. The lack of integration of planning and other administrative issues between the Parties; making it difficult for private landowners to participate in forestry and conservation programs;

3. Funding devoted to forestry and agroforestry is inadequate and inconsistent;

4. The Parties speak different technical/organizational languages, which suggest a need for improved communication, and

5. Forestry is not a priority for many State Technical Committees.

MOU between AFC and Alabama Association of Regional Planning & Development Councils (AARPDC)

This MOU is the first formal relationship between the Forestry Commission and an organization dedicated and equipped to assist local governments with planning and other technical services. The agreement represents initial steps needed to lay a foundation for long-term collaboration.

Opportunities for Collaboration

1. AFC will help define role of Forestry Commission liaison with assigned regional planning council;
2. AFC will help develop innovative ideas to incorporate green infrastructure concepts into regional planning council activities and programs; and
3. AARPDC Task Force will help AFC in familiarizing agency liaisons and other key people on green infrastructure practices and the operations and services of the respective regional councils.

Community Wildfire Protection Plans

Community Wildfire Protection Plans are authorized in Title I of the Healthy Forests Restoration Act (HFRA). It provides an incentive for the US Forest Service (USFS), the Bureau of Land Management (BLM), and State Foresters to assist local communities as they develop and implement forest management and hazardous fuel reduction projects. In order for a community to take full advantage of this new opportunity, it must first prepare a Community Wildfire Protection Plan (CWPP) which addresses issues such as wildfire response, hazard mitigation, community preparedness, or structure protection. At this time Alabama's CWPPs are prepared on a county-wide basis except for the larger, hotter counties by the Alabama Forestry Commission (AFC). CWPPs also involve collaboration with county leaders, the US Forest Service, and other partner groups.

Unlike other organizations' planning documents, Community Wildfire Protection Plans (CWPP) are tools that target local development in the wildland urban interface. As a tool, it is best suited to this assessment as a specific strategy that mitigates the risk of wildfire to encroaching urban development. To help assure that this Farm Bill requirement is met, the Alabama Forestry Commission's person responsible for promoting CWPP in the state was added to the subject matter experts group that developed the wildfire goals, objectives, and strategies. The concept of CWPPs are addressed as a specific measurable strategy in the "Strategies: Wildlfire" section.

> *Identify communities at risk to wildfire; complete a minimum of one (1) Community Wildfire Protection Plan in all 67 counties (Strategy 2.2.2).*

In the spirit of interagency collaboration, this strategy is found verbatim in Alabama's 2010 State Hazard Mitigation Plan as a "mitigation activity," which lends itself to federal emergency management funding and increased state capacity through the involvement of local County Emergency Management entities.

State and Private Forestry Programs

Alabama Forestry Commission: Forest Stewardship

The Forest Stewardship Program (FSP) provides technical assistance, through State forestry agencies, to nonindustrial private forest (NIPF) owners to encourage and enable active long-term forest management. A primary focus of the Program is the development of comprehensive, multi-resource management plans that provide landowners with the information they need to manage their forests for a variety of products and services. For more details on how the Forest Stewardship Program operates, see the National Standards and Guidelines.

Alabama Issues:

- Contribution to Climate Change Mitigation and Adaptation
- Contribution to Water Quality and Supply
- Contribution to Development of Biomass Energy Facilities and Markets
- Emphasizing Program Delivery in High Priority Areas
- Improving Spatial Analysis and Reporting Capability through U.S. Forest Service WebDET
- Monitoring Forest Stewardship Plan Implementation
- Coordinate with NRCS on Farm Bill Delivery
- Review Outreach Performance Measures and Effectiveness Monitoring
- Streamline certification process
- Longleaf restoration
- Cogongrass control
- Wildland Urban Interface
- Outreach to underserved landowners
- Collaborate with Tree Farm Program

Alabama Forestry Commission: Wildfire

The Fire and Aviation Management part of the U.S. Forest Service works with the states to advance technologies in fire management and suppression, maintain and improve the extremely efficient mobilization and tracking systems in place, and reach out in support of our Federal, State, and International fire partners.

Alabama Issues:

- Address the role of remote sensing as a means of early wildfire recognition that results in reduced acres burned and contributes to safer and more effective wildfire suppression
- Reduction of timber damage, injuries, and property loss due to wildfire
- Increased use of prescribed burning
- Enhance fire prevention through education, law enforcement, training, and targeting communities at risk
- Improve capacity of volunteer fire departments

Alabama Forestry Commission: Forest Health

Forest Health Protection provides technical assistance on forest health-related matters, particularly those related to disturbance agents such as native and non-native insects, pathogens, and invasive plants. We value and work through partnerships across lands of all ownerships. We work closely with land managers and resource staff with the National Forest System, the Department of the Interior, Department of Defense, other federal agencies, Tribes, all 50 States, U.S. Territories, universities, private landowners and other countries.

Alabama Issues:

- Collaborations with state, federal, educational institutions, and other groups
- Better exchange of information and technology
- Technical assistance to landowners
- Education, outreach, and training
- Detection, assessments, reporting, and monitoring of forest pests

Alabama Forestry Commission: Urban & Community Forestry

In the 1990 Farm Bill, Congress expanded the Cooperative Forestry Assistance Act of 1978 to improve federal support for each state's capacity to deliver urban forestry assistance to cities and towns. As a condition to receiving U.S. Forest Service Urban & Community Forestry financial assistance, the State Forester is required to develop an Alabama Urban & Community Forestry Strategic Plan. Alabama's original plan was completed in 1994 and underwent its first revision in 2000. The state urban forestry program is currently operating under "Alabama's Five-Year Strategic Plan (2007-2011)," and is accessible at www.aces.edu/pubs/docs/a/anr-1319/anr-1319.pdf.

Alabama Issues:

- Increase capacity of individuals, groups, and organizations to participate and contribute to Alabama's Urban & Community Forestry Program.
- Implement activities to assess the condition of Alabama's urban forestry resource
- Increase public awareness of urban forestry
- Acknowledge and show appreciation for the achievements of individuals, organizations, and communities that contribute to Alabama's urban forestry program.
- Improve public policy and governance to guide regional and local decision making
- Increase the level of professionalism in urban forestry private and public sector practices

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APPPENDIX 1. Glossary

Airshed – a part of the atmosphere that behaves in a coherent way with respect to the dispersion of emissions. It typically forms an analytical or management unit. Also: A geographic boundary for air quality standards.

Biodiversity- the variation of life forms within a given ecosystem, biome, or on the entire Earth. Biodiversity is often used as a measure of the health of biological systems.

Carbon Sequestration- The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release the oxygen and store the carbon. Fossil fuels were at one time biomass and continue to store the carbon until burned.

Changing Markets- transformation of the economy in terms of technological and market conditions which could influence the position of a specific sector and the role it may play in the state, region, national ,and world market

Climate Change- Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun; natural processes within the climate system (e.g. changes in ocean circulation); human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.)

Community Wildfire Protection Plan- a plan for an “at-risk” community that identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatments on Federal and non Federal land that will protect one or more “at-risk” communities and essential infrastructure.

Ecoregions- areas of relative homogeneity in ecological systems and their components. Factors associated with spatial differences in the quality and quantity of ecosystem components, including soils, vegetation, climate, geology, and physiography, are relatively homogeneous within an ecoregion.

Ecosystem Services – conditions and processes through which natural systems, and the species which make them up, sustain and fulfill human life. Goods and services include food, biological raw materials, biomass fuel, freshwater, genetic resources, biochemicals, air quality, climate regulation, water regulation, erosion control, water purification and water treatment, cultural services, and supporting services.

Forest - a dense growth of trees, together with other plants, covering a large area of land. The science concerned with the study, conservation, and management of forests is forestry. A forest is an

ecosystem-a community of plants and animals interacting with one another and with the physical environment.

Forest Health- describes the concepts of forest resilience, persistence and sustainability as related to a vigorous ecosystem. Other common include stress, complexity, ecosystem balance, management objectives, human needs, ecosystem function and processes, and indicators.

Forest Inventory Analysis (FIA) – a national Program of the U.S. Forest Service that provides information needed to assess America's forests on a state-by-state basis. FIA reports on status and trends in forest area and location; in the species, size, and health of trees; in total tree growth, mortality, and removals by harvest; in wood production and utilization rates by various products; and in forestland ownership.

Forest Management- is the branch of forestry concerned with the overall administrative, economic, legal, and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection, and forest regulation. This includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, forest genetic resources and other forest resource values. Management can be based on conservation, economics, or a mixture of the two. Techniques include timber extraction, planting and replanting of various species, cutting roads and pathways through forests, and preventing fire.

Forest Sustainability- The stewardship and use of forests and forestlands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.

Forest Types- A forest type is a classification of forestland based on the species presently forming a plurality of living trees growing in that particular forest.

Fragmentation- Fragmentation has been defined as the conversion of large areas of contiguous native forest to other types of vegetation and /or land use leaving remnant patches of forest that vary in size and isolation

Green Infrastructure- highlights the importance of the natural environment in decisions about land use planning with an emphasis on the "life support" functions provided by a network of natural ecosystems, with an emphasis on interconnectivity to support long term sustainability.

Greenhouse Gas Emissions- Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), ozone (O3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6).

Gross domestic Product- is a measure of a country's overall economic output. It is the market value of all final goods and services made within the borders of a country in a year. It is often positively correlated with the standard of living.

Invasive Species- a species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Multi-State Priority Area - a region shared geographically by two or more states that has a specific forest related issue, quality, or features of upmost importance or urgency.

National Themes-Federal government priorities that require the Secretary of Agriculture to allocate or otherwise made available under the Farm Bill to focus on 1) conserving and managing working forest landscapes for multiple values and uses, 2) protecting forest from threats, including catastrophic wildfires, hurricanes, tornadoes, windstorms, snow or ice storms, flooding, drought, invasive species, insect or disease outbreaks, or development, and restoring appropriate forest types in response to such threats, and 3) enhancing public benefits from private forests, including air and water quality, soil conservation, biological diversity, carbon storage, forest products, forestry-related jobs, production of renewable energy, wildlife, wildlife corridors and wildlife habitat, and recreation.

Parcelization- refers to a separation of the land base into distinct parcel due to changes in ownership patterns

Prescribed Burning- activity used to approximate the natural vegetative disturbance of periodic fire occurrence. This vegetative management tool is used to maintain fire dependent ecosystems and restore those outside their natural balance. Generally, low intensity prescribed fire, is applied by trained experts to clear ground of dangerous fuels like dead wood and brush. This low-intensity fire is vital to the life cycles of fire-dependent range and forestlands.

Private Nonindustrial Landowners-private forestland owners who do not own or operate wood processing facilities, and include farmers, miscellaneous individuals, and non-forest industry operations.

Reforestation - the reestablishment of a forest, either by natural regeneration or by planting in an area where forest was removed.

Silvopasture- the practice of combining forestry and grazing of domesticated animals in a mutually beneficial way. Advantages of a properly managed silvopasture operation are enhanced soil protection and increased long-term income due to the simultaneous production of trees and grazing animals.

State Priority Area- a geographical region within a state that has a specific forest related issue, quality, or features of upmost importance or urgency

Stewardship Program- Authorized by the Cooperative Forestry Assistance Act of 1978, the Forest Stewardship Program provides technical assistance, through State forestry agency partners, to

nonindustrial private forestland owners to encourage and enable active long-term forest management. A primary focus of the Program is the development of comprehensive, multi-resource management plans that provide landowners with the information they need to manage their forests for a variety of products and services.

Timber- a name for wood, whether standing in the form of trees or felled to be turned into materials for construction.

Urban Forest- a collection of trees that grow within a city, town or a suburb, while maintaining some form or function as a forest system.

Urbanization- the process of population growth and related development within an existing urban area, in adjoining rural lands, or a combination of both.

Urban Mega-Region- a recent concept use to describe urban growth and development at regional scales and far beyond traditional municipal, county, and state boundaries. In the US, this demographic trend has been classified into eleven (11) distinctive mega-regions.

Wildfire- a fire that burns uncontrollably in a natural setting (e.g., a forest, or grassland).

Wildland Urban Interface- the zone where structures and other human developments meet, or intermingle with, undeveloped wildlands.

Woody Biomass- the trees and woody plants, including limbs, tops, needles, leaves, and other woody parts, grown in a forest, woodland, or rangeland environment, that are the by-products of forest management.

Working Forest- promotes all operations that follow normal business and legal constraints for private non-industrial forest owners who seek multiple benefits from their lands.

APPENDIX 2. Public Survey Summary

Gathering public input is a crucial step to assessing Alabama's forest resources. On December 19, 2008, 27 stakeholders (Table A-1) met in Montgomery to help frame the Assessment's focus. Their comments were then used by the Forestry Commission and Auburn University in Montgomery to develop a public attitudes survey in March, 2009. The survey had 985 participants, with 865 responding to all 31 questions and another 120 completing partial surveys.

Though not a scientific random sample, the results do provide valuable information that when used in context of other data and analysis help identify critical issues facing Alabama forest resources. A partial summary of the results is presented below. A total of 489 Alabama resident forestland owners and 345 resident non-forestland owners responded. Tables A-2 and A-3 rank their top critical issues in descending order.

The priority issues for forestland owners and non-owners differed to some extent, as may be expected. Both groups included fragmentation, invasive exotics, and emerging markets among their top concerns, but forestland owners recognized tax policies as their first concern.

Table A-2. Top Forest Priorities, Resident Alabama Forestland Owners (N=489*)

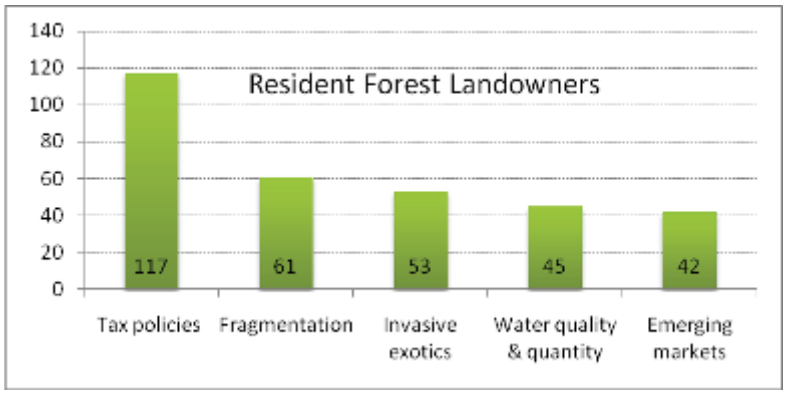
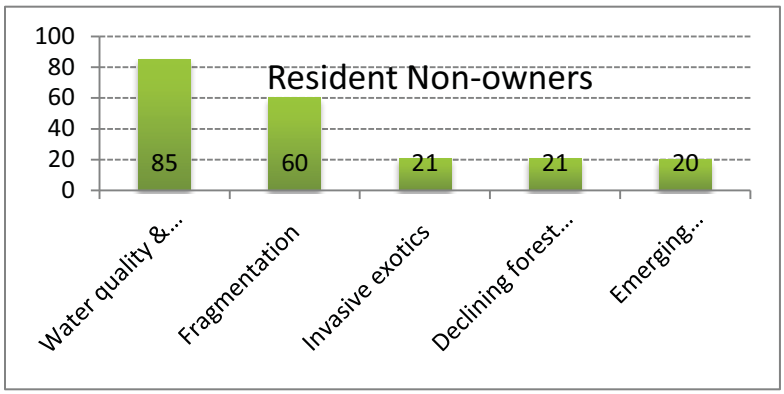


Table A-3. Top Forest Priorities, Resident Alabama Non-forestland Owners (N=385*)



Auburn University in Montgomery's Alabama Training Institute conducted the analysis. Only complete surveys (865) were considered in order to avoid incomplete responses.

Cross Tabulation of Critical Issues

The following pages present the frequency of the critical issues, depicting how often an issue appeared in the top 5, regardless if it appeared as a number 1 critical issue or a number 5. This segment has been analyzed as follows:

- Cross Tabulation of all Critical Issues
- Total Residents Cross Tabulation of Critical Issues
- Total Resident Landowner Cross Tabulation of Critical Issues
- Total Resident Non-Landowner Cross Tabulation of Critical Issues
- Total Non-Resident Cross Tabulation of Critical Issues

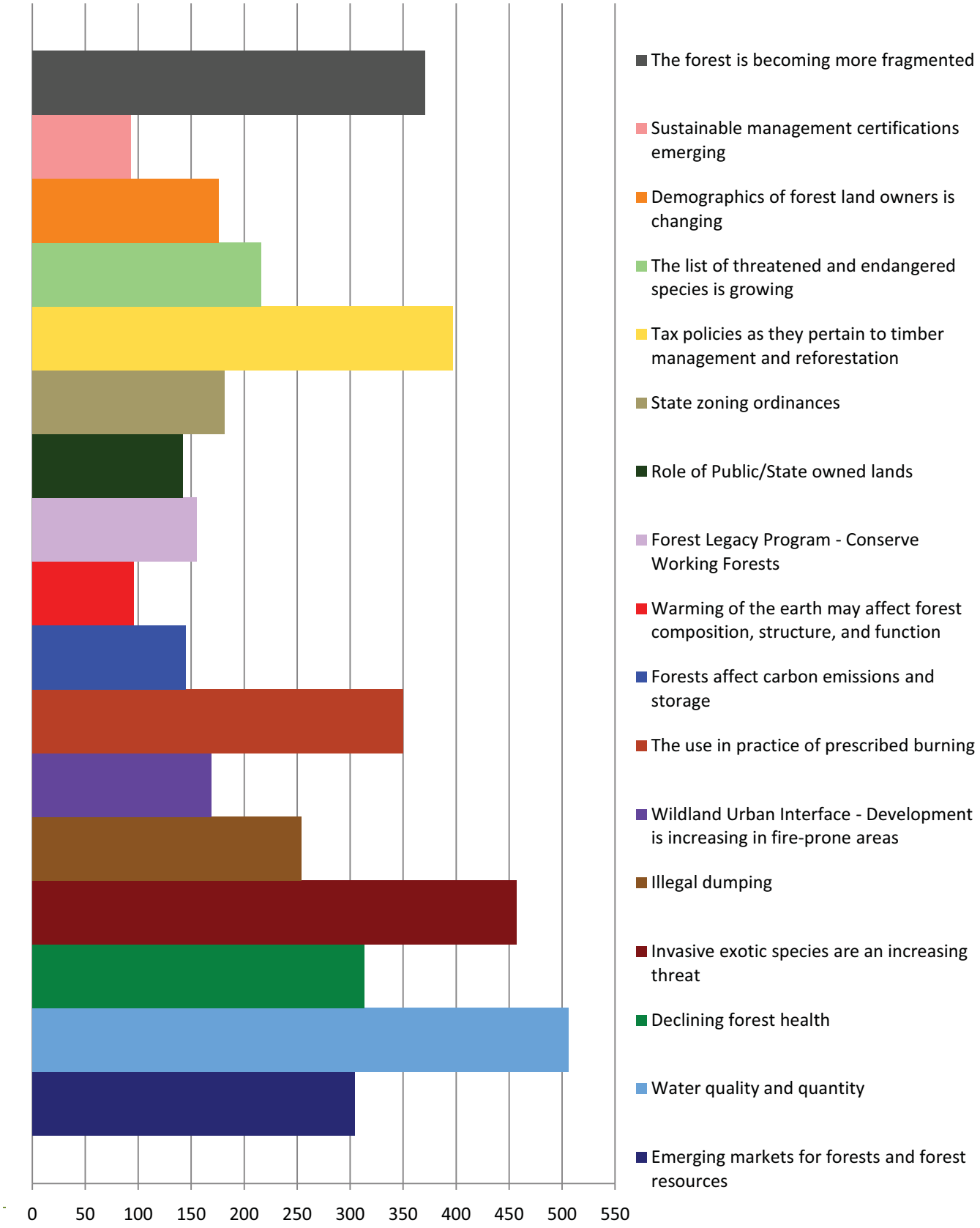
Legend:

The following color coding was used throughout the analysis:

- The Forest is becoming more fragmented
- Sustainable management certifications emerging
- Demographics of forest land owners is changing
- The list of threatened and endangered species is growing
- Tax policies as they pertain to timber management and reforestation
- State zoning ordinances
- Role of Public/State owned lands
- Forest Legacy Program - Conserving Working Forests
- Warming of the earth may affect forest composition, structure, and function
- Forests affect carbon emissions and storage
- The use in practice of prescribed burning
- Wildland Urban Interface - Development is increasing in fire-prone areas
- Illegal dumping
- Invasive exotic species are an increasing threat
- Declining forest health
- Water quality and quantity
- Emergining markets for forests and forest resources

Total Cross Tabulation of all Critical Issues

	#1 Critical Issue	#2 Critical Issue	#3 Critical Issue	#4 Critical Issue	#5 Critical Issue	Total	Total %
The forest is becoming more fragmented	126	83	65	60	37	**371**	**9%**
Sustainable management certifications emerging	14	15	8	27	29	**93**	**2%**
Demographics of forestland owners is changing	28	38	42	34	34	**176**	**4%**
The list of threatened and endangered species is growing	29	51	57	41	38	**216**	**5%**
Tax policies as they pertain to timber management and reforestation	139	64	76	59	59	**397**	**9%**
State zoning ordinances	26	47	26	34	48	**181**	**4%**
Role of Public/State owned lands	21	15	30	40	36	**142**	**3%**
Forest Legacy Program - Conserve Working Forests	28	25	30	37	35	**155**	**4%**
Warming of the earth may affect forest composition, structure, and function	16	18	23	21	18	**96**	**2%**
Forests affect carbon emissions and storage	15	29	26	43	32	**145**	**3%**
The use in practice of prescribed burning	42	81	77	64	86	**350**	**8%**
Wildland Urban Interface - Development is increasing in fire-prone areas	23	28	32	42	44	**169**	**4%**
Illegal dumping	25	53	49	64	63	**254**	**6%**
Invasive exotic species are an increasing threat	77	108	106	99	67	**457**	**11%**
Declining forest health	54	61	59	56	83	**313**	**7%**
Water quality and quantity	137	98	100	87	84	**506**	**12%**
Emerging markets for forests and forest resources	65	51	59	57	72	**304**	**7%**
	865	865	865	865	865	4325	100%


The forest is becoming more fragmented
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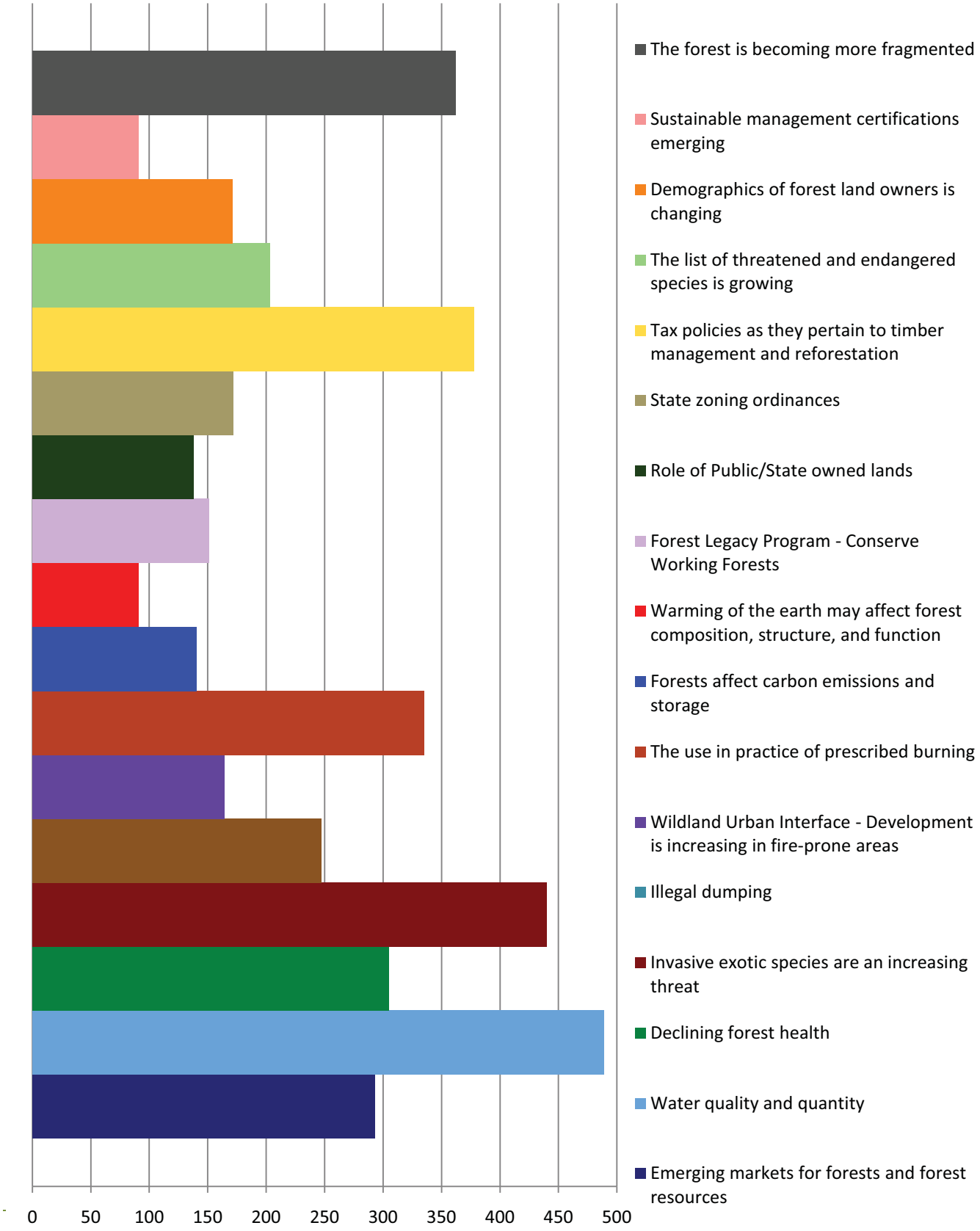
Illegal dumping
Invasive exotic species are an increasing threat
Declining forest health
Water quality and quantity
Emerging markets for forests and forest resources
0
50
100
150
200
250
300
350
400
450
500
550

Total Residents Cross Tabulation of Critical Issues

	#1 Critical Issue	#2 Critical Issue	#3 Critical Issue	#4 Critical Issue	#5 Critical Issue	Total	Total %
The forest is becoming more fragmented	121	81	65	58	37	**362**	**8%**
Sustainable management certifications emerging	14	15	8	26	28	**91**	**2%**
Demographics of forestland owners is changing	28	37	41	31	34	**171**	**4%**
The list of threatened and endangered species is growing	29	50	53	38	33	**203**	**5%**
Tax policies as they pertain to timber management and reforestation	135	59	72	56	56	**378**	**9%**
State zoning ordinances	25	43	24	32	48	**172**	**4%**
Role of Public/State owned lands	20	15	30	40	33	**138**	**3%**
Forest Legacy Program - Conserve Working Forests	27	24	29	37	34	**151**	**3%**
Warming of the earth may affect forest composition, structure, and function	16	17	21	21	16	**91**	**2%**
Forests affect carbon emissions and storage	15	28	26	40	31	**140**	**3%**
The use in practice of prescribed burning	37	79	75	60	84	**335**	**8%**
Wildland Urban Interface - Development is increasing in fire-prone areas	23	27	31	41	42	**164**	**4%**
Illegal dumping	24	52	47	63	61	**247**	**6%**
Invasive exotic species are an increasing threat	74	102	100	98	66	**440**	**10%**
Declining forest health	54	60	55	54	82	**305**	**7%**
Water quality and quantity	130	96	98	85	80	**489**	**11%**
Emerging markets for forests and forest resources	62	49	59	54	69	**293**	**7%**
	834	834	834	834	834	4170	96%


The forest is becoming more fragmented
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Declining forest health
Water quality and quantity
Emerging markets for forests and forest resources
0
50
100
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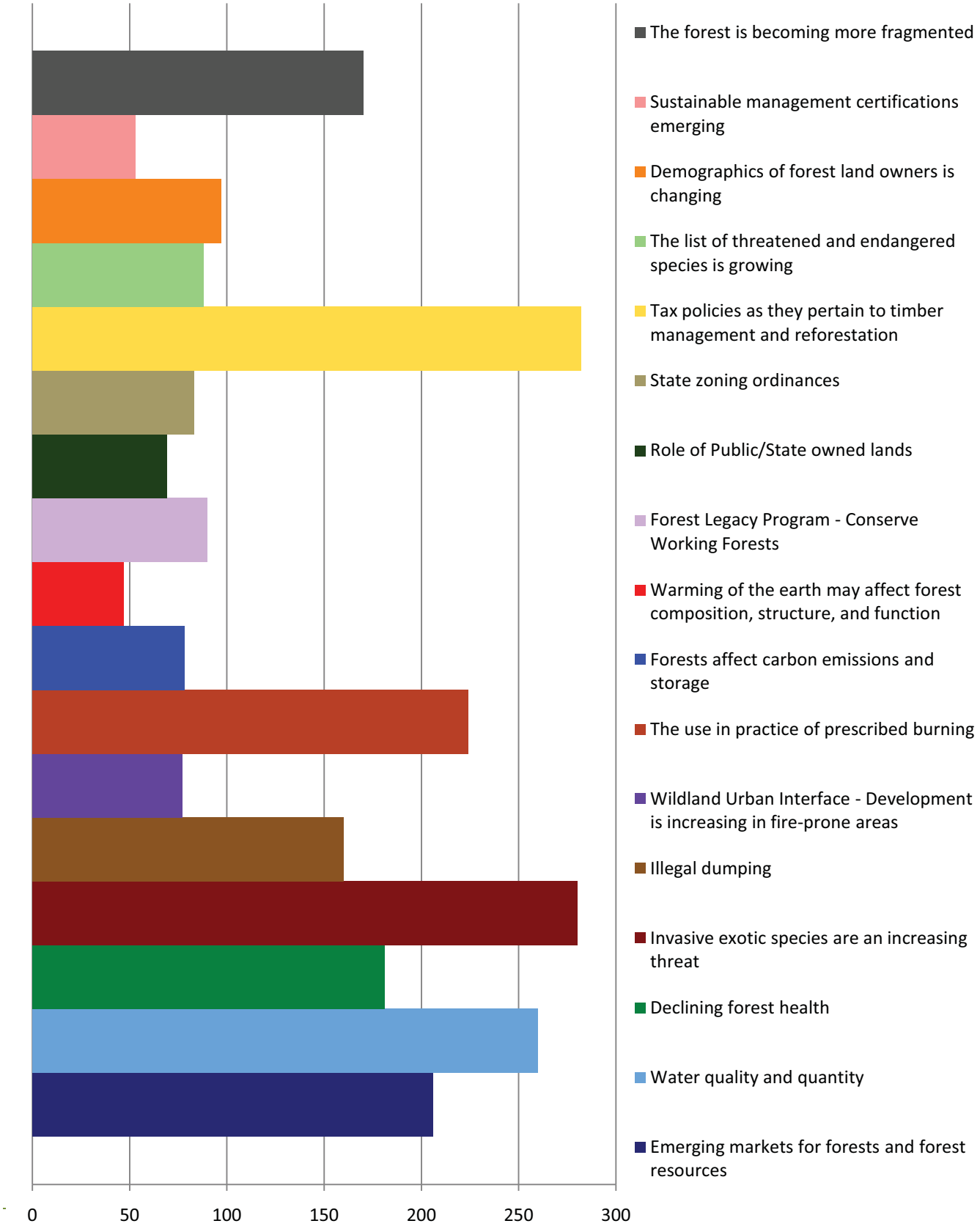
350
400
450
500

Total Resident Landowner Cross Tabulation of Critical Issues

	#1 Critical Issue	#2 Critical Issue	#3 Critical Issue	#4 Critical Issue	#5 Critical Issue	Total	Total %
The forest is becoming more fragmented	61	40	27	26	16	**170**	**4%**
Sustainable management certifications emerging	10	8	6	13	16	**53**	**1%**
Demographics of forestland owners is changing	16	18	27	21	15	**97**	**2%**
The list of threatened and endangered species is growing	14	19	20	17	18	**88**	**2%**
Tax policies as they pertain to timber management and reforestation	117	44	39	48	34	**282**	**7%**
State zoning ordinances	12	24	10	14	23	**83**	**2%**
Role of Public/State owned lands	10	9	17	18	15	**69**	**2%**
Forest Legacy Program - Conserve Working Forests	15	16	14	21	24	**90**	**2%**
Warming of the earth may affect forest composition, structure, and function	9	8	13	11	6	**47**	**1%**
Forests affect carbon emissions and storage	3	17	14	28	16	**78**	**2%**
The use in practice of prescribed burning	27	49	52	39	57	**224**	**5%**
Wildland Urban Interface - Development is increasing in fire-prone areas	5	9	21	19	23	**77**	**2%**
Illegal dumping	17	31	34	38	40	**160**	**4%**
Invasive exotic species are an increasing threat	53	68	59	57	43	**280**	**6%**
Declining forest health	33	30	37	32	49	**181**	**4%**
Water quality and quantity	45	58	58	50	49	**260**	**6%**
Emerging markets for forests and forest resources	42	41	41	37	45	**206**	**5%**
	489	489	489	489	489	2445	57%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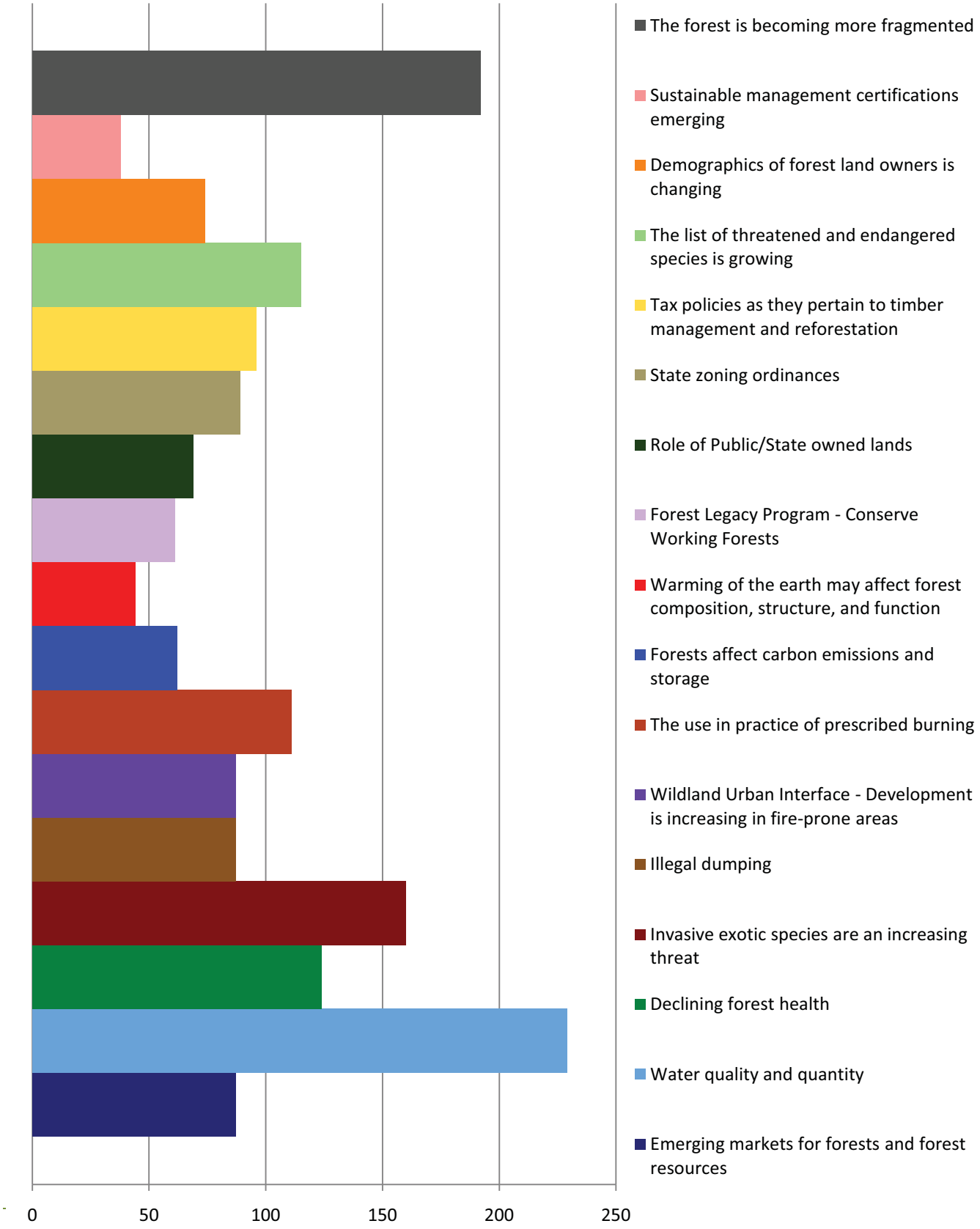
The use in practice of prescribed burning
Wildland Urban Interface - Development is increasing in fire-prone areas
Illegal dumping
Invasive exotic species are an increasing threat
Declining forest health
Water quality and quantity
Emerging markets for forests and forest resources
0
50
100
150
200
250
300

Total Resident Non-Landowner Cross Tabulation of Critical Issues

	#1 Critical Issue	#2 Critical Issue	#3 Critical Issue	#4 Critical Issue	#5 Critical Issue	Total	Total %
The forest is becoming more fragmented	60	41	38	32	21	**192**	**4%**
Sustainable management certifications emerging	4	7	2	13	12	**38**	**1%**
Demographics of forestland owners is changing	12	19	14	10	19	**74**	**2%**
The list of threatened and endangered species is growing	15	31	33	21	15	**115**	**3%**
Tax policies as they pertain to timber management and reforestation	18	15	33	8	22	**96**	**2%**
State zoning ordinances	13	19	14	18	25	**89**	**2%**
Role of Public/State owned lands	10	6	13	22	18	**69**	**2%**
Forest Legacy Program - Conserve Working Forests	12	8	15	16	10	**61**	**1%**
Warming of the earth may affect forest composition, structure, and function	7	9	8	10	10	**44**	**1%**
Forests affect carbon emissions and storage	12	11	12	12	15	**62**	**1%**
The use in practice of prescribed burning	10	30	23	21	27	**111**	**3%**
Wildland Urban Interface - Development is increasing in fire-prone areas	18	18	10	22	19	**87**	**2%**
Illegal dumping	7	21	13	25	21	**87**	**2%**
Invasive exotic species are an increasing threat	21	34	41	41	23	**160**	**4%**
Declining forest health	21	30	18	22	33	**124**	**3%**
Water quality and quantity	85	38	40	35	31	**229**	**5%**
Emerging markets for forests and forest resources	20	8	18	17	24	**87**	**2%**
	345	345	345	345	345	1725	40%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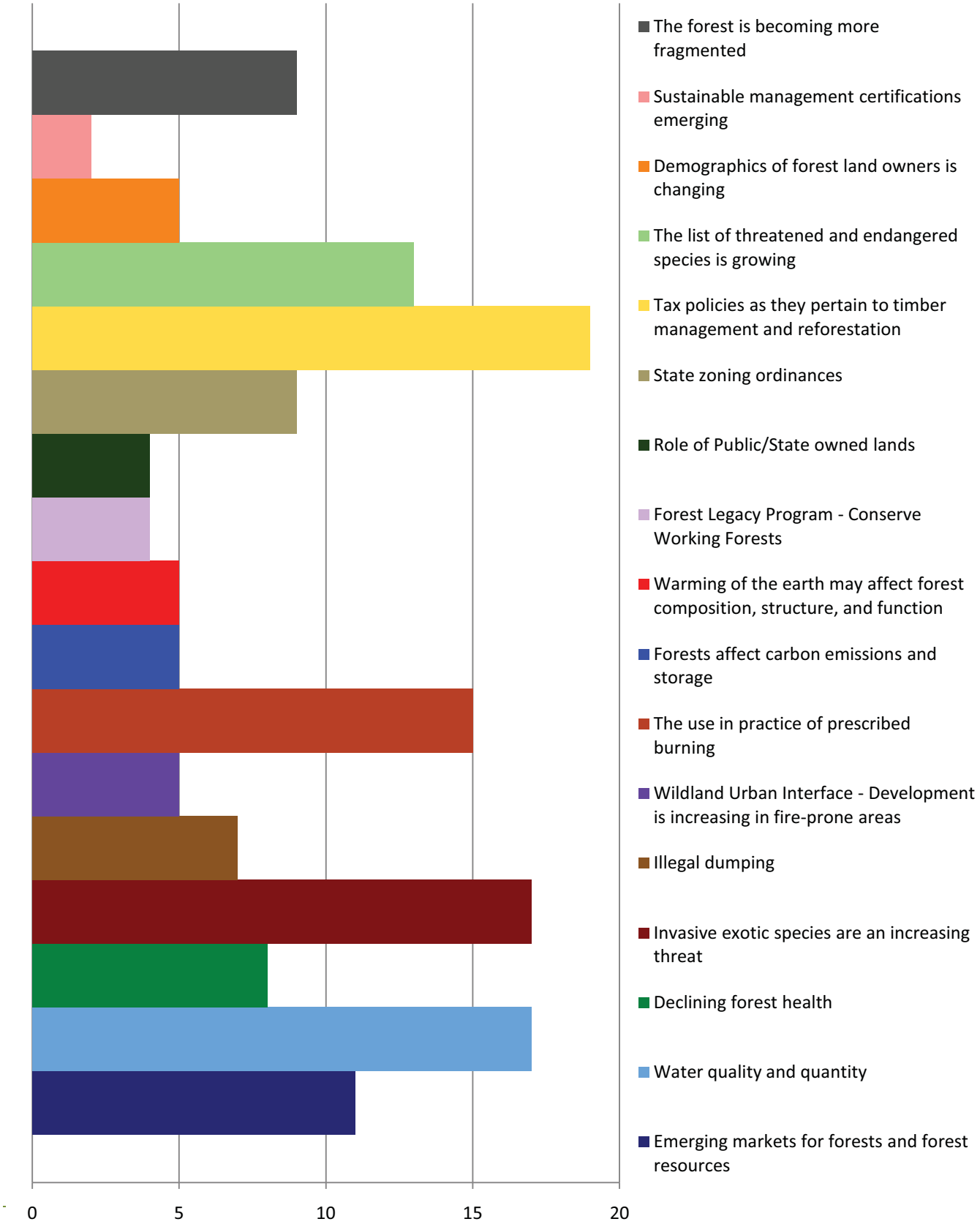
Invasive exotic species are an increasing threat
Declining forest health
Water quality and quantity
Emerging markets for forests and forest resources
0
50
100
150
200
250

Total Non-Resident Cross Tabulation of Critical Issues

	#1 Critical Issue	#2 Critical Issue	#3 Critical Issue	#4 Critical Issue	#5 Critical Issue	Total	Total %
The forest is becoming more fragmented	5	2	0	2	0	**9**	**0%**
Sustainable management certifications emerging	0	0	0	1	1	**2**	**0%**
Demographics of forestland owners is changing	0	1	1	3	0	**5**	**0%**
The list of threatened and endangered species is growing	0	1	4	3	5	**13**	**0%**
Tax policies as they pertain to timber management and reforestation	4	5	4	3	3	**19**	**0%**
State zoning ordinances	1	4	2	2	0	**9**	**0%**
Role of Public/State owned lands	1	0	0	0	3	**4**	**0%**
Forest Legacy Program - Conserve Working Forests	1	1	1	0	1	**4**	**0%**
Warming of the earth may affect forest composition, structure, and function	0	1	2	0	2	**5**	**0%**
Forests affect carbon emissions and storage	0	1	0	3	1	**5**	**0%**
The use in practice of prescribed burning	5	2	2	4	2	**15**	**0%**
Wildland Urban Interface - Development is increasing in fire-prone areas	0	1	1	1	2	**5**	**0%**
Illegal dumping	1	1	2	1	2	**7**	**0%**
Invasive exotic species are an increasing threat	3	6	6	1	1	**17**	**0%**
Declining forest health	0	1	4	2	1	**8**	**0%**
Water quality and quantity	7	2	2	2	4	**17**	**0%**
Emerging markets for forests and forest resources	3	2	0	3	3	**11**	**0%**
	31	31	31	31	31	155	4%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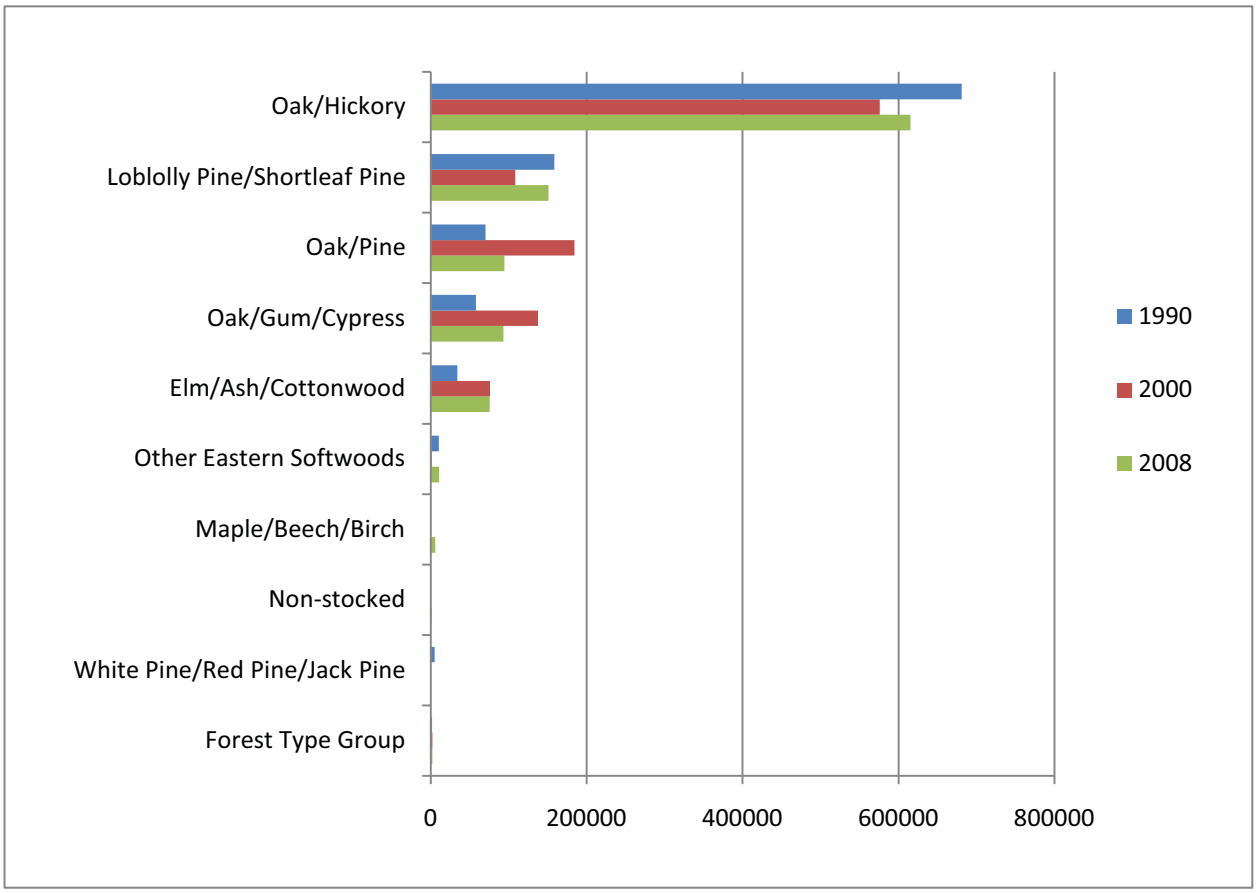
Illegal dumping
Invasive exotic species are an increasing threat
Declining forest health
Water quality and quantity
Emerging markets for forests and forest resources
0
5
10
15
20

APPPENDIX 3. Forest Types and Trends by Ecoregion

INTERIOR PLATEAU

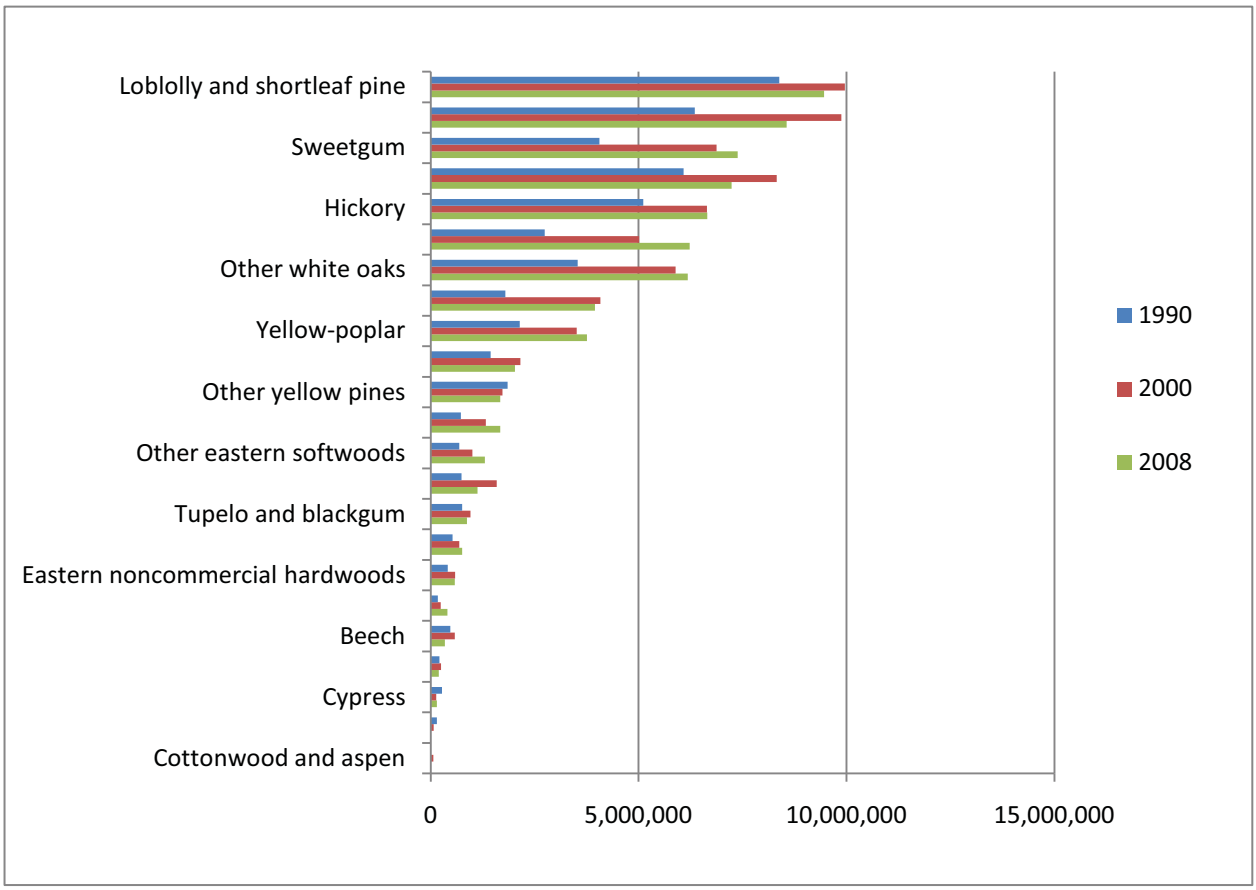
Forest Area



Interior Plateau: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Colbert, Lauderdale, Lawrence, Limestone, Madison, and Morgan counties

INTERIOR PLATEAU

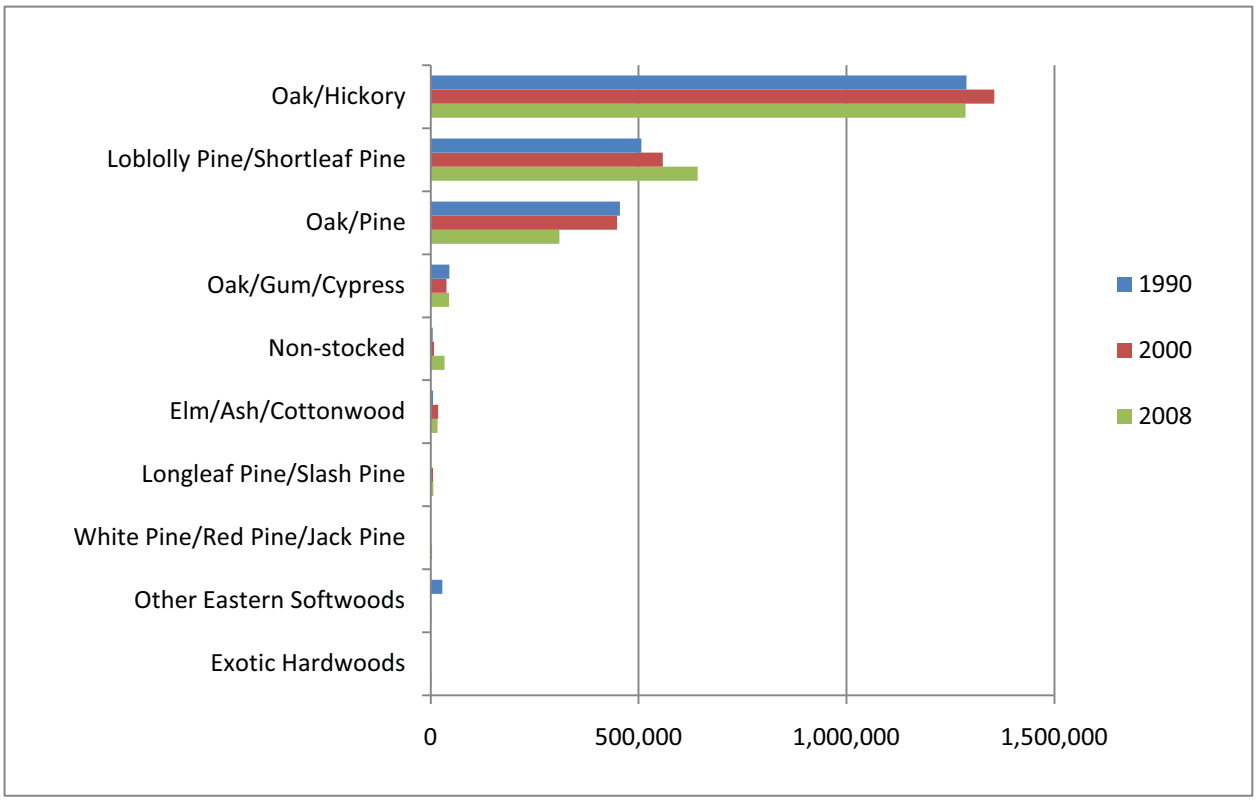
Timber Volume



Interior Plateau: Timberland Volume by Species Group (Tons) and Year, 1990-2008
FIA data for Colbert, Lauderdale, Lawrence, Limestone, Madison, and Morgan counties

SOUTHWESTERN APPALACHIANS

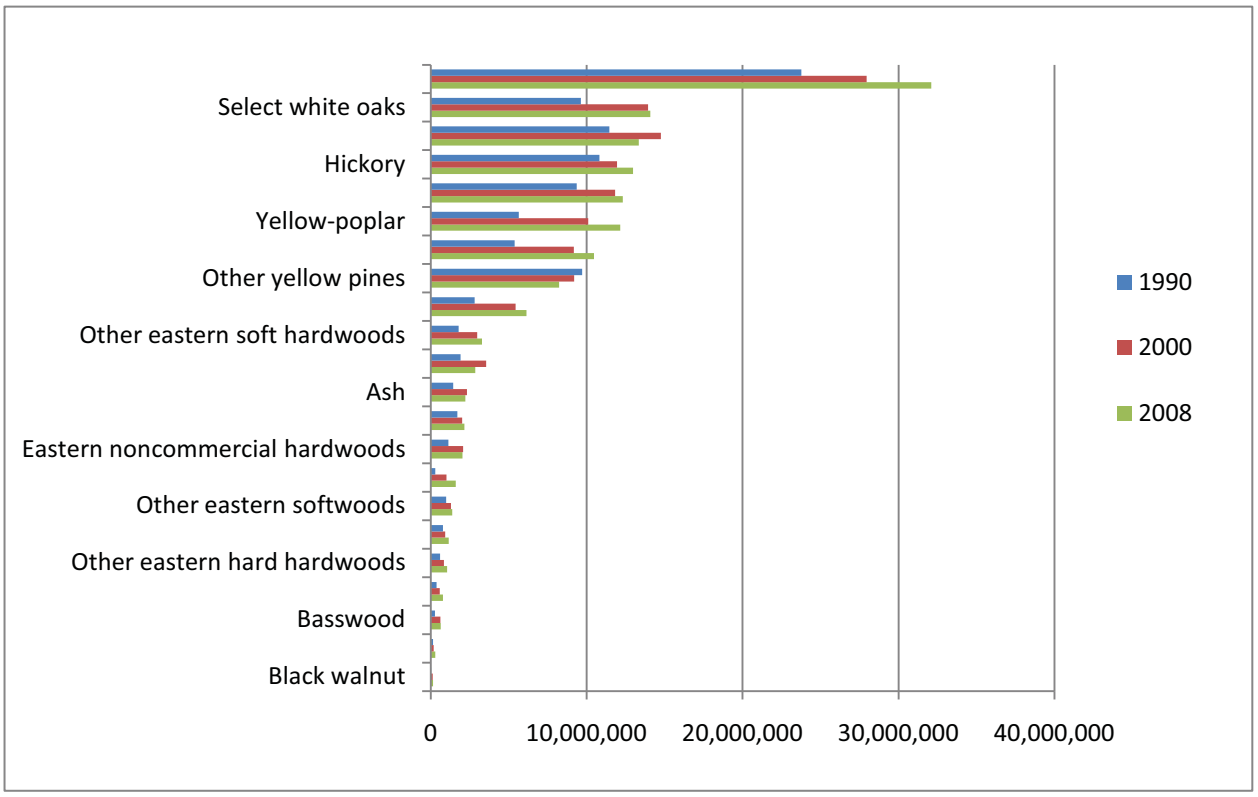
Forest Area



Southwestern Appalachians: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Blount, Cullman, DeKalb, Jackson, Jefferson, Marshall, Walker, and Winston counties.

SOUTHWESTERN APPALACHIANS

Timber Volume



Southwestern Appalachians: Timberland Volume by Species Group (Tons) and Year, 1990-2008
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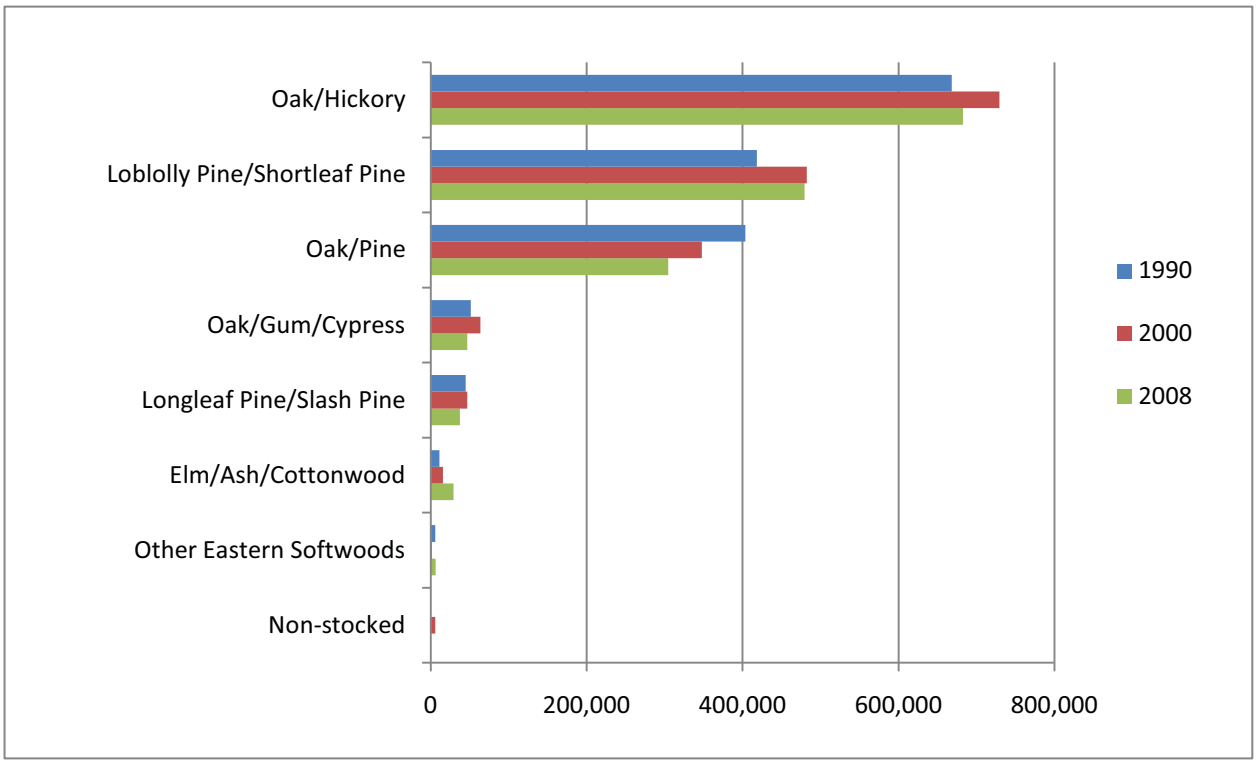
RIDGE AND VALLEY

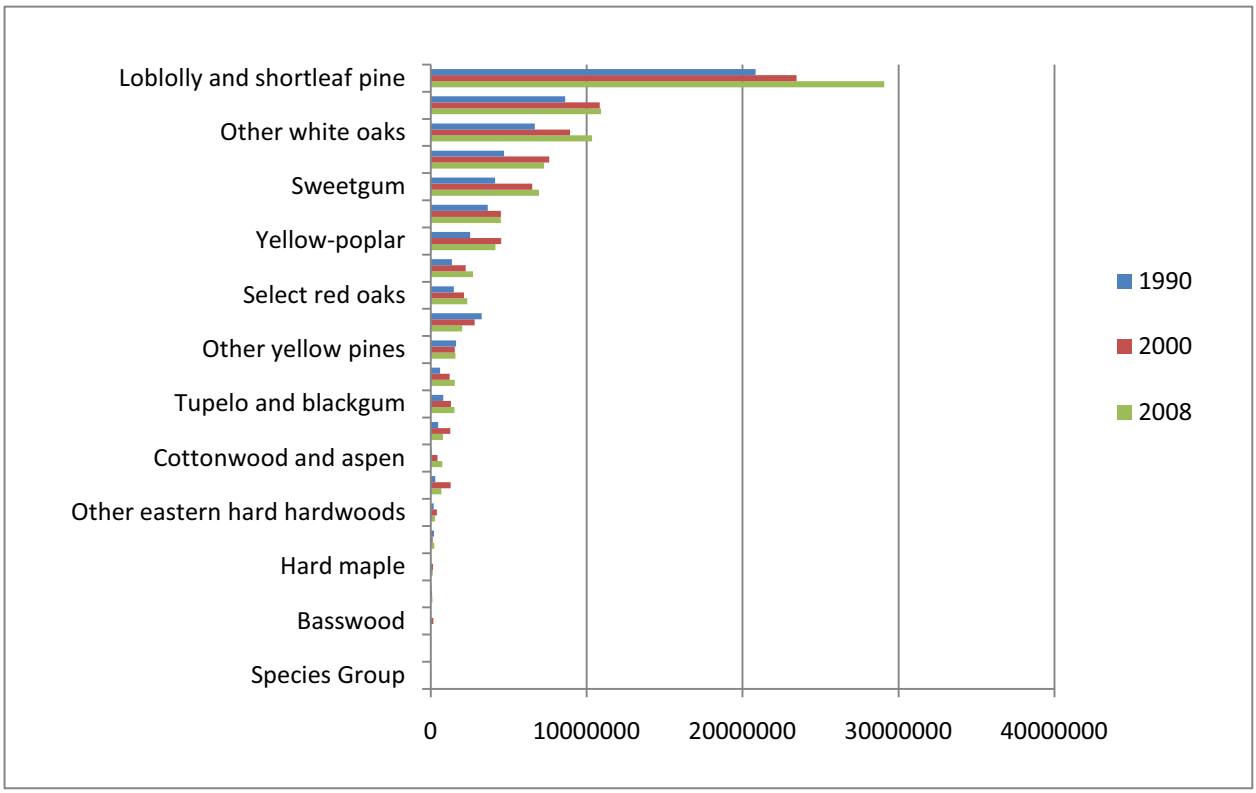
Forest Area



Ridge and Valley: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Calhoun, Cherokee, Etowah, Shelby, St Clair, and Talladega counties.

RIDGE AND VALLEY

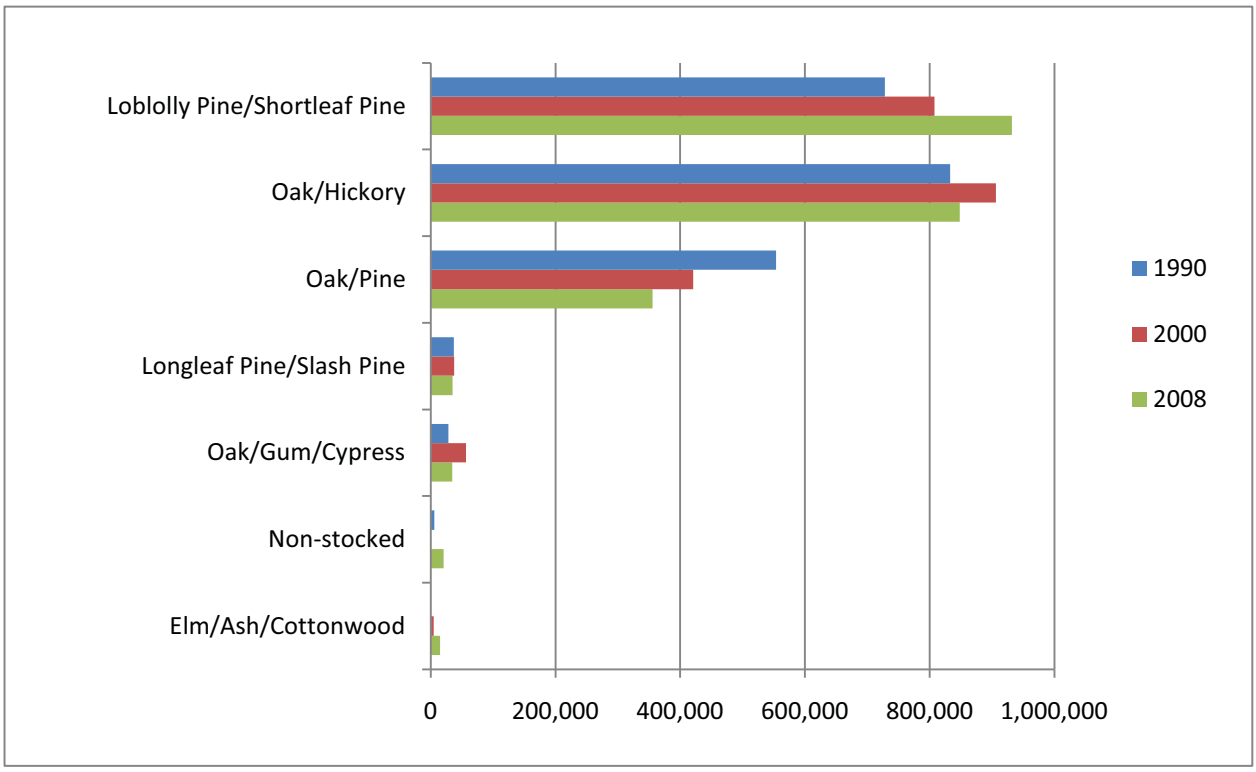
Timber Volume



Ridge and Valley: Timberland Volume by Species Group (Tons) and Year, 1990-2008
FIA data for Calhoun, Cherokee, Etowah, Shelby, St Clair, and Talladega counties.

PIEDMONT

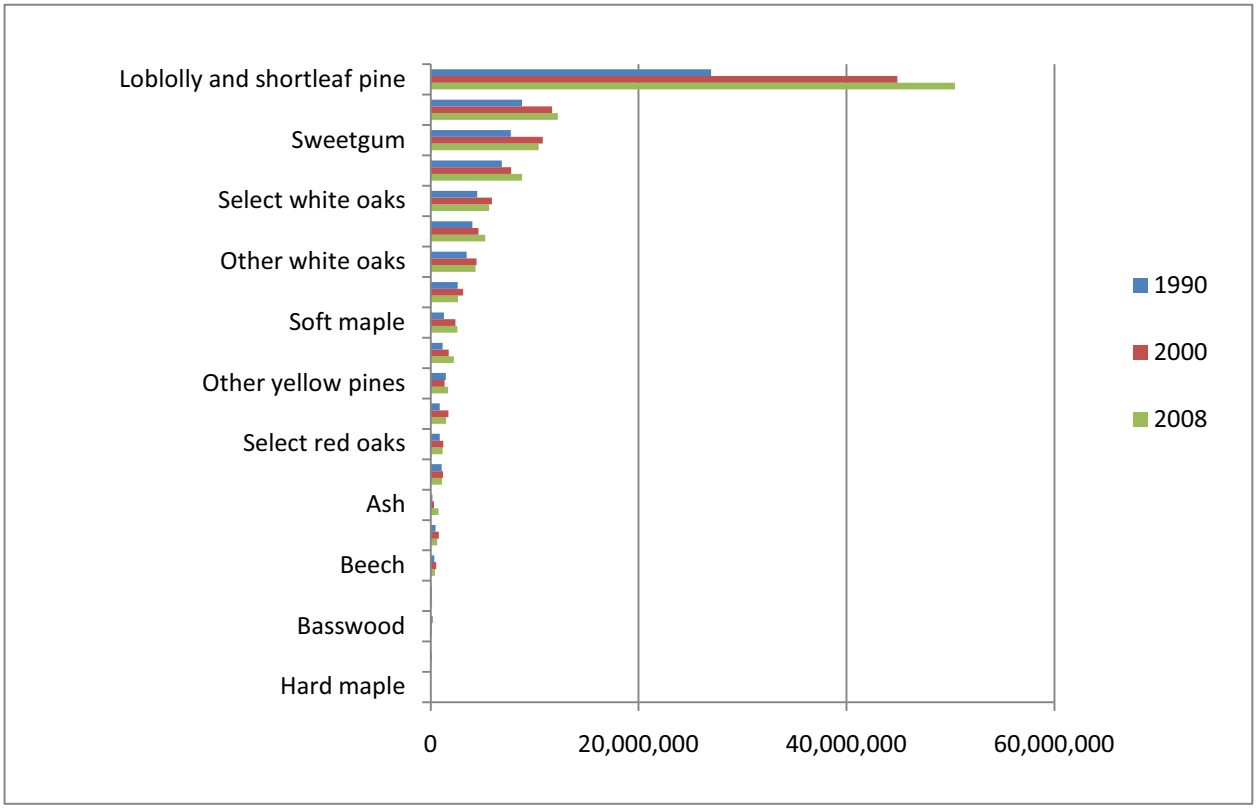
Forest Area



Piedmont: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Chambers, Clay, Cleburne, Coosa, Lee, Randolph, and Tallapoosa counties.

PIEDMONT

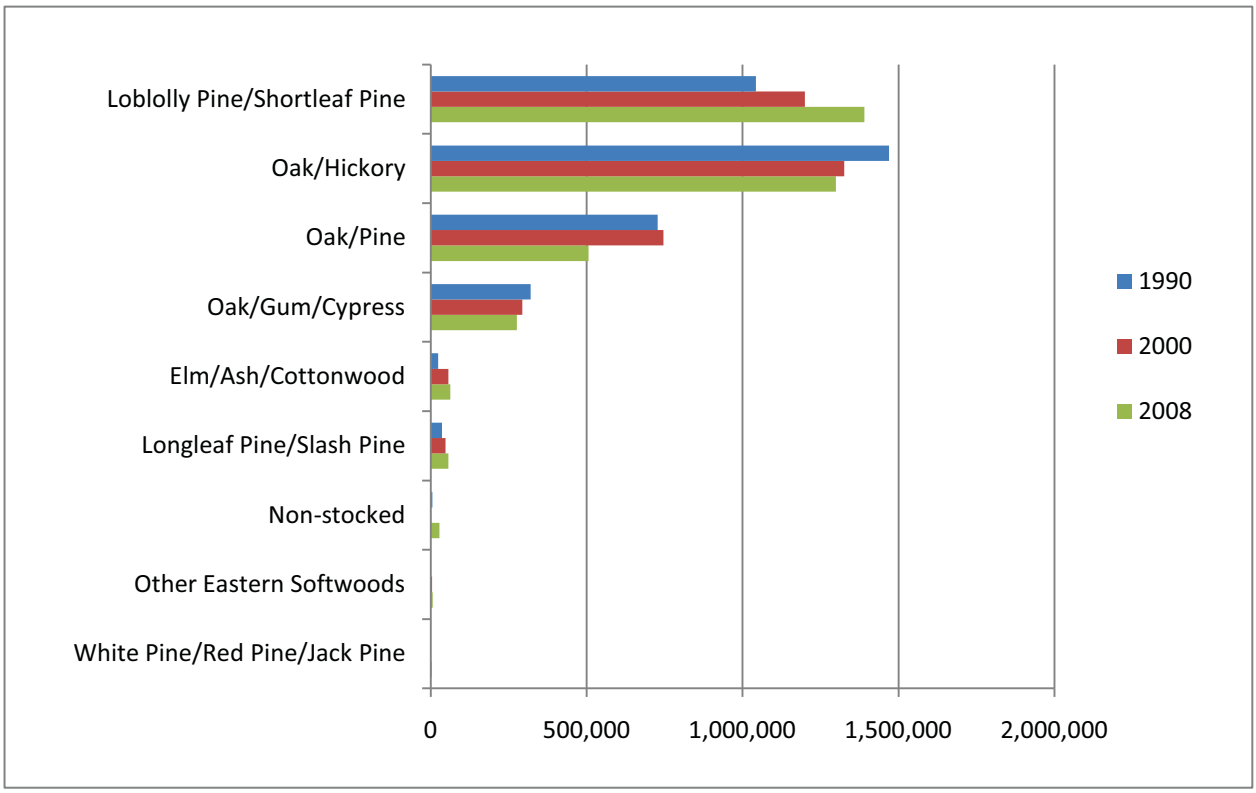
Timber Volume



Piedmont: Timberland Volume by Species Group (Tons) and Year, 1990-2008
FIA data for Chambers, Clay, Cleburne, Coosa, Lee, Randolph, and Tallapoosa counties.

FALL LINE HILLS

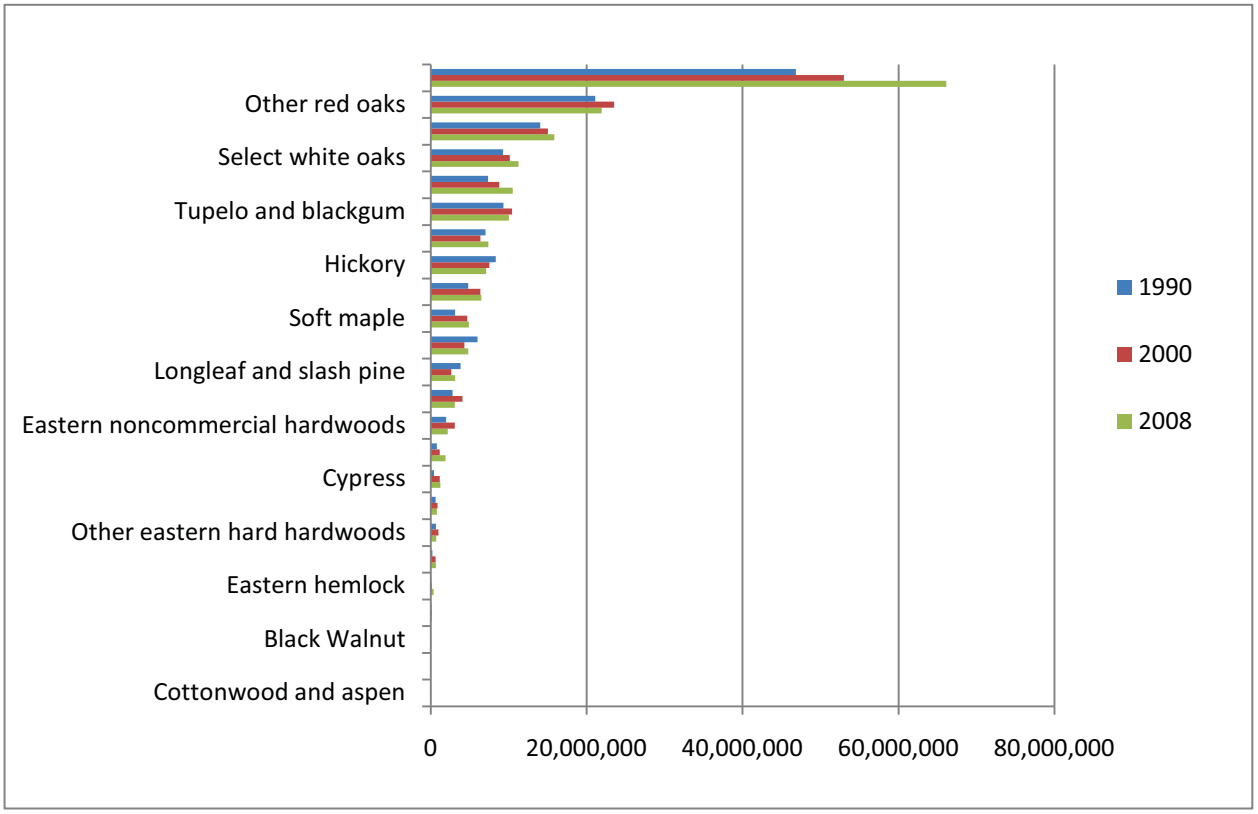
Forest Area



Fall Line Hills: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Autauga, Bibb, Chilton, Elmore, Fayette, Franklin, Lamar, Marion, Pickens, and Tuscaloosa counties.

FALL LINE HILLS

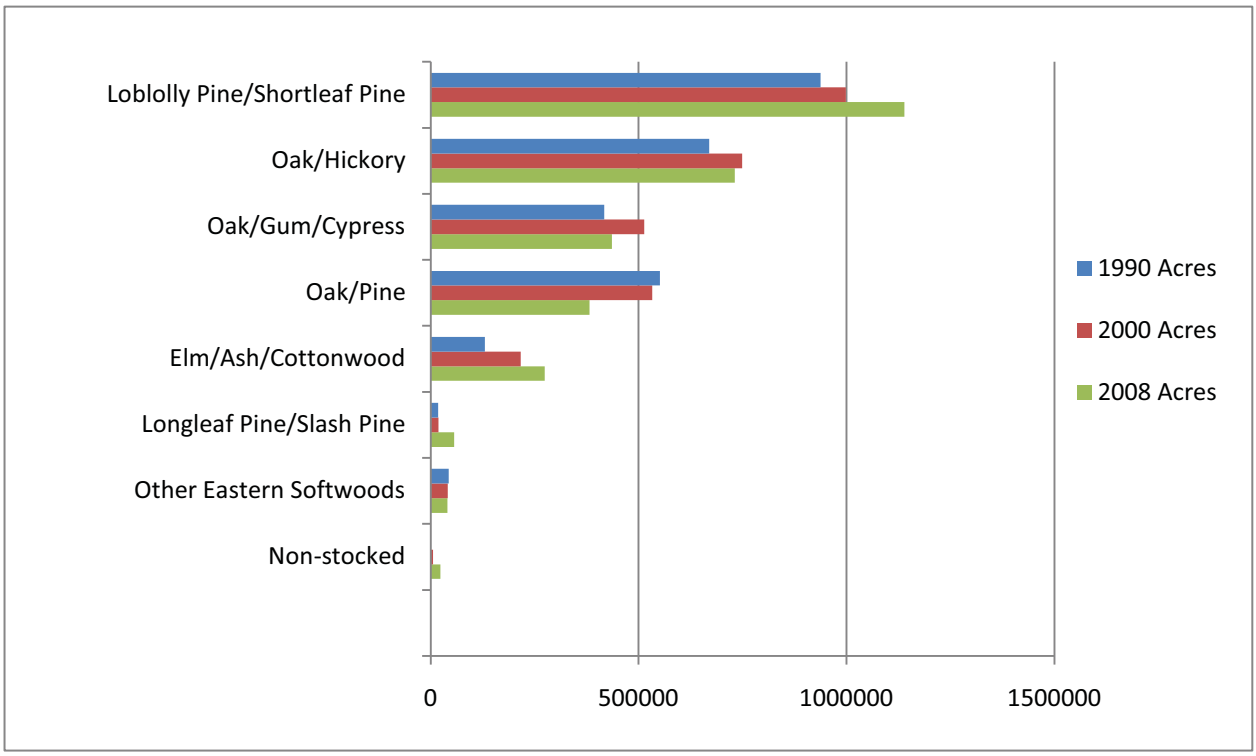
Timber Volume



Fall Line Hills: Timberland Volume by Species Group (Tons) and Year, 1990-2008
FIA data for Autauga, Bibb, Chilton, Elmore, Fayette, Franklin, Lamar, Marion, Pickens, and Tuscaloosa counties.

Black Belt

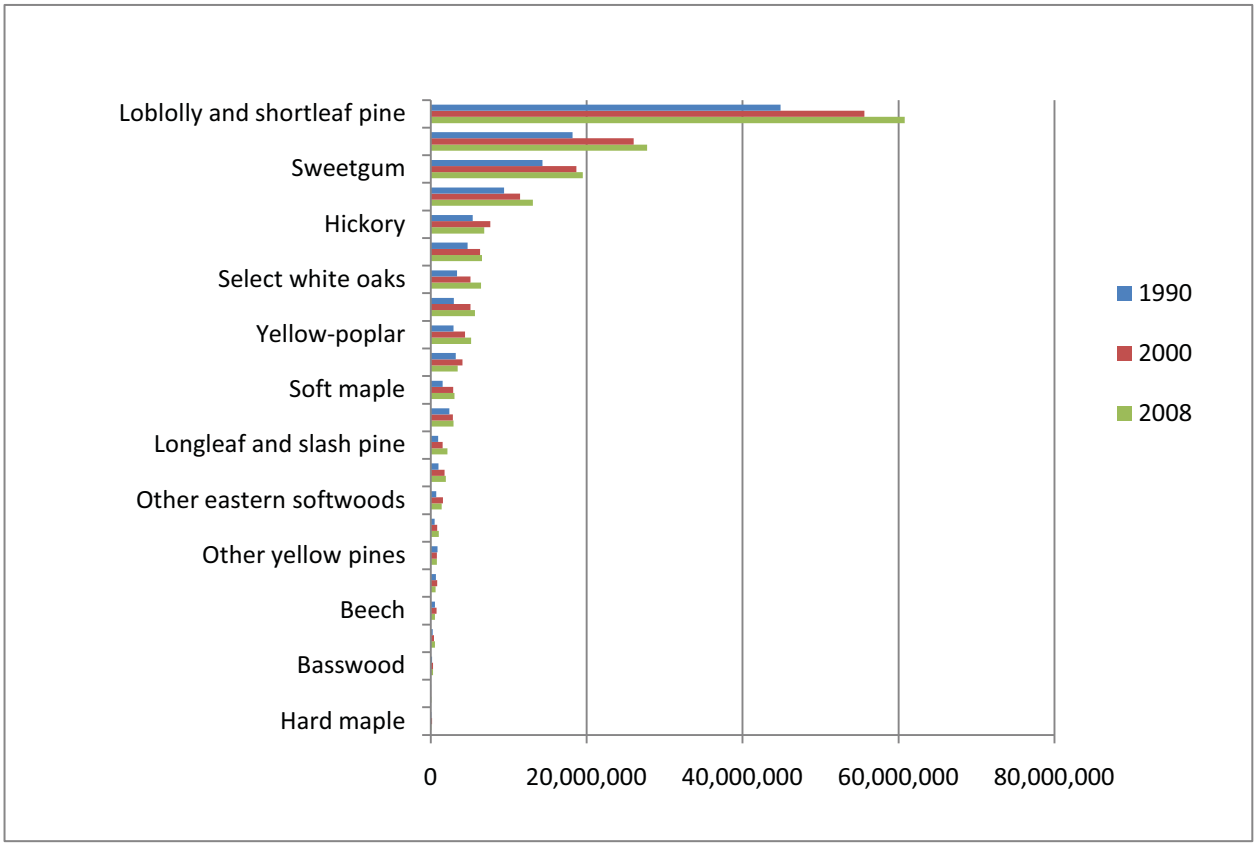
Forest Area



Black Belt: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Dallas, Greene, Hale, Lowndes, Macon, Marengo, Montgomery, Perry, and Sumter counties.

Black Belt

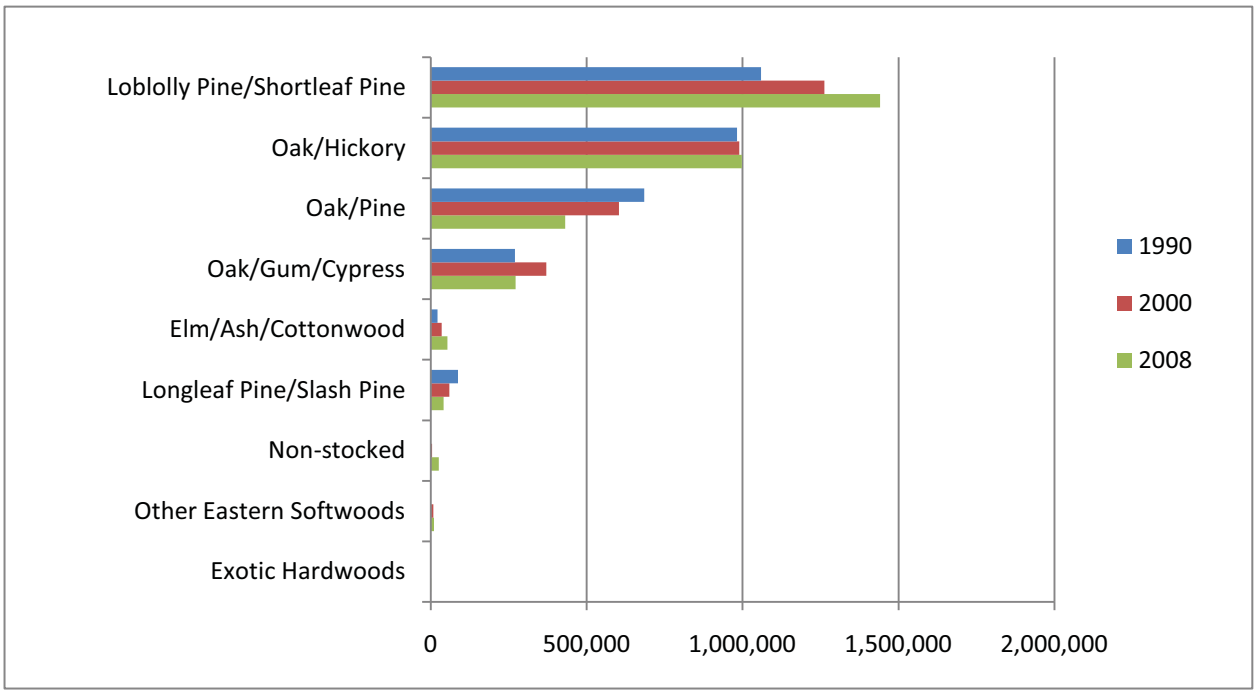
Timber Volume



Black Belt: Timberland Volume by Species Group (Tons) and Year, 1990-2008
FIA data for Dallas, Greene, Hale, Lowndes, Macon, Marengo, Montgomery, Perry, and Sumter counties.

Southeastern Plains

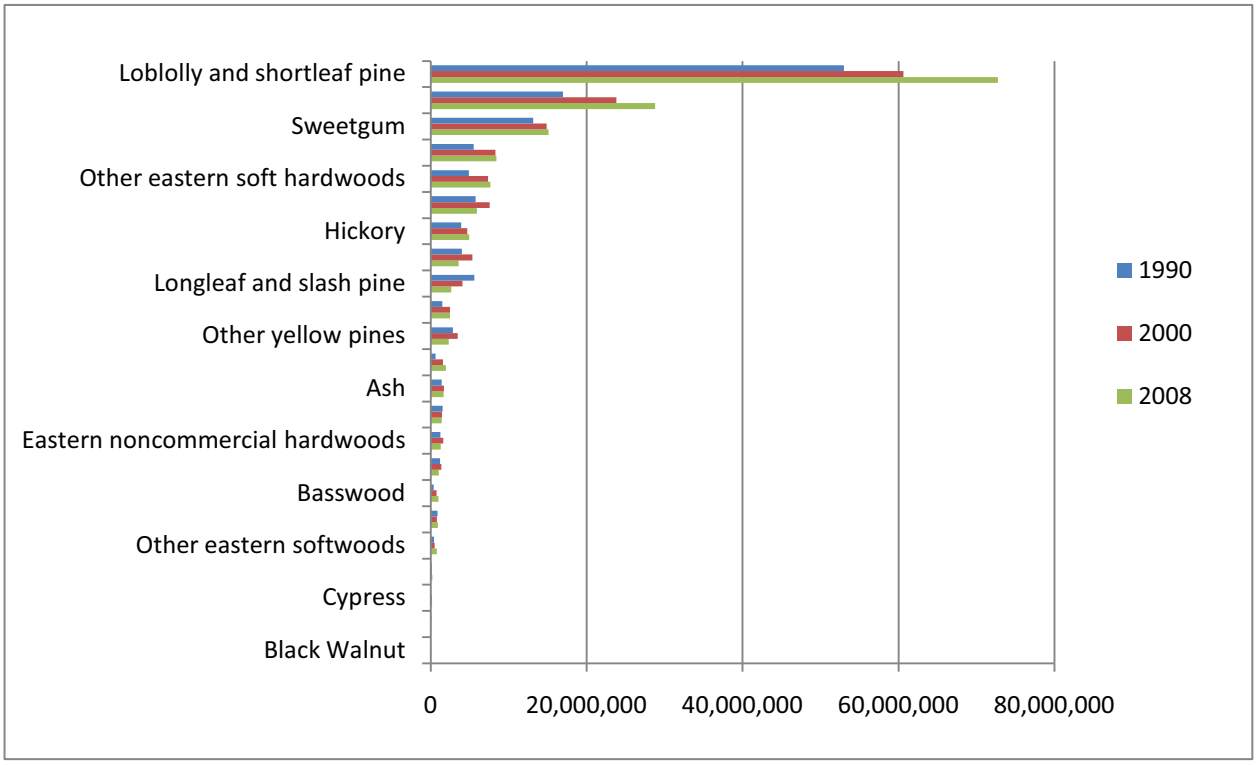
Forest Area



Southeastern Plains: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Barbour, Bullock, Butler, Coffee, Crenshaw, Dale, Henry, Pike, Russell, and Wilcox counties.

Southeastern Plains

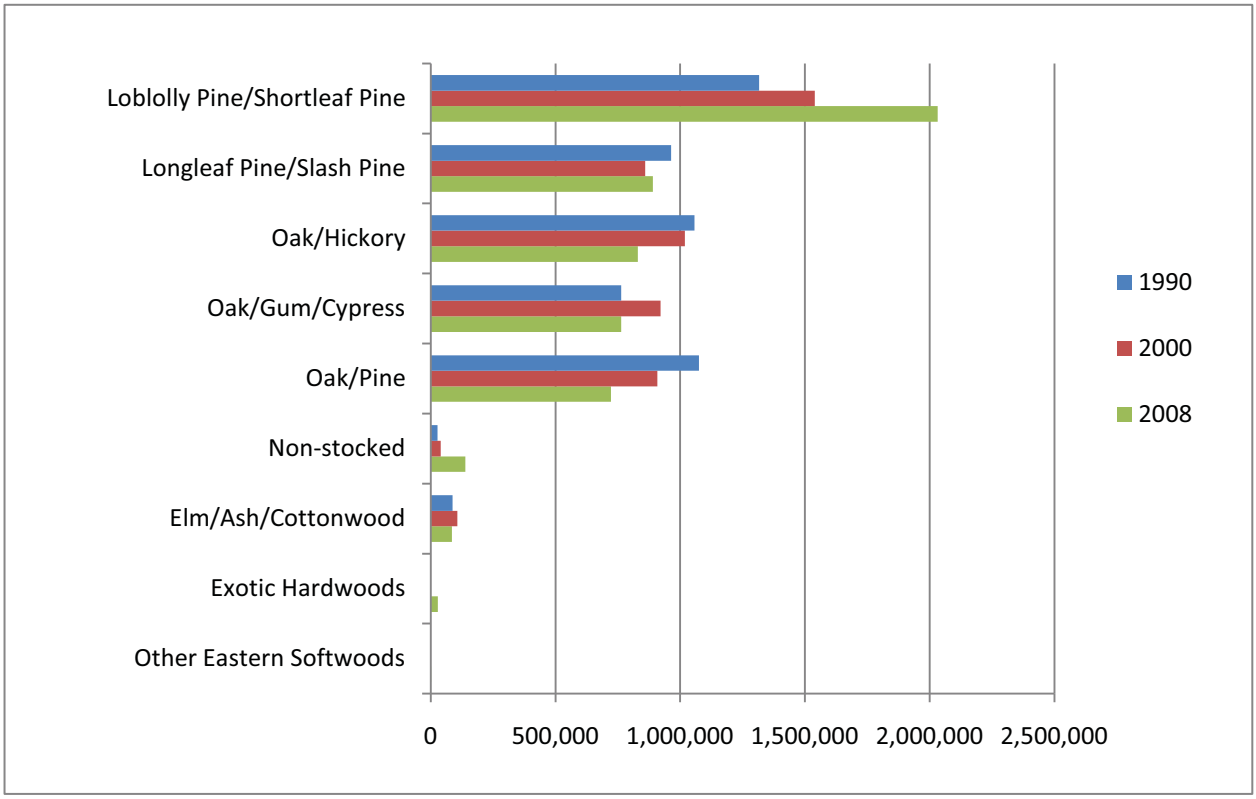
Timber Volume



Southeastern Plains: Timberland Volume by Species Group (Tons) and Year, 1990-2008
FIA data for Barbour, Bullock, Butler, Coffee, Crenshaw, Dale, Henry, Pike, Russell, and Wilcox counties.

Gulf Plain

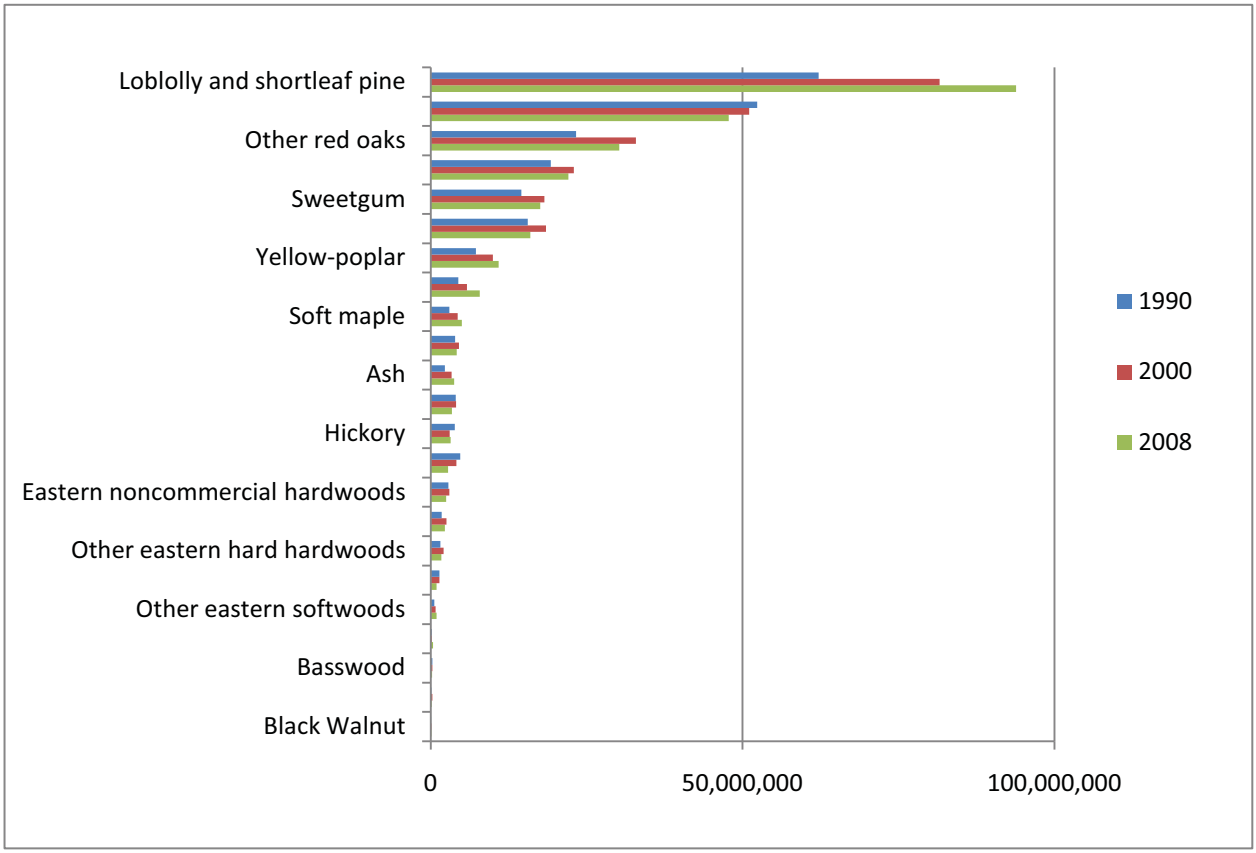
Forest Area



Gulf Plain: Timberland Area by Forest Type Group and Year, 1990-2008
FIA data for Baldwin, Choctaw, Clarke, Conecuh, Covington, Escambia, Geneva, Houston, Mobile, Monroe, and Washington counties.

Gulf Plain

Timber Volume



Gulf Plain: Timberland Volume by Species Group (Tons) and Year, 1990-2008
FIA data for Baldwin, Choctaw, Clarke, Conecuh, Covington, Escambia, Geneva, Houston, Mobile, Monroe, and Washington counties.

APPENDIX 4. Forest Types of Alabama (FIA data)

Forest Type*	Area (1000 acres)	Percent of total
Loblolly pine	7,708.4	33.8
Mixed upland hardwoods	2,762.4	12.1
Loblolly pine-hardwood	2,186.6	9.6
White oak-red oak-hickory	1,686.1	7.4
Sweetgum-yellow poplar	1,089.7	4.8
Sweetgum-Nuttall oak-willow oak	981.5	4.3
Sweetbay-swamp tupelo-red maple	688.3	3.0
Longleaf pine	676.5	3.0
Slash pine	448.8	2.0
Yellow-poplar-white oak-red oak	367.3	1.6
Post oak-blackjack oak	366.8	1.6
Sugarberry-hackberry-elm-green ash	329.9	1.5
Virginia pine	291.7	1.3
Chestnut oak	291.3	1.3
Non-stocked	271.6	1.2
Shortleaf pine-oak	266.8	1.2
Chestnut oak-black oak-scarlet oak	235.2	1.0
Shortleaf pine	189.5	0.8
Longleaf pine-oak	184.4	0.8
Baldcypress-water tupelo	149.1	0.7
Slash pine-hardwood	137.1	0.6
Virginia pine-southern red oak	136.0	0.6
White oak	135.4	0.6
Sassafras-persimmon	128.6	0.6
Eastern red cedar-hardwood	127.8	0.6
Yellow-poplar	123.3	0.5
Sycamore-pecan-American elm	117.5	0.5
Swamp chestnut oak-cherrybark oak	96.8	0.4
River birch-sycamore	89.2	0.4
Eastern red cedar	78.5	0.4
Other pine-hardwood	68.5	0.3
Red maple-oak	50.4	0.2
Overcup oak-water hickory	49.8	0.2
Willow	33.6	0.1
Other exotic hardwoods	32.0	0.1
Southern scrub oak	20.8	<0.1
Northern red oak	17.9	<0.1
Red maple-lowland	17.2	<0.1
Spruce pine	16.0	<0.1
Scarlet oak	14.9	<0.1
Cottonwood	13.0	<0.1
Eastern hemlock	6.3	<0.1
Black ash-American elm-red maple	6.3	<0.1
Hard maple-basswood	5.9	<0.1
Cottonwood-willow	4.9	<0.1
Silver maple-American elm	0.4	<0.1
Total	**22,781.7**	**100**

* for trees with diameter >= 5.0 inches

APPENDIX 5. Forested Ecological Systems of Alabama (NatureServe)

● primarily forested; ○ sparsely forested or adjacent; -- not forested

FOREST AND WOODLAND (17)		
Allegheny-Cumberland Dry Oak Forest and Woodland	CES202.359	●
East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	CES203.506	●
East Gulf Coastal Plain Interior Upland Longleaf Pine Woodland	CES203.496	●
East Gulf Coastal Plain Maritime Forest	CES203.503	●
East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	CES203.483	●
East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	CES203.477	●
South-Central Interior Mesophytic Forest	CES202.887	●
Southeastern Interior Longleaf Pine Woodland	CES202.319	●
Southern Appalachian Low-Elevation Pine Forest	CES202.332	●
Southern Coastal Plain Dry Upland Hardwood Forest	CES203.560	●
Southern Coastal Plain Limestone Forest	CES203.502	●
Southern Coastal Plain Mesic Slope Forest	CES203.476	●
Southern Coastal Plain Oak Dome and Hammock	CES203.494	●
Southern Interior Low Plateau Dry-Mesic Oak Forest	CES202.898	●
Southern Piedmont Dry Oak-(Pine) Forest	CES202.339	●
Southern Piedmont Mesic Forest	CES202.342	●
Southern Ridge and Valley / Cumberland Dry Calcareous Forest	CES202.457	●

SAVANNA AND SHRUB (4)		
Alabama Ketona Glade and Woodland	CES202.338	●
Central Interior Highlands Calcareous Glade and Barrens	CES202.691	○
Cumberland Sandstone Glade and Barrens	CES202.337	○
Southern Piedmont Glade and Barrens	CES202.328	○

UPLAND GRASSLAND AND HERBACEOUS (2)		
Southern Coastal Plain Blackland Prairie and Woodland	CES203.478	●
Southern Ridge and Valley Patch Prairie	CES202.453	○

WOODY WETLANDS AND RIPARIAN (19)		
Central Interior Highlands and Appalachian Sinkhole and Depression Pond	CES202.018	○
Cumberland Riverscour	CES202.036	--
Cumberland Seepage Forest	CES202.361	●
East Gulf Coastal Plain Freshwater Tidal Wooded Swamp	CES203.299	●
East Gulf Coastal Plain Interior Shrub Bog	CES203.385	○
East Gulf Coastal Plain Large River Floodplain Forest	CES203.489	●
East Gulf Coastal Plain Northern Seepage Swamp	CES203.554	●
East Gulf Coastal Plain Small Stream and River Floodplain Forest	CES203.559	●
East Gulf Coastal Plain Southern Loblolly-Hardwood Flatwoods	CES203.557	●

Piedmont Seepage Wetland	CES202.298	○
Piedmont Upland Depression Swamp	CES202.336	●
South-Central Interior / Upper Coastal Plain Wet Flatwoods	CES203.480	●
Southern Coastal Plain Blackwater River Floodplain Forest	CES203.493	●
Southern Coastal Plain Hydric Hammock	CES203.501	●
Southern Coastal Plain Nonriverine Basin Swamp	CES203.384	●
Southern Coastal Plain Nonriverine Cypress Dome	CES203.251	●
Southern Coastal Plain Seepage Swamp and Baygall	CES203.505	●
Southern Piedmont Large Floodplain Forest	CES202.324	●
Southern Piedmont Small Floodplain and Riparian Forest	CES202.323	●

HERBACEOUS WETLAND (7)

East Gulf Coastal Plain Depression Pondshore	CES203.558	○
East Gulf Coastal Plain Savanna and Wet Prairie	CES203.192	●
Mississippi Sound Fresh and Oligohaline Tidal Marsh	CES203.067	--
Mississippi Sound Salt and Brackish Tidal Marsh	CES203.303	--
Northern Gulf of Mexico Seagrass Bed	CES203.263	--
Southeastern Coastal Plain Interdunal Wetland	CES203.258	--
Southern Coastal Plain Herbaceous Seep and Bog	CES203.078	○

MIXED UPLAND AND WETLAND (4)

East Gulf Coastal Plain Dune and Coastal Grassland	CES203.500	--
East Gulf Coastal Plain Near-Coast Pine Flatwoods	CES203.375	●
South-Central Interior Large Floodplain	CES202.705	●
South-Central Interior Small Stream and Riparian	CES202.706	●

SPARSELY VEGETATED (10)

Cumberland Acidic Cliff and Rockhouse	CES202.309	○
East Gulf Coastal Plain Dry Chalk Bluff	CES203.492	○
Florida Panhandle Beach Vegetation	CES203.266	--
Southeastern Coastal Plain Cliff	CES203.398	○
Southern Appalachian Spray Cliff	CES202.288	○
Southern Coastal Plain Sinkhole	CES203.495	○
Southern Interior Calcareous Cliff	CES202.356	○
Southern Interior Sinkhole Wall	CES202.357	○
Southern Piedmont Cliff	CES202.386	○
Southern Piedmont Granite Flatrock and Outcrop	CES202.329	○

APPENDIX 6. Development of Regional Priority Maps

Priority Area Map 1. Composite Priority Areas

The nine individual "Threat Issue" grid layers were combined using ESRI's raster calculator. The following weights were applied to the individual grid layers to produce the final Priority Areas composite:

Layer	Weight Factor
Urban growth and Development	18%
Fragmentation and Parcelization	20%
Invasive Species - Cogongrass	13%
Changing Markets	16%
Insects and Disease	9%
Wildfire	11%
Catastrophic Events - Hurricanes	7%
Air Quality	4%
Climate Change	2%

A variety of statistical analytics were used to evaluate the breakpoint classifications to represent the weighted overlay analysis in a manner that was consistent with expectations of stakeholder experts. It was finally determined that manual determination of the breakpoints would be required to accurately portray the results in a manner consistent with the feedback from stakeholders.

Priority Area Map 2. Urban Growth

Alabama cities with a population of 10,000 and greater chosen as a subset, (count =57). A city's jurisdictional limits (polygons) were used to created buffers with differing radii based on the following criteria: cities 10,000 to 25,000 were buffered 5-miles; cities 25,001 to 50,000 were buffered 10-miles; cities 50,001 to 75,000 were buffered 15-miles; cities 75,001 to 250,000 were buffered 20-miles. Freehand polygons were created to connect adjacent population centers with near, or overlapping, buffers and for densely populated transportation corridors. These manually interpreted population polygons were converted to a 2-class GRID dataset at a final spatial resolution of 300-meters. Datasets used: ESRI Data, 2009.

Priority Area Map 3. Fragmentation and Parcelization

USDA Forest Service Forest Inventory and Analysis (FIA) county-level statistic were obtained denoting total forest volumes for years 2000 and 2008. A percent forest change statistic was derived for each county. County polygons were used to create centroid points to which were related the percent forest change metrics. ArcGIS 9.3 Spatial Analyst was accessed to interpolate a raster surface from the values using the Inverse Distance weighted (IDW) method. Upper and lower class bounds were manually adjusted to create a final 3-class GRID dataset at 300-meters spatial resolution. Datasets used: USDA-Forest Service, FIA, 2010.

Priority Area Map 4. Cogongrass Density by Ecoregion

The Alabama Forestry Commission (AFC) has actively addressed the control and eradication of cogongrass since 2009. A web-based database has been created to assist AFC personnel in documenting the locations of cogongrass in Alabama. Ecoregions from the Environmental Protection Agency (EPA) Level 3/4 datasets were acquired and used to create a summary table regarding the total acreage of cogongrass spots for each EPA ecoregion. The ecoregional sum totals were divided into three classes based on natural breaks and used to create a 3-class GRID dataset at a spatial resolution of 300-meters. Datasets used: Environmental Protection Agency, 2003 (Omernik, James M. et.al, 1987).

Priority Area Map 5. Changing Markets

Three levels of roads were buffered by the following amounts: Interstates – 5-miles, US Routes and State Highways/State Routes – 3-miles. The resulting buffer polygons for the three road types were combined using the UNION tool to create a polygon feature that was then divided into three classes based on manual breaks and used to create a 3-class GRID dataset at a spatial resolution of 300-meters.

After the buffering of road inputs was achieved the resultant “roadless” areas were then intersected with a primary wood using facilities point feature dataset that had been buffered to represent the wood basket associated for consumption for each of those facilities. The resultant was used to identify forested areas that were being minimally impacted by utilization. Datasets used: ESRI StreetMap North America, 2009; Alabama Forestry Commission 2009 Industry Survey, 2009.

Priority Area Map 6. Insects and Disease (by Ecoregion)

An “Areas at Risk (Presence/Absence)” 3-class grid dataset was obtained from the USDA Forest Services’ Forest Health Technology Enterprise regarding Team. This grid was produced from their National Insect and Disease Risk Map (NIDRM) and downloaded from the NIDRM website located at http://www.fs.fed.us/foresthealth/technology/nidrm.shtml. The grid values represent the percent of total of basal area loss broken into two classes in accordance with the definition of risk of mortality: areas with less than 25 percent mortality risk are not at risk and areas with 25 percent or more are at risk. Both classes were aggregated and acreage summaries by ecoregion were determined and used to create the 3-class priority areas map. Datasets used: USDA-FS National Insect and Disease Risk Map datasets, 2006.

Priority Area Map 7. Wildfire Risk (by Ecoregion)

The "Wildfire Susceptibility Index" grid from the Southern Wildfire Risk Analysis (SWRA) was used to aggregate and sum the three highest categories of wildfire risk, namely, Extreme, High and Moderate wildfire risk grid classes by ecoregion. The statewide grid was then broken into ecoregions and their respective ecoregional acreage calculated. The total acreage was classified into three acreage groups used to produce the final 3-class priority areas map. Datasets used: Southern Wildfire Risk Analysis "Wildfire Susceptibility Index," Sanborn, 2006; EPA Ecoregions, 2003.

Priority Area Map 8. Catastrophic Events – Hurricanes

Using information from Hurricane Katrina (August,2005), three generalized latitudinal wind damage zones were created by observing the documented changes in hurricane category status (Saffir-Simpson Hurricane Scale) as hurricane Katrina approached and made landfall. Added to the latitudinal zones of expected wind damage, was information obtained from a 30-meter digital elevation model (DEM) that would denote the areal extent of land-area elevations affected by a 30-foot storm surge. Inferred as a salt water intrusion area, the effect of this DEM-slice inclusion can be seen in the priority areas map by an extension of the "High Priority" category into the "Medium Priority" category north of Mobile Bay, Alabama. Information sources: http://en.wikipedia.org/wiki/Hurricane_Katrina

Priority Areas Map 9. Air Quality

For the five largest cities in Alabama, generalized air-sheds were manually created based on population and average wind direction. A grid was produced that coded the priority air-sheds as "High Priority" and all other areas within the state were classed as "Low Priority" areas.

Priority Areas Map 10. Climate Change

Statewide elevations (in meters) were classified into the 3-categories on Priority Area designation as follows:

Priority Designation	Lower DEM elevation	Upper DEM Elevation
3	0	40
1	41	200
3	201	350
2	350	734

Note: higher numbers denotes higher priority category

Based upon research conducted in other areas the two ecosystems that will be impacted the greatest by climate change are the interface between aquatic and terrestrial habitats in estuarine zones and the side slopes of topographic features with significant altitudinal differences. The diversity contained within these two elevation zones has the highest susceptibility to alteration from climate change and represents the highest priority for mitigation.

Regional Priority Area Map A. Cogongrass

The Alabama Invasive Plant Council (AIPC) (http://www.se-eppc.org/alabama/) website was referenced to view a county-level occurrence map. The counties depicted as having cogongrass occurrence was recreated locally. Documented by the Alabama Forestry Commission (AFC) as of May 11, 2010, verified cogongrass occurrences were displayed with AIPC's county occurrence map information. Counties of occurrence that were missing in AIPC's 2009 dataset were added to a summary shapefile for display. The AFC has been documenting cogongrass occurrences in an enterprise database since 2008. The counties of occurrence represent areas for containment, reduction, and eradication. Datasets used: Alabama Invasive Plant Council, 2009; Alabama Forestry Commission, 2010.

Regional Priority Area Map B. Longleaf

The historic range of Longleaf Pine (Little, 1971) was acquired through Auburn University's GIS Laboratory and the polygon displayed on counties of the Forest Services' Region 8. The historic range of longleaf pine species represents areas for establishment, retention, and forest management. Datasets used: Longleaf Historic Range by Little, 1971 via John Gilbert, Auburn University, 2008.

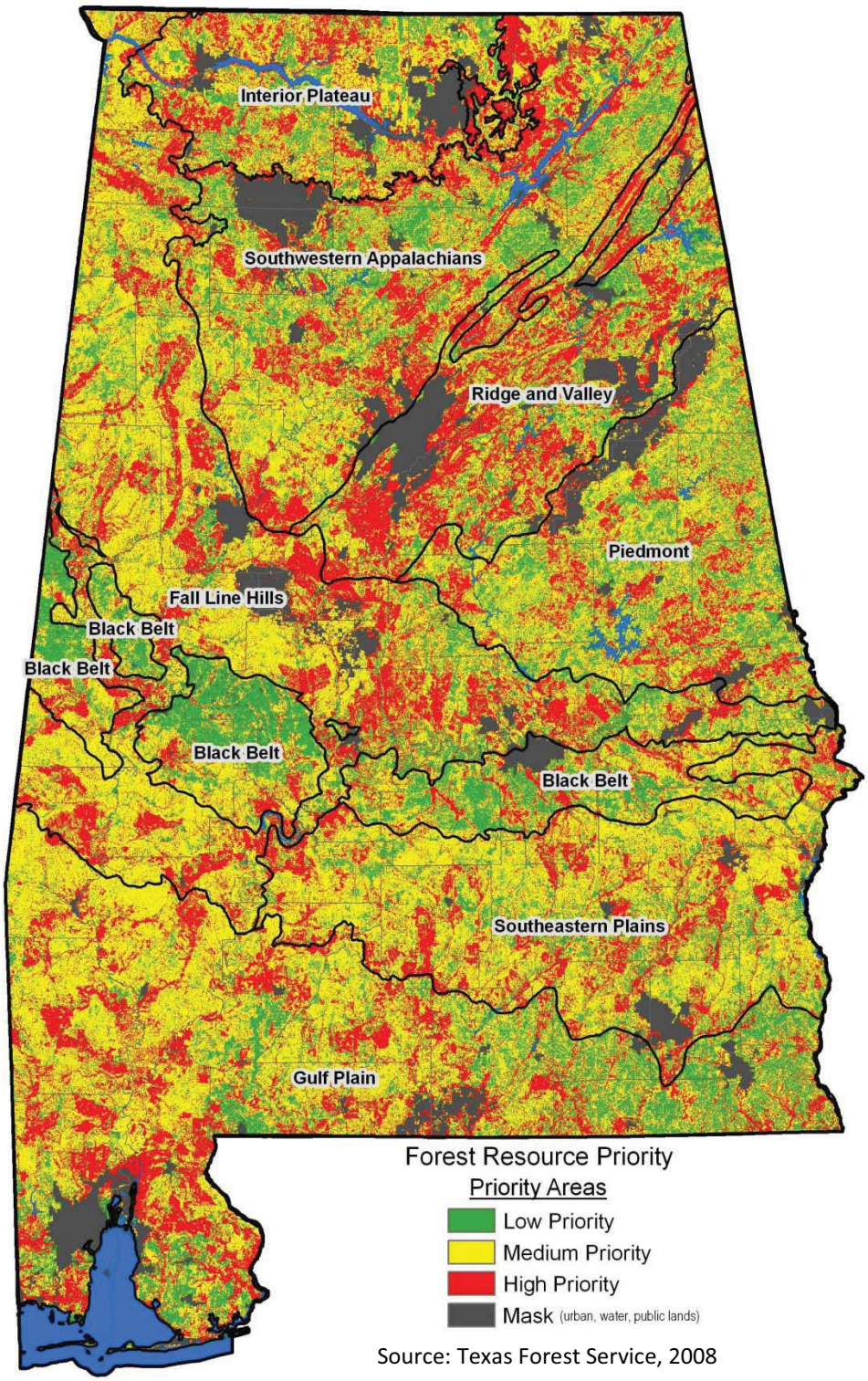
Regional Priority Area Map C. Water Quality

4-digit Hydrologic Unit's are displayed and named that intersect with the State of Alabama. The six sub basins represent coherent water drainage systems to geographically interact with surrounding states. Dataset used: USDA Watershed Boundary Dataset via EPA (2010).

Regional Priority Area Map D. Urban Mega-Regions

Two of the nation's eleven (11) urban megaregions are helping to drive urban growth and development in Alabama. Information taken from U.S. Department of Transportations' Federal highway Administrations website located at http://www.fhwa.dot.gov/planning/megaregions6.htm was used to show the "Gulf Coast" megaregion layered on states in the Forest Services' Region 8. The Piedmont Crescent region is one of the EPA regions. Both megaregions show where urban growth and development are occurring in line with other states. Dataset used: Gulf Coast Megaregion, Regional Plan Association, 2006; Piedmont Crescent, EPA, 2003.

APPENDIX 7. Southern Forestland Assessment Priority Area Map



Source: Texas Forest Service, 2008

APPENDIX 8. Relationship of Strategies to National Themes

"A state-wide assessment of forest resource conditions (to include) the threats to forest lands and resources in that state consistent with the national priorities..."
-2008 Farm Bill

The national State and Private Forestry (S&PF) Redesign Board identified three themes or priorities to identify where and how federal S&PF resources should be focused in order to make the most significant progress in providing diverse and sustainable public benefits from trees and forests. Alabama's Assessment addresses these national themes in varying ways through the preceding strategies.

The desired outcomes and key strategies associated with each theme follows.

Theme 1: Conserve Working Forest Landscapes

Desired Outcomes — Actions under this theme are directed at: 1) reducing the rate of conversion of forested landscapes to other uses; and 2) informing decisions about which landscapes should be conserved as working forests to optimize public benefits for current and future generations.

Key strategies under this theme include: 1) forest products, woody biomass, and environmental services market development; 2) tax policies, conservation easements, and county planning tools; and 3) facilitating other social and economic incentives to encourage retention of important forested landscapes. Technical assistance to communities and landowners on the various techniques available to maintain healthy forests will be an essential supporting activity.

Theme 2: Protect Forests from Harm

Desired Outcomes — Actions under this theme are directed at reducing threats to and restoring forest health and productivity associated with: 1) uncharacteristic wildfire; 2) insects and disease; and 3) invasive species.

Key strategies under this theme include: 1) restoration of fire adapted forests; 2) monitoring, assessment, and treatment of forest insect and disease pathogens; and 3) prevention, early detection,

and rapid response to eradicate or control invasive species. An ongoing national inventory and assessment of forest conditions and technical assistance would be essential supporting activities.

Theme 3: Enhance Public Benefits from Trees and Forests

Desired Outcomes - Actions under this theme are directed at: 1) enhancing the suite of public benefits associated with trees and forests such as: clean air and water, fish and wildlife habitat, open space, outdoor recreation opportunities, renewable materials (e.g., building materials, paper products, bio-energy, medicinal products), economic attributes (e.g., employment, reduced heating/cooling costs, enhanced property values, reduced water storage and treatment costs, reduced flood risk and impacts, reduced fire suppression costs and impacts), and climate change buffering; and 2) reducing the risk to communities from uncharacteristic wildfire.

Key strategies under this theme include: 1) strategic use of trees and forests in urban environments; 2) watershed planning; 3) enhancing community fire protection capabilities; and 4) linking environmental health with community well-being. Promoting environmental literacy and partnership building would be important supporting activities to increase public understanding of the benefits provided by trees and forests and build support for managing forests to secure those benefits.

Relationship of Strategies to National Themes

Strategy	Protect forests from harm	Conserve working forest landscapes	Enhance public benefits from trees and forests
Statewide (Overarching) Strategies			
1.1.1			✔
1.1.2			✔
1.1.3			✔
1.2.1			✔
1.2.2		✔	✔
1.2.3			✔
1.2.4			✔
1.3.1			✔
1.3.2			✔
1.3.3			✔
2.1.1		✔	
2.1.2		✔	
2.1.3		✔	
2.1.4		✔	
2.1.5		✔	
2.2.1		✔	
2.2.2		✔	

Strategy	Protect forests from harm	Conserve working forest landscapes	Enhance public benefits from trees and forests
2.3.1		✔	✔
2.3.2		✔	✔
2.3.3			✔
2.3.4		✔	✔
2.3.5		✔	✔
2.4.1		✔	
2.4.2			✔
2.4.3		✔	
2.4.4	✔		
2.4.5		✔	
2.4.6		✔	
2.4.7		✔	
3.1.1			✔
3.1.2			✔
3.1.3			✔
3.1.4			✔
3.2.1			✔
3.2.2			✔
3.3.1		✔	✔
3.3.2		✔	✔
3.4.1		✔	
3.4.2		✔	✔
3.5.1			✔
3.5.2			✔
Urban Growth and Development			
1.1.1		✔	
1.1.2		✔	✔
1.1.3	✔	✔	
1.1.4		✔	✔
1.1.5	✔	✔	
1.1.6			✔
1.1.7			✔
1.1.8			✔
1.2.1	✔	✔	
1.2.2	✔		
1.2.3	✔	✔	
1.2.4	✔	✔	
1.2.5	✔		
1.2.6	✔		
2.1.1		✔	✔
2.1.2			✔

Strategy	Protect forests from harm	Conserve working forest landscapes	Enhance public benefits from trees and forests
2.2.1	✔	✔	✔
2.2.2	✔		✔
2.3.1	✔		✔
2.3.2	✔		✔
2.4.1	✔		✔
2.4.2	✔		✔
2.5.1			✔
3.1.1			✔
3.1.2			✔
3.1.3		✔	
Fragmentation and Parcelization			
1.1.1	✔	✔	✔
1.1.2			✔
1.1.3	✔	✔	
1.1.4	✔	✔	
2.1.1		✔	✔
2.1.2			✔
2.1.3		✔	
2.1.4			✔
2.1.5			✔
3.1.1		✔	✔
3.1.2		✔	✔
3.1.3	✔	✔	
3.1.4	✔	✔	
Invasive Species			
1.1.1	✔	✔	
1.1.2	✔		
1.1.3	✔		✔
1.2.1	✔	✔	
1.2.2	✔	✔	
1.3.1	✔	✔	
1.3.2	✔	✔	
1.4.1	✔	✔	
1.5.1	✔		✔
1.5.2	✔		✔
1.6.1	✔		✔
Changing Markets			
1.1.1			✔
1.1.2			✔
1.1.3		✔	✔
1.1.4			✔

Strategy	Protect forests from harm	Conserve working forest landscapes	Enhance public benefits from trees and forests
1.1.5			✔
1.2.1		✔	✔
1.2.2			✔
1.2.3			✔
1.2.4			✔
1.3.1			✔
1.3.2			✔
2.1.1			✔
2.1.2			✔
2.1.3			✔
2.1.4			✔
2.1.5			✔
2.2.1		✔	
2.2.2			✔
2.2.3			✔
2.3.1		✔	✔
2.3.2		✔	✔
2.3.3			✔
2.3.4		✔	✔
2.3.5		✔	
3.1.1			✔
3.1.2			✔
3.1.3			✔
3.1.4			✔
3.2.1		✔	
3.2.2	✔	✔	
3.2.3		✔	
4.1.1		✔	✔
4.1.2			✔
4.1.3	✔	✔	
4.1.4	✔	✔	
4.1.5		✔	
4.2.1	✔	✔	
4.2.2	✔	✔	
4.2.3			✔
4.2.4	✔	✔	
Insects and Disease			
1.1.1	✔	✔	
1.1.2	✔		
1.2.1	✔		
1.2.2	✔		

Strategy	Protect forests from harm	Conserve working forest landscapes	Enhance public benefits from trees and forests
1.2.3	✔		✔
2.1.1	✔	✔	
2.1.2	✔		✔
2.2.1	✔	✔	
2.3.1	✔		
Wildfire			
1.1.1	✔		✔
1.1.2	✔	✔	
1.1.3	✔		
2.1.1	✔		
2.1.2	✔		
2.2.1	✔		
2.2.2	✔		
2.2.3	✔		
2.2.4	✔		
2.2.5	✔		
Catastrophic Weather Events			
1.1.1	✔		
1.1.2	✔		
1.2.1	✔		
1.2.2	✔		
1.2.3	✔		
1.3.1	✔		
1.3.2	✔		
2.1.1	✔		
2.1.2	✔		
2.1.3	✔		
2.1.4	✔		
2.1.5	✔		
2.2.1	✔		
2.2.2	✔		
2.2.3	✔		
2.2.4	✔		
3.1.1	✔		
3.1.2	✔		
3.2.1	✔		
3.2.2	✔		
3.2.3	✔		
3.3.1	✔		

Strategy	Protect forests from harm	Conserve working forest landscapes	Enhance public benefits from trees and forests
3.3.2	✔		
3.3.3	✔		
3.3.4	✔		
Air Quality			
1.1.1	✔		
1.1.2	✔		
1.2.1	✔		
1.2.2	✔		
1.2.3	✔	✔	
2.1.1	✔		
2.1.2	✔		
2.1.3	✔		
2.1.4	✔		
2.1.5	✔		
3.1.1	✔		
3.1.2	✔		
3.1.3	✔		
3.1.4	✔		
3.1.5	✔		
Climate Change			
1.1.1	✔		
1.1.2	✔		
1.1.3	✔		
1.2.1	✔		
1.2.2	✔		
1.2.3	✔		
2.1.1			✔
2.1.2			✔
2.1.3		✔	
2.1.4		✔	
2.1.5			✔
2.2.1		✔	
2.2.2		✔	
2.2.3		✔	
2.2.4		✔	
2.2.5		✔	
3.1.1	✔		
3.1.2		✔	
3.1.3		✔	
3.1.4	✔		
3.2.1		✔	

Strategy	Protect forests from harm	Conserve working forest landscapes	Enhance public benefits from trees and forests
3.2.2		✔	
4.1.1		✔	
4.1.2		✔	
4.2.1		✔	
4.2.2		✔	

APPENDIX 9. Coordination with Required Entities

"In developing or updating the State-wide assessment and State-wide strategy required by subsection (a), the State Forester or equivalent State official shall coordinate with — ''(1) the State Forest Stewardship Coordinating Committee established for the State under section 19(b); ''(2) the State wildlife agency, with respect to strategies contained in the State wildlife action plans; ''(3) the State Technical Committee; ''(4) applicable Federal land management agencies; and ''(5) for purposes of the Forest Legacy Program under section 7, the State lead agency designated by the Governor."

-2008 Farm Bill

State Stewardship Coordinating Committee (Alabama) – This committee consists of twenty-six members representing twenty-two federal and state natural resource organizations. On July 17, 2009, the Alabama Forestry Commission presented a preview of the state assessment project to the committee. Issue statements were shared as well as the general project outline. The committee offered comments and suggestions. Many of the members participated in the 18-month process as subject matter experts, attending meetings, and through working groups.

State Wildlife Agency (Alabama) – The Alabama Department of Conservation and Natural Resources (ADCNR) serves this role. ADCNR wildlife biologist Jim McHugh served on the Alabama's State Forest Assessment steering committee during the entire term of the project. McHugh was the lead person in developing Alabama's State Wildlife Action Plan. Other ADCNR wildlife biologists also participated in follow-up meetings.

State Technical Committee (Alabama NRCS) - This committee consists of sixty-six members representing forty-five agencies, departments, organizations, and groups. On May 27, 2010, the Alabama Forestry Commission presented an update of the final draft version of the state assessment project to the committee. The committee was given instructions on how to make final comments, edits, and suggestions. Many of the members participated in the 18-month process as subject matter experts, attending meetings, and through working groups.

Applicable Federal land management agencies – The US Forest Service Region contributed guidance through its Washington and Region 8 offices through national meetings, conference calls, base camp web sites, and personal contacts. Region 8 provided facilitator (Mike Murphy) for stakeholders meeting on December 19, 2008 in Montgomery. Tim Mersmann also gave individual advice and counsel to Alabama's state assessment project development. The Alabama National Forest System (NFS) 1) attended meeting to develop forest resource strategies, 2) arranged for their regional air quality specialist to develop the document's "air quality" strategies, 3) scheduled Forestry Commission to present state assessment update and to ask for comments at their Leadership Team meeting in Montgomery, 4) helped identify elements of Alabama NFS management plan that could be incorporated in state assessment; and 5) as subject matter experts.