USDA United States Department of Agriculture Forest Service

Alabama, 2012

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Forest Inventory & Analysis Factsheet

Issue—May 2013

Lake in Cheaha State Park, Alabama. (photo by Andrew J. Hartsell)

Introduction

This science update summarizes the key findings of the ninth forest survey of Alabama. The survey was conducted by the Forest Inventory and Analysis (FIA) program at the Southern Research Station of the U.S. Department of Agriculture Forest Service in cooperation with the Alabama Forestry Commission (AFC). Previous FIA periodic surveys have been performed by FIA in the State since 1936. Annual inventories began in 2000 as a joint effort between FIA and AFC. Alabama's annual inventory is conducted on a 7-year cycle. The following results are based on a complete inventory of the State's annual plots from 2006 to 2012. For past FIA inventory reports on Alabama's forests as well as information regarding the FIA program, methodologies, and procedures, please refer to the references at the end of this publication.

Trend Analysis

The FIA program was initially established to monitor the Nation's timber supply and the amount of commercially available resources. These early surveys were not concerned with the forests, species, and tree sizes that were not considered commercially viable. Early surveys reported only on growing-stock trees on timberlands, i.e. commercially important tree species and tree sizes on forests that could sustain harvest operations. Currently, FIA reports on all of the forest lands regardless of site productivity or the potential to provide forest products. This science update will focus on long-term trends using the traditional measures of growing stock and timberland. A more detailed analysis focusing on all forest lands, tree species, and sizes will follow this science update.

Statistical Reliability

FIA inventories employ sampling methods designed to achieve reliable statistics at the State level. A measure of reliability of inventory statistics is provided by sampling errors. These sampling errors mean that the chances are two out of three that the true population value is within the limits indicated by a confidence interval. Sampling errors (in percent) and associated confidence intervals for timberland area, growing-stock volume, and components of change are presented in table 1.

Table 1—Forest statistics, Alabama, 2006–12

Timberland estimates	2006–12	Sampling error	Confidence interval
		percent	
Timberland area (*acres*)	22,928,066	0.65	149,032
Number of growing-stock trees ≥5 inches d.b.h.	2,682,208,057	1.40	37,550,913
Volume of growing-stock trees ≥5 inches d.b.h. (ft^3/*year*)	31,090,487,504	1.33	413,503,484
Average net annual growth of growing stock trees ≥5 inches d.b.h. (ft^3/*year*)	1,651,545,891	1.98	32,700,609
Average net annual removals of growing stock trees ≥5 inches d.b.h. (ft^3/*year*)	1,192,041,169	4.28	51,019,362
Average net annual mortality of growing stock trees ≥5 inches d.b.h. (ft^3/*year*)	348,803,800	4.23	14,754,401

d.b.h. = diameter at breast height.

Forest Characteristics

Timberlands accounted for 22.9 million acres in 2012 (fig. 1). While this was an all-time high for Alabama, total timberland area has remained fairly constant since 2000, and has not changed by >6 percent since 1963. Although total timberland area has not changed substantially, the area of planted stands within the State has. Planted stands were first recorded during the 1972 survey. Since then they have increased by over 300 percent, and now account for over 7 million acres statewide.

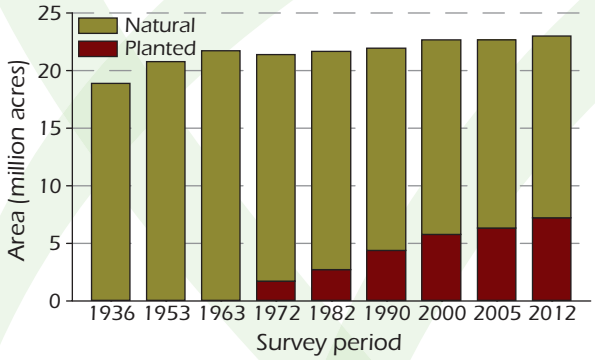

Figure 1—Area of timberland by survey period and stand origin, Alabama.

Volume of both hardwood and softwood species has steadily increased each survey (fig. 2). Softwood volume has increased 180 percent since 1953, while hardwood volume gained 151 percent over the same period. The total volume of all growing-stock trees rose 165 percent between 1953 and 2012. Softwood and hardwood growing-stock volumes have increased over 16 and 6 percent, respectively, since the 2005 survey.

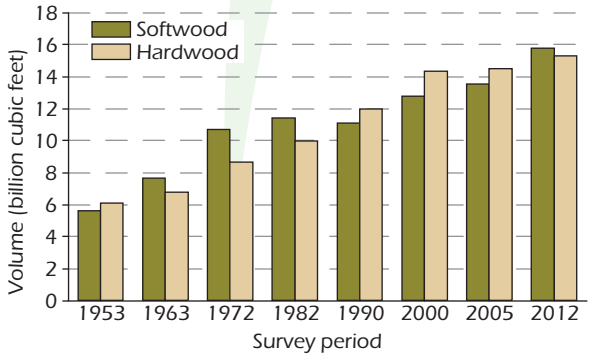

Figure 2—Volume of growing stock on timberland by species group and survey period, Alabama.

Average annual softwood growth exceeded average annual removals for softwood species. One possible explanation is the increase in area of planted pine stands (fig.1). These artificially regenerated softwood forests receive more intensive management than natural hardwood stands, and are therefore apt to produce more wood volume per acre. Many of these new plantations are replacing hardwood stands. This reduction in hardwood acreage, combined with the increased management of planted pine forests, has resulted in an increase in softwood stand production volume across the State.

Hardwood and softwood species volumes are distributed differently across Alabama. Softwood concentrations are highest in the southwestern part of the State, and lowest in the northeast (fig. 3). Meanwhile, hardwoods are the opposite, being most prominent in the northeast, and lower in the southwest (fig. 4).

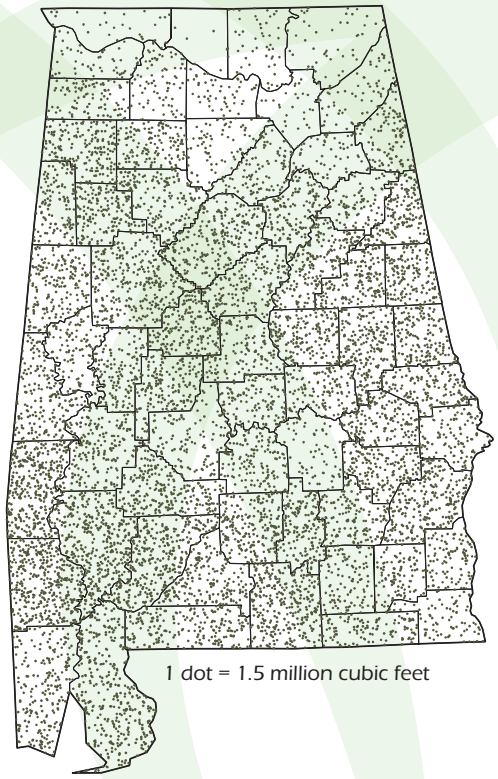

Figure 3—Volume of softwood growing stock on timberland, Alabama, 2012.

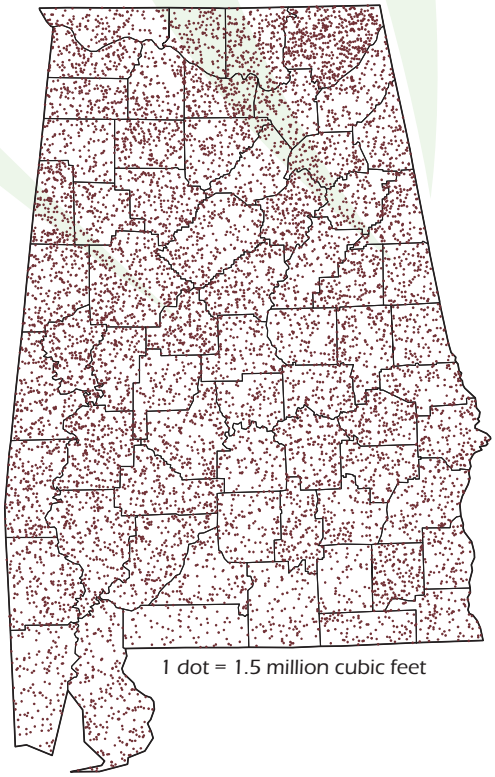

Figure 4—Volume of hardwood growing stock on timberland, Alabama, 2012.

Loblolly pine (*Pinus taeda*) is the most prevalent species in the State. Alabama's population of loblolly pine is almost 1.4 billion trees (table 2). In fact, one out of every two growing-stock trees in Alabama is a loblolly. Sweetgum (*Liquidambar styraciflua*) is the second most numerous species, followed by water oak (*Quercus nigra*), yellow-poplar (*Liriodendron tulipifera*), and white oak (*Quercus alba*).

Table 2—The 25 most common growing-stock tree species (≥5.0 inches d.b.h.) by common and scientific name, Alabama 2012

Common name	Scientific name	Total
		number
Loblolly pine	*Pinus taeda*	1,366,068,025
Sweetgum	*Liquidambar styraciflua*	234,211,308
Water oak	*Quercus nigra*	103,792,345
Yellow-poplar	*Liriodendron tulipifera*	100,252,256
White oak	*Quercus alba*	74,386,358
Longleaf pine	*Pinus palustris*	62,647,248
Slash pine	*Pinus elliottii*	58,716,377
Shortleaf pine	*Pinus echinata*	54,083,117
Virginia pine	*Pinus virginiana*	49,422,794
Southern red oak	*Quercus falcata*	44,975,880
Blackgum	*Nyssa sylvatica*	44,062,451
Chestnut oak	*Quercus prinus*	39,953,676
Pignut hickory	*Carya glabra*	38,222,608
Mockernut hickory	*Carya alba*	36,854,511
Red maple	*Acer rubrum*	32,012,002
Laurel oak	*Quercus laurifolia*	29,225,671
Post oak	*Quercus stellata*	29,146,016
Swamp tupelo	*Nyssa biflora*	26,785,100
Eastern redcedar	*Juniperus virginiana*	17,640,192
Green ash	*Fraxinus pennsylvanica*	16,297,270
Black cherry	*Prunus serotina*	15,164,738
Winged elm	*Ulmus alata*	14,368,545
Water tupelo	*Nyssa aquatica*	13,365,438
Black oak	*Quercus velutina*	13,138,217
Northern red oak	*Quercus rubra*	12,440,519

d.b.h. = diameter at breast height.

Average annual softwood growth has steadily increased since the 1954–63 survey, while average annual removals reached a plateau during the 1991–2000 inventory (fig. 5). Over the most recent annual inventory period, Alabama softwoods grew at a rate of 1,181.8 million cubic feet per year, while 892.5 million cubic feet were removed. The current growth to removals ratio of softwoods in Alabama is 1.3, meaning that for every 1 cubic foot of tree volume harvested, 1.3 cubic feet grew. Average annual softwood mortality experienced a decline for the first time since the 1983–90 inventory.

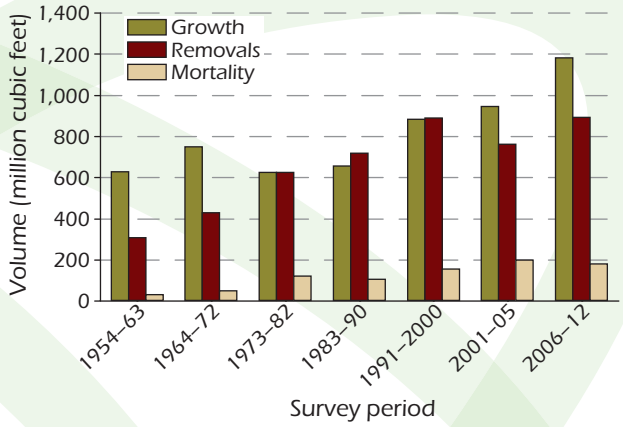

Figure 5—Average annual estimates of growth, removals, and mortality of softwood growing stock by survey period, Alabama, 2012.

Current average annual growth and removals of hardwood species in Alabama peaked during the 1991–2000 inventory years (fig. 6). Hardwood removals (299.5 million cubic feet per year) are as low as they have been in a quarter of a century. Current hardwood growth estimates (469.8 million cubic feet per year) have declined as well. Much of the decline in hardwood net growth can be attributed to the increase in area of pine plantations, discussed previously. Possible reasons for the decline in hardwood removals, however, are more difficult to determine as many factors play a role. One factor is the economic recession that occurred between 2007–09, which negatively impacted new home construction and sales. This in-turn impacted the furniture industry, which utilizes primarily hardwood species. A special e-pub was recently published that details these impacts (Brandeis and others 2012). Softwood removals were also impacted by the recession. Southern pine pulp production, however, is at an all-time high. As a result, pine removals were not impacted as deeply as hardwoods. Current hardwood mortality, on the increase since the 1964–72 inventory, is at its highest recorded level.

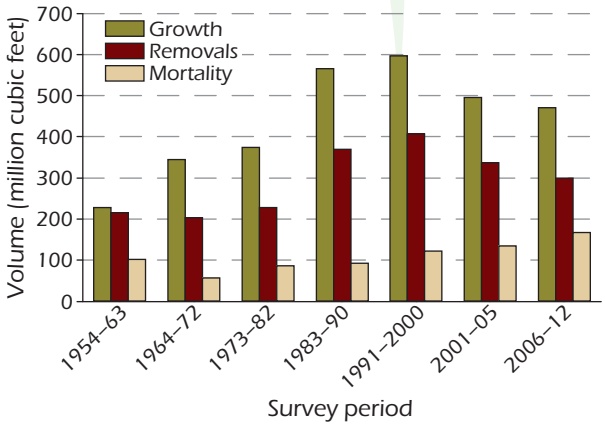

Figure 6—Average annual estimates of growth, removals, and mortality of hardwood growing stock by survey period, Alabama, 2012.

Causes of Tree Mortality

Weather was the primary agent of tree mortality accounting for >46 percent of all growing-stock tree death. Much of this mortality can be attributed to hurricanes and other storm-related damage, including hurricanes Katrina in 2005, and Isaac in 2012. While these storms occurred either in the last survey or at the end of the current inventory, the impact of these storms is evident in the data.

In addition to storm-related mortality, losses due to insects and disease contributed 62 and 43 million cubic feet, respectively, over the last 7 years (table 3). The southern pine beetle (SPB) (*Dendroctonus frontalis*) is one of the most destructive insects in forested ecosystems in the Southern Gulf Coastal Plain of the United States. Mortality to insects is lower than the previous survey period, indicating that SPB infestations were in decline between 2005 and 2012. This is corroborated by reports produced by the AFC and Forest Service Forest Health Protection between 2006 and 2010. The Forest Health Highlight reports also note low infestation levels of SPB during this time period.

Table 3—Average annual mortality of growing stock on timberland by cause and species group, Alabama, 2012

Cause	All species	Soft-woods	Hard-woods
	--- million cubic feet ---		
Insect	62.0	61.5	0.5
Disease	43.0	14.8	28.2
Fire	4.4	3.4	1.1
Animal	7.8	0.2	7.6
Weather	161.7	69.1	92.5
Vegetation	30.0	16.2	13.8
Unknown	39.9	16.7	23.2
Total	348.8	181.8	167.0

Although current Alabama SPB infestation levels are low, this does not mean that the forests are not at risk. Changes in weather and other environmental factors could lead to stresses in southern yellow pine forests that might increase the risk of infestation. The National Insect and Disease Risk Map produced by the Forest Health Enterprise Team in Ft. Collins, CO (Krist and others 2010) displays the areas of the State that are at risk (fig. 7). Preferred SPB hosts are shortleaf (*Pinus echinata*), loblolly (*P. taeda*), and Virginia pines (*P. virginiana*). Landowners with stands of these species near areas with high SPB hazard ratings index are advised to manage their stands to mitigate or lower the risk of SPB outbreaks and reduce the possibility of future infestations.

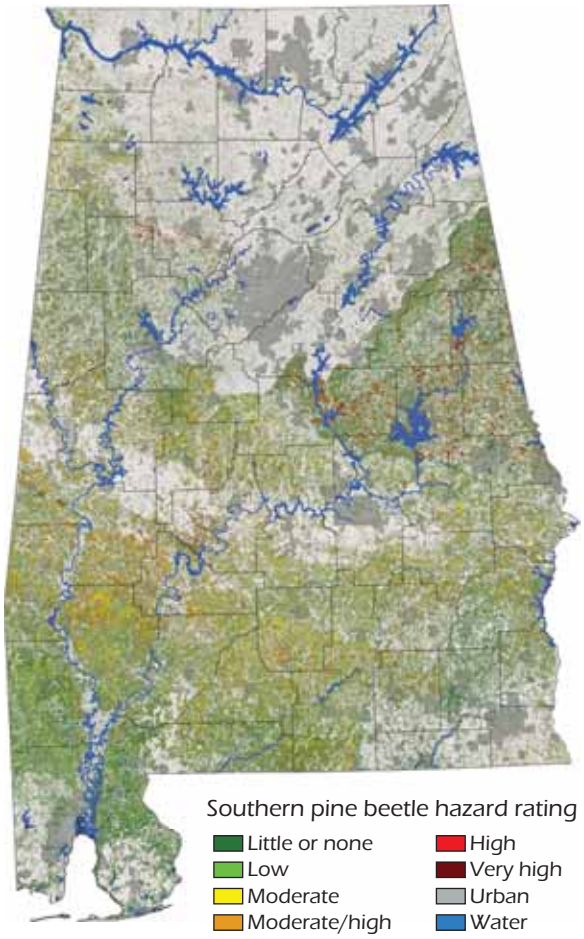

Figure 7—Southern pine beetle hazard rating, Alabama, 2012.

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How to Cite This Publication

Hartsell, Andrew J. 2013. Alabama, 2012—forest inventory and analysis factsheet. e-Science Update SRS–067. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 5 p.

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Openings in forests offer a diverse mixture of grasses, flowers, and shrubs. (photo by Andrew J. Hartsell)

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