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Incidence and Impact of Damage to Alabama's Timber, 1983

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SUMMARY

The Southern Forest Experiment Station in Starkville, MS, periodically inventories and evaluates forest resources in Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Puerto Rico, Tennessee, and Texas. Survey data were collected in 1981, 1982, and 1983 by the Forest Inventory and Analysis work unit of the Southern Forest Experiment Station as part of the fifth inventory of Alabama's forests. Considerably more information was gathered for this inventory than in previous data collections, making possible the publication of this specialized report summarizing information on agents that damage timber in Alabama's forests.

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INTRODUCTION

During the periodic inventory of Alabama's forests conducted from 1981 to 1983 by the Southern Forest Experiment Station, Starkville, MS, damage to live trees on sample plots was noted, and, where possible, a cause or damaging agent was specified. Since a plot is visited only once during the survey, and that visit can be at any time of the year, only agents that produce durable symptoms or signs of damage were reported.

Since the data reported here were gathered by people trained and experienced in forest inventory, not entomology or pathology, qualified people from Region 8, State and Private Forestry, Forest Pest Management, trained the field crews to use a damage-identification handbook (Anderson et al. 1980) before going out on the field survey. Specimen kits and forms were provided to crew members for submission of damage samples they might be unable to identify in the field. During the survey, field checks were made to ensure the accuracy and consistency of the recording and collection of the data.

Agents selected to be included in the survey were required to be (1) easily identifiable, (2) present year-round, and (3) present on trees at least 1 inch in diameter at breast height (d.b.h.). Therefore, small trees with problems such as brown spot and trees of all sizes with damage such as defoliation (which is not apparent in winter) are not included in this report.

There are several reasons why this report does not completely assess the incidence and impact of all damage observed in Alabama's forests. First, damage is caused by a wide variety of agents; some are easily recognized, others are more difficult to identify. The data presented here for damaging agents that are easily identified and persistent, such as stem and branch rust, are reliable. The data for damaging agents that are more difficult to recognize, such as root rot, are underestimated.

Second, certain types of damage can only be observed during part of the year; these have not been included in this survey in a dedicated category. For example, defoliation caused by insects is only evident at the time of year during which trees normally have leaves, and insects are active. Since survey crews work year-round, defoliation data could not be consistently collected and is recorded only as "other insect" when observed during the summer.

Third, some damaging agents cause trees to die rapidly; these trees were recorded in a mortality (not a damage) category. For instance, trees attacked by bark beetles in summer tend to die rapidly. If the survey crew found a tree with evidence of bark beetle activity, there was a good chance that it was already dead and was tallied as such. Thus, many bark beetle damaged trees would not be recorded in the "Bark Beetle" damage category.

And finally, only a single "most damaging" agent is reported per tree. Thus, there is no information presented concerning complexes such as a disease/insect/environment/etc. interaction.

Data presented in this Bulletin were compiled for this report in a separate computer run. Similarity will be seen between acres of forest types, timber removals, and mortality by species when compared to numbers presented in "Forest Statistics for Alabama Counties in 1982" (USDA For. Serv. 1985). Differences in accumulation, definition changes, and rounding will account for the differences in numbers presented.

In spite of these problems the survey gives a good picture of the relative incidence of the pre-selected, easily recognized damage types (or agents) that persist year round.

SAMPLING PROCEDURE

The sampling procedure used for this inventory was designed to provide reliable statistics on a statewide basis or for large groups of counties. It also accurately summarizes species having a relatively large total volume in the State. However, errors associated with relatively minor species, like cottonwood or pondcypress, exceed those for such major species as loblolly pine.

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The data on forest acreage and timber volume in this report were obtained by a sampling method involving a forest-nonforest classification on aerial photographs linked to ground measurements of trees at sample locations. The sample locations were at the intersections of a grid of lines spaced 3 miles apart. In Alabama, 151,671 photographic classifications were made and 5,723 ground locations were visited. The initial estimates of forest area obtained from aerial photographs were adjusted on the basis of the ground check.

A cluster of 5 variable-radius plots was installed at each ground sample location. Each sample tree on the variable-radius plots represented 7.50 square feet of basal area per acre. Trees less than 5.0 inches in diameter were tallied on fixed-radius plots around the plot centers. Trees on a subsample of plots were measured in detail to obtain data for calculating timber volumes.

Plots established during the fourth survey of Alabama (Murphy 1973) were remeasured during this (the fifth) survey to determine the elements of change, and these remeasured plots are the basis for estimating growth, mortality, removals, and changes in land use.

COMPUTATION METHODS

Limits on size classes of trees were: saplings, 1.0 to 4.9 inches d.b.h.; softwood poles, 5.0 to 8.9 inches d.b.h.; hardwood poles, 5.0 to 10.9 inches d.b.h.; softwood sawtimber ≥9.0 inches d.b.h.; and hardwood sawtimber ≥11.0 inches d.b.h. Volume equations based on measurements of standing trees in Alabama were used to compute merchantable and total cubic volume.

Percentage of loss in an individual tree was estimated in the field. Volume loss by pest/tree combination and total volume loss attributable to all agents damaging a species were subsequently computed. Data on percent incidence of damage do not imply total economic loss; only a part of the volume in cull would fail to qualify for some commercial use, such as firewood. Cull includes loss due to crooks, limbs, decay, missing wood, sweep, large forks, and sections of the bole too rough to be used as pulpwood or sawtimber. The volume loss was determined by totaling the volume of cull by species.

Mortality could not be attributed to specific damaging agents because it was often impossible to determine the cause of death. In many cases, a tree which had been tallied in the fourth survey 10 years earlier (Murphy 1973) was simply missing. It was possible, however, to determine volume loss due to mortality for each tree species on each plot. Accumulating total volume per dead tree by tree species resulted in the total volume loss for poles and sawtimber by tree species. Economic impact was determined by multiplying the total wood fiber and quality loss for each tree species by the stumpage value per unit. These dollar estimates were taken from an average of a sample of timber sales in Alabama in 1982.

INCIDENCE OF DAMAGING AGENTS

Alabama has 21,658,700 acres of commercial forest, and most of the acreage is in the oak-hickory, loblolly pine, shortleaf pine, slash pine, oak-pine, and mixed oak forest types. Table 1 shows the acreage in the various size classes and forest types. The remaining tables in this report show how much of the timber resource was damaged and the agents responsible for the damage. The term "damage" refers to any injury the tree has suffered. A damaged tree is still living.

Tables 2 and 3 show percentage of trees damaged, by size class and tree species. Overall, hardwoods had more damage than softwoods. Red oaks, gums, and white oaks were severely affected. More hardwood sawtimber was damaged than saplings or poletimber, but more softwood saplings were damaged than poletimber or sawtimber. Loblolly, shortleaf, and slash pine are the most abundant softwood species in Alabama. For all three species 25 percent or more of both poletimber- and sawtimber-sized trees were damaged, with damage to saplings being greater than the damage observed in the older age classes.

The percentage of saplings damaged was generally higher for hardwoods (49 percent average) than softwoods (39 percent average). In most hardwood species, 35 to 70 percent of the saplings were damaged (table 3). The most frequently damaged saplings were black walnut, with hard maples, blackgum, and ash all having more than 70 percent of their seedlings damaged. Hardwood poletimber was damaged less often than saplings or sawtimber. The most frequently damaged hardwood sawtimber trees were hard and soft maples, black walnut, and basswood. More than 70 percent of the sawtimber trees in these species were damaged.

Table 4 shows the incidence of damage to softwood. The most common causes of softwood damage were suppression and stagnation in saplings, weather, logging, and form. Fusiform rust, caused by *Cronartium quercuum* (Berk.) Miy. & Shirai f. sp. *fusiforme*, was the most common disease caused damage. Loblolly, slash, and pond pines, in all size classes, were affected by this disease. In these tree species, fusiform rust was the most damaging agent and was associated with high volume losses. Fusiform rust was recorded only if the gall was on or within 12 inches of the main stem. Economically, galls farther than 12 inches out have minimal impact on the tree. If galls farther out on limbs had been recorded, the reported occurrence of fusiform rust would have been much higher.

Bark beetles are considered to be the most serious insect pests of pines in the Southeast; however, the main reason for this discrepancy is that this survey only reported damage to living trees; bark beetles usually kill trees, and the dead trees were recorded under the heading "mortality".

The reported incidence of damage due to insects on both hardwoods and softwoods was very low with the exception of terminal, shoot, and stem borers on sapling hardwoods. Insect damage, however, was significantly underestimated due to the difficulty in diagnosing and evaluating many types of insect-caused damage.

Table 5 shows the incidence of damage to hardwoods. The most common problems associated with damage observed in hardwoods were basal defect, dieback, weather caused problems, suppression and stagnation, logging, and tree form. Form damage had the highest incidence in mature trees. Saplings had a high incidence of damage resulting from suppression and stagnation.

MORTALITY, CULL, AND ECONOMIC IMPACT

Annual mortality of softwood poletimber is shown in table 6. Softwood poletimber mortality was more than 32 percent of the annual volume of softwood poletimber removals and hardwood poletimber mortality was 36 percent of the annual volume of hardwood poletimber removals. Softwood sawtimber mortality was approximately 13 percent of the annual softwood sawtimber removals while hardwood sawtimber mortality was almost 34 percent of the annual hardwood sawtimber removals. The mortality figures shown in table 6 are the total for the resource and do not reflect any discounting for dead trees that represented no economic loss. Table 6 also shows the estimated volumes of cull for the major species groups in Alabama. Annual removal figures are given to place the volume losses in perspective.

The volume lost due to cull was much greater in hardwoods than softwoods; but, considering their relative population sizes, the cull of softwood sawtimber is about 3 times as great as that for hardwood sawtimber! Proportioned by population, annual accumulated cull of hardwood poletimber was about 133 percent of that of softwoods, while the values for mortality in poles show much greater damage in both softwood categories.

The economic impact of damaging agents is greatest in softwood sawtimber, which showed an annual loss of about $74 million (table 7). The annual wood volume loss for hardwood sawtimber, although it is more than 75 percent as great as for softwood, is valued at about only $18.5 million because hardwood stumpage value is considerably less than that of softwood. In poletimber, the $8 million softwood loss was three and a half times that of hardwoods despite the fact that hardwood volume loss was 120 percent of softwood loss.

Overall, 79.5 percent of all economic impact occurs in softwoods, and about 89.7 percent of the total economic impact was in sawtimber-size trees.

DAMAGING AGENTS, GROWTH DEFECTS, AND SYMPTOMS

The definitions presented under the subheadings Diseases, Growth Defects, Natural Phenomena, Animals and Birds, Insects, and Human Activities are those used in the field manual prepared by Anderson, et al. (1980). They describe the problems reported by the field crews.

Diseases

Fusiform Rust.—Common host species: Slash, loblolly, and shortleaf pines. Symptoms and signs: Spindle-shaped galls formed on the stem or on branches within 12 inches (30.5 cm) of the bole. Older galls appear as cankers with sunken, rotten centers encircled by a callus ridge. Witches' brooms are common at galls. Bright orange spores are produced on the galls in the spring.

Hardwood Cankers.—Common host species: All hardwoods. Symptoms and signs: Dead, sunken area formed on the stem, frequently with annual callus ridges around the dead area.

Littleleaf Disease.—Common host species: Shortleaf and loblolly pines, but shortleaf is more susceptible. Symptoms and signs: Affected trees occur in groups. Short, yellow needles; reduced shoot growth; and large crops of under sized cones are typical symptoms. Littleleaf disease usually occurs in trees growing on heavy clay soils with poor internal drainage.

Pitch Canker.—Common host species: Most southern pines, but primarily slash, loblolly, and shortleaf. Symptoms and signs: Flagging at branch ends, pitch flow from affected area, slight swelling on affected stems and twigs, crooks in main stem, and wilting of current candles are all symptoms of this disease.

Root Rots.—Common host species: All tree species. Symptoms and signs: Diseased trees, often with thin, tufted crowns, frequently occur in groups that usually contain dead or windthrown trees. Conks (fruiting bodies) of various fungi may be present on or near the bases of diseased trees. Root rots are more frequent in trees of reduced vigor, thinned stands, and in trees with butt or root injury. Trees with root rots are often subsequently attacked by bark beetles.

Other Diseases.—Common host species: All tree species. Symptoms and signs: All damage caused by

diseases not identified in separate categories (e.g., red heart of pine, brown spot, and leaf diseases). Trees showing degrade caused by diseases are included in this category.

Growth Defects

Branch Stubs.—Common host species: All tree species. Symptoms and signs: Branch holes or stubs greater than 4.0 inches in diameter on stems of trees 5.0 inches d.b.h. and larger or greater than 1.0 inch in diameter on stems of trees 1.0 to 4.9 inches d.b.h.

Basal Defect.—Common host species: All tree species. Symptoms and signs: Butt swelling, curls, V-shaped stump sprouts, frost seams, and low stubs below 4.5 feet are symptoms of basal defect.

Dieback.—Common host species: All hardwoods. Symptoms and signs: Tips of the branches die back. Initially, only a few branches are affected, but in advanced stages, entire branches die with the possibility of tree mortality. Dieback is frequently associated with stress caused by an unfavorable environment.

Suppression and Stagnation.—Common host species: All tree species. Symptoms and signs: Suppressed and stagnated trees are characterized by poor form and small crowns. Suppressed trees are overtopped and receive indirect sunlight. Stagnated trees have thin foliage despite receiving some direct sunlight. Stagnation is usually associated with poor growing sites or overstocking.

Form (damaging).—Common host species: All tree species. Symptoms and signs: All trees 5.0 inches d.b.h. and larger that are deformed due to unknown causes.

Natural Phenomena

Fire.—Common host species: All tree species. Symptoms and signs: Fire scars are usually at the base of the stem and are widespread in the stand. The scars are usually on the uphill side of the tree, and signs of charring are generally present on the stem.

Flooding.—Common host species: All tree species. Symptoms and signs: Yellowing and curling downward of leaves, premature leaf fall, branch and top dieback, tree mortality, and high water and silt marks on tree boles are the most common effects of flooding.

Lightning.—Common host species: All tree species. Symptoms and signs: Lightning causes bark stripping or cracking, with damage running from the strike point to the ground in a straight or spiral line. Often, the foliage will fade due to root damage or top breakage. Bark beetles often invade struck trees.

Weather.—Common host species: All tree species. Symptoms and signs: Windthrow, ice, frost cracks, broken tops, broken branches, marginal leaf burn, and winter burn are the common symptoms.

Animals and Birds

Beaver.—Common host species: All tree species. Symptoms and signs: Beavers leave toothmarks and remove the bark from the bole of the tree. Trees are often flooded by water impoundment, which can lead to flooding damage and death.

Other Animals.—Common host species: All tree species. Symptoms and signs: Branches clipped off or broken, bark removed, holes in the stem, and tears and toothmarks in the wood are all common signs of animal activity.

Sapsucker.—Common host species: All tree species. Symptoms and signs: Horizontal rows of small holes that may encircle the tree's bole are seen. Bark below the holes is usually streaked or stained by oozing sap.

Insects

Bark Beetles.—Common host species: All pines. Symptoms and signs: Symptoms include pitch tubes, bark beetle galleries on the inner bark surface and the surface of the sapwood, exit holes, and loose bark. Streaks caused by blue stain fungi are often evident in the sapwood. Foliage of infested trees gradually yellows and then turns red.

Hardwood Borers.—Common host species: All hardwoods. Symptoms and signs: The initial symptom is a dark sap spot on the bark surface, often mixed with frass. Eventually, coarse boring particles appear in bark cracks and crevices beneath the point of attack. Old damage appears as knobby overgrowths or scars on the bark surface.

Terminal Shoot and Stem Borers.—Common host species: All tree species. Symptoms and signs: Fresh attacks show boring dust and frass at the entrance holes, which are most often located at the base of leaf petioles and buds. Resin globs may be present at points of attack. Dieback results from larval tunneling within terminal shoots and branches. Foliage on the shoots turns yellow, red, and finally brown.

Other Insects.—Common host species: All tree species. Symptoms and signs: All damage caused by insects not identified in separate categories. Includes hardwood defoliators (e.g., orangestriped oakworm and fall cankerworm), pine defoliators (e.g., redheaded pine sawfly), and pine weevils.

Human Activities

People.—Common host species: All tree species. Symptoms and signs: Initials in bark, nails in tree, burns from lanterns, stripped bark, wire around stem, and ax marks are signs of damage by people.

Logging and Related.—Common host species: All tree species. Symptoms and signs: Logging scars on the stem will form callus ridges within 1 to 2 years after wounding. Trees with logging damage are scat-

tered in stands and show no charring. Broken limbs and scars on the stem near the crown will occur from the felling of other trees. Skid trails, stumps, or other evidence of logging will be present.

FOREST SURVEY TERMS

The following terms, used by the Forest Inventory Analysis group are presented to clarify some of the constraints placed on the data collected, and on subsequent data analysis.

Acceptable Trees.—Growing-stock trees of commercial species that meet specified standards of size and quality, but do not qualify as desirable trees.

Annual Accumulated Cull.—Total cull divided by the intrasurvey period.

Basal Area.—The area in square feet of the cross section at breast height of a single tree or of all the trees in a stand, usually expressed in square feet per acre.

Commercial Forest Land.—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Cull Volume.—Total volume loss due to crooks, limbs, decay, missing wood, sweep, large forks, and volume in sections of the bole too rough to be used as sawtimber or pulp.

Desirable Trees.—Growing- stock trees of commercial species having no serious quality defects that limit present or prospective use for timber products, of relatively high vigor, and containing no pathogens that may result in death or serious deterioration before rotation age.

D.b.h. (Diameter at breast height).—Tree diameter in inches, outside bark, measured at 4.5 feet above ground.

Diameter Class.—A classification of trees based on diameter outside bark, at d.b.h. Two-inch diameter classes are commonly used in forest surveys, with the even numbered inch as the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

Growing-Stock Trees.—Live trees of commercial species excluding rough and rotten trees.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Incidence.—Percentage of susceptible trees affected by a damaging agent.

Intrasurvey Period.—The number of years between the current survey and the past survey.

Mortality.—Number or sound-wood volume of live trees that died from natural causes during the intrasurvey period.

Poletimber Trees.—Live trees of commercial species at least 5.0 inches d.b.h. but smaller than sawtimber size, of good form and vigor.

Rough and Rotten Trees.—Live trees that are unmerchantable for saw logs currently or potentially because of defect, rot, or species.

Saplings.—Live trees 1.0 to 4.9 inches d.b.h. and of good form and vigor.

Saw Log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight, with a minimum diameter inside bark of 6.0 inches for softwoods and 8.0 inches for hardwoods.

Sawtimber Trees.—Live trees of commercial species containing at least one 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, with at least one-third of the gross board-foot volume between the 1-foot stump and minimum saw log top being sound. Softwoods must be at least 9.0 inches d.b.h. and hardwoods at least 11.0 inches d.b.h.

Sawtimber Volume.—Net volume of the saw log portion of live sawtimber in board feet of the International rule, 1/4-inch kerf.

Softwoods.—Coniferous trees, usually evergreen, having needles or scalelike leaves.

Species Groups.—Sets of tree species pooled together for standard reporting.

- Hard maples: Florida, black, and sugar maples
- Soft maples: Boxelder, red, and silver maples
- Select red oaks: Cherrybark, northern red, and shumard oaks
- Other red oaks: Scarlet, southern red, laurel, water, willow, black, and others not in select red oaks
- Select white oaks: White, swamp white, bur, and swamp chestnut oaks
- Other white oaks: Overcup, chestnut, post, live, and others not in select white oaks
- Other eastern hardwoods: Buckeye, birch, hackberry, dogwood, persimmon, honeylocust, silverbell, holly, butternut, cucumbertree, mulberry, scrub oaks, willow, and other commercial species.

Stand-size Class.—A classification of forest land based on the size class of growing-stock trees on the area.

Sawtimber stands: Stands at least 16.7 percent stocked with growing-stock trees, with half or more of the total stocking in sawtimber or poletimber trees and sawtimber stocking at least equal to poletimber stocking.

Poletimber stands: Stands at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in poletimber and sawtimber trees, and poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands: Stands at least 16.7 percent stocked with growing-stock trees, of which more than half of the stocking is saplings and seedlings.

Susceptible Trees.—All living trees. Includes desirable and acceptable trees, as well as rough and rotten trees.

Timber Removals.—The net volume of growing-stock trees removed from the inventory by harvesting or cultural operations such as timber-stand improvement, land clearing, or changes in land use.

TSI.—Timber stand improvement.

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Table 1.—*Area of commercial forest land in Alabama, by stand-size class and forest type*

Forest classification	Thousands of acres[1]
Stand-size class:	
Sawtimber	7,617.7
Poletimber	6,948.8
Sapling-seedling	6,723.3
Understocked areas	369.0
All stand sizes	21,658.7
Forest type:	
White oak-red oak-hickory	6,215.0
Loblolly pine	4,412.9
Loblolly pine-hardwood	2,466.7
Sweetgum-nuttal oak-willow oak	1,052.1
Shortleaf pine	899.4
Shortleaf pine-oak	864.0
Slash pine	756.5
Longleaf pine	726.2
Sweetbay-swamp tupelo-red maple	588.7
Virginia pine	464.9
Sugarberry-American elm-green ash	443.7
Sweetgum-yellow poplar	425.0
Longleaf pine-scrub oak	411.6
Slash pine-hardwood	338.9
Mixed hardwoods	328.6
Virginia pine-southern red oak	289.5
Cypress-tupelo	166.5
Other oak-pine	130.9
Yellow poplar-white oak-N. red oak	99.2
Chestnut oak	79.6
Overcup oak-water hickory	63.8
Eastern redcedar-hardwood	61.4
Swamp chestnut oak-cherrybark oak	52.8
Post oak-black oak-bear oak	51.1
Southern scrub oak	42.1
Eastern redcedar	41.5
Sycamore-pecan-American elm	39.1
White oak	35.2
Nonstocked	36.2
Spruce pine	29.1
Willow	29.0
Atlantic white-cedar	6.0
Cottonwood	6.0
Sand pine	6.0
All types	21,658.7

[1]Totals may not add due to rounding.

Table 2.—*Percentage of susceptible softwood trees damaged and volume of cull by species and tree size in Alabama*

Host	Total population	Trees damaged			Volume of cull[1]	
		Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	Thousands	*Percent*			*Mft³*	*Mfbm*
Loblolly pine	1,950,192.1	38.5	33.0	36.2	58,997.4	349,152.3
Shortleaf pine	709,240.3	46.9	25.1	25.7	6,539.4	68,246.5
Slash pine	339,463.5	28.0	25.9	30.3	8,907.7	24,907.7
Virginia pine	289,993.8	45.2	30.3	44.4	9,024.6	30,683.7
Longleaf pine	230,286.3	29.0	26.5	28.6	2,378.1	34,055.5
Eastern redcedar	126,445.2	27.2	52.5	47.6	2,160.7	0.0
Spruce pine	30,649.4	32.3	39.5	45.7	458.4	15,273.1
Baldcypress	15,676.9	36.2	39.5	21.8	819.2	5,905.7
Eastern hemlock	10,502.2	28.0	0.0	0.0	0.0	0.0
Atlantic white cedar	1,441.0	0.0	0.0	56.7	0.0	524.0
Southern Redcedar	356.7	0.0	100.0	0.0	0.0	0.0
Pondcypress	54.1	0.0	0.0	0.0	0.0	0.0
Total[2]	3,704,301.6	38.6	30.5	33.6	89,285.5	528,748.5

[1]Cull due to crooks, limbs, decay, missing wood, sweep, large forks, and volume in sections of bole that are too rough to be utilized as pulpwood or as sawtimber.

[2]Totals may not add due to rounding.

Table 3.—*Percentage of susceptible hardwood trees damaged and volume of cull by species and tree size in Alabama*

Host	Total population	Trees damaged			Volume of cull[1]	
		Sapling	Poletimber	Sawtimber	Poletimber	Sawtimber
	Thousands	*Percent*			*Mft³*	*Mfbm*
Other eastern hardwoods	3,783,829.5	35.4	46.3	66.3	90,156.5	50,808.9
Sweetgum	1,918,040.6	54.9	44.9	56.8	49,933.1	74,972.3
Other red oaks	1,763,611.9	40.6	37.2	53.4	60,024.7	110,738.0
Hickories	902,192.0	66.8	47.6	58.6	35,814.4	52,170.3
Soft maple	780,725.6	69.3	75.7	85.3	27,882.5	7,777.7
Blackgum/tupelo	775,284.3	73.6	60.2	56.5	37,175.3	48,724.3
Other white oaks	550,186.2	62.1	50.3	61.8	37,800.4	52,921.3
Select white oaks[2]	427,945.7	54.0	37.7	46.5	17,632.7	44,556.8
Yellow-poplar	218,981.8	36.1	41.8	49.4	21,832.9	43,520.1
Ash	213,626.8	72.9	63.3	66.2	8,046.1	23,439.1
Hard maple	92,095.0	73.1	55.4	95.8	1,258.3	981.5
Noncommercial	86,663.5	6.5	5.4	0.0	1,571.0	0.0
Select red oaks[3]	78,477.0	61.3	42.6	51.8	4,625.1	23,286.9
Beech	42,798.5	54.2	59.3	65.7	2,107.2	2,302.8
Basswood	26,489.0	57.7	66.8	71.9	1,174.2	3,762.9
Black walnut	6,739.7	89.3	55.1	79.4	0.0	1,274.5
Cottonwood	2,746.6	33.3	44.1	83.1	425.7	497.7
Totals[4]	11,670,433.8	49.3	46.7	57.3	397,460.3	541,735.1

[1]Damage due to crooks, limbs, decay, missing wood, sweep, large forks, and volume in sections of bole that are too rough to be utilized as pulpwood or as sawtimber.

[2]White, swamp white, swamp chestnut, and bur oaks.

[3]Cherrybark, N. red, and shumard oaks.

[4]Totals may not add due to rounding.

Table 4.—*Approximate number of trees and percentage of damage/defect by softwood species and damaging agent or defect in Alabama*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Loblolly pine	1,297,801,000	433,416,000	218,976,000
Insects—other	0.1	0.2	0.3
Bark beetles	0.1	0.3	0.8
Terminal, shoot, & stem borers	3.2	1.7	0.9
Diseases—other	0.6	0.5	1.7
Fusiform rust	11.4	14.8	16.5
Root rots	0.0	0.0	0.2
Branch stubs	0.2	0.2	1.1
Basal defects	0.5	0.7	1.0
Dieback	0.1	0.0	0.1
Fire	0.5	0.4	0.7
Beaver	0.0	0.6	0.2
Sapsucker	0.0	0.0	0.5
Weather—other	4.2	3.1	1.7
Lightning	0.0	0.0	0.1
Hurricane	0.2	0.3	0.0
Tornado	0.0	0.0	0.1
Ice	2.8	1.9	0.5
Suppression, stagnation	12.8	1.3	0.0
People	0.1	0.1	0.3
Logging—damage	1.6	1.8	1.8
Form (live tree only)	0.0	5.4	7.8
Shortleaf pine	472,117,000	164,625,000	72,498,000
Insects—other	0.0	0.1	0.3
Bark beetles	0.2	0.3	0.9
Terminal, shoot, & stem borers	3.1	1.3	0.8
Diseases—other	0.4	2.3	3.1
Fusiform rust	1.8	0.9	0.6
Littleleaf disease	1.0	1.3	0.3
Branch stubs	0.0	0.1	1.2
Basal defects	0.9	1.6	1.5
Dieback	0.0	0.4	0.0
Fire	0.6	0.8	0.5
Animals	0.1	0.0	0.0
Sapsucker	0.0	0.2	0.5
Weather—other	4.9	3.4	2.8
Lightning	0.0	0.0	0.1
Ice	2.6	1.3	0.2
Suppression, stagnation	28.4	3.2	0.1
People	0.1	0.3	0.5
Logging—damage	2.2	1.9	2.3
Form (live tree only)	0.6	5.8	10.0
Slash pine	225,674,000	84,455,000	29,334,000
Insects—other	0.5	0.8	0.9
Bark beetles	0.0	0.3	0.7
Terminal, shoot, & stem borers	0.5	0.2	0.3
Diseases—other	0.8	0.5	3.0
Fusiform rust	8.4	10.0	10.6
Branch stubs	0.0	0.7	1.7
Basal defects	1.0	0.4	1.3
Fire	0.3	1.8	0.4
Sapsucker	0.0	0.1	2.7
Weather—other	3.7	3.3	1.8
Hurricane	2.7	2.9	1.0
Tornado	0.0	0.2	0.0
Ice	0.0	0.0	0.1
Suppression, stagnation	9.9	1.0	0.0
People	0.0	0.2	0.2
Logging—damage	0.0	0.9	0.8
Turpentining	0.0	0.0	0.8
Form (live tree only)	0.2	2.6	4.0

Table 4.—*Approximate number of trees and percentage of damage/defect by softwood species and damaging agent or defect in Alabama—Continued*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Virginia pine	188,815,000	75,910,000	25,269,000
Insects—other	0.3	0.0	0.0
Terminal, shoot, & stem borers	6.1	2.3	3.6
Diseases—other	3.2	2.9	4.8
Fusiform rust	4.2	2.8	3.5
Root rots	0.0	0.3	0.0
Branch stubs	0.3	0.0	0.9
Basal defects	0.6	0.9	0.9
Fire	1.1	1.1	2.2
Beaver	0.0	0.0	0.3
Sapsucker	0.0	0.0	0.9
Weather—other	4.9	2.5	2.8
Lightning	0.0	0.0	0.4
Ice	2.3	2.1	0.3
Suppression, stagnation	20.9	0.7	0.0
People	0.3	0.5	0.9
Logging—damage	0.9	3.7	2.4
Turpentining	0.0	0.0	0.2
Form (live tree only)	0.2	10.5	20.6
Longleaf pine	129,388,000	55,694,000	45,203,000
Insects—other	0.0	2.1	1.5
Bark beetles	0.0	1.1	2.5
Terminal, shoot, & stem borers	3.0	1.5	0.6
Diseases—other	0.4	1.7	2.6
Branch stubs	0.0	0.2	0.7
Basal defects	0.0	0.3	1.4
Dieback	0.4	0.4	0.2
Pitch canker	0.0	0.0	0.5
Fire	2.6	2.2	3.8
Sapsucker	0.0	0.7	3.7
Weather—other	6.9	4.5	2.0
Flooding	0.0	0.4	0.0
Hurricane	3.9	1.9	0.5
Ice	1.2	0.0	0.2
Suppression, stagnation	7.1	1.2	0.0
People	0.4	0.3	0.0
Logging—damage	2.6	1.5	1.5
Turpentining	0.0	0.0	0.8
Offsite tree	0.0	0.0	0.2
Form (live tree only)	0.0	4.1	3.9
Eastern redcedar	106,771,000	16,254,000	3,421,000
Terminal, shoot, & stem borers	2.9	1.6	0.0
Diseases—other	1.4	9.6	9.8
Gall rust (cedar apple rust)	0.0	1.1	0.0
Branch stubs	0.5	1.9	2.7
Branch defects	3.9	6.4	13.1
Dieback	0.0	0.0	2.4
Fire	0.9	3.7	0.0
Animals	0.5	0.0	0.0
Sapsucker	0.0	0.0	2.4
Weather—other	3.3	5.3	0.0
Hurricane	0.5	0.0	0.0
Ice	0.6	0.0	1.6
Suppression, stagnation	9.6	0.0	0.0
People	0.5	0.7	0.0
Logging—damage	2.5	2.7	0.0
Form (live tree only)	0.0	19.5	15.6
Spruce pine	16,116,000	7,578,000	6,955,000
Terminal, shoot, & stem borers	2.9	0.0	0.0
Diseases—other	0.0	7.7	7.7
Fusiform rust	0.0	0	2.1

Table 4.—*Approximate number of trees and percentage of damage/defect by softwood species and damaging agent or defect in Alabama—Continued*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Spruce pine—Continued			
Branch stubs	0.0	2.6	4.8
Basal defects	3.3	6.2	2.1
Beaver	0.0	0.0	2.4
Sapsucker	0.0	0.0	1.3
Weather—other	6.8	6.2	2.9
Flooding	0.0	0.0	0.6
Suppression, stagnation	19.3	0.0	0.0
People	0.0	1.4	0.0
Logging—damage	0.0	6.3	1.1
Offsite tree	0.0	0.0	0.9
Form (live tree only)	0.0	9.1	19.9
Baldcypress	7,575,000	3,768,000	4,334,000
Terminal, shoot, & stem borers	0.0	0.0	0.1
Diseases—other	0.0	0.0	2.9
Basal defects	0.0	4.1	1.6
Dieback	0.0	4.7	0.0
Sapsucker	0.0	0.0	2.1
Weather—other	7.4	5.8	2.3
Lightning	0.0	0.0	0.5
Hurricane	0.0	0.0	0.3
Suppression, stagnation	0.0	0.0	2.0
People	0.0	4.1	0.7
Logging—damage	28.8	4.7	0.7
Form (live tree only)	0.0	16.2	8.7
Eastern hemlock	9,377,000	754,000	371,000
Terminal, shoot, & stem borers	10.6	0.0	0.0
Weather—other	5.8	0.0	0.0
Suppression, stagnation	11.6	0.0	0.0
Atlantic white cedar	0	965,000	476,000
Basal defects	0.0	0.0	11.0
Form (live tree only)	0.0	0.0	45.7
Southern redcedar	0	357,000	0
Weather—other	0.0	100.0	0.0

Table 5.—*Approximate number of trees and percentage of damage incidence by hardwood species group and damaging agent or growth defect in Alabama*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Other eastern hardwoods	3,507,541,000	244,588,000	31,701,000
Insects—other	0.1	0.1	0.1
Hardwood borers	0.1	0.1	0.6
Terminal, shoot, & stem borers	5.5	1.0	0.9
Diseases—other	2.4	7.7	9.4
Root rots	0.0	0.3	0.4
Hardwood cankers	0.2	0.1	0.0
Branch stubs	1.0	0.8	2.2
Basal defects	2.7	4.1	3.8
Dieback	0.5	0.6	0.6
Fire	0.6	1.0	0.4
Beaver	0.1	0.5	1.3
Sapsucker	0.0	0.6	2.5
Weather—other	6.8	3.5	3.7
Flooding	0.0	0.1	0.4
Lightning	0.0	0.0	0.2
Hurricane	0.1	1.4	2.3
Ice	0.1	0.0	0.2
Suppression, stagnation	11.7	1.2	0.0
People	0.3	0.4	0.2
Logging—damage	3.2	1.8	0.4
Offsite tree	0.0	0.1	0.1
Form (live tree only)	0.2	21.1	26.4
Sweetgum	1,633,802,000	252,131,000	32,108,000
Insects—other	0.2	0.0	0.0
Terminal, shoot, & stem borers	6.2	1.7	0.7
Diseases—other	2.9	5.1	11.3
Root rots	0.0	0.0	0.7
Branch stubs	0.5	0.5	1.3
Basal defects	4.6	5.2	7.0
Dieback	0.5	2.2	0.6
Fire	1.2	1.9	1.1
Beaver	0.1	2.8	8.3
Sapsucker	0.0	0.0	0.2
Weather—other	7.6	4.2	3.3
Flooding	0.0	0.0	0.1
Hurricane	0.1	0.1	0.3
Tornado	0.0	0.0	0.2
Ice	0.3	0.1	0.0
Suppression, stagnation	23.6	3.7	0.4
People	0.4	0.4	0.6
Logging—damage	6.5	5.0	2.4
TSI (dead trees only)	0.0	0.0	0.1
Form (live tree only)	0.2	12.3	18.1
Other red oaks	1,434,140,000	258,489,000	70,982,000
Insects—other	0.2	0.1	0.0
Hardwood borers	0.3	0.9	0.6
Terminal, shoot, & stem borers	5.8	0.8	0.5
Diseases—other	1.3	5.5	15.6
Root rots	0.0	0.0	0.5
Hardwood cankers	0.0	0.5	1.1
Branch stubs	1.3	2.1	5.1
Basal defects	3.1	5.6	5.7
Dieback	0.5	0.6	0.8
Fire	1.2	1.4	1.0
Beaver	0.0	0.1	0.1
Sapsucker	0.0	0.1	0.2
Weather—other	8.1	2.5	1.9
Lightning	0.0	0.0	0.2
Hurricane	0.3	0.2	0.5
Ice	0.3	0.1	0.2

Table 5.—*Approximate number of trees and percentage of damage incidence by hardwood species group and damaging agent or growth defect in Alabama—Continued*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Other red oaks—Continued			
Suppression, stagnation	14.5	0.6	0.0
People	0.2	0.2	0.4
Logging—damage	3.6	2.2	0.7
Offsite tree	0.0	0.1	0.0
Form (live tree only)	0.0	13.6	18.3
Hickories	749,983,000	122,829,000	29,380,000
Insects—other	0.9	0.1	0.2
Hardwood borers	0.6	0.2	0.3
Bark beetles	0.0	0.1	0.0
Terminal, shoot, & stem borers	19.5	2.6	0.9
Diseases—other	1.7	6.6	10.5
Root rots	0.0	0.0	0.5
Hardwood cankers	0.0	0.2	0.2
Branch stubs	1.3	1.3	4.9
Basal defects	3.8	4.8	4.7
Dieback	0.4	1.0	0.1
Fire	1.5	3.8	3.3
Animals	0.0	0.0	0.1
Beaver	0.0	0.0	0.1
Sapsucker	0.0	0.2	2.3
Weather—other	8.5	2.8	2.2
Flooding	0.1	0.1	0.0
Lightning	0.0	0.0	0.3
Hurricane	0.1	0.3	0.5
Tornado	0.0	0.0	0.2
Ice	0.2	0.2	0.0
Suppression, stagnation	22.6	0.6	0.0
People	0.3	0.3	0.5
Logging—damage	5.4	1.9	0.8
Offsite tree	0.0	0.1	0.0
Form (live tree only)	0.1	20.6	26.0
Soft maple	718,425,000	54,549,000	7,752,000
Hardwood borers	0.7	0.0	0.9
Bark beetles	0.1	0.0	0.0
Terminal, shoot, & stem borers	12.9	1.2	1.4
Diseases—other	3.9	11.4	21.7
Root rots	0.1	0.2	1.7
Hardwood cankers	0.7	0.3	0.3
Branch stubs	3.0	3.0	3.4
Basal defects	4.8	2.8	5.1
Dieback	0.1	0.6	4.1
Fire	0.5	0.5	0.7
Beaver	0.3	0.4	0.7
Sapsucker	0.0	0.0	0.7
Weather—other	14.2	3.5	2.2
Flooding	0.2	0.3	0.8
Hurricane	0.3	2.9	0.8
Ice	0.5	0.4	0.0
Suppression, stagnation	21.4	1.4	0.0
People	0.2	0.0	0.9
Logging—damage	5.2	5.6	1.3
Offsite trees	0.0	0.1	0.0
Form (live tree only)	0.3	41.2	38.6
Blackgum/tupelo	634,536,000	113,351,000	27,398,000
Insects—other	0.0	0.2	0.1
Hardwood borers	0.3	0.2	0.3
Terminal, shoot, & stem borers	13.1	1.4	1.4
Diseases—other	3.5	8.9	14.5
Root rots	0.0	0.4	0.2

Table 5.—*Approximate number of trees and percentage of damage incidence by hardwood species group and damaging agent or growth defect in Alabama—Continued*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Blackgum/tupelo—Continued			
Hardwood cankers	0.0	0.0	0.2
Branch stubs	1.6	0.8	1.0
Basal defects	3.3	4.0	4.4
Dieback	0.9	1.2	1.3
Fire	1.3	2.4	0.9
Beaver	0.8	2.9	1.7
Sapsucker	0.0	0.0	0.1
Weather—other	10.4	5.6	4.6
Flooding	0.0	0.4	0.1
Hurricane	0.7	1.2	0.8
Tornado	0.1	0.0	0.0
Ice	0.2	0.0	0.0
Suppression, stagnation	32.4	4.8	0.0
People	0.2	0.6	0.0
Logging—damage	4.8	2.4	0.7
Offsite tree	0.0	0.3	0.0
Form (live tree only)	0.3	22.6	24.2
Other white oaks	425,827,000	100,351,000	24,009,000
Insects—other	0.1	0.1	0.1
Hardwood borers	0.1	0.4	0.3
Terminal, shoot, & stem borers	11.5	2.2	1.2
Diseases—other	2.8	7.0	12.6
Root rots	0.0	0.1	0.7
Hardwood cankers	0.0	0.2	0.2
Branch stubs	1.5	3.9	8.2
Basal defects	2.7	5.3	5.3
Dieback	0.9	0.5	0.3
Fire	2.1	2.1	1.7
Sapsucker	0.0	0.0	0.6
Weather—other	13.3	2.4	0.8
Lightning	0.0	0.1	0.2
Hurricane	0.0	0.5	0.4
Ice	0.1	0.3	0.0
Suppression, stagnation	22.7	1.5	0.0
People	0.6	0.7	0.5
Logging—damage	3.8	3.2	0.2
Offsite tree	0.0	0.2	0.1
Form (live tree only)	0.0	19.9	28.5
Select white oaks[1]	323,486,000	78,301,000	26,159,000
Insects—other	0.2	0.1	0.0
Hardwood borers	0.0	0.4	0.1
Terminal, shoot, & stem borers	11.5	1.7	0.5
Diseases—other	0.8	3.3	7.0
Root rots	0.0	0.0	0.4
Hardwood cankers	0.0	0.3	0.1
Branch stubs	1.0	1.4	6.2
Basal defects	2.2	5.1	4.8
Dieback	0.9	1.0	0.5
Fire	1.3	1.2	1.5
Beaver	0.0	0.2	0.0
Sapsucker	0.0	0.8	1.5
Weather—other	9.5	2.1	0.5
Flooding	0.0	0.3	0.0
Lightning	0.0	0.0	0.1
Hurricane	0.2	0.0	0.0
Ice	0.4	0.0	0.0
Suppression, stagnation	21.3	0.8	0.0
People	0.6	0.2	0.7
Logging—damage	4.2	3.6	1.5
Offsite tree	0.2	0.0	0.0
Form (live tree only)	0.0	15.3	21.1

Table 5.—*Approximate number of trees and percentage of damage incidence by hardwood species group and damaging agent or growth defect in Alabama—Continued*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Yellow-poplar	155,452,000	42,370,000	21,160,000
Insects—other	0.0	0.0	0.2
Hardwood borers	0.0	0.6	1.2
Terminal, shoot, & stem borers	5.4	2.8	1.0
Diseases—other	1.4	2.3	8.4
Root rots	0.3	0.0	0.8
Hardwood cankers	0.4	0.9	0.5
Branch stubs	0.0	0.2	1.0
Basal defects	5.0	4.9	6.5
Dieback	1.1	0.0	0.4
Fire	1.1	0.5	1.9
Beaver	0.4	0.5	0.5
Sapsucker	0.0	0.0	2.3
Weather—other	9.2	7.4	4.1
Flooding	0.0	0.2	0.0
Hurricane	0.0	0.8	0.8
Ice	1.0	0.8	0.0
Suppression, stagnation	7.6	0.5	0.1
People	0.0	0.5	0.4
Logging—damage	3.4	3.5	1.5
Form (live tree only)	0.0	15.2	17.8
Ash	177,194,000	28,605,000	7,828,000
Insects—other	0.0	0.0	0.4
Terminal, shoot, & stem borers	13.4	3.8	1.3
Diseases—other	0.9	6.3	12.1
Root rots	0.3	0.0	1.2
Branch stubs	1.5	1.5	1.8
Basal defects	1.1	2.3	3.6
Dieback	1.2	0.7	0.9
Fire	0.3	0.0	1.5
Beaver	0.6	3.6	7.1
Sapsucker	0.0	1.0	1.3
Weather—other	22.2	8.6	2.3
Flooding	1.2	0.0	0.7
Hurricane	0.0	0.6	2.2
Suppression, stagnation	26.9	1.8	0.0
People	0.0	1.0	0.0
Logging—damage	2.6	1.1	1.1
Form (live tree only)	0.6	31.1	28.7
Hard maple	86,337,000	4,791,000	967,000
Terminal, shoot, & stem borers	17.0	0.0	0.0
Diseases—other	1.8	9.5	5.7
Hardwood cankers	1.4	0.0	0.0
Branch stubs	4.9	12.2	15.7
Basal defects	2.0	2.7	8.2
Dieback	0.0	0.0	6.9
Fire	0.6	4.8	14.0
Sapsucker	0.0	0.0	10.7
Weather—other	18.2	4.7	7.6
Suppression, stagnation	20.7	0.0	0.0
Logging—damage	5.2	0.0	0.0
Form (live tree only)	0.6	21.6	27.2
Noncommercial	78,277,000	8,318,000	69,000
Terminal, shoot, & stem borers	1.3	0.0	0.0
Diseases—other	0.0	3.4	0.0
Basal defects	1.8	0.0	0.0
Fire	0.0	2.0	0.0
Weather—other	0.6	0.0	0.0
Suppression, stagnation	2.8	0.0	0.0

Table 5.—*Approximate number of trees and percentage of damage incidence by hardwood species group and damaging agent or growth defect in Alabama—Continued*

Agent	Incidence of damage		
	Saplings	Poletimber	Sawtimber
Select red oaks[2]	53,757,000	15,547,000	9,173,000
Insects—other	1.1	0.0	0.4
Hardwood borers	1.0	2.8	0.2
Terminal, shoot, & stem borers	8.9	0.4	1.1
Diseases—other	3.9	4.2	12.7
Root rots	0.0	0.0	1.7
Hardwood cankers	1.0	1.3	0.0
Branch stubs	1.0	3.3	4.9
Basal defects	3.9	4.1	5.2
Dieback	2.0	0.7	0.8
Fire	0.0	0.7	1.9
Sapsucker	0.0	0.0	0.4
Weather—other	16.4	4.1	1.3
Lightning	0.0	0.0	0.5
Suppression, stagnation	18.2	0.0	0.2
People	1.0	1.8	0.1
Logging—damage	3.0	1.1	0.7
Form (live tree only)	0.0	18.1	19.6
Beech	31,372,000	6,966,000	4,460,000
Terminal, shoot, & stem borers	15.1	4.1	0.6
Diseases—other	0.0	6.8	27.2
Root rots	0.0	1.9	2.1
Branch stubs	1.6	3.4	1.4
Basal defects	3.7	2.3	3.7
Fire	1.7	3.9	5.0
Beaver	0.0	0.0	0.6
Weather—other	8.6	4.0	0.5
Flooding	0.0	0.0	1.0
Suppression, stagnation	16.6	0.0	0.0
Logging—damage	5.1	3.7	0.0
Form (live tree only)	1.8	29.3	23.1
Basswood	21,587,000	3,837,000	1,065,000
Terminal, shoot, & stem borers	12.6	0.0	0.0
Diseases—other	2.3	4.7	26.1
Root rots	0.0	1.8	6.2
Branch stubs	4.9	2.6	0.0
Basal defects	0.0	0.0	4.5
Fire	0.0	3.1	0.0
Sapsucker	0.0	6.2	9.6
Weather—other	30.9	5.9	0.0
Suppression, stagnation	7.0	0.0	0.0
Logging—damage	0.0	7.9	0.0
TSI (dead trees only)	0.0	6.1	0.0
Form (live tree only)	0.0	28.5	25.4
Black walnut	5,016,000	1,397,000	327,000
Terminal, shoot, & stem borers	9.9	8.0	0.0
Diseases—other	12.9	0.0	15.5
Branch stubs	0.0	0.0	9.7
Weather—other	31.6	0.0	0.0
Suppression, stagnation	24.3	0.0	0.0
Logging—damage	10.6	0.0	0.0
Form (live tree only)	0.0	47.2	54.2
Cottonwood	1,638,000	727,000	382,000
Diseases—other	0.0	0.0	55.5
Basal defects	0.0	0.0	10.5
Weather—other	0.0	11.7	4.1
Suppression, stagnation	33.3	0.0	0.0
Form (live tree only)	0.0	32.4	13.0

[1]White, swamp white, swamp chestnut, and bur oaks.
[2]Cherrybark, N. red, and shumard oaks.

Table 6.—*Poletimber and sawtimber removals and wood losses in Alabama*

Species	Annual timber removals		Volume loss: Annual mortality		Volume loss: Annual accumulated cull[1]	
	Poletimber	Sawtimber	Poletimber	Sawtimber	Poletimber	Sawtimber
	Mft³	*Mfbm*	*Mft³*	*Mfbm*	*Mft³*	*Mfbm*
Softwoods						
Loblolly pine	74,794.0	1,941,455.4	19,628.3	210,615.8	6,193.2	36,589.4
Shortleaf pine	40,841.0	669,764.9	21,379.4	136,014.0	666.8	7,099.3
Slash pine	15,618.5	149,158.4	3,332.2	25,737.9	963.3	2,733.7
Virginia pine	8,770.4	57,332.0	2,133.9	19,126.2	855.3	2,951.1
Longleaf pine	9,680.7	344,970.5	1,206.0	28,097.9	253.8	3,610.8
E. redcedar	727.5	3,043.8	684.5	2,388.6	203.5	0.0
Spruce pine	790.2	56,557.7	268.4	4,973.6	49.7	1,636.5
Baldcypress	0.0	23,704.4	85.3	4,184.3	88.8	627.9
Atlantic white cedar	0.0	0.0	0.0	0.0	0.0	54.6
Totals	151,222.6	3,245,989.8	48,718.0	431,138.3	9,274.5	55,308.4
Hardwoods						
Other eastern hardwoods	6,839.9	47,142.4	7,189.2	36,814.9	9,307.5	5,319.8
Sweetgum	15,927.8	128,147.4	5,515.8	42,557.0	5,195.9	7,663.2
Other red oaks	22,127.2	264,144.8	5,083.4	78,728.5	6,140.9	10,978.6
Hickories	9,224.3	90,608.9	1,619.0	28,127.9	3,466.7	5,091.4
Soft maple	2,259.7	13,635.5	1,531.6	9,707.4	2,821.1	783.8
Blackgum/tupelo	3,332.8	48,203.7	2,029.5	24,998.7	3,842.4	5,123.9
Other white oaks	8,394.2	61,430.1	2,384.7	19,824.7	3,838.9	5,098.9
Select white oaks[2]	6,493.1	106,888.0	614.5	11,248.9	1,710.8	4,377.5
Yellow-poplar	3,160.6	56,099.7	1,244.4	11,156.8	2,313.9	4,533.4
Ash	1,938.6	14,224.7	1,259.6	11,587.4	807.7	2,381.5
Hard maple	276.0	2,111.5	0.0	0.0	121.6	91.3
Noncommercial hardwoods	0.0	0.0	0.0	0.0	169.2	0.0
Select red oaks[3]	1,928.6	35,605.4	282.4	10,412.6	448.7	2,269.2
Beech	173.6	9,366.4	0.0	6,906.9	212.2	224.7
Basswood	96.9	573.2	0.0	679.4	124.6	363.6
Black walnut	0.0	0.0	222.9	513.2	0.0	119.6
Cottonwood	0.0	2,871.1	1,137.6	4,483.9	42.6	55.3
Totals	82,173.0	881,051.4	30,114.8	297,748.0	40,564.8	54,475.7

[1]Cull due to crooks, limbs, decay, missing wood, sweep, large forks, and volume in sections of bole that are too rough to be utilized as pulpwood or sawtimber.
[2]White, swamp white, swamp chestnut, and bur oaks.
[3]Cherrybark, Northern red, and shumard oaks.

Table 7.—*Annual economic impact of damage on the timber resource in Alabama*

Species	Annual volume wood fiber loss	Stumpage value per unit	Annual loss
		Dollars	
Softwoods			
Poletimber (Mft³)	57,992.5	141.00	8,176,942.50
Sawtimber (Mfbm)	486,446.6	152.00	73,939,886.85
Hardwoods			
Poletimber (Mft³)	70,679.6	35.30	2,494,988.70
Sawtimber (Mfbm)	352,223.7	53.00	18,667,856.74
All species			
Poletimber (Mft³)	128,672.1		10,671,931.20
Sawtimber (Mfbm)	838,670.3		92,607,743.58
Total			103,279,674.78

Appendix II—Scientific Names of Tree Species Mentioned

Common Name	Scientific Name
American elm	Ulmus americana L.
Ash	Fraxinus spp.
Atlantic white cedar	Chamaecyparis thyoides (L.) B.S.P.
Baldcypress	Taxodium distichum (L.) Rich.
Basswood	Tilia americana L.
Bear oak	Quercus ilicifolia Wangenh.
Beech	Fagus grandifolia Ehrh.
Black maple	Acer nigrum Michx.
Black oak	Quercus velutina Lam.
Black walnut	Juglans nigra L.
Blackgum	Nyssa sylvatica Marsh.
Birch	Betula spp.
Boxelder	Acer negundo L.
Buckeye	Aesculus spp.
Bur oak	Quercus macrocarpa Michx.
Butternut	Juglans cinerea L.
Cherrybark oak	Quercus falcata var. pagodifolia Ell.
Chestnut oak	Quercus prinus L.
Cottonwood	Populus deltoides Bartr. ex Marsh.
Cucumbertree	Magnolia acuminata L.
Cypress	Cupressus spp.
Dogwood	Cornus florida L.
Eastern hemlock	Tsuga canadensis (L.) Carr.
Eastern red cedar	Juniperus virginiana L.
Florida maple	Acer barbatum Michx.
Green ash	Fraxinus pennsylvanica Marsh.
Gums	Nyssa spp.
Hackberry	Celtis occidentalis L.
Hickories	Carya spp.
Holly	Ilex opaca Art.
Honeylocust	Gleditsia tricanthos L.
Laurel oak	Quercus laurifolia Michx.
Live oak	Quercus virginiana Mill.
Loblolly pine	Pinus taeda L.
Longleaf pine	Pinus pallustris Mill.
Maples (soft or hard)	Acer spp.
Mulberry	Morus spp.
Northern red oak	Quercus rubra L.
Nuttall oak	Quercus nuttallii Palmer
Oaks (red or white)	Quercus spp.
Overcup oak	Quercus lyrata Walt.
Pecan	Carya illinoiensis (Wangenh.) K. Koch.
Persimmon	Diospyros virginiana L.
Pines	Pinus spp.
Pond cypress	Taxodium distichum var. nutans (Ait.) Sweet
Pond pine	Pinus serotina Michx.
Post oak	Quercus stellata Wangenh.
Red maple	Acer rubrum L.
Sand pine	Pinus clausa (Chapm. ex Engelm.) Vasey ex Sarg.

Appendix II—Scientific Names of Tree Species Mentioned— Continued

Common Name	Scientific Name
Scarlet oak	Quercus coccinea Muench.
Scrub oak	Quercus spp.
Shortleaf pine	Pinus echinata Mill.
Shumard oak	Quercus shumardii Buckl.
Silver maple	Acer saccharinum L.
Silverbell	Halesia spp.
Slash pine	Pinus elliotii Enelm.
Southern red oak	Quercus falcata Michx.
Southern redcedar	Juniperus silicicola (Small) Bailey
Spruce pine	Pinus glabra Walt.
Sugar maple	Acer saccharum Marsh.
Sugarberry	Celtis laevigata Willd.
Swamp chestnut oak	Quercus michauxii Nutt.
Swamp tupelo	Nyssa aquatica L.
Swamp white oak	Quercus bicolor Willd.
Sweetbay	Magnolia virginiana L.
Sweetgum	Liquidambar styraciflua L.
Sycamore	Platanus occidentalis L.
Tupelo	Nyssa spp.
Virginia pine	Pinus virginiana Mill.
Water hickory	Carya aquatica (Michx. f.) Nutt.
Water oak	Quercus nigra L.
White oak	Quercus alba L.
Willow	Salix spp.
Willow oak	Quercus phellos L.
Yellow poplar	Liriodendron tulipifera L.

Mistretta, Paul A.; Bylin, Carl V.; Incidence and impact of damage to Alabama's timber, 1983. Resour. Bull. SO-112. New Orleans, LA: U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station; 1986. 20 p.

Data on timber damage collected during a 1981-83 survey of Alabama's forests are tabulated and discussed.

Additional keywords: forest resources, injury, insect, disease, survey.

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