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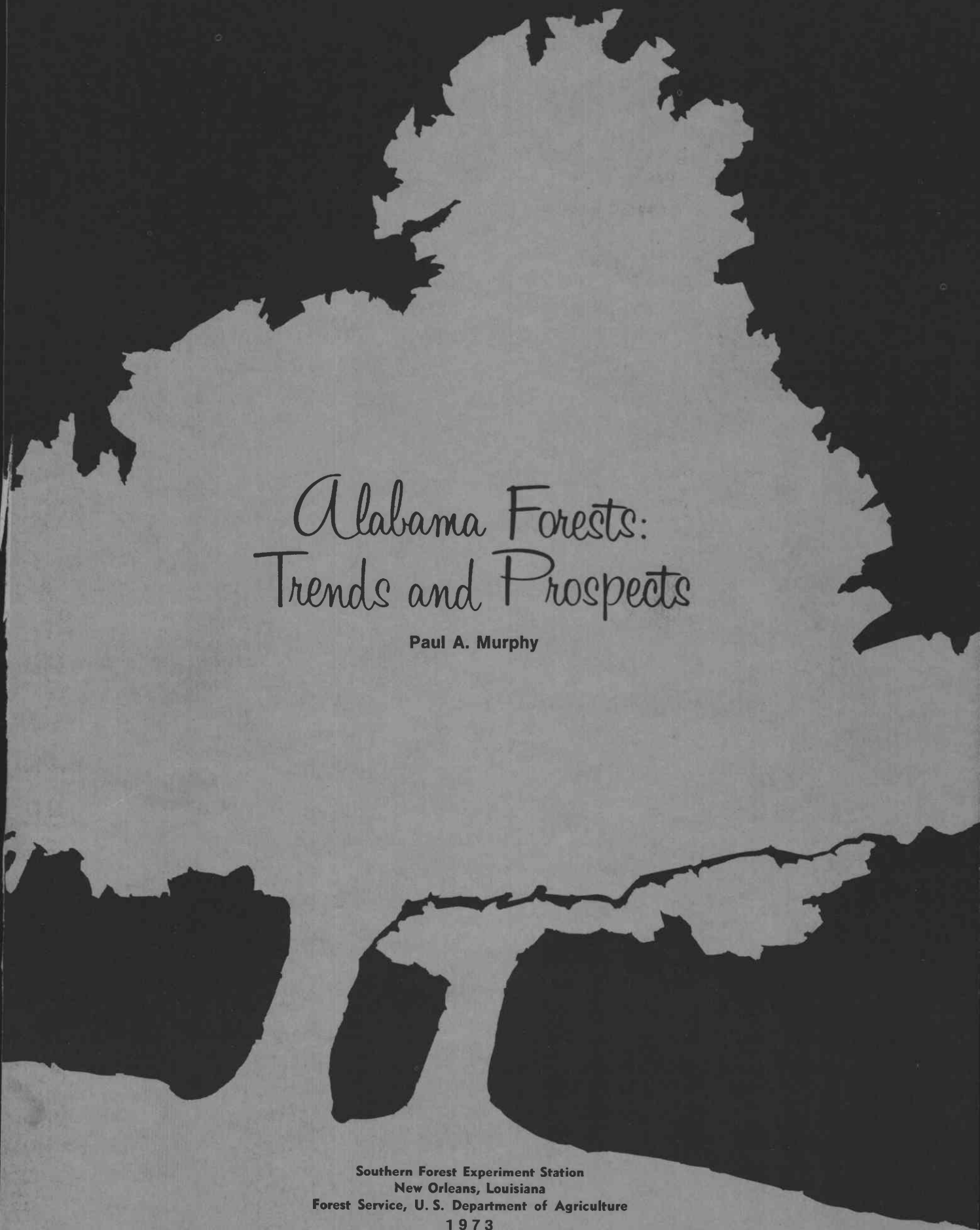

Alabama Forests: Trends and Prospects

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Highlights

This report contains the principal findings of the latest forest survey of Alabama. Data for growth and cut are given for 1971, and the inventory is reported for January 1, 1972. A canvass of forest products output for 1971 also provided information.

Forest area declined 2 percent since 1963 and now totals 21.3 million acres. The loss was principally due to woodland clearing for pasture.

The only noteworthy change in ownership was a decline in farmer-owned forest land due to clearing for pasture and shifts by farmers to other occupations. Most forest land is still owned by individuals, but forest industries have a substantial amount—4.2 million acres.

The volume of softwood growing stock is currently 11.3 billion cubic feet, an increase of 30 percent over 1963. All size classes experienced an increase, but most of the rise occurred in trees 14 inches and less in diameter. About 93 percent of the softwood growing stock is in the four major southern pines.

The softwood sawtimber inventory also increased 30 percent and now totals 42.3 billion board feet. Concomitant with this improvement in sawtimber inventory was an increase in timber quality.

In contrast, hardwood growing stock increased 15 percent, resulting in a 1972 inventory of 8.9 billion cubic feet. About three-fourths of this volume increase was in trees 14 inches in diameter and less. The most important species groups in order of volume are oak, sweetgum, hickories, and tupelo and blackgum.

Hardwood sawtimber volume is presently 21.2 billion board feet, an increase of 15 percent. However, no improvement in hardwood sawtimber quality was detected.

Net growth in 1971 was 1.2 billion cubic feet or 56 cubic feet per acre; 1962 growth was 45 cubic feet per acre. However, growth is still below its potential of 90 cubic feet per acre because 65 percent of Alabama's forests are less than fully stocked.

After deducting the 1971 timber removals from net growth, 448 million cubic feet remained to add to the State's timber inventory in 1971. These removals—such as from timber harvesting and land clearing—totaled 739.6 million cubic feet. Thus, Alabama enjoys a comfortable margin of timber growth over cut.

About 718 million cubic feet of roundwood were supplied to forest industries from Alabama's forests. Two products, sawtimber and pulpwood, accounted for 91 percent of the total output.

Between 1962 and 1971 softwood saw-log production rose 46 percent to 1.1 billion board feet. Many pine saw logs are now being processed by the 11 chipping headrigs in Alabama. Hardwood saw-log cutting increased only 13 percent, to 386 million board feet.

Pulpwood production reached 4.8 million cords in 1971, making pulpwood Alabama's leading roundwood product. Pulping capacity has more than doubled since 1962, but roundwood requirements have been moderated somewhat by the increased utilization of residue in pulp manufacture.

There are now six pine plywood plants in Alabama, and they account for most of the veneer-log consumption. From virtually nothing in 1962, softwood veneer-log output rose to 221 million board feet in 1971. By contrast, hardwood veneer-log production dropped 44 percent to 57 million board feet in 1971. Most of the hardwood mills produced veneer for containers.

Although Alabama's forests have improved in volume, stocking, and growth, problems still remain. Almost 10 million acres suitable for growing pine are currently supporting pure or mixed hardwood stands. Moreover, one of every five hardwood trees 5 inches d.b.h. and larger is a cull.

The expansion of the forest products industry in the last decade indicates that more industrial growth may be in the offing. Improving hardwood stands and converting unproductive upland hardwood stands to pine can help Alabama's forests meet the increased resource demands of the years ahead.

Figure 1.—*Forest resource regions of Alabama.*

Resource Trends

FOREST AREA

Less Forest Area

Occupying 65 percent of the State, forests are a dominant feature of Alabama's landscape (fig. 1). Some 21.3 million acres (table I) are capable of and available for growing commercial crops of timber, and an additional 17,000 are reserved for nontimber uses. The present commercial forest area represents a 2 percent decline from that of 1963.

Table I. *Commercial forest land in 1972 and change since 1963*

Region	Commercial forest	Change since last survey	Proportion of region forested[1]
	Thousand acres	*Percent*	*Percent*
North	9,818.7	−3	63
Southeast	5,348.4	−2	59
Southwest	6,166.0	(2)	75
All regions	21,333.1	−2	65

[1] Total forest, including noncommercial, as a proportion of total area in the region.
[2] Negligible.

Of the 67 counties in Alabama, 37 lost significant forest area since the last survey in 1963 (fig. 2). The remainder had either no change or an increase. The counties experiencing losses were mostly in the North and Southeast regions.

Most of the decline was attributable to agriculture. Since the last survey, about 696,000 acres of forest were cleared for agriculture, mostly pasture (table II). An additional 216,000 were diverted to other uses. Although 503,000 acres reverted to forest, they were insufficient to offset the losses from land clearing.

The modest decline in forest acreage reverses a trend of increasing forest area documented in early 1960's.[1] Recent surveys in other Midsouth States also have revealed losses in timbered acreage. As agriculture and other uses continue to claim forest land, further declines are anticipated for the future.

No Big Changes in Ownership

Ownership patterns did not change substantially since 1963. Forest ownership in Alabama is overwhelmingly private; only 5 percent is publicly owned. Most of the public forest land is in national forests.

Forest industries own 4.2 million acres and lease an additional 372,000. As large tracts suitable for acquisition have become more scarce, forest industries have turned to leasing to assure a raw material supply.

About 16.1 million acres are held by private owners other than forest industries. Corporations in this category have some 1.7 million acres; the remainder is owned by farmers or other individuals. Farmer-owned forest land has declined as some operators switched to other occupations and others cleared timber for pasture and cropland. This category was the only one that changed appreciably in the last 9 years.

[1] Sternitzke, H. S. **Alabama forests.** USDA For. Serv. Resour. Bull. SO-3, 32 p. South. For. Exp. Stn., New Orleans, La. 1963.

Table II. *Changes in commercial forest land, 1963-1972*

Region	Net change	Additions from:			Diversions to:		
		Total	Nonforest	Noncommercial forest	Total	Agriculture	Other
				Thousand acres			
North	−315.3	123.2	122.6	0.6	438.5	301.7	136.8
Southeast	−104.4	155.5	149.3	6.2	259.9	210.9	49.0
Southwest	+ 10.6	224.6	218.0	6.6	214.0	183.7	30.3
All regions	−409.1	503.3	489.9	13.4	912.4	696.3	216.1

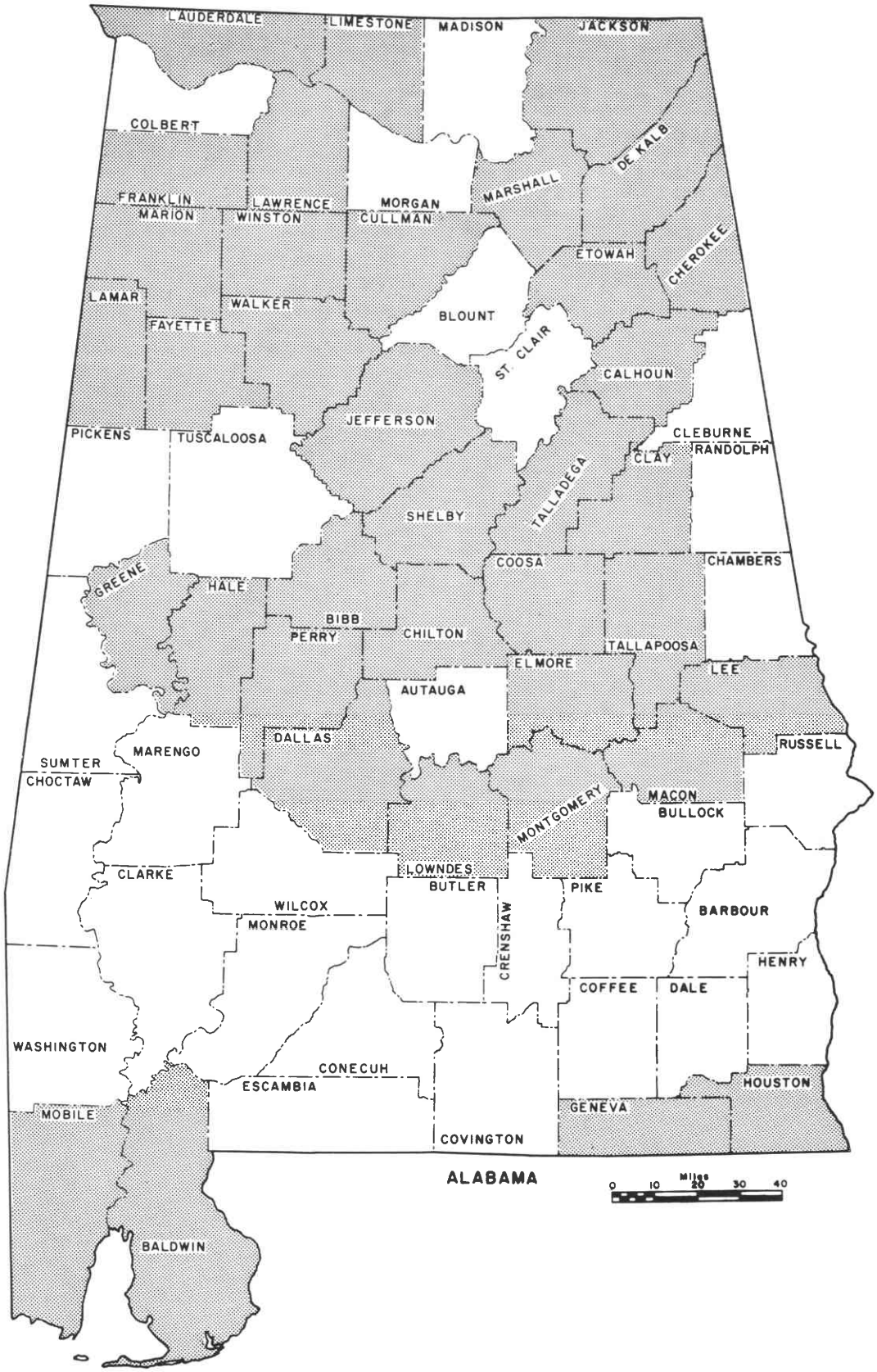

Figure 2.—*Alabama counties with a loss in commercial forest area from 1963 to 1972.*

About 7.7 million acres are owned by other private individuals, a heterogeneous category that includes professionals, retirees, housewives, and others.

Forest Type

Forest land in Alabama was classified according to its suitability for growing certain species groups—pines, upland hardwoods, or bottomland hardwoods (table III). These site classes do not necessarily indicate what species are presently growing on an area.

Most of Alabama's forest land is suited for southern pine. Such areas, comprising 17.4 million acres, occur in the Coastal Plain and in the uplands on dry sites. Some are already occupied by the longleaf-slash or loblolly-shortleaf pine forest types, but more than half are currently supporting pure or mixed stands of hardwoods. Oak-pine and oak-hickory forests collectively occupy 9.7 million acres or more than half of the pine sites.

Table III. *Commercial forest land by forest type and site, 1972*

Forest type	All sites	Southern pine	Upland hardwood	Bottomland hardwood
		Thousand acres		
Longleaf-slash pine	1,483.6	1,365.2	.....	118.4
Loblolly-shortleaf pine	6,380.1	6,272.6	.....	107.5
Oak-pine	5,016.9	4,682.9	.....	334.0
Oak-hickory	5,913.1	5,036.4	876.7	.....
Oak-gum-cypress	2,443.5	.....	.....	2,443.5
Elm-ash-cottonwood	95.9	.....	.....	95.9
All types	21,333.1	17,357.1	876.7	3,099.3

There are 877,000 acres of uplands that are suitable for growing cove-type hardwoods such as yellow-poplar. An additional 3.1 million acres of hardwood sites are in bottom lands, principally along the Mobile, Tombigbee, Black Warrior, and other rivers.

TIMBER VOLUME

In 1972 there were 22.4 billion cubic feet of wood in Alabama's forests. Volume in growing stock—that is, in trees presently or prospectively suitable for sawtimber—totaled 20.2 billion cubic feet. Because methods for computing tree volume were changed since the 1963 survey, the volumes from 1963 were adjusted to conform to the 1972 standards.

Softwood Increases Moderately

Softwood growing stock composes 98 percent of the softwood volume (fig. 3). Almost all is in the four major southern pines. For example, loblolly pine alone makes up 53 percent of the softwood (fig. 4).

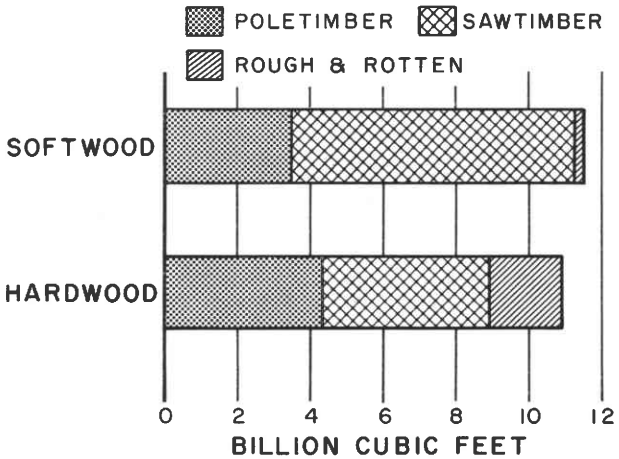

Figure 3.—*Volume of softwoods and hardwoods by class of timber.*

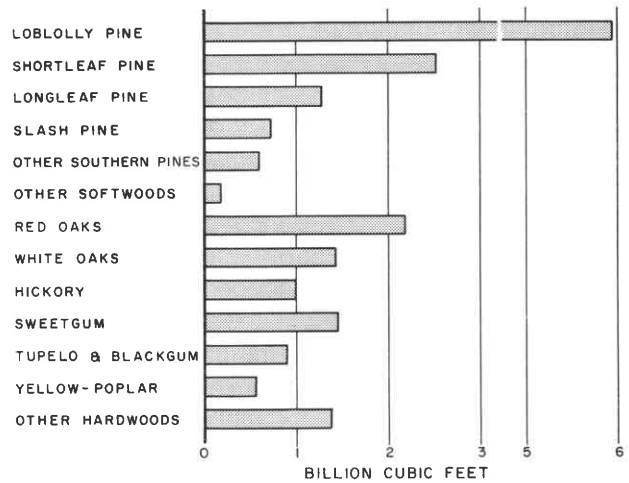

Figure 4.—*Growing stock by species.*

The 11.3 billion cubic feet in softwoods represents a 30-percent increase over 1963 (table IV). An upward trend in softwood volume was also documented in the previous survey. Although the most sizable gain was in trees in the 14-inch class and less, all diameter classes grew in volume (fig. 5). The sizable growth in the small sizes is encouraging to the pulp industry, and the increase in the sawtimber sizes bodes well for sawmills and plywood mills.

Table IV. *Growing-stock volume in 1972 and change since 1963*

Region	Softwood		Hardwood	
	Volume	Change	Volume	Change
	Million cu. ft.	*Percent*	*Million cu. ft.*	*Percent*
North	4,492.8	+44	4,244.6	+21
Southeast	2,825.0	+43	2,122.1	+22
Southwest	3,964.8	+11	2,562.4	+ 2
All regions	11,282.6	+30	8,929.1	+15

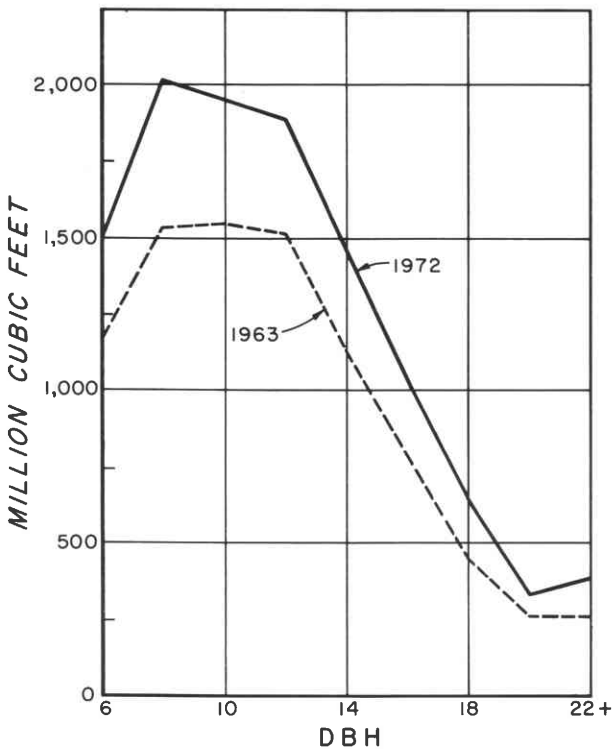

Figure 5.—*Softwood growing stock by tree diameter, 1963 and 1972.*

About 69 percent of the growing stock volume is in sawtimber trees. The percentage increases in sawtimber resemble those of growing stock (table V). The overall gain was 30 percent, with the North and Southeast regions posting the largest increases. Most sawtimber is in private nonindustrial ownership (fig. 6). Associated with the increase in volume was some improvement in quality.

Table V. *Sawtimber volume in 1972 and change since 1963*

Region	Softwood		Hardwood	
	Volume	Change	Volume	Change
	Million bd. ft.	*Percent*	*Million bd. ft.*	*Percent*
North	14,542.6	+42	9,660.7	+22
Southeast	10,664.9	+45	4,747.7	+30
Southwest	17,075.9	+14	6,825.3	− 1
All regions	42,283.4	+30	21,233.7	+15

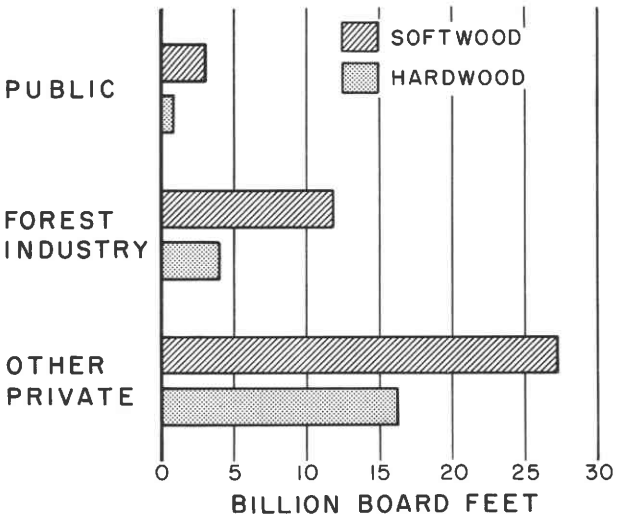

Figure 6.—*Sawtimber volume by class of ownership.*

The smaller volume gains for growing stock and sawtimber in the Southwest region are probably the result of larger initial volumes per acre and greater removals. This region has the largest per-acre volumes (table VI). As stand volume increases, annual growth becomes proportionately less of the standing inventory. With a high concentration of forest industry in the Southwest, there is a relatively large drain on the forest resource. Despite the heavy removals in the Southwest, its inventory continues to increase.

Table VI. *Average volume per acre of growing stock and sawtimber by species group and region, 1972*

Region	Growing stock			Sawtimber		
	Total	Softwood	Hardwood	Total	Softwood	Hardwood
	Cubic feet			*Board feet*		
North	890	458	432	2,465	1,481	984
Southeast	925	528	397	2,882	1,994	888
Southwest	1,059	643	416	3,876	2,769	1,107
All regions	948	529	419	2,977	1,982	995

Hardwood Increases Some

Hardwood growing stock presently totals 8.9 billion cubic feet (table IV). Species groups with

greatest volumes were oaks, sweetgum, hickories, and tupelo and blackgum.

The present volume represents a 15-percent increase over the 1963 inventory (table IV). At that time a volume increase in the Southwest region compensated for inventory declines in the remainder of the State. Since 1963, however, the North and Southeast regions had gains of over 20 percent, while the Southwest region's hardwood volume remained relatively stable.

About 52 percent of the growing-stock volume is in sawtimber-size trees. The present sawtimber volume is 21.2 billion board feet; its increase was the same as for growing stock—15 percent (table V). However, sawtimber volume in the Southwest region declined slightly, mainly due to a reduction of the blackgum and tupelo inventory in that region. This soft-textured species group is much in demand, but its diameter growth is slow.

The distribution of the volume increase was uneven. While growing-stock volume in the lower diameter classes increased considerably, the absolute gain in diameter classes 18 inches and greater was small (fig. 7).

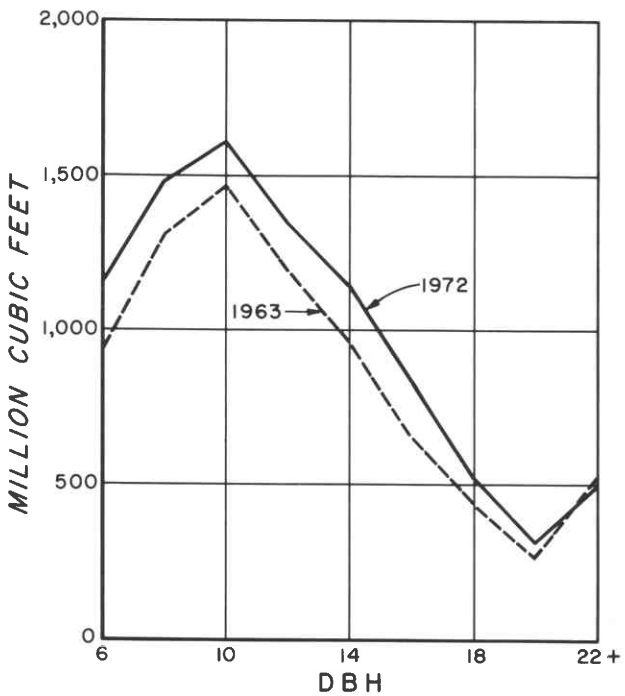

Figure 7.—*Hardwood growing stock by tree diameter, 1963 and 1972.*

Concomitant with the small increase in large trees was a lack of improvement in timber quality. These two trends are not good for hardwood industries that depend upon factory lumber logs. These mills may have to buy smaller and poorer quality logs to maintain or increase production. If they do, the yield of high-quality lumber will decline. Moreover, supplies will not increase much in the future unless management of hardwood stands is improved.

In contrast, low quality material suitable for pulpwood is plentiful. Much of this volume is currently on pine sites where growth is slower for hardwoods. About 5.2 billion cubic feet or over half of the hardwood growing stock falls in this category.

GROWTH AND REMOVALS

Gross growth for Alabama's forests was 1.3 billion cubic feet in 1971 (table VII). The components of gross growth are: (1) survivor growth—the increment in net volume of growing stock trees at the beginning of the specified year and surviving to its end; (2) ingrowth—the net volume of trees at the time they grew into growing stock during a specified year; (3) growth on ingrowth—the increment in net volume of trees after they grew into growing stock in a specified year; (4) growth on removals—the increment in net volume of growing-stock trees that were cut during the year; (5) mortality—the net volume in growing-stock trees that died during the year.

Survivor growth comprised 78 percent of gross growth in 1971, ingrowth and growth on ingrowth contributed 12 percent, growth on removals took up 2 percent of gross growth, and mortality claimed 8 percent. These percentages did not vary significantly between regions, but differences between hardwoods and softwoods did occur.

The relative importance of each growth component was the same for both species groups, but mortality claimed a bigger percentage of gross growth in hardwoods. This bigger mortality also reduced the percentage contribution of hardwood survivor growth. The difference in species groups was least pronounced in the North resource region.

Net growth, gross growth minus mortality, was 1.2 billion cubic feet in 1971 (table VII). About 44 percent of this net growth was in the North region, 26 percent occurred in the Southeast, and the remaining 30 percent was in the

Table VII. *Growth components of growing stock on commercial forest land, by species group and resource region, Alabama, 1971*

Resource region	Species group	Growth components					Total	
		Survivor growth	Ingrowth	Growth on ingrowth	Growth on removals	Mortality	Gross growth	Net growth
		Million cubic feet						
North	Softwood	287.7	44.2	1.1	6.9	27.5	367.4	339.9
	Hardwood	161.2	23.2	.3	1.8	21.5	208.0	186.5
	Total	448.9	67.4	1.4	8.7	49.0	575.4	526.4
Southeast	Softwood	174.4	29.6	.8	5.3	10.3	220.4	210.1
	Hardwood	82.1	15.0	.2	1.3	16.9	115.5	98.6
	Total	256.5	44.6	1.0	6.6	27.2	335.9	308.7
Southwest	Softwood	206.1	25.4	.7	5.8	12.0	250.0	238.0
	Hardwood	93.3	19.0	.3	1.7	15.3	129.6	114.3
	Total	299.4	44.4	1.0	7.5	27.3	379.6	352.3
All regions	Softwood	668.2	99.2	2.6	18.0	49.8	837.8	788.0
	Hardwood	336.6	57.2	.8	4.8	53.7	453.1	399.4
	Total	1,004.8	156.4	3.4	22.8	103.5	1,290.9	1,187.4

Southwest. The percentage contribution of each region to growth followed the distribution of the State's growing stock.

Nearly all the softwood growth is in southern pine, and sweetgum and the oaks comprise almost two-thirds of the growth of hardwood growing stock. The growth in hardwoods, however, is not so well distributed in desirable species as in softwood. For example, only 25 percent of oak growth is in preferred species.

In 1962, annual net growth was 972.7 million cubic feet or 45 cubic feet per acre. By 1971, growth had increased to 56 cubic feet per acre. But annual net growth has not reached its capacity.

Alabama's forests are capable of producing an average annual net growth of 90 cubic feet per acre. Thus, growth was only 62 percent of its potential in 1971. Stocking and stand structure provide clues as to why commercial forests in Alabama are not producing at capacity.

Stocking is an indication of how much the productive capacity of a site is being utilized by trees, and it is usually measured by comparing the number of trees or basal area with some standard. Full or 100 percent stocking is the relative density at which there is no increase in growth with any further increase in stocking.

About 65 percent of Alabama's forests are less than fully occupied by growing-stock trees. In some stands growing space is being preempted by less desirable trees or competing vegetation; until this material is removed, growing stock cannot fully occupy these sites. In other stands the growing space is not fully occupied by any trees, good or bad.

Stand structure also affects net volume growth. Nonstocked and seedling and sapling stands contribute little volume growth, and there are 7.4 million acres of these stands in Alabama.

Growing stock in Alabama increased by 448 million cubic feet in 1971, while the sawtimber inventory grew by 1.3 billion board feet (table VIII). These increases are the residual after subtracting the year's timber removals from net growth. Growing stock increased for all species in 1971. Likewise, the sawtimber inventory grew except for tupelo and sweetgum. Cutting in excess of growth in the Southeast and Southwest regions reduced the statewide sawtimber inventory in these species.

Of the 739.6 million cubic feet of removals, 92 percent left the woods as roundwood products, 5 percent remained as logging residue, and 3 percent was destroyed in operations such as land clearing and timber stand improvement.

Table VIII. *Summary of volume-change statistics, 1971*

Resource region	Species group	Growing stock			Sawtimber		
		Net growth	Removals	Net change	Net growth	Removals	Net change
		— — — *Million cubic feet* — — —			— — — *Million board feet* — — —		
North	Softwood	339.9	180.2	+159.7	1,154.9	724.8	+ 430.1
	Hardwood	186.5	82.1	+104.4	472.7	292.7	+ 180.0
	All species	526.4	262.3	+264.1	1,627.6	1,017.5	+ 610.1
Southeast	Softwood	210.1	146.3	+ 63.8	894.0	568.9	+ 325.1
	Hardwood	98.6	58.2	+ 40.4	249.4	192.6	+ 56.8
	All species	308.7	204.5	+104.2	1,143.4	761.5	+ 381.9
Southwest	Softwood	238.0	199.4	+ 38.6	1,104.6	849.7	+ 254.9
	Hardwood	114.3	73.4	+ 40.9	326.1	223.7	+ 102.4
	All species	352.3	272.8	+ 79.5	1,430.7	1,073.4	+ 357.3
All regions	Softwood	788.0	525.9	+262.1	3,153.5	2,143.4	+1,010.1
	Hardwood	399.4	213.7	+185.7	1,048.2	709.0	+ 339.2
	All species	1,187.4	739.6	+447.8	4,201.7	2,852.4	+1,349.3

Timber Products Output

About 718 million cubic feet of wood were supplied to industry from Alabama's forests in 1971.[2] Saw logs and pulpwood together comprised 91 percent of the industrial roundwood output. An additional 17 million cubic feet were cut for nonindustrial or domestic consumption, mostly for firewood.

The last 9 years have witnessed many changes in forest industries and timber harvesting in Alabama. These developments have expanded the resource by increasing its utilization.

TRENDS IN TECHNOLOGY

There have been two major developments in forest industries. Improvements in peeling equipment have made it practical to produce veneer from relatively small southern pine logs. A new sawmill headrig has been developed.

The southern pine plywood industry began in Arkansas in 1963. By 1969, there were 34 plywood plants located throughout the Midsouth. The industry owes its growth to three factors—an available timber supply, nearness to populous markets, and the development of high-speed peeling equipment with low unit operating cost for small diameter logs. To be profitable, logs for plywood should be at least 12 inches in diameter, and the region's supply in these sizes is ample.

The other new technology is the chipping headrig. Instead of producing slabs and sawdust like a conventional headrig, the chipping headrig, as its name implies, produces chips while forming a cant, which is subsequently sawn into dimension lumber. In this operation, only about 5 percent of the log is ultimately converted into sawdust versus the 22 percent for a conventional operation.[3] Moreover, chipping headrigs can profitably process logs as small as 6 inches in diameter, and they can be used to convert veneer cores into chips and studs.

Time has also wrought changes in timber harvesting. Because the trees can be more completely utilized, shears are being used to sever the tree stems. The lower stump height means less waste.

The need for more complete utilization has stimulated tree-length and multiproduct logging. For example, in 1964 about 6 percent of the softwood pulpwood came from multiproduct logging operations, but by 1972 this proportion had increased to 20 percent.[4]

Forest industries have improved utilization through lateral integration—manufacturing of several products at single locations. Logs can be hauled tree length to these locations. Sections less than 6 inches in diameter can be completely chipped, and 6- to 12-inch portions can be processed by a chipping headrig. Logs at least 12 inches in diameter can be made into plywood if the quality is sufficient. Otherwise, they too may be processed by the chipping headrig.

The effect of these new technologies can be seen in the 1971 timber harvest for Alabama.

TIMBER HARVEST

Saw Logs

About 1.5 billion board feet of saw logs were harvested in Alabama during 1971, which is an increase of 36 percent over 1962. Softwoods, mainly pine, made up three-fourths of the production.

Softwood volume has risen by 46 percent since 1962. The advent of the chipping headrig has made the processing of once marginal log sizes profitable. Lumber production has risen accordingly. Eleven of the 323 sawmills in Alabama had chipping headrigs in 1971. They accounted for 28 percent of all the softwood saw logs produced.

In contrast to softwood, hardwood saw-log production has risen only 13 percent to 386 million board feet. Oak comprises over one-half of the volume; yellow-poplar, sweetgum, and tupelo and blackgum are the other principal species.

Attrition continues to reduce the ranks of sawmills. There were 323 in 1971 (fig. 8), 555 in 1962, and 3,030 in 1946. Although the number

[2] Bertelson, D. F. **Alabama forest industries.** USDA For. Serv. Resour. Bull. SO-36, 29 p. South. For. Exp. Stn., New Orleans, La. 1972.

[3] Koch, P. **Technological developments in the southern pine industry.** For. Farmer 30(7):16-20. 1971.

[4] Beltz, R. C., and Chappell, T. W. **Trends in product logging and tree utilization in Alabama.** For. Prod. J. 23(8):15-16. 1973.

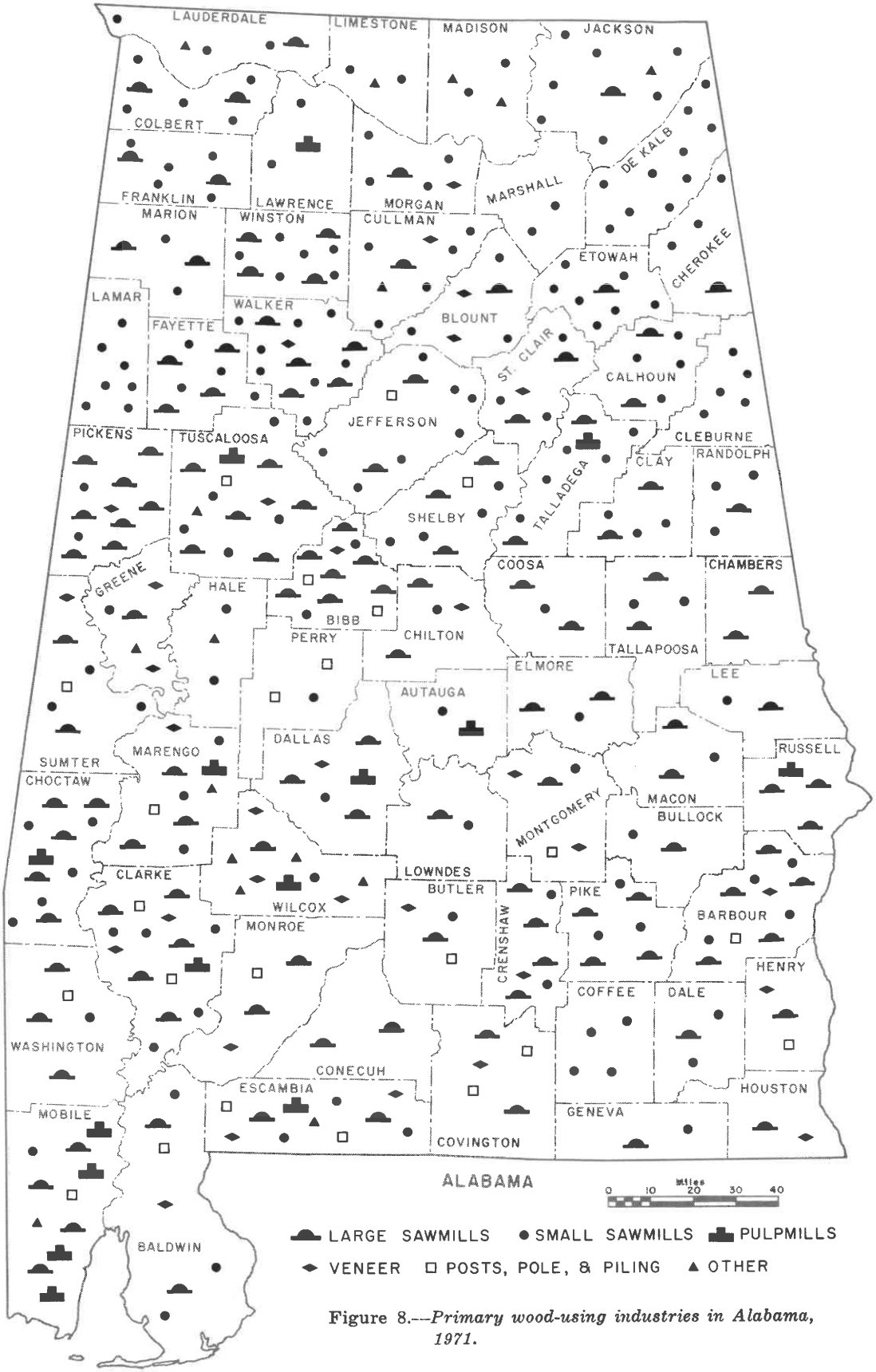

Figure 8.---*Primary wood-using industries in Alabama, 1971.*

has decreased, average size has increased, and 43 mills cut over 10 million board feet in 1971. Most of the large plants—those processing at least 3 million board feet per year—use pine. With a potential processing rate of 100 or more lineal feet per minute, the 11 mills with chipping headrigs have large raw material requirements. Consequently, their occurrence has raised average production significantly.

The supply radius for the State's mill is large; half of the saw logs cut in Alabama cross county lines before primary processing. Alabama's sawmills get most of their logs from inside the State. Only 84 million board feet of logs are imported, and only 3 percent of the logs cut in the State are exported.

Pulpwood

With a 1971 production of more than 4.8 million cords, pulpwood is Alabama's leading roundwood product (fig. 9). Only Georgia led Alabama in pulpwood production in 1971, and these States together accounted for one-third of the South's output.[5]

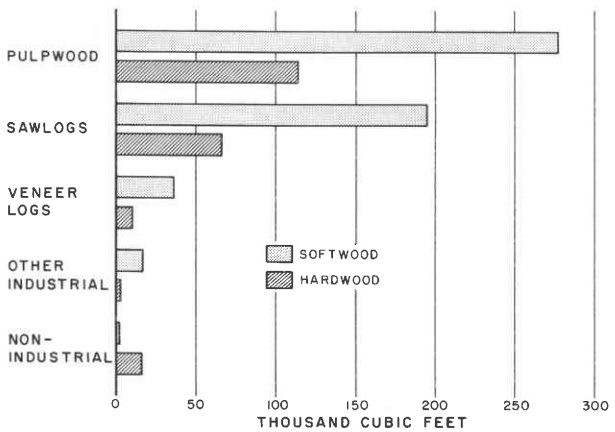

Figure 9.—*Output of Alabama roundwood by product, 1971.*

Softwood pulpwood cutting has risen 71 percent since 1962, and the hardwood share has risen from 24 to 29 percent of the total. Roundwood production — especially pine — increased briskly until about 1968, when residue use started growing rapidly (fig. 10). Roundwood output has subsequently remained at a plateau as softwood residue has assumed a larger share of the pulpwood output.

[5] Bellamy, T. R. **Southern pulpwood production, 1971.** USDA For. Serv. Resour. Bull. SE-23, 20 p. Southeast. For. Exp. Stn., Asheville, N. C. 1972.

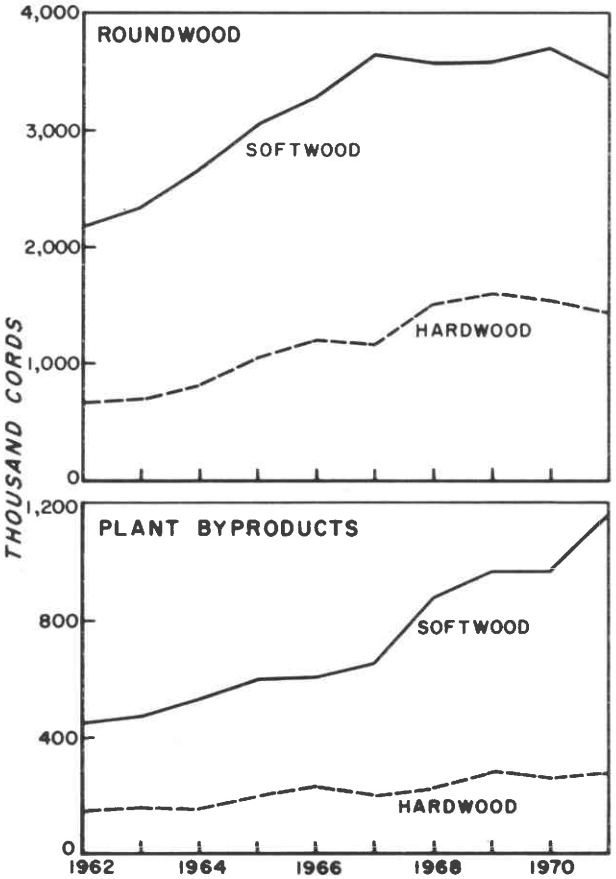

Figure 10.—*Pulpwood production in Alabama, 1962-1971.*

About 1.4 million cords of Alabama wood were processed in other States, and 800,000 cords were imported. Hence, 71 percent of the roundwood produced in Alabama is also processed there.

Several pulpmills have been expanded, and six pulpmills have been built since 1962, raising the daily capacity from 5,093 to 11,443 tons. The State's 15 pulpmills (fig. 8) now have an average daily capacity of 764 tons—up from 556 tons in 1962.

Veneer Logs

About 278 million board feet of veneer logs were removed from Alabama's forests in 1971, and pine comprised almost four-fifths of this total. In 1962, the southern pines made up a minuscule portion of the veneer-log harvest; today they dominate it. Virtually all this pine volume finds its way into plywood.

With six plants located now in Alabama, the nascent southern pine plywood industry has grown and matured. Production of logs for ply-

wood has zoomed. From virtually nothing in 1962, harvest of pine peeler logs reached 137 million board feet in 1969 and 220 million in 1971.

Three of the six plants also have a sawmill with a chipping headrig. Thus, these firms can allocate logs for the greatest financial return. Logs that are submarginal for veneer can be processed by the chipping headrig.

Hardwood veneer-log production has been waning because of a declining resource base. Even in Alabama, which leads the other Midsouth States in hardwood veneer-log production, the harvest went from 101 million board feet in 1962 to 57 million in 1971—a drop of 44 percent. Soft-textured hardwoods, such as tupelo and blackgum, have been preferred by the industry, but their proportion of the harvest has been declining as large trees of these species have become scarcer. Others, such as oaks, now make up a larger portion of the harvest.

The number of hardwood veneer mills has declined from 34 to 26 since 1963. Seventeen of the 26 produce veneer for containers, and these mills can utilize smaller and lower quality logs than producers of standard veneer.

Other Products

Alabama is one of the leading producers of poles in the Midsouth. In 1971, its forests produced over 1 million poles, which represents about 2 percent of the industrial roundwood harvest. Pole production has been increasing—from 820,000 in 1962 and 836,000 in 1964 to the present amount.

Other roundwood products comprised less than 1 percent of the total industrial roundwood output. These products include commercial posts, cooperage, excelsior, furniture stock, handlestocks, miscellaneous dimension, piling, and shuttleblocks.

PLANT RESIDUES AND BYPRODUCTS

About 179 million cubic feet of residues were generated by the forest industries in Alabama in 1971. About two-thirds was coarse material, such as slabs, edgings, and cull pieces, which can be converted into chips for pulping. The rest was in fines like sawdust, which cannot be chipped.

Some 115 million cubic feet of residues were used in pulp and particleboard, 29 million were burned for fuel, and 7.8 million were used for other purposes like charcoal, animal bedding, or mulch. In total, 87 percent of all the plant residue was used in some manner.

About 97 percent of coarse residues are being utilized versus only 70 percent of the fines. About 24 million cubic feet, mostly fine, were wasted. Chipping headrigs have reduced the proportion of fine residue that might have ordinarily occurred.

About 2 million tons of bark were also generated by Alabama industries. Currently about two-thirds of it is being utilized.

Timber Supply Outlook

Although future demand for timber is difficult to predict, it will almost certainly increase. Timber supply too is unpredictable, but projections can be made to see what might happen under different assumptions about future conditions.

Two such projections, called prospective cut and potential cut, were made for Alabama. In the prospective cut, present trends in forest management were assumed to continue, and the cut was adjusted to balance with growth by the end of the projection period. In the potential cut, more intensive management was assumed so that there would be a better balance of tree sizes in 30 years, the length of the projection period.

PROSPECTIVE CUT

The annual cut in this projection was adjusted each year so that it balanced with the growth on growing stock for the last year of the projection period (figs. 11 and 12). The other assumptions were that commercial forest area will remain constant, and that growth, mortality, and cutting rates for each diameter class will not change.

The margin of growth over cut for softwood was 1.5 for both growing stock and sawtimber at the start. This margin decreased as annual removals were increased until the year 2001, when they balanced. The growth in 2001 would be approximately 1 billion cubic feet—an increase of 27 percent over the growth for 1971. Sawtimber cut for softwood also increased throughout the projection period. In 2001, the cut for sawtimber would be slightly less than the growth of 4.4 billion board feet (fig. 11). Most of the increase in volume would be in the smaller classes (fig. 13). The growing-stock volume in 2002 would be 15.1 billion cubic feet.

The growth-cut ratios for hardwoods in 1971 were 1.9 for growing stock and 1.5 for sawtimber. Growing stock growth and cut both increased during the projection period and balanced in 2001, when they equalled 599 million cubic feet (fig. 12). Growing-stock growth in

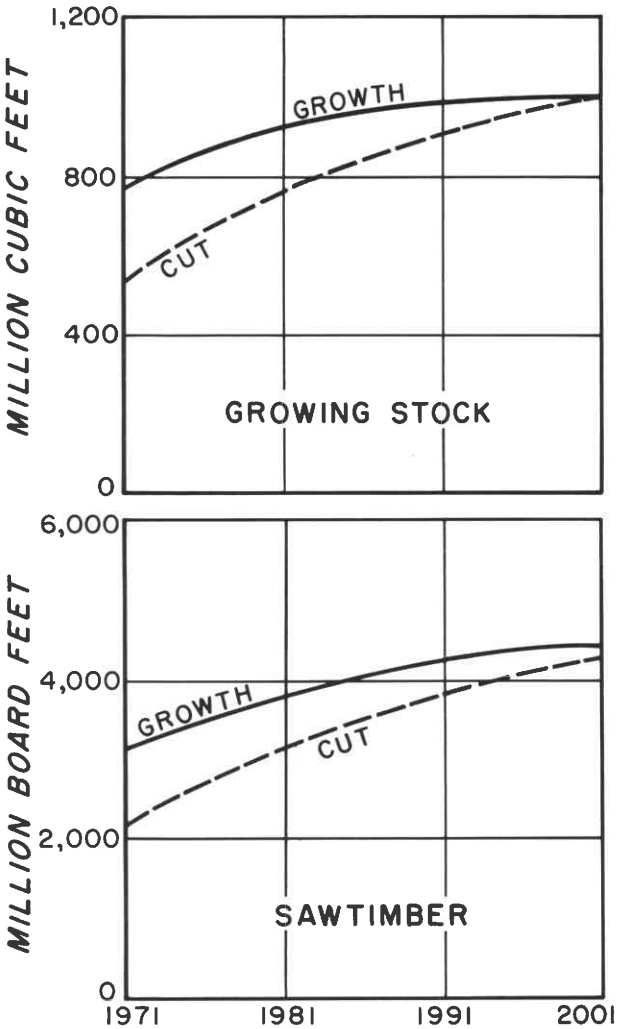

Figure 11.—*Prospective growth and cut of softwood, 1971-2001.*

fact increased 50 percent during the projection period.

Hardwood sawtimber growth and cut are a different matter. Although growth exceeded cut in 1971, sawtimber removals equaled growth in 1979 and exceeded it by an increasing margin for the remainder of the projection period. Growth would be only 81 percent of removals in 2001.

This persistent excess of removals over growth would reduce the hardwood sawtimber inventory from 21.2 billion board feet in 1971

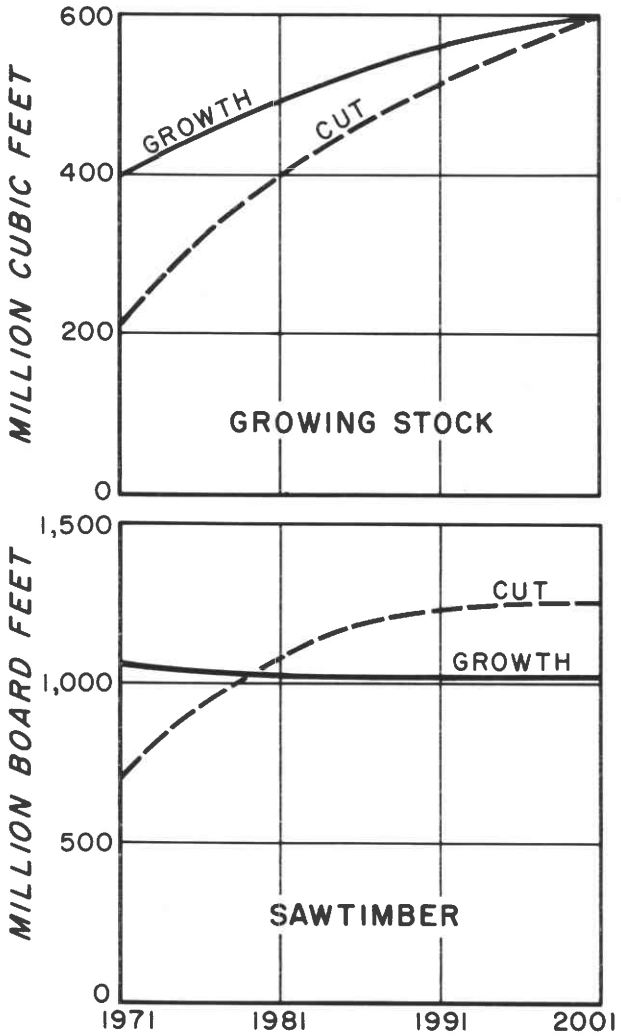

Figure 12.—*Prospective growth and cut of hardwood, 1971-2001.*

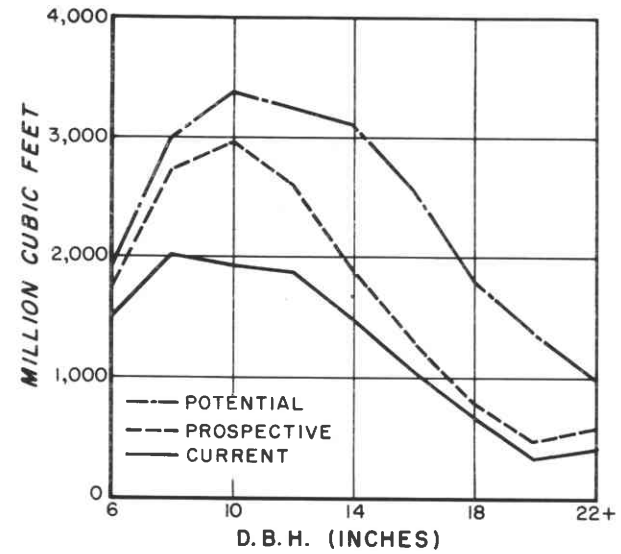

Figure 13.—*Comparison of 1972 softwood growing stock with prospective and potential inventories of 2002.*

to 17.7 billion in 2002. Graphically, this reduction is even more dramatic (fig. 14). There would be a volume loss in every diameter class over 12 inches.

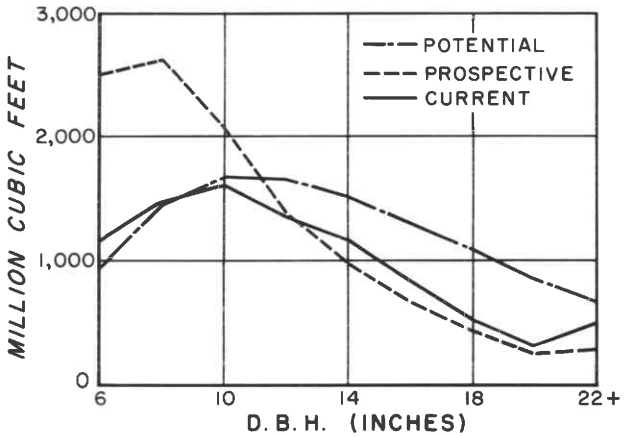

Figure 14.—*Comparison of 1972 hardwood growing stock with prospective and potential inventories of 2002.*

The reason for this reduction is the high cutting rates in the upper diameter classes. Growth on the remaining trees and ingrowth from trees moving from lower diameters cannot compensate for the large removals. The consequence is a reduction in the inventory.

In computing prospective hardwood cut, no cognizance was given to the insufficient number of trees of large diameter. However, size distribution and other variables were considered in the potential cut.

POTENTIAL CUT

For this projection, it was assumed that the commercial forest area will be the same, but that the oak-pine type will be converted to pure pine. With this conversion there will be 12.9 million acres in softwood forest types and 8.4 million in hardwoods. Mortality and growth rates were not adjusted.

Specific goals for softwood stands are a basal area of 90 square feet per acre for all live trees —rough and rotten as well as growing stock— and a reduction of the cull tree proportion from 7 to 3 percent. For the hardwoods, a basal area of 90 square feet is the desired density. The present cull proportion is relatively high, 28 percent. The goal, 14 percent, would result in a significant increase in the growing-stock inventory.

To correct the deficit of trees in the larger diameter classes, a goal for both types is to im-

prove the distribution of trees by adjusting the annual cut. With the 1972 inventory and the desired inventory of 2002 as the bases, stand tables for each year of the projection period were found by interpolation. The cut each year was adjusted so that the interpolated stand structure was left. In the early years of the projection period the cut is reduced, but as the stand structure is rehabilitated by growth the removals increase toward the end. The annual removals are concentrated in lower diameters so that the deficit in large trees is gradually ameliorated.

If the goals for the potential cut projection were attained, Alabama would have a growing-stock inventory in 2002 of 32.1 billion cubic feet —versus 20.2 billion for the current inventory and 26.3 billion for the prospective cut. Softwoods would comprise 65 percent of the total.

About 1.6 billion cubic feet in annual growth would be available for harvest in 2001. This growth is 76 cubic feet per acre versus the 1971 growth of 56 cubic feet.

The increase in sawtimber growth is even more dramatic. It would be 328 board feet per acre versus the 197 board feet of current growth and 252 board feet for the prospective cut in 2001. The inventory needed for this growth may be seen in figures 13 and 14.

The volume and growth for both species groups in the potential cut is much greater than for 1971. Consequently, Alabama's forests are capable of supporting more than they now do.

Management Opportunities

TYPE CONVERSION

Extensive acreages of mixed and pure hardwood types cover sites in Alabama that can support southern pine. Often the hardwood growth is small and concentrated on trees of little or no commercial value. Because most suitable nonstocked areas have been planted to pine, converting these low-potential hardwood stands is now the best means of increasing the pine timber supply.

The magnitude of the conversion task is enormous. Of the 17.4 million acres of pine sites in Alabama, some 9.7 million are now growing oak-pine or oak-hickory stands. Some of these stands have enough potential to be managed and regenerated to pine after the hardwoods are harvested. Others, however, have no potential value and are candidates for immediate conversion.

There are 2 million acres of pine sites that are poorly stocked with growing stock trees. Of these about 635,000 have an adequate pine seed source. Although control of competing hardwoods and some site preparation may be needed, natural regeneration may be relied upon to convert these sites. On the remaining areas, seed sources are either inadequate or absent, and artificial regeneration—either by seeding or planting—must be relied upon. About 1.3 million acres fall into this category.

Priorities for type conversion on pine sites can be outlined on the basis of cost and technical difficulty.

The first priority would be those sites which can be naturally regenerated. In some cases adequate pine reproduction already exists, and it can be released by harvesting or deadening the competing overstory. If an adequate seed source is present, reproduction can be established naturally prior to overstory removal.

Pine sites needing planting or seeding are next in priority. Some areas may have an overstory of a few large trees, which can be deadened economically. Most, however, are composed of many trees of different sizes, and site preparation with heavy machinery is necessary. Hence, conversion can be quite expensive for these areas.

HARDWOOD IMPROVEMENT

Almost 4 million acres of forest land in Alabama are suited for hardwoods. Most of this acreage in bottom lands, which are some of the most potentially productive in the United States. The condition of a great many of these stands, however, bears witness to years of neglect. One of every five hardwood trees 5 inches or larger in Alabama has defects or rot that make it unsuitable for sawtimber now or in the future.

How serious are the conditions of these stands, and what can be done to improve them? The proportion of desirable trees provides clues.

A desirable tree is growing stock that is vigorous, has no defects that would seriously limit its present or prospective use, and contains no pathogens that would cause death or serious degrade before rotation age. Growing stock not classed as desirable is called acceptable. Forest land in Alabama was classified according to the amount of desirable trees present.

There are about 726,000 acres of hardwood sites that are poorly stocked with growing stock trees. These stands are the poorest, and restocking will take a long time. Improvement may be facilitated in some cases by removing cull trees. Some locations may be suitable for prompt restocking by planting such species as yellow-poplar in coves and cottonwood on good quality bottom land.

An additional 2.7 million acres are poorly stocked with desirable trees but are at least medium stocked with growing stock. There is enough growing stock on these areas to maintain periodic removals. These stands can be improved by killing culls and favoring desirable trees in improvement cuts.

There are 500,000 acres that are medium stocked with desirable trees. On about 118,000 acres there is not much competition from less desirable trees or unwanted vegetation; hence no special treatment is necessary. On the remainder, desirable trees have significant competition; and cull tree removal and thinning acceptable trees can improve the proportion of desirables.

About 76,000 acres of hardwoods are well stocked with desirable trees. No stand treatments are necessary except for thinning to reduce overstocking in some stands.

In total, over 3.5 million acres of hardwood sites need some form of stand treatment. Because of the magnitude of the hardwood stand treatment task, priorities need to be assigned. Although the economic values of treatments in hardwood stands are hard to measure, a preliminary list of priorities may be made on the basis of cost.

First would be the harvesting of undesirable but merchantable trees. Growing space would be freed while furnishing a net return. Next would be the deadening of large culls. The cost of girdling a tree is proportional to its diameter, but the growing space it occupies is proportional to its basal area. Hence, the greatest return will come by concentrating on large stems.

Clumps of small weed or cull trees should be treated last. Blanket treatment by chemical spraying or clearing with heavy machinery is needed. There are problems associated with blanket treatment—sprouting may occur or seedlings of desirable species may not appear promptly. Nevertheless, blanket treatment may be the only way to rehabilitate these stands.

RESOURCE OUTLOOK

Despite the increase in timber products output during the last 9 years, timber volume increased. Can Alabama's forests sustain expansion in the State's timber industries in the future? The answer is a qualified yes.

The outlook for the softwood supply is good. The excess of growth over removals in 1971 suggests that a moderate increase in pine timber removals will not deplete the resource. However, Alabama's forests could furnish more softwood than indicated by growth-cut ratios alone, if measures like type conversion were undertaken.

The prospect for hardwoods is mixed. Pulpwood and sawtimber were the leading roundwood products in 1971. The balance of growth over cut for growing stock is favorable for an increase in hardwood pulpwood removals. However, as indicated by the prospective cut, a substantial increase in the hardwood sawtimber harvest is not feasible. The supply of quality large-diameter hardwoods has not increased much since 1963, and the sawtimber cut in tupelo and blackgum is already exceeding growth. However, with hardwood stand improvement, the sawtimber supply for the future could be increased. Removals from improvement cuttings could furnish pulpwood while the stands were being rehabilitated.

Only by improving the resource now can Alabama's forests fully provide for industrial expansion in the years ahead.

Appendix

SURVEY METHODS

The data on forest acreage and timber volume in this report were secured by a sampling method involving a forest-nonforest classification on aerial photographs and on-the-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, 151,673 photographic classifications were made and 5,724 ground sample locations were visited.

The initial estimates of forest area that were obtained with the aerial photographs were adjusted on the basis of the ground check.

A cluster of 10 variable-radius plots were installed at each ground sample location. Each sample tree on the variable-radius plots represented 3.75 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. Together, these samples provided most of the information for the new inventory. A subsample of trees on the plots was measured in detail to obtain data for calculating timber volumes.

The plots established by the prior survey were remeasured to determine the elements of change and were the basis for estimating growth, mortality, removals, and changes in land use.

A special study was made to determine product output. It consisted of a canvass of all primary wood-using plants active in Alabama during 1971. Out-of-State firms known to use Alabama roundwood were also contacted. Additionally, fuelwood and other domestic uses were determined from an area sample.

RELIABILITY OF THE DATA

Reliability of the estimates may be affected by two types of errors. The first stems from the use of a sample to estimate the whole and from variability of the items being sampled. This type is termed sampling error; it is susceptible to a mathematical evaluation of the probability of error. The second type—often referred to as reporting or estimating error—derives from mistakes in measurement, judgment, or recording, and from limitations of method or equipment. Its effects cannot be appraised mathematically, but the Forest Service constantly attempts to hold it to a minimum by proper training and good supervision, and by emphasis on careful work.

Statistical analysis of the data indicates a sampling error of plus or minus 0.2 percent for the estimate of total commercial forest area, 1.2 percent for total cubic volume, and 1.8 percent for total board-foot volume. As these totals are broken down by forest type, species, tree diameter, and other subdivisions, the possibility of error increases and is greatest for the smallest items. The order of this increase is suggested in the following tabulation, which shows the sampling error to which the timber volume and area estimates are liable, two chances out of three:

Sampling errors for commercial forest area, growing-stock and sawtimber volumes, Alabama, 1972

Commercial forest area	Sampling error[1]	Cubic volume[2]	Sampling error[1]	Board-foot volume[3]	Sampling error[1]
Thousand acres	*Percent*	*Million cubic feet*	*Percent*	*Million board feet*	*Percent*
21,333.1	0.2				
853.3	1.0	20,211.7	1.2	63,517.1	1.8
213.3	2.0	7,276.2	2.0	51,448.8	2.0
94.8	3.0	3,433.9	3.0	22,866.2	3.0
53.3	4.0	1,819.1	4.0	12,862.2	4.0
34.1	5.0	1,164.2	5.0	8,231.8	5.0
8.5	10.0	291.0	10.0	2,058.0	10.0
3.8	15.0	129.4	15.0	914.6	15.0
2.1	20.0	72.8	20.0	514.5	20.0
1.4	25.0	46.6	25.0	329.3	25.0

[1] By random-sampling formula.
[2] Growing-stock volume on commercial forest land.
[3] Sawtimber volume on commercial forest land.

The sampling error to which the estimates of growth, mortality, and removals are liable, on a probability of two chances out of three, are:

Net annual growth and timber removals sampling error, Alabama, 1971

Net annual growth				Annual removals			
Cubic volume	Sampling error[1]	Board-foot volume	Sampling error[1]	Cubic volume	Sampling error[1]	Board-foot volume	Sampling error[1]
Million cubic feet	*Percent*	*Million board feet*	*Percent*	*Million cubic feet*	*Percent*	*Million board feet*	*Percent*
				739.6	1.8		
1,187.4	2.3			599.1	2.0		
697.9	3.0	4,201.7	3.4	266.3	3.0		
392.6	4.0	3,035.7	4.0	149.8	4.0	2,852.4	4.1
251.3	5.0	1,942.9	5.0	95.9	5.0	1,918.0	5.0
62.8	10.0	485.7	10.0	24.0	10.0	479.5	10.0
27.9	15.0	215.9	15.0	10.7	15.0	213.1	15.0
15.7	20.0	121.4	20.0	6.0	20.0	119.9	20.0
10.1	25.0	77.7	25.0	3.8	25.0	76.7	25.0

[1] By random-sampling formula.

DEFINITIONS OF TERMS

Forest Land Class

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having such tree cover and not currently developed for nonforest use.

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

Nonstocked land.—Commercial forest land less than 16.7 percent stocked with growing-stock trees.

Productive-reserved forest land.—Productive public forest land withdrawn from timber utilization through statute or administrative regulation.

Unproductive forest land.—Forest land incapable of yielding crops of industrial wood because of adverse site conditions.

Tree Species

Commercial species.—Tree species presently or prospectively suitable for industrial wood products; excludes so-called weed species such as blackjack oak and blue beech.

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

Softwoods.—Coniferous trees, usually evergreen, having needle or scale-like leaves.

Forest Type

Longleaf-slash pine.—Forests in which longleaf or slash pine, singly or in combination, comprise a plurality of the stocking. Common associates include other southern pines, oak, and gum.

Loblolly-shortleaf pine.—Forests in which southern pine and eastern redcedar except longleaf or slash pine, singly or in combination, comprise a plurality of the stocking. Common associates include oak, hickory, and gum.

Oak-pine.—Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking but in which softwoods, except cypress, comprise 25-50 percent of the stocking. Common associates include gum, hickory, and yellow-poplar.

Oak-hickory.—Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking except where pines comprise 25-50 percent, in which case the stand would be classified oak-pine. Common associates include yellow-poplar, elm, maple, and black walnut.

Oak-gum-cypress.—Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprise a plurality of the stocking except where pines comprise 25-50 percent, in which case the stand would be classified oak-pine. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.

Elm-ash-cottonwood.—Forests in which elm, ash, or cottonwood, singly or in combination, comprise a plurality of the stocking. Common associates include willow, sycamore, beech, and maple.

Class of Timber

Growing stock trees.—Sawtimber trees, poletimber trees, saplings, and seedlings; that is, all live trees except rough and rotten trees.

Desirable trees.—Growing-stock trees that have no serious defects to limit present or prospective use, are of relatively high vigor, and contain no pathogens that may result in death or serious deterioration before rotation age. They comprise the type of trees that forest managers aim to grow; that is, the trees favored in silvicultural operations.

Acceptable trees.—Trees meeting the specifications for growing stock but not qualifying as desirable trees.

Sawtimber trees.—Live trees of commercial species, 9.0 inches and larger in diameter at breast height for softwoods and 11.0 inches and larger for hardwoods, and containing at least one 12-foot saw log.

Poletimber trees.—Live trees of commercial species 5.0 to 9.0 inches in d.b.h. for softwoods and 5.0 to 11.0 inches for hardwoods, and of good form and vigor.

Saplings.—Live trees of commercial species, 1.0 inch to 5.0 inches in d.b.h. and of good form and vigor.

Rough and rotten trees.—Live trees that are unmerchantable for saw logs now or prospectively because of defect, rot, or species.

Salvable dead trees.—Standing or down dead trees that are considered currently or potentially merchantable.

Stand-Size Class

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

Sapling-seedling stands.—Stands at least 16.7 percent stocked with growing-stock trees, with more than half of this stocking in saplings or seedlings.

Nonstocked areas.—Commercial forest lands less than 16.7 percent stocked with growing-stock trees.

Stocking

Stocking is a measure of the extent to which the growth potential of the site is utilized by trees or preempted by vegetative cover. Stocking is determined by comparing the stand density in terms of number of trees or basal area with a specified standard. Full stocking is assumed to range from 100 to 133 percent of the stocking standard.

The tabulation below shows the density standard in terms of trees per acre, by size class, required for full stocking:

D.b.h. (inches)	Number of trees	D.b.h. (inches)	Number of trees
Seedlings	600	16	72
2	560	18	60
4	460	20	51
6	340	22	42
8	240	24	36
10	155	26	31
12	115	28	27
14	90	30	24

Volume

Volume of sawtimber.—Net volume of the saw-log portion of live sawtimber trees in board feet of the International rule, ¼-inch kerf.

Volume of growing stock.—Volume of sound wood in the bole of sawtimber and poletimber trees from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Volume of timber.—The volume of sound wood in the bole of growing stock, rough, rotten, and salvable dead trees 5.0 inches and larger in d.b.h. from stump to a minimum 4.0-inch top outside bark or to the point where the central stem breaks into limbs.

Area Condition Class

A classification of commercial forest land based upon stocking by desirable trees and other conditions affecting current and prospective timber growth.

Class 10.—Areas 100 percent or more stocked with desirable trees and not overstocked.

Class 20.—Areas 100 percent or more stocked with desirable trees and overstocked with all live trees.

Class 30.—Areas 60 to 100 percent stocked with desirable trees and with less than 30 percent of the area controlled by other trees, inhibiting vegetation, slash, or nonstockable conditions.

Class 40.—Areas 60 to 100 percent stocked with desirable trees and with 30 percent or more of the area controlled by other trees, or conditions that ordinarily prevent occupancy by desirable trees.

Class 50.—Areas less than 60 percent stocked with desirable trees, but with 100 percent or more stocking of growing-stock trees.

Class 60.—Areas less than 60 percent stocked with desirable trees, but with 60 to 100 percent stocking of growing-stock trees.

Class 70.—Areas less than 60 percent stocked with desirable trees and with less than 60 percent stocking of growing-stock trees.

Miscellaneous Definitions

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 as square feet per acre.

D.b.h. (Diameter breast high).—Tree diameter in inches, outside bark, measured at 4½ feet above ground.

Diameter classes.—The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. Thus, the 12-inch class includes trees 11.0 inches through 12.9 inches d.b.h.

Site classes.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood.

Log grades.—A classification of logs based on external characteristics as indicators of quality or value.

Gross growth.—Annual increase in net volume of trees in the absence of cutting and mortality.

Net annual growth.—The increase in volume of a specified size class for a specific year. Components of net annual growth include the increment in net volume of trees at the beginning of the specific year surviving to its end plus volume of trees reaching the size class during the year minus the volume of trees that died during the year minus the net volume of trees that become rough or rotten during the year.

Mortality.—Number or sound-wood volume of live trees dying from natural causes during a specified period.

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

Timber products.—Roundwood products and plant byproducts. Timber products output includes roundwood products cut from growing stock on commercial forest land; from other sources, such as cull trees, salvable dead trees, limbs, and saplings; from trees on noncommercial and nonforest lands; and from plant byproducts.

Roundwood products.—Logs, bolts, or other round sections cut from trees for industrial or consumer uses. Included are saw logs, veneer logs and bolts, cooperage logs and bolts, pulpwood, fuelwood, piling, poles and posts, hewn ties, mine timbers, and various other round, split, or hewn products.

Logging residues.—The unused portions of trees cut or killed by logging.

Plant byproducts.—Wood products, such as pulp chips, obtained incidental to manufacture of other products.

Plant residues.—Wood materials from manufacturing plants not utilized for some product. Included are slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screening.

STANDARD TABLES

NOTE: Regional tables, identical in format to standard State tables 1-22, are available for each of the six forest resource regions in Alabama. They are free on request to the Southern Forest Experiment Station.

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Table 1. *Area by land classes, Alabama, 1972*

Land class	Area
	Thousand acres
Forest:	
Commercial	21,333.1
Productive-reserved	17.0
Unproductive	...
Total forest	21,350.1
Nonforest:	
Cropland[1]	5,118.6
Pasture and range[1]	2,555.0
Other[2]	3,521.7
Total nonforest	11,195.3
All land[3]	32,545.4

[1] Source: Census of Agriculture.
[2] Includes swampland, industrial and urban areas, other nonforest land, and 113,100 acres, classed as water by Forest Survey standards, but defined by the Bureau of the Census as land.
[3] Source: United States Bureau of the Census, Land and Water Area of the United States.

Table 2. *Area of commercial forest land by ownership classes, Alabama, 1972*

Ownership class	Area
	Thousand acres
Public:	
National forest	629.5
Other federal	182.0
State	155.6
County and municipal	53.4
Total public	1,020.5
Private:	
Forest industry[1]	4,204.9
Farmer	6,732.5
Miscellaneous private:	
Individual	7,675.8
Corporate	1,699.4
Total private	20,312.6
All ownerships	21,333.1

[1] Not including 371,800 acres of farmer-owned and miscellaneous private lands leased to forest industry.

Table 3. *Area of commercial forest land by stand-size and ownership classes, Alabama, 1972*

Stand-size class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
Sawtimber	6,839.5	302.6	113.9	1,517.7	4,905.3
Poletimber	7,141.9	203.7	122.1	1,214.0	5,602.1
Sapling and seedling	7,242.5	123.2	155.0	1,449.8	5,514.5
Nonstocked areas	109.2	...	...	23.4	85.8
All classes	21,333.1	629.5	391.0	4,204.9	16,107.7

Table 4. *Area of commercial forest land by stand-volume and ownership classes, Alabama, 1972*

Stand-volume per acre[1]	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
Less than 1,500 board feet	9,398.6	175.9	143.7	1,618.9	7,460.1
1,500 to 5,000 board feet	7,644.3	248.3	154.3	1,386.0	5,855.7
More than 5,000 board feet	4,290.2	205.3	93.0	1,200.0	2,791.9
All classes	21,333.1	629.5	391.0	4,204.9	16,107.7

[1] International ¼-inch rule.

Table 5. *Area of commercial forest land by stocking classes based on selected stand components, Alabama, 1972*

Stocking percentage	Stocking classified in terms of					
	All trees	Growing-stock trees			Rough and rotten trees	Inhibiting vegetation
		Total	Desirable	Acceptable		
	Thousand acres					
160 or more	10.8	...	...	...	...	...
150 to 160	258.9	74.8	28.9	...	...	...
140 to 150	713.6	266.9	28.3	22.5	...	...
130 to 140	1,591.1	553.2	43.6	29.8	6.3	...
120 to 130	3,173.3	1,209.2	71.8	27.6	...	...
110 to 120	4,248.1	2,201.8	201.8	95.7	...	...
100 to 110	4,249.0	3,089.2	299.7	288.1	16.9	6.3
90 to 100	3,156.1	3,473.0	494.1	634.0	12.3	...
80 to 90	1,883.5	3,269.6	897.5	1,121.0	45.6	...
70 to 80	978.5	2,870.8	1,110.9	1,880.2	67.9	6.3
60 to 70	495.4	1,633.0	1,782.7	2,758.1	200.2	...
50 to 60	250.8	1,134.9	2,050.0	3,270.5	405.0	12.0
40 to 50	145.1	705.9	2,613.4	3,146.7	949.4	22.2
30 to 40	77.3	518.4	2,784.5	2,842.6	2,227.5	12.4
20 to 30	29.4	158.3	3,152.9	2,584.4	3,804.8	120.0
10 to 20	29.9	97.0	3,006.0	1,492.9	6,102.3	251.3
Less than 10	42.3	77.1	2,767.0	1,139.0	7,494.9	20,902.6
All areas	21,333.1	21,333.1	21,333.1	21,333.1	21,333.1	21,333.1

Table 6. *Area of commercial forest land by area-condition and ownership classes, Alabama, 1972*

Area-condition class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
10	462.5	6.0	...	92.9	363.6
20	211.6	5.7	12.3	56.7	136.9
30	1,136.6	33.0	4.7	333.1	765.8
40	3,148.6	54.0	53.8	886.8	2,154.0
50	4,004.6	157.7	86.9	896.0	2,864.0
60	9,677.6	286.1	189.1	1,595.6	7,606.8
70	2,691.6	87.0	44.2	343.8	2,216.6
All classes	21,333.1	629.5	391.0	4,204.9	16,107.7

Table 7. *Area of commercial forest land by site and ownership classes, Alabama, 1972*

Site class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
165 cu. ft. or more	413.4	...	11.4	87.5	314.5
120 to 165 cu. ft.	2,334.2	17.5	22.6	677.0	1,617.1
85 to 120 cu. ft.	7,947.7	145.5	95.6	1,581.0	6,125.6
50 to 85 cu. ft.	9,175.6	378.1	202.8	1,624.5	6,970.2
Less than 50 cu. ft.	1,462.2	88.4	58.6	234.9	1,080.3
All classes	21,333.1	629.5	391.0	4,204.9	16,107.7

Table 8. *Area of commercial forest land by forest types and ownership classes, Alabama, 1972*

Type	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
			Thousand acres		
Longleaf-slash pine	1,483.6	88.5	39.1	545.2	810.8
Loblolly-shortleaf pine	6,380.1	162.1	101.2	1,394.5	4,722.3
Oak-pine	5,016.9	185.1	103.9	1,065.3	3,662.6
Oak-hickory	5,913.1	187.8	103.6	813.6	4,808.1
Oak-gum-cypress	2,443.5	6.0	43.2	381.0	2,013.3
Elm-ash-cottonwood	95.9	...	...	5.3	90.6
All types	21,333.1	629.5	391.0	4,204.9	16,107.7

Table 9. *Area of noncommercial forest land by forest types, Alabama, 1972*

Type	All areas	Productive-reserved areas	Unproductive areas
		Thousand acres	
Longleaf-slash pine	1.0	1.0	...
Loblolly-shortleaf pine	8.8	8.8	...
Oak-pine	4.4	4.4	...
Oak-hickory	2.8	2.8	...
All types	17.0	17.0	...

Table 10. *Number of growing-stock trees on commercial forest land by species and diameter classes, Alabama, 1972*

Species	All classes	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Diameter class (inches at breast height)										
	Thousand trees										
Softwood:											
Longleaf pine	115,522	38,735	28,329	21,231	14,936	8,215	3,022	791	225	38	...
Slash pine	98,884	48,184	27,481	11,971	5,840	2,876	1,514	678	236	104	...
Shortleaf pine	351,841	177,709	88,610	46,541	24,365	9,315	3,904	1,005	290	102	...
Loblolly pine	653,817	299,366	163,157	82,432	48,503	28,398	16,430	8,867	3,653	2,924	87
Virginia pine	83,602	49,487	21,522	7,845	3,450	1,030	208	60	...	...	...
Spruce pine	12,365	4,798	2,536	1,158	1,225	1,200	614	477	212	132	13
Cypress	6,343	1,849	1,481	838	647	387	381	232	172	335	21
Other softwoods[1]	16,359	9,687	4,930	1,226	312	142	32	13	8	9	...
Total	1,338,733	629,815	338,046	173,242	99,278	51,563	26,105	12,123	4,796	3,644	121
Hardwood:											
Select white oaks[2]	83,660	33,241	20,119	12,789	7,073	5,253	2,523	1,387	633	601	41
Select red oaks[3]	21,333	7,345	4,230	3,327	2,511	1,285	1,057	685	319	516	58
Other white oaks	89,143	37,785	24,771	12,737	6,592	3,797	1,725	887	437	384	28
Other red oaks	223,098	97,381	51,061	34,130	16,746	11,141	6,134	3,180	1,422	1,663	240
Pecan	2,144	622	504	384	202	222	51	39	47	65	8
Other hickories	121,236	51,096	30,469	19,525	9,936	5,702	2,526	961	503	506	12
Sweetgum	215,765	118,327	50,571	24,266	11,445	5,905	2,818	1,306	586	528	13
Tupelo and blackgum	107,786	41,272	28,226	19,298	8,782	5,183	2,985	1,125	486	418	11
Hard maple	2,590	1,273	539	426	213	119	12	...	...	8	...
Soft maple	31,152	17,803	6,555	3,602	1,234	756	714	186	217	81	4
Beech	5,883	1,915	870	966	636	501	403	242	194	138	18
Ash	26,639	12,539	5,833	3,210	1,875	1,740	750	261	257	170	4
Cottonwood	2,388	929	781	225	173	105	51	13	41	64	6
Basswood	2,664	1,101	662	294	221	160	156	48	10	7	5
Yellow-poplar	45,310	16,454	10,628	7,182	4,406	2,886	1,741	1,111	482	382	38
Black walnut	1,002	509	178	108	108	76	14	9	...	...	...
Black cherry	4,339	2,518	1,373	241	140	61	...	...	...	6	...
Willow	2,680	1,202	801	445	194	23	15	...	...	...	...
Magnolia (*Magnolia* spp.)	41,483	18,733	10,124	6,757	3,545	1,368	512	294	93	57	...
American elm	9,609	3,652	2,215	1,575	873	621	368	196	74	19	16
Other elms	15,490	7,521	4,199	2,245	877	242	270	69	38	29	...
Hackberry	13,679	4,735	3,408	2,971	1,050	464	576	286	98	87	4
Sycamore	3,143	1,123	749	356	260	237	128	133	57	92	8
Other hardwoods	43,713	33,222	6,544	2,305	781	353	316	109	51	28	4
Total	1,115,929	512,298	265,410	159,364	79,873	48,200	25,845	12,527	6,045	5,849	518
All species	2,454,662	1,142,113	603,456	332,606	179,151	99,763	51,950	24,650	10,841	9,493	639

[1] Includes redcedar, hemlock, and sand pine.
[2] Includes white, swamp chestnut, swamp white, and chinkapin oaks.
[3] Includes northern red, Shumard, and cherrybark oaks.

Table 11. *Volume of timber on commercial forest land by class of timber and by softwoods and hardwoods, Alabama, 1972*

Class of Timber	All species	Soft-wood	Hard-wood
	— — *Million cubic feet* — —		
Sawtimber trees:			
Saw-log portion	10,402.1	6,782.7	3,619.4
Upper-stem portion	2,021.0	969.4	1,051.6
Total	12,423.1	7,752.1	4,671.0
Poletimber trees	7,788.6	3,530.5	4,258.1
All growing stock	20,211.7	11,282.6	8,929.1
Rough trees	1,514.3	138.4	1,375.9
Rotten trees	698.1	117.4	580.7
Salvable dead trees	13.6	9.3	4.3
All timber	22,437.7	11,547.7	10,890.0

Table 12. *Volume of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Alabama, 1972*

Ownership class	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	— *Million cubic feet* —			— *Million board feet* —		
National forest	729.7	502.5	227.2	2,744.3	2,216.3	528.0
Other public	371.6	210.1	161.5	1,270.2	848.3	421.9
Forest industry	4,572.3	2,969.2	1,603.1	16,035.0	11,962.6	4,072.4
Farmer and misc. private	14,538.1	7,600.8	6,937.3	43,467.6	27,256.2	16,211.4
All ownerships	20,211.7	11,282.6	8,929.1	63,517.1	42,283.4	21,233.7

Table 13. *Volume of growing stock on commercial forest land by species and diameter classes, Alabama, 1972*

Species	Diameter class (inches at breast height)										
	All classes	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	— — — — — — — — — — — — — *Million cubic feet* — — — — — — — — — — — — —										
Softwood:											
Longleaf pine	1,280.3	103.4	210.9	271.8	301.7	229.6	110.5	36.1	13.0	3.3	...
Slash pine	730.6	112.4	164.3	141.2	116.4	80.1	59.8	33.1	14.8	8.5	...
Shortleaf pine	2,532.3	438.3	555.2	526.3	478.7	278.4	165.0	60.1	20.1	10.2	...
Loblolly pine	5,962.0	701.9	924.0	907.8	903.9	815.0	660.2	481.5	256.2	293.3	18.2
Virginia pine	408.2	119.8	119.4	79.6	55.5	25.6	6.1	2.2	...	...	...
Spruce pine	186.8	11.4	18.0	13.0	21.9	36.7	27.3	26.6	17.0	12.5	2.4
Cypress	125.1	3.4	9.0	9.0	11.0	11.0	15.5	11.5	13.1	37.1	4.5
Other softwoods	57.3	18.6	20.5	8.3	4.7	2.4	1.2	.4	.3	.9	...
Total	11,282.6	1,509.2	2,021.3	1,957.0	1,893.8	1,478.8	1,045.6	651.5	334.5	365.8	25.1
Hardwood:											
Select white oaks	782.7	78.0	109.8	125.9	123.9	126.5	79.8	58.9	31.4	41.9	6.6
Select red oaks	282.1	18.0	25.6	36.1	40.6	30.9	34.0	28.9	18.1	41.0	8.9
Other white oaks	649.5	90.3	129.4	116.5	101.5	80.6	50.0	33.5	19.3	23.4	5.0
Other red oaks	1,907.0	236.7	286.0	328.7	269.7	252.8	187.9	127.5	69.8	114.8	33.1
Pecan	29.9	.8	2.5	3.7	4.3	6.4	1.7	1.7	2.2	5.6	1.0
Other hickories	970.3	110.8	161.1	192.7	166.1	140.0	86.6	43.0	28.1	39.8	2.1
Sweetgum	1,449.9	267.8	299.2	272.4	216.1	156.1	100.1	59.5	33.3	44.0	1.4
Tupelo and blackgum	901.4	89.7	158.9	207.7	143.0	118.5	89.9	42.9	23.7	25.4	1.7
Hard maple	16.9	3.2	2.6	3.9	3.6	2.9	.3	...	...	.4	...
Soft maple	174.2	38.5	30.7	32.4	17.1	15.8	19.0	5.7	8.9	5.8	.3
Beech	76.1	3.5	4.1	8.5	9.3	10.1	11.9	8.3	9.6	8.0	2.8
Ash	239.5	29.0	35.7	33.1	32.8	44.9	26.2	12.0	13.0	12.1	.7
Cottonwood	30.6	3.3	5.5	2.9	3.4	3.0	1.7	.7	2.9	5.6	1.6
Basswood	29.7	2.6	4.5	3.7	4.3	4.6	6.1	2.4	.6	.4	.5
Yellow-poplar	564.5	45.5	71.2	83.8	86.5	82.2	68.0	58.3	31.1	32.7	5.2
Black walnut	8.4	1.2	1.2	1.1	2.2	1.7	.5	.5	...	...	...
Black cherry	19.6	6.0	6.9	2.3	2.3	1.6	...	...	...	.5	...
Willow	15.9	3.3	4.3	4.1	3.3	.5	.4	...	...	...	...
Magnolia (*Magnolia* spp.)	291.6	46.4	56.3	63.9	58.2	30.6	16.2	11.2	4.9	3.9	...
American elm	86.6	7.6	12.2	14.1	12.1	15.3	11.4	7.4	3.7	1.3	1.5
Other elms	95.6	16.0	23.4	22.2	13.8	5.6	7.8	2.9	1.7	2.2	...
Hackberry	116.5	9.8	16.8	24.8	16.4	10.4	16.0	10.1	5.2	6.6	.4
Sycamore	47.4	3.5	5.6	3.7	4.8	5.9	4.8	6.3	3.9	7.5	1.4
Other hardwoods	143.2	53.8	29.7	21.4	11.5	8.9	9.4	4.0	2.4	1.8	.3
Total	8,929.1	1,165.3	1,483.2	1,609.6	1,346.8	1,155.8	829.7	525.7	313.8	424.7	74.5
All species	20,211.7	2,674.5	3,504.5	3,566.6	3,240.6	2,634.6	1,875.3	1,177.2	648.3	790.5	99.6

Table 14. *Volume of sawtimber on commercial forest land by species and diameter classes, Alabama, 1972*

Species	Diameter class (inches at breast height)								
	All classes	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
	Million board feet								
Softwood:									
Longleaf pine	5,384.8	1,220.0	1,719.2	1,401.1	701.3	233.3	86.4	23.5	...
Slash pine	2,593.1	635.8	691.3	499.5	390.3	219.7	98.8	57.7	...
Shortleaf pine	7,904.7	2,597.3	2,497.7	1,467.1	870.8	314.3	102.5	55.0	...
Loblolly pine	24,013.2	3,881.9	4,855.5	4,748.2	3,988.3	2,997.2	1,607.1	1,824.2	110.8
Virginia pine	860.6	396.8	292.2	130.3	30.4	10.9	...	...	...
Spruce pine	818.8	63.9	111.0	191.3	143.6	144.7	90.6	60.9	12.8
Cypress	611.7	40.3	55.9	58.6	85.6	62.2	75.2	211.3	22.6
Other softwoods	96.5	44.0	24.3	13.6	6.4	2.2	1.0	5.0	...
Total	42,283.4	8,880.0	10,247.1	8,509.7	6,216.7	3,984.5	2,061.6	2,237.6	146.2
Hardwood:									
Select white oaks	2,383.1	...	540.9	637.9	424.1	322.6	180.7	240.2	36.7
Select red oaks	1,036.2	...	160.5	153.5	176.6	151.3	104.1	241.0	49.2
Other white oaks	1,544.5	...	431.9	395.6	263.3	182.2	108.9	130.2	32.4
Other red oaks	5,226.6	...	1,103.9	1,230.5	973.1	698.8	383.3	644.3	192.7
Pecan	96.4	...	15.2	25.0	8.6	6.6	9.9	26.7	4.4
Other hickories	2,001.9	...	568.4	560.8	365.3	186.5	126.5	183.9	10.5
Sweetgum	2,837.5	...	828.7	741.8	514.6	318.8	181.9	244.9	6.8
Tupelo and blackgum	1,969.1	...	516.6	531.1	438.3	218.0	124.0	132.1	9.0
Hard maple	23.5	...	10.4	10.2	.9	...	...	2.0	...
Soft maple	266.9	...	49.5	57.1	71.2	22.9	40.9	24.2	1.1
Beech	234.3	...	29.4	36.5	46.9	29.2	43.7	36.8	11.8
Ash	583.5	...	103.8	188.9	116.6	54.3	61.1	55.6	3.2
Cottonwood	81.4	...	11.6	11.5	7.6	2.9	13.0	27.4	7.4
Basswood	79.8	...	14.0	19.7	28.3	10.4	2.0	1.8	3.6
Yellow-poplar	1,479.6	...	265.7	336.8	293.4	265.4	143.5	150.9	23.9
Black walnut	18.7	...	7.9	6.2	2.0	2.6	...	...	...
Black cherry	15.3	...	7.8	5.5	...	...	...	2.0	...
Willow	13.3	...	9.8	1.5	2.0	...	...	...	...
Magnolia (*Magnolia* spp.)	444.1	...	180.5	113.0	63.1	49.4	19.3	18.8	...
American elm	215.4	...	37.6	64.3	48.8	35.5	15.3	6.3	7.6
Other elms	135.9	...	49.6	21.2	33.5	12.3	8.7	10.6	...
Hackberry	251.2	...	50.9	39.8	63.9	43.5	23.3	28.2	1.6
Sycamore	149.2	...	15.0	21.3	20.3	28.4	19.7	38.1	6.4
Other hardwoods	146.3	...	36.2	35.5	39.2	16.9	9.1	7.9	1.5
Total	21,233.7	...	5,045.8	5,245.2	4,001.6	2,658.5	1,618.9	2,253.9	409.8
All species	63,517.1	8,880.0	15,292.9	13,754.9	10,218.3	6,643.0	3,680.5	4,491.5	556.0

Table 15. *Volume of sawtimber on commercial forest land by species and log grade, Alabama, 1972*

Species	All grades	Grade 1	Grade 2	Grade 3	Grade 4
			Million board feet		
Softwood:					
Yellow pines[1]	41,575.2	4,539.2	4,909.6	32,126.4	...
Cypress	611.7	198.9	110.7	302.1	...
Redcedar[2]	96.5	96.5	...	...	...
Total	42,283.4	4,834.6	5,020.3	32,428.5	...
Hardwood:[3]					
Select white and red oaks	3,419.3	405.8	644.7	1,667.7	701.1
Other white and red oaks	6,771.1	431.9	875.3	3,242.6	2,221.3
Hickory	2,098.3	147.2	326.8	1,136.2	488.1
Hard maple	23.5	...	2.3	7.7	13.5
Sweetgum	2,837.5	290.9	401.5	1,433.8	711.3
Ash, walnut, and black cherry	617.5	79.2	111.8	332.4	94.1
Yellow-poplar	1,479.6	136.7	178.9	649.8	514.2
Other hardwoods	3,986.9	340.5	621.4	2,154.6	870.4
Total	21,233.7	1,832.2	3,162.7	10,624.8	5,614.0
All species	63,517.1	6,666.8	8,183.0	43,053.3	5,614.0

[1] Based on **Southern Pine Log Grades for Yard and Structural Lumber,** Research Paper SE-39, published by the Southeastern Forest Experiment Station in 1968.
[2] All redcedar saw logs are graded as No. 1.
[3] Grades 1-3 are based on **Hardwood Log Grades for Standard Lumber,** issued by the U.S. Forest Products Laboratory under the designation D1737A in 1961. Grade-4 tie and timber log specifications are based chiefly on knot size and log soundness.

Table 16. *Annual growth and removals of growing stock on commercial forest land by species, Alabama, 1971*

Species	Net annual growth	Annual removals
	Million cubic feet	
Softwood:		
Yellow pines	780.3	521.6
Cypress	4.0	.8
Other softwoods	3.7	3.5
Total	788.0	525.9
Hardwood:		
Select white and red oaks	44.3	23.3
Other white and red oaks	130.7	67.9
Hickory	35.4	21.4
Hard maple	.4	...
Sweetgum	67.6	30.9
Tupelo and blackgum	28.0	23.6
Ash, walnut, and black cherry	11.6	5.3
Yellow-poplar	26.1	11.4
Other hardwoods	55.3	29.9
Total	399.4	213.7
All species	1,187.4	739.6

Table 17. *Annual growth and removals of growing stock on commercial forest land by ownership classes and by softwoods and hardwoods, Alabama, 1971*

Ownership class	Net annual growth			Annual removals		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million cubic feet					
National forest	33.5	24.4	9.1	14.6	10.4	4.2
Other public	19.9	13.1	6.8	14.5	10.7	3.8
Forest industry	259.0	188.1	70.9	179.7	139.1	40.6
Farmer and misc. private	875.0	562.4	312.6	530.8	365.7	165.1
All ownerships	1,187.4	788.0	399.4	739.6	525.9	213.7

Table 18. *Annual growth and removals of sawtimber on commercial forest land by species, Alabama, 1971*

Species	Net annual growth	Annual removals
	Million board feet	
Softwood:		
Yellow pines	3,122.6	2,129.1
Cypress	22.8	4.0
Other softwoods	8.1	10.3
Total	3,153.5	2,143.4
Hardwood:		
Select white and red oaks	163.8	92.2
Other white and red oaks	374.7	218.6
Hickory	97.7	72.6
Hard maple	2.0	1.0
Sweetgum	136.1	90.5
Tupelo and blackgum	62.4	77.1
Ash, walnut, and black cherry	30.0	12.9
Yellow-poplar	81.6	52.7
Other hardwoods	99.9	91.4
Total	1,048.2	709.0
All species	4,201.7	2,852.4

Table 19. *Annual growth and removals of sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Alabama, 1971*

Ownership class	Net annual growth			Annual removals		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	Million board feet					
National forest	130.1	108.0	22.1	73.5	55.9	17.6
Other public	76.7	57.8	18.9	63.9	51.3	12.6
Forest industry	985.3	796.8	188.5	726.2	601.1	125.1
Farmer and misc. private	3,009.6	2,190.9	818.7	1,988.8	1,435.1	553.7
All ownerships	4,201.7	3,153.5	1,048.2	2,852.4	2,143.4	709.0

Table 20. *Mortality of growing stock and sawtimber on commercial forest land by species, Alabama, 1971*

Species	Growing stock	Sawtimber
	Million cubic feet	*Million board feet*
Softwood:		
Yellow pines	49.3	138.9
Other softwoods	.5	1.0
Total	49.8	139.9
Hardwood:		
Select white and red oaks	2.4	8.5
Other white and red oaks	11.6	29.3
Hickory	6.3	15.6
Hard maple	.1	.3
Sweetgum	9.8	17.4
Tupelo and blackgum	6.7	17.9
Ash, walnut, and black cherry	2.4	5.5
Yellow-poplar	1.6	5.3
Other hardwoods	12.8	31.5
Total	53.7	131.3
All species	103.5	271.2

Table 21. *Mortality of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Alabama, 1971*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet					
National forest	3.1	2.6	0.5	12.8	11.0	1.8
Other public	2.0	1.5	.5	7.4	6.0	1.4
Forest industry	20.3	10.7	9.6	51.5	30.8	20.7
Farmer and misc. private	78.1	35.0	43.1	199.5	92.1	107.4
All ownerships	103.5	49.8	53.7	271.2	139.9	131.3

Table 22. *Mortality of growing stock and sawtimber on commercial forest land by causes and by softwoods and hardwoods, Alabama, 1971*

Cause of death	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet					
Fire	2.9	2.0	0.9	5.2	3.2	2.0
Insects	6.1	6.1	...	22.2	22.2	...
Disease	4.7	4.0	.7	13.1	10.6	2.5
Other	15.8	4.9	10.9	42.9	10.2	32.7
Unknown	74.0	32.8	41.2	187.8	93.7	94.1
All causes	103.5	49.8	53.7	271.2	139.9	131.3

Table 23. *Total output of timber products by product, by type of material used, and by softwoods and hardwoods, Alabama, 1971*

Product and species group	Standard unit	Total output		Roundwood products		Plant byproducts	
		Number	M cu. ft.	Number	M cu. ft.	Number	M cu. ft.
Saw logs:							
Softwood	M bd. ft.[1]	1,139,317	198,987	1,095,586	195,343	43,731	3,644
Hardwood	M bd. ft.[1]	385,929	66,418	385,929	66,418	...	...
Total	M bd. ft.[1]	1,525,246	265,405	1,481,515	261,761	43,731	3,644
Veneer logs and bolts:							
Softwood	M bd. ft.	221,031	35,719	221,031	35,719	...	...
Hardwood	M bd. ft.	57,019	9,568	57,019	9,568	...	...
Total	M bd. ft.	278,050	45,287	278,050	45,287	...	...
Pulpwood:							
Softwood	Std. cords[2]	4,587,240	371,566	3,429,940	277,825	1,157,300	93,741
Hardwood	Std. cords[2]	1,696,331	135,675	1,428,731	114,301	267,600	21,374
Total	Std. cords[2]	6,283,571	507,241	4,858,671	392,126	1,424,900	115,115
Cooperage:							
Softwood	M bd. ft.	3,633	596	3,633	596	...	...
Hardwood	M bd. ft.	1,826	263	1,826	263	...	...
Total	M bd. ft.	5,459	859	5,459	859	...	...
Piling:							
Softwood	M linear ft.	805	645	805	645	...	...
Hardwood	M linear ft.	...	...	...	...	...	...
Total	M linear ft.	805	645	805	645	...	...
Poles:							
Softwood	M pieces	1,002	14,231	1,002	14,231	...	...
Hardwood	M pieces	...	...	...	...	...	...
Total	M pieces	1,002	14,231	1,002	14,231	...	...
Commercial posts (round and split):							
Softwood	M pieces	1,974	1,146	1,974	1,146	...	...
Hardwood	M pieces	1	1	1	1	...	...
Total	M pieces	1,975	1,147	1,975	1,147	...	...
Other[3]:							
Softwood	M cu. ft.	4,232	4,232	108	108	4,124	4,124
Hardwood	M cu. ft.	5,650	5,650	1,971	1,971	3,679	3,679
Total	M cu. ft.	9,882	9,882	2,079	2,079	7,803	7,803
Total industrial products:							
Softwood	...	...	...	...	...	525,613	...	101,509
Hardwood	...	...	...	...	...	192,522	...	25,053
Total	...	...	...	...	...	718,135	...	126,562
Noncommercial posts (round and split):							
Softwood	M pieces	326	207	326	207	...	...
Hardwood	M pieces	2,008	1,288	2,008	1,288	...	...
Total	M pieces	2,334	1,495	2,334	1,495	...	...
Fuelwood:							
Softwood	Std. cords	290,780	21,809	11,367	853	[4]279,413	[4]20,956
Hardwood	Std. cords	299,947	22,496	192,000	14,400	[4]107,947	[4] 8,096
Total	Std. cords	590,727	44,305	203,367	15,253	[4]387,360	[4]29,052
All products:							
Softwood	...	...	...	...	...	526,673	...	122,465
Hardwood	...	...	...	...	...	208,210	...	33,149
Total	...	...	...	...	...	734,883	...	155,614

[1] International ¼-inch rule.

[2] Rough wood basis (for example, chips converted to equivalent standard cords).

[3] Includes chemical wood, handle stock, miscellaneous dimension and other minor industrial products. Additionally, byproducts include material used for livestock bedding, mulch, etc.

[4] Includes plant byproducts used for industrial and domestic fuel.

Table 24. *Output of roundwood products by source and by softwoods and hardwoods, Alabama, 1971*

Product and species group	All sources	Growing stock trees[1]			Rough and rotten trees[1]	Salvable dead trees[1]	Other sources[2]
		Total	Saw-timber	Pole-timber			
	Thousand cubic feet						
Industrial products:							
Saw logs:							
Softwood	195,343	191,290	190,303	987	658	438	2,957
Hardwood	66,418	64,064	63,408	656	1,891	...	463
Total	261,761	255,354	253,711	1,643	2,549	438	3,420
Veneer logs and bolts:							
Softwood	35,719	34,658	34,658	...	...	...	1,061
Hardwood	9,568	9,402	9,402	...	126	...	40
Total	45,287	44,060	44,060	...	126	...	1,101
Pulpwood:							
Softwood	277,825	256,910	188,046	68,864	3,256	333	17,326
Hardwood	114,301	96,100	57,040	39,060	9,862	49	8,290
Total	392,126	353,010	245,086	107,924	13,118	382	25,616
Misc. industrial products:							
Cooperage:							
Softwood	596	588	566	22	...	2	6
Hardwood	263	259	259	...	2	...	2
Total	859	847	825	22	2	2	8
Piling:							
Softwood	645	642	642	...	...	...	3
Hardwood	...	...	...	...	...	...	...
Total	645	642	642	...	...	...	3
Poles:							
Softwood	14,231	14,126	12,494	1,632	...	...	105
Hardwood	...	...	...	...	...	...	...
Total	14,231	14,126	12,494	1,632	...	...	105
Commercial posts (round and split):							
Softwood	1,146	1,045	...	1,045	...	...	101
Hardwood	1	1	...	1	...	...	...
Total	1,147	1,046	...	1,046	...	...	101
Other:							
Softwood	108	102	52	50	...	...	6
Hardwood	1,971	1,967	1,847	120	1	...	3
Total	2,079	2,069	1,899	170	1	...	9
All misc. industrial products:							
Softwood	16,726	16,503	13,754	2,749	...	2	221
Hardwood	2,235	2,227	2,106	121	3	...	5
Total	18,961	18,730	15,860	2,870	3	2	226
All industrial products:							
Softwood	525,613	499,361	426,761	72,600	3,914	773	21,565
Hardwood	192,522	171,793	131,956	39,837	11,882	49	8,798
Total	718,135	671,154	558,717	112,437	15,796	822	30,363
Noncommercial posts (round and split):							
Softwood	207	151	38	113	...	...	56
Hardwood	1,288	945	45	900	...	...	343
Total	1,495	1,096	83	1,013	...	...	399
Fuelwood:							
Softwood	853	524	66	458	96	38	195
Hardwood	14,400	8,855	1,851	7,004	1,613	649	3,283
Total	15,253	9,379	1,917	7,462	1,709	687	3,478
All products:							
Softwood	526,673	500,036	426,865	73,171	4,010	811	21,816
Hardwood	208,210	181,593	133,852	47,741	13,495	698	12,424
Total	734,883	681,629	560,717	120,912	17,505	1,509	34,240

[1] On commercial forest land.

[2] Includes noncommercial forest land, nonforest land such as fence rows, trees less than 5.0 inches in diameter, and treetops and limbs.

Table 25. *Timber removals from growing stock on commercial forest land by items and by softwoods and hardwoods, Alabama, 1971*

Item	All species	Softwood	Hardwood
	— *Thousand cubic feet* —		
Roundwood products:			
Saw logs	255,354	191,290	64,064
Veneer logs and bolts	44,060	34,658	9,402
Pulpwood	353,010	256,910	96,100
Cooperage logs and bolts	847	588	259
Piling	642	642	...
Poles	14,126	14,126	...
Posts	2,142	1,196	946
Other	2,069	102	1,967
Fuelwood	9,379	524	8,855
All products	681,629	500,036	181,593
Logging residues	32,918	17,235	15,683
Other removals	25,111	8,677	16,434
Total removals	739,658	525,948	213,710

Table 26. *Timber removals from live sawtimber on commercial forest lands by items and by softwoods and hardwoods, Alabama, 1971*

Item	All species	Softwood	Hardwood
	— *Thousand board feet* —		
Roundwood products:			
Saw logs	1,384,482	1,037,301	347,181
Veneer logs and bolts	263,355	208,035	55,320
Pulpwood	886,949	697,149	189,800
Cooperage logs and bolts	4,924	3,179	1,745
Piling	3,808	3,808	...
Poles	72,197	72,197	...
Posts	325	150	175
Other	11,630	284	11,346
Fuelwood	9,388	333	9,055
All products	2,637,058	2,022,436	614,622
Logging residues	141,436	78,134	63,302
Other removals	73,895	42,820	31,075
Total removals	2,852,389	2,143,390	708,999

Table 27. *Volume of plant residues by industrial source and type of residue and by softwoods and hardwoods, Alabama, 1971*

Species group and type	All industries	Lumber	Veneer and plywood	Other
	— — — — — *Thousand cubic feet* — — — — —			
Softwood:				
Coarse[1]	1,855	1,792	9	54
Fine[2]	10,513	10,266	90	157
Total	12,368	12,058	99	211
Hardwood:				
Coarse	1,946	1,478	437	31
Fine	9,528	9,212	129	187
Total	11,474	10,690	566	218
All species:				
Coarse	3,801	3,270	446	85
Fine	20,041	19,478	219	344
All types	23,842	22,748	665	429

[1] Unused material suitable for chipping, such as slabs, edgings, and veneer cores.

[2] Unused material not suitable for chipping, such as sawdust and shavings.

Table 28. *Projections of net annual growth, available cut, and inventory of growing stock and sawtimber on commercial forest land, Alabama, 1971-2001*[1]

Species group	Growing stock				Sawtimber			
	1971	1981	1991	2001	1971	1981	1991	2001
	Thousand cubic feet				*Thousand board feet*			
Softwood:								
Cut	525,900	754,500	901,300	1,002,600	2,143,400	3,188,000	3,824,000	4,281,000
Growth	788,000	926,900	989,900	1,002,600	3,153,500	3,831,000	4,243,000	4,382,000
Inventory[2]	11,282,600	13,425,000	14,687,700	15,111,900	42,283,400	49,665,000	54,930,000	57,454,000
Hardwood:								
Cut	213,700	397,100	511,100	598,600	709,000	1,086,000	1,238,000	1,251,000
Growth	399,400	497,300	565,900	598,600	1,048,200	1,011,000	1,020,000	1,009,000
Inventory[2]	8,929,100	10,144,200	10,900,200	11,182,800	21,233,700	21,776,000	20,118,000	17,745,000
Total:								
Cut	739,600	1,151,600	1,412,400	1,601,200	2,852,400	4,274,000	5,062,000	5,532,000
Growth	1,187,400	1,424,200	1,555,800	1,601,200	4,201,700	4,842,000	5,263,000	5,391,000
Inventory[2]	20,211,700	23,569,200	25,587,900	26,294,700	63,517,100	71,441,000	75,048,000	75,199,000

[1] Based on the assumption that the cut of growing stock will be in balance with growth by the year 2001, and that forestry progress will continue at the rate indicated by recent trends.

[2] Inventory as of January 1 of the following year.

Murphy, Paul A.

1973. Alabama forests: trends and prospects. South. For. Exp. Stn., New Orleans, La. 36 p. (USDA For. Serv. Resour. Bull. SO-42)

Between 1963 and 1972, forest area in Alabama declined 2 percent to 21.3 million acres. Softwood volume increased 30 percent and hardwood 15 percent. Volumes increased in all tree-size classes, but increases were greatest in small trees.

Additional keywords: Timber volume, forest acreage, timber cut, timber growth, forest industries.