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Contents

Highlights

This report presents the principal findings of a new forest survey of Mississippi. [1] Field work was completed in 1967, and that year is given for the date of inventory. Estimates of growth and cut, and of industrial output, were compiled for 1966. Comparison with the previous survey of 1957 helps to clarify timber trends.

Forest land in Mississippi declined 2 percent in the decade between the two surveys. Clearing of hardwood forests was extensive in the Delta region (fig. 1), in continuation of a long-term trend. Land reverting to forest in the uplands of central Mississippi partly offset the Delta loss. In other regions, changes were small.

Statewide, an increasing emphasis on forestry has helped to improve stocking. Fire protection, planting, seeding, and natural reproduction have reduced the acreage of nonstocked forest to less than 1 percent. And improvements in stand density were noted in all regions, most strikingly in the Southern and Central. A substantial rise in numbers of 2- and 4-inch diameter trees augurs well for the future, and increases in numbers of larger trees are reflected in sizable current volume gains.

Softwood growing stock volume, mostly pines, has increased 63 percent since 1957. Mississippi timber stands now contain 6.6 billion cubic feet of softwood growing stock. Three-fourths of this volume is in trees large enough to be classed as sawtimber; the rest is poletimber. Largest growing-stock gains were in trees from 7 to 15 inches in diameter. Volume increased everywhere except in the Delta, which experienced a small loss.

Despite land clearing in some areas, the hardwood resource has remained remarkably stable. The 6.5 billion cubic feet of growing stock nearly equals the softwood volume. Throughout the range of tree sizes, volume changes were small. A slight decline in trees 19 inches and larger was more than compensated for by the buildup in smaller sizes. Although tree quality is highly dependent on size, it did not change measurably between surveys.

Timber harvested from Mississippi forests totaled more than 450 million cubic feet in 1966—the biggest harvest in a decade. In the interval between surveys, output of roundwood for pulpwood eclipsed saw logs as the leading product. Softwood species exceeded hardwoods, making up 53 percent of the harvest.

A canvass of Mississippi's primary wood-using plants revealed some 450 operations of various kinds. Mississippi timber was pulped, sawn into lumber, cut into veneer, treated with preservatives, sawn into furniture and handle squares, and burned for fuel.

Even with industrial activity at a recent high, timber growth greatly exceeded removals in 1966. The volume in trees retained for future harvest, 335 million cubic feet, was equal to almost two-thirds of the cut. One-fourth of the timber removed was unused. It consisted mainly of hardwood abandoned in logging and destroyed in land clearing.

Though growth currently exceeds cut, productivity of Mississippi forests is well below potential. It is estimated that the current annual yield of 50 cubic feet per acre could be almost doubled. Moreover, the quality and tree-size distribution of the existing inventory could be simultaneously improved. Thinning, removing cull trees, and regulating rotation age are some of the methods available to foresters.

It seems inevitable that Mississippi's timber resource will become increasingly important in meeting growing national demands. Recent industrial expansion, most notably in the pulp industry, is only a preview of the activity that will be stimulated by a wisely managed forest resource.

[1] Data supplementary to the present report will be found in: **Forest statistics for Mississippi counties.** Arnold Hedlund and J. M. Earles. USDA Forest Serv. Resource Bull. SO-15, 24 pp. 1969. South. Forest Exp. Sta., New Orleans, La. **Mississippi forest industry.** Dwane D. Van Hooser. USDA Forest Serv. Resource Bull. SO-12, 25 pp. 1968. South. Forest Exp. Sta., New Orleans, La.

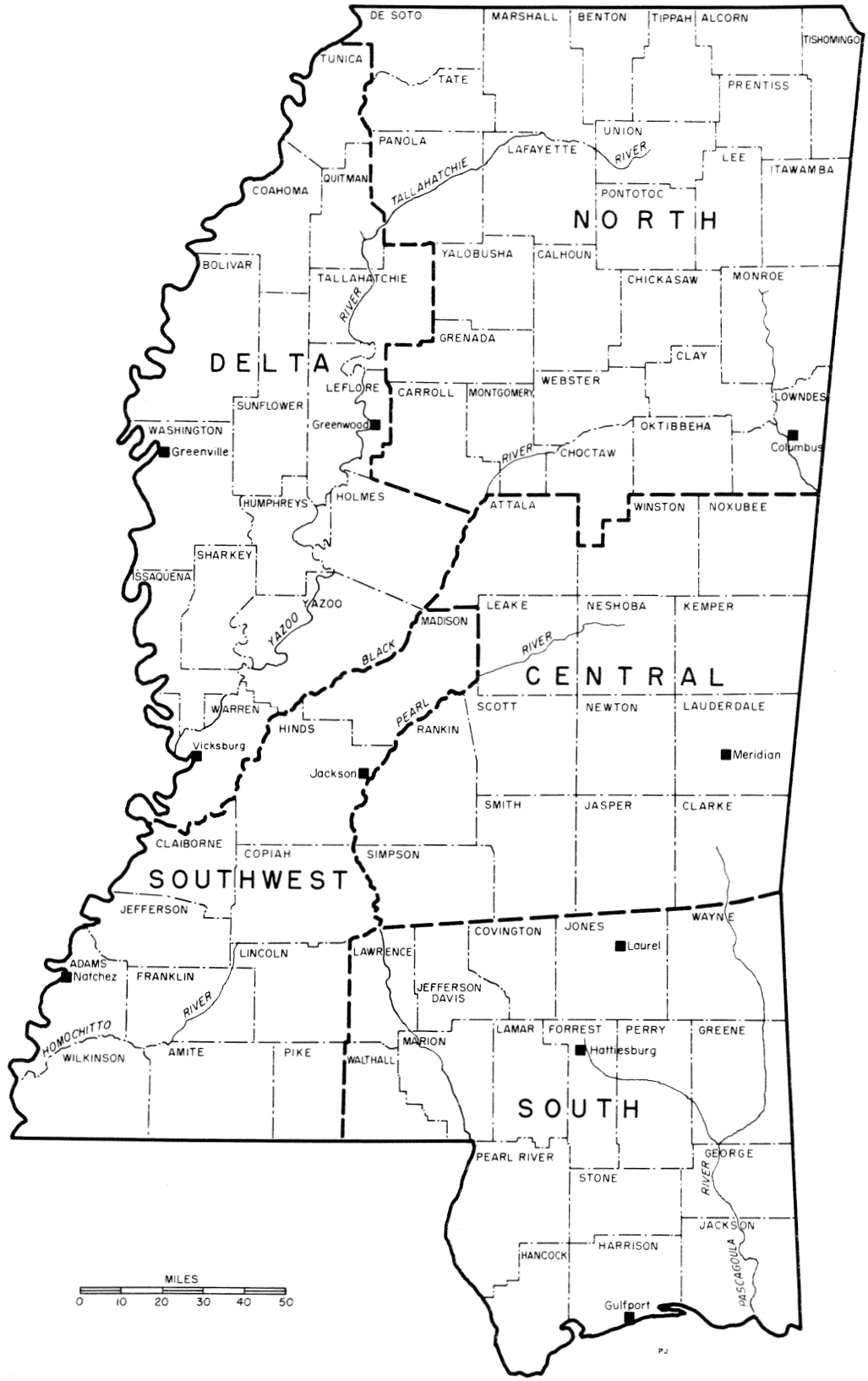

Figure 1. *Forest Survey regions in Mississippi.*

The Changing Resource

FOREST LAND

Forests continue to be the dominant land use in Mississippi. They occupy 56 percent of the total land area. In all, 16.9 million acres are under some kind of forest [2] cover. Of this, 21,000 acres in public holdings are withheld from timber harvesting. Most of the reserved land is on the Natchez Trace Parkway.

Forest Types

Mississippi forests may be classified into three groups—pines, upland hardwoods, and bottom-land hardwoods (fig. 2). The pine forests are composed of three major types and contain virtually all of the pine volume. Longleaf-slash pine and loblolly-shortleaf types are found on one-third of the State's forest land. Pine stocking also makes up 25 to 50 percent of the oak-pine type, thus accounting for another fifth of forest. The oak-pine association can usually be converted to pure pine with moderate treatment.

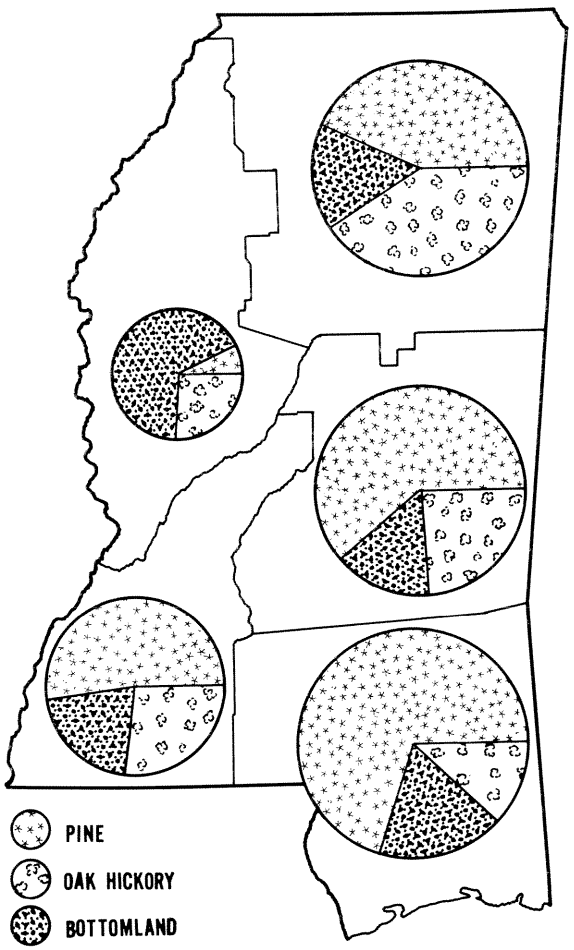

Figure 2. *Major forest-type groups by Forest Survey regions.*

[2] Technical terms are defined on pages 20-22.

The uncultivated portions of the Mississippi River Delta and the river bottoms of lesser streams support stands of oak-gum-cypress and elm-ash-cottonwood. These bottom-land types comprise 22 percent of the State's forest area.

The bottom-land forests merge into oak-hickory uplands as sites become higher and dryer. Oak-pine stands also give way to oak-hickory in the northern part of the State, where cool winters limit the occurrence of loblolly pine.

Changes in Forest Area

Forest land area declined by 2 percent between surveys (table I). The small total change obscures shifts in land use within regions.

Table I.—*Commercial forest land in 1967 and change since 1957*

Survey region	Commercial forest	Proportion of land area forested	Change since last survey
	Thousand acres	*Percent*	*Percent*
Delta	1,493.8	27	− 22
North	4,194.8	50	(1)
Central	3,959.5	67	+ 4
South	4,489.1	73	− 1
Southwest	2,754.7	63	(1)
All regions	16,891.9	56	− 2

[1] Negligible.

Forests have been cleared in a large portion of the State's Delta region. There, a 22-percent loss of the commercial forest land occurred. This region, lying almost entirely within the

alluvial plain of the Mississippi River, contains some of the State's choice hardwood-producing land. Razing of the Delta forests is partly the result of worldwide demand for soybeans.[3] This crop surpassed corn and cotton to become the Nation's number one agricultural cash crop in 1966. Much of the Delta clearing has taken place since 1960 and coincides closely with increases in the State's soybean acreage.

In the Central region, abandonment of farm land added 167,000 acres to the forest.

Comparison of shifts in acreage among forest types is made difficult by changes in specifications for the 1957 and 1967 surveys. Thus, differences in the area of pine types were not large enough to be clearly attributable to forest changes. But in the Delta much of the acreage loss was in desirable bottom-land hardwoods. The gain in the Central region was mostly in the less productive upland hardwood type.

While the changes in forest acreage were partly compensatory, timber growth nevertheless suffered. Land removed from forest usually contains immature trees representing years of growth. Land reverting naturally to forest is unproductive for some time if regeneration is delayed or inadequate.

Ownership

Ninety percent of Mississippi's commercial forest land is privately owned. The amount in public ownership, mostly National forest, did not change materially between surveys.

Changes among private, nonindustrial ownership classes largely reflect trends in rural population. Farmers now own 6.2 million acres of forest, 16 percent less than they did in 1957. Miscellaneous private landowners hold 6.4 million acres, 13 percent more than recorded previously. The most recent Census of Agriculture, in 1964, disclosed a 20-percent decline in the number of Mississippi farms in 5 years. The trend was found to some degree in every county in the State. As with farms, forest acreage is probably being consolidated and shifted to other ownerships.

Forest industry holdings—2.5 million acres—are nearly identical to the 1957 acreage. However, forest industry's stewardship is also extended to some 200,000 acres of land leased from farmers or other private owners. Additional lands are under long-term cutting contracts.

[3] Beltz, R. C., and Christopher, J. F. Land clearing in the Delta region of Mississippi, 1957-1967. USDA Forest Serv. Res. Note SO-69, 3 pp. 1967. South. Forest Exp. Sta., New Orleans, La.

TIMBER VOLUME

Mississippi forests contained more than 15 billion cubic feet of wood in 1967, not including wood in stumps and branches. This total includes trees of all kinds and sizes including those currently considered too rough or rotten to be utilized for products. The concept of growing stock and sawtimber is used to aid in interpretation of the inventory. Growing stock trees have quality attributes that make them either presently or prospectively suitable for saw logs. Their volume is measured from a 1-foot stump to a 4-inch top. Sawtimber trees are growing stock trees larger than a specified diameter limit. In the interval between surveys, changes were made in the specifications for growing stock. Moreover, methods of computing tree volume also evolved. Thus, to permit comparisons with the 1957 inventory, the earlier volumes were adjusted to current specifications. All volume comparisons in this report use recomputed 1957 data.

Strong Gain in Pine Volume

Softwood volume, nearly all in southern pines, rose 63 percent during the last decade (table II). Most of the 6.6 billion cubic feet are in sound, well-formed trees (fig. 3). Vol-

Table II.—*Growing stock volume in 1967 and change since 1957*

Region	Softwood		Hardwood	
	Volume	Change	Volume	Change
	Million cu. ft.	*Percent*	*Million cu. ft.*	*Percent*
Delta	69.3	+ 1	1,148.5	− 8
North	878.0	+ 77	1,655.5	+ 3
Central	2,028.0	+ 71	1,520.2	+ 11
South	2,187.7	+ 61	1,073.1	+ 8
Southwest	1,391.8	+ 51	1,082.5	+ 2
All regions	6,554.8	+ 63	6,479.8	+ 3

ume of softwood growing stock now exceeds that of hardwood.

The spectacular gain took place throughout the range of tree sizes. But the largest volume increases were in trees from 7 to 15 inches in diameter (fig. 4). Trees of these sizes are vital to the forthcoming expansion in Mississippi's forest industry.

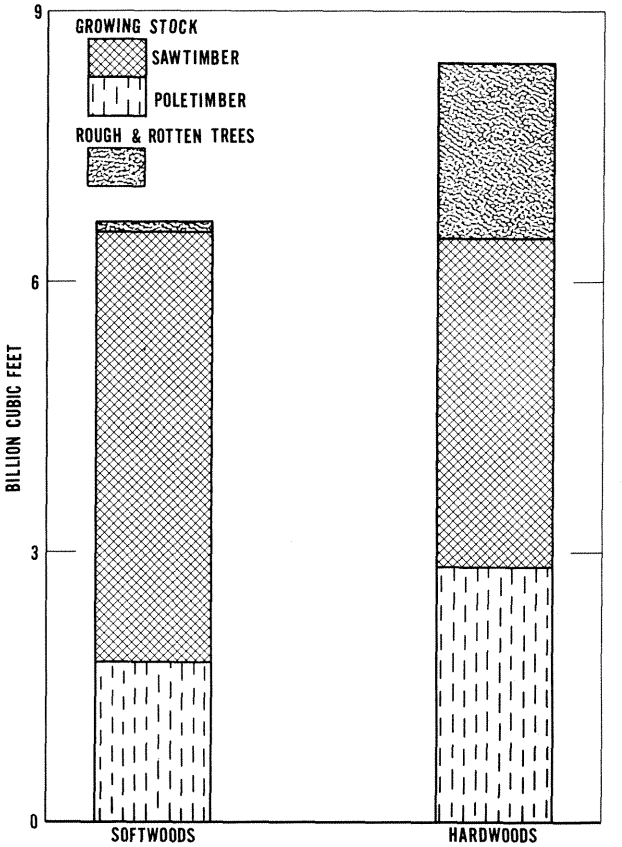

Figure 3. *Volume of softwoods and hardwoods, by class of timber.*

About three-fourths of the current softwood growing stock volume is classed as sawtimber-size trees—that is, at least 9 inches in diameter. The rest is classed as poletimber. Ninety percent of the 4.8 billion cubic feet in softwood sawtimber trees can be made into saw logs. This is equivalent to 25 billion board feet (table III). The remainder is in upper stems but is suitable for pulpwood or similar products. Changes in sawtimber volume also indicate the shift in tree size: pine saw log volume on the stump in Mississippi is nearly 70 percent greater than in 1957.

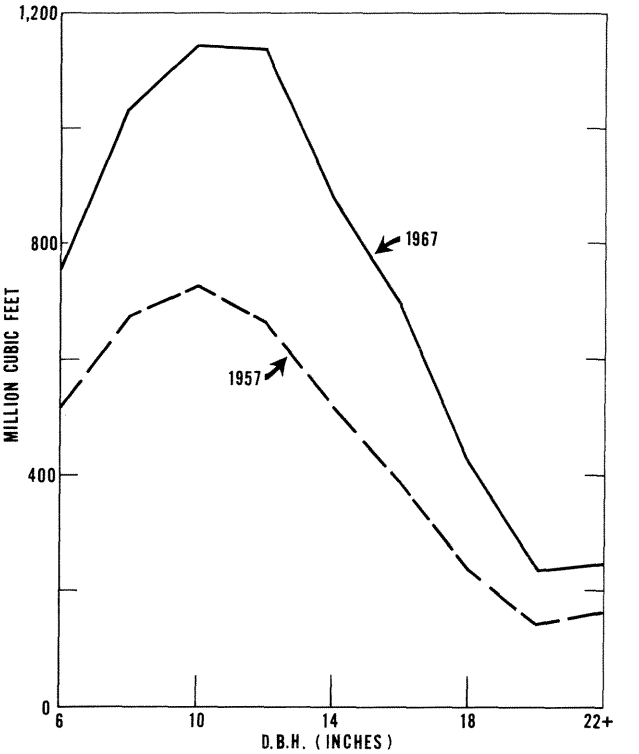

Figure 4. *Softwood growing stock volume by tree diameter, 1957 and 1967.*

Table III.—*Sawtimber volume in 1967 and change since 1957*

Region	Softwood		Hardwood	
	Volume	Change	Volume	Change
	Million bd. ft.	*Percent*	*Million bd. ft.*	*Percent*
Delta	267.1	— 9	3,804.0	— 16
North	2,576.9	+ 97	3,651.3	+ 5
Central	7,523.0	+ 81	3,474.6	+ 20
South	8,836.0	+ 71	2,850.0	+ 19
Southwest	6,233.9	+ 50	3,018.7	— 1
All regions	25,436.9	+ 69	16,798.6	+ 3

The increase in softwood sawtimber was accompanied by noticeable improvements in quality (fig. 5). Quality gains can be expected when tree size increases, as log grades are based partly on diameter specifications. Moreover, as trees increase in size the accompanying gains in stand density cause them to shed lower limbs more quickly and hence to have fewer surface defects.

The biggest improvement in pine volume occurred in the North and Central regions. The change is accounted for partly by the history

of forest industry in these portions of the State. Small sawmills, once numerous, have been declining in number for the last two decades and have not been immediately replaced with similar timber markets. The resulting pause in harvesting activities has done much to help build up the growing stock base.

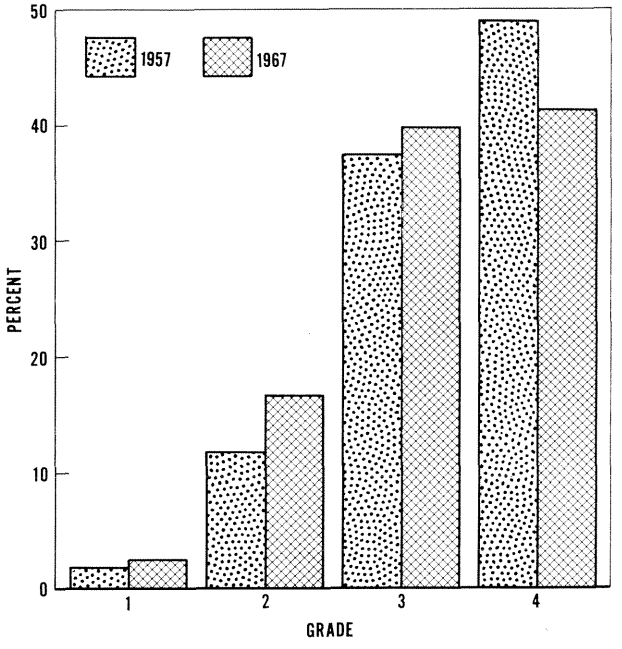

Figure 5. *Distribution of softwood sawtimber volume by log grade, 1957 and 1967.*

In the Northern region, pine volumes have also been increased by publicly sponsored efforts to establish cover on the highly erosive drainages of the Yazoo and Little Tallahatchie Rivers. The area is characterized by many small farms and low per-capita income. Landowners were often unaware of the need for soil stabilization, and, even when informed, were unable to make the required investments without public assistance. Extensive programs of tree planting and timber stand improvement were initiated shortly after the Second World War, and their benefits are now evident.

Mild Gain in Hardwood Volume

The 1967 inventory revealed an increase of 3 percent in the volume of hardwood growing stock—the total now is 6.5 billion cubic feet. There was a decline in the volume of large trees, and a gain in the smaller sizes (fig. 6). The previously mentioned clearing of fertile hardwood lands in the Delta reduced volume there by 8 percent. Volume rose in the Central and Southern regions, accompanied by increases in the upland and bottom-land hardwood types.

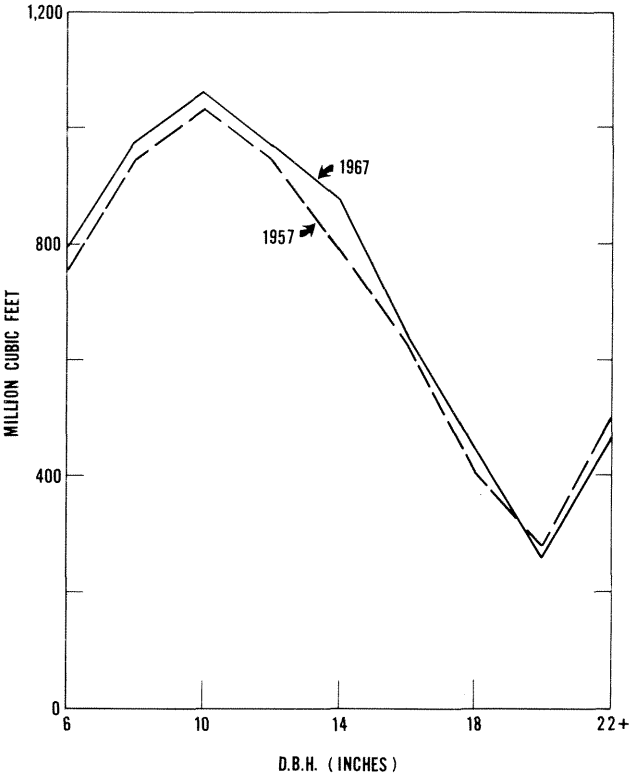

Figure 6. *Hardwood growing stock volume by tree diameter, 1957 and 1967.*

The overall species composition of Mississippi's hardwood forests is indicated by figure 7. Changes between surveys were minor. Gums declined from 28 percent to 25 percent of the growing stock volume, and red oaks increased from 22 percent to 26. Most other species were found in about the same proportions as observed by the previous survey. Gums, yellow-poplar, magnolia, and similar species have been in much demand for pulpwood and veneer. Recently, developing technology in the pulp industry has helped redistribute demand as more species are found acceptable. The proportion of oaks in Mississippi's harvest of hardwood pulp increased from less than 10 percent in 1959 to the current level of nearly 20.

Fifty-six percent of the hardwood growing stock volume is in sawtimber-size trees—at least 11 inches in diameter. Four-fifths of the 3.7 billion cubic feet in sawtimber trees will make saw logs. The volume of hardwood grow-

ing stock is nearly equal to that of pine; in sawtimber volumes, the advantage of pine is probably due as much to differing minimum-diameter specifications as to the distribution of tree sizes.

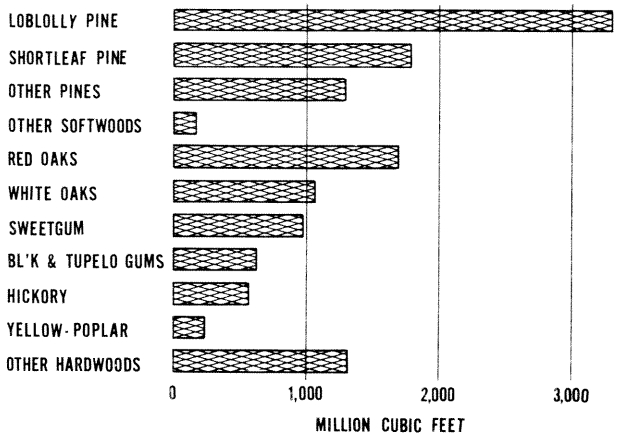

Figure 7. *Growing stock by species.*

Despite a slight decline in trees 20 inches and larger, hardwood quality does not appear to have been adversely affected. Fully 25 percent of the sawtimber volume is in logs of grades 1 and 2. Although absolute volumes are not directly comparable with those recorded in the earlier survey, this is about the same proportion as previously reported. Logs such as these are normally most in demand for factory lumber and other products requiring clear material. Fifty-four percent of the hardwood sawtimber is made up of grade 3, which is the lowest or marginal grade suitable for standard factory lumber. The remaining volume is in tie and timber logs that are presently suited only to low-value uses such as crating and crossties (table IV).

Table IV.—*Sawtimber volume by log grade and tree diameter, Mississippi, 1967*

Species group and d.b.h. class (inches)	All grades	Grade 1[1]	Grade 2	Grade 3	Grade 4
	Million board feet				
Softwood:					
10 to 12	10,474.1	12.9	273.8	6,000.9	4,186.5
14 to 18	11,892.5	53.6	3,192.0	3,531.6	5,115.3
20 and up	3,070.3	577.5	741.1	576.3	1,175.4
Total	25,436.9	644.0	4,206.9	10,108.8	10,477.2
Hardwood:					
12	3,774.4	...	206.0	2,720.5	847.9
14 to 18	9,222.3	376.4	1,690.8	4,867.1	2,088.0
20 and up	3,801.9	899.6	852.8	1,482.8	566.7
Total	16,798.6	1,276.0	2,949.6	9,070.4	3,502.6

[1] All cedar logs were graded as No. 1.

In addition to growing stock trees, Mississippi forests support 2 billion cubic feet of sound volume in rough and rotten trees. Such trees pose a dilemma for forest managers. They are generally unsuitable for sawn products, although many contain usable amounts of pulpwood. They take up growing space, yet often lose more volume than they gain. In short, these trees reduce the productivity of hardwood stands.

PRODUCTIVITY

As part of the Mississippi survey, forest land was rated by site class. The results are an indication of potential productivity.

Annual growth on growing stock trees averages 52 cubic feet per acre. This is well below the land's capabilities. The average acre could be made to yield about 90 cubic feet annually. Why, then, are the forests growing at less than capacity? A description of stocking gives some important clues.

Stocking

Stocking is an indication of the extent to which trees utilize the growth potential of the site. Basal area per acre was taken as a measure of stocking for stands with trees larger than 5 inches d.b.h., and numbers of trees was a criterion for stands with smaller trees. The standards were chosen so that 100-percent stocking represented the minimum required to make full use of the site.

Forty-two percent of the forest acres in Mississippi are fully stocked with growing stock trees. An additional 46 percent are at least medium stocked with such trees. Stands of both classes contain substantial numbers of trees that are too rough or too rotten to make saw logs. Such culls make up one-fifth of the basal area on the average acre. Growth on them is not added to the growing stock inventory, and they hamper the development of growing stock trees. The loss they cause is approximately in proportion to their basal area.

The stand structure of Mississippi's forests—that is the distribution of trees by size classes—offers another clue to present low volume yields. In figure 8, existing stand structure is compared with a hypothetical distribution de-

rived from normal yield tables. The chart is for Mississippi forests considered as a whole, not for particular stands. On this basis, it is clear that the acreage in small stands is greater than would be required over the long run (it is also possible that stocking in some of these small stands is excessive). And the acreage in large- and medium-size timber is too small. In fact, only 27 percent of the forest area is presently classed as supporting sawtimber stands, while half is covered by seedling and sapling stands. Biological productivity thus is higher than indicated by present volume growth. Even when all live trees are considered—that is, when culls are added to growing stock—stand structure limits volume output.

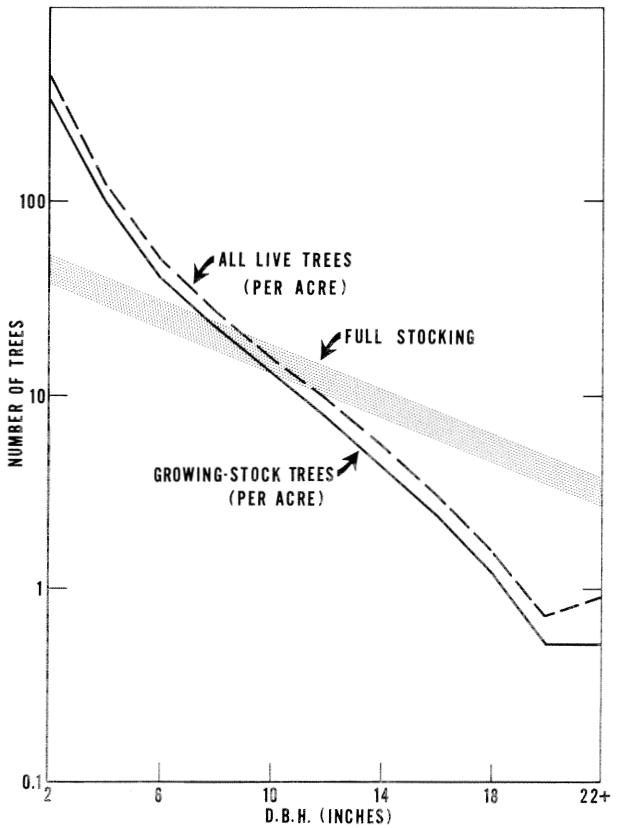

Figure 8. *Comparison of present stand structure with that of hypothetical fully stocked stand.*

On the average, Mississippi stands contain 73 square feet of basal area per acre in trees of all sizes. In 1957, the average stand density was about 60 square feet. Both fire protection and tree planting have contributed to the improvement. In the decade between 1957 and 1967, more than one million acres were planted,[4] nearly all with pines. A peak of 170,000 acres was reached in 1960. Since then pine planting has declined, in part because of the withdrawal of Soil Bank assistance. It also seems likely that many areas badly in need of planting have received attention.

Until recently hardwood plantings were largely experimental, but the acreage of some cottonwood and sycamore plantations has now reached commercial proportions.

Given the overcutting of the forests in earlier decades, and given also the recent efforts to regenerate the stands, the shape of the curve depicted in figure 8 is almost inescapable. If future overcutting of medium and large trees is avoided, the present abundance of small trees will repair the deficit of large trees.

Growth and Removals

In 1966 the increase in Mississippi's growing stock inventory was 335 million cubic feet (table V). This is the amount that growth added to the inventory after deductions were made for mortality and removals.

Table V.—*Summary of timber resource statistics, Mississippi, 1957-1967*

Item	Growing stock		Sawtimber	
	Soft-wood	Hard-wood	Soft-wood	Hard-wood
	Million cubic feet		*Million board feet*	
Inventory, 1957 [1]	4,028.1	6,273.1	15,089.3	16,363.5
Timber removals, 1966	251.2	287.3	1,005.7	956.4
Mortality, 1966	21.5	50.6	66.4	138.5
Net growth, 1966	523.8	349.7	1,955.6	878.9
Net change, 1966	+ 272.6	+ 62.4	+ 949.9	− 77.5
Inventory, 1967	6,554.8	6,479.8	25,436.9	16,798.6

[1] Adjusted for 1967 measurement standards.

Softwood species demonstrated an overall growth rate of 9 percent in 1966. A small portion of this was nullified by fires, insects, disease, and other natural causes of mortality. Net growth was 524 million cubic feet (fig. 9). Timber removed for products offset 46 percent of the total growth, leaving about half to be reinvested as new growing stock.

The margin of hardwood growth over removals and mortality added 62 million cubic feet to the growing stock in 1966. Hardwood mortality was substantial, reducing gross growth by about one-eighth. Removals totaled

[4] USDA Forest Service. Annual summaries, published in Tree Planters' Notes, of Forest and windbarrier planting and seeding in the U. S. 1957-1967.

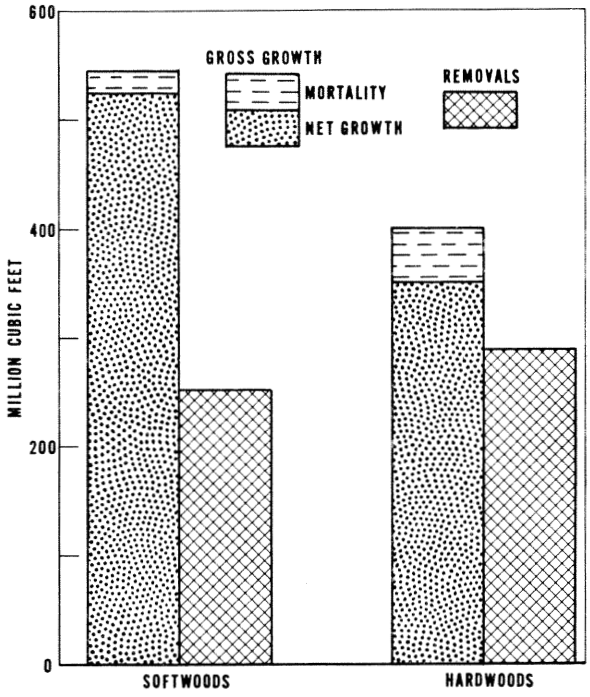

Figure 9. *Growth, mortality, and removals of growing stock, 1966.*

287 million cubic feet; of this two-thirds went into timber products and some 104 million cubic feet were removed in logging and land clearing but not used. When land is cleared, the timber is usually windrowed and burned. Recent changes in hardwood stand structure indicate that pole-size trees are increasing while saw logs are being removed faster than growth can replenish the supply. The net changes registered for hardwood in 1966 (table V) corroborate this trend.

REGIONAL CONTRASTS

The Forest Survey regions in Mississippi represent differing physiographic zones, though their boundaries follow county lines for convenience in compiling data. As figure 10 suggests, the forest situation differs considerably from one region to another.

Delta region.—Hardwoods make up 94 percent of the Delta growing stock volume. The minor softwood volume is mostly cypress with some pine. In this region land clearing for agriculture has been extensive. Much of the remaining forest is in the backwater basins of the Yazoo and Black Rivers. Tree size and quality are well above the average for the State. Consequently, the continued clearing of the Delta's hardwood lands is causing concern among hardwood foresters.

Northern region.—Trees in the Northern region are predominantly small. Seedling and sapling stands comprise three-fifths of the forest. The latest survey found little change in forest area, but between 1948 and 1957 a gain of 13 percent was recorded. Trees established then are beginning to reach poletimber size.

Though this is a region of predominantly pine sites, two-thirds of the growing stock volume is in hardwoods. Partly because of low present volumes, and partly because of in-

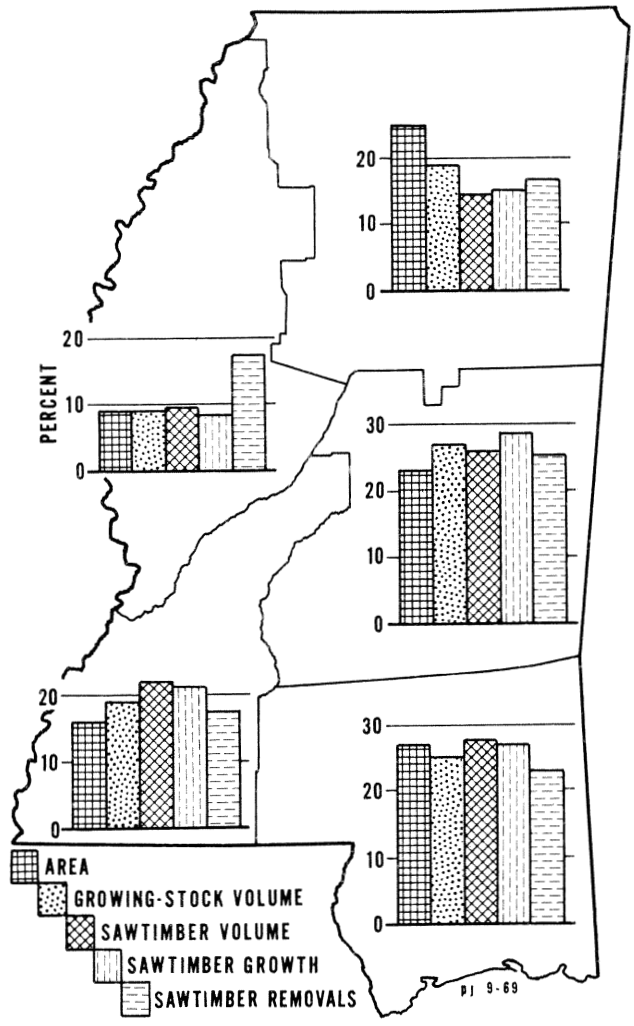

Figure 10. *Relative importance of forest resources, by region.*

growth from trees established a decade or two ago, growth rates are among the highest in the State. Pine sawtimber volume almost doubled between 1957 and 1967, and hardwoods made modest gains.

Central region.—The Central region contains the most growing stock volume. Three-fifths is softwoods, virtually all pine. Here, as in the North, pine growth rates are high, but more of the growth is taking place on sawtimber-size trees than in other regions. Average volume per acre is high and stands are well stocked.

This is the only region in which a gain in forest land area was observed.

Southern region.—Three acres out of every 4 in the Southern region are forested. Here too, the largest volume of pine timber is found —almost 9 billion board feet. Hardwoods add another 3 billion to the total.

More than a third of the forest land is in public or industrial holdings. These ownerships share a history of better than average forest management.

Longleaf-slash pine stands predominate. About 90 percent of the State's inventory of these species is found here. Even so, overall stand density is lower than it should be. Nearly one-fifth of the area is poorly stocked with growing stock.

Southwestern region.—This region is best described as having a balanced resource. The 2.8 million acres of forest land support 900 cubic feet of growing stock per acre, as compared with a Statewide average of 770. The ratio of sawtimber volume to growing stock volume is higher than average, and growth rates are good. The high productivity reflects very good sites.

Timber Harvest and Industry

HARVESTING

Mississippi's 1966 output of roundwood products was the largest harvest in a decade. It amounted to 456 million cubic feet of wood. Softwood species, nearly all pine, made up 53 percent. Hardwoods consisted chiefly of oaks, gums, hickories, and yellow-poplar (fig. 11).

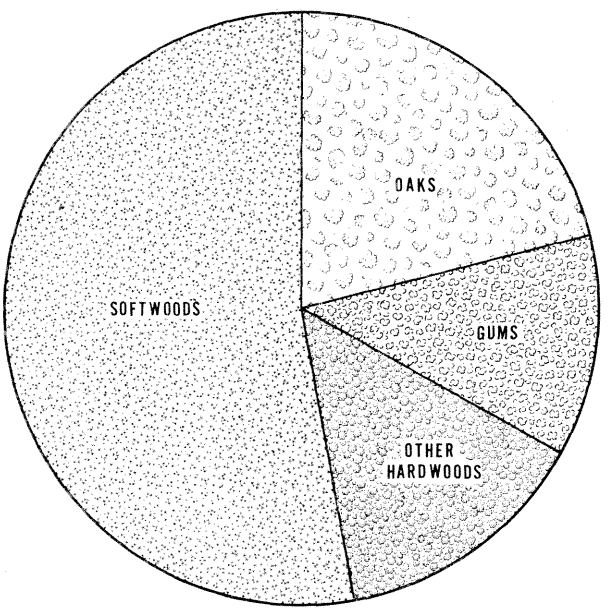

Figure 11. *Distribution of roundwood output, by species groups.*

Although roundwood output was almost the same as in 1956, important changes took place between surveys. Pulpwood and veneer logs increased while saw logs declined (fig. 12).

Pulpwood was the largest single product in 1966, comprising more than two-fifths of the roundwood output. The 2.5 million cords was a record high. With the exception of a few periods of slight decline, pulpwood production has trended upward since 1946. The saw log harvest was second to pulpwood by a small margin. One billion board feet of saw logs were cut, with pine and hardwoods in nearly equal proportions.

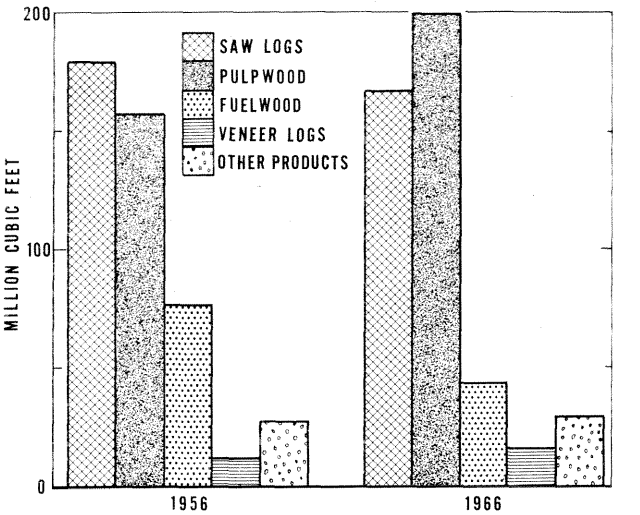

Figure 12. *Output of roundwood by product, 1956 and 1966.*

Fuelwood, veneer logs, poles, piling, posts, and miscellaneous products combined for one-fifth of the harvest. Of these, fuelwood made up the largest volume. In contrast to industrial products, much of the fuelwood is taken from culls and other nongrowing-stock sources.

Veneer logs produced in 1966 totaled 98 million board feet, about half pine. In 1956 the output was 90 million board feet, all hardwood. Production of hardwood veneer logs is declining.

Mississippi is a top-ranking supplier of poles and piling. In 1966, nearly 800,000 pines were cut for poles and some 4.9 million linear feet of piling were harvested. Other products such as posts, cooperage, handle stock, and miscellaneous dimension made up 4 percent of the output.

Mississippi was a net exporter of timber in 1966. Instate plants processed only three-fifths of the timber severed. Pulpwood accounted for most of the interstate movement: of the total 2.5 million cords, nearly 60 percent was shipped to out-of-State plants. Eighty-five percent of the pulpwood exports were pine.

Timber harvesting methods are rapidly changing. The effects of rising wages and developments in logging equipment are evident everywhere. The chain saw was a breakthrough in harvesting methods during the 1940's. More recent developments include tree-length logging, rubber-tired skidders, mechanical pulpwood loaders, weight-scaling, and mechanized woodyards. Roundwood chipping installations, located close to the wood supply, are a recent innovation in pulpwood marketing. Wood arrives at the installations in tree-length form to be debarked, chipped, and loaded onto railcars for shipment to a pulpmill. Although not necessarily in the above order, all of these techniques and devices have helped reduce the cost and increase the ease of getting timber to the market.

Logging residues are the unused portions of trees cut or killed by logging. The residues in 1966 were estimated to contain 55 million cubic feet of growing stock material, more than two-thirds hardwood. Most of the loss was a consequence of saw log operations.

INDUSTRY DEVELOPMENTS

Seven pulpmills were operating in Mississippi in 1966. Since then, mills at Monticello and Vicksburg have become operational. The 1966 capacity of 3,605 tons per day is thus expanded to 6,140 tons—an increase of 70 percent. Future pulpwood production in the State should be greatly stimulated by these developments.

Both number of sawmills and lumber production rose from 1962 to 1966, in reversal of a trend that was evident during the fifties. While lumber output is expected to continue upward in the immediate future, little change is anticipated in numbers of mills. There are now 108 sawmills with individual capacities in excess of 3 million board feet of lumber per year (fig. 13); smaller sawmills number 242. The large mills got about 80 percent of the logs in 1966.

Twenty-two plants were cutting veneers in 1966. Of these, 18 primarily manufactured hardwood veneers for containers, though some also cut southern pine. The other four plants cut pine for manufacture into plywood. Sixty percent of the veneers produced in 1966 were hardwood. Additional plywood facilities planned for Mississippi will further increase the demand for southern pine veneer logs.

The wood-preserving industry in Mississippi consists of some 30 plants, about three-fifths of which use pressure systems. They treat most of the roundwood harvested in the State for poles, piling, and fence posts. They also process some lumber, railroad ties, crossarms, and other sawn products.

Other plants using Mississippi roundwood manufacture dimension stock, handle stock, shuttle blocks, charcoal, cooperage, and excelsior. Most numerous are those producing miscellaneous dimension stock.

Mississippi is entering a new era in forestry. Markets are improving for a variety of products from pulpwood to veneer. In most cases, these outlets are replacing the once-numerous small sawmill. The 242 small sawmills represent one-seventh of the number operating shortly after World War II. Such mills were profitable in the days when labor costs were low and the scattered nature of timber stands discouraged competition from large mills. Now stumpage owners find other producers bidding effectively for their timber.

WOOD RESIDUES AND BYPRODUCTS

Of every cubic foot of wood that goes to Mississippi mills, one-third remains after primary manufacture. Wood residues and byproducts in 1966 totaled 96 million cubic feet. Three-fifths of this volume was coarse material —slabs, edgings, miscuts, cull pieces, and other items of a size suitable for conversion into pulp chips. The rest was fine material, mainly sawdust and shavings.

For some years the manufacturing residues produced at Mississippi plants have remained a relatively constant proportion of raw material receipts. But during the last decade, the means of disposing of coarse residues has changed remarkably. In 1966, some 38 million cubic feet, mainly from sawmills, were chipped and sent to pulpmills. This volume represents a sixfold increase since 1956. The growing market for chips, together with the declining costs of alternative power sources, mainly electricity, have combined to cause a 73-percent decline in the volume of wood byproducts used for fuel.

In 1966, more than 85 sawmills and 17 veneer mills operated chipping equipment. Several pulpmills now have outdoor storage facilities capable of handling large quantities of chips. At large sawmills, producing pulp chips is commonly an integral part of the operation. Large mills without chipping equipment are generally those that still depend on wood for fuel.

Uses were found for more than half of the fine material produced in 1966. They include both industrial and domestic fuel, livestock bedding, and mulch. The pulp industry has begun using sawdust in some processes.

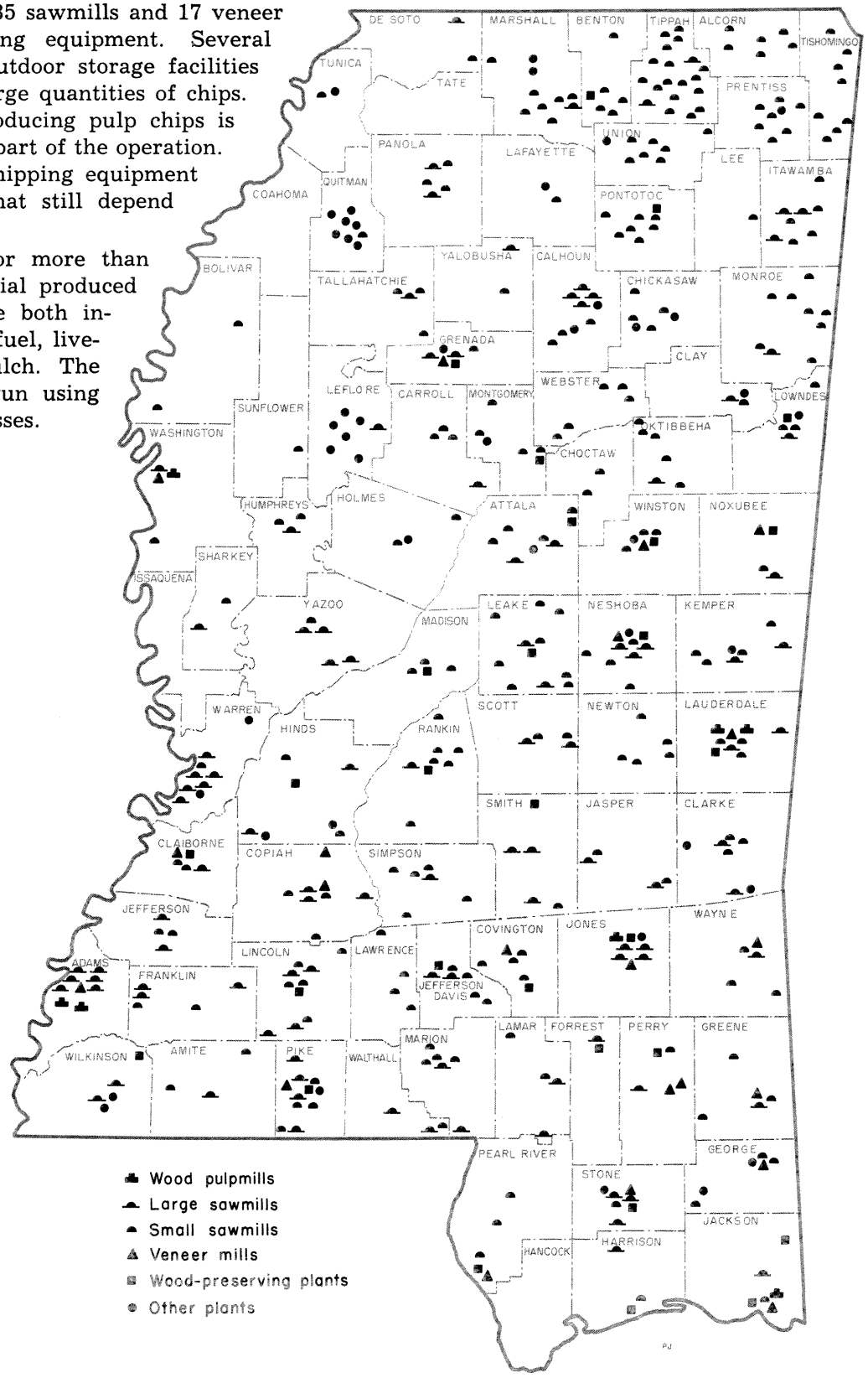

Figure 13. *Location of primary wood-using plants.*

Timber Supply Outlook

Mississippi's future supply of timber depends on many unforeseeable events. Demand is uncertain, largely because of the unknown effects of changing population, productivity, and technology. Nevertheless, timber demand will almost certainly rise. And since tree-growing requires time, preparation for eventual needs must begin today. Timber supply projections can be useful in this endeavor.

Two basic projections were made for Mississippi's timber supply. Each takes different assumptions as a starting point. One assumption is that current trends in forest management will continue, and the projection on this basis is shown here as prospective cut. However, present levels of management can be improved. Hence a second projection was made to represent more intensive management. The latter projection assumes that during the projection period the stands will be adjusted to provide a desirable distribution of tree size-classes. This projection is referred to as potential cut.

PROSPECTIVE CUT

The prospective-cut projection shows the volume of timber that will be available if growth and cut of growing stock are gradually brought into balance at the end of 30 years. It is also assumed that diameter growth, mortality rates, and distribution of cut by diameter classes will remain unchanged. The results of this projection in terms of future growth and cut are shown in figures 14 and 15.

In 1966, the margin of softwood growth over timber removals was quite favorable. This situation permits removals to increase greatly in the next 30 years. Current trends in Mississippi's wood-using industry suggest an early reduction of the margin of growth over cut. New plants, either announced or put into operation since 1966, have already reduced the growth-cut margin, and an effort was made to partially anticipate the effect of these events. Still, the cut indicated for growing stock in 1996 is more than three times the 1966 harvest.

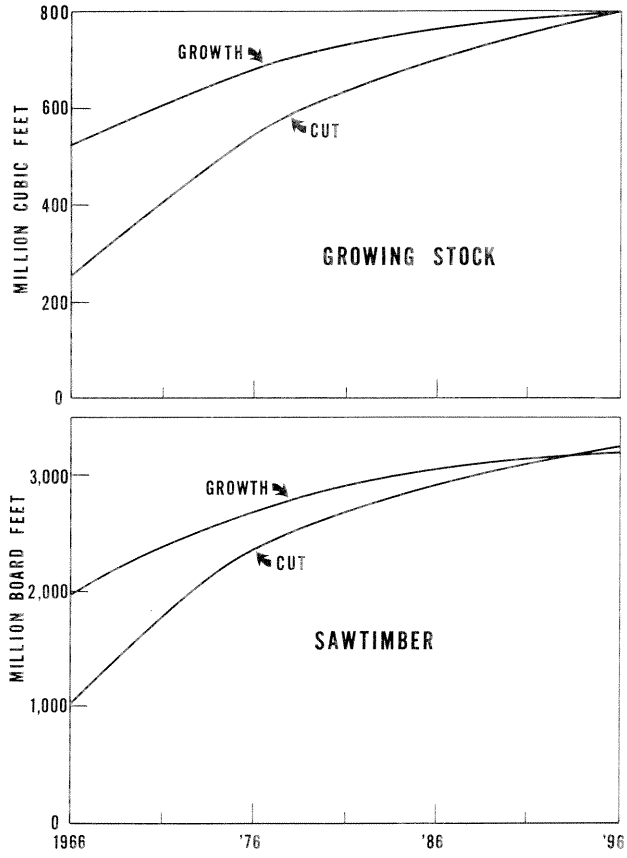

Figure 14. *Prospective growth and cut of softwood, 1966-1996.*

The trend for softwood sawtimber approximately parallels that for growing stock. As figure 16 indicates, however, the majority of the sawtimber (about 60 percent) will eventually come from trees less than 15 inches in diameter.

In 1966 hardwood growth was in excess of removals by 62 million cubic feet. The hardwood inventory gradually increases as the pro-

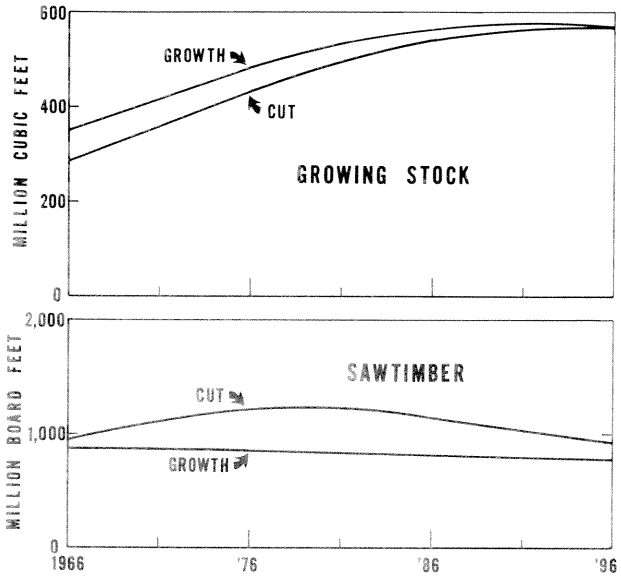

Figure 15. *Prospective growth and cut of hardwood, 1966-1996.*

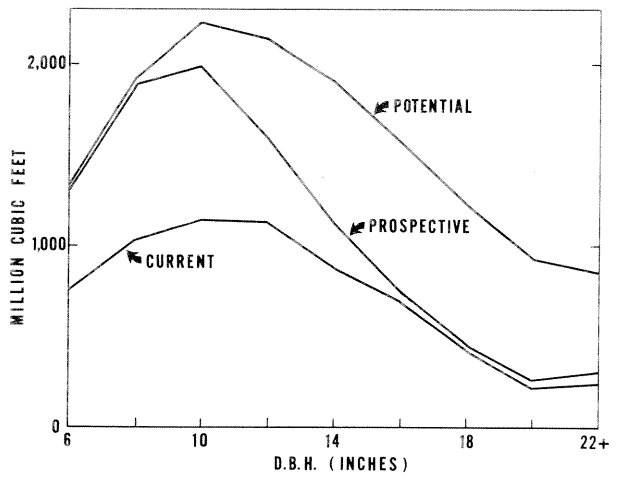

Figure 16. *Comparison of 1967 softwood growing stock with prospective and potential inventories of 1997.*

jection of prospective cut eliminates the difference between growth and cut. By the turn of the century, volume will be one-sixth greater than at present. Furthermore, cut can be maintained at 570 million cubic feet annually—almost double the present harvest. The distribution of the harvest is far from ideal, however. For years, hardwood cutting has been concentrated on the largest trees. Continuation of this trend will drastically reduce the quality of the hardwood inventory by restricting the number of large trees (fig. 17).

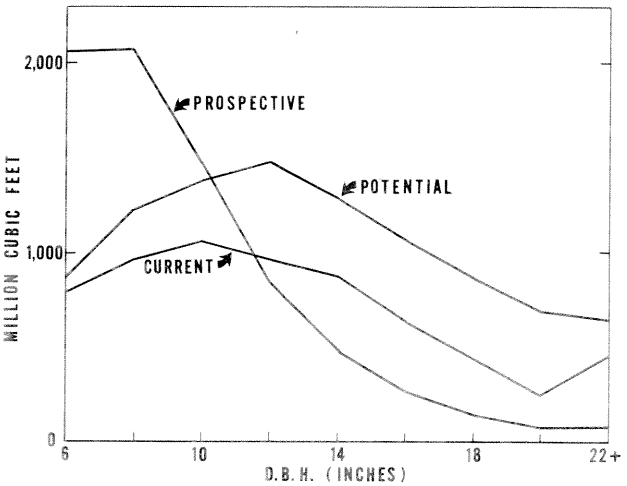

Figure 17. *Comparison of 1967 hardwood growing stock with prospective and potential inventories of 1997.*

POTENTIAL CUT

The projection called potential cut indicates the volume of timber that might be annually harvested 30 years hence if management is intensified. To make the potential cut a reality would require the development of well-stocked stands that contain a higher proportion of large trees than exist presently or that are in prospect under present trends. The inventories needed to support the potential cut are indicated in figures 16 and 17.

In this projection it was also assumed that the area of commercial forest will remain constant but that the acreage currently occupied by oak-pine types will eventually be converted to pure pine. This addition would bring the total pine acreage to 9 million.

A third important assumption is that more intensive management will reduce the proportion of rough and rotten trees in the stands, so as to create space for thrifty trees. Now, 30 percent of the hardwoods 5 inches in d.b.h. and larger are culls. For the calculations, the proportion of culls was reduced to 15 percent. Among softwoods, 98 percent of the trees now in the stands classify as growing stock; this proportion was assumed to rise to 99 percent.

If these three assumptions can be realized, growing stock trees in Mississippi's forests might be expected to sustain a harvest of 1.4 billion cubic feet annually. About 70 percent of the volume would be softwood. The total is only slightly greater than the volume that

would be available under the projection of prospective cut. The important difference is in the kinds of timber. A much larger harvest of sawtimber-size trees could be sustained with the intensified management envisaged under the potential-cut projection. The prospective cut of sawtimber is only 4.2 billion board feet while the potential is 5.8 billion board feet. The marked difference between the prospective and potential sawtimber cut is one indication of the opportunity for improving Mississippi's timber situation.

BASIS FOR PROJECTIONS

A number of conditions have already been defined as the starting point for the Mississippi projections. Some of these assumptions will be enlarged upon and others will be mentioned here.

It may be conservative to assume, in the potential-cut calculations, that in the future pines will occupy merely the areas now in pine and oak-pine types. An additional 3 million acres, mostly in the oak-hickory types, are classified as pine sites by the Forest Survey—that is, they are better adapted to growing pine than industrial hardwoods. Some oak-hickory stands already have a pine component.

For the prospective-cut projection, distribution of timber cut was determined on permanent survey sample plots that had been logged since the 1957 inventory. The magnitude of future cutting was assumed to vary in response to growth, but the plot data determined the proportion of total cut allotted to trees of each size class. For the potential-cut projection, cut was distributed differently. Management goals were established for the future stand, and cut was then allotted to each diameter class so as to accomplish these goals by the end of the projection period.

The management goals for the potential-cut projection are expressed in terms of basal area per acre and a stand-structure quotient. An analysis of the Mississippi inventory indicated that an average density of 90 square feet of basal area per acre is a realistic goal. The stand-structure quotient is the quotient of the number of trees in any 2-inch diameter class divided by the number in the next larger class. This value is useful in describing the diameter distribution of trees within the stand. Mississippi's potential stand was given a quotient of 1.7 for softwoods and 1.6 for hardwoods. The choice of these values was influenced by present stand conditions and considerations of future management possibilities.

Resource Improvement Possibilities

During the last 10 years the volume of standing timber in Mississippi rose 27 percent. The margin of growth over cut that produced this gain is still adding new volume to the resource. But Mississippi's industries, present and prospective, will be demanding increased amounts of raw material. To improve the future forest it is not enough simply to hold the cut to less than the growth. To do so might soon curtail industrial expansion. Instead, resource development will need to come from positive forestry investments.

Probably less than half of Mississippi's forest acres are currently under management. On the remaining acres, timber production is largely encouraged by fire protection alone. At present, untended acres represent a major opportunity for increasing productivity. In many cases only moderate efforts will be required to improve productivity greatly.

STAND TREATMENTS

"Variable" might be a good one-word description of Mississippi's forests. The combinations of type, stocking, size, ownership, and site are virtually unlimited. The range of management practices and objectives is wide. Still, the description of the resource suggests many ways to improve and redirect management efforts.

Fire protection and tree planting have achieved marked success. Virtually all of the forest land is now under organized fire protection. Some 1.8 million acres of plantations have been established. Today, little of Mississippi's forest land can be considered nonstocked. Seven-eighths of the forest is better than 60 percent stocked with growing stock trees. But resource development will require improvements in tree quality as well as stocking. Desirable trees, as defined in this report, represent the ideal that foresters strive to grow. This kind of tree is in notably short supply.

Data collected on several thousand sample plots were used to stratify timber stands into condition classes. The following description of stand conditions should help to define needed treatments.

Poorly Stocked Stands

Almost 2 million acres of forest are poorly stocked with growing stock trees. On pine sites, which comprise two-thirds of this area, seed sources are largely lacking. More than half of the poorly stocked acres are in the South and Southwest, where there are large areas of cut-over pine lands that have been neglected for years. Overall, cull trees make up one-third of the total stocking. Treatments to restore productivity will generally be site preparation to control undesirable vegetation, followed by seeding or planting. Such treatments necessarily constitute long-term investments.

Medium Stocked Stands

More than 7 million acres of forest are classed as medium to fully stocked with growing stock trees but poorly stocked with desirable trees. The proportion of culls is high.

This condition is most serious in the Delta, where 60 percent of the stands are medium stocked with growing stock. Elsewhere, such stands make up 45 percent of the area except in the Central region where conditions are slightly better than average.

Where the trees are small, stocking will slowly improve if measures are taken to eliminate culls. But thin stands of merchantable size should be harvested to make way for more uniformly stocked stands. On pines sites, one-third of the stands contain enough pines for adequate reseeding.

The understocked conditions derive from several causes. In some stands, particularly in the hardwood types, loggers have removed the

best trees and left the worst. In many others, stocking has been inadequate from the beginning, either because seed sources were lacking or because harvest of the previous stands was done in such a way that the site was in poor condition for regeneration by desirable species. Enlightened cutting practices in the future can greatly reduce the acreage in this class, and without adding to forestry costs.

Well Stocked—Good Condition

Five and one-half million acres are fully stocked with growing stock trees, although desirable trees are scarce. These acres are fully productive, especially for items such as pulpwood, in which tree quality is unimportant. Further, stocking is sufficient to permit foresters to make limited improvements in quality by removing the poorer trees; timber removed often defrays the cost of treatment.

Whereas stands described previously were more commonly associated with hardwood types, 60 percent of the stands in good condition are in pine and oak-pine types. Among stands in very good condition, to be described next, more than three-fourths of the acreage is in pine.

Well Stocked—Very Good Condition

Stands containing a relatively high proportion of desirable trees, and also containing enough other growing stock for full stocking, are found on about 2 million acres. Only moderate treatments will be required to eliminate the less desirable elements as the stand develops. Upgrading such stands offers one of the best forest investment opportunities, since returns may be realized in a relatively short time.

In the very best stands—140,000 acres—no treatment is currently recommended.

CONTINUING THE TREND

Forecasts of population growth and the demand for timber products make it clear that forestry opportunities in Mississippi will become increasingly numerous. As new markets develop, conservation of the resource through close utilization becomes increasingly feasible. Already there are indications that rising demand and new technology have brought changes that are benefiting the resource. The rate at which these practices extend may be considered a barometer of resource development now and in the future.

Land leasing for forestry purposes is a relatively new practice, intended to stimulate production on private nonindustrial timberlands where other uses might normally prevail over timber production. The agreements allow forest industries to manage the land for timber production while the owner maintains most other rights. The 200,000 acres now under such agreements are supplemented by additional lands under long-term cutting contracts.

Owners of small tracts hold a large percentage of the aggregate forest acreage in Mississippi. The per-acre costs of managing individual small holdings are high, and usually the owners have incomplete knowledge of forestry practices and timber markets. There is evidence that cooperative programs designed for small tracts are now becoming operational.

Changes in harvesting, transport, and manufacture are helping to conserve the resource. Not long ago, almost all harvesting was for single products, a practice conducing to large logging residues. Today, more and more trees are being taken from the woods full length and hauled to a central yard where they are divided into the products for which they are best suited. The long-wood chipping installation is the newest manifestation of this trend. In the manufacturing plant, refinements like the chipping headrig are increasing the amount of products obtained from a given volume of logs. Developments such as these are a preview of still more intensive utilization as technology improves and stumpage values rise.

An additional conservation opportunity is in the utilization of bark. Although few profitable uses have been developed for this commodity, the vast quantities that are available, and the material's unique properties, offer incentive for research.

In sum, the growth of forest industry in Mississippi—and in surrounding States—has added greatly to the incentives for timber growing. The challenge is for forest improvement to keep pace with industrial development.

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 Mississippi, 142,844 photographic classifications were made and 5,494 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.

After the sample location had been established, a cluster of 10 variable-radius plots was installed. Each selected sample tree represented 37.5 square feet of basal area per acre. Trees less than 5.0 inches were tallied on fixed-radius plots around the point centers. Sample trees selected in this manner provided most of the information for the new inventory. Timber volumes were calculated on the basis of tree measurements and regression equations.

A special study was made to determine primary output. It consisted of a canvass of all primary wood-using plants active in Mississippi during 1966. Out-of-State firms known to use Mississippi 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 Survey 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 0.3 percent for the estimate of total commercial forest area, 1.6 percent for growing stock cubic-foot volume, and 2.3 percent for sawtimber 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 orders of this increase is suggested in the following tabulation, which shows the sampling error to which the estimates are liable, two chances out of three.

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*
16,891.9	0.3				
1,520.3	1.0	13,034.6	1.6		
380.1	2.0	8,342.1	2.0	42,235.5	2.3
168.9	3.0	3,707.6	3.0	24,825.1	3.0
95.0	4.0	2,085.5	4.0	13,964.1	4.0
60.8	5.0	1,334.7	5.0	8,937.0	5.0
15.2	10.0	333.7	10.0	2,234.0	10.0
6.8	15.0	148.3	15.0	993.0	15.0
3.8	20.0	83.4	20.0	558.6	20.0
2.4	25.0	53.4	25.0	357.5	25.0

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

Estimates of timber growth and mortality are based on plot remeasurements. Timber removals are determined by plot remeasurements and by studies of product output conducted during the period of forest inventory. The sampling error to which the estimates are liable, on a probability of two chances out of three are:

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*
873.5	1.6			538.5	1.9		
559.0	2.0	2,834.5	2.4	486.0	2.0		
248.5	3.0	1,814.1	3.0	216.0	3.0	1,962.1	3.2
139.8	4.0	1,020.4	4.0	121.5	4.0	1,225.7	4.0
89.4	5.0	653.1	5.0	77.8	5.0	803.7	5.0
22.4	10.0	163.3	10.0	19.4	10.0	200.9	10.0
9.9	15.0	72.6	15.0	8.6	15.0	89.3	15.0
5.6	20.0	40.8	20.0	4.9	20.0	50.2	20.0
3.6	25.0	26.1	25.0	3.1	25.0	32.1	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 50 percent or more of the stand is longleaf or slash pine, singly or in combination. Common associates include other southern pines, oak, and gum.

Loblolly-shortleaf pine.—Forests in which 50 percent or more of the stand is southern yellow pine, and loblolly or shortleaf pine, singly or in combination, predominates. Common associates include oak, hickory, and gum.

Oak-pine.—Forests in which 50 percent or more of the stand is hardwoods, usually upland oaks, but in which southern pines make up 25-49 percent of the stand. Common associates include gum, hickory, and yellow-poplar.

Oak-hickory.—Forests in which 50 percent or more of the stand is upland oaks or hickory, singly or in combination, except where pines comprise 25-49 percent, in which case the stand is classified oak-pine. Common associates include yellow-poplar, elm, maple, and black walnut.

Oak-gum-cypress.—Bottom-land forests in which 50 percent or more of the stand is tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, except where pines comprise 25-49 percent, in which case the stand is classified oak-pine. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.

Elm-ash-cottonwood.—Forests in which 50 percent or more of the stand is elm, ash, or cottonwood, singly or in combination. 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 for the site is utilized by trees or preempted by other 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 sawlog portion of live sawtimber trees, in board feet, International ¼-inch rule.

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.

Log Grades

Log grades are based on the standards presented by the USDA Forest Service in "Interim Log Grades for Southern Pines," issued by the Southern Forest Experiment Station in 1953, and "Hardwood Log Grades for Standard Lumber," issued by the Forest Products Laboratory under the designation D1737A in 1961.

Hardwood log grades include, in addition to the grades for standard lumber, a grade-4 tie and timber log. Specifications for tie and timber logs are based chiefly on knot size and log soundness; clear cuttings are not required.

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 by 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

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.

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 given 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 incidentally to manufacture or other products.

Plant residues.—Wood materials not utilized for products. Included are slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screenings.

STANDARD TABLES

Table 1. *Area by land classes, Mississippi, 1967*

Land class	Area
	Thousand acres
Forest:	
Commercial	16,891.9
Productive-reserved	21.3
Unproductive	...
Total forest	16,913.2
Nonforest:	
Cropland [1]	6,565.3
Pasture and range [1]	3,716.9
Other [2]	3,095.4
Total nonforest	13,377.6
All land [3]	30,290.8

[1] Source: 1964 Census of Agriculture.
[2] Includes swampland, industrial and urban areas, other nonforest land, and 97,700 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, 1960.

Table 2. *Area of commercial forest land by ownership classes, Mississippi, 1967*

Ownership class	Area
	Thousand acres
Public:	
National forest	1,118.8
Bureau of Land Management	1.1
Indian	13.4
Other federal	166.2
State	93.3
County and municipal	377.4
Total public	1,770.2
Private:	
Forest industry [1]	2,505.1
Farmer	6,204.6
Miscellaneous private	6,412.0
Total private	15,121.7
All ownerships	16,891.9

[1] Not including 204,500 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, Mississippi, 1967*

Stand-size class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
Sawtimber	4,557.9	528.0	258.6	839.6	2,931.7
Poletimber	3,772.2	149.9	139.2	506.6	2,976.5
Sapling and seedling	8,427.9	440.9	241.2	1,154.4	6,591.4
Nonstocked areas	133.9	...	12.4	4.5	117.0
All classes	16,891.9	1,118.8	651.4	2,505.1	12,616.6

Table 4. *Area of commercial forest land by stand-volume and ownership classes, Mississippi, 1967*

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	8,417.0	288.8	206.9	1,055.2	6,866.1
1,500 to 5,000 board feet	6,151.0	378.0	299.5	916.8	4,556.7
More than 5,000 board feet	2,323.9	452.0	145.0	533.1	1,193.8
All classes	16,891.9	1,118.8	651.4	2,505.1	12,616.6

[1] International ¼-inch rule.

Table 5. *Area of commercial forest land by stocking classes based on selected stand components, Mississippi, 1967*

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	...	...	...	...	...	...
150 to 160	172.0	17.5	5.7	...	...	...
140 to 150	976.3	153.4	...	16.4	...	...
130 to 140	2,785.0	676.0	6.0	26.4	...	...
120 to 130	3,533.8	1,506.3	21.3	88.0	...	...
110 to 120	3,164.4	2,287.6	43.6	294.9	...	...
100 to 110	2,468.9	2,482.3	66.3	576.7	...	...
90 to 100	1,519.1	2,575.2	148.8	1,070.6	22.9	...
80 to 90	756.5	2,126.3	288.2	1,838.7	42.2	...
70 to 80	587.7	1,836.0	540.0	2,468.1	93.7	...
60 to 70	358.7	1,237.7	965.5	2,470.6	316.4	6.0
50 to 60	170.1	740.1	1,293.3	2,294.9	696.6	...
40 to 50	141.2	555.3	1,761.9	2,086.7	1,069.2	6.0
30 to 40	126.8	323.4	2,630.5	1,572.5	1,980.8	8.5
20 to 30	80.5	214.2	2,766.5	990.4	3,311.6	71.5
10 to 20	38.9	115.0	3,336.7	704.8	4,132.2	306.7
Less than 10	12.0	45.6	3,017.6	392.2	5,226.3	16,493.2
All areas	16,891.9	16,891.9	16,891.9	16,891.9	16,891.9	16,891.9

Table 6. *Area of commercial forest land by area-condition and ownership classes, Mississippi, 1967*

Area-condition class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
10	80.9	...	11.6	37.9	31.4
20	62.0	11.2	...	15.5	35.3
30	292.5	33.3	29.5	79.2	150.5
40	1,645.2	126.6	54.9	369.6	1,094.1
50	5,485.4	409.9	299.1	846.2	3,930.2
60	7,332.3	436.6	208.6	941.3	5,745.8
70	1,993.6	101.2	47.7	215.4	1,629.3
All classes	16,891.9	1,118.8	651.4	2,505.1	12,616.6

Table 7. *Area of commercial forest land by site and ownership classes, Mississippi, 1967*

Site class	All ownerships	National forest	Other public	Forest industry	Farmer and misc. private
	Thousand acres				
165 cu. ft. or more	544.2	55.5	60.9	110.7	317.1
120 to 165 cu. ft.	1,466.3	154.2	63.9	297.3	950.9
85 to 120 cu. ft.	5,815.7	523.6	243.0	912.2	4,136.9
50 to 85 cu. ft.	7,877.8	365.4	254.6	1,039.1	6,218.7
Less than 50 cu. ft.	1,187.9	20.1	29.0	145.8	993.0
All classes	16,891.9	1,118.8	651.4	2,505.1	12,616.6

Table 8. *Area of commercial forest land by forest types and ownership classes, Mississippi, 1967*

Type	All ownerships	Public	Private
	-- *Thousand acres* --		
Longleaf-slash pine	1,335.4	283.8	1,051.6
Loblolly-shortleaf pine	4,242.6	523.8	3,718.8
Oak-pine	3,372.0	402.2	2,969.8
Oak-hickory	4,306.3	242.8	4,063.5
Oak-gum-cypress	3,283.4	295.3	2,988.1
Elm-ash-cottonwood	352.2	22.3	329.9
All types	16,891.9	1,770.2	15,121.7

Table 9. *Area of noncommercial forest land by forest types, Mississippi, 1967*

Type	All areas	Productive-reserved areas	Unproductive areas
	-- *Thousand acres* --		
Longleaf-slash pine	2.0	2.0	...
Loblolly-shortleaf pine	4.7	4.7	...
Oak-pine	9.7	9.7	...
Oak-hickory	4.6	4.6	...
Oak-gum-cypress	.3	.3	...
All types	21.3	21.3	...

Table 10. *Number of growing-stock trees on commercial forest land by species and diameter classes, Mississippi, 1967*

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
	Thousand trees										
Softwood:											
Longleaf pine	64,743	18,485	16,248	13,879	9,788	3,815	1,751	565	138	74	...
Slash pine	64,189	31,521	15,204	7,782	5,312	2,626	1,208	375	97	64	...
Shortleaf pine	254,285	123,649	63,904	34,933	18,725	8,109	3,391	1,128	310	133	3
Loblolly pine	346,627	152,958	84,007	45,109	27,274	16,406	10,486	5,715	2,765	1,832	75
Spruce pine	8,967	2,571	1,905	1,245	1,314	713	698	290	151	80	...
Cypress	8,895	1,881	2,659	1,089	973	839	772	379	102	142	59
Redcedar	6,871	3,542	2,320	544	141	173	80	60	11	...	...
Total	754,577	334,607	186,247	104,581	63,527	32,681	18,386	8,512	3,574	2,325	137
Hardwood:											
Select white oaks [1]	57,389	21,910	11,442	9,576	5,687	4,190	2,253	1,316	572	389	54
Select red oaks [2]	26,957	10,871	6,640	3,262	2,065	1,597	1,125	609	284	447	57
Other white oaks	75,792	33,310	19,088	10,806	5,826	3,244	1,672	862	372	547	65
Other red oaks	176,294	74,987	43,422	25,635	13,593	8,660	4,730	2,571	1,088	1,446	162
Pecan	13,345	5,970	2,303	1,864	1,223	556	446	447	212	274	50
Other hickories	46,208	17,175	9,403	9,313	4,036	3,236	1,417	852	403	359	14
Sweetgum	145,615	75,406	34,027	16,979	8,522	5,532	2,626	1,345	648	505	25
Tupelo and blackgum	76,425	28,740	20,029	12,492	6,726	4,304	2,350	1,095	447	238	4
Maple	15,416	7,586	3,888	1,932	817	654	364	112	45	14	4
Beech	4,333	814	713	887	533	408	451	196	130	189	12
Ash	24,210	11,335	5,889	3,155	1,764	984	481	349	110	132	11
Cottonwood	3,632	536	599	595	448	370	284	167	181	395	57
Basswood	965	425	232	27	84	74	41	55	12	15	...
Yellow-poplar	19,528	6,805	4,058	3,399	2,126	1,530	691	453	242	224	...
Black walnut	660	117	336	80	40	60	27	...	...	...	...
Black cherry	3,890	2,006	914	526	206	117	54	28	18	21	...
Willow	10,077	4,188	2,192	1,443	804	581	403	249	101	115	1
Magnolia	2,447	1,071	393	378	285	140	125	38	12	5	...
American elm	16,265	6,015	4,186	2,524	1,538	777	500	370	196	145	14
Other elms	19,320	8,523	5,394	2,616	1,455	768	263	137	39	125	...
Hackberry	18,851	7,384	4,988	2,707	1,633	1,033	572	337	151	92	4
Sycamore	6,442	2,159	1,290	1,297	526	531	332	110	66	115	16
Other hardwoods	48,513	27,603	10,070	5,335	2,650	1,344	1,009	285	87	126	4
Total	812,574	354,936	191,446	116,828	62,587	40,690	22,216	11,983	5,416	5,918	554
All species	1,567,151	689,543	377,693	221,409	126,114	73,371	40,602	20,495	8,990	8,243	691

[1] Includes white, swamp chestnut, chinkapin, Durand, and swamp white oaks.
[2] Includes cherrybark, Shumard, and northern red oaks.

Table 11. *Volume of timber on commercial forest land by class of timber and by softwoods and hardwoods, Mississippi, 1967*

Class of timber	All species	Softwood	Hardwood
	-- *Million cubic feet* --		
Sawtimber trees:			
Saw-log portion	7,156.7	4,278.0	2,878.7
Upper-stem portion	1,268.5	492.9	775.6
Total	8,425.2	4,770.9	3,654.3
Poletimber trees	4,609.4	1,783.9	2,825.5
All growing stock	13,034.6	6,554.8	6,479.8
Rough trees	1,441.2	50.5	1,390.7
Rotten trees	574.6	29.6	545.0
Salvable dead trees	4.8	3.4	1.4
All timber	15,055.2	6,638.3	8,416.9

Table 12. *Volume of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Mississippi, 1967*

Ownership class	Growing stock			Sawtimber		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	- *Million cubic feet* -			-- *Million board feet* --		
National forest	1,311.0	979.5	331.5	5,564.2	4,650.7	913.5
Other public	665.4	340.2	325.2	2,350.7	1,335.8	1,014.9
Forest industry	2,166.7	1,252.3	914.4	8,056.6	5,398.7	2,657.9
Farmer and misc. private	8,891.5	3,982.8	4,908.7	26,264.0	14,051.7	12,212.3
All ownerships	13,034.6	6,554.8	6,479.8	42,235.5	25,436.9	16,798.6

Table 13. *Volume of growing stock on commercial forest land by species and diameter classes, Mississippi, 1967*

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	678.7	44.5	106.1	162.2	179.0	94.1	56.9	23.0	6.8	6.1	...
Slash pine	487.5	67.4	88.6	89.3	99.0	72.2	43.7	17.2	5.4	4.7	...
Shortleaf pine	1,784.1	279.7	347.0	373.0	335.9	225.6	130.6	58.9	21.0	12.2	0.2
Loblolly pine	3,301.9	345.6	457.4	491.4	478.8	442.4	407.1	297.5	185.2	181.5	15.0
Spruce pine	132.7	6.4	11.7	13.1	24.2	19.8	27.5	13.0	9.8	7.2	...
Cypress	147.9	3.5	13.8	11.2	17.2	27.5	30.2	18.3	4.9	10.8	10.5
Redcedar	22.0	5.0	7.2	3.3	1.1	2.5	1.3	1.3	.3	...	...
Total	6,554.8	752.1	1,031.8	1,143.5	1,135.2	884.1	697.3	429.2	233.4	222.5	25.7
Hardwood:											
Select white oaks	549.7	51.0	60.3	85.9	90.7	92.6	66.7	47.5	26.0	23.5	5.5
Select red oaks	274.6	28.0	37.0	32.8	33.6	35.7	31.6	24.5	13.4	32.5	5.5
Other white oaks	516.8	71.8	91.8	86.6	82.2	58.6	41.4	28.4	15.1	35.0	5.9
Other red oaks	1,424.2	180.1	227.5	239.1	205.5	185.7	131.0	92.2	50.5	93.7	18.9
Pecan	132.7	12.6	10.6	17.9	18.1	12.3	11.8	16.4	10.0	18.5	4.5
Other hickories	430.8	38.5	51.1	85.1	64.9	70.9	42.2	33.0	20.2	22.9	2.0
Sweetgum	989.6	162.9	172.3	160.9	144.9	133.0	85.5	54.3	35.4	36.2	4.2
Tupelo and blackgum	601.6	59.9	95.9	111.9	104.7	90.9	66.3	38.7	19.5	13.5	.3
Maple	90.7	16.9	17.8	16.5	11.7	12.4	9.2	4.0	1.2	.7	.3
Beech	61.2	1.9	2.7	6.4	7.4	7.5	11.4	6.6	5.0	11.1	1.2
Ash	169.6	23.7	29.6	29.7	26.4	21.0	14.2	12.0	4.6	7.5	.9
Cottonwood	107.3	1.1	2.8	5.8	7.1	9.5	10.1	8.2	12.7	39.4	10.6
Basswood	11.1	1.2	1.1	.3	1.3	1.7	1.3	2.4	.8	1.0	...
Yellow-poplar	243.9	19.3	26.8	36.8	40.5	39.4	25.7	22.2	14.6	18.6	...
Black walnut	4.8	.2	1.5	.6	.7	1.1	.7	...	...	...	...
Black cherry	24.3	4.5	4.6	5.1	3.0	2.6	1.8	1.0	.7	1.0	...
Willow	98.7	9.1	12.4	12.9	12.4	13.1	12.9	12.0	5.1	8.6	.2
Magnolia	21.9	1.8	1.9	3.1	5.1	3.3	4.4	1.3	.5	.5	...
American elm	132.9	14.2	21.1	19.9	22.5	13.3	13.0	11.8	7.5	7.9	1.7
Other elms	121.6	16.4	26.1	21.9	21.5	14.1	7.2	5.1	2.0	7.3	...
Hackberry	129.3	14.9	20.9	19.7	19.1	18.1	14.9	10.5	6.3	4.4	.5
Sycamore	80.0	5.6	7.7	13.0	10.2	12.7	11.4	4.9	3.3	9.4	1.8
Other hardwoods	262.5	56.8	48.9	48.8	37.2	25.5	25.6	9.3	3.9	6.3	.2
Total	6,479.8	792.4	972.4	1,060.7	970.7	875.0	640.3	446.3	258.3	399.5	64.2
All species	13,034.6	1,544.5	2,004.2	2,204.2	2,105.9	1,759.1	1,337.6	875.5	491.7	622.0	89.9

Table 14. *Volume of sawtimber on commercial forest land by species and diameter classes, Mississippi, 1967*

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	2,691.4	703.7	927.1	524.5	325.2	134.9	38.8	37.2	...
Slash pine	1,673.6	349.7	503.4	403.4	255.4	100.9	32.2	28.6	...
Shortleaf pine	5,897.3	1,516.6	1,741.5	1,282.1	783.7	365.9	131.8	74.5	1.2
Loblolly pine	13,747.2	1,959.2	2,473.7	2,526.7	2,482.2	1,859.2	1,179.0	1,174.9	92.3
Spruce pine	619.3	47.0	115.6	114.5	165.4	75.8	57.3	43.7	...
Cypress	766.2	37.5	86.2	159.9	185.1	121.1	32.9	76.9	66.6
Redcedar	41.9	8.7	4.2	12.8	6.5	7.3	2.4	...	...
Total	25,436.9	4,622.4	5,851.7	5,023.9	4,203.5	2,665.1	1,474.4	1,435.8	160.1
Hardwood:									
Select white oaks	1,596.9	...	354.0	412.7	310.6	232.6	129.8	127.1	30.1
Select red oaks	833.7	...	134.0	160.7	151.5	115.9	72.2	168.1	31.3
Other white oaks	1,212.1	...	320.5	258.7	196.0	144.2	78.1	183.9	30.7
Other red oaks	3,571.9	...	772.5	841.0	637.4	457.7	259.5	503.8	100.0
Pecan	459.2	...	74.3	57.1	59.0	84.1	51.2	108.3	25.2
Other hickories	1,160.2	...	251.4	318.7	198.7	160.8	100.0	120.2	10.4
Sweetgum	2,149.6	...	554.1	571.6	385.8	257.2	172.4	184.5	24.0
Tupelo and blackgum	1,521.9	...	408.4	420.3	332.2	187.2	101.6	70.5	1.7
Maple	165.7	...	41.2	52.4	41.9	18.7	5.6	4.3	1.6
Beech	241.1	...	31.6	34.7	54.1	32.1	27.0	53.6	8.0
Ash	403.4	...	104.9	98.6	73.9	59.7	22.1	39.8	4.4
Cottonwood	510.8	...	26.5	38.9	50.5	42.7	69.2	221.5	61.5
Basswood	37.9	...	6.1	7.3	5.9	9.8	3.5	5.3	...
Yellow-poplar	772.1	...	166.8	187.2	129.2	114.2	75.5	99.2	...
Black walnut	12.7	...	4.2	4.8	3.7	...	...	...	...
Black cherry	45.7	...	12.1	10.7	9.2	5.8	3.6	4.3	...
Willow	306.1	...	45.2	63.4	66.9	62.2	25.0	42.6	.8
Magnolia	65.2	...	20.1	14.4	20.2	6.0	1.6	2.9	...
American elm	380.9	...	96.0	61.4	68.7	62.6	40.9	42.3	9.0
Other elms	267.9	...	89.4	65.8	36.1	26.4	10.1	40.1	...
Hackberry	340.5	...	78.7	82.0	72.8	50.9	29.0	24.6	2.5
Sycamore	260.1	...	39.9	56.6	56.8	25.2	18.0	53.2	10.4
Other hardwoods	483.0	...	142.5	116.0	119.5	50.7	19.3	33.6	1.4
Total	16,798.6	...	3,774.4	3,935.0	3,080.6	2,206.7	1,315.2	2,133.7	353.0
All species	42,235.5	4,622.4	9,626.1	8,958.9	7,284.1	4,871.8	2,789.6	3,569.5	513.1

Table 15. *Volume of sawtimber on commercial forest land by species and log grade, Mississippi, 1967*

Species	All grades	Grade 1	Grade 2	Grade 3	Grade 4
	Million board feet				
Softwood:					
Yellow pines	24,628.8	552.3	3,976.6	9,853.5	10,246.4
Cypress	766.2	49.8	230.3	255.3	230.8
Other eastern softwoods	41.9	41.9	...	...	...
Total	25,436.9	644.0	4,206.9	10,108.8	10,477.2
Hardwood:					
Select white and red oaks	2,430.6	214.1	447.2	1,273.2	496.1
Other white and red oaks	4,784.0	281.0	605.7	2,364.3	1,533.0
Hickory	1,619.4	152.3	307.5	933.3	226.3
Maple	165.7	1.8	20.6	120.4	22.9
Sweetgum	2,149.6	142.3	440.9	1,144.1	422.3
Ash, walnut, and black cherry	461.8	31.2	105.6	290.6	34.4
Yellow-poplar	772.1	41.4	116.7	392.7	221.3
Other hardwoods	4,415.4	411.9	905.4	2,551.8	546.3
Total	16,798.6	1,276.0	2,949.6	9,070.4	3,502.6
All species	42,235.5	1,920.0	7,156.5	19,179.2	13,979.8

Table 16. *Annual growth and removals of growing stock on commercial forest land by species, Mississippi, 1966*

Species	Net annual growth	Annual removals
	Million cubic feet	
Softwood:		
Yellow pines	515.3	245.3
Cypress	6.1	4.2
Other eastern softwoods	2.4	1.7
Total	523.8	251.2
Hardwood:		
Select white and red oaks	42.4	28.3
Other white and red oaks	125.8	93.6
Hickory	22.2	22.4
Maple	5.8	2.1
Sweetgum	53.3	57.4
Tupelo and blackgum	16.9	22.5
Ash, walnut, and black cherry	13.0	7.0
Yellow-poplar	10.6	7.0
Other hardwoods	59.7	47.0
Total	349.7	287.3
All species	873.5	538.5

Table 17. *Annual growth and removals of growing stock on commercial forest land by ownership classes and by softwoods and hardwoods, Mississippi, 1966*

Ownership class	Net annual growth			Annual removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet					
National forest	77.8	61.0	16.8	40.0	34.6	5.4
Other public	41.5	25.5	16.0	18.7	6.3	12.4
Forest industry	137.5	93.3	44.2	81.5	49.9	31.6
Farmer and misc. private	616.7	344.0	272.7	398.3	160.4	237.9
All ownerships	873.5	523.8	349.7	538.5	251.2	287.3

Table 18. *Annual growth and removals of sawtimber on commercial forest land by species, Mississippi, 1966*

Species	Net annual growth	Annual removals
	Million board feet	
Softwood:		
Yellow pines	1,920.1	980.4
Cypress	32.0	18.2
Other eastern softwoods	3.5	7.1
Total	1,955.6	1,005.7
Hardwood:		
Select white and red oaks	125.8	110.1
Other white and red oaks	285.1	293.1
Hickory	78.4	80.3
Maple	10.9	4.5
Sweetgum	94.4	176.2
Tupelo and blackgum	37.3	71.6
Ash, walnut, and black cherry	28.7	21.3
Yellow-poplar	42.6	28.9
Other hardwoods	175.7	170.4
Total	878.9	956.4
All species	2,834.5	1,962.1

Table 19. *Annual growth and removals of sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Mississippi, 1966*

Ownership class	Net annual growth			Annual removals		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million board feet					
National forest	354.2	311.2	43.0	176.6	157.2	19.4
Other public	133.2	88.9	44.3	65.4	25.2	40.2
Forest industry	531.1	389.3	141.8	332.8	229.6	103.2
Farmer and misc. private	1,816.0	1,166.2	649.8	1,387.3	593.7	793.6
All ownerships	2,834.5	1,955.6	878.9	1,962.1	1,005.7	956.4

Table 20. *Mortality of growing stock and sawtimber on commercial forest land by species, Mississippi, 1966*

Species	Growing stock	Sawtimber
	Million cubic feet	*Million board feet*
Softwood:		
Yellow pines	20.5	60.8
Cypress	.7	4.1
Other eastern softwoods	.3	1.5
Total	21.5	66.4
Hardwood:		
Select white and red oaks	2.5	7.6
Other white and red oaks	11.5	31.1
Hickory	4.9	19.1
Maple	1.5	3.2
Sweetgum	11.6	24.1
Tupelo and blackgum	3.4	8.2
Ash, walnut, and black cherry	1.4	2.6
Yellow-poplar	.6	1.9
Other hardwoods	13.2	40.7
Total	50.6	138.5
All species	72.1	204.9

Table 21. *Mortality of growing stock and sawtimber on commercial forest land by ownership classes and by softwoods and hardwoods, Mississippi, 1966*

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	8.6	6.5	2.1	18.0	13.7	4.3
Other public	3.6	.5	3.1	11.7	2.5	9.2
Forest industry	12.7	4.3	8.4	42.4	15.8	26.6
Farmer and misc. private	47.2	10.2	37.0	131.8	34.4	97.4
All ownerships	72.1	21.5	50.6	203.9	66.4	137.5

Table 22. *Mortality of growing stock and sawtimber on commercial forest land by causes and by softwoods and hardwoods, Mississippi, 1966*

Cause of death	Growing stock			Sawtimber		
	All species	Soft-wood	Hard-wood	All species	Soft-wood	Hard-wood
	– Million cubic feet –			*– Million board feet –*		
Fire	0.6	0.3	0.3	2.2	1.3	0.9
Insects	.8	.7	.1	3.5	3.5	...
Disease	1.8	1.0	.8	6.3	3.8	2.5
Other	6.4	1.6	4.8	21.4	5.5	15.9
Unknown	62.5	17.9	44.6	171.5	52.3	119.2
All causes	72.1	21.5	50.6	204.9	66.4	138.5

Table 23. *Total output of timber products by product, by type of material used, and by softwoods and hardwoods, Mississippi, 1966*

Product and species group	Standard units	Total output		Roundwood products		Plant byproducts	
		Number of units	Thousand cu. ft.	Number of units	Thousand cu. ft.	Number of units	Thousand cu. ft.
Saw logs:							
Softwood	M bd. ft. [1]	531,494	87,431	531,494	87,431	...	...
Hardwood	M bd. ft. [1]	477,951	79,674	477,951	79,674	...	...
Total	M bd. ft. [1]	1,009,445	167,105	1,009,445	167,105	...	...
Veneer logs and bolts:							
Softwood	M bd. ft.	45,752	7,526	45,752	7,526	...	...
Hardwood	M bd. ft.	52,354	8,785	52,354	8,785	...	...
Total	M bd. ft.	98,106	16,311	98,106	16,311	...	...
Pulpwood:							
Softwood	Std. cords [2]	1,913,603	155,001	1,560,287	126,383	353,316	28,618
Hardwood	Std. cords [2]	1,035,884	82,871	915,000	73,200	120,884	9,671
Total	Std. cords [2]	2,949,487	237,872	2,475,287	199,583	474,200	38,289
Cooperage:							
Softwood	M bd. ft.	...	...	...	...	...	...
Hardwood	M bd. ft.	6,546	931	6,546	931	...	...
Total	M bd. ft.	6,546	931	6,546	931	...	...
Piling:							
Softwood	M linear ft.	4,907	3,512	4,907	3,512	...	...
Hardwood	M linear ft.	...	...	...	...	...	...
Total	M linear ft.	4,907	3,512	4,907	3,512	...	...
Poles:							
Softwood	M pieces	793	9,235	793	9,235	...	...
Hardwood	M pieces	...	...	...	...	...	...
Total	M pieces	793	9,235	793	9,235	...	...
Mine timbers (round):							
Softwood	M cu. ft.	...	...	...	...	...	...
Hardwood	M cu. ft.	...	...	...	...	...	...
Total	M cu. ft.	...	...	...	...	...	...
Commercial posts (round and split):							
Softwood	M pieces	2,752	1,342	2,752	1,342	...	...
Hardwood	M pieces	...	...	...	...	...	...
Total	M pieces	2,752	1,342	2,752	1,342	...	...
Other: [3]							
Softwood	M cu. ft.	4,405	4,405	897	897	3,508	3,508
Hardwood	M cu. ft.	7,925	7,925	5,874	5,874	2,051	2,051
Total	M cu. ft.	12,330	12,330	6,771	6,771	5,559	5,559
Total industrial products:							
Softwood		...	268,452	...	236,326	...	32,126
Hardwood		...	180,186	...	168,464	...	11,722
Total		...	448,638	...	404,790	...	43,848
Noncommercial posts (round and split):							
Softwood	M pieces	2,111	1,351	2,111	1,351	...	...
Hardwood	M pieces	9,853	6,306	9,853	6,306	...	...
Total	M pieces	11,964	7,657	11,964	7,657	...	...
Fuelwood:							
Softwood	Std. cords	136,390	10,229	58,897	4,417	[4] 77,493	[4] 5,812
Hardwood	Std. cords	729,508	54,713	526,588	39,494	[4] 202,920	[4] 15,219
Total	Std. cords	865,898	64,942	585,485	43,911	[4] 280,413	[4] 21,031
All products:							
Softwood		...	280,032	...	242,094	...	37,938
Hardwood		...	241,205	...	214,264	...	26,941
Total		...	521,237	...	456,358	...	64,879

[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, miscellaneous domestic use, 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, Mississippi, 1966*

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	87,431	86,846	86,527	319	106	...	479
Hardwood	79,674	76,690	76,594	96	1,051	1,864	69
Total	167,105	163,536	163,121	415	1,157	1,864	548
Veneer logs and bolts:							
Softwood	7,526	7,476	7,448	28	9	...	41
Hardwood	8,785	8,633	8,633	...	115	...	37
Total	16,311	16,109	16,081	28	124	...	78
Pulpwood:							
Softwood	126,383	120,298	82,851	37,447	780	...	5,305
Hardwood	73,200	58,834	33,031	25,803	11,072	183	3,111
Total	199,583	179,132	115,882	63,250	11,852	183	8,416
Misc. industrial products:							
Cooperage:							
Softwood	...	...	...	...	...	...	...
Hardwood	931	930	930	...	...	...	1
Total	931	930	930	...	...	...	1
Piling:							
Softwood	3,512	3,498	3,498	...	...	...	14
Hardwood	...	...	...	...	...	...	...
Total	3,512	3,498	3,498	...	...	...	14
Poles:							
Softwood	9,235	9,167	8,108	1,059	...	...	68
Hardwood	...	...	...	...	...	...	...
Total	9,235	9,167	8,108	1,059	...	...	68
Mine timbers (round):							
Softwood	...	...	...	...	...	...	...
Hardwood	...	...	...	...	...	...	...
Total	...	...	...	...	...	...	...
Commercial posts (round and split):							
Softwood	1,342	1,224	...	1,224	...	...	118
Hardwood	...	...	...	...	...	...	...
Total	1,342	1,224	...	1,224	...	...	118
Other:							
Softwood	897	836	533	303	2	...	59
Hardwood	5,874	4,830	3,179	1,651	355	169	520
Total	6,771	5,666	3,712	1,954	357	169	579
All misc. industrial products:							
Softwood	14,986	14,725	12,139	2,586	2	...	259
Hardwood	6,805	5,760	4,109	1,651	355	169	521
Total	21,791	20,485	16,248	4,237	357	169	780
All industrial products:							
Softwood	236,326	229,345	188,965	40,380	897	...	6,084
Hardwood	168,464	149,917	122,367	27,550	12,593	2,216	3,738
Total	404,790	379,262	311,332	67,930	13,490	2,216	9,822
Noncommercial posts (round and split):							
Softwood	1,351	1,219	663	556	59	...	73
Hardwood	6,306	5,689	1,657	4,032	275	...	342
Total	7,657	6,908	2,320	4,588	334	...	415
Fuelwood:							
Softwood	4,417	3,121	559	2,562	206	306	784
Hardwood	39,494	27,909	5,003	22,906	1,843	2,738	7,004
Total	43,911	31,030	5,562	25,468	2,049	3,044	7,788
All products:							
Softwood	242,094	233,685	190,187	43,498	1,162	306	6,941
Hardwood	214,264	183,515	129,027	54,488	14,711	4,954	11,084
Total	456,358	417,200	319,214	97,986	15,873	5,260	18,025

[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, Mississippi, 1966*

Item	All species	Softwood	Hardwood
	– *Thousand cubic feet* –		
Roundwood products:			
Saw logs	163,536	86,846	76,690
Veneer logs and bolts	16,109	7,476	8,633
Pulpwood	179,132	120,298	58,834
Cooperage logs and bolts	930	. . .	930
Piling	3,498	3,498	. . .
Poles	9,167	9,167	. . .
Posts	8,132	2,443	5,689
Other	5,666	836	4,830
Fuelwood	31,030	3,121	27,909
All products	417,200	233,685	183,515
Logging residues	55,251	17,528	37,723
Other removals	66,065	. . .	66,065
Total removals	538,516	251,213	287,303

Table 26. *Timber removals from live sawtimber on commercial forest land by items and by softwoods and hardwoods, Mississippi, 1966*

Item	All species	Softwood	Hardwood
	– *Thousand board feet* –		
Roundwood products:			
Saw logs	973,876	525,063	448,813
Veneer logs and bolts	95,988	45,197	50,791
Pulpwood	458,009	330,001	128,008
Cooperage logs and bolts	6,192	. . .	6,192
Piling	20,749	20,749	. . .
Poles	49,215	49,215	. . .
Posts	9,054	2,634	6,420
Other	17,451	550	16,901
Fuelwood	25,762	2,592	23,170
All products	1,656,296	976,001	680,295
Logging residues	113,268	29,741	83,527
Other removals	192,527	. . .	192,527
Total removals	1,962,091	1,005,742	956,349

Table 27. *Volume of plant residues by industrial source and type of residue and by softwoods and hardwoods, Mississippi, 1966*

Species group and type	All industries	Lumber	Veneer and plywood	Other
	– – – – – *Thousand cubic feet* – – – – –			
Softwood:				
Coarse [1]	2,867	2,332	66	469
Fine [2]	11,048	8,082	126	2,840
Total	13,915	10,414	192	3,309
Hardwood:				
Coarse	5,436	4,748	389	299
Fine	11,881	8,330	61	3,490
Total	17,317	13,078	450	3,789
All species:				
Coarse	8,303	7,080	455	768
Fine	22,929	16,412	187	6,330
All types	31,232	23,492	642	7,098

[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, Mississippi, 1966-1996* [1]

Species group	Growing stock				Sawtimber			
	1966	1976	1986	1996	1966	1976	1986	1996
	Thousand cubic feet				*Thousand board feet*			
Softwood:								
Cut	251,200	547,400	703,900	799,400	1,005,700	2,356,000	2,917,000	3,246,000
Growth	523,800	680,500	767,300	799,400	1,955,600	2,678,000	3,051,000	3,204,000
Inventory [2]	6,554,800	8,489,100	9,408,000	9,693,500	25,436,900	31,269,000	33,288,000	33,709,000
Hardwood:								
Cut	287,300	432,800	540,700	570,600	956,400	1,216,000	1,141,000	920,000
Growth	349,700	482,300	568,000	570,600	878,900	849,000	803,000	780,000
Inventory [2]	6,479,800	7,036,400	7,417,600	7,542,200	16,798,600	14,432,000	10,636,000	8,331,000
Total								
Cut	538,500	980,200	1,244,600	1,370,000	1,962,100	3,572,000	4,058,000	4,166,000
Growth	873,500	1,162,900	1,335,300	1,370,000	2,834,500	3,527,000	3,854,000	3,984,000
Inventory [2]	13,034,600	15,525,500	16,825,600	17,235,700	42,235,500	45,701,000	43,924,000	42,040,000

[1] Based on the assumption that the cut of growing stock will be in balance with growth by the year 1996, and that forestry progress will continue at the rate indicated by recent trends.

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