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## Forestry : its economic importance to Mississippi

James E. Moak

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# FORESTRY · ITS ECONOMIC IMPORTANCE TO

By  
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Mississippi

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## HIGHLIGHTS

**56 percent** of the total land area in Mississippi is commercial forest land.

**75 percent** of commercial forest land is owned by non-industrial private owners.

**Total growing stock** on commercial forest land in 1970 was 13.5 billion cubic feet which included 42.8 billion board feet of sawtimber.

**Growth** on growing stock in 1969 was 886 million cubic feet which included 2.8 billion board feet of sawtimber.

**Timber removed** from growing stock in 1969 was 969.9 million cubic feet which included 3.6 billion board feet of sawtimber. (290 million cubic feet were damaged by hurricane Camille and is considered as a reduction in inventory).

**36 percent** of all manufacturing plants are timber-based.

**28 percent** of all manufacturing employment is in timber-based plants.

**26 percent** of all manufacturing payrolls are in timber-based plants.

**23 percent** of all value added in manufacturing is in timber-based plants.

**64,280** full time jobs in 1968 were provided by timber-based economic activities.

**\$318 million** in annual payrolls were provided by timber-based activities in 1968.

**\$618 million** in value added originated in timber-based economic activities in 1968.

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## INTRODUCTION

There is a constant need for some measure of the magnitude and importance of forestry activities in the state of Mississippi. This work is an effort to bring together at one period in time information relating to the major elements associated with growing timber and the processing and utilization of timber products.

These elements are **LAND, TIMBER, EMPLOYMENT, PAYROLLS, VALUE AND, VALUE OF SHIPMENTS**. Land is the basic resource from which all of the timber related activities spring and the growing stock or inventory is the key factor in timber growth. In showing the economic importance of timber, four widely accepted measures of economic activity were chosen. Employment, payrolls, value added, and value of shipments are estimated within progressive stages along the processing and utilization chain. These stages are **forest management, harvesting, manufacturing, and a group consisting of construction, transportation, and marketing**.

Most of the data are for 1968, but when they are not the date will be indicated. Timber inventory and growth figures are more recent.

A much more comprehensive and basic work was done covering similar data for the United States, by states, for the years 1954 and 1958 by Hair (3).

Definition of terms and detailed procedures are found in the appendix.

## LAND

**FORESTRY** is by far the dominant land use in Mississippi. Commercial forest land accounts for 56 percent of the total land area while farm land, including pasture land, makes up 34 percent of the total. Urban and miscellaneous uses cover the remaining 10 percent. Commercial forest acreage has fluctuated somewhat over the past three decades, being 52 percent in 1935, 54 percent in 1948, 57 percent in 1957, and dropping back to 56 percent in 1967. This drop was mainly due to heavy land clearing in the Delta (7).

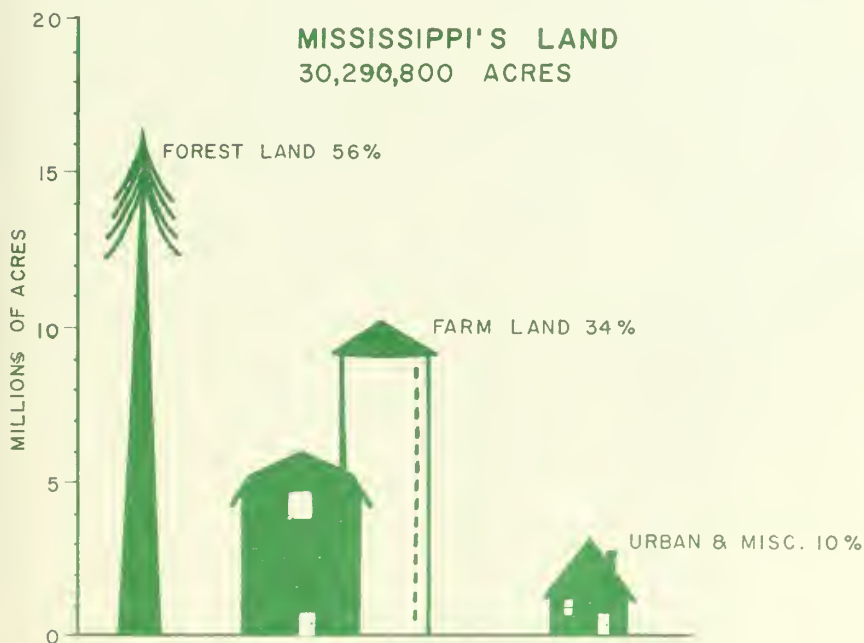


Figure 1. Land use in Mississippi, 1967.

source: see table 2 in appendix.



OWNERSHIP of the forest land is pre dominantly in the hands of non-industrial private individuals who own three-fourths of the total. Farmers with 37 percent own over twice that of forest industry which owns only 15 percent. Other private, non-industrial, owners hold 38 percent. The remaining 10 percent is in public ownership, over half of which is in National Forests. Both public and forest industry ownerships have remained almost the same during the last ten years while a million acres has shifted from farmers to non-farm non-industrial private owners.

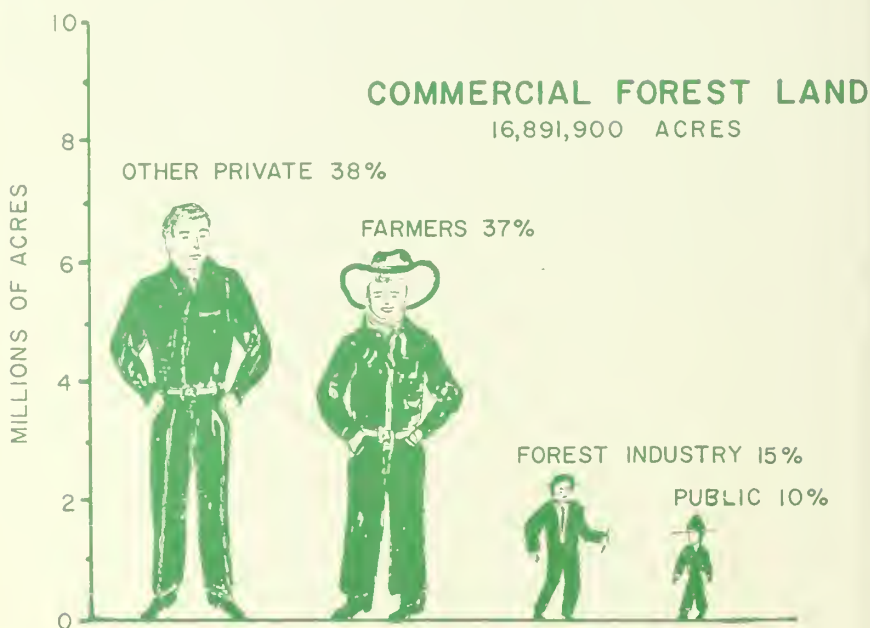


Figure 2. Commercial forest land ownership in Mississippi, 1967.

source: see table 2 in appendix

## TIMBER

VOLUME of growing stock on commercial forest land reached a peak of 13.6 billion cubic feet in 1969. A slight drop was reported as of the beginning of 1970 due to heavy drain in 1969. There was an increased cut to furnish raw materials for new plywood and pulp mills, and there was hurricane Camille. The 1970 inventory of merchantable sized material consisted of slightly more than half pine, 51 percent. Pine sawtimber inventory exceeded hardwood sawtimber by 10.2 billion board feet.

## TIMBER INVENTORY

13,549,700,000 CUBIC FEET

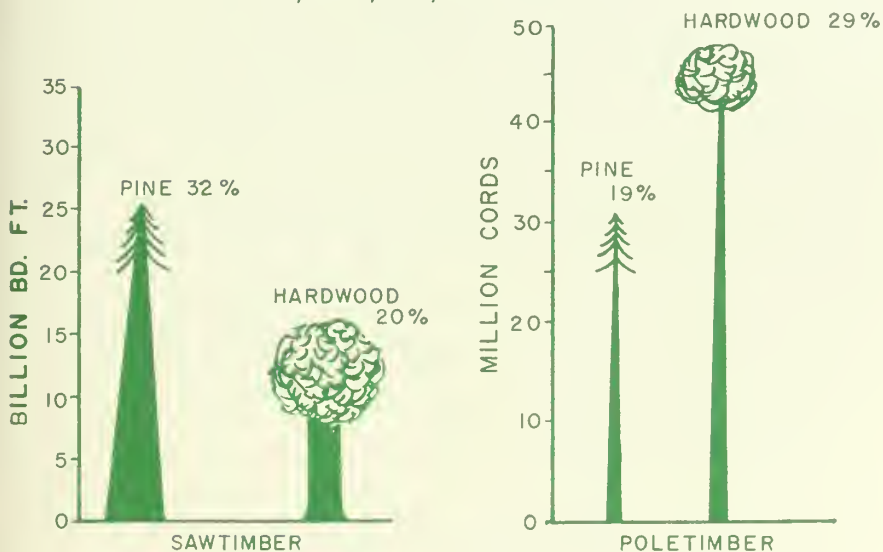


Figure 3. Timber inventory by species and size groups in Mississippi, 1970.

source: see table 3 in appendix.

## EMPLOYMENT

EMPLOYMENT in timber based economic activities is at its highest point in over a decade.

The full time equivalent of people employed in growing and protecting the timber make up only the base from which emerges the many employment opportunities in processing and handling timber products. In fact, we can say that for every full time job<sup>1</sup> in growing and protecting timber, there are 31 other full time jobs in processing and handling timber products.

<sup>1</sup>Thousands of farmers and other owners spend part of their time in management activities. All of this time has been reduced to an equivalent full time basis.

## EMPLOYMENT

64,280 Equivalent full time employees

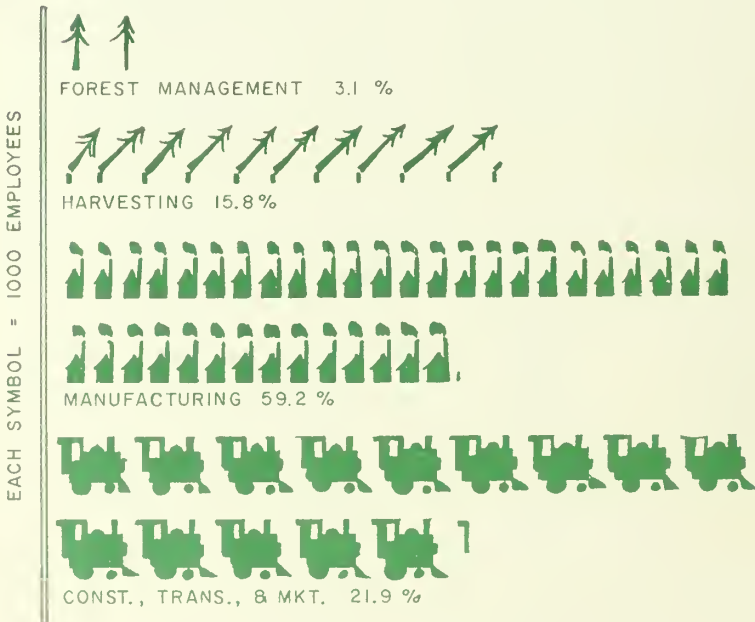


Figure 4. Estimated employment in timber-based economic activities in Mississippi, 1968.

source: see table 6 in appendix.

**MANUFACTURING** employment accounts for over one-half of all employment in timber-based activities with the lumber and wood products group employing 57 percent of the total. This group includes sawmills and planing mills, millwork, plywood, wooden containers, and a few miscellaneous plants. Paper and allied products, which includes pulp mills, paper mills, converted paper products, paperboard containers and boxes, building paper and hardboard mills, was next highest by employing nearly seven thousand people. Over fifty-six hundred people were employed in making wooden furniture and fixtures. Miscellaneous wood-based manufacturing plants employed almost four thousand people in producing wood-based products.

## EMPLOYMENT IN MANUFACTURING

38,095

EACH SYMBOL = 1000 EMPLOYEES

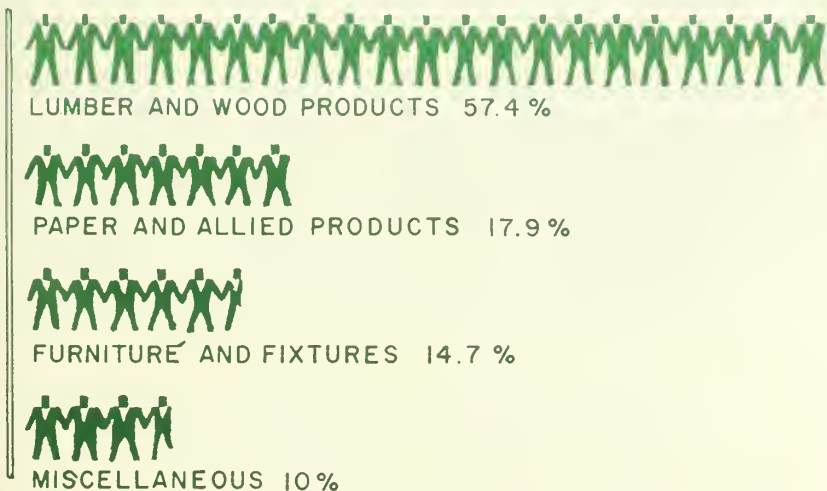


Figure 5. Estimated employment in timber-based manufacturing industries in Mississippi, 1968.

source: see table 6 in appendix.

## PAYROLLS

**WAGES AND SALARIES** earned in timber-based economic activity were dominated by the manufacturing sector which accounted for over 62 percent of the total.

It is estimated that for each 100 cubic feet of timber harvested in 1968 that \$2.71 were earned in salaries and wages in the forest management sector, \$8.80 in the harvesting sector, \$46.08 in the manufacturing sector, and \$16.11 in construction, transportation, and marketing.

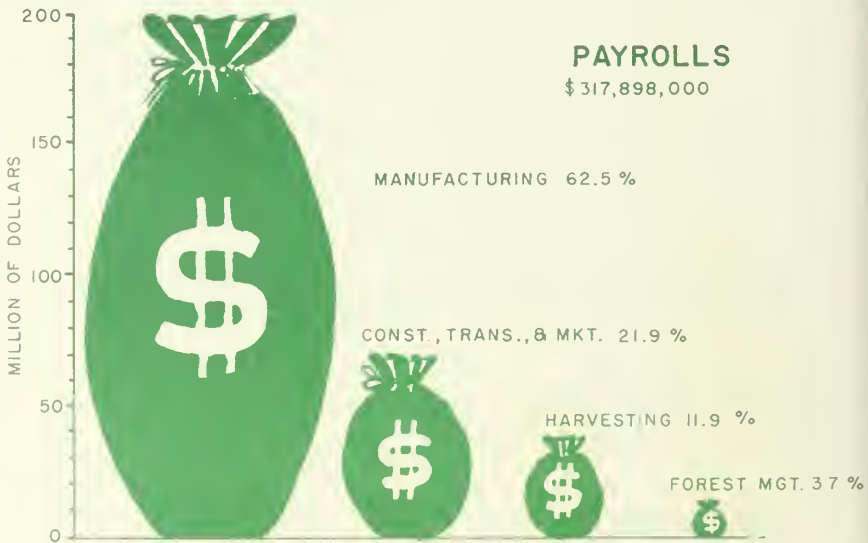


Figure 6. Estimated payrolls in timber-based economic activities in Mississippi, 1968.

source: see table 6 in appendix.

**MANUFACTURING** payrolls in timber-based plants continue to increase, up 59 percent in the five years prior to 1968. The lumber and wood products group provided 50.7 percent of the total during 1968. Paper and allied products was the next highest group with 26.3 percent, while furniture and fixtures plants (wooden products) paid out 13.2 percent of the total. The remaining 9.8 percent came from miscellaneous wood-based plants.

### MANUFACTURING PAYROLLS

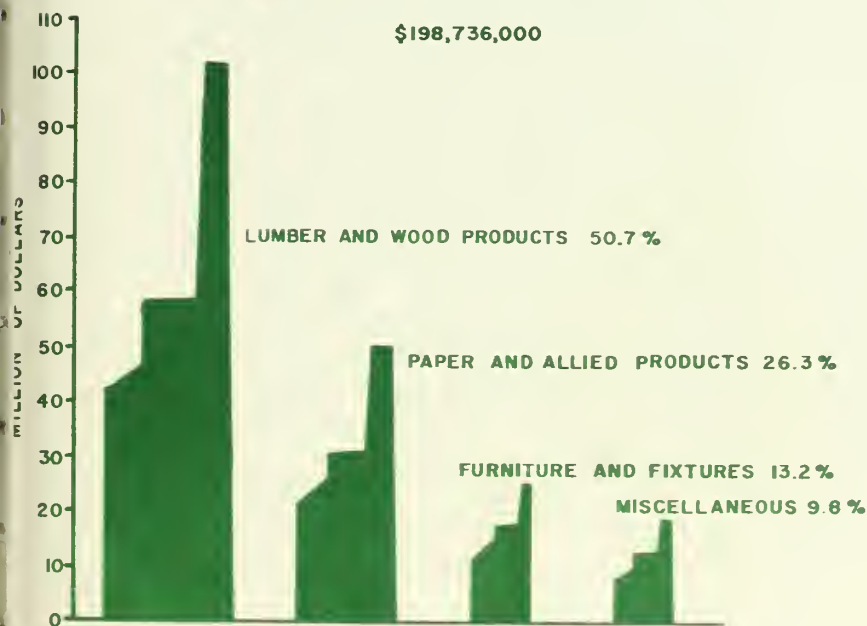


Figure 7. Estimated payrolls in timber-based manufacturing industries in Mississippi, 1968.

source: see table 6 in appendix.

## VALUE ADDED

VALUE ADDED in timber-based economic activities was well over one-half billion dollars in 1968. This is more than double the 1958 figure. And here again the manufacturing sector dominates the picture, since over 60 per cent of total value added occurred in this sector.

Conceptually, value added is the difference between the cost of goods purchased by an enterprise and the value of the products it sells. It is roughly equivalent to the amount of income earned or originating in that activity and represents that activity's contribution to gross national product.

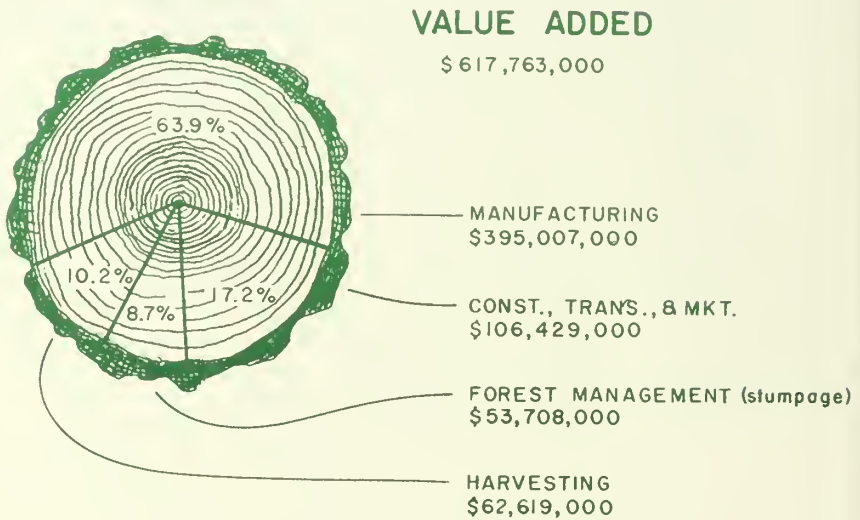


Figure 8. Estimated value added in timber-based economic activities in Mississippi, 1968.

source: see table 6 in appendix

It is estimated that for each 100 cubic feet of timber harvested in 1968, \$12.45 of value added originated in forest management activities, \$14.52 in harvesting, \$91.57 in manufacturing, and \$24.67 in construction, transportation, and marketing. Total value added for each 100 cubic feet of timber harvested was \$143.21.

This is not to infer that the raw material, timber, is the only resource utilized in activities resulting in the value added. Plant, machinery, labor and money capital were also involved. It might also be pointed out that the value added was the result of growing, processing and handling timber and timber products with the technology and within the industrial structure existing in 1968. Any changes in these would of course affect value added.

It is also estimated that for each one dollar's worth of stumpage cut an additional \$1.17 of value added originated in harvesting, \$7.35 in manufacturing, and \$1.98 in construction, transportation, and marketing. Total value added per \$1.00 of stumpage cut was \$11.50.



**TIMBER-BASED** manufacturing plants made up 36 percent of all manufacturing plants in 1968. Of the total value added in these timber-based plants, over one-half, or 50.4 percent, was in the lumber and wood products group. Within this group 38 percent was in sawmills and planing mills while approximately 13 percent was in plywood plants. The paper and allied products group added almost 100 million dollars or one-fourth of total value added in timber-based plants. Furniture and fixtures (wooden products) contributed 12 percent of the total while miscellaneous plants added 12.5 percent.



Figure 9. Estimated value added in timber-based manufacturing industries in Mississippi, 1968.

source: see table 6 in appendix

## VALUE OF SHIPMENTS

**SALE VALUE** of timber and timber products as the stump and on through various stages of manufacturing and marketing is presented in the following tabulation. Some of the timber is consumed in the round form without much alteration for fence posts, poles, etc., while some is processed through many stages of manufacturing before it reaches the final consumer. The values presented here are for timber products either consumed in Mississippi or their value at the time they were shipped out of state. A large part of Mississippi's timber leaves the state before it moves very far up the processing chain and is processed into finished consumer products out of state.

It is estimated that in 1968 other states benefited by value added through further processing of timber after it left Mississippi in the amount of \$714 million as compared to value added in Mississippi of \$618 million.

Table 1. Value of shipments of timber products at various stages of processing in Mississippi, 1968.

Item	Value of Shipments Dollars
Stumpage	53,708,000
Raw products at local points of delivery	123,461,000
Lumber and wood products (primary manuf.)	392,481,000
Wood furniture and cabinets	99,992,000
Paper and allied products	207,724,000
Miscellaneous wood, wood based plastics and synthetics	89,600,000
Wood in construction	154,900,000
Transportation of wood products	19,400,000

## SUMMARY

IN summation, timber-based economic activities are of major importance to the state of Mississippi. By all of the commonly used economic measures, it is clear that Mississippi's economy depends heavily on timber and timber-based activities. With commercial forest land occupying 56 percent of the total land area, one and one-half times that devoted to crop-land and pasture, it provides a firm base on which to grow raw material for continued expansion of the forest industry. Forest-based industry in 1968 operated 36 percent of all manufacturing plants, furnished 28 percent of all manufacturing employment, accounted for 26 percent of all manufacturing payrolls, and claimed 23 percent of all value added in manufacturing.

Timber-based economic activities alone, not counting substantial forest values in recreation, wildlife, grazing, aesthetics, and water, provided 64,280 full time jobs, a 318 million dollar annual payroll, gave rise to 618 million dollars income, and generated an estimated 1.6 billion dollars<sup>1</sup> in total spending in Mississippi during 1968.

<sup>1</sup> Based on what is considered to be a conservative multiplier of 2.55. There has been no applicable multiplier developed for Mississippi. This figure was assumed after review of national, regional, and local studies, and after consultation with Dr. Guy Peden, Director of Business Research, Mississippi State University.

## APPENDIX

**Value added** as used here is reported by the Bureau of the Census and is an economic measure designed to avoid double counting in adding up the value of goods and services produced in the economy. Conceptually, it is the difference between the value of goods produced by an enterprise and the cost of goods purchased by it. It represents the money available to pay wages and salaries, interest, profits, direct taxes, and depreciation and depletion charges.

In this report all value added in forest management, harvesting, lumber and wood products, paper and allied products, and in wood and gum chemicals, was assigned to timber. Value added in furniture and fixtures, man-made fibers, and plastic materials and synthetics was reduced to allow for the use of non-wood materials. See the footnotes following appendix table 6 for details.

**Employment, payrolls, and value of shipments** in the various activities were assigned to timber also as indicated in the paragraph above.

The estimates shown in this report are not of equal reliability. Value added and value of shipments in manufacturing, construction, transportation, and marketing have been up-dated from Bureau of Census figures in most cases from 1966 to 1968. It should also be noted that figures for construction, transportation, and marketing were derived by less precise methods than the others. Even so, it is believed that the report can be very useful if these limitations are recognized. This is the best we have.

Table 2. Land, landownership, and timber inventory, Mississippi, 1966.

Land Class	Area	Growing Stock Volume <sup>1/</sup>	
		Softwood	Hardwood
	Thousand Acres	---- Million cubic feet -----	
<u>Commercial Forest</u> <sup>2/</sup>	16,891.9	6,554.8	6,479.8
Public	1,770.2	1,319.7	656.7
Forest Industry	2,505.1	1,252.3	914.4
Farmer	6,204.6	3,982.8	4,908.7
Other Private	6,412.0		
<u>Cropland</u>	6,565.3	---	---
<u>Pasture and Range</u>	3,716.9	---	---
<u>Other</u>	3,116.7	---	---
ALL LAND	30,290.8		

<sup>1/</sup> Live trees of commercial species, 5.0 inches d.b.h. to a 4.0 inch top diameter outside bark.

<sup>2/</sup> Forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization.

source: U.S.D.A. Forest Service, Resource Bul. SO-17, 1969. Standard tables 12, 13.

Table 3. Pine and hardwood inventory on commercial forest land in Mississippi, 1967-70.

Date	Growing Stock			Sawtimber		
	Total	Pine	Hardwood	Total	Pine	Hardwood
	Million cubic feet			Million board feet		
1967	13,034.6	6,384.9	6,479.8	41,427.4	24,628.8	16,798.6
1968	13,353.5	6,812.4	6,541.1	42,989.3	26,268.6	16,720.7
1969	13,632.9	7,018.0	6,614.9	43,650.1	26,954.6	16,695.5
1970	13,549.7	6,956.5	6,593.2	42,845.5	26,528.1	16,317.4

source: Adapted from Bulletins SO-15 and SO-23, U.S.D.A. Southern Forest Expt. Sta., N.O., La.

Table 4. Timber removal from commercial forest land in Mississippi, 1966.

Class	Sawtimber	Poletimber
	Million bd. ft.	Thousand cords
Softwood	1,005.7	1,056
Hardwood	956.4	1,599

source: computed from standard tables 17, 18, 23, U.S.D.A. Forest Service, Resource Bul. SO-17, 1969.

Table 5. Value added in timber-based economic activity in Mississippi, 1954, 1958, 1968.

Item	1968 <sup>1/</sup>	1958 <sup>2/</sup>	1954 <sup>3/</sup>
	\$	\$	\$
Forest Management (stumpage)	53,708,000	23,300,000	33,150,000
Harvesting	62,619,000	42,850,000	64,450,000
Manufacturing	395,007,000	116,550,000	175,050,000
Construction	53,355,000	38,000,000	24,200,000
Transportation	13,561,000	9,000,000	8,000,000
Marketing	39,513,000	19,000,000	16,000,000
Total	617,763,000	300,700,000	320,850,000

<sup>1/</sup> See appendix table 5.

<sup>2/</sup> From Hair, Dwight. 1963. The Economic Importance of Timber in the U.S., U.S.D.A. Misc. Pub. No. 941.

Table 6. Summary table - Economic importance of timber to Mississippi, estimated, 1968.

Item	Employ- ment #	Payrolls \$	Value Added \$	Value of Shipments \$
For. Management	1,977 <sup>1/</sup>	11,695,000 <sup>9/</sup>	53,708,000 <sup>17/</sup>	53,708,000 <sup>26/</sup>
Harvesting	10,138 <sup>2/</sup>	37,958,000 <sup>10/</sup>	62,619,000 <sup>18/</sup>	123,461,000 <sup>27/</sup>
Additional Manufacturing				
Lbr. & Wood Pr.	21,854 <sup>3/</sup>	100,681,000 <sup>11/</sup>	199,065,000 <sup>19/</sup>	392,481,000 <sup>28/</sup>
Furn. & Fix.	5,618 <sup>4/</sup>	26,300,000 <sup>12/</sup>	48,550,000 <sup>20/</sup>	99,992,000 <sup>29/</sup>
Paper & Allied	6,814 <sup>3/</sup>	52,271,000 <sup>11/</sup>	98,060,000 <sup>21/</sup>	207,724,000 <sup>30/</sup>
Misc.	3,809 <sup>5/</sup>	19,484,000 <sup>13/</sup>	49,332,000 <sup>22/</sup>	89,602,000 <sup>31/</sup>
Sub-total	38,095	198,736,000	395,007,000	789,799,000
Const.	6,056 <sup>6/</sup>	34,280,000 <sup>14/</sup>	53,355,000 <sup>23/</sup>	154,880,000 <sup>32/</sup>
Transp.	1,929 <sup>7/</sup>	13,268,000 <sup>15/</sup>	13,561,000 <sup>24/</sup>	19,353,000 <sup>33/</sup>
Mkt.	6,032 <sup>8/</sup>	21,961,000 <sup>16/</sup>	39,513,000 <sup>25/</sup>	77,841,000 <sup>34/</sup>
Sub-total	14,071	69,509,000	106,429,000	252,074,000
State Total	64,281	317,898,000	617,763,000	-----

Footnotes for this table on pages 24, 25, and 26



1/ Estimated employment in forest management was computed from figures furnished by state and federal agencies, Miss. Directory of Foresters, 1968 Economic Analysis of the Pulp and Paper Industry in the South, published by Southern Forest Institute, and personal contacts.

2/ Estimated from pulpwood harvested based on productivity of 533 cords per man year. Based on information from 1968 Economic Analysis of the Pulp and Paper Industry in the South published by Southern Forest Institute, U.S.D.A. Misc. Pub. No. 941, July 1963, and the 1963 Census of Manufacturers. Estimated employment in harvesting sawtimber based on productivity of 294,800 board feet per man year, developed from U.S.D.A. Misc. Pub. No. 941, July 1963 and 1963 Census of Manufacturers, and updated to 1968. Turpentine gum harvesting based on 125 barrels of gum per man year.

3/ As reported by Mississippi Employment Security Commission annual report for 1968.

4/ Reduced from reported figure for 1968 by Mississippi Employment Security Commission, to only that number attributed to timber. Employment attributed to timber considered to be the same ratio as the ratio of value of timber products consumed to other products consumed in the manufacturing process. This ratio from 1963 Census of Manufacturers.

5/ From 1968 Mississippi Employment Security Commission, but reduced to employment attributed to timber by same method as in 4 above. Includes gum and wood chemicals, plastics materials and synthetics, and man-made textile fibers.

6/ Employment in construction from Mississippi Employment Security Commission 1968, and reduced to employment attributed to timber. This was computed to be 22 percent of the total. Based on information obtained from "Construction Review", Business and Defense Services Administration, Bureau of the Census, Census of Manufacturers, Census of Mineral Industries, and U.S.F.S. Misc. Pub. No. 941, July 1963.

7/ Employment in transportation from Mississippi Employment Security Commission in 1968, and adjusted for attributed to timber by "Transport Statistics in the U.S.", Interstate Commerce Commission for both rail and truck transportation, and for water transportation from "Waterborne Commerce in the U.S.", U. S. Corps of Engineers.

8/ Employment in marketing from Mississippi Employment Security Commission, 1968, and reduced to employment attributed to timber by ratio of timber products sales to total sales taken from U.S.D.A. Misc. Pub. No. 941, July 1963.

9/ Estimated payrolls in forest management activities computed from 1968 Economic Analysis of the Pulp and Paper Industry published by Southern Forest Institute, Atlanta, Go., plus information furnished by State and Federal Agencies on employment and salary charts, and small ownerships workers based on the minimum wage.

10/ Computed from information in 1968 Economic Analysis of the Pulp and Paper Industry published by Southern Forest Institute, supplemented by Mississippi Employment Security Commission data and other information indicating about 75 percent of all workers in harvesting make the minimum wage.

11/ As reported by Mississippi Employment Security Commission annual report for 1968.

12/ Reduced from that reported by Mississippi Employment Security Commission in 1968 to that estimated to be attributed to timber by the same procedure as in footnote #4.

13/ Reduced from that reported by Mississippi Employment Security Commission 1968 to that estimated to be attributed to timber by the same procedure as in footnote #5.

14/ Reduced from that reported by Mississippi Employment Security Commission 1968 to that estimated to be attributed to timber, see footnote #6.

15/ Reduced from that reported by Mississippi Employment Security Commission 1968 to that estimated to be attributed to timber, see footnote #7.

16/ Reduced from that reported by Mississippi Employment Security Commission 1968 to that estimated to be attributed to timber, see footnote #8.

17/ Equivalent to stumpage value. Volume of stumpage severed from Timber Severance Tax Division, State Tax Commission, Jackson, Miss. Stumpage value per unit obtained from U.S.F.S., Atlanta, Ga., U.S.D.A. Misc. Pub. No. 1086, and local price information. Pine sawtimber \$45.51, Hardwood sawtimber \$25.22, Pine pulpwood \$5.01, Hardwood pulpwood \$3.00.

18/ Value added in harvesting timber products computed by the ratio of payrolls to value added which existed in the 1963 Census of Manufacturers for logging camps and logging contractors.

19/ Computed for 1968 by updating value added in lumber and wood products as reported in 1966 Annual Survey of Manufacturers, Bureau of the Census. A factor was computed, dollars in value added per dollar of payroll which held in the 1966 census data, and this was applied to the 1968 payroll data as reported by the Mississippi Employment Security Commission to obtain 1968 value added. See U. S. Dept. of Commerce, "U. S. Industrial Outlook, 1968," Dec. 1967, Appendix B.

20/ Computed for 1968 by applying a factor, dollars in value added per dollar of payroll which held in the 1966 census data for industrial classification of furniture and fixtures, to our 1968 payroll data.

21/ Computed for 1968 by taking 1968 Mississippi Employment Security Commission figures on payrolls for paper and allied products and applying a factor, dollars in value added per dollar of payroll which held in the 1966 Annual Survey of Manufacturers Census data.

22/ Computed for 1968 by taking Mississippi Employment Security figures for payrolls, adjusted to that attributed to timber, and applying a factor, dollars in value added per dollar of payroll which held in the 1963 Census of Manufacturers. See footnote 5 for items included.

23/ Computed for 1968 by the following method: (1) Total value of construction in the U.S. from "Construction Review" published by Business and Defense Services Administration, (2) Value of construction in Mississippi was reported by Hair in U.S.D.A. Misc. Pub. #941 to be 0.8 percent of U.S. total. This was used to determine total for Miss., (3) Total value added computed by subtracting construction materials cost from construction material in mineral industries (Census of Mineral Industries) and value of shipments of manufactured construction materials, taken from Census of Manufacturers, (4) Then assigning 22 percent of the computed value added to timber.

24/ Value added attributed to timber in railroad transportation was computed for Mississippi by data from "Transport Statistics in the U.S." published by the Interstate Commerce Commission for railroad transportation. The ICC has reported that 14.8 percent of freight revenue in the South is from forest products and this was assumed to hold for Mississippi. For water transportation as published by the Corp of Engineers, "Waterborne Commerce in the U.S.", forest products revenue computed to be 3.4 percent.

25/ Value added attributed to timber was computed from a ratio of value added per employee which held in Hair's 1963 report. This was updated and applied to our employment attributed to timber in marketing for 1968.

26/ Value of shipments by forest managers and landowners considered to be equivalent to stumpage received.

27/ Value at local points of delivery considered to be value of shipments by loggers and harvesters. This value computed by adding harvesting costs to stumpage value by product. Harvesting cost obtained from U.S.F.S., Mississippi Extension Service personnel, Mississippi Forestry Commission, and contact with loggers and sawmill personnel.

28/ Computed for 1968 by updating value of shipments in lumber and wood products as reported in 1966 Annual Survey of Manufacturers, Bureau of Census. A factor, dollars in value of shipments per dollar of payroll which held in the 1966 Census data, and this was applied to 1968 payroll data as reported by the Mississippi Employment Security Commission to obtain 1968 value of shipments.

29/ Computed for 1968 by applying a factor, dollars of value of shipments per dollar of payroll which held in the 1966 Census data, to our 1968 payroll data.

30/ Computed for 1968 by applying a factor, dollars of value of shipments per dollar of payroll which held in the 1966 Census data, to the 1968 payroll data as reported by the Mississippi Employment Security Commission.

31/ Computed for 1968 by applying a factor, dollars of value of shipments per dollar of payroll which held in the 1966 Census data, to our 1968 payroll data.

32/ Value of shipments in construction computed by the procedure as that for value added as outlined in appendix note #23.

33/ Value of shipments considered to be revenue received for transportation of forest products. This computed by the procedure as outlined for value added in appendix note #24.

34/ Value of shipments considered to be value of timber products sold. The 1968 value was derived from Mississippi Employment Security Commission on employment in retail and wholesale trade, adjusted by a ratio of timber products sold to total products sold. This same ratio, taken from Hair's work and updated, was applied to value of shipments. Timber products considered to be 8 percent of retail sales and 3 percent of wholesale sales.

## REFERENCES

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