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Status of Privately Owned Harvested Timberland in Mississippi, 1977-87

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SUMMARY

Commercial harvesting was conducted on 5.7 million acres or 38 percent of the privately owned timberland in Mississippi from 1977 through 1987. Three-fourths of the harvesting was on nonindustrial private timberland. Partial cutting was the harvesting method most often used by nonindustrial owners, while clearcuts were most common on forest industry land. Forty-seven percent of the pine and mixed pine-hardwood stands were harvested. Three-fourths of the harvested pine and mixed pine-hardwood stands were at least 60 percent stocked with pine following harvest.

Additional keywords: clearcut, forest-type transition, partial cut, pine regeneration, timber supply.

INTRODUCTION

The Forest Inventory and Analysis unit (FIA) of the Southern Forest Experiment Station recently completed its fifth survey of Mississippi's forest resources. The results of the survey indicate significant changes in the privately owned softwood resource. To summarize briefly, the acreage of pine-type timberland decreased, the volume of softwood inventory decreased slightly, and softwood removals now exceed growth (Kelly, in press). Similar trends are taking place in many areas of the Southern United States and will impact future softwood timber supplies (USDA-FS, in press). Private owners control 86 percent of Mississippi's pine and mixed pine-hardwood timberland. This note provides information on the status of harvesting and regeneration on privately owned timberland in Mississippi from 1977 through 1987, a critical factor affecting the future softwood resource.

DATA COLLECTION

Data were collected during the 1987 forest survey of Mississippi (fig. 1). Data on forest area and timber volume were obtained by a systematic sampling method involving both a forest/nonforest classification of aerial photographs and on-the-ground measurements of trees at sample locations. The sample locations were at intersections of a grid of lines spaced 3 miles apart. On-the-ground measurements included data describing crop tree removals, management activity, natural disturbance, and the stocking of well-established pine seedlings (6 inches or greater in height). Sample locations were assigned a code describing any harvest since previous measurement in 1977. Field crews used existing plot conditions along with personal judgment to distinguish between harvesting and other management activities such as commercial thinning, precommercial thinning, or stand improvement cuttings.

HARVESTING

Thirty-eight percent of the privately owned timberland in Mississippi showed evidence of commercial harvesting since 1977 (table 1). Commercial harvesting included clearcuts and partial cuts. Partially cut timberland was defined to include heavily cut stands such as those that underwent diameter-limit or pine selection cuts (see Definition of Terms in Appendix). Three-fourths of the 5.7 million acres harvested was on nonindustrial private land; however, forest industry land was more heavily cut. Half of the forest industry stands were harvested, compared to slightly over one-third of the nonindustrial private stands. Forty-eight percent of the pine-type timberland (2.2 million acres)

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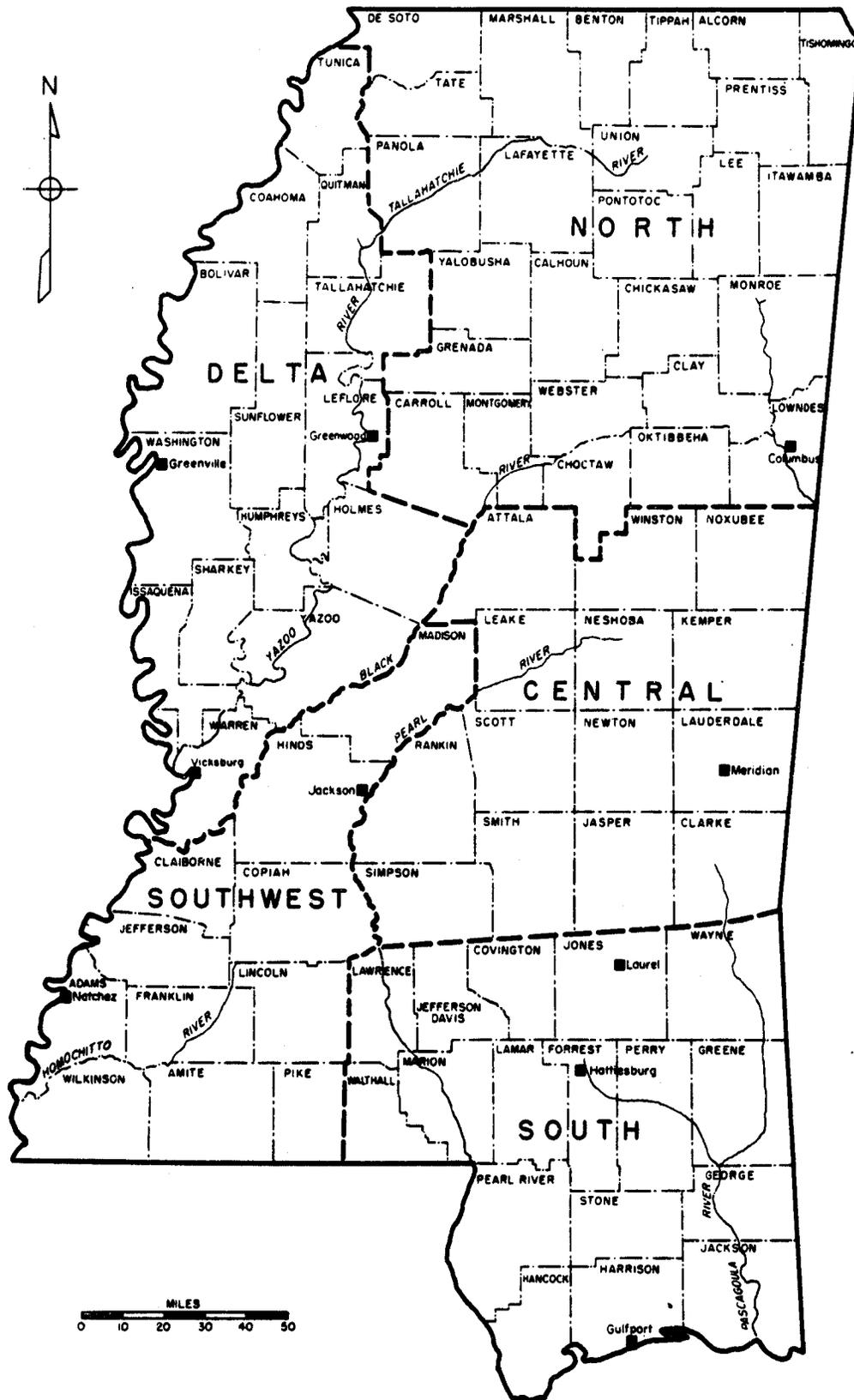


Figure 1.—The forest survey regions of Mississippi.

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Table 1.—Area of Timberland harvested by ownership class, past forest type, and method of harvest for private owners, Mississippi, 1977-87¹

Ownership class and past forest type	Total past timberland	Total timberland harvested	Method of harvest		
			Clearcuts	Seed tree and shelterwood cuts	Partial cuts ²
----- Thousand acres -----					
Forest industry					
Pine types	1,193.1	647.5	453.0	6.1	188.4
Mixed pine-hardwoods	645.6	327.4	205.2	...	122.2
Hardwood types	1,777.7	490.7	234.9	...	255.8
Total	3,016.4	1,465.6	893.1	6.1	566.4
Nonindustrial private					
Pine types	3,259.4	1,514.1	460.3	12.2	1,041.6
Mixed pine-hardwoods	2,426.3	1,022.0	278.6	23.3	760.1
Hardwood types	6,223.2	1,720.2	342.1	5.7	1,372.4
Total	11,908.9	4,256.3	1,081.0	41.2	3,134.1
Total private					
Pine types	4,452.5	2,161.6	913.3	18.3	1,230.0
Mixed pine-hardwoods	3,071.9	1,349.4	483.8	23.3	842.3
Hardwood types	7,400.9	2,210.9	577.0	5.7	1,628.2
Total	14,925.3	5,721.9	1,974.1	47.3	3,700.5

¹Excludes precommercial thinnings, commercial thinnings in pole timber stands, and single-tree selection.

²Includes pine selection, diameter-limit, and salvage cuts. Thinnings in pole timber stands are excluded; some heavy thinnings of dominant trees in saw timber stands are included.

and 44 percent of the mixed pine-hardwood timberland (1.4 million acres) were impacted by harvesting. Thirty percent of the hardwood-type timberland (2.2 million acres) was cut.

Partial cutting was the predominant harvesting practice on two-thirds of the harvested timberland. A portion of the partially cut timberland may have been in an intermediate stage of harvest. Stands containing merchantable pine and hardwood timber are often harvested in stages, e.g. with pines cut first and hardwoods cut later. Stands having only pines removed are classified as partial cuts. Also, some thinnings may be included as partial cuts because judgment concerning the difference between partial cuts and heavy thinnings is difficult to make in the field. Clearcuts made up nearly all of the remaining harvest area and totaled 2.0 million acres.

Considerable differences were found in the harvest practices of the two ownerships. Clearcuts were much more common on forest industry timberland. Sixty-one percent of the harvesting on forest industry timberland was conducted as clearcuts, compared to 25 percent for nonindustrial private owners. Forest industry clearcuts tended to result in more complete removal of trees. Classification of clearcuts included the distinction between complete and merchantable clearcuts. Merchantable clearcuts remove only merchantable trees, leaving rough and rotten trees standing. These residuals often hinder regeneration and tend to provide an inferior seed source for the future stand. Seventy-eight percent of the forest industry clearcuts removed all trees. In contrast, 62 percent of the nonindustrial private clearcuts left nonmerchantable trees standing.

Some of the acreage with residuals may have been scheduled for site-preparation activity subsequent to the visit by FIA field crews.

Nonindustrial private owners have a preference for partial cuts; three-fourths of their harvested area was partially cut. Partial cuts were found in all forest types but were most prevalent in hardwood stands. A common practice is to selectively remove pine and select hardwood timber, leaving a stand of substantially less value.

PINE REGENERATION

Stocking is quantified by comparing existing tree stocking, in terms of number of trees or basal area, with the "normal" stocking standards used by FIA (see Definition of Terms in Appendix). Inventory plots are characterized as understocked or overstocked in relation to this standard. Pine regeneration on harvested sites can be assessed by examining the degree of pine stocking following harvest. Such assessment is intended to provide a relative measure of pine regeneration success and should not be used as an absolute measure because management objectives vary considerably among owners. For example, the FIA standard for a fully stocked stand of seedlings is 600 well-established trees per acre. Owners practicing intensive pine plantation management may not require this many pine seedlings if followup hardwood control activities are scheduled. Alternatively, a landowner practicing natural stand management on a limited budget may consider 600 seedlings a minimum for successful pine regeneration.

Pine regeneration is most important in harvested pine and mixed pine-hardwood stands because they previously supported pine timber. Forty-seven percent of the 3.5 million acres of such stands that were heavily cut (clearcut and partially cut stands) exhibited a high stocking of pine. Stands with medium pine stocking may represent adequate pine regeneration; 28 percent of the harvested stands had medium pine stocking.

Forest industry had the most successful pine regeneration in harvested pine and mixed pine-hardwood stands, with 60 and 24 percent in the high and medium pine stocking classes, respectively (fig. 2). Nonindustrial private owners had 42 percent with high pine stocking and 29 percent with medium pine stocking.

Both ownerships were successful at reforesting pure pine stands. Eighty-two percent of the heavily cut stands had at least medium pine stocking. The findings for clearcut stands indicate that half the stands previously in pine and mixed pine-hardwood had high pine stocking and 22 percent had medium stocking (table 2). Pine regeneration following clearcuts on forest industry timberland was very successful. Eighty-eight percent of the clearcut pine and mixed pine-hardwood stands had medium or high pine stocking, compared to 59 percent for nonindustrial private owners.

Conversion of hardwood stands to pine was evident for both ownerships. Forty-six percent of the clearcut hardwood stands had medium or high pine stocking. Forest industry had 60 percent and nonindustrial private

owners had 36 percent in this condition following clearcutting.

Pine regeneration in partially cut pine and mixed pine-hardwood stands was about the same as for clearcuts. About three-fourths of these stands had at least medium pine stocking (table 3). Both ownerships had similar success at regenerating partially cut stands. Regeneration tends to be higher in partially cut stands, even if management activity aimed at pine regeneration is absent. Natural seeding from adjacent pines and existing residual stems contribute to overall pine stocking of the stand.

FOREST-TYPE TRANSITION

Forest-type classification is based on the stocking of dominant and codominant trees of a given stand. Shifts between forest types, termed forest-type transitions, take place as the relative stocking of pine and hardwood trees of the main canopy change over time. Forest-type transition results from both natural and man-induced forces. Partial cutting practices that remove merchantable pines and leave hardwoods and nonmerchantable pines on sites previously supporting pine forest types cause timberland to shift to hardwood types.

Forty-two percent of the pine-type timberland that was partially cut shifted to mixed pine-hardwood and hardwood forest types (table 4). Some acreage shifted

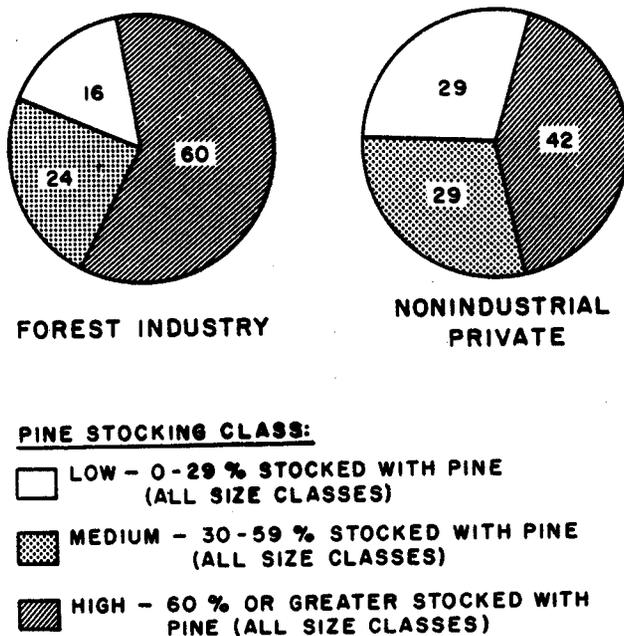


Figure 2.—Status of pine and mixed pine-hardwood type timberland harvested using clearcuts and partial cuts, Mississippi, 1977-87. Numbers inside pie charts represent percentage of stands in a particular stocking class.

Table 2.—Area of timberland harvested using clearcuts by ownership class, past forest type, and pine stocking class for private owners, Mississippi, 1977-87

Ownership class and past forest type	Pine stocking class ¹			
	Total	Low	Medium	High
— Thousand acres —				
Forest industry				
Pine types	453.0	25.2	114.5	313.3
Mixed-pine hardwoods	205.2	55.2	51.6	98.6
Hardwood types	234.9	94.2	64.2	76.5
Total	893.1	174.4	230.3	488.4
Nonindustrial private				
Pine types	460.3	198.1	101.4	160.8
Mixed-pine hardwoods	278.6	107.7	39.7	131.2
Hardwood types	342.1	217.8	62.8	61.5
Total	1,081.0	523.6	203.9	353.5
Total private				
Pine types	913.3	223.3	215.9	474.1
Mixed-pine hardwoods	483.8	162.7	91.3	229.8
Hardwood types	577.0	312.0	127.0	138.0
Total	1,974.1	698.0	434.2	841.9

¹Low indicates 0-29 percent stocked with pine (all size classes); medium indicates 30-59 percent stocked with pine (all size classes); and high indicates 60 percent or greater stocked with pine (all size classes).

Table 3.—Area of timberland harvested using partial cuts by ownership class, past forest type, and pine stocking class for private owners, Mississippi, 1977-87¹

Ownership class and past forest type	Pine stocking class ²			
	Total	Low	Medium	High
	-----Thousand acres-----			
Forest industry				
Pine types	188.4	27.6	35.7	125.1
Mixed-pine hardwoods	122.2	42.8	34.2	45.2
Hardwood types	255.8	210.7	34.6	10.5
Total	566.4	281.1	104.5	180.8
Nonindustrial private				
Pine types	1,041.6	134.6	248.7	658.3
Mixed-pine hardwoods	720.1	287.7	327.8	104.6
Hardwood types	1,372.4	1,189.8	116.5	66.1
Total	3,134.1	1,612.1	693.0	829.0
Total private				
Pine types	1,230.0	162.2	284.4	783.4
Mixed-pine hardwoods	842.3	330.5	362.0	149.8
Hardwood types	1,628.2	1,400.5	151.1	76.6
Total	3,700.5	1,893.2	797.5	1,009.8

¹Includes pine-selection, diameter-limit, and salvage cuts. Thinnings in poletimber stands are excluded; some heavy thinning of dominant trees in sawtimber stands are included.

²Low indicates 0-29 percent stocked with pine (all size classes); medium indicates 30-59 percent stocked with pine (all size classes); and high indicates 60 percent or greater stocked with pine (all size classes).

to pine types; the net effect of partial cutting was a loss of 407,800 acres of pine-type timberland. A shift of 462,200 acres of mixed pine-hardwood to hardwood was offset by acreage shifting into mixed pine-hardwoods; the net loss was 147,000 acres. The overall impact of forest-type shifts was 554,800-acre increase in hardwood-type timberland. Eighty-six percent of the increase was on nonindustrial private land.

CONCLUSIONS

The status of regeneration on timberland harvested over the past decade is an important factor affecting future timber supplies. The results for stands that previously supported pine are favorable. Three-fourths of the area harvested was at least 60 percent stocked with pine. Some of the poorly stocked stands may have been cut recently and may be scheduled for future reforestation.

Pine regeneration efforts were most successful on forest industry land. However, cutting was extensive on industry land; over half of the pine and mixed pine-hardwood stands were harvested. This will affect short-term growth from industry's timberland because newly established pines don't contribute to growth until they reach the lower limit of merchantability (5.0-inches d.b.h.).

Table 4.—Area of timberland harvested using partial cuts by ownership class, past forest type, and present forest type for private owners, Mississippi, 1977-87¹

Ownership class and past forest type	Total	Present forest type		
		Pine types	Mixed pine-hardwoods	Hardwood types
	-----Thousand acres-----			
Forest industry				
Pine types	188.4	119.0	34.4	35.0
Mixed-pine hardwoods	122.2	39.1	29.4	53.7
Hardwood types	255.8	5.7	5.9	244.2
Total	566.4	163.8	69.7	332.9
Nonindustrial private				
Pine types	1,041.6	587.5	298.3	155.8
Mixed-pine hardwoods	720.1	64.7	247.0	408.4
Hardwood types	1,372.4	6.2	80.3	1,285.9
Total	3,134.1	658.4	625.6	1,850.1
Total private				
Pine types	1,230.0	706.5	332.7	190.8
Mixed-pine hardwoods	842.3	103.8	276.4	462.2
Hardwood types	1,628.2	11.9	86.2	1,530.1
Total	3,700.5	822.2	695.3	2,183.0

¹Includes pine-selection, diameter limit, and salvage cuts. Thinnings in poletimber stands are excluded; some heavy thinnings of dominant trees in sawtimber stands are included.

Pine regeneration was less prevalent on nonindustrial private timberland. Eighty-three percent of the 878,700 acres of harvested pine and mixed pine-hardwood stands having poor regeneration is held by nonindustrial private owners. Pine timber supply can only be secure on this timberland if efforts are made to improve pine stocking.

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APPENDIX-DEFINITION OF TERMS

FIA.—Forest Inventory and Analysis unit of the U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station.

Forest type.—A classification of FIA plots according to the relative stocking of pine and hardwood trees tallied.

Pine: Forests in which pine species comprise the plurality of all live tree stocking.