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EMERGING PATTERNS IN THE DISTRIBUTION OF ROADLESS FORESTED AREAS IN THE MIDSOUTH

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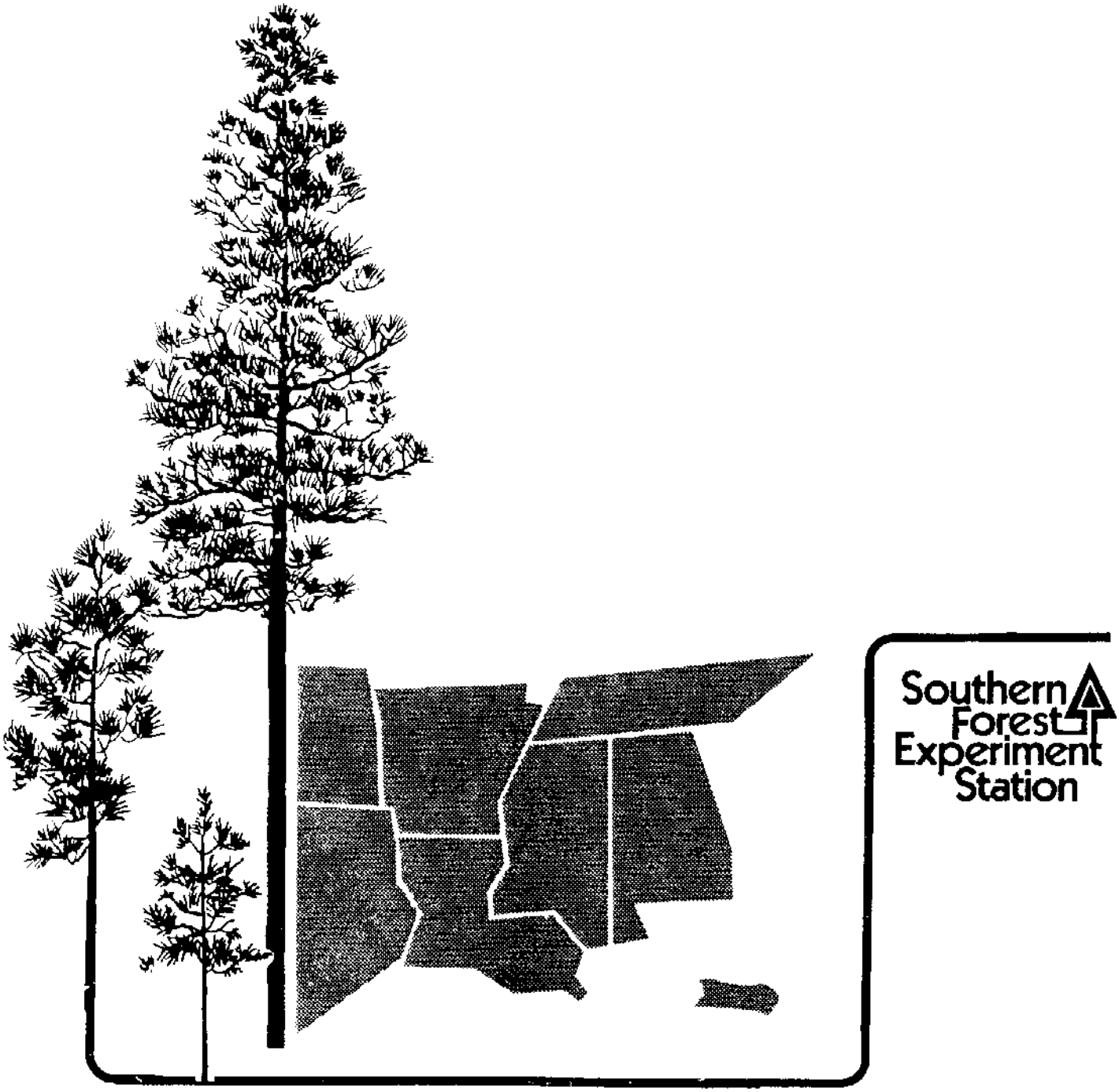
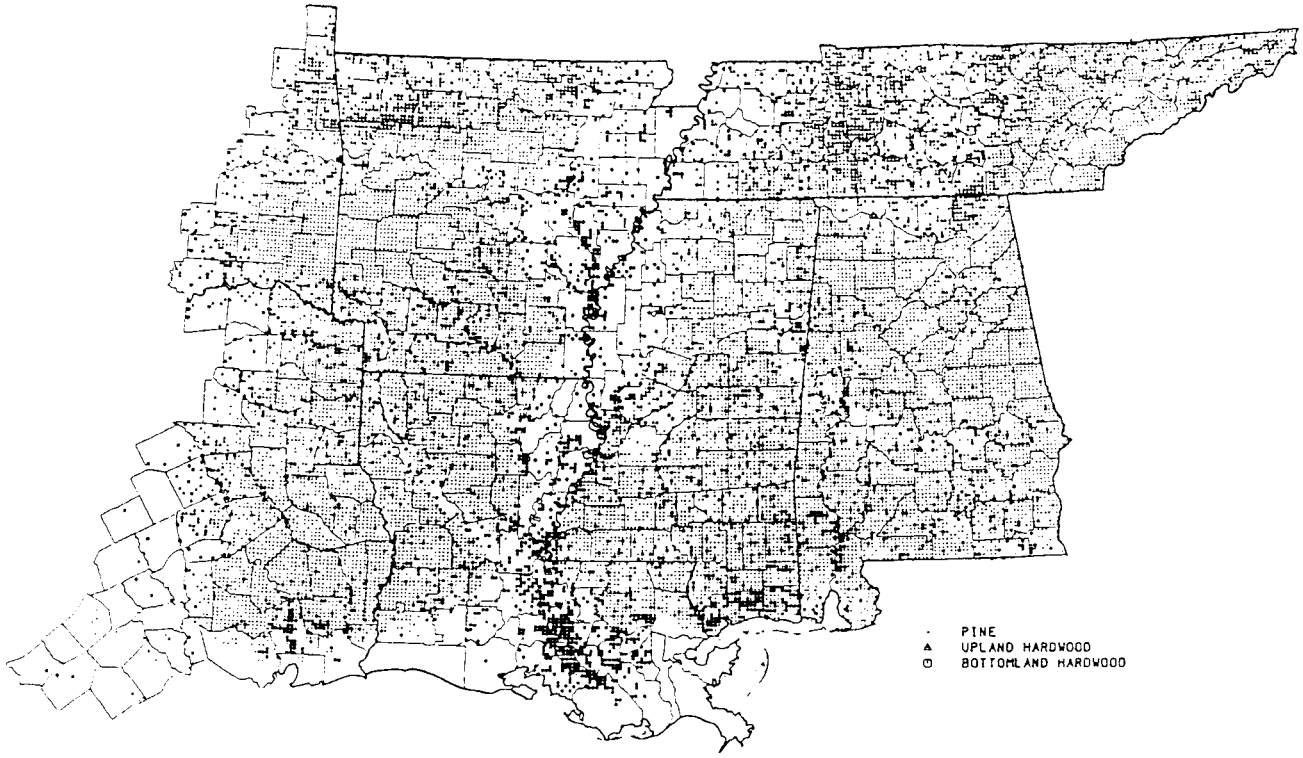
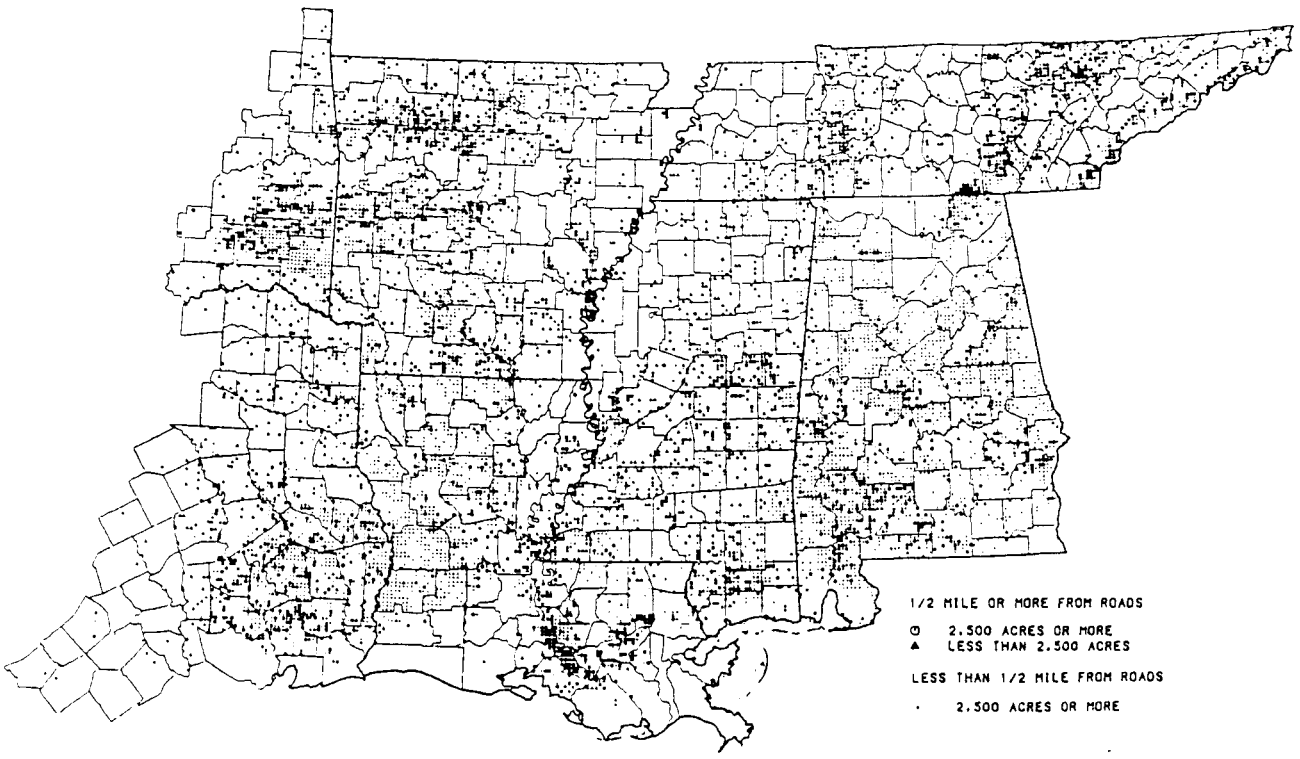




MIDSOUTH TIMBERLAND BY PHYSIOGRAPHIC CLASS.



REMOTE TIMBERLAND BY FOREST SIZE AND DISTANCE FROM ROADS.

Emerging Patterns In The Distribution Of Roadless Forested Areas In The Midsouth

by
Victor A. Rudis

ABSTRACT--Of the roughly 100 million acres (40.5 million ha) of forest land in the Midsouth, roadless forested areas comprise some 23 million acres (9.3 million ha). Although much of the acreage is on bottomland sites (7 million acres, or 2.8 million ha) and areas with rugged terrain or steep slopes (4 million acres, or 1.6 million ha), half of the acreage is on upland sites with level-to-rolling terrain. This paper discusses the distribution of roadless forested areas by location, stand characteristics, and proximity to population centers. Roadless timberland areas are clustered around selected landforms. Current patterns suggest trends toward greater representation in hardwood forest types, public ownership, and sawtimber stands. Data were obtained from a 1975-84 survey of Midsouth timberland.

KEYWORDS: wilderness, remote forests, forest inventories, mapping, primitive areas.

For many years numbers of people hiking and camping in remote or roadless areas have been increasing (Spencer *et al.* 1980). Crowding is anticipated in roadless areas near metropolitan areas, thereby increasing the demand for these areas, particularly in the eastern United States (Cordell and Hendee 1982). Coupled with increased demand for roadless areas is a declining supply that has resulted from accelerated roadbuilding since World War II (Irland and Rumpf 1980). Pressures for intensified multiple-use management of public as well as private roadless areas are likely to lead to a major decrease in primitive recreation opportunities (Cordell and Hendee 1982).

The USDA Forest Service's Forest Inventory and Analysis (FIA) Units have been conducting statewide timber surveys since the 1930's to assess private as well as public forest resources in the United States. A geographically extensive data base has been prepared to assist in these timber assessments. In response to requirements that they address multiresource values, the Forest Service has begun to assemble comparable information on nontimber attributes of forested land. Efforts are underway by FIA units to record objective characteristics that help to describe specific recreation, wildlife, range, and watershed values of forested land (Labau 1984). Although such characteristics do not translate directly into wilderness or recreational values, they should prove useful as bases for regional assessments.

Distance from roads is such a characteristic. Forests distant from roads are, by definition, remote--a chief criterion for wilderness or primitive recreational opportunity designation (USDA Forest Service 1982). Roadless forested areas also provide key habitat for black bears and other wildlife in need of seclusion. The relatively small designated wilderness areas common in the eastern United States may not support some raptorial and mammalian species that have extensive home ranges. Presence of extensive areas of similar habitat outside designated wilderness areas is a key ingredient in the survival of these species. As a limited resource, roadless forested areas should be monitored to ensure that an adequate supply remains for the future.

In this paper, existing data on roadless forested areas in the Midsouth Region (Alabama, Arkansas, Louisiana, Mississippi, eastern Oklahoma, Tennessee, and eastern Texas) are summarized. Inventory years range from 1975 for eastern Texas to 1984 for Louisiana. Information is presented on the location, kinds of vegetation, stand size, and ownership characteristics of roadless forested areas. Limitations associated with existing data are also described.

METHODS

The Southern Forest Experiment Station's FIA Unit established a system of permanent sample plots located systematically at the intersection of perpendicular grid lines spaced at 3-mile (4.8 km) intervals throughout the Midsouth. Plot locations were transferred to aerial photos, and all plots were visited on the ground to verify conditions. Detailed measurements were made at all plot locations classified as timberland (at least 1 acre, or 0.4 ha in forest cover, 120 feet (36.6 m) in width, capable of

producing crops of industrial wood, and not withdrawn from timber utilization by statute or administrative regulation). Forest resource information was obtained for some 17,000 plots throughout the seven states surveyed. Survey details are described in FIA field manuals (FIA Research Work Unit 1985).

In 1974, additional criteria were added to survey procedures to address timber availability, including distance of the plot from the nearest road. Although not intended as an aid in determining wilderness or primitive recreation opportunities of forested stands, this measure does provide an estimate of remoteness.

For all states, distance from roads was measured from the plot center to the nearest all-weather road (improved and maintained) or unimproved road. Unimproved roads were considered only if they were currently truck operable or could be made so with minimum improvement such as removal of blown down trees.

(The reader should note that due to changes in photo quality and interpretation between 1974 and 1984, and recent emphasis on this measure as an estimate of remoteness, timberland area 1/2 mile (0.8 km) or more from roads may be slightly overestimated, particularly for surveys prior to 1981).

RESULTS AND DISCUSSION

Timberland in the Midsouth Region occupies 98.5 million acres. Of this area, 75.8 million acres are less than 1/2 mile from roads,16.1 million acres are 1/2 to 1 mile, 6.0 million acres are 1 to 3 miles, and 0.6 million acres are more than 3 miles. The total of 22.7 million acres (23% of the Region's 98.5 million acres) 1/2 mile or more from roads are considered in this report as roadless. Timberland is distributed unevenly among the seven states, with most acreage in Alabama (22%) and the least acreage in Oklahoma (4%) (Fig. 1). Timberland 1/2 mile (0.8 km) or more from roads is found in every state, with the largest acreage in Arkansas (21%) and the least acreage in Oklahoma (6%).

Of the 98.5 million acres (40 million ha) of timberland in the Midsouth, 66.2 million acres (26.8 million ha)

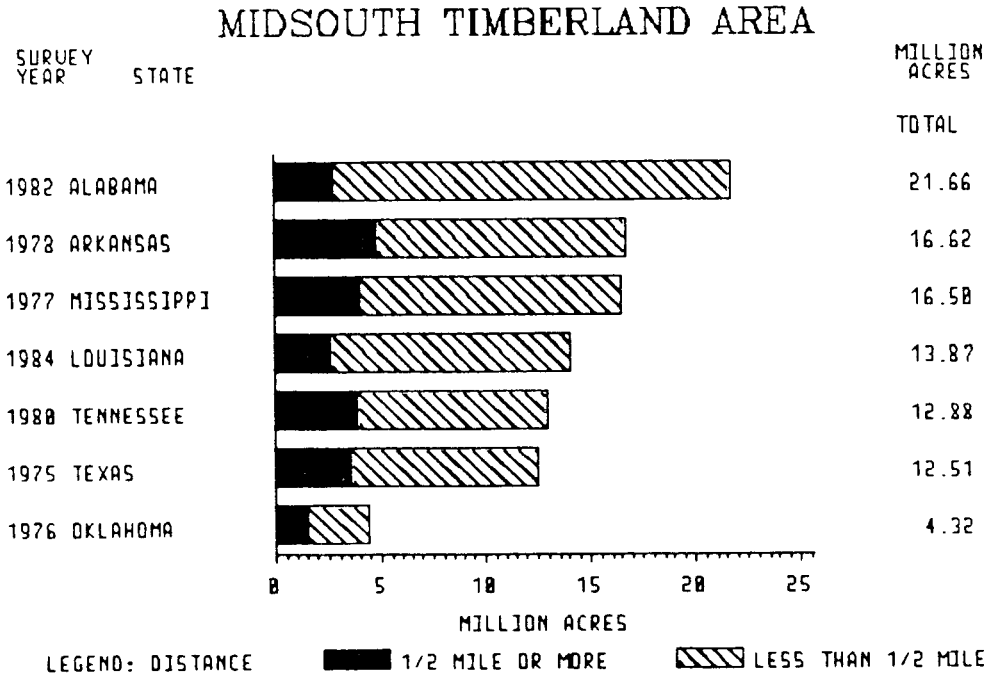
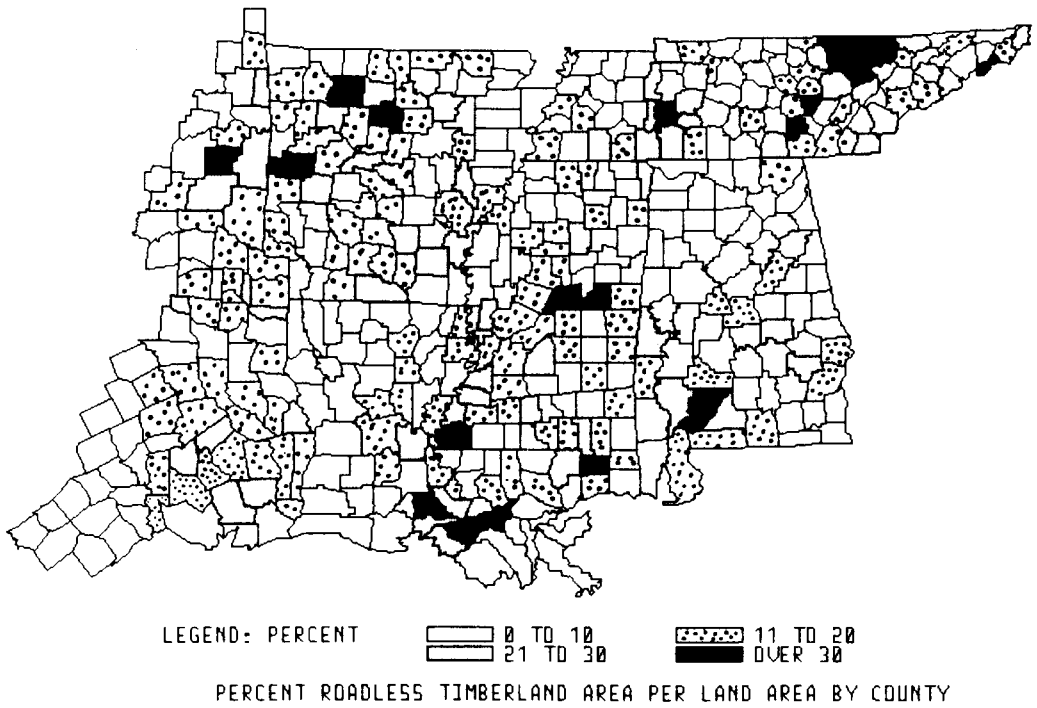


FIGURE 1. TIMBERLAND AREA BY STATE AND DISTANCE FROM ROADS.



(67%) are classified physiographically (physiographic class is defined according to its suitability for growing pines, upland hardwoods, and bottomland hardwoods. Pine physiographic class is favored where pines and upland hardwoods are present) as pine sites (Table 1). Upland hardwood sites, 14.0 million acres (5.7 million ha) (14%), are found chiefly in the northern portions of the Region. Bottomland sites, 18.3 million acres (7.4 million ha) (19%), are concentrated in the lower Mississippi River Floodplain, but are also found in widely scattered locations throughout the Region (Fig. 2).

Of the areas classified as roadless, 12.0 million acres (4.9 million ha) (53%) are pine sites, 4.0 million acres (1.6 million ha) (17%) are upland hardwood sites and 6.8 million acres (2.8 million ha) (30%) are bottomland sites. Roadless timberland areas are illustrated in Fig. 3 by physiographic class. As one might expect, roadless timberland areas are often found in swamps and in areas with steep terrain (slopes greater than 20 percent) where road building is difficult (Table 1). Half of the roadless acreage, 12.2 million acres (4.9 million ha), however, is found on upland hardwood or pine sites with level-to-rolling terrain. Because such areas are more suited to a wide variety of land uses, one can expect this acreage to diminish more rapidly with time than other roadless timberland areas.

The largest clusters of roadless timberland areas are in bottomlands along the paths of major rivers, in the mountainous areas of Arkansas and Tennessee, and in the loess or bluff hills bordering the Mississippi River Floodplain (Major landforms are described by Nelson and Zillgitt (1969)). Clusters indicate areas where wildlife in need of seclusion may be abundant, and areas where the potential for primitive recreation opportunities is greatest. However, overall recreation value may be low, as clusters are isolated from metropolitan areas (see Cordell and Hendee 1982, p.72), or represent suitable environments for a limited number of activities.

Acreage by forest type, ownership, and stand size class is summarized in Tables 2, 3, and 4. Differences between roadless and roaded areas are significant (P (larger Chi-square) lt 0.005). Roadless areas are more frequent in oak-gum-cypress and elm-ash-cottonwood forest types, in sawtimber stands, and among public land-holding agencies. Roaded areas are more frequent in longleaf-slash and loblolly-shortleaf forest types, in sapling and seedling stands, and among non-industrial private landowners.

CONCLUSIONS

The most recent forest surveys show that roadless areas represent less than one-fourth of the timberland in the Midsouth. Some of the roadless areas may not be developed soon, such as the clustered acreage of bottomland hardwoods and many of the upland hardwood or pine sites with rough terrain. These clusters represent areas that may contain and continue to retain wilderness potential for the near future. As such, they provide buffers against encroachment of dissimilar land uses for nearby designated or proposed wilderness areas.

Roadless timberland areas are significantly different from roaded areas, not only in terms of location and physiography, but in terms of forest type, ownership, and stand size as well. Undoubtedly the patterns, or "trends" suggested by the data--more hardwood forest types, more public owners, and more sawtimber stands--in roadless vs.

Table 1. Midsouth Timberland Area by Physiographic Class, Slope Class, and Distance from Roads.

Physiographic class and slope class	All Timberland		1/2 Mile or More		Less than 1/2 Mile	
	Million Acres	Percent	Million Acres	Percent	Million Acres	Percent
Pine						
Greater than 20%	8.74	8.9	2.16	9.5	6.58	8.7
20% or less	57.50	58.4	9.82	43.2	47.68	62.9
Total	66.23	67.2	11.97	52.7	54.26	71.6
Upland hardwood						
Greater than 20%	4.53	4.6	1.55	6.8	2.99	3.9
20% or less	9.44	9.6	2.40	10.6	7.04	9.3
Total	13.97	14.2	3.95	17.4	10.02	13.2
Bottomland hardwood	18.31	18.6	6.79	29.9	11.52	15.2
Total	98.53	100.0	22.71	100.0	75.82	100.0

Table 2. Midsouth Timberland Area by Forest Type and Distance from Roads.

Forest Type	All Timberland		Distance from Roads			
			1/2 Mile or More		Less Than 1/2 Mile	
	Million Acres	Percent	Million Acres	Percent	Million Acres	Percent
Longleaf-slash	3.74	3.8	0.42	1.9	3.32	4.4
Loblolly-shortleaf	25.15	25.5	3.94	17.4	21.21	28.0
Oak-pine	17.61	17.9	3.35	14.7	14.26	18.8
Oak-hickory	34.88	35.4	8.42	37.1	26.46	34.9
Oak-gum-cypress	15.63	15.9	5.94	26.2	9.69	12.8
Elm-ash-cottonwood	1.38	1.4	0.59	2.6	0.79	1.0
Other[1]	0.14	0.1	0.05	0.2	0.09	0.0
Total	98.53	100.0	22.71	100.0	75.82	100.0

[1] White pine-hemlock, sugar maple-beech-birch, and nontyped (nonstocked) stands.

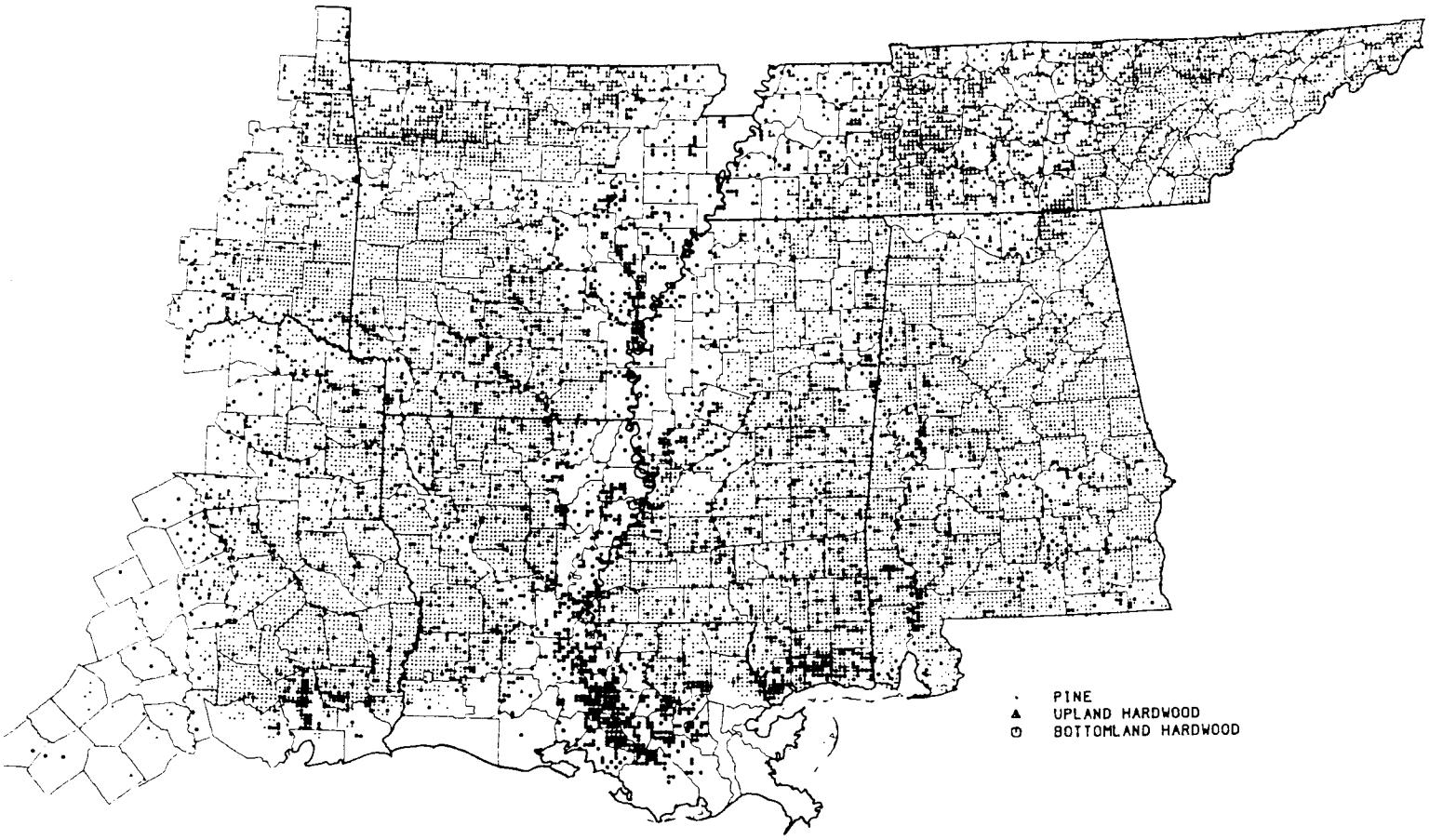


FIGURE 2. MIDSOUTH TIMBERLAND BY PHYSIOGRAPHIC CLASS.

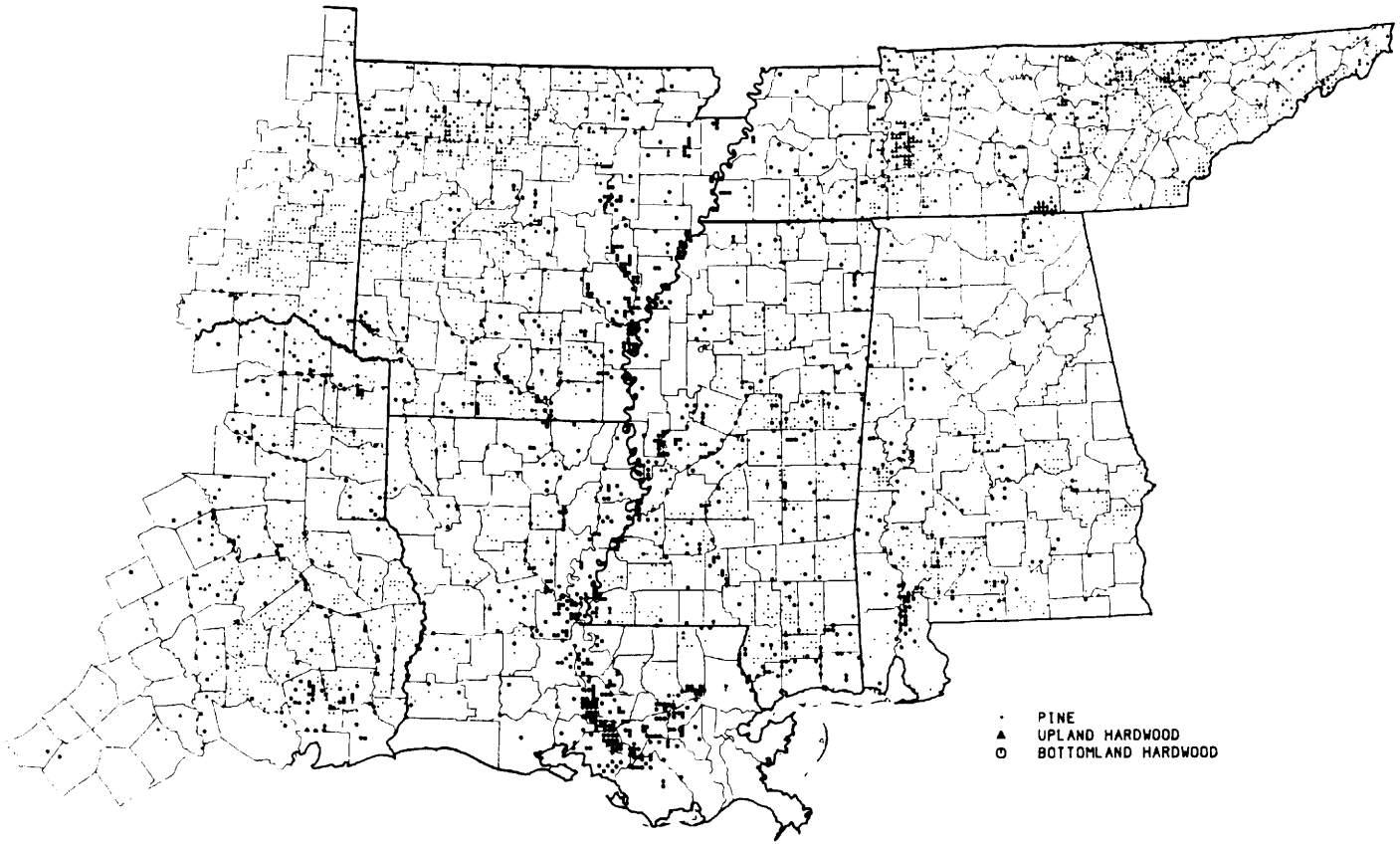


FIGURE 2. MIDSOUTH TIMBERLAND 1/2 MILE OR MORE FROM ROADS BY PHYSIOGRAPHIC CLASS.

Table 3. Midsouth Timberland Area by Ownership Class and Distance from Roads.

			Distance from Roads			
	All Timberland		1/2 Mile or More		Less Than 1/2 Mile	
Ownership Class	Million Acres	Percent	Million Acres	Percent	Million Acres	Percent
National Forest	6.31	6.4	2.18	9.6	4.13	5.4
Other public	3.51	3.6	1.25	5.5	2.26	3.0
Forest industry	21.38	21.7	4.96	21.8	16.42	21.7
Other private	67.33	68.3	14.33	63.1	53.00	69.9
Total	98.53	100.0	22.71	100.0	75.82	100.0

Table 4. Midsouth Timberland Area by Stand Size Class and Distance from Roads.

			Distance from Roads			
	All Timberland		1/2 Mile or More		Less Than 1/2 Mile	
Size Class	Million Acres	Percent	Million Acres	Percent	Million Acres	Percent
Nonstocked	1.50	1.5	0.32	1.5	1.15	1.5
Sapling/seedling	24.30	24.7	4.22	18.6	20.09	26.5
Poletimber	29.93	30.4	6.78	29.9	23.15	30.5
Sawtimber	42.79	43.4	11.36	50.0	31.43	41.5
Total	98.53	100.0	22.71	100.0	75.82	100.0

roaded timberland areas will continue. Conversion of some roaded areas to roadless areas can be expected, however, as abandoned farm and logging roads revert to forest cover.

Roadless areas represent a limited range of resources, are unevenly distributed and eventually may be restricted to a few sections of the Region. Planned development of these sections for timber management, wildlife, agriculture, human settlement, or recreation should be evaluated in terms of how such development will affect the regional supply and isolation of roadless areas.

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