

**Annual Forest Management Activities of
TIMOs and Industrial Landowners in Mississippi During 1998-1999¹**

by

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Abstract

This study reports results from a survey of timberland investment management organizations (TIMOs) and industrial timberland owners in Mississippi during 1998-1999. Respondents were asked to report acres owned by forest type, silvicultural treatments, and regeneration and harvest information. Results provide information on how TIMOs and industrial landowners manage their timberland annually. Additionally, evidence suggests TIMOs and large industrial landowners manage their lands similarly.

INTRODUCTION

Silvicultural treatments used to enhance stand value and health are the cornerstone of modern forestry. They have done much to improve timber supply by increasing productivity of our nation's forests. However, population growth, urbanization, and land clearing for agriculture have all put increasing demands on foresters to produce more wood with less land. To that end, natural resource professionals began investigating how landowners manage their lands. Currently, there are no published articles that report total forest management activities for landowners. Several articles report costs of various forest management activities (e.g. Dubois et al. 2001, 1999, 1997, 1995), but none have reported both silvicultural and overhead activities.

This paper investigates forest management activities for two landowner groups known for practicing intensive management. TIMOs and industrial landowners in Mississippi were surveyed to determine their management activities for 1998 and 1999. Each group was asked to report acreage by forest type, acreage treated by various silvicultural activities, regeneration and harvest information, and overhead activities undertaken for 1998 and 1999. These activities are indicators of how intensive management timberland owners manage their lands annually.

BACKGROUND

TIMOs are classified by the USDA Forest Service, Forest Inventory and Analysis (FIA) as non-industrial, private corporate landowners (USDA, 1998). They comprise several forms of ownership, including corporations, limited partnerships, limited liability companies, and real estate investment trusts. They are, however, a unique landowner group in that they manage timberland for investors strictly for its inclusion in investment portfolios. Industrial forest landowners are defined as individuals or companies that own timberland and have at least one wood processing facility.

Institutional investment in timberland is increasing (Binkley et al. 1996, Caufield 1994, 1998, Donegan 1999, and Rinehart 1985). In 1998 and 1999, over three million acres were transferred from industrial to institutional landowners (Diamond et al. 1999, Drafan 1999, and James W. Sewall, 1999). This has compounded the need to better understand this landowner group. Many industrial landowners are divesting their land holdings to focus operations on their value-added processing facilities. These large landholdings represent new potential investment for institutional landowners and others.

METHODS

The study population consisted of industrial landowners and TIMOs with landholdings in Mississippi during 1998-1999. The population of

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industrial landowners was identified from those listed in the Mississippi Forestry Association's Membership Directory, the American Business Directory, and the Mississippi Manufacturer's Directory. A representative of one major TIMO provided a list of all TIMOs owning/managing timberland in Mississippi. Five TIMOs and 27 industrial landowners were identified in Mississippi for 1998, while in 1999 there was one less large industrial landowner. The area land managers for these companies were contacted by phone and asked to participate. Those willing to participate were asked to complete a survey by one of the following methods: (1) mail, (2) telephone, or (3) personal interview at their place of business.

The survey instrument was developed using Dillman's (1978) total design method. It delineated the management activities Mississippi's industrial landowners and TIMOs conducted during 1998 and 1999. The survey solicited three types of information: (1) property data, (2) silvicultural treatments, and (3) timber harvest information. Property data included information about the acreage owned or leased by forest type. Treatment data included information about regeneration and various intermediate silvicultural activities. Harvest information included the acres harvested by harvest type: final, intermediate, or uneven-age harvests. Harvest types were further broken down by method (e.g. final harvest could be clear-cut, seed tree, or shelter wood).

Summary statistics for each forest management activity and landowner were computed. Acres treated by each management activity and landowner group were computed by summing the total reported acres plus estimates of acres not reported. Estimates for acres not reported were determined by dividing the total expenditures for that activity by the average cost per acre for that activity.

RESULTS

In general, both large industrial landowners and TIMOs were willing to participate in the survey; however, respondents took a very long time to complete surveys. Small industrial landowners were the least willing to provide financial information. All TIMOs (N=5) returned questionnaires for both years, while only 16 and 15 of the industrial landowners (N=27 and N=26) returned surveys for the years 1998 and 1999, respectively. Responses of industrial owners varied dramatically by size of ownership. Many small industrial landowners reported no forest management activities, while large industrial landowners conducted a wide array of activities. A post-stratification of industrial landowners was done

by partitioning them into large (greater than 10,000 acres) and small (less than 10,000 acres) landowners.

Ten industrial landowners fit the classification as large landowners (>10,000 acres of timberland) in 1998 and nine did in 1999. The remaining seventeen industrial landowners were classified as small industrial landowners. Eight large industrial landowners returned questionnaires for both years, while only eight and seven small industrial landowners returned questionnaires for 1998 and 1999, respectively.

Property data

In terms of forest type, planted pine composed the greatest proportion of total acres in 1998 and 1999 for TIMOs (66.2 and 67.2 percent) and large industrial landowners (54.7 and 56.2 percent) (table 1). Hardwood (35.6 percent) comprised the largest proportion of small industrial timberland in 1998, while in 1999 planted pine (47.3 percent) comprised the largest proportion. TIMOs had a greater proportion of their total acreage in planted pine than small industrial landowners for 1998-1999.

In 1999, TIMOs increased their total landholdings substantially (69.5 percent) with the largest percentage increase occurring in the hardwood-pine type (table 2). However, the largest increase in acres was in the pine forest type (131,559) for TIMOs. Large industrial landowners reported a slight decrease in their total landholdings (1.4 percent) between 1998 and 1999.

Silvicultural activities

Most acres treated were for stand establishment (table 3). Mechanical site preparation, chemical site preparation, site preparation burning, and fertilization of regeneration were the major activities used to prepare sites. Mechanical site preparation accounted for 8 percent of the total area treated by TIMOs in 1998 and 17 percent in 1999. It accounted for 11 percent of the total treated by large industrial landowners in 1998 and 13 percent in 1999. Bedding was used by five TIMOs and four large industrial landowners, more than any other mechanical site preparation treatment in 1998. Windrowing, chopping, ripping, and various combinations were also used.

Chemical site preparation was the most common method of site preparation for TIMOs and industrial landowners. All TIMOs reported applying herbicides in 1998, as did six large industrial landowners. Most landowners applied herbicides by aerial application, while a few applied them by ground (broadcast). Four small industrial landowners reported using

Table 1. Acres Owned/Managed by Forest Type for TIMOs and Industrial Landowners for 1998-1999.

	Year	Planted pine	Natural pine	Hard/pine	Hardwood	Non-typed	Total*	Leased
TIMO	1998	179,944	28,911	11,275	32,759	18,813	271,702	-
	1999	311,503	49,677	43,959	32,666	34,096	460,598	26,750
Small	1998	4,808	2,797	1,095	5,012	495	14,117	-
	1999	5,220	1,752	1,965	1,437	640	11,014	160
Large	1998	1,370,981	288,288	141,018	505,757	214,961	2,507,681	156,270
	1999	1,389,552	247,038	122,229	519,378	147,395	2,472,043	232,633
Total	1998	1,555,733	319,996	153,388	543,528	234,269	2,793,500	156,270
	1999	1,706,275	298,467	168,153	553,481	182,131	2,943,655	415,813

*Total acres reported differed from the sum of acres reported by forest type because some landowners did not have the information available and had to make estimates. Hence, some columns do not equal the total acres reported.

chemical site preparation in 1998, but only one used it in 1999.

Despite controversy over site preparation burning (i.e. public opinion, environmental regulations), TIMOs and industrial landowners continue to use burning as a silvicultural tool. Thirteen respondents used it in 1998, while nine used it in 1999.

Table 2. Percent Change in Forest Types and Total Acres Owned/Managed for TIMOs and Industrial Landowners in Mississippi for 1998-1999.

Group	Planted Pine	Nat. Pine	Hwd. /Pine	Hwd.	Non-Typed	Tot.
	(Percent)*					
TIMO	73.1	71.8	289.9	- 0.3	81.2	69.5
Small	8.6	-37.4	79.5	-71.3	29.3	n/a
Large	1.4	-14.3	-13.3	2.7	-31.4	-1.4

*Some percentages do not add up due to rounding.

Fertilization was also used to enhance recently planted stands. Although only seven landowners reported using fertilization in 1998, it accounted for the largest proportion of acres treated for stand establishment (38 percent). However, in 1999, acres fertilized (regeneration) decreased substantially.

In aggregate, intermediate treatments were the most common silvicultural activities. The most common intermediate treatments were prescribed fire, chemical release, and fertilization. Small industrial landowners reported no intermediate treatments during 1998-1999. However, intermediate treatments accounted for 37 percent of the area treated in 1998 and 56 percent in 1999.

Total area treated was 482,000 acres in 1998 (table 3). All groups treated fewer acres in 1999 (369,000 acres) than 1998, despite the slight increase in total acreage owned/managed. Three landowners did not provide estimates of area treated, only the total cost of treatments for certain activities. Estimates for area treated by these landowners were derived by dividing the total cost reported for that activity by the survey average for that activity.

In 1998, TIMOs accounted for 18 percent of the acreage treated, large industrial landowners 81 percent, and small industrial landowners less than one percent. Fertilization of regeneration comprised the greatest number of acres treated in 1998. In 1999, fertilization accounted for a large portion of the acres treated again; however, respondents fertilized their existing timberland more than recently planted timberland. Respondents treated slightly fewer acres with mechanical site preparation in 1999. No major change in the number of acres treated with chemical site preparation occurred. The number of acres treated with fertilization (regeneration) decreased substantially.

Regeneration information

Regeneration information illustrated the species, density, and methods companies used to regenerate their timberland. Nearly 109,000 acres were regenerated in 1998, with approximately 57 percent of that total planted (table 4). Loblolly pine (*Pinus taeda*) was by far the most commonly planted species. Other species included slash pine (*Pinus elliotti*), longleaf pine (*Pinus palustris*), shortleaf pine (*Pinus echinata*), water oak (*Quercus nigra*), Shumard oak (*Quercus shumardii*), willow oak (*Quercus phellos*), Nuttall oak (*Quercus nuttallii*), cherrybark oak (*Quercus pagoda*) and green ash (*Fraxinus pennsylvanica*). Oak species are aggregated in table 4. Loblolly pine accounted for more than 94 percent of total planted acres in 1998. On average, landowners planted 646 trees per acre, equivalent to an 8 x 8 spacing. Natural regeneration was preferred by small industrial landowners. Small industrial landowners naturally regenerated 67 percent of the area they regenerated, large industrial landowners six percent, and TIMOs less than one percent. Respondents reported regenerating 39,000 fewer acres in 1999 than 1998 – a 57 percent decrease (table 4). Loblolly pine continued to be the dominant species planted, comprising 93 percent of the total acres regenerated. Average planting density decreased to 635 trees per acre in 1999.

Table 3. Acres Treated as Reported by TIMOs and Industrial Landowners in Mississippi for 1998-1999.

Silvicultural Activity	TIMOs				Small				Large			
	1998		1999		1998		1999		1998		1999	
	n	Acres	n	Acres	n	Acres	n	Acres	n	Acres	n	Acres
Mechanical site prep.												
Chopping	1	611	1	200	-	-	1	200	4	893	2	1,236
Ripping	1	200	1	400	-	-	-	-	4	10,976	3	10,713
Bedding	5	3,907	3	1,598	-	-	-	-	4	8,422	4	8,272
Disking	1	250	-	-	-	-	-	-	1	3,218	1	n/a
Shear/pile (windrow)	1	200	4	2,738	2	27	-	-	5	8,285	4	8,932
Shear and rake	3	1,962	1	1,600	-	-	-	-	-	-	-	-
Subsoil	1	60	2	348	-	-	-	-	3	4,810	1	680
Other	-	-	4	4,132	-	-	-	-	3	5,841	6	10,628
Total	13	7,190	16	11,016	2	27	1	200	24	42,445	21	40,461
Chemical site prep.												
Aerial	3	6,351	4	7,470	4	597	-	-	6	70,697	4	46,301
Ground	1	77	-	-	-	-	1	200	1	220	2	3,025
Injection	1	10	-	-	-	-	-	-	-	-	-	-
Total	5	6,438	4	7,470	4	597	1	200	7	70,917	6	49,326
Site prep. burning												
Aerial	-	-	2	809	1	200	-	-	1	n/a	2	6,578
Ground	4	3,783	2	4,410	2	83	-	-	6	55,217	3	19,964
Total	4	3,783	4	5,219	3	283	-	-	7	55,217	5	26,542
Fertilization												
Regeneration	2	23,214	4	7,443	1	20	-	-	4	91,563	2	15,719
Intermediate treatments												
Prescribed burn	3	6,145	1	1,000	-	-	-	-	5	4,187	3	2,803
Fertilization	1	28,157	4	32,102	-	-	-	-	2	56,814	4	74,733
Prune	-	-	1	230	-	-	-	-	1	10,700	2	23,859
Chemical release	3	10,458	2	1,621	-	-	-	-	4	53,326	5	50,134
Pre-commercial thin.	1	164	-	-	-	-	-	-	2	4,569	2	8,795
Timber stand improve.	-	-	-	-	-	-	-	-	2	5,987	3	10,095
Total	8	44,924	8	34,953	-	-	-	-	16	135,583	19	170,419
Total treated		85,549		66,101		927		400		395,725		302,467

Table 4. Regeneration Information for TIMOs and Industrial Landowners in Mississippi for 1998-1999.

Planting	1998		1999	
	Acres	TPA	Acres	TPA
loblolly	95,435	646	64,860	635
shortleaf	50	691	-	n/a
slash	200	600	200	600
longleaf	-	n/a	306	605
loblolly/slash*	3,168	605	-	n/a
oak	2,469	316	1,058	275
ash	23	302	-	n/a
Natural regen.				
pine	674	n/a	1,897	n/a
hardwood	5,867	n/a	1,102	n/a
pine/hardwood	427	n/a	-	n/a
Total regen.	108,313		69,423	

*One respondent reported planting a combination of both.

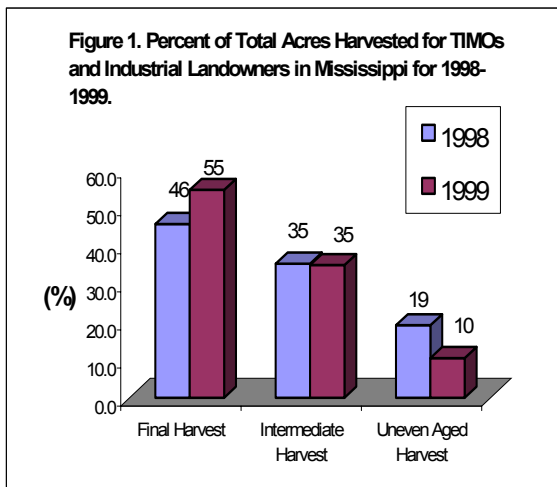
Harvest information

TIMOs and industrial landowners cut approximately 148,000 acres in 1998, or roughly five percent of their total landholdings (table 5). Clear-cuts were the most common method, accounting for nearly 45 percent of the area harvested (figure 1). Intermediate harvests by row thinning were next (26 percent) followed by group selection, uneven age harvests (16 percent). TIMOs clear-cut approximately 85 percent of their area harvested. Large industrial landowners clear-cut only 43 percent of their harvested area. Small industrial landowners, with a greater percentage of hardwoods, harvested 48 percent (1,551 acres) using uneven-aged, single tree

selection. Respondents harvested 52 percent more in 1999 than in 1998. Clear-cuts were the preferred method again. Uneven-aged harvests were used less in 1999, accounting for a total of 11 percent in 1999, versus 19 percent in 1998. Respondents harvested five percent of their land-base in 1998, and nearly eight percent in 1999.

Table 5. Acres Harvested by TIMOs and Industrial Landowners in Mississippi for 1998-1999.

Method	1998		1999	
	n	Acres	n	Acres
Final				
Clear-cut	14	66,133	10	121,090
Shelterwood	2	1,140	1	1,200
Seed tree	1	160	1	400
Intermediate				
1 st thin-row	1	38,781	5	50,944
1 st thin-marked	2	200	-	-
1 st thin-operator	6	5,783	5	16,150
2 nd thin-marked	2	2,735	2	989
2 nd thin-operator	3	4,556	5	10,220
Uneven aged				
Group selection	2	23,373	3	19,662
Single tree selection	4	4,722	1	3,752
Total acres	16	147,583	33	224,407



DISCUSSION AND CONCLUSIONS

TIMOs and industrial landowners used a wide-array of silvicultural activities to enhance the value and health of their stands. Most activities were associated with stand establishment. TIMOs used mechanical site preparation the most for site preparation, whereas, industrial landowners used chemical site preparation the most. Both also used burning to prepare sites for regeneration. To increase the productivity of their recently planted stands, TIMOs and industrial landowners applied fertilizers with aerial application. Fertilization of regeneration was used more in 1998 than the following year. In 1999, fewer recently planted acres were fertilized, but older stands were fertilized more (intermediate treatments).

Intermediate treatments were the most common silvicultural activities for 1998-1999. Chemical release, fertilization of existing stands, and prescribed burning were all used to improve residual stock.

TIMOs and industrial landowners used clear-cuts the most for harvesting, followed by first thinnings (row). Planting loblolly pine was the most common method of regeneration. All of these results are consistent with the trend toward intensive pine plantation management.

As foresters continue to need better information to make sound decisions, information provided from a survey such as this could prove useful. Additional studies incorporating regional estimates of forest management activities of several landowner groups could provide additional information, which could then be used to make better decisions on intensive management practices. Results from this study indicate that TIMOs and large industrial landowners are willing to disclose the necessary information. Hence, this method of collecting information should be given due consideration.

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