Trends Among Family Forest Owners in Alabama, 1994–2004

Yi Pan, Yaoqi Zhang, and Brett J. Butler

ABSTRACT

There are an estimated 432,000 family forest owners in Alabama and they control 67% of the State's forestland. About two-thirds owned less than 10 ac. and about 88% of the family forest owners have holdings of less than 50 ac; collectively, this group of owners with 1–49 ac of forestland own 15% of Alabama's family forestland. The corollary to this finding is that a majority (85%) of the state's family forestland is owned by the minority (12%) of owners who own 50 ac or more. Between 1994 and 2004, the amount of forestland owned by family forest owners with small (less than 10 ac) and large (more than 500 ac) forest holdings increased, while the total area of forestland owned by people with intermediate-size holdings, in general, decreased. Compared with 10 years ago, the number of family forest owners 45–54 years old is higher but they tend to own smaller parcels of forestland. During the same period, the number of owners 65 years or older decreased, but, on average, the size of their holdings increased. Recreation and investments have become more important objectives of ownership, whereas timber production as a primary ownership objective decreases. The probability of an owner having harvested trees, having a management plan, or having sought forest management advice increased as the size of the forest holding increased.

Keywords: nonindustrial private forest, forest management, harvesting, parcelization, National Woodland Owner Survey

"Family forests" is a term introduced by European forest owner associations in the mid-1990s. Often, it is used synonymously for terms such as "nonindustrial private forests" (NIPF) and "private woodlots." There are three characteristics that distinguish family forest ownerships from other types of forest ownerships: (1) ownership is private, not public; (2) forest area tends to be relatively small and forest management techniques are often "small scale"; and (3) the owner does not have a timber processing facility (Demarsh et al. 2004).

Family forest owners have diverse backgrounds and experiences. They not only have various motivations for owning their forestland but they also have a wide range of management goals. To fully understand the forests and the forces that affect them, we need to understand the families and individuals who own them. Knowing the current and historical characteristics of family forest owners provides valuable information for policy makers, foresters, and all individuals and groups interested in understanding and interacting with family forest owners.

Family forests and family forest owners are continually changing. The number of family forest owners in the contiguous United States increased from 9.3 million in 1993 to 10.3 million in 2003, and these owners now control 42% of the nation's forestland (Butler and Leatherberry 2004). At the national level, family forest owners, on average, were found to be well educated, older people who owned less than 50 ac of forestland with enjoyment of the forest's beauty/scenery as a primary ownership objective. Nationally, the average holding size tends to be smaller in the North (about 20 ac) than in the South (about 30 ac) (Butler and Leatherberry 2004). Regarding the motivation for owning the land, aesthetic enjoyment is cited more frequently in the North and West than in the South. Forty-one percent of the family forestland in the South is owned by people who indicated that timber production is an important ownership objective, compared with 22 and 18% in the North and West, respectively (Butler and Leatherberry 2004).

The national summary of family forest owners provided by Butler and Leatherberry (2004) may differ significantly from state-level trends. In this study we examined the family forest owners of Alabama, the fifth most forested state in the United States (Smith et al. 2004). Alabama has 23 million ac of forestland, accounting for 71% of the total land area. The vast majority (94%) of the forestland is privately owned, and family owners control 71% of the private forestland (Table 1).

Somberg (1971) is among the earliest investigators to characterize the NIPF owners in Alabama. In his study, NIPF owners who held at least 20 ac of forestland and did not own a mill were investigated. The "average" NIPF owner in Alabama was a white man who owned 717 ac of land of which 437 ac was forested. The typical or average owner was 58 years of age and was a farmer with a high school education. Typically, he was raised on a farm, lived on his property, and most likely had purchased most of it. The average land tenure was 24 years.

In 1992, the Alabama Agricultural Experiment Station conducted a survey of more than 700 forest owners in the state (Bliss 1993). This study was designed to assess forest management objectives. They found that among NIPF owners in Alabama, approximately 40% were 65 years or older and only about 2% were less than 35 years old. Forty percent of NIPF owners had completed at least 16 years of formal education. About 25% of the respondents cited

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Table 1. Forestland area in Alabama by ownership type, 1994 and 2004 (1,000 ac).

Year	All ownerships	Public				Private		
		Total[a]	Federal[a]	State[a]	Local[a]	Total[a]	Family	Business[b]
1994	21,911	1,130	823	212	95	20,781	12,005	9,712
2004	22,987	1,291	928	241	122	21,696	15,343	6,353
Change	1,076	161	105	29	27	915	3,338	−3,359
Percent	4.91%	14.25%	12.76%	13.68%	28.42%	4.40%	27.81%	−27.61%

[a] Source: Smith et al. (2004).
[b] Including corporations, nonfamily partnerships, tribal lands, nongovernmental organizations, clubs, and other nonfamily groups.

income from timber sales as the primary benefit of ownership; an additional 14% said the primary benefit they received was "beauty or land appreciation."

Somberg (1971) and Bliss (1993), as well as some other studies (e.g., Sisock [1998]), provide useful historical information about NIPF owners in Alabama. Unfortunately, the results cannot be compared easily because survey methodologies, definitions, and reporting standards varied.

In addition to research objectives similar to previous investigations, we wanted to investigate how the family forest owners of Alabama have changed over the past 10 years in terms of ownership objectives, demographics, and management activities. In particular, we wanted to examine the correlations between size of forest holdings and these characteristics. These issues are important not only for forecasting future supplies of timber and environmental services, but also in designing programs to better assist family owners in meeting their objectives.

Data and Methods

Data for this study were collected in 1994 and 2002–2004 as part of the National Woodland Owner Surveys (NWOS) conducted by the USDA Forest Service's Forest Inventory and Analysis program (Birch 1996, Butler et al. 2005). The NWOS is the nation's census of forest owners. On a recurring basis, it contacts a random set of forest owners from across the United States to ascertain information about their forestland, ownership objectives, forest use, forest management practices, sources of information, concerns and issues, and demographics.

At a random set of sample points across the United States, the NWOS uses remotely sensed imagery to determine if sample points are forested. For the forested points, ownership information is collected from tax offices or other public sources. This information is used to contact the forest owners using a mixed-method survey; a self-administered mail survey is the primary data collection method and telephone interviews are used to increase response rates. Detailed information on data collection and processing procedures are described in Butler et al. (2005).

In Alabama, 329 family forest owners responded to the NWOS in the 1994 survey and 262 responded between 2002 and 2004 (response rates of 59 and 56%, respectively). The NWOS covers all private landowners, but results pertaining to corporations, partnerships, tribes, and other nonfamily organizations were excluded so that trends in family forests could be highlighted. Regarding this ownership type in 1994, the term "individual" used by Birch (1996) is synonymous with the term "family and individual" in the 2004 data.

In addition to basic statistical descriptors, an analysis of variance (ANOVA) was conducted to investigate the characteristics of family forest owners with different holding sizes. ANOVA is a method for comparing the statistical difference among multiple categories based on sample means and variances (Moore and McCabe 2003).

Table 2. Area and number of family owned forests in Alabama by size of landholdings, 1994 and 2004.

Size of holdings (ac)	Area			Number		
	1994	2004	Percent change (1994–2004)	1994	2004	Percent change (1994–2004)
	Thousands (% of the total)			Thousands (% of the total)		
1–9	675	996	47.56%	308	284	−7.79%
	5.62%	6.49%		69.14%	65.74%	
10–49	1,953	1,342	−31.29%	92	95	3.49%
	16.27%	8.75%		20.61%	21.99%	
50–99	1243	1,347	8.37%	20	21	6.06%
	10.35%	8.78%		4.44%	4.86%	
100–499	4,985	4,802	−3.67%	23	26	15.56%
	41.52%	31.30%		5.05%	6.02%	
Subtotal (10–499)	8181	7491	−8.43%	134	142	5.89%
	68.15%	48.82%		30.10%	32.87%	
500–999	1,314	1,815	38.13%	2	3	42.86%
	10.95%	11.83%		0.47%	0.69%	
1000–4999	1,882	2,869	52.44%	1	2	66.67%
	15.68%	18.70%		0.27%	0.46%	
5000+	852	1,171	37.44%	<1	<1	
	7.10%	7.63%		(<0.1)	(<0.1)	
Subtotal (500+)	4,048	5,855	44.64%	26	31	20.16%
	33.72%	38.16%	160.54%	5.79%	7.18%	
Total	12,005	15,343	27.81%	446	432	-3.03%
	100	100		100	100	

Results and Discussion

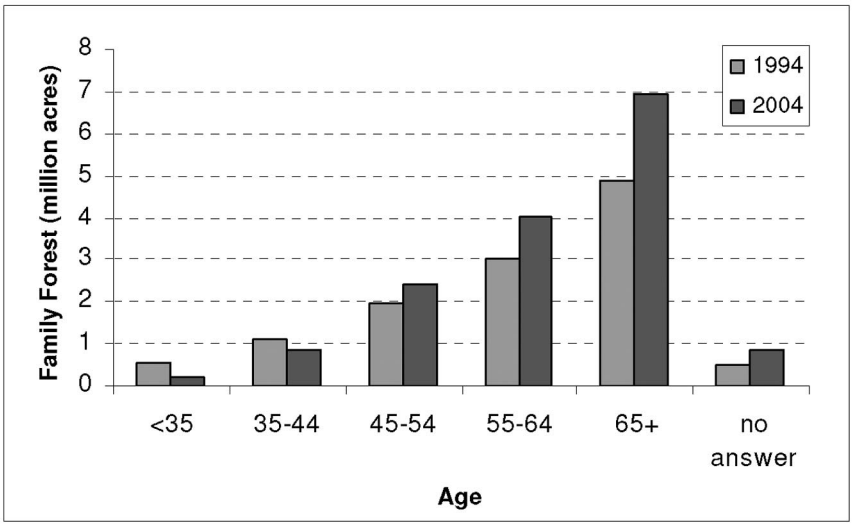
Holding Size

There were significant increases in the amount of forestland in the smallest and the larger categories of forest holdings and either decreases or moderate gains among the intermediate categories (Table 2). The estimates of number of owners were less precise because of the sampling design (Butler et al. 2005) and the observed differences between numbers of owners were, in general, not statistically significant.

The estimated forestland in holdings less than 10 ac was 675,000 ac in 1994 and increased to 996,000 ac in 2004 (Table 2). Although the proportion of total forestland in this category increased only marginally (5.6 to 6.5%), the total acres of forestland in this category increased by 48%. Substantial increases were observed also for all categories of 500 ac or more with percentage changes in excess of 35%. The largest forest area decrease was for the 10- 49-ac category.

Further collapsing the forest holdings into 1–9, 10–499, and 500+ ac categories, the pattern described by Zhang et al. (2005) was observed. The major arguments for this pattern (increases in small and large categories and decreases in intermediate categories) are related to the demands for nontimber amenities and the realities of timber production. Timber production–oriented forestland holdings are getting larger, often from merging smaller parcels, to take advantage of investment opportunities and to capitalize on economies of scale. For most family forest owners, the importance of environmental services, ranging from aesthetics to hunting, are relatively important; therefore, the amount of forestland dedicated to the production of environmental services is increasing as population pressures change and continue to increase. Therefore, the share of midsized holdings that is neither economic for timber production nor efficient for nontimber production is decreasing.

Is this evidence of parcelization and consolidation? Unfortunately, the NWOS data set does not include remeasurement of the same points over time, so these trends are difficult to fully quantify. A lack of information on the amount of family forestland being



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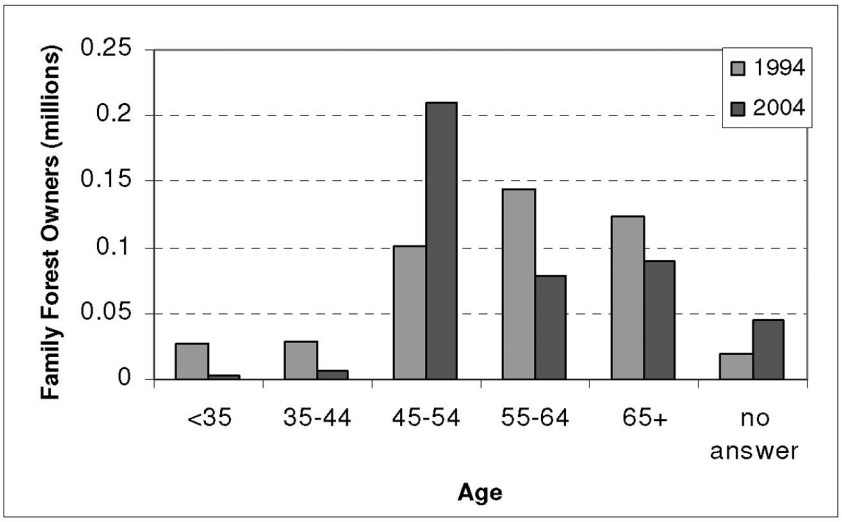

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Figure 1. (A) Number of family forest owners and (B) area of family forestland by age of owners (Alabama, 1994 and 2004). (1994 Data source: Birch 1996.)

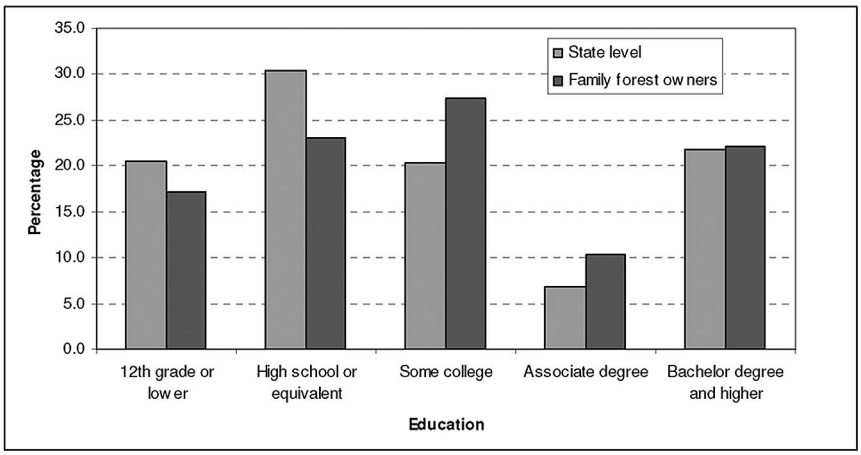


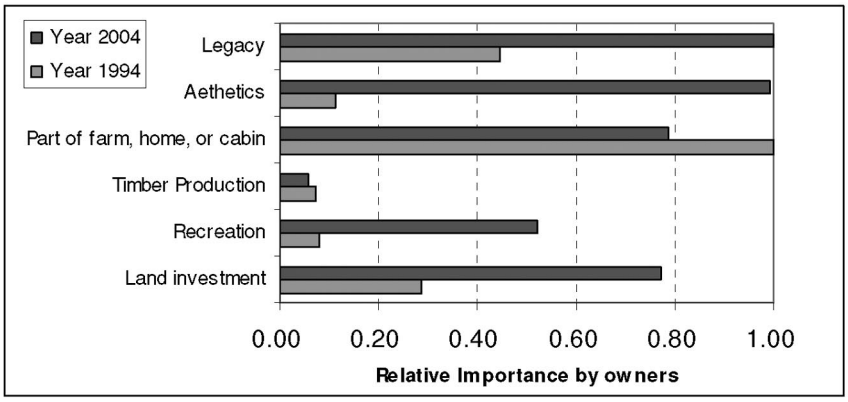
Figure 2. Level of educational attainment for the general population and family forest owners of Alabama, 2004. (Source for general population statistics: 2004 American Community Survey from US Census Bureau 2004.)

gained (e.g., being acquired from forest industry or financial investment organization) and being lost (e.g., converted to nonforest uses) further confounds this issue.

Demographics

Alabama's family forest owners are, on average, younger than they were 10 years ago (Figure 1). In contrast to the 60-year average age of family forest owners at the national level (Butler and Leatherberry 2004), the average age of Alabama's family forest owners was 48 years. The number of owners older than 65 years decreased between 1994 and 2004, but their total forest holdings increased from 4.9 to 6.9 million ac. Thus, the average holding size for individuals 65 years old or over increased considerably during the last 10 years. In 2004, individuals 65 years and older owned more than 45% of Alabama's family forests. At the other age extreme, individuals under 35 years old owned less than 0.2 million ac in 2004 (1.4% of the forestland).

The number of family forest owners between 45 and 54 years old increased from 100,000 to 210,000 between 1994 and 2004 and the



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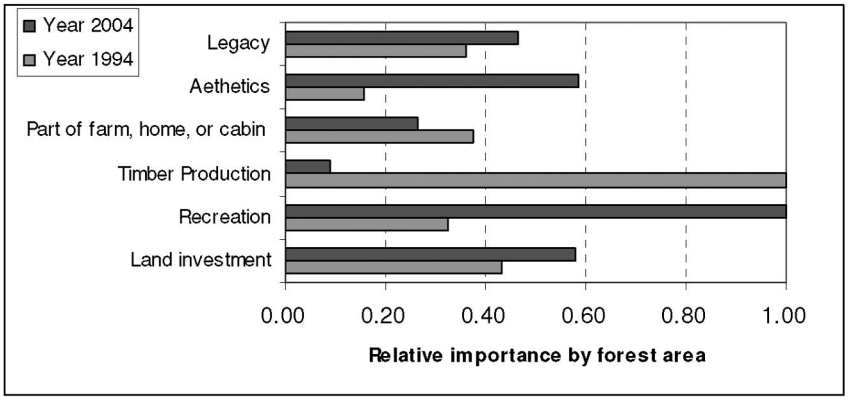

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Figure 3. (A) Number of family forest owners and (B) area of family forestland by ownership objectives (Alabama, 1994 and 2004).

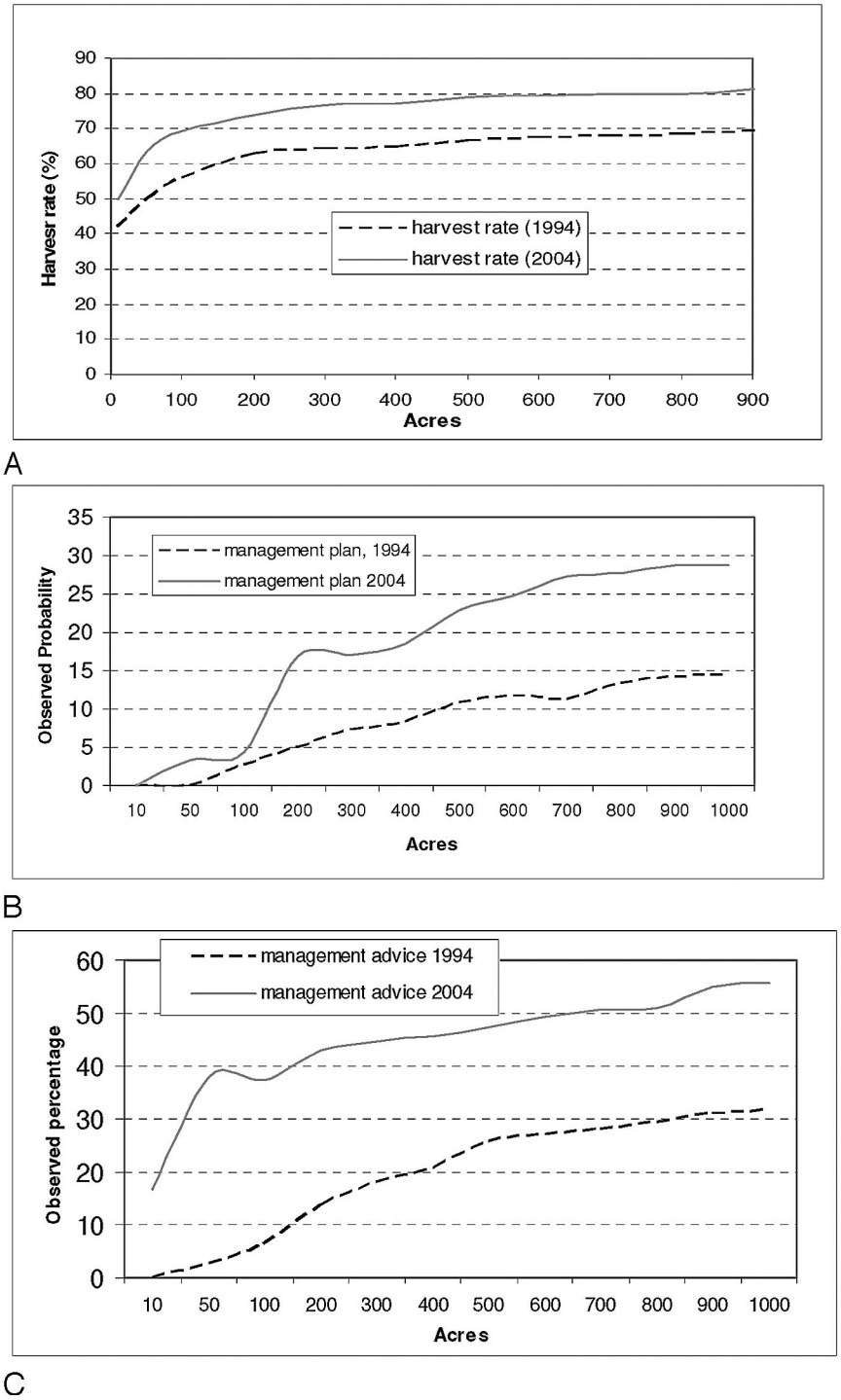

Figure 4. Percentage of family forestland in Alabama owned by people who have (A) harvested timber, (B) a written management plan, and (C) received management advice by size of forest holdings (1994 and 2004).

total area they control increased by 20%. This indicates that people in this age group have, on average, smaller forest holdings now than they did 10 years ago. This may be related to the influx of demand, money, and, more generally, people, associated with the baby boomers.

A significant percentage of Alabama family forest owners are relatively well-educated people who received at least some college education (Figure 2). This differs from the state's general population where approximately 51% of the individuals have only a high school or lower degree (US Census Bureau 2004) compared with 40% for family forest owners in Alabama.

Objectives for Owning Forestland

In both the 1994 and the 2004 surveys, respondents were asked about the importance of reasons for owning forestland, but different methods were used. In 1994, forest owners were asked to rank

Table 3. ANOVA results for size of forest holdings with age, land tenure, and harvests for family forest owners in Alabama, 1994 and 2004.

		Holding sizes				
		1–10 ac	10–200 ac	>200 ac	*F*-test	*P* Value
1994 Data						
Age (yr)	*n*	22	143	150		
	Means	48.4	53.3	55.4	4.47	0.0122
	(SD)	(15.54)	(12.99)	(12.87)		
Land tenure (yr)	*n*	19	140	149		
	Means	18.47	22.47	31.75	15.9	<0.0001
	(SD)	(4.14)	(4.97)	(7.59)		
Harvest[a]	*n*	23.00	150.00	156.00	26.01	
	Means	0.35	0.67	0.90		<0.0001
	(SD)	(0.49)	(0.47)	(0.30)		
Motivation for timber production[b]	*n*	3.00	68.00	120.00	22.51	
	Means	4.67	3.01	1.62		<0.0001
	(SD)	(1.53)	(2.10)	(1.06)		
2004 Data						
Age (yr)	*n*	10	83	111		
	Means	56	63.73	64.68	2.23	0.1105
	(SD)	(9.66)	(11.45)	(13.4)		
Land tenure (yr)	*n*	9	66	91		
	Means	28.89	27.64	38.56	6.15	0.0027
	SD	(7.46)	(4.95)	(13.65)		
Harvest[a]	*n*	19.00	105.00	135.00		
	Means	0.53	0.78	0.97	21.27	<0.0001
	SD	(0.51)	(0.42)	(0.17)		
Motivation for timber production[b]	*n*	18.00	96.00	128.00		
	Means	6.22	3.56	1.97	44.69	<0.0001
	SD	(1.48)	(2.37)	(1.7)		

[a] Harvest in 1994 and 2004 are dummy variables within which 1 stands for yes and 0 stands for no.
[b] Motivation for timber production in 1994 was ranked among other nine motivations and in 2004, this variable was rated as numbers from 1 to 7 in which 1 stands for most important and 7 stands for least important.

ownership objectives while in 2004, they were asked to rate objective using a Likert scale. Hence, we can compare only the relative importance of the objectives. Relative importance values (RIV) were calculated separately for area of family forestland and the number of family forest owners. For the 1994 data, important was defined as a *ranking* of 1 or 2; for the 2004 data, it was defined as a *rating* of 1 or 2. The objective with the maximum value within each of the four data subsets was identified and the values for all objectives within the subset were divided by this maximum value. Thus, the RIV for the most important objective within the data set was set to one and all other objectives were set to values between zero and one.

The RIV for part of a farm, home, or cabin decreased from 1 in 1994 to 0.79 in 2004 (Figure 3). This number for legacy increased from 0.45 to 1. Within the last 10 years, aesthetics increased by 0.88, which implies people are more concerned about environmental value. The relative importance of timber production dropped from 1 to 0.09. This change shows more emphasis has been put on nontimber benefits. For instance, Birch (1996) suggested that aesthetic enjoyment was the most popular benefit expected in the upcoming 10 years.

Forest Management Decisions

Although the different ownership objectives indicated the primary reasons for family forest owners owning forestland, it also is important to know about forest owners' management decisions. We examined the changes in harvesting behavior, written management plans, and management advice as indicators of forest management activities.

Harvesting activity was more common in 2004 than in 1994, even though fewer family forest owners' primary ownership objectives included timber production. In 1994, 76% of the family forests in Alabama were owned by people who had harvested trees in the 5 years before the survey; this number increased to 86% in 2004. Similarly, the percentage of forestland owned by people who had written management plans and had sought forest management advice increased (12 and 9%, respectively).

The probabilities of harvesting, having a written management plan, and having sought management advice were positively correlated with the size of forest holdings (Figure 4). This suggests that owners put more effort into managing their forestland when they hold larger parcels possibly because of increased incentives, increased opportunities, or both. The overall management level increased significantly over the last 10 years. This may be related to stronger timber markets, improved outreach from the forestry community, or other reasons. If these findings can be generalized to other states, then our concerns about family forests in supplying timber can be relaxed to some extent.

Forest Owner Characteristics and Size of Forest Holdings

To investigate relationships between landowner characteristics and size of forest holdings, we conducted an ANOVA. We divided respondents into three groups: owners who hold less than 10 ac of forestland, owners whose holdings are from 10 to 200 ac, and owners with 200 ac or more of forestland. Although there is some evidence that the age of owners is positively correlated with size of holdings, the statistical differences were not significant (Table 3).

The ANOVA indicated that, in general, the length of land tenure increased as a function of size of forest holdings. The land tenure was substantially longer for owners with holdings of 200 ac or more. Land tenure was, on average, longer in 2004 than in 1994.

In addition, the ANOVA indicated that forest owners with larger forest holdings were more likely to harvest trees. The overall probability of harvesting increased, while the probability of having timber production as an ownership objective decreased. This might indicate a difference between the real activities and their statement of motivation. From a historical perspective, both timber and nontimber value from land have been increasing but at different rates.

Conclusions

Like other states and at the national level (Butler and Leatherberry 2004), the most common reasons for owning family forestland in Alabama are related to aesthetics, land investment, and family legacy. These nontimber objectives are increasing in importance in Alabama (Figure 3). The importance of timber production decreased, while forestry activities (e.g., harvesting and management plans) increased. Individuals still are very willing to harvest trees and practice forestry, but this is no longer their primary objective. They will respond to market signals and other incentives, but their responses and required incentives may be different from before.

Forestland ownership is traditionally classified into industrial forests versus nonindustrial forests, public-owned versus private-owned, and family entities versus incorporated entities. An alternative classification for forest management may be based on size of forest holdings (Larson 2004). Indeed, we can gain more insight by examining the changes in holding size and different behavior by size class. Our results confirm that holding size has a strong correlation with forest management activities. Therefore, to examine the dynamics of holding sizes and different behaviors of owners holding various sizes is important for future study. Relying on averages across holding size categories may prove misleading.

Analyzing the structural change by holding size also will enable us to quantify trends in forest parcelization and consolidation. Even though parcelization was reported as a nationwide trend, our results can not confirm or refute if this trend is occurring in Alabama. To rigorously investigate such dynamics, we need more information about transfers among ownership groups and losses of forestland to nonforest uses.

The NWOS conducted by the Forest Service's Forest Inventory and Analysis provides useful and consistent information that can be used to trace changes of family forest owners. We need to continue the efforts to track the family forestland owners and how they manage their land and what kind of policies are the most efficient for helping them meet their goals and the goals of society.

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