

# Assistance Foresters and Nonindustrial Private Forest Management in Alabama

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ABSTRACT

A mail survey was conducted on nonindustrial private forest (NIPF) landowners' usage and assessment of services provided by assistance foresters in Alabama from 2000 to 2009. Overall, assistance foresters participated in 67% of all forest management activities. Consulting foresters provided nearly half (48%) of all the assistance. Industry foresters accounted for 17% of that assistance, in comparison with 22% in the 1990s. Public foresters provided most assistance services to landowners with low income and small acreage. The involvement of assistance foresters in management activities was correlated with landowner demographics and land characteristics, and the perception of assistance foresters was largely positive.

**Keywords:** NIPF, technical assistance, consulting forester, public forester, forest management

Nonindustrial private forest (NIPF) landowners have been a major contributor to timber supply and environmental amenities in the United States (Wear and Greis 2002). As many NIPF landowners lack expertise in forest management and timber marketing, they turn to professional foresters for assistance. Assistance foresters include three groups: public foresters who work for county, state, or national agencies and whose services are often provided without charge; consulting foresters who run their own forestry consulting business and who charge a fee for services; and industry foresters who work for forest industry firms and who provide services to NIPF landowners on behalf of these firms (Zhang et al. 1998).

Several studies provide description and analysis of the influence of assistance foresters in forest management activities. The profiles, clientele, and achievements of assistance foresters are documented in Cabbage and Hodges (1986), Field (1986), Hodges and Cabbage (1990), and Zhang et al. (1998). Munn and Rucker (1994) estimate that, on average, increased sale prices received by NIPF landowners roughly equal the fees that consultants have charged for their services. Zhang and Mehmood (2001) find that NIPF landowners' choices of a forester for timber harvesting and tree-planting assistance are related to their income, size of ownership, and species composition of their forests.

Because timberland ownership and the composition of assistance foresters have changed in Alabama and other southern states since the mid-1990s (Zhang et al. 2012), the influence of assistance foresters in NIPF management may have evolved. Forest industry firms have largely sold their timberland. Between 1997 and 2002, industrial timberland in Alabama has declined from 22 to 16% while NIPF increased from 73 to 79%, representing a net increase of 2,000,000 acres. Consequently, the number of industrial foresters has declined. Similarly, due to government budget constraints, the number of public foresters has stayed flat. Hence, consulting fore-

sters may have picked up the slack and helped more NIPF landowners manage their forestlands.

The purpose of this study is to assess the role and coverage of assistance foresters in NIPF management in Alabama. Further, by comparing the results of this study to a similar study conducted in the 1990s, we reveal the varied influence of forest assistance before and during the course of industrial timberland ownership changes. Finally, we try to explain the difference in the levels of involvement of assistance foresters in forest management activities in Alabama. Our results show that assistance foresters participated in two-thirds of all forest management activities and that consulting foresters provided nearly half of all assistance. This study is relevant to efforts that promote the involvement of assistance foresters in the resource management activities and improve forest practices in the state and elsewhere where the number of industrial foresters has declined and where NIPF management faces similar challenges.

## Methods

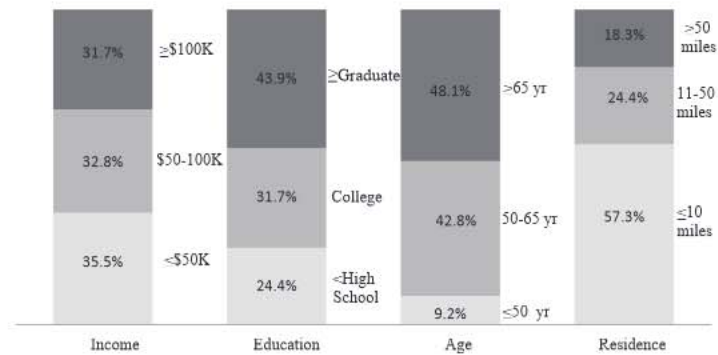
A mail survey was conducted of 652 randomly selected Alabama NIPF landowners in May and June of 2010 to collect services of assistance foresters in forest management in a 10-year period from 2000 to 2009. The mail survey was designed according to the total design method (Dillman 1978). The questionnaire covered all major forest management practices, the involvement of assistance foresters, landowner characteristics, and forest characteristics. Our motivations for choosing these questions are straightforward: the first two groups of questions are the subjects of this study, and the latter two influence the NIPF management choices (e.g., Zhang and Flick 2001), management intensity (e.g., Alig et al. 1990, Royer and Moulton 1987), and the involvement of assistance foresters (e.g., Zhang and Mehmood 2001). For example, all else being equal, a landowner with pine forests would be more active in managing his forests than a landowner with hardwood forests (Zhang and Mehmood 2001).

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**Figure 1. Demographics of NIPF landowners responding to survey questionnaire with respect to the role of assistance forests in forest management in Alabama (N = 262).**

The survey sample was selected in two steps. First, 19 out of 67 counties were randomly selected from six forest regions in Alabama, representing a range of physiographic and forest conditions of the state as described in Hartsell and Brown (2002). These regions are north (represented by Jackson, Lauderdale, and Marshall County), north-central (Blount, Calhoun, Cullman, Etowah, and Jefferson), west-central (Greene, Pickens, and Tuscaloosa), southeast (Butler, Chilton, Houston, and Lee), southwest-north (Choctaw and Conecuh), and southwest-south survey region (Baldwin and Escambia). Second, all forest landowners in these 19 counties were obtained based on property tax records. After excluding forest and nonforest companies and partnerships and NIPF landowners with less than 25 acres of forestland, we had a list of 22,567 landowners. Thus, our survey sample represented 1 out of every 34 NIPF landowners. In addition, a follow-up telephone survey of 49 (about 1 out of 5) randomly selected nonrespondents was conducted by the Survey Research Lab at the Auburn University Center of Government Services in November 2010. The nonrespondent survey covered land and landowner characteristics and was used to check if a nonrespondent bias existed in the mail survey.

The mail survey questionnaire began with asking if a landowner had done a forest management activity in the last 10 years and if an assistance forester had been involved. It proceeded with choice of which one of the three groups of foresters was used and the perception about the service. This process repeated itself until all major forest management activities were covered. The questionnaire then had a few questions about distribution of services and public foresters. Finally, information on landowner and forest characteristics was collected.

Survey results were summarized and analyzed using the SAS (SAS Institute 2008). Specifically, relative frequencies, and in some cases means, were calculated to summarize the survey results. Moreover, Fisher's exact test and analysis of variance (ANOVA) were conducted to analyze the reasons behind the selection of each type of assistance forester. Fisher's exact test was used to examine if there was a relationship between two categorical variables regardless of how small the expected frequency was. ANOVA was used to test for differences in the means of the selection of assistance foresters influenced by landowner characteristics and forest characteristics in this study.

## Results

Of the 652 landowners contacted by mail, 49 were unreachable (their survey questionnaires were returned unopened), 11 were de-

ceased, and 17 had sold their forestland. This brings the study sample to 575, among which 21 refused to participate. In total, 262 NIPF landowners completed the survey for a response rate of 46%. The overall margin of error representing the amount of random sampling error in the survey's results was 3.8% with a 95% confidence interval, indicating that the 262 respondents accurately represented the 652 landowners randomly selected from the 22,567 Alabama NIPF landowners.

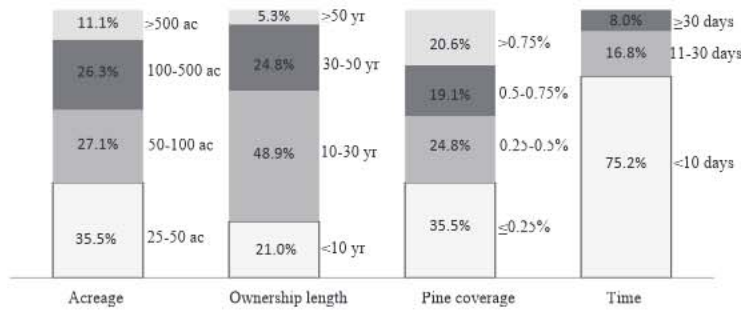
### Landowners' Characteristics

Figure 1 depicts the summary statistics on demographics of the responding landowners. Their household income was equally distributed among three categories: less than or equal to \$50,000, between \$50,000 and \$100,000, and more than \$100,000, and three-quarters of these respondents had college degrees. Age-wise, less than 10% of the landowners were 50 years old or younger and nearly half of them were older than 65 years. More than one-half (57%) of the landowners resided on the forestland or within 10 miles from their nearest forest tract, 24% resided far away (11–50 miles from the tract), and the rest resided 50 miles or farther away. Finally, 16% of the respondents had formal or informal training in forestry, including going to forest landowner meetings or attending forestry continuing education programs, and roughly the same number of landowners belonged to a forestry association.

Figure 2 shows respondents' land and ownership characteristics. Some 36% of the respondents owned between 25 and 50 acres, 27% owned between 50 and 100 acres, 26% owned between 100 and 500 acres, and 11% owned more than 500 acres. The overall coverage of pine forest (versus hardwood) in forestland was less than a quarter for 36% of the responding landowners, a quarter to one-half for 25% of the landowners, one-half to three-quarters for about 19%, and more than three-quarters for about 21%. This result is consistent with the fact that Alabama has more hardwood than softwood. The mean length of ownership was 25 years, and three-fourths of the respondents spent less than 10 days annually on forest management.

Statistical analysis shows that there was no statistically significant relationship with regard to the land characteristics between landowners who responded to the mail survey and landowners who did not. However, some landowners' demographics such as income and education were significantly different between respondents and nonrespondents (Fisher-exact test;  $P < 0.10$ ), meaning that landowners who had lower income and education were less likely to participate in our mail survey.





**Figure 2.** Characteristics of land and ownership in response to the survey of the role of assistance foresters in forest management in Alabama ( $N = 262$ ).

**Table 1.** Forest management activities conducted by NIPF landowners in Alabama and the involvement of assistance foresters: 2000–2009.

	Total no. of respondents	Engaged in practice	Assistance foresters provided services			
			No.	Public	Consulting	Industry
Timber harvesting	262	135	103	34.0	50.5	15.5
Timber marketing	262	124	83	27.7	53.0	19.3
Tree planting	262	83	60	36.7	45.0	18.3
Spraying	262	49	40	22.5	45.0	32.5
Burning	262	46	33	42.4	42.4	15.2
Management plan development	262	45	39	41.0	46.2	12.8
Wildlife habitat improvement	261	111	38	52.6	39.5	7.9
Weighted average (%)			66.8	35.1	47.5	17.4

### Forest Management Activities and the Involvement of Assistance Foresters

Major forest management activities that respondents had completed in the 10-year period are reported in Table 1. About 51% of the responding landowners conducted timber harvesting, 47% sold timber, and 32% planted trees on their lands. Less than 20% of the landowners did spraying, prescribed burning, or a forest management plan. About 42% of the respondents improved wildlife habitats on their lands. Additionally, 32% of the landowners reported that they did other kinds of forest management activities, such as site preparation, timber stand improvement, and establishing recreation facilities.

Of the 262 respondents, 10% conducted only one of the forest management activities and 58% (152 of the respondents) conducted more than one. The remaining 32% did not conduct any management activity in the survey period. Timber harvesting was statistically related to other forest management activities at the 1% significance level. For example, 92% of the respondents who reported 130 timber harvests also sold timber (the remaining landowners are those who cut timber around their houses and property boundary or cut timber for fuelwood, or cut insect-, disease- or storm-damaged timber), 52% of them planted trees, and 64% of them improved wildlife habitats.

Not surprisingly, landowner demographics and ownership characteristics are related to the probability of landowners' undertaking of forest management activities (Tables 2 and 3). The 179 respondents who conducted forest management activities were wealthier, had higher education, and owned larger acreage of forestland than the 83 who did not at the 1% level. For example, in the landowner group with an income of \$100,000, for every landowner who did not conduct any forest management activity, 4.2 landowners did. However, the ratio of landowners who did forest management to who did not was merely 1.3 in the landowner group with an income

**Table 2.** Landownership characteristics, forest management activities, and the use of assistance foresters in forest management activities: 2000–2009.

	Ratio of landowners who conducted forest management to those who did not <sup>a</sup>	Of those who conducted forest management, ratio of landowners who use assistance foresters to those who did not <sup>b</sup>
Income:		
# \$50,000	1.3	0.4
\$50,000–\$100,000	2.3	2.2
\$ \$100,000	4.2	1.4
Education:		
# High school	0.9	0.4
College	2.6	1.1
\$ College	3.3	1.8

<sup>a</sup> The relationship between landownership characteristics and the decision to conduct forest management is significant at the 1% level ( $F = 6.54$  for income;  $F = 8.35$  for education).

<sup>b</sup> The relationship between landownership characteristics and the decision to use assistance foresters is significant at the 1% level ( $F = 9.06$  for income;  $F = 5.86$  for education).

of less than or equal to \$50,000. Further, most of the former group of landowners had more pine forests.

Tables 2 and 3 also present the comparison between landowners who used assistance foresters and those who did not. Landowners who used assistance foresters tended to have a higher income, better education, larger acreage, and more pine coverage on their land than those who did not. Of the landowners who used assistance foresters, a majority (59%) had pine forest covering more than one-half of their forestland, 50% annually spent more than 10 days on forest management, and 45% were a member of forest organizations, while of the landowners who did not use any assistance forester, 33% on pine coverage, 18% on time spent (10 days or more), and 7% on membership, respectively.



**Table 3. Land characteristics, forest management activities, and the use of assistance foresters in forest management activities: 2000–2009.**

	Ratio of landowners who conducted forest management to those who did not <sup>a</sup>	Of those who conducted forest management, ratio of landowners who use assistance foresters to those who did not <sup>b</sup>
Land acreage:		
# 50 acres	1.1	0.3
50–100 acres	1.6	1.2
100–500 acres	5.9	1.5
\$ 500 acres	13.5	12.5
Pine coverage:		
# 25%	1.3	0.5
25–50%	1.8	1.0
50–75%	4.0	1.2
\$ 75%	4.4	3.9

<sup>a</sup> The relationship between land characteristics and the decision to conduct forest management is significant at the 1% level ( $F = 10.90$  for land acreage;  $F = 4.64$  for pine coverage).

<sup>b</sup> The relationship between land characteristics and the decision to use assistance foresters is significant at the 1% level ( $F = 13.68$  for land acreage;  $F = 7.49$  for pine coverage).

### The Role of Assistance Foresters

Table 1 also shows a summary of the role of assistance foresters in providing services on forest management activities to NIPF landowners. Of the landowners who engaged in the practices, 76% used assistance foresters in timber harvesting, 67% in timber marketing, 72% in tree planting, 82% in spraying, 72% in prescribed burning, 87% in preparing a forest management plan, and 34% in improving wildlife habitats. The rate of assistance forester participation in all forest management activities was 67%.

Of the activities in which assistance foresters were involved, consulting foresters were involved in about one-half (51–53%) of timber harvesting and marketing, 45% of tree planting and spraying, 42% of prescribed burning, and 46% of forest management plans. About 40% of the landowners employed consulting foresters to improve wildlife habitats while 53% of them used public foresters. Public foresters were ranked second in timber harvesting (34%), timber marketing (28%), tree planting (37%), and management plan development (41%), while tying consulting foresters in prescribed burning. More involvement of public foresters in prescribed burning was perhaps because forest landowners had to apply for permission from the state forestry agency, which might have referred public foresters to them. Further, unlike other services they provide, public foresters in Alabama do charge a fee for conducting prescribed burning, making them compete in monetary terms with consulting foresters. Industry foresters were ranked second in spraying (33%) and third in all other activities.

Among the three groups, consulting foresters provided the most services to NIPF landowners at 48% and public foresters were at 35%; industrial foresters were at 17%. For landowners who did not use assistance foresters, some reported that they had no knowledge of these services. Others said that they were aware of these services but had not felt the need to use these services.

### Distribution of Clientele

From policy and marketing perspectives, an interesting aspect of assistance forester involvement in NIPF management activities is how three groups of assistance foresters are distributed among landowners with different land acreage and income. The results show that, for those landowners who engaged in one or more practices,

income, education, residence, land acreage, pine coverage, and time spent on forest management were statistically related to their decisions on whether to use an assistance forester and their selections of what type of assistance foresters to use at the 10% level. Of the significant characteristics, size of land holding and household income influenced these two decisions for more forest management activities and at a higher significance level than other factors. For example, land acreage was significant on timber harvesting ( $P$ -value of one-way ANOVA = 0.001 and 0.008, respectively), timber marketing ( $P = 0.001$  and 0.005), tree planting ( $P = 0.002$  and 0.013), burning ( $P = 0.007$  and 0.005), management plan development ( $P = 0.017$  and 0.057), and wildlife habitat improvement ( $P = 0.001$  and 0.003). Income was significant on harvesting ( $P = 0.007$  and 0.014, respectively), timber marketing ( $P = 0.001$  and 0.006), and tree planting ( $P = 0.029$  and 0.016).

Figure 3 shows the relationship between size of forestland holding and use of assistance foresters in all management activities. Consulting foresters were the primary source of assistance for NIPF landowners in all but one category of holding size while public foresters were the primary source in one holding size and the secondary source in all others.

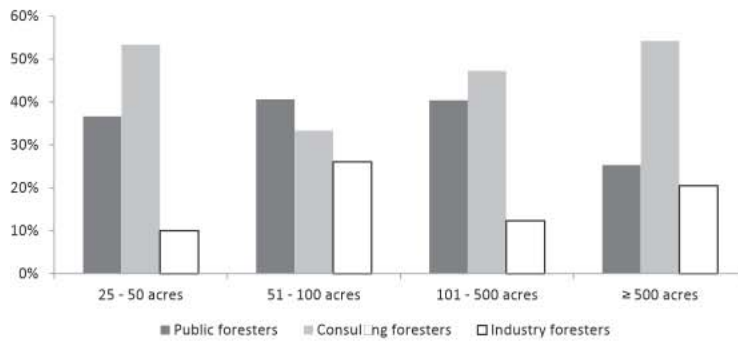
Figure 4 shows the relationship between household income and use of assistance foresters. Public foresters primarily served landowners with lower income (less than or equal to \$50,000) than consulting and industry foresters. Specifically, public, consulting, and industry foresters provided services to 42, 36, and 22% of the landowners in this group. Consulting foresters were the primary assistance foresters in forest management activities to NIPF landowners with higher income (from \$50,000 to \$100,000 and more than \$100,000), accounting for 45 and 54%, respectively. Public foresters provided services to 41 and 24% of the landowners and industry foresters provided services to 14 and 22%, respectively, in these two groups.

### Perceptions of and Request for Services

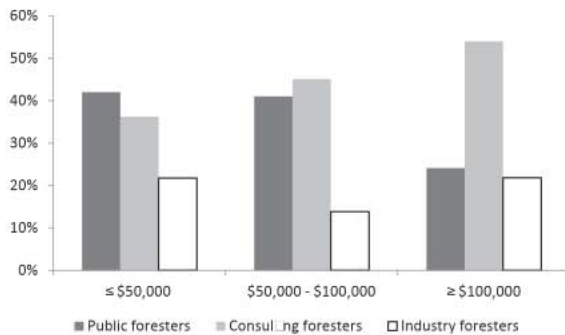
Figure 5 presents the results of respondents' assessment of the services they received from each group of foresters in all management activities. In general, the landowners had favorable impressions of all three groups. About 90% of the landowners were satisfied with the services provided by each group of assistance foresters in all forest management activities, rating them as "good" or "excellent." Further, there was a statistically significant relationship between the practices for which assistance foresters provided services and the levels of satisfaction ( $P = 0.075$ ), but there was no statistically significant relationship ( $P = 0.138$ ) between the type of assistance foresters and the levels of satisfaction.

When landowners were asked where and from whom they heard about the particular assistance forester they initially contacted, 43% of the landowners responded that they heard about the particular foresters from another landowner, 24% from a friend other than a landowner, and 12% from telephone directories, landowner conference, and advertisements in a magazine, newsletter, or newspaper. The rest (21%) heard the professional assistance from a forestry association, contacts with professionals in government incentive programs, and others in federal, state, and county forestry agencies. These results indicate that networking and reputation are important when NIPF landowners seek professional assistance in their forest management activities.

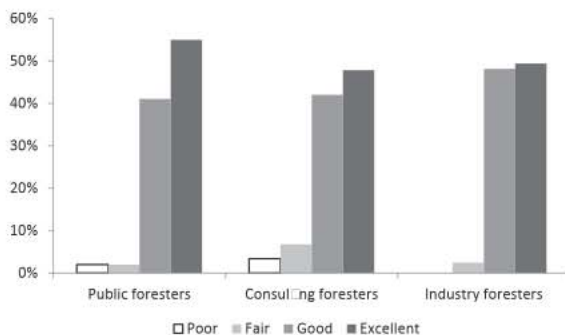




**Figure 3. Types of assistance foresters used in forest management in Alabama, by size of forestland holding.**



**Figure 4. Types of assistance foresters used in forest management in Alabama, by landowner household income before taxes.**



**Figure 5. The overall rating of assistance foresters' services by NIPF landowners in Alabama: 2000-2009.<sup>a</sup>**

<sup>a</sup> The relationship between the practices for which assistance foresters provided services and the levels of satisfaction is significant at the 10% significance level ( $\chi^2 = 27.22$ ), while the relationship between the type of assistance foresters and the levels of satisfaction is not ( $\chi^2 = 9.71$ ).

When the NIPF landowners were asked if they had ever been denied services from assistance foresters, only 8% reported denial from public foresters, 4% from consulting foresters, and 4% from industry foresters. The primary reasons for denial of services were that the foresters did not have time and staff or that the land acreage owned by landowners was too small. These results indicate that, in general, most landowners were able to receive the services from assistance foresters.

#### Public Foresters

Finally, two questions were designed to collect information on NIPF landowners' opinions related to public forester assistance. One question recorded whether the number of public foresters should be increased, decreased, or stay roughly the same. Among the

250 respondents who responded to this question, 29% reported "be increased," 21% indicated "stay roughly the same," 48% had "no opinion," and only 2% reported "be decreased." Another question was designed to measure how much NIPF landowners might be willing to pay if public foresters charged for their services. A majority (62%) of the 233 respondents would be willing to pay nothing; 13% to pay \$20 per day; 11% to pay \$50 per day; and 14% to pay more than \$100 per day. A few landowners provided additional comments on the "willing-to-pay" question. Most of these comments stated that they should not pay anything because they had paid taxes.

#### A Comparison with an Earlier Study

Zhang et al. (1998) report a similar study in Alabama that covered the 10-year period between 1986 and 1995. In this study, we used similar questions and methods as in Zhang et al. (1998). The Fisher's exact tests show that the levels of assistance foresters' involvement in NIPF management activities in these two studies are statistically different (e.g.,  $P = 0.009$  for timber harvesting and 0.001 for tree planting), as are some of the landowner characteristics (e.g.,  $P = 0.001$  for size of holding). The effect of these differences notwithstanding, comparing the results of this study and Zhang et al. (1998) helps assess changes in NIPF management activities and the role of assistance foresters in two different decades.

Zhang et al. (1998) note that only 17% of the respondents had not conducted any management activities from 1986 to 1995, while this study found that 32% had not conducted any forest practices. This is perhaps related to low and declining stumpage prices in Alabama since 1998, compared with rising stumpage prices in the later 1980s and early 1990s, and changing landowner demographics and objectives. Although most landowners could benefit from even minor management improvements (Measells et al. 2005), change in stumpage prices over a period of 10 years was more likely to influence the behavior of NIPF forest activities than other economic concerns (Amacher et al. 2003, Sun et al. 2008). If stumpage prices remain low, NIPF landowners will not do much timber harvesting and other forest management activities (Boyd 1984, Hyberg and Holthausen 1989).

However, NIPF landowners who conducted forest practices used assistance foresters more often from 2000 to 2009 than from 1986 to 1995. Among the respondents who conducted management activities, assistance foresters were involved in 67% of all activities from 2000 to 2009, compared with 58% from 1986 to 1995 (Zhang et al. 1998). This finding could be related to the fact that this study excluded landowners with less than 25 acres. It may also suggest that



foresters might be better equipped to play professional roles in forest resource management in the last decade than before, or that more landowners believed that the involvement of assistance foresters in forest management was beneficial in recent years.

Zhang et al. (1998) also find that consulting foresters provided services to NIPF landowners in the biggest share (48%, roughly the same as in this study) of all forest management activities, public foresters in 30%, and industry foresters in 22%. In comparison with this study, the number of services provided by industrial foresters decreased to 17%. Public foresters, on the other hand, increased their share of assistance to 35% in the recent decade. Again, two economic recessions in the 2000s and depressed stumpage market might prompt landowners to use more “free” services provided by public foresters.

Zhang et al. (1998) indicate that, out of their 210 respondents, 21% stated that the number of Alabama’s public foresters should “be increased,” 33% indicated “stay roughly the same,” 42% “responded “have no opinion,” and 5% responded “be decreased.” Fifty percent of their 163 respondents chose to pay “nothing” if public foresters were to charge for their services; 45% were willing to pay \$20, \$50, or \$100 for a day; 5% were willing to pay more than \$100 a day. Although our Fisher’s exact tests suggest that landowners’ opinions related to public forester assistance ( $P = 0.009$  for general opinions on public forester and  $P < 0.001$  for willingness to pay) were different in the two surveys, the majority of responding landowners were satisfied with the assistance from public foresters but not willing to pay for their services.

### Summary and Discussion

The result of a mail survey shows that three groups of assistance foresters were involved in two-thirds of all forest management activities in Alabama from 2000 to 2009, an increase of nearly 10 percentage points from 1986 to 1995. Consulting foresters, accounting for nearly half of assisted management activities, remained the largest contributor to NIPF management. Public foresters were the second largest contributor and provided assistance services to landowners with low income and small land holdings. Industrial foresters had a reduced role in all assisted activities. Further, the involvement of assistance foresters in management activities was positively related to landowner income, education, and membership of a forestry association, and land characteristics such as land acreage and pine coverage on forestland. Finally, NIPF landowners gave a favorable rating to the services they received, and they were not supportive of either increasing the number of public foresters or paying for services received from public foresters. These results need to be interpreted with the understanding that NIPF landowners who had lower income and education were less likely to participate in our mail survey, and consequently, the level of forest management activities and the involvement of assistance foresters might be somewhat inflated.

The policy and practical implications of these results are three-fold. First, landowners associated with forestry associations are more likely to employ forestry professionals than other landowners. Given that more than 80% of NIPF landowners were not members of a forestry association, encouraging NIPF landowners to join a forestry association may help assistance foresters expand their business and to ensure better forest management in Alabama and elsewhere. Thus, assistance foresters and forestry associations need to work together and recruit NIPF landowners to become members of a forestry association.

Second, the relationship between public foresters and consulting foresters seems to be somewhat complementary, at least for small- and low-income landowners. The number of public foresters in Alabama has not increased from the 1980s to 2000s and the number of industry foresters has declined. Yet, the “market share” of consulting foresters stayed about the same in the two study periods while that of public foresters increased. This probably implies that not all landowners can afford to pay for consulting foresters or that they want to take advantage of the free services from public foresters. Given that public foresters are involved more in NIPF management activities of owners with low income and small acreage, the number of public foresters should not be reduced in the future. Despite the recent economic downturn, the state should maintain a healthy budget for the state forestry agency whose foresters provided the majority of services among all public foresters. This being said, the economic efficiency of assistance from public foresters in NIPF management has yet to be conducted in the form of a benefit-cost analysis anywhere in the United States.

Finally, assistance foresters are involved more in NIPF management in the recent decade than earlier in Alabama, and far more than in other states—as the State of America’s Forest (SAF 2007) said, “only 22% (of private nonindustrial forest owners) sought professional advice before harvesting timber.” One plausible explanation is that Alabama has strong timber markets. For example, the level of stumpage prices in 2003 and the rate of stumpage price appreciation in south Alabama in the 27 years from 1977 to 2003 were highest among various regions in the southern states (Zhang 2006). A multistate comparative study of landowners’ forest management behavior and their use of assistance foresters may identify other causes, and the results of such study may help more assistance foresters understand their clients and more landowners actively involved in managing their forests.

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