

NON-INDUSTRIAL PRIVATE FOREST LANDOWNER
KNOWLEDGE ABOUT FOREST MANAGEMENT
AND BEST MANAGEMENT PRACTICES

By

CHRISTY LYNN DAVIS

Bachelor of Science

Phillips University

Enid, Oklahoma

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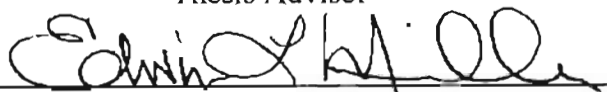
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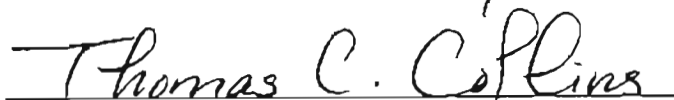
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CHAPTER I

INTRODUCTION

This thesis is composed of three primary components. The first is a literature review of material as it relates to NIPF land, best management practices and forest management. The second component is a report containing data from a study funded by the National Council of the Paper Industry For Air and Stream Improvement. The third is a manuscript. The order of arrangement for the manuscript is text, literature cited, and tables. Chapter III, is written in the format of the Southern Journal of Applied Forestry.

CHAPTER 2 LITERATURE REVIEW

Forests occupy more acres in the southern United States than all cropland and pastureland combined (USDA Forest Service, 1988). Timber is also the most important agricultural crop in the South, ranking among the top three crops in terms of value of production in all 12 states of the region (USDA Forest Service, 1988). In addition to timber, forests provide other valuable products such as recreation, wildlife habitat, wilderness and aesthetic values.

An abundant supply of high quality water is also a very important benefit from forest land. The forests, and the streams and lakes that they sustain, are a highly valued setting for hunting, fishing, boating, hiking, and other outdoor recreation activities (Irland and Connors, 1994).

Forest management activities can work to sustain water quality or, if improperly applied, impair water quality and decrease safety and enjoyment of water recreation. In general, water draining forest watersheds is among the best in the country as compared with agricultural watersheds, whether the forests are undisturbed or managed (NCASI, 1994). While the risk of degrading water quality from forest management practices varies greatly among forests, regions and soils, best management practices (BMPs) have been developed that can minimize degradation of water quality to within generally acceptable limits. BMPs can largely eliminate the effects of forest management activities on stream temperature, dissolved oxygen, and the concentration of nutrients and pesticides (Commerford et al., 1992). However, road construction, associated with forest harvest continues to be the main concern regarding altered sediment yields and stream channel conditions (Scoles et al., 1994).

Because they own about 58 percent of the commercial forest resource in the United States and about 70 percent in the South (USDA Forest Service, 1982; Bliss, 1994) and account for approximately 40 percent of the total U.S. softwood harvest and 68

percent of the nation's hardwood removals (Cubbage and Wear, 1993), nonindustrial private forest landowners (NIPF owners) can have significant impacts on water quality through their forest harvest and regeneration decisions. Failure of some landowners and loggers to use BMPs is perceived to be the most important cause of water quality problems associated with forest management.

This literature review will provide a general background of the importance of NIPF land ownership and review scientific and technical literature regarding NIPF landowner characteristics, attitudes and management decisions. It is expected that this information may be useful in addressing why some NIPF landowners fail to implement BMPs and what kind of programs may be effective in improving BMP implementation rates of NIPF lands. The compiled information will be used in developing a pilot survey of NIPF landowners in two Counties in Oklahoma and to identify future research needs.

The NIPF Situation

One of the outstanding features of NIPF forestland ownership is that there are over 9 million NIPF owners in the United States (Birch, 1994). They are not only geographically dispersed but also have diverse reasons for owning their forestland and diverse objectives in their management. These factors have made efforts to provide educational programs to these landowners problematic (Anderson, 1993). Compounding the problem is that these ownerships have been seriously fragmented through inheritance and changing ownerships (Birch, 1994). As the average size of ownership decreases, landowners lose economies of scale which make forest management practices easier and more cost effective to implement. As ownerships continue to change at an increasing rate, the effect of educational and technical assistance programs can be diluted. Furthermore, many owners appear to be more interested in recreation, wildlife and aesthetic pursuits than in obtaining timber income.

It is within these contexts that previous efforts have been made by forestry professionals to assist private landowners to improve reforestation and productive management of their lands. After decades of technical assistance, education and cost-share programs; lack of reforestation and number of acres not being managed continues to be a concern. While many success stories exist (Duryea et al., 1987; Anderson, 1993) the sheer magnitude of the problem has dwarfed the monetary and personnel resources applied. The continued challenge will be to make the most effective use of technology transfer, education and incentive programs under decreasing budget and downsizing scenarios (Laughlin and Schmidt, 1995).

This situation is roughly analogous to the situation facing the new concern of BMP implementation on NIPF lands. Initial empirical evidence from BMP compliance surveys indicate that consistent implementation of BMPs is more difficult on NIPF ownerships than on industry or government lands. This is not surprising given the

mandated nature of forest management on public lands and the ability of industrial ownerships to absorb management costs as compared to individual private properties. The recent introduction and initial implementation of industry's Sustainable Forestry Initiative (AFPA, 1995) is substantial evidence in this direction.

The following sections are intended to provide background and details regarding NIPF ownership, characteristics, demographics, attitudes, management decisions and response to government programs that will serve as a basis for discussion of NIPF owner implementation of BMPs.

Characteristics of NIPF Landowners

NIPF Ownership

In the United States, about 74 percent of all commercial timberland is held by private individuals or firms, with Federal, State, and other Public ownerships accounting for the remaining 26 percent (USDA Forest Service, 1982). Farmers, ranchers, and other private landowners (NIPF owners) hold some 58 percent; the forest industry holds about 16 percent; 18 percent is held by National Forests; 2 percent is held by other federal lands; and state, county, and municipal forests make up 6 percent of the total (USDA Forest Service, 1982).

Approximately nine million NIPF owners hold about 58 percent of the country's timberland (Birch, 1994). However, the percentage of NIPF landowners varies significantly among different regions of the United States (USDA Forest Service, 1988). In the south, NIPF owners own about 70 percent of the commercial forest resource (USDA Forest Service, 1988). In Washington State, NIPF landowners control about 4.4 million acres of very productive forest land representing only 25 percent of the state's commercial forest land base (Blatner, Baumgartner, & Quackenbush, 1991). In the Texas Pineywoods of Eastern Texas, NIPF owners dominate timberland ownership with 7.0 million acres or 3 out of every 5 acres (McWilliams et al., 1989). In Southern Illinois, private forest land provides 96 percent of Illinois' total timber harvests (McCurdy and Mercker, 1986). In Oklahoma, it has been estimated that there are over 90,000 NIPF landowners (USDA Forest Service, 1982). In eastern Oklahoma, NIPF landowners own approximately 67 percent of the commercial forestland in the eighteen eastern counties of the state (Earles, 1976; Rosson, Jr. and Doolittle, 1987; Wheatcraft and Lewis, 1986).

Private forest landowners are well distributed throughout the thirteen southern states (Table 1). North Carolina has 705,000 owners, the greatest number, followed by Georgia with 611,000 owners and Tennessee, Virginia and Alabama, all which have more than 450,000. Of the thirteen southern states, Oklahoma and Louisiana have the fewest number of owners. However, Louisiana has a higher percentage of the South's forestland (7 percent) than it has of the South's forest landowners (3 percent) suggesting that forested tracts are comparatively large in that state, while the reverse condition seems to apply in North Carolina and in other states (Moulton and Birch, 1995).

Size of forest holding has been an important explanatory and predictive variable in studies of NIPF attitudes and behavior (Alig et al., 1990; Straka et al., 1984; Thompson and Jones, 1981). In an Oregon study (Cleaves and Bennett, 1995), ownerships larger than 500 acres comprised just 3% of the population, but accounted for 41% of the NIPF acreage. Ownerships of 50-500 acres represented 29% of the holdings and accounted for 44% of the NIPF acreage. Holdings of less than 50 acres represented 69% of the total ownerships but only 18% of the NIPF acreage. Larger land holdings have been positively correlated to timber harvesting (Hyberg and Holthausen, 1989).

Of particular importance is the increase in numbers of private forestland owners (Table 2). From 1978 to 1994 the number of NIPF owners increased by over 2 million owners or 28 percent nationwide (Moulton and Birch, 1995). Approximately half of the increase occurred in the southern states. Because privately-owned forests are so important nationally; and even more so in the south where 89 percent of forestland land is in private ownership (Table 3), and where virtually all timber comes from private lands; there has been a great demand for information about private landowners from throughout the forest community (Moulton and Birch, 1995).

Table 1. Numbers of NIPF owners and acres by Southern states (Moulton and Birch, 1995).

<u>State</u>	<u>Owners</u>		<u>Acres</u>	
	<u>1000's</u>	<u>Percent</u>	<u>Millions</u>	<u>Percent</u>
Alabama	452	9	20.8	11
Arkansas	296	6	14.5	8
Florida	321	6	13.1	7
Georgia	611	12	22.0	12
Kentucky	307	6	11.4	6
Louisiana	149	3	12.5	7
Mississippi	341	7	15.1	8
North Carolina	705	14	16.8	9
Oklahoma	158	3	6.9	3
South Carolina	336	7	11.0	6
Tennessee	476	10	11.8	6
Texas	320	7	18.3	10
Virginia	469	10	13.4	7

Table 2. Number of private forestland owners by region in 1978 and 1994 (Moulton and Birch, 1994).

<u>Region</u>	<u>1978</u>	<u>1994</u>	<u>Change from</u>	
			<u>1978</u>	
North	3,289.5*	3,939.9*	650.4*	20%
South	3,850.4	4,940.2	1,089.8	28%
West	618.0	1,030.6	412.6	67%
U.S.	7,757.9	9,910.7	2,152.8	28%

*owners shown in thousands

Table 3. Privately owned forests in the U.S. and in the South (Moulton and Birch, 1995).

	<u>In U.S.</u>	<u>In South</u>
Forestland	58%	89%
Harvested timber	82%	94%

Landowner Objectives

Landowners objectives play a very important role in the management of forestland. Objectives are the end goals, the reasons and purposes for ownership of forestland (Kurtz and Lewis, 1981; Walkingstick, 1992). Some common ownership objectives include grazing; commercial timber production; recreation; preservation; and investment (Carpenter and Hansen, 1986; Young et al., 1984). Fifty-two percent of 46 landowners surveyed in a South Carolina study indicated that lifestyle enhancement such as pride of ownership and personal satisfaction; stewardship; best land use and conservation; privacy; recreation and pleasure; and family estate were their primary ownership benefits (Table 4). Only 48 percent chose economics and timber production (Haymond, 1988). Top reasons Illinois forest landowners gave for owning land (Table 5) were shelter for wildlife (87%); preserve natural beauty (81%); and heritage for future generations (80%). About half indicated they owned their land for family recreation (56%) or a place to hunt (55%). Only 16 percent mentioned timber sale income as a reason for owning their land. In Minnesota, residence, aesthetic enjoyment and recreation were the three top reasons for ownership (Carpenter and Hansen, 1986).

Jones and Thompson (1981) indicate that grazing was the primary use of about one-half of NIPF land in an eighteen county forested area of Oklahoma (Table 7). However, Walkingstick (1992) discovered similar findings, in Oklahoma, to those of other states with top reasons for land ownership being to provide habitat for wildlife (44.9%), provide forests for the future (36.6%), and for scenic enjoyment (35.9%). Only 22.6 percent listed timber production as very important and recreation was listed by 22.3

percent as the top reason for ownership (Table 6). These studies seem to indicate that there is uniform diversity in landowner objectives on a regional basis. Economic uses may be important on a local basis, but other personal, recreational, and environmental objectives commonly take precedence among landowner objectives.

A national study found that nearly 40% of NIPF landowners (Table 8) believe the primary reason for owning forest land is that it is simply part of the farm or residence (Birch, 1994). Eight percent have farm or domestic use as the most important reason. Another 23 percent view recreation and esthetic enjoyment as important. Only 3 percent of the NIPF landowners hold their land primarily for timber production. These owners control 29 percent of the private forest land.

One implication of these varying landowner objectives is that they must be considered in developing educational programs. Landowners need to feel that their objectives are being taken seriously and that their position is respected by the forest resource professionals as well as other landowners. Forest management education, including BMPs and water quality programs, will be well received by landowners when they are put in the context of landowner objectives. Individual landowner objectives can change over time as their life situations change. Family, college, deaths, inheritance and emergencies can change objectives at different points in time. Educational programs may be able to take advantage of these occurrences by targeting certain landowner groups. Furthermore, objectives of landowners in general may change over time but few time series studies exist to evaluate possible changes over time.

Resource professionals are therefore challenged to inform and educate landowners about the long-term benefits of forest management for meeting their own objectives and the resource needs and demands of society (Walkingstick, 1992). In turn, the general public needs to understand the objectives private landowners have for their land and how resource policy can affect landowner management decisions.

Table 4. South Carolina survey of primary ownership benefits (Haymond, 1988).

<u>Landowner Objectives</u>	<u>Percent</u>
Lifestyle Enhancement (such as:)	
pride of ownership and personal satisfaction	20%
stewardship	9%
best land use and conservation	7%
privacy	6%
recreation and pleasure	6%
family estate	4%
subtotal	52%
Economics and timber production	
present economics	24%
future economics	13%
timber production	11%
subtotal	48%

Table 5. Primary landowner objectives from respondents in Illinois (Carpenter and Hansen, 1986).

<u>Landowner Objectives</u>	<u>Percent</u>
shelter for wildlife	87%
preserve natural beauty	81%
heritage for future generations	80%
family recreation	56%
place to hunt	55%
timber sale income	16%

Table 6. Primary landowner objectives from respondents in three Oklahoma Counties (Walkingstick, 1992).

<u>Landowner Objectives</u>	<u>Percent</u>
habitat for wildlife	44.9%
provide forests for future	36.6%
scenic enjoyment	35.9%
timber production	22.6%
recreation	22.3%

Table 7. Landowner objectives from respondents in 18 Oklahoma counties (Jones and Thompson, 1981).

<u>Landowner Objectives</u>	<u>Percent</u>
grazing	49%
no use	20%
commercial timber production	19%
investment	4%
erosion control	1%

Table 8. National study on primary reasons for owning forestland (Birch, 1994).

<u>Landowner Objectives</u>	<u>Percent</u>
part of farm	16%
part of residence	26%
farm and domestic use	8%
recreation	79%
timber production	3%
land investment	8%
other	15%
no answer	3%

Demographics of NIPF Owners

The average landowner

NIPF landowners are individuals, farmers and ranchers who own forestland, but do not operate wood-processing facilities. Demographic attributes of landowners including age; gender; occupation; education; and income are often used to compare NIPF landowners regionally and nationally (Farrell, 1964; McDermid et al., 1959; Kingsley, 1981; Thompson, 1979; Birch, 1982; Clawson, 1979; Force, 1991; Young, 1984; Worrell and Irland, 1975; and Carpenter and Hansen, 1986). In a 1990 National Private Land Ownership study of landowners with at least 20 acres, the average landowner was a white male who made roughly \$30,000 - \$49,000 in 1985, and owned an average of 69 forest acres (U.S. Forest Service, 1990). According to a national survey in 1991, the average landowner is a white male farmer, who is over 50 years old, and probably living in the same county as his forest tract (Birch, 1994).

In a study of three southeast Oklahoma counties, the typical NIPF landowner was male, 60 to 62 years old, of Scottish-Irish descent, had completed high school, was a retired professional, earned \$30,000 to \$39,999 a year and did not live on their forestland (Walkingstick, 1992). The typical landowner in the midsouth is 65 years or older, is a white male, and lives in the county where their forestland is located (Rosson, Jr. and Doolittle, 1987). The following sections will provide more detail about the demographics of NIPF owners followed by discussions on how they may be related to harvesting and management decisions.

Occupation

In a 1991 national survey, NIPF owners with at least 20 acres cited their occupation as farmers (22%), professional/technical workers (21%), and retired forest

landowners (44%). In the midsouth, retired people own almost 34% of private timberland. Thirty-seven percent of NIPF landowners in eastern Oklahoma were farmers and ranchers and owned 40 percent of the NIPF forestland. 13 percent were skilled laborers owning 22 percent of the forestland; and 18 percent were retired owning 17 percent of the forestland (Jones and Thompson, 1981) (Table 9).

A national study making comparisons between 1978 and 1993 NIPF landowner occupations (Table 10) found an increase in the percentage of retired owners and an increase in the acreage owned by retired owners (Birch 1994). This change may be the result of the aging population in the U.S.

The acreage owned by farmers and blue collar workers has decreased dramatically. Although the percentage of owners who are farmers remained at 8 percent from 1978 to 1993, the acreage owned by farmers decreased from 27 percent to 16 percent nationwide. This implies, according to Cleaves and Bennett (1995), that there may be a reduction in propensity to harvest because they found that farmers were more likely than other occupations to report a harvest. A profile of NIPF owners in the southern U.S. (Table 11) shows that white collar workers (professionals, business managers and other salaried workers whose work does not involve manual labor) are the largest group of southern private forest landowners (Moulton and Birch, 1995). This survey indicates that the top three occupations reported were white collar workers, retired owners and blue collar workers which account for 72% of southern NIPF owners and 45% of the NIPF acreage. Farmers make up 7% of southern NIPF owners. The study does not report what group(s) make up the remaining 21% of southern NIPF owners and the 47% of NIPF acreage.

Table 9. Landowner occupations in the midsouth and in Oklahoma (Rosson and Doolittle, 1987) and (Jones and Thompson, 1981).

Midsouth		Oklahoma	
<u>occupation</u>	<u>percent</u>	<u>occupation</u>	<u>percent</u>
farmers	8.6	farmers	37
white collar	18.9	professionals	11
blue collar	20.9	skilled	22
retired	33.7	laborers	9
other	5.1	retired	12
corporations	4.4	merchants	12
no answer	0.7	other	8

Table 10. Comparison of NIPF occupation by owners and percentage of acres owned in 1978 and 1993 (Birch, 1994).

<u>Percentage of Owners</u>			<u>Acres</u>	
	1978	1993	1978	1993
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
white collar	33	32	24	29
blue collar	26	16	19	10
farmer	8	8	27	16
retired	26	29	24	33
others	7	15	6	12

Table 11. Occupations by owner and acres owned in the southern U.S.
(Moulton and Birch, 1995).

<u>Occupation</u>	<u>Owners</u>	<u>Acreage</u>
white collar	29%	19%
retirees	27%	21%
blue collar	16%	5%
farmers	7%	8%
other	21%	47%

Ethnicity

On a regional basis ancestral background may have a relationship to landowner objectives and how landowners view the management of their land. For example, in Wisconsin, where severally culturally pure communities were identified, German-American landowners showed a strong desire to keep the woods "clean" - free of stagnant or dead trees and residue (Bliss and Martin, 1990). Finnish-American landowners exhibited a high degree of integration of farming and forest management, treating timber as an important farm crop. Despite these examples, the authors considered their data insufficient to warrant sweeping generalizations about the forest management styles of ethnic groups.

Walkingstick (1992) determined ethnic background was not a significant factor influencing forest management in Oklahoma. In a written survey, respondents were asked to indicate all ethnic groups of both their mother and father. The study found the most respondents to report a Scottish and English background with Irish, German, Native American, Dutch, and French being other ethnic groups represented (Table 12). Unlike the Wisconsin study, many landowners indicated a multi-ethnic background and no culturally pure communities were identified in the Oklahoma study. Bliss and Martin (1990) identified several culturally pure communities in Wisconsin. Ethnically concentrated communities can help perpetuate values derived from that background (Walkingstick, 1992).

Table 12. Top six ethnic groups reported in Oklahoma (Walkingstick, 1992).

<u>Ethnic Group</u>	<u>Percent</u>
Scottish/English	60.2%
Irish	41.3%
German	24.8%
Native American	24.0%
Dutch	16.5%
French	11.0%

Income

Income is a demographic variable that has been examined in relation to NIPF landowner behavior. A range of incomes were indicated by respondents in an Oklahoma study (Table 13) looking at the characteristics, attitudes and objectives of NIPF landowners (Jones and Thompson, 1981). Forty percent of owners had incomes in excess of \$25,000. The income group with the next largest percentage (16%) is the group earning under \$5,000 per year.

Most studies of NIPF owners have used random sample surveys to produce generalizations about the “typical” NIPF owner (e.g., Birch and Kaiser, 1978, Roberts et al., 1986). Bliss and Martin (1990) wanted to identify factors that motivate NIPF management, so they selected Wisconsin landowners who actively manage their forest resources in accordance with current standards of the forestry profession which includes such things as tree planting, timber harvesting, timber stand improvement, wildlife habitat improvement, and other practices that increase the quality and quantity of forest-related products and amenities. This study was compared to Roberts et al. (1986) who did a random sample survey of Wisconsin NIPF owners. Bliss and Martin found that only 37% of active managers reported gross annual incomes less than \$40,000, while Roberts et al. found 67% of the general landowner had incomes lower than \$40,000

(Table 14). While some studies indicate that harvest participation may decrease by the most affluent landowners because they need less income; Cleaves and Bennett (1995) found that harvest participation dropped off only slightly for higher income landowners. If income is strongly correlated to ownership size then it may not be the best attribute to use when assessing inclination to harvest or manage forestland.

Table 13. Income characteristics of NIPF owners in Oklahoma (Jones and Thompson, 1981).

<u>Income</u>	<u>Percent</u>
less than \$5,000	16%
\$5,000-7,000	2%
\$7,000-9,000	7%
\$9,000-12,000	14%
\$12,000-15,000	9%
\$15,000-20,000	10%
\$20,000-25,000	3%
\$25,000 +	40%

Table 14. Income characteristics of Wisconsin NIPF owners (Roberts et al., 1986) and (Bliss and Martin, 1990).

<u>Income</u>	<u>Roberts et al.</u>	<u>Bliss and Martin</u>
<\$20,000	37%	31%
\$20,000-\$29,999	15%	6%
\$30,000-39,999	15%	0%
\$40,000-49,999	4%	13%
\$50,000-59,999	6%	13%
\$60,000-69,999	1%	0%
\$70,000 +	10%	25%
no response	13%	13%

Education

In general, most NIPF owners have at least a high school education (Jones and Thompson, 1981; Bliss and Martin, 1990; Rosson and Doolittle, 1987). However, these studies also indicate that there can be regional differences in landowner education. An Alabama study (Palmer, 1985) found that better education was an important characteristic of landowners who decided to regenerate their forest stands following harvesting. In 1978, an 18 county Oklahoma study (Table 15) found that a majority of the NIPF land area was owned by people with at least a high school education (70%), although there was a portion of the area (7%) owned by people who had never attended high school (Jones and Thompson, 1981). Walkingstick (1992) found education levels to be different between three Oklahoma counties (Table 16). For instance, the percentage of landowners having at least a college degree ranged from 33 to 46%. In addition, those who reported a maximum of a high school education ranged from 30 to 46%. In a study of active managers in Wisconsin, Bliss and Martin (1990) found (Table 17) respondents to report

to report more years of formal education: 19% of managers graduated from college or technical school, compared to 11% of the Roberts et al. (1986) sample which was a random selection of Wisconsin NIPF owners (Bliss and Martin, 1990). In general, Bliss and Martin (1990) and Roberts et al. (1986) had similar findings on education.

Table 15. Education characteristics for NIPF landowners in Oklahoma containing ten or more acres of forest land (Jones and Thompson, 1981).

<u>Education</u>	<u>Percent</u>
never attended school	7%
elementary	24%
high school	28%
college (2 or more years)	41%

Table 16. Education characteristics for respondents in three Oklahoma Counties (Walkingstick, 1992).

<u>Education</u>	<u>Latimer</u>	<u>McCurtain</u>	<u>Pushmataha</u>
7 years or less	1.1%	2.4%	0.0%
some high school	5.5%	14.5%	8.1%
high school	27.3%	28.9%	21.8%
some college	33.0%	15.7%	24.1%
completed college	12.5%	19.3%	13.8%
some graduate work	5.7%	4.8%	17.2%
graduate degree	14.8%	14.5%	14.9%

Table 17. Midsouth private landowners by education and percent of total forestland owned (Rosson and Doolittle, 1987).

<u>Education</u>	<u>Percent of owners</u>	<u>% acres owned</u>
Jr. high or less	28.4%	12.7%
some high school	10.1%	7.1%
high school	22.6%	14.9%
some college	11.4%	8.4%
college plus	12.7%	12.6%
corporate, estates, etc.	4.4%	35.0%
no answer	8.4%	9.3%

Table 18. Education characteristics of Wisconsin NIPF owners (Roberts et al., 1986) and (Bliss and Martin, 1990).

<u>Education</u>	<u>Roberts et al.</u>	<u>Bliss and Martin</u>
less than 8 years	16%	6%
some high school	7%	13%
high school graduate	31%	31%
some college or technical school	22%	19%
college or technical school	11%	19%
graduate	4%	6%
some graduate school	4%	6%
advanced degree	6%	0%
no response		

Age

Age is a variable often used in NIPF landowner studies to assess attitude or performance relative to forestry projects (Carpenter, 1979). Bliss and Martin (1990) found that NIPF owners that manage forestland in Wisconsin are generally older than the Wisconsin NIPF owners sampled randomly by Roberts et al. (1986) (Table 19). There were no respondents under the age of 35 in the study of active Wisconsin managers. In addition, 50% of this study was 65 or older whereas the random survey only found 19% of respondents to be over the age of 65. Individuals 65 years and older own more than 22 percent of the midsouth's private forestland (Table 20). This ownership pattern has important implications because it is reasonable to assume that title to many of these forest acres will transfer to new owners within the foreseeable future.

Table 19. Age characteristics of Wisconsin NIPF owners (Roberts et al., 1986) and (Bliss and Martin, 1990).

<u>Age</u>	<u>Roberts et al.</u>	<u>Bliss and Martin</u>
<24	0%	0%
25-34	13%	0%
35-44	16%	13%
45-54	22%	25%
55-64	26%	13%
65+	19%	50%

Table 20. Midsouth private landowners by age and percent of total forest land owned (Rosson and Doolittle, 1987).

<u>Age</u>	<u>Percent of Owners</u>	<u>Percent Acres Owned</u>
under 35 years	8.5%	2.8%
35-49	20.5%	13.0%
50-64	23.1%	19.8%
65 plus	33.2%	22.2%
corporate, estates, etc.	4.4%	35.0%
no answer	10.2%	7.2%

Gender

In the midsouth, female ownership is largest in Alabama (109,200 owners) where women own nearly 2.9 million acres-21 percent of the nearly 13 million noncorporate acres (Rosson and Doolittle, 1987). Across the midsouth there are about 377,900 female ownership's (23.8%) owning 11,219,400 acres. Female NIPF owners own an average of about 30 acres in the midsouth region (Table 21). This contrasts with 41.5 acres owned by each male landowner. Walkingstick (1992) found that in Oklahoma women represented 24.7% of the combined total respondents (Table 22) while Rosson and Doolittle (1987) found that women represented 37.7% of landowners. Gender can play a part in how NIPF land is managed. Walkingstick (1992) found that non-resident NIPF owners were more likely to manage their forest land and that a higher percentage of these non-residents were female as compared to resident landowners.

Table 21. Midsouth landowners by gender and percentage of acres owned
(Rosson and Doolittle, 1987).

<u>Gender</u>	<u>Percent of owners</u>	<u>Percent acres owned</u>
male	64.2%	47.8%
female	23.8%	12.7%
corporate, estates, etc.	4.4%	35.0%
no answer	7.6%	4.6%

Table 22. Gender characteristics in Oklahoma (Walkingstick, 1992).

<u>Gender</u>	<u>Percent</u>
male	75.3%
female	24.7%

Land Tenure

Land tenure is another demographic characteristic that may be of some interest. An Oklahoma survey found land tenure to vary quite widely across groups of Oklahoma counties. Over 60 percent of the NIPF area is in ownerships in which the major portion of the land was obtained 20 or more years ago. Of the remaining portion, less than 17 percent of the land area is in ownerships in which the major portion of the land has been owned for ten years or less. Walkingstick (1992) found that the number of years that respondents had owned their forestland did not vary between three counties studied. The mean tenure (24.1 years), was slightly less than the tenure (26.7 years) reported by Thompson (1978). For one county the mean was 22.9 years compared to mean tenures of 24.8 years in two other counties.

The implications of changing ownership patterns are significant. The yearly transition makes the communication of information difficult. More recently, however, over 40 percent of the private forest owners in a national ownership survey (Birch, 1994)

acquired forestland since 1978 (Table 23). These new owners own 23 percent of the private forestland. Only 10 percent of the owners owned land prior to 1950. In contrast, one study done to compare private forestland ownerships from 1977 to 1985 in Illinois found that size of ownerships and size of forest acreage had decreased while the length of ownership had increased (McCurdy and Mercker, 1986).

Table 23. National survey on land tenure (Birch, 1994).

<u>Land Tenure</u>	<u>Percent in 1978</u>	<u>Percent in 1993</u>
1978-1993	0%	41%
1970-1977	35%	18%
1960-1969	27%	16%
1950-1959	13%	7%
pre 1950	18%	9%
no answer	7%	9%

Resident Status

It has been generally thought that the distance a landowner lives from their forestland might affect their ability or likelihood to put their land under active management. It has also been recognized that a significant part of the NIPF ownership is held by non-residents. For this reason, resident status of NIPF owners is a demographic characteristic that has also been examined. A resident landowner is often defined as a landowner either living on or nearby his or her forestland.

In 1990, non-resident and resident landowner characteristics were studied in New York to determine the influence on management behavior and the relationship to associated demographic and ownership characteristics (Alden, 1990). Residents were defined as those individuals living within the Adirondack Park boundaries. Non-residents lived outside the park boundaries. Non-residents had more years of formal education and had greater incomes. Non-residents were less likely to own woodland for

timber production and included recreation and aesthetics as the most important reasons for ownership.

In Oklahoma, it was found that nearly half of the NIPF land in eastern Oklahoma was owned by non-resident owners (Jones and Thompson, 1981). Walkingstick (1992), examining resident status (living on or in the same county as their forestland) in Oklahoma found that 44.7%, 70.8% and 82.1% of respondents were non-resident landowners in three different counties. The total percentage of non-resident landowners (66.5%) in this study was greater than the percentage (52.6%) reported by Donovan (1986). Possible explanations for the differences in non-resident numbers in Walkingstick's study from Donovan (1986) could be that 1) during this time period the percentage of non-resident landowners did actually increase in number or 2) the higher figures only represent county to county differences. Donovan's population represented the total population of NIPF landowners in 18 eastern Oklahoma counties who owned at least 40 acres whereas the results from Walkingstick's study are based on a sample population of the NIPF landowners owning at least 40 acres in only three counties. A continuation of this study over a period of time, such as ten years, would help to provide some more insight into these changing statistics.

Table 24. Comparison of resident and non-resident landowner status between a New York study and two Oklahoma studies.

	<u>New York Study(1990)</u>	<u>Donovan(1986)</u>	<u>Walkingstick(1990)</u>
resident	52%	47.4%	33.5%
non-resident	48%	52.6%	66.5%

Large differences in resident status by county may need to be considered when developing educational programs. Carpenter (1979) found that in the Michigan Upper Peninsula from 1967 to 1979, resident properties increased by 16 percent while non-resident properties increased by 40 percent (Table 25). In 1979, there were 293 owners.

That compared with 197 in 1960 and 232 in 1967. Thus, the trend towards increasing non-resident ownership continued from 1967. In the midsouth, more than 54 percent of the private timberland belongs to owners who live on their land or, in the case of corporations, have headquarters in the county where at least a portion of their timberland is located (Table 26). Another 20 percent of the land belongs to owners living in the same state, and about 16 percent belongs to out-of-state owners. Even though residents own a majority of the timberland, their average ownership is significantly smaller than that of non-resident owners (Rosson and Doolittle, 1987).

Table 25. Number of owners, acres of forestland owned, and average size of holding by size, class, residency status and year (Carpenter, 1979).

		<u>Residents</u>			<u>Non-Residents</u>		
<u>Size</u>		<u>1960</u>	<u>1967</u>	<u>1979</u>	<u>1960</u>	<u>1967</u>	<u>1979</u>
1-9	no.	7	6	27	3	4	9
	acres	37	30	128	2	32	57
	average	5	5	5	8	8	6
10-34	no.	30	29	48	9	11	27
	acres	649	588	908	176	206	531
	average	22	20	19	19	19	20
35-74	no.	59	59	44	15	21	24
	acres	2753	2831	2053	626	943	1071
	average	48	48	47	44	45	45
75-149	no.	41	43	31	8	14	12
	acres	4168	4204	3062	754	1312	1233
	average	102	98	99	91	94	103
150-599	no.	21	23	36	2	6	6
	acres	4625	5418	9689	448	1338	1497
	average	220	236	269	224	223	250
600+	no.	1	5	5	1	1	2
	acres	4060	10750	10542	2000	2040	6440
	average	4060	2160	2108	2000	2040	3220

Table 26. Midsouth NIPF owners by residence and percentage of acres owned (Rosson and Doolittle, 1987).

<u>Residence Status</u>	<u>Percent of Owners</u>	<u>Percent acres owned</u>
same county	79.7%	54.5%
other county, same state	7.3%	19.7%
different state or country	4.6%	15.7%
no answer	8.3%	10.0%

Resident landowners tend to come from rural farm backgrounds and to have had more childhood forest related experiences than non-residents which implies they may be more familiar with active management of land resources (Walkingstick, 1992). For this reason, efforts to motivate landowners to act responsibly when they decide to harvest their forest land may be most effective if focused on landowners living in the general proximity of their forest land. However, education aimed at non-residents cannot be overlooked because they own a significant portion of the NIPF ownership. A variety of methods may need to be utilized because of the diversity of NIPF owner groups. Further information on the influence of resident status on management behavior is needed to effectively design NIPF landowner extension and education efforts (Alden, 1990).

There is a wide diversity of objectives, motivations and attitudes among landowners (Young, et al., 1984). Demographic characteristics may be very helpful in assessing the forest management behavior of NIPF landowners. In general, "most farmers and other private forest owners have diverse objectives, widely differing characteristics and attitudes, a limited knowledge of existing management opportunities, and varying willingness and capacity to make investments" (Royer and Risbrudt, 1983).

The diversity of NIPF owners indicates that the issues surrounding their management decisions are complex. While the diversity of NIPF owners makes it difficult to predict the decisions they will make concerning their land, appropriate

research can improve understanding of NIPF owner characteristics and objectives required to assess their decision processes. Identification of an appropriate model of NIPF owner behavior and decision process is as important as the selection of appropriate resource policy, because the choice of optimal policy depends on the use of the correct behavioral model (Hyberg and Holthausen, 1989). This information also could contribute to the development of effective educational programs designed to both help landowners increase the benefits they receive from their forestland and increase the benefits society receives from their prudent management.

Landowner Decisions Concerning Timber Harvesting and Forest Management

Landowner decisions about the management of their land not only address their own objectives, but also can affect public benefits, such as water quality, that are derived from the land. For over 50 years, researchers have investigated how and why NIPF owners make timber harvest and forest management decisions.

Harvesting Decisions

One of the earliest NIPF studies found "lack of knowledge" regarding cutting, transportation and marketing of forest products to be a major factor influencing owners' decisions on forest management (Stoddard, 1942). A few years later in Mississippi another NIPF study noted "lack of knowledge" as a major factor influencing owners' decisions on forest management (Chamberlain et al., 1945). Later studies continued to stress the importance of information to NIPF landowners because of their apparent lack of management skills or, in some cases, the negative attitudes toward management harbored by some private landowners (James et al., 1951; Porterfield et al., 1978).

Most recently, a Pennsylvania study found that 94 percent of landowners admitted they need more information to properly manage their land. In Pennsylvania, only 6 percent of NIPF owners have a management plan and less than 20 percent of NIPF timber harvests involve a forester (Birch and Stelter, 1993). Most timber harvests involve the removal of the largest, fastest growing, highest value trees sometimes with a lack of consideration for the measures necessary for regeneration (Jones, 1994). This implies the ongoing need by NIPF landowners for proper information regarding timber harvest and forest management.

A study done in Michigan's Upper Peninsula postulated that relative to timber harvesting, NIPF landowners operate in an economically rational manner as indicated by forest survey statistics (Stone, 1970). Many will harvest timber as it becomes marketable. In a later study done in Michigan, residents consistently cited mature timber and the need for money as important reasons for harvesting timber (Carpenter, 1979). Main reasons for not harvesting were immature timber, small volume or small area, with aesthetics and scenery also important for both residents and non-residents. However, Hyberg and Holthausen (1989) presented a behavior model that shows NIPF owners tend to maximize utility more than just income alone. It is believed that the long-term responses of NIPF owners concerning forest investment behavior will depend on their objectives and their perceptions of future timber prices (Cubbage and Wear, 1993). Kurtz (1985) found that past timber harvest and sales activity by NIPF owners is a good indicator of future harvest intentions; a large share of those who have harvested in the past expect to harvest in the future.

Holding size has been found to be an important factor in explaining harvesting participation (Alig et al., 1990; Straka et al., 1984; Thompson and Jones, 1981; Cleaves and Bennett, 1995). While many of these studies indicate that landowners with larger tracts may have different attitudes towards harvesting, Cleaves and Bennett (1994; 1995) suggest that the greater inclination of landowners with larger tract sizes to harvest may simply be due to the larger pool of acres eligible for harvest at the time of any one survey. Although landowners with small holding sizes may be less inclined or able to harvest, their absolute numbers indicate that this group should not be ignored in harvesting studies and therefore, BMP implementation. In one study, sixty-two percent of landowners surveyed, who reported at least one harvesting activity, owned less than 100 acres (Cleaves and Bennett, 1995).

Cleaves and Bennett (1995) also found that farmers were more likely than other occupations to report a harvest. These results on occupation agree with other studies (Hyberg and Holthausen, 1989; Boyd, 1984; Binkley, 1981; Larsen and Ganser, 1973 and Webster and Stoltenberg, 1959). Retirees were least likely to report a harvest. Harvest participation ranged from 23% for landowners making less than \$10,000 (1988 before -

tax) to 34% for landowners making \$30,000 to \$69,000. Harvest participation dropped slightly for incomes higher than \$70,000.

Table 27. Harvest participation by type and occupation group and income. (Cleaves and Bennett, 1995).

<u>Occupation</u>	<u>Clearcut</u>	<u>Thin</u>	<u>Clearcut and Thin</u>	<u>Any harvest</u>	<u>no harvest</u>
retired	20%	52%	28%	25%	76%
farmers	19%	26%	55%	47%	53%
self- employed	25%	47%	28%	32%	69%
employed	17%	52%	31%	29%	71%
other	0%	17%	9%	26%	74%
<u>Income (1,000's of \$)</u>					
<10	13%	65%	22%	23%	77%
10-29	18%	59%	23%	22%	78%
30-49	21%	44%	35%	34%	66%
50-69	18%	47%	35%	34%	66%
70+	23%	36%	42%	31%	69%

In an attempt to understand landowner behavior, a Missouri study classified landowners into four owner types including timber agriculturalist, timber conservationist, forest environmentalist and range pragmatist (Kurtz and Trokey, 1982). A timber agriculturalist manages timber by harvesting and regeneration and uses timber as a source of income and an investment for long-term profit. Timber conservationists and forest

environmentalists would rather keep the land forested for recreation, wildlife or aesthetic purposes rather than for the harvesting of timber. A range pragmatist uses the land for cattle grazing and considers timber harvesting important only if it is economically attractive. The most important reason given for harvesting timber across all owner types was that their timber was mature. For the timber agriculturalist type, a relatively strong relationship exists between having plans to harvest in the future and having sold timber in the past. The timber agriculturalist also is more aware of stumpage prices and has more of an interest in price forecasts than other owner types.

Four of 5 studies dealing with timber harvesting behavior found that timber harvests were positively correlated with stumpage prices; and three found that harvests increased when technical assistance was provided (Alig et al., 1990). In another study it was found that NIPF owners can help make up an expected timber shortfall, but that in the short-run their response to rising timber prices will focus mostly on timber harvests, not regeneration (Cubbage and Wear, 1993).

Egan and Jones (1993) found limited correlation between landowner attitude (their expressions of a land ethic) and site impact variables associated with harvesting such as erosion and water quality; substantial correlation between knowledge (what they know about forests and forestry) and site impact; and an even stronger relationship between assistance (help from a forester) and site impact. These results suggest that without adequate knowledge or help from a forester, landowners (even those embracing a land ethic) can, and often do, make timber harvesting decisions that negatively impact the site and the remaining timber stands (Egan and Jones, 1993).

These investigations into landowner harvesting decisions relate significantly to landowner perception of and possible implementation of BMPs. First, it is apparent that efforts to promote BMPs should be focused initially on those landowners inclined to harvest their timber as it will be on these properties that most activity takes place. The fact that not all landowners will be interested in harvesting suggest that programs to promote BMPs can be targeted. Kurtz and Trokey's timber agriculturalist and range pragmatists may be most appropriate to target. Second, because harvesting by a landowner does not ensure that the landowner will be interested in reforestation, it can be

expected that some landowners who harvest will not be inclined to consider implementation of BMPs. Third, other factors need to be evaluated in relation to educational and technical assistance efforts. If timber harvests are positively correlated with stumpage prices then timing of program effort may be critical to reaching landowners at the appropriate time. Tract size and previous harvesting history may be important variables to consider while environmental attitudes may be less help in determining who may be inclined to implement BMPs. The study by Jones and Egan (1994) certainly points to education and field technical assistance in the success of avoiding negative site impacts.

Management Decisions

There is often failure to regenerate the forest after harvest on NIPF lands (Colvin, 1977; Hickman, 1983; and Royer, 1987). Regeneration failure often results in low stocking levels and poor quality stands (Alig et al., 1990; Birdsey and Bertelson, 1987; Mcwilliams et al., 1987; and Rosson, Jr., and Doolittle, 1987). This is a national trend on non-industrial private forests. Because harvest levels from National Forests may decrease and only marginal increases in production from industrial lands can be expected, improved forest management on NIPF lands may be necessary to meet the multiple resource needs of the public (Walkingstick, 1992; Cubbage and Wear, 1993).

While sawtimber prices can affect landowner decisions to harvest, several studies found that sawtimber prices had no significant effect on the number of trees planted by NIPF owners (Cubbage and Wear, 1993). Of course, when the decision to harvest is tied to active management, certain landowners can be encouraged by price stimulus to take additional land management actions. However, most landowner behavior studies have found that public policies can stimulate tree planting (Alig et al., 1990).

Davis (1980) found that only 30% of Mississippi landowners surveyed had made adequate provisions for reforestation and that landowners who did not make plans for regeneration (non-reforesters) were more likely to have cut more severely at harvest; to have never adopted any timber management practice; to have low annual incomes; and to

have owned forest land longer. In addition, the non-reforesters left lower-quality stands uncut, were less receptive to contacts with forestry agencies, had less overall forestry knowledge and were more likely to own land in the underdeveloped, poor areas of the county.

In a study of NIPF landowners in Alabama it was found that regenerators placed more importance on timber management, were more accepting of new ideas, and placed a high degree of importance on timber or wood-product production (Palmer, 1985). Regenerators were also better educated; more active participants in organized groups such as churches, professional groups, and civic groups; were opinion leaders; and appeared to have higher incomes, on average, than non-regenerators. Top reasons for reforestation by regenerators were as an economic decision in anticipation of future forest profits and for keeping land in timber production after harvest. Reasons for non-reforestation by non-regenerators were that the site would reforest itself and that the revenue from the sale was used for other purposes (Palmer, 1985).

A study in Missouri and Wisconsin indicated that NIPF owners in Missouri had very little reforestation activity whereas in Wisconsin over three-fourths of the timber-oriented owners have done some planting or seeding (Marty, et al., 1988). It was shown that timber stand improvement (TSI) was the management practice most used by Missouri NIPF owners and by the timber-oriented owners in Wisconsin. Another management activity utilized to some extent in Missouri and Wisconsin is the completion of a timber inventory. The percentage of owners having a timber inventory completed was much higher in Wisconsin. Forest grazing and land conversion were the two management activities found to be more prevalent in Missouri. Such regional differences indicate that some owners may be more willing than others to actively manage their forestland and perhaps implement BMPs.

Bailey (1959) found that, in New York, occupation, age of owner, method by which forest property was acquired, years owned, and distance of forest property from owner's residence did not have a positive correlation with response to public programs offering assistance to landowners in planting and doing stand improvement work. However, there was a positive correlation between acreage of forestland owned and

assessed value of the owner's property with indication of a probable response to forestry programs.

The management objectives of Illinois NIPF owners indicate that assistance programs aimed at improving wood production would not achieve landowner management goals because Illinois owners are more concerned with nontimber uses of their forests (Young et al., 1984). Similarly, another study, which looked at individual cultural practices to determine the types of management activities most utilized, concluded that programs need to be adapted to reach non-timber production oriented landowners as well as landowners primarily interested in timber (Marty et al., 1988). Bliss and Martin (1989) likewise state that more understanding into motivations and attitudes associated with managing for reasons other than for forest products is necessary.

Landowners often view management activities as incompatible with conservation practices or other benefits such as wildlife, recreation and aesthetics (Hickman, 1983). Other obstacles to forest management are lack of knowledge, lack of interest, incompatible goals, low profit potential, and lack of ability (Worrell and Irland, 1975). Forest management can be further hindered by negative attitudes, perception that management practices are too expensive, and lack of time (Worrell and Irland, 1975; Alden, 1990; Young, 1987; Bliss, 1988; Carpenter et al., 1986).

Some studies have analyzed forest landowner behavior by designating landowners as managers or non-managers, however, few have defined manager in the same way. Walkingstick (1992) defined a manager as a landowner respondent who indicated participation in at least one management activity from a list of possible activities. Another study took a different route by evaluating a series of attitude scales concentrating on the degree of agreement with certain forestry management practices such as clear-cutting, prescribed burning, and likelihood for planting (Jones and Thompson, 1981). This broader definition of a 'manager' divided the sample population into approximately equal parts. Walkingstick (1992) found that 52 percent of the NIPF survey population had not conducted any of the listed forest management activities. This study also found that maintaining forestland for wildlife habitat, providing forests for the future, producing timber, and providing recreational and hunting opportunities were very important

ownership objectives for managers while non-managers tended to lack clear goals or objectives regarding their forestland. Differences in demographic characteristics between managers and non-managers were found such as resident status, age, and employment status. Approximately 71% of residents were classified as managers whereas only 36% of non-residents were managers. Nearly 65% of non-residents had conducted no forest management activities in contrast to only 29% of residents that were classified as non-managers. About 17 percent of non-managers were older than 75 years whereas only 9% of managers were in that age class. The two distinctive differences between managers and non-managers on employment status were the percentages of self-employed and retired individuals. Approximately 31% of the managers indicated that they were self-employed whereas 18.6% of non-managers were self-employed. More non-managers were also retired (54%) than managers (37%).

Timing is a very important issue because it is vital to know when best to target the NIPF owners for educational programs. For instance, a landowner who will not be able to harvest for another twenty years may have a current need for other types of useful information besides harvesting and BMPs. Educational efforts regarding timber harvesting may be most effective with landowners when they are ready to harvest. Timing of current landowner assistance efforts often comes after poor harvest practices have been employed. In states with harvest permit processes, a beginning of the year mailing could alert landowners about educational opportunities. A better understanding of educational, economic and sociological aspects of landowners could enable federal and state agencies to determine the best time to have educational programs (Palmer, 1985).

These studies related to forest management decisions indicate that efforts to identify landowners who reforest their harvested sites and actively manage their stands may also identify landowners predisposed to implement BMPs. Higher income levels and larger tract-size also seem to allow landowners the luxury of reforestation or active management. These landowners may also be able to absorb the costs of implementing BMPs or at least to react positively or be neutral to the concepts. The corollary suggests that low-income timber harvesters may react positively to financial incentives that help them implement BMPs that they otherwise would perceive as too costly. It is also

apparent that if educational or technical assistance programs are developed to encourage timber production by landowners who have non-timber uses as their prime objectives that information about BMPs should be part of that effort. In fact, BMPs and water quality may be a hook that helps them find timber production more palatable.

To further understand the NIPF owners, more research needs to be done on NIPF owner knowledge and attitudes about management techniques. The above data suggest that adequate information on management techniques is not reaching the NIPF owner. An adequate channel of communication is necessary for the development and implementation of the proper types of educational programs.

Attitudes Towards BMPs and Water Quality

With the application of common sense and low-cost best management practices (BMPs), timber products may be harvested with minimal impact on water quality (Turton et al., 1992). The Environmental Protection Agency (EPA) defines BMPs as: "those methods, measures, or practices to prevent or reduce water pollution and include but are not limited to structural and nonstructural controls, and operation and maintenance procedures (Brown and Binkley, 1994). In simpler terms, BMPs are actions taken when building roads, harvesting, or preparing sites that minimize erosion and protect streams and water quality (Scoles et al., 1994). Where forestry related water quality problems have been studied in detail, results show that erosion and sedimentation are the most common problems, but related studies do show that relatively simple, cost effective BMPs can reduce their occurrence significantly (Irland and Connors, 1994).

The Water Quality Act of 1987 amended the Clean Water Act, encouraging implementation of BMPs by requiring planning procedures that made the link between cause and effect more explicit. Planning was accomplished by requiring states to submit detailed water quality plans that identified water bodies not meeting water quality standards; to identify categories of nonpoint sources or particular nonpoint sources responsible for violation of water quality standards in those water bodies; and to identify BMPs to control the violations of water quality standards (Brown and Binkley, 1994).

Most states that perform formal implementation surveys report at least 85% compliance with BMPs, although compliance tends to be lower for private than public or industry land, and lower for landowners owning smaller tracts than landowners with larger tracts of land (Brown and Binkley, 1994). In states with voluntary BMPs, BMP compliance on private land fell below 50 percent. Although, these figures suggest that regulatory compliance has more success, a recent article suggested that voluntary forestry BMPs coupled with aggressive education and compliance monitoring program is the most

cost effective method of achieving forest water quality protection (Shaffer and Aust. 1994). Current enforcement status of BMPs in 13 midsouth states is presented in Table 28 (NCASI, 1994). Only two states, Florida and North Carolina have what are considered to be regulatory BMPs.

Table 28. Current Enforcement Status of BMPs in the Midsouth (NCASI, 1994).

<u>State</u>	<u>BMP Implementation</u>
Alabama	voluntary
Arkansas	voluntary
Florida	regulatory
Georgia	voluntary
Kentucky	voluntary
Louisiana	voluntary
Mississippi	voluntary
North Carolina	regulatory
Oklahoma	voluntary
South Carolina	voluntary
Tennessee	voluntary
Texas	voluntary
Virginia	voluntary

Many in the forestry community fear that the rising concern with environmental issues, coupled with growing reliance upon legislative remedies to societal problems, is washing away the rights of property owners (Bliss, 1994). Bliss found that the overwhelming majority of owners and non-owners desire a reasonable balance between environmental protection and property rights. It is a mistaken perception that forest owners do not have environmental concerns. Their concerns are not always completely dependent upon timber harvesting. A 1992 survey found that in seven mid-south states the opinions of forest owners about traditional forest management practices; governmental regulation of tree cutting to protect environmental values; and tradeoffs between environmental protection, private property rights, and economic development did not differ significantly from those of the general public (Bliss and Nepal, 1994).

In another study, Pennsylvania landowners answered in the affirmative significantly more often than the general public did to participation in environmentally prompted actions taken during the previous year (Jones, Luloff, & Finley, 1994). Unfortunately, NIPF owners are too often unable to translate this activism into responsible management; they regularly make uninformed decisions on their woodlots (Jones, et al. 1994).

A survey by state, federal and conservation groups in South Carolina showed that while only slightly over 50% of the harvesting owners were aware of BMPs and only 37% had BMPs specified in logging contracts, 85% of the harvested sites were in compliance with minimum BMP standards (Henry and Bliss, 1994; McKee et al., 1991). The most consistent problems were excessive rutting and lack of streamside management zones (SMZs)(McKee et al., 1991). Comparatively, a study of BMP implementation in Alabama found that only 14 of 83 (17%) industrial and NIPF harvests with streams contained adequate SMZs (Alabama Forestry Commission, 1992).

A central Alabama study found that owner satisfaction with the condition of their forestland following harvest was more closely tied to future harvest and regeneration plans than was owner satisfaction with timber sale revenue (Henry and Bliss, 1994). Very few owners in this study took the precautions necessary to protect the water quality of adjacent waterways. Knowledge seems to be lacking about forestry BMPs. This shows a need to consider education, technical assistance, and financial incentive alternatives for NIPF owners with regard to water quality and BMPs. If these types of efforts are not shown to be effective, it can be expected that government agencies and legislative bodies will provide for regulation, whether or not it is cost effective or results in corresponding improvements to resources.

Options For Increasing BMP Implementation Rates On NIPF Lands

There are a variety of ways in which the public has historically attempted to affect management of private lands. Regulation has obviously been one alternative although usually a very costly one especially when compliance programs must be established. Other ways in which the public has affected NIPF owner management include cost-share assistance, tax incentives, technical assistance by professional foresters and education. External incentives such as income production opportunities property tax incentives, cost-sharing, and technical assistance appear primarily to affect the timing and extent of management activities (Bliss and Martin, 1990). However, education seems to have the most enduring effect on management because other external incentives are effective only after the decision to manage has been made (Bliss and Martin, 1990)

Incentives

Tax and cost-sharing assistance programs provide various types of financial assistance to NIPF landowners to encourage desirable forest practices such as tree planting, timber stand improvement, and forest retention (Cubbage, 1993). The principal federal cost-sharing programs are the Forestry Incentives Program (FIP) of 1973, the Agricultural Conservation Program (ACP) initiated in the 1960's, the former Soil Bank program (from 1956 to 1960), the Conservation Reserve Program (CRP) of 1985, and the Stewardship Incentive Program (SIP). The SIP broadens the commodity production orientation of the FIP and ACP programs to provide multiple-use benefits. CRP is supported by environmental groups as well as farm and forest groups because its principal goals are for conservation purposes--to reduce soil erosion, improve water quality, and provide wildlife habitat.

The questions surrounding these programs is whether they are worth the public expense given scarce budgets and whether public funds are being used when private investments would be made in the absence of the public funding (Cubbage, 1994). For example, estimates of environmental benefits from a 45 million acre Conservation Reserve Program (CRP) have ranged from \$6-\$13 billion over the life of the program compared to an estimated cost of over \$19 billion (Dicks and Coombs, 1992). However, the exact measure of the level of the benefits and costs of the CRP is elusive and varies considerably among various analyses. In addition, it is not clear whether cost-share programs, that are primarily land set-asides such as the CRP, distort land management rather than support good land management decisions.

Tax benefits for forest landowners include reductions of federal and associated state taxes on timber sale income, and in-state and local property taxes (Cubbage, 1993). State property taxes can be reduced by deferring taxes on trees until the timber is harvested in order to reduce cash flow problems for forest landowners and to prevent harvesting young timber. Also, current use property tax provisions, which exist in almost all states, allow qualifying agricultural or forest land to be taxed at rates prevalent for rural land uses in order to prevent forced conversion to more highly developed uses and to preserve green space in urban areas (Cubbage, 1993).

The politics of tax laws make changes in tax laws affecting forestry far more difficult to enact than more narrow cost-share or technical assistance programs. If government policy is to be effective, policymakers must recognize the resource base, the motives, objectives and economic needs of NIPF owners, then enact a tax system that encourages private investment and good personal forestland stewardship (Raper, 1995). However, arguments for tax incentives include that private funds and efforts from tax savings would be spent directly on specific actions on the land. This would be more efficient than first collecting public money, spending some of it on administrative structures and then sending a portion of the money back to private landowners through cost-share programs (DeCoster, 1995). Tax-incentives that promote long-term confidence in forest management decisions will serve to increase forest management

investment including the employment of environmental safeguards such as best management practices.

One way to make forest management attractive to the NIPF sector is to cut the cost of it (Franklin, 1980). To reduce the major cost of regeneration, preharvest planning, including BMP and water quality education, needs to be provided to the NIPF owner. Financial incentives may increase adoption of BMPs because some of the potential risks are negated. The landowner is able to implement some forest management techniques with less fear of economic loss or personal failure. Because forest industries are buying most of the wood, they have a unique opportunity to help provide preharvest planning to the forest owner (Franklin, 1980), although educational programs prior to the point of sale are important to allow the landowner decision-making time. Thus, coordination of educational efforts by extension, state foresters, consultants and forest industry may serve to advance BMP implementation.

Generally, the more discrepancy between market outcomes and the perceived socially desirable outcomes, the more likely there will be calls for mandatory public interventions (regulation and government ownership) rather than voluntary interventions such as education and financial assistance (Cubbage, 1993). Royer and Vasievich (1987) suggest that landowners are motivated more by the satisfaction associated with good stewardship rather than by monetary returns. Additional research is needed to know what causes landowners to respond to changing situations including the projection of declining timber inventories over the next 50 years.

Technical Assistance

The initial federal-state cooperative efforts for the protection of private forestlands were initiated by the Clarke-McNary Act of 1924 and expanded upon by the Cooperative Forest Management Act of 1950, the Cooperative Forestry Assistance Act of 1978, and the forest stewardship title of the 1990 farm bill (Cubbage, 1993). These efforts help provide technical assistance to NIPF owners regarding timber production or broader multiple-use management of forestlands. Political support for these technical

assistance programs has been pervasive, but recent federal and state budget-balancing programs have resulted in a large reduction in the programs (Cubbage, 1993).

Straka, et al. (1986) found that technical assistance provided by service foresters provided cost/benefit ratios of 20.4, 8.2, and 2.6 at interest rates of 4, 7, and 10 percent. This does not include the multiplier effects on the statewide economy of \$500,000 generated annually by a service forester or the increased tax revenues generated.

Rosen (1988) found that the involvement in New York by professional foresters in non-industrial private timber management is limited in scope although owners were responsive to an offer of information and assistance with timber management. In the past, observers of non-industrial private forestry have been more preoccupied with the effect of professional forestry assistance rather than its market penetration. A clear need is shown for professional foresters to be involved in providing assistance on more acres. A national survey estimated that only 5 percent of the private forestland owners have a written management plan (Birch, 1994). This study also reports, for the South, that an average of 55 percent of NIPF owned acres do not have management plans. In Pennsylvania, only 10 percent of surveyed owners had management plans and only 32 percent had forester involvement (Egan, 1993).

When asked which program (technical assistance, cost-sharing, forest tax laws) they would prefer if budgets only allowed one, Tree Farm Award winners in Wisconsin unanimously agreed it would be technical assistance from professional foresters (Bliss and Martin, 1990).

While viable returns to public investment in technical assistance programs may exist, the total level of funding and personnel involved in these programs may limit their effectiveness. These programs may also be at risk if they continue to be cut first in budgets and if staffed with inexperienced or poorly trained foresters. However, given the level of investment, it seems that the provision of forestry assistance is an effective and cost-efficient program that achieves its objectives of disseminating technical knowledge on forest management and increasing future timber supplies (Cubbage, et al., 1985).

Educational Programs

Education seems to have the most enduring effect on management because external incentives are effective only after the decision to manage has been made (Bliss and Martin, 1990). Egan and Jones (1993) support the idea that information translates to more favorable outcomes. In a statewide Pennsylvania survey, 94% of the landowners said they need more information to properly manage their land (Jones, 1995).

Pennsylvania landowners and the general public selected education as the strategy that they thought could most effectively encourage landowners to practice forest management (Jones, et al., 1994).

A study of the communication behavior of scientists, foresters, and landowners in Virginia, North Carolina, South Carolina and Georgia found that one-third of NIPF landowners receive no forest management information while scientific information was primarily directed toward other scientists (Baldwin and Haymond, 1994). The study further indicated that landowners most commonly reported contact with other landowners as their main information source. Bliss (1994) discussed the divergent views expressed by foresters and forest owners, suggesting that "foresters are seriously out of sync with the views prevailing among forest owners."

Landowners make decisions based on things that are of value to them. Extensive research has shown that a relatively small group of adopters of innovations can be classified as early adopters (Rogers and Shoemaker, 1971). The early adopters are opinion leaders who influence other people in the community who are seeking information and advice when considering making changes. Diffusion-of-innovations research about other social systems (especially that of farmers) has shown that efficient change programs are directed initially to early adopters (Rogers, 1983). Interviews with sixty-three opinion leaders in rural South Carolina found that the number of forest management practices implemented was related positively to the owners professed importance of the value of improving the forest for uses other than timber production (Haymond, 1988). By their example, opinion leaders may be able to play a critical role in getting NIPF owners to actively manage their forestland or adopt BMPs.

A Washington state survey shows that owners commonly receive assistance/education from more than one source, reflecting the fact that NIPF forestry programs have worked historically as a system, with each part serving a different function (Blatner et al., 1991). Several states have implemented Master Woodland Owner programs to help landowners have more intensive educational experience, but also to multiply the effects of extension programming. Master volunteer programs are based on providing hours of intensive training to volunteers in exchange for volunteer time to help other landowners. These programs can certainly be adopted to include BMP and water quality training. However, these programs are not without risks. Losing touch with clientele, liability of program delivery, the time involved with training and reduced program control are valid concerns (Laughlin and Schmidt, 1995).

Effective education is one goal of research focused on understanding the characteristics, motivations, attitudes and knowledge of NIPF owners. Extension agents, companies, foresters and others want to know how best to target education toward NIPF owners. While many NIPF landowners are receptive to education, some landowners question the assistance they receive. Cabbage (1993) interviewed one forest owner dissatisfied with the information given by a local forester whom he believed caused him to waste money to achieve an impossible outcome.

Deneke and Fischer (1985) see education as a means to provide the necessary information for landowners to achieve individual goals while at the same time improving the productivity of woodlands to help achieve national objectives. Extension education is a tool for empowering landowners to practice the land ethic that most already embrace (Salwasser, 1994).

Extension educational programs have been shown to be an effective use of taxpayer dollars. Estimated benefit/cost ratios of three forestry extension programs for landowners were 15.9, 21.2, and 24.1 (Anderson, 1987). Satellite videoconferencing has also been used by Extension to reach the geographically scattered NIPF owners with forestry education and inspire them to action (Anderson, 1993).

In addition, two educational programs implemented by the Florida Cooperative Extension Service, the Seven-County Reforestation Program and the Limited-Resource

Landowner Program, have been effective in encouraging and aiding landowners to reforest their harvested forestland, poorly stocked forestland, and idle cropland (Duryea, et al., 1987). The long range objectives were to improve the productivity of NIPF lands by (1) providing information on reforestation and forest management practices and (2) motivating landowners to manage their land for forest resources. Twenty-three publications to aid landowners in reforesting and managing their land were reproduced. Workshops and field demonstrations for landowners, news releases, one-on-one conferences and discussions, announcements at other farm meetings, IFAS (Institute of Food and Agricultural Sciences) signs at demonstration plots, and radio and television programs were the different ways that information was disseminated. Fifty-eight percent more acres were planted with trees due to the Seven-County Reforestation Program and the Limited-Resource Landowner Program was responsible for 18 percent of landowners' idle acres being planted to trees and for landowner awareness of assistance programs increasing from 47 percent to 70 percent (Duryea, et al., 1987).

Recently, the concept of ecosystem management has come to the forefront. The USDA Cooperative Extension Service, under the 1994 Renewable Resources Extension Act, awarded \$480,000 to 11 projects to develop and deliver educational programs on forest ecosystem management issues (Salwasser, 1994). This program, if funding continues, may be asked to focus on BMP education as part of ecosystem management educational programs. Education can be a powerful and welcome tool for encouraging private landowners to apply ecosystem science to woodland management (Salwasser, 1994). While some educational programs have been meaningful, many have not been designed to effectively deal with a variety of owner interests and needs (Kurtz and Irland, 1987). Owner needs should be identified more clearly, agency actions needed to be coordinated effectively, and communication techniques should always be optimally chosen.

Kurtz and Irland (1987) believe that management practices can be encouraged that will lead to accomplishment of both timber and wildlife objectives. In addition, they suggest that educational and technical assistance serve as interventions between an

owner's general attitude toward management and their perception of management opportunities.

It should never be assumed that everything is known about what NIPF owners believe and what information they need (Jones, et al., 1994). The Assistant Deputy Minister, Canadian Forest Service, Dr. Yvan Hardy, said we should start listening to the public, and remember that we are servants of the public. Bliss (1994) suggested we spend "less time defending unpopular practices and more time demonstrating practices which satisfy silvicultural and environmental goals in socially acceptable ways." Fortmann and Fairfax (1991) urged the forestry profession to overcome the presumption that resource management is a technical, not a social, undertaking. As long as we continue to base our outreach efforts on the mythical owner we will fail to capture the real power of education.

New research is proving to be very helpful in yielding a better understanding of landowner attitudes, motivations, and behavior. New groups and participants, new technologies, and new information needs are coming to the forefront, yet many of the tried and true systems and methods still retain their relevance. (Irland, 1994).

Summary and Research Needs

Considering preliminary compliance studies it appears that concern about BMP implementation on NIPF lands is justified. This new concern about NIPF owner management is not unlike the historical concern about lack of reforestation on these lands and experiences in previous public policy programs can be used to provide insight to the new challenges.

Acknowledging that a one on one educational effort to affect BMP adoption by NIPF owners may not be fiscally realistic, the challenge then is to identify the most important and most likely responsive landowners to which to target program efforts. Additionally, it must be recognized that no one program delivery method will likely be successful in reaching all landowners, thereby indicating that a varied approach will be required.

Recognizing the diversity of landowner objectives is important to the discussion of BMP adoption. Landowners who will harvest timber should arguably be targeted first. However, landowners with compatible goals such as recreation or wildlife habitat may also benefit from BMP programs.

Landowner demographics, including resident status may be useful indicators to identify landowners to target. Income, education, tract size and previous harvesting history may be variables to consider initially. Landowner characteristics can differ significantly from county to county indicating that programs may need to be modified locally for success.

It is apparent from recent literature that NIPF owners are not different from the general public in their environmental views. This suggests that landowners in general would not be negative to adopting BMPs given that other constraints such as knowledge, technical help and financial wherewithal are addressed.

From this initial literature review it appears that financial incentives such as cost-share programs or tax relief may be appropriate to consider to encourage some landowner groups to adopt BMPs. It is also clear that landowners will react most positively to one on one technical assistance and educational programs that raise their awareness level, with education having the most enduring effect.

The pilot study to examine the knowledge and attitudes of NIPF owners to BMPs and water quality will focus on some of these factors to better assess how characteristics of NIPF owners may affect the effectiveness of various delivery mechanisms. The intent is to identify how various options might be tailored to different groups of NIPF owners. Although the pilot study in two Oklahoma counties will be helpful in honing a survey instrument, the county to county variance in landowner characteristics strongly suggests that a regionwide survey be implemented throughout the southern states.

CHAPTER 3

REPORT TO NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT

Non-industrial private forest landowners (NIPF) own about 58 percent of the commercial forest resource in the United States and about 70 percent in the South (USDA Forest Service, 1982; Bliss, 1994). Harvesting on NIPF lands accounts for approximately 40 percent of the total U.S. softwood harvest and 68 percent of the nation's hardwood removals (Cubbage and Wear, 1993). For these reasons, NIPF owners can have significant impacts on water quality through their forest harvest and regeneration decisions. Failure of some landowners and loggers to use best management practices (BMPs) is perceived to be an important cause of water quality problems associated with forest management. The purpose of this study was to investigate factors affecting private landowner knowledge, attitudes and opinions about forest management, BMPs, water quality as well as their adoption of BMPs. Demographic characteristics, management status, resident status and environmental attitudes of landowners were examined as well as their preferences for incentives and methods of communication. It is hoped by using these variables to assess landowner knowledge and attitudes that insight into the most effective ways to encourage NIPF use of BMPs will be identified.

METHODOLOGY

Study Area and Population

The study area selected for this research included Latimer and McCurtain counties in Oklahoma. The study population consisted of NIPF landowners in the two target counties who owned at least 40 acres of forest land. A database previously compiled by

the Extension Forest, Wildlife and Aquaculture Program at Oklahoma State University (Donovan, 1986) and continuously updated was used as a mailing list for this study.

The 1986 database was originally developed using aerial photographs from the Agricultural Stabilization and Conservation Service (ASCS) offices to identify potential NIPF land. Using legal descriptions and County tax rolls, or Soil Conservation Service (SCS) ownership records, over 8,000 NIPF landowners in 18 eastern Oklahoma Counties were identified who owned at least 40 acres of forest land.

Walkingstick (1992) compiled a new database of the same counties and investigated the objectives, management practices and perceptions of NIPF landowners. For this reason, comparisons will be made to Walkingstick's analysis throughout this study, to recognize differences between the populations in each study and evaluate survey processes.

Questionnaire Development

Survey methods evaluated for use in this study included (1) phone questionnaire, (2) focus groups and (3) mail questionnaire. Based on time and cost constraints, a mail questionnaire was the method selected to collect data.

To achieve careful questionnaire design and structure, professionals in fields of sociology, statistics and forestry were consulted. The questionnaire was designed to allow comparisons to those concepts previously studied in NIPF research. Topics not previously studied in Oklahoma were also included in the questionnaire. The questionnaire content included:

- *Ownership Characteristics
- *Forest Management Activities
- *General Attitudes Toward Forests
- *Knowledge about best management practices
- *Opinions on Forest Management
- *Demographic Information

To achieve the highest rate of response possible, the questionnaire design and administration was based on a well established and effective method, the "total design method" (Dillman, 1978). The total design method incorporates cover letters (Appendix a), follow-up reminders (Appendix b) and postcards (Appendix b), visual appeal of the instrument, and careful questionnaire design and structure.

Data Analysis

For purpose of analysis and consistency with Walkingstick (1992), forest managers were defined as respondents who had conducted at least one forest management activity. Previous research suggests forest managers differ from those landowners who do not manage for forest products (Greene, et al, 1986) and that resident and non-residents also represent different populations (Alden, 1990; and Walkingstick, 1992). Landowner differences by County were also anticipated.

Landowner responses were grouped by county. Seventeen questionnaires were returned without county identification. Those questionnaires were used in the analyses when data from the two counties were combined.

Responses by county were examined using chi-square analyses to determine statistically significant differences using an alpha of 0.05. Chi-square analysis is a non-parametric test often used in the behavior and social sciences when data are nominal or ordinal. Chi-square tests were used in analyzing demographic information and questions requiring yes/no responses. Gender, employment status, and occupation are nominal variables whereas education and income are ordinal variables.

T-tests were also used to determine if the sample population of private landowners actually represented the total population of private landowners. T-tests were also used to test hypotheses associated with fill in the blank questions such as age and forest acreage owned.

One-way analysis of variance (ANOVA) was used, in several instances, for analyses involving more than two variables. ANOVA was used when analyzing responses to whether landowners were using BMPs and in comparisons involving

demographic variables and residence status. ANOVA can be used when data are nominal or ordinal.

A gamma was used in analyses where ordinal data was represented. A gamma was used for comparisons involving levels of education and income.

Response Rates

There were 843 landowners in both counties included in the database (Latimer-599, McCurtain-244). There were 85 (approximately 10%) unusable questionnaires returned. These included questionnaires returned because of insufficient addresses or the landowners were deceased or no longer owned forest land. In addition, 14 questionnaires were returned which were not completed correctly. The unusable questionnaires were removed from the sample resulting in an adjusted sample of 758. A final response rate of 28.2% (214/758) was obtained. The Latimer County response rate was 29.1% and the McCurtain County response rate was 26.2%. Total and County response rates are summarized in Table 1.

TABLE 1. QUESTIONNAIRE RESPONSE RATE BY COUNTY.

	Latimer County	McCurtain County	Total
	Number Percent	Number Percent	Number Percent
Original sample	599 100%	244 100%	843 100%
<u>Unusable:</u>	66 11%	19 17.8%	85 10.1%
Insufficient address	35 53%	6 31.6%	41 48.2%
Deceased	10 15.1%	6 31.6%	16 18.8%
Sold property	5 7.6%	1 5.3%	6 7.1%
Own no land	5 7.6%	3 15.8%	8 9.4%
Questionnaire not completed correctly	11 16.7%	3 15.8%	14 16.5%
Adjusted sample	533 89%	225 92.2%	758 89.9%
Usable response	155 29.1%	59 26.2%	214 28.2%

GENERAL DEMOGRAPHIC CHARACTERISTICS

Description of Landowner Respondents

Landowner demographic characteristics include gender, age, employment status, occupation, education and income. Other demographic characteristics discussed are the amount of forest land owned and where landowners live.

Demographic data were analyzed by County, by resident status and by grouping respondents from both Counties together. Demographic information is presented in Tables 2-7.

The NIPF landowners ranged in age from 31-93. About 70% of the respondents are 56 years of age or older. Only 10% of landowners are 45 years or younger. The majority of landowners are high school graduates (91%) while a substantial percentage (24%) have done graduate work. Incomes range from under \$15,000 to over \$500,000 per year. Almost 38% of the landowners have annual incomes under \$30,000 (Table 4). Seventy-five percent of the landowners in the two Counties combined are male (Table 5). Over 60% are retired (Table 7). Twenty-five percent of the retired landowners remain employed. A majority of the landowners cite professional/managerial (39%) or farmer/rancher (29%) as their occupation (Table 6).

The only demographic characteristic to differ significantly by County in this study was occupation. McCurtain County had a higher percentage of both farmers/ranchers (44%) and people working in forestry (12%) than Latimer County (22%, 0%).

The demographics of landowners in this study are generally similar to landowners across the nation (Rosson, Jr. And Doolittle, 1987; U.S Forest Service, 1990; Walkingstick, 1992; Birch, 1994) although this study found that landowners in Latimer and McCurtain Counties own more acres (Latimer- 105 acres, McCurtain- 352 acres) on average than was documented for NIPF landowners in a 1990 USFS study (69 acres).

Walkingstick (1992), found similar demographic patterns. She reported that the largest percentage of landowners were male, 60 to 62 years old, of Scottish-Irish descent, had completed high school, were retired professionals, earned \$30,000 to \$39,999 a year and did not live on their forest land.

In contrast to our study, Walkingstick (1992) found a statistically significant difference ($p = 0.03$) in education level between landowners in Latimer and McCurtain Counties. McCurtain County respondents had less education than respondents from Latimer County. Approximately 17% of McCurtain County respondents had less than a high school education. In Latimer County, 6.8% of respondents had less than a high school education. Despite these differences, in 1990, the percentage of respondents with a graduate degree was approximately equal across the two Counties (14.7%). Our study found no statistically significant differences in education by County. The percentage of landowners with post-graduate work (24%) is greater for our study than for the Walkingstick study (14.7%).

TABLE 2. AGE BY COUNTY(Q32).

	Latimer County	McCurtain County	Total
	Number (Row Percent) Column Percent	Number (Row Percent) Column Percent	Number (Row Percent) Column Percent
31-45	11 (52.4%) 7.1%	10 (47.6%) 16.7%	21 (100%) 9.8%
46-55	32 (80%) 20.8%	8 (20%) 13.3%	40 (100%) 18.7%
56-65	42 (76.4%) 27.3%	13 (23.6%) 21.7%	55 (100%) 25.7%
66-75	46 (71.9%) 29.9%	18 (28.1%) 30.0%	64 (100%) 29.9%
76-85	19 (65.5%) 12.3%	10 (34.5%) 16.7%	29 (100%) 13.6%
86-95	4 (80%) 2.6%	1 (20%) 1.7%	5 (100%) 2.3%

chi-square=6.56, df=5, p=0.256

All the information in tabular form will follow this format

TABLE 3. EDUCATION BY COUNTY (Q35).

	Latimer County	McCurtain County	Total
Education			
Less than high school graduate	12 (66.7%) 8.1%	6 (33.3%) 10.7%	18 (100%) 8.8%
High school graduate	34 (73.9%) 22.8%	12 (26.1%) 21.4%	46 (100%) 22.4%
Some college	34 (79.1%) 22.8%	9 (20.9%) 16.1%	43 (100%) 21%
Trade/technical/ vocational training	13 (76.5%) 8.7%	4 (23.5%) 7.1%	17 (100%) 8.3%
College graduate	24 (75%) 16.1%	8 (25%) 14.4%	32 (100%) 15.6%
Graduate work/ degree	32 (65.3%) 21.5%	17 (34.7%) 30.4%	49 (100%) 23.9%

chi-square=2.80, df=5, p=0.73

TABLE 4. INCOME BY COUNTY (Q36).

	Latimer County	McCurtain County	Total
<u>Income</u>			
under \$15,000	21 (75%) 17.2%	7 (25%) 13.7%	28 (100%) 16.2%
\$15,000-\$29,999	22 (59.5%) 18.0%	15 (40.5%) 29.4%	37 (100%) 21.4%
\$30,000-\$49,999	36 (76.6%) 29.5%	11 (23.4%) 21.6%	47 (100%) 27.2%
\$50,000-\$69,999	21 (77.8%) 17.2%	6 (22.2%) 11.8%	27 (100%) 15.6%
\$70,000-\$99,999	9 (75%) 7.4%	3 (25%) 5.9%	12 (100%) 6.9%
\$100,000-\$149,000	7 (63.6%) 5.7%	4 (36.4%) 7.8%	11 (100%) 6.4%
\$150,000-\$499,000	5 (62.5%) 4.1%	3 (37.5%) 5.9%	8 (100%) 4.6%
\$500,000+	1 (33.3%) 0.8%	2 (66.7%) 3.9%	3 (100%) 1.7%

chi-square=6.58, df=7, p=0.47

TABLE 5. GENDER BY COUNTY (Q31).

	Latimer County	McCurtain County	Total
Male	112 (70.4%) 73.2%	47 (29.6%) 82.5%	159 (100%) 75.7%
Female	41 (80.4%) 26.8%	10 (19.6%) 17.5%	51 (100%) 24.3%

chi-square=1.93, df=1, p=0.16

TABLE 6. OCCUPATION BY COUNTY (Q34).

	Latimer County	McCurtain County	Total
Student	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%
Professional/managerial	32 (74.4%) 40%	11 (25.6%) 34.4%	43 (100%) 38.9%
Secretarial/clerical	2 (100%) 2.5%	0 (0%) 0%	2 (100%) 1.8%
Services/labor	8 (80%) 10%	2 (20%) 6.3%	10 (100%) 8.9%
Sales/retail sales	4 (80%) 5%	1 (20%) 3.1%	5 (100%) 4.5%
Farmer/rancher	18 (56.3%) 22.5%	14 (43.8%) 43.8%	32 (100%) 28.6%
Military	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%
Forest industry/forestry	0 (0%) 0%	4 (100%) 12.5%	4 (100%) 3.6%
Other	16 (100%) 20%	0 (0%) 0%	16 (100%) 14.3%

chi-square=21.5, df=6, p=0.001

TABLE 7. EMPLOYMENT STATUS BY COUNTY (Q33).

	Latimer County	McCurtain County	Total
Employed	59 (73.8%) 39.1%	21 (26.3%) 36.8%	80 (100%) 38.5%
Retired	71 (74.7%) 47.0%	24 (25.3%) 42.1%	95 (100%) 45.7%
Retired and employed	21 (63.6%) 13.9%	12 (36.4%) 21.1%	33 (100%) 15.9%

chi-square=1.60, df=2, p=0.45

Total forest land acreage

Almost 77% of respondents own 250 acres or less of forest land (Table 8). Under 5% own over 1000 acres. Latimer County respondents own an average of 105 acres whereas McCurtain County respondents own an average of 352 acres ($p = 0.006$) (Table 9). This differs from what was reported by Walkingstick (1992). She did not find a significant difference ($p = 0.30$) in size of forest land ownership in her sample population: (204.4 acres) for Latimer and (266.8 acres) for McCurtain. Among responses for our study, the largest ownership in Latimer County was 2541 acres and 3400 acres for McCurtain County. It would appear that McCurtain County landowners have larger forest land holdings although there are fewer landowners in McCurtain County compared to Latimer County. In Latimer County, almost 84% own 250 or fewer acres whereas in McCurtain County just over 63% own 250 or fewer acres. Only 5% of respondents in both Counties own between 1001-5000 acres.

TABLE 8. HOW MANY ACRES OF FOREST LAND DO YOU OWN IN OKLAHOMA? (Q1).

Forest Acreage	Latimer County	McCurtain County	Total
0-40	38 (82.6%) 24.7%	8 (17.4%) 13.3%	51 (100%) 22.1%
41-100	46 (73%) 29.9%	17 (27%) 28.3%	65 (100%) 28.1%
101-250	45 (77.6%) 29.2%	13 (22.4%) 21.7%	61 (100%) 26.4%
251-500	13 (59.1%) 8.4%	9 (40.9%) 15.0%	27 (100%) 11.7%
501-1000	5 (33.3%) 3.2%	10 (66.7%) 16.7%	16 (100%) 6.9%
1001-5000	7 (70%) 4.5%	3 (30%) 5.0%	11 (100%) 4.8%

chi-square=16.4, df=5, p= 0.006

TABLE 9. HOW MANY ACRES OF FOREST LAND DO YOU OWN IN OKLAHOMA? (Q1).

County	Average acreage	Minimum	Maximum
Latimer	104.6	5	2541
McCurtain	351.5	20	3400

p= 0.006; t-test

Resident/ Non-Resident Owners

Resident landowners were defined as those landowners who either live directly on their forest land or who live in the same County as their forest land. Non-resident landowners were defined as those landowners living in a different Oklahoma County from their forest land or in another state. By this definition, 55% of the landowners in this study (Table 10) were resident landowners. McCurtain County had a significantly higher percentage of resident landowners (68%) than Latimer County (50%).

The residence status of the respondents in this study does not reflect the resident status of the landowners in the two Counties as represented in the database. From the mailing list, 27% were resident landowners and 73% were non-resident landowners in Latimer County compared to 73% resident and 27% non-resident in McCurtain County. The relative percentages of resident and non-resident landowners in the database has not changed over time. Donovan (1986) found that in Latimer County, almost 74% were non-resident landowners (Table 10) and that in McCurtain County, 31% were non-resident landowners.

Walkingstick's (1992) sample population generally agrees with resident/non-resident percentages of the database. Although, in her study a different database was used and she only mailed questionnaires to 1/3 of the landowners in each of the two Counties. No reason is evident why more resident than non-resident landowners responded to the questionnaires in our study.

TABLE 10. NUMBER AND PERCENT OF RESIDENT AND NON-RESIDENT LANDOWNERS FOR DONOVAN (1986), WALKINGSTICK (1992) AND OUR STUDY.

Total Number and Percent of Residents and Non-Residents (Donovan, 1986).

	Latimer County	McCurtain County	Total
Resident	258 (48.6%) 26.2%	273 (51.4%) 68.6%	531 (100%) 38.4%
Non- Resident	728 (85.3%) 73.8%	125 (14.7%) 31.4%	853 (100%) 61.6%

Total Number and Percent of Residents and Non-Residents (Walkingstick, 1992).

	Latimer County	McCurtain County	Total
Resident	17 (27%) 17.8%	47 (73%) 55.3%	90 (100%) 35.6%
Non- Resident	78 (67%) 82.1%	38 (33%) 44.7%	179 (100%) 64.4%

$p < 0.001$

Total Number and Percent of Residents and Non-Residents for our Study

	Latimer County	McCurtain County	Total
Resident	77 (66.4%) 50%	39 (33.6%) 68.4%	116 (100%) 55%
Non- Resident	77 (81.1%) 50%	18 (18.9%) 31.6%	95 (100%) 45%

chi-square=5.70, df=1, $p=0.017$

Resident and Demographic Comparisons

To test whether Oklahoma resident and non-resident landowners represented different populations, analyses of demographic characteristics were conducted. There were no significant differences between resident and non-resident respondents on gender, age, occupation, education, income, or forest acreage (Tables 11-16).

While 46 percent of resident landowners were employed only 28% of non-resident landowners were employed ($p = 0.003$) (Table 17). In addition, 72% of landowners who were retired and employed are resident landowners.

The majority of resident landowners (66%) live on a farm compared to just over 13% of non-resident landowners ($p < 0.001$) (Table 18). Approximately 69% of non-residents live in large cities or suburbs compared to less than 1% of resident landowners.

Waikingsstick (1992) found significant differences in education level ($p = 0.001$), gender ($p = 0.02$), and size of home community ($p < 0.001$) between resident and non-resident landowners.

A study of New York NIPF landowners (Alden, 1990) concluded that resident and non-resident landowners represented two distinct populations based on ownership objectives. Alden (1990) determined that the majority of landowners in New York were married and male. The mean age of residents, 57 years, was significantly higher ($p < 0.024$) than that of non-residents, 53 years. The education and income distributions between residents and non-residents also differed significantly ($p < 0.001$). In general, she found that non-residents had completed more years of formal education and had greater incomes than non-residents.

For our study, we can not conclude that resident and non-resident landowners represent two distinct populations based on ownership objectives. However, resident landowners answered differently than non-resident landowners to the following objectives: personal uses such as firewood and fence posts ($p < 0.001$); woodland is part of my residence ($p < 0.001$); wildlife ($p = 0.001$); solitude ($p < 0.001$); scenic enjoyment ($p = 0.007$); and grazing ($p < 0.001$) (Table 20).

In addition, we cannot conclude that resident and non-resident landowners are two distinct populations based on demographic results. The only significant differences

found among resident and non-resident landowners were in employment status (more non-resident landowners were retired) and in the size of the home community (66% of resident landowners lived on a farm compared to just 13% for non-resident landowners).

TABLE 11. GENDER (Q31) BY RESIDENCE STATUS (Q2).

Gender	Male	Female
Resident	90 (79.6%) 57.3%	23 (20.4%) 45.1%
Non-resident	67 (70.5%) 42.7%	28 (29.5%) 54.9%

chi-square=3.11, df=1, p=0.08

TABLE 12. AGE (Q32) BY RESIDENCE STATUS (Q2).

	Resident	Non-Resident
31-45	14 (63.6%) 11.1%	8 (36.4%) 7.7%
46-55	26 (60.5%) 20.6%	17 (39.5%) 16.3%
56-65	38 (63.3%) 30.2%	22 (36.7%) 21.2%
66-75	30 (44.8%) 23.8%	37 (78.7%) 35.6%
76-85	15 (50%) 11.9%	15 (50%) 14.4%
86-95	3 (37.5%) 2.4%	5 (62.5%) 4.8%

p = 0.12; anova

	Number	Average Age
Resident	122	62.3
Non-Resident	100	64.9

anova, df=1, f=2.46, p = 0.12

TABLE 13. OCCUPATION (Q34) BY RESIDENCE STATUS (Q2).

	Resident	Non-Resident
Student	0 (0%) 0%	0 (0%) 0%
Professional/managerial	21 (50%) 32.3%	21 (50%) 75%
Secretarial/clerical	1 (50%) 1.5%	1 (50%) 3.6%
Services/labor	7 (70%) 10.8%	3 (30%) 10.7%
Sales/retail sales	4 (80%) 6.1%	1 (20%) 3.6%
Farmer/rancher	29 (96.7%) 44.6%	1 (3.3%) 3.6%
Military	0 (0%) 0%	0 (0%) 0%
Forest industry/forestry	3 (75%) 4.6%	1 (25%) 3.6%

*p value not relevant due to small sample size in different occupation categories

TABLE 14. EDUCATION (Q35) BY RESIDENCE STATUS (Q2).

	Resident	Non-Resident
Less than high school graduate	14 (73.7%) 13.9%	5 (26.3%) 5.4%
High school graduate	27 (58.7%) 26.7%	19 (41.3%) 20.7%
Some college	24 (55.8%) 23.8%	19 (44.2%) 20.7%
Trade/technical vocational training	10 (58.8%) 9.9%	7 (41.2%) 7.6%
College graduate	15 (46.9%) 14.9%	17 (53.1%) 18.5%
Graduate work/degree	11 (30.6%) 10.9%	25 (69.4%) 27.2%

chi-square=5.70, df=5, p=0.34, gamma = 0.09

TABLE 15. INCOME (Q36) BY RESIDENCE STATUS (Q2).

	Resident	Non-Resident
Under \$15,000	17 (60.7%) 17.8%	11 (39.3%) 14.7%
\$15,000-\$29,999	23 (62.2%) 24%	14 (37.8%) 18.7%
\$30,000-\$49,999	29 (60.4%) 30.2%	19 (39.6%) 25.3%
\$50,000-\$69,999	9 (36%) 9.4%	16 (64%) 21.3%
\$70,000-\$99,000	8 (66.7%) 8.3%	4 (33.3%) 5.35
\$100,000-\$149,000	5 (45.5%) 5.2%	6 (54.5%) 8.0%
\$150,000-\$499,000	4 (57.1%) 4.25	3 (42.9%) 4.0%
\$500,000 or more	1 (33.3%) 1.0%	2 (66.7%) 2.7%

chi-square=6.32, df=7, p=0.50, gamma = 0.101

TABLE 16. HOW MANY ACRES OF FOREST LAND DO YOU OWN IN OKLAHOMA? (Q1) GROUPED BY RESIDENCE STATUS (Q2).

Total				
	Number	Mean	Standard Deviation	Standard Error
Resident	124	273.5	457.2	41.1
Non-resident	99	267.5	491.4	49.4

anova, f=1.16, df=221, p = 0.60

Latimer County				
	Number	Mean	Standard Deviation	Standard Error
Resident	76	197.1	346.1	39.7
Non-Resident	74	239.4	414.7	48.2

anova, F=1.44, df=148, p= 0.25

McCurtain County				
	Number	Mean	Standard Deviation	Standard Error
Resident	38	372.5	542.5	88.0
Non-Resident	18	437.4	776.1	182.9

anova, F=2.05, df=54, p = 0.94

TABLE 17. EMPLOYMENT STATUS (Q33) BY RESIDENCE STATUS (Q2).

	Resident	Non-Resident
Employed	51 (65.4%) 45.9%	27 (34.6%) 28.4%
Retired	37 (38.5%) 33.3%	59 (61.5%) 62.1%
Retired and employed	23 (71.9%) 20.7%	9 (28.1%) 9.5%

chi-square=16.0, df=2, p < 0.001

TABLE 18. RESIDENCE STATUS (Q2) AND HOW LANDOWNERS' DESCRIBE WHERE THEY LIVE (Q4).

	Resident	Non-Resident
Farm	73 (85.9%) 66.4%	12 (14.1%) 13.2%
A rural area, not on a farm	26 (81.2%) 23.6%	6 (18.8%) 6.6%
A town, under 10,000	10 (50%) 9.1%	10 (50%) 11%
A city, 10,000 to under 100,000	1 (4.8%) 0.9%	20 (95.2%) 22%
A city, 100,000 or larger	0 (0%) 0%	31 (100%) 34.0%
A suburb of a city, 100,000 or larger	0 (0%) 0%	12 (100%) 13.2%

chi-square=115.7, df=5, p<0.001

LANDOWNER OBJECTIVES AND MANAGEMENT STATUS

Forest landowners were asked to identify their ownership objectives. Landowner objectives will influence how a landowner chooses to manage or not manage their land.

There was not a significant difference between Counties regarding landowner objectives (Table 19). However, in every category of objective, except two, McCurtain County landowners responded at a higher percentage than Latimer County landowners. Almost 70% of the landowners in McCurtain County grow timber for sale compared to only 27% in Latimer County. Latimer County landowners indicated that income from activities other than selling trees was more important (21%) than McCurtain County landowners (12%).

Combining the two Counties, there are more respondents who own land for an estate to pass on to their children (57%) than own land to grow timber (39%), as income from other than selling trees (19%) or as a land investment (22%). More respondents have aesthetic objectives (such as wildlife, solitude, recreational activities, enjoyment of forest land, scenic enjoyment and stewardship- an average of 39%) than they have monetary objectives (average of 26%).

There were significant differences between resident and non-resident landowner objectives for personal use such as firewood and fence posts ($p < 0.001$), having the woodland as part of their residence ($p < 0.001$), wildlife ($p = 0.001$), solitude ($p < 0.001$), scenic enjoyment ($p = 0.007$), and grazing ($p < 0.001$). Almost 50% of resident landowners list personal uses such as firewood and fence posts as one of their landowner objectives (Table 20). Seventy-seven percent of landowners who have solitude as an objective are resident landowners. Forty-two percent of resident landowners compared to 25% of non-resident landowners list scenic enjoyment as a landowner objective. Eighty percent of landowners who have grazing as an objective are resident landowners. Resident landowners listed a higher percentage of landowner objectives than non-resident

landowners. However, non-resident landowners listed higher percentages for land investment, income from other than selling trees and protecting forests for the future.

Future Plans for Forest Land

About 78% of respondents expect to pass their forest land on to their children (Table 21). This figure is larger than the percentage of landowners who reported passing their estate to their children as an objective (57%) (Table 19). This decrease was evident in both Counties. This fact indicates a potential disconnect between landowner long-term expectations and their current objectives. Almost 74% and 88% of Latimer and McCurtain County respondents, respectively, plan to pass their forest land on to their children. However, approximately 52% of Latimer County landowners and 71% of McCurtain County landowners reported this as an objective. Possible explanations could be that some respondents do not consider passing their land to their children as an objective for which they need to manage and some respondents might never have contemplated what would happen to their forest land in the future. Approximately 6% of Latimer County respondents and almost 4% of McCurtain County respondents reported that they never had thought about what would happen to their land in the future.

TABLE 19. FOR WHICH OF THE FOLLOWING REASONS DO YOU MAINTAIN OWNERSHIP OF FORESTED LAND? (Q5).

	Latimer County	McCurtain County	Total
Land investment(hope to sell land at profit)	35 (76.1%) 22.9%	11 (23.9%) 18.6%	46 (100%) 21.7%
Hunting and camping or other rec. activities	47 (68.1%) 30.7%	22 (31.9%) 37.3%	69 (100%) 32.6%
Growing timber for sale	41 (50%) 26.8%	41 (50%) 69.5%	82 (100%) 38.7%
Personal uses such as firewood and fence posts	40 (63.5%) 26.1%	23 (36.5%) 39.0%	63 (100%) 29.7%
Enjoyment of owning woodland	63 (62.4%) 41.2%	38 (37.6%) 64.4%	101 (100%) 47.6%
Woodland is part of my residence	45 (71.4%) 29.4%	18 (28.6%) 30.5%	63 (100%) 29.7%
For an estate to pass on to my children	79 (65.3%) 51.6%	42 (34.7%) 71.2%	121 (100%) 57.1%
Income from other than selling trees	33 (82.5%) 21.6%	7 (17.5%) 11.9%	40 (100%) 18.9%
Wildlife	71 (67%) 46.4%	35 (33%) 59.3%	106 (100%) 50.0%
Solitude	38 (60.3%) 24.8%	25 (39.7%) 42.4%	63 (100%) 29.7%
To protect forests for the future	50 (60.2%) 32.7%	33 (39.8%) 55.9%	83 (100%) 39.2%
Scenic enjoyment	47 (62.7%) 30.7%	28 (37.3%) 47.5%	75 (100%) 35.4%
Grazing	33 (63.5%) 21.6%	19 (36.5%) 32.3%	52 (100%) 24.5%
Stewardship	18 (46.2%) 11.8%	21 (53.8%) 35.6%	39 (100%) 18.4%
Other	14 (60.9%) 9.2%	9 (39.1%) 15.3%	23 (100%) 10.9%

chi-square=6.67, df=14, p=0.160

TABLE 20. LANDOWNER OBJECTIVES (Q5) WITH RESIDENT STATUS (Q2).

	Resident	Non-Resident	Chi-square	DF	P value
Land investment(hope to sell land at profit)	20 (40%) 15.9%	30 (60%) 30.3%	0.45	1	0.15
Hunting and camping or other rec. activities	45 (62.5%) 35.7%	27 (37.5%) 27.3%	0.84	1	0.20
Growing timber for sale	48 (57.1%) 38.1%	36 (42.9%) 36.4%	32.7	1	0.89
Personal uses such as firewood and fence posts	59 (88.1%) 46.8%	8 (11.9%) 8.1%	3.36	1	0.000
Enjoyment of owning woodland	67 (60.9%) 53.2%	43 (39.1%) 43.4%	9.21	1	0.18
Woodland is part of my residence	62 (92.5%) 49.2%	5 (7.5%) 5.1%	0.025	1	0.000
For an estate to pass on to my children	72 (56.7%) 57.1%	55 (43.3%) 55.6%	6.64	1	0.89
Income from other than selling trees	20 (44.4%) 15.9%	25 (55.6%) 25.3%	2.62	1	0.094
Wildlife	74 (67.3%) 58.7%	36 (32.7%) 36.4%	2.84	1	0.001
Solitude	50 (76.9%) 39.7%	15 (23.1%) 15.2%	6.27	1	0.000
To protect forests for the future	43 (52.4%) 34.1%	39 (47.6%) 39.4%	9.67	1	0.49
Scenic enjoyment	54 (68.4%) 42.3%	25 (31.6%) 25.3%	5.22	1	0.007
Grazing	44 (80%) 34.9%	11 (20%) 11.1%	2.60	1	0.000
Stewardship	26 (61.9%) 20.6%	16 (38.1%) 16.2%	16.1	1	0.49
Other	6 (27.3%) 4.8%	16 (72.7%) 16.2%	1.64	1	0.006

TABLE 21. THINKING ABOUT THE FUTURE, WHAT DO YOU THINK WILL MOST LIKELY HAPPEN TO YOUR FOREST LAND? (Q7).

	Latimer County	McCurtain County	Total
Will be passed on to children	108 (68.4%) 74%	50 (31.6%) 87.7%	158 77.8%
Broken into tracts and sold	8 (72.7%) 5.5%	3 (27.3%) 5.3%	11 (100%) 5.4%
Sold to children or grandchildren	6 (66.7%) 4.1%	3 (33.3%) 5.3%	9 (100%) 4.4%
Sold for retirement money	19 (82.6%) 13.0%	4 (17.4%) 7.0%	23 (100%) 11.3%
Maintained in an estate/trust	37 (77.1%) 25.3%	11 (22.9%) 19.3%	48 (100%) 23.7%
Have never thought about it	9 (81.8%) 6.2%	2 (8.2%) 3.5%	11 (100%) 5.4%
Other	5 (71.4%) 3.4%	2 (28.6%) 3.5%	7 (100%) 3.5%

chi-square=1.07, df=6, p= 0.53

Management Status

Only 14% of respondents have written management plans while almost 40% have sought advice in managing their forest land (Table 22-23). Only 9% of Latimer County landowners have written management plans compared to 26% of McCurtain County landowners ($p = 0.003$) (Table 22).

Of the almost 40% who have sought forest management advice, almost 60% contacted a government agency while 40% contacted a “private forestry professional”.

Approximately 30% of Latimer County landowners have sought management advice compared to over 66% of McCurtain County landowners ($p > 0.001$) (Table 23).

There was a significant relationship ($p < 0.001$) between landowners who have management plans and those that have sought advice in managing their woodland (Table 24). Almost 88% of landowners with management plans have sought advice in managing their woodlands.

While receiving advice in the management of a woodland increases the landowners likelihood of having a management plan, there is still a significant shortfall in management plans being developed. Almost 18% of landowners indicate that they receive advice from a friend or neighbor while 37% rely on the logger or timber buyer for information (Table 25). No significant difference was found between Latimer and McCurtain County landowners on sources of management advice.

A manager was classified as a landowner who had performed at least one management activity on their land in the last ten years. This was the same definition used by Walkingstick (1992). She classified approximately 48% of respondents as forest managers. Our study classified almost 77% of respondents as managers (Table 26). For our study, the management activity most reported by landowners was selling timber from forest land (46%) followed by planting trees (29%), vegetation control (29%) and using a professional forester (23%) (Table 27). While 50% of the landowners had reported that wildlife was one of their objectives, only 20% of the landowners had done anything to improve habitat.

Landowners in McCurtain County reported significantly more management activities than landowners in Latimer County for the following categories: sold timber from their land ($p = 0.000$), controlled weeds/undesirable trees ($p = 0.002$), burned ($p = 0.04$), and prepared a site for seeding or planting ($p = 0.010$) (Table 27). Landowners in McCurtain County are also more likely to use a professional forester ($p < 0.001$).

TABLE 22. DO YOU HAVE A WRITTEN MANAGMENT PLAN FOR YOUR WOODLAND? (Q11).

	Latimer County	McCurtain County	Total
Have management plan	14 (48.3%) 9.2%	15 (51.7%) 25.9%	32 (100%) 14.1%
Do not have management plan	138 (76.2%) 90.8%	43 (23.8%) 74.1%	195 (100%) 85.9%

chi-square=9.80, df=1, p = 0.003

TABLE 23. HAVE YOU EVER SOUGHT ADVICE OR HELP IN MANAGING YOUR WOODLAND? (Q12).

	Latimer County	McCurtain County	Total
Have sought advice	45 (53.6%) 29.4%	39 (46.4%) 66.1%	84 (100%) 39.7%
Have not sought advice	108 (84.4%) 70.6%	20 (15.6%) 33.9%	128 (100%) 60.3%

chi-square=23.9, df=1, p< 0.001

TABLE 24. DO YOU HAVE A WRITTEN MANAGEMENT PLAN FOR YOUR WOODLAND? (Q11) COMPARED WITH (Q12) HAVE YOU EVER SOUGHT ADVICE OR HELP IN MANAGING YOUR WOODLAND?

	Latimer county	McCurtain County	Total
Have management plan			
Have sought advice	28 (31.5%) 87.5%	61 (68.5%) 31.3%	89 (100%) 39.2%
Have not sought advice	4 (2.9%) 12.5%	134 (97.1%) 68.7%	138 (100%) 60.8%

chi-square=36.4, df=1, $p < 0.001$

TABLE 25. IF YOU HAVE SOUGHT ADVICE OR HELP IN MANAGING YOUR WOODLAND, FROM WHICH OF THE FOLLOWING DID YOU SEEK HELP? (Q12).

Sources of management advice	Latimer County	McCurtain County	Total
Friend or neighbor	5 (31.3%) 11.4%	11 (68.7%) 28.2%	16 (100%) 19.3%
Professional resource manager	12 (38.7%) 27.3%	19 (61.3%) 48.7%	36 (100%) 40.0%
Government agency	27 (55.1%) 61.4%	22 (44.9%) 56.4%	53 (100%) 58.9%
Logger	5 (41.7%) 11.4%	7 (58.3%) 17.9%	12 (100%) 14.4%
Timber buyer	9 (42.9%) 20.5%	12 (57.1%) 30.8%	21 (100%) 23.3%
Other	3 (60%) 6.8%	2 (40%) 5.1%	5 (100%) 6%

chi-square=1.67, df=5, $p = 0.45$

TABLE 26. NUMBER OF MANAGEMENT ACTIVITIES CONDUCTED BY RESPONDENTS (RELATED TO Q10).

	Latimer County	McCurtain County	Total
<u>Number of activities</u>			
0	42 (89.4%) 29.8%	5 (10.6%) 8.6%	47 (100%) 23.4%
1	40 (78.4%) 28.4%	11 (21.6%) 19.0%	51 (100%) 26.2%
2	32 (65.3%) 22.7%	17 (34.7%) 29.3%	49 (100%) 24.3%
3	17 (70.8%) 12.1%	7 (29.2%) 12.1%	24 (100%) 11.2%
4	6 (54.5%) 4.3%	5 (45.5%) 8.6%	11 (100%) 5.6%
5	2 (16.7%) 1.4%	10 (83.3%) 17.2%	12 (100%) 5.6%
6	2 (100%) 1.4%	0 (0%) 0%	2 (100%) 1.9%
7	0 (0%) 0%	2 (100%) 3.4%	2 (100%) 1.4%
8	0 (0%) 0%	1 (100%) 1.7%	1 (100%) 0.5%

chi-square

	Number	Average management activities	Standard Deviation	Standard Error
Latimer County	141	1.43	1.34	0.11
McCurtain County	58	2.72	1.89	0.25

t-test, F=1.98, df=81.7, p=0.0001

TABLE 27. DURING THE PAST TEN YEARS, HAVE YOU DONE ANY OF THE FOLLOWING? (Q10).

	Latimer County	McCurtain County	Total	Chi- square	DF	P value
<u>Management activities</u>						
Have sold timber from land	50 (54.9%) 35.5%	41 (45.1%) 70.7%	98 (100%) 45.8%	20.6	1	0.000
Planted trees on land	32 (61.5%) 22.7%	20 (38.5%) 34.5%	55 (100%) 28.7%	3.0	1	0.11
Controlled weeds/undesirable trees	30 (54.5%) 21.3%	25 (45.5%) 43.1%	63 (100%) 29.4%	9.8	1	0.002
Burned	12 (52.2%) 8.5%	11 (47.8%) 19.0%	24 (100%) 11.2%	4.4	1	0.04
Used a professional forester	23 (48.9%) 16.3%	24 (51.1%) 41.4%	51 (100%) 23.8%	14.3	1	0.000 4
Improved wildlife habitat on land	20 (54.1%) 14.2%	17 (45.9%) 29.3%	42 (100%) 19.6%	6.2	1	0.016
Built a permanent road	22 (75.9%) 15.6%	7 (24.1%) 12.1%	33 (100%) 15.4%	0.41	1	0.66
Prepared site for seeding or planting	12 (48%) 8.5%	13 (52%) 22.4%	27 (100%) 12.6%	7.2	1	0.01
No management activities	55 (84.6%) 39%	10 (15.4%) 17.2%	68 (100%) 23.4%	8.9	1	0.003
Other	9 (60%) 6.3%	6 (40%) 10.3%	16 (100%) 7.4%	0.96	1	0.38

chi-square

Harvesting Participation

Approximately 62% of respondents have at one time harvested timber on their forest land (Table 28). Almost 50% of the landowners do not intend to harvest timber in the future (Table 29). For those that plan to harvest in the future, over 50% responded that they plan to in the next 0-5 years, approximately 25% in the next 6-10 years and almost 25% in 11 or more years (Table 30).

More landowners in Latimer County have harvested in the past (90%) compared to landowners in McCurtain County (52%) ($p < 0.001$). More McCurtain County landowners also plan to harvest in the future (71%) than landowners in Latimer County

(43%) ($p < 0.001$). However there was no significant differences between Latimer and McCurtain Counties on the time frame in which they expect to sell timber ($p = 0.87$).

Landowners who have harvested were asked “the main reason for timber harvest.” There were no significant differences between landowners in Latimer and McCurtain Counties on reasons for having harvested their forest land (Table 31) expect for two of the reasons which were to release the ‘crop trees’ ($p = 0.027$) and that the market price was good ($p = 0.05$). None of the respondents from Latimer County said they harvested their forest land to release ‘crop trees’ and twice as many McCurtain County respondents said that they harvested because the market price was good (Latimer- 9.1%; McCurtain- 22.2%).

Landowners who have not harvested timber were also asked “what were the main reasons behind your decision not to harvest.” There were no statistically significant differences between landowners in Latimer and McCurtain Counties on reasons for not having harvested their forest land (Table 32).

Over 60% of resident landowners have harvested in the past compared to only about 39% of non-resident landowners ($p = 0.03$) (Table 33).

No significant differences were found ($p = 0.28$) between resident/non-resident landowners on whether or not they plan to sell timber in the future (Table 34). There were also no significant differences ($p = 0.12$) between resident/non-resident landowners on the time frame that landowners expect to sell timber if they plan to sell timber in the future (Table 35).

These findings agree with Walkingstick (1992) who found past timber harvest activity to be significantly different between residents and non-residents ($p < 0.001$), but similar views about selling timber in the future ($p = 0.66$).

TABLE 28. HAVE YOU SOLD TIMBER FROM YOUR LAND DURING THE TIME YOU HAVE OWNED YOUR WOODLAND? (Q8).

	Latimer County	McCurtain County	Total
Have sold timber	78 (59.5%) 51.7%	53 (40.5%) 89.8%	141 (100%) 62.1%
Have not sold timber	73 (92.4%) 48.3%	6 (7.6%) 10.2%	86 (100%) 37.9%

chi-square=26.3, df=1, p<0.001

TABLE 29. DO YOU PLAN TO SELL TIMBER IN THE FUTURE? (Q9).

Plans to sell timber	Latimer County	McCurtain County	Total
Yes	63 (60.6%) 42.9%	41 (39.4%) 70.7%	112 (100%) 50.5%
No	84 (83.2%) 57.1%	17 (16.8%) 29.3%	110 (100%) 49.5%

chi-square=12.9, df=1, p = 0.0004

TABLE 30. IF YOU PLAN TO SELL TIMBER IN THE FUTURE, WHEN DO YOU THINK YOU WILL SELL TIMBER? (Q9).

Time frame to sell timber	Latimer County	McCurtain County	Total
0-5 years	29 (59.2%) 46%	20 (40.8%) 50%	56 (100%) 50.5%
6-10 years	17 (60.7%) 27%	11 (39.3%) 27.5%	28 (100%) 25.2%
11 or more years	17 (65.3%) 27%	9 (34.6%) 22.5%	27 (100%) 24.3%

chi-square=0.28, df=2, p=0.87

TABLE 31. IF YOU HAVE HARVESTED, WHAT WOULD YOU SAY WAS THE MAIN REASON FOR YOUR HARVEST? (Q8).

	Latimer County	McCurtain County	Total	P value
Timber was mature	29 (60.4%) 37.7%	19 (39.6%) 35.2%	48 (100%) 36.6%	0.86
To release the 'crop trees'	0 (0%) 0%	4 (100%) 7.4%	4 (100%) 3.1%	0.03
Thin and improve the timber stand	27 (57.4%) 35.1%	20 (42.6%) 37.0%	47 (100%) 35.9%	0.86
Timber was diseased or damaged	2 (28.6%) 2.6%	5 (71.4%) 9.3%	7 (100%) 5.3%	0.12
Needed some emergency money	11 (78.6%) 14.3%	3 (21.4%) 5.6%	14 (100%) 10.7%	0.15
The market price was good	7 (36.8%) 9.1%	12 (63.2%) 22.2%	19 (100%) 14.5%	0.05
Cleared to convert to other use	14 (77.8%) 18.2%	4 (22.2%) 7.4%	18 (100%) 13.7%	0.12
Needed money to pay taxes	2 (66.7%) 2.6%	1 (33.3%) 1.9%	3 (100%) 2.3%	1.000
part of overall management plan	6 (40%) 7.8%	9 (60%) 16.7%	15 (100%) 11.5%	0.16
other	7 (46.7%) 9.1%	8 (53.3%) 14.8%	15 (100%) 11.5%	0.41

TABLE 32. IF YOU HAVE NOT HARVESTED, WHAT ARE THE MAIN REASONS BEHIND YOUR DECISION NOT TO HARVEST? (Q8).

	Latimer County	McCurtain county	Total	P value
No market	6 (100%) 8.3%	0 (0%) 0%	6 (100%) 7.7%	1.000
Timber is too immature	12 (92.3%) 16.7%	1 (7.7%) 16.7%	13 (100%) 16.7%	1.000
Not enough volume	14 (87.5%) 19.4%	2 (12.5%) 33.3%	16 (100%) 20.5%	0.60
Timber is of poor quality	12 (85.7%) 16.7%	2 (14.3%) 33.3%	14 (100%) 18.0%	0.29
Opposed to cutting timber	17 (100%) 23.6%	0 (0%) 0%	17 (100%) 21.8%	0.33
Land value would be lowered	4 (100%) 5.6%	0 (0%) 0%	4 (100%) 5.1%	1.000
Privacy would be lost	13 (92.9%) 18.1%	1 (7.1%) 16.7%	14 (100%) 18.0%	1.000
Land is tied up in an estate	3 (100%) 4.2%	0 (0%) 0%	3 (100%) 3.9%	1.000
Too much work involved	1 (100%) 1.4%	0 (0%) 0%	1 (100%) 1.3%	1.000
Mistrust loggers	18 (94.7%) 25.0%	1 (5.3%) 16.7%	19 (100%) 24.4%	1.000
Plan to sell land	4 (80%) 5.6%	1 (20%) 16.7%	5 (100%) 6.4%	0.34
Would change wildlife habitat	26 (92.9%) 36.1%	2 (7.1%) 33.3%	28 (100%) 35.9%	1.000
Would change the natural beauty of land	31 (91.2%) 43.1%	3 (8.8%) 50.0%	34 (100%) 43.6%	1.000
Too old or ill	4 (100%) 5.6%	0 (0%) 0%	4 (100%) 5.1%	1.000
Cutting trees has serious environmental consequences	15 (93.8%) 20.8%	1 (6.2%) 16.7%	16 (100%) 20.5%	1.000
Other	6 (85.9%) 8.3%	1 (14.3%) 16.7%	7 (100%) 9.0%	0.44

TABLE 33. HAVE YOU SOLD TIMBER FROM YOUR LAND DURING THE TIME YOU HAVE OWNED YOUR WOODLAND (Q8) COMPARED WITH (Q2) RESIDENCE STATUS.

	Have harvested trees	Have not harvested trees
Resident	85 (68%) 61.2%	40 (32%) 46.5%
Non-resident	54 (54%) 38.9%	46 (46%) 53.5%

chi-square=4.60, df=1, p=0.03

TABLE 34. DO YOU PLAN TO SELL TIMBER IN THE FUTURE (Q9) COMPARED WITH (Q2) RESIDENCE STATUS.

	Plan to sell timber	Do not plan to sell timber
Resident	57 (46.7%) 51.8%	65 (53.3%) 59.1%
Non-resident	53 (54.1%) 48.2%	45 (45.9%) 40.9%

chi-square=1.20, df=1, p=0.28

TABLE 35. IF YOU PLAN TO SELL TIMBER IN THE FUTURE, WHEN DO YOU THINK YOU WILL SELL TIMBER (Q9) COMPARED WITH (Q2) RESIDENCE STATUS.

Time frame to sell timber	0-5 years	6-10 years	11 or more years
Resident	27 (50%) 48.2%	18 (33.3%) 64.3%	9 (16.7%) 36%
Non-resident	29 (52.7%) 51.8%	10 (18.2%) 35.7%	16 (29.1%) 64%

chi-square=4.30, df=2, p=0.12

BMP RESULTS

Knowledge of BMPs

Only 19% of respondents have any knowledge of best management practices (BMPs). Of the 19% who claim they knew what BMPs were, 85% indicated that they employ them sometimes or on a consistent basis (Table 36-37).

Only 13% of Latimer County respondents have any knowledge of BMPs compared to 35% of McCurtain County respondents ($p < 0.001$) (Table 36). The use of BMPs also differed significantly by County. Eighty percent of McCurtain County landowners with knowledge about BMPs say that they employed them consistently compared to only 20% in Latimer County (Table 37). Consistent with these results is that McCurtain County landowners also reported a higher percentage of contacts with forestry professionals and a higher percentage of written management plans.

There was not a significant difference in responses between Counties on factors that encouraged landowners to implement BMPs (Table 38); factors that would encourage landowners who don't currently employ BMPs (Table 39); opinions on whether landowners should be required to use BMPs (Table 40), or on knowledge about whether landowners are currently required to use BMPs in Oklahoma (Table 41).

Landowners who indicated they use BMPs were asked what had encouraged them to do so. Approximately 47% were encouraged from information given by a forestry professional while 75% were encouraged because they simply want to minimize any possibilities of erosion. Another 33% indicated they participate in a cost-sharing program which enables them or encourages them to implement BMPs. Although not significantly different, 90% of McCurtain County landowners indicated that they wanted to minimize any possibility of erosion while only 56% of landowners in Latimer County indicated a concern for erosion.

Landowners who do not use BMPs were asked what would encourage them to do so. Approximately 32% of 174 respondents indicated that financial assistance would encourage them to use BMPs while 73% indicated that more information would encourage them. About 15% of landowners indicated that nothing would encourage them to use BMPs.

When asked whether BMPs should be regulated, almost 74% of landowners responded that they should be voluntary while 21% are not sure. The remaining 6% think that BMPs should be required. When asked about the current status of BMP regulation in Oklahoma, almost 62% are not sure if BMPs are voluntary or regulatory while only 38% know them to be voluntary. Less than 1% are misinformed in thinking that BMPs are required in Oklahoma.

These data indicate landowners are not highly knowledgeable about BMPs. Landowners who already employ BMPs have been motivated mainly by themselves (environmental ethic); by information provided on the subject and to a lesser extent cost-sharing. To a greater extent, landowners who have not used BMPs may be motivated by information and education alone while a smaller but still considerable group may be motivated by financial incentives. It is also apparent that there is a small group (15%) who are not inclined to use BMPs.

Almost 74% of respondents think that it is very important to employ forest harvesting practices that minimize erosion (Table 61) and yet over 80% of respondents have no knowledge of BMPs (Table 36). Over 58% and 75% of landowners in Latimer and McCurtain Counties, respectively, indicated they want more information about minimizing erosion and protecting water quality ($p = 0.031$) (Table 82).

When landowners were asked how they would like to receive information on forest management, 13% indicated they did not want to be contacted by anyone. There seemed to be a significant relationship between landowners who can be encouraged to use BMPs and those who want contact about forest management ($p < 0.001$) (Table 42). Over 90% of respondents who replied that they could be encouraged to use BMPs on their forest land, also wanted more information about BMPs and water quality.

Comparatively, over 68% of landowners who responded that they could not be encouraged to use BMPs did not want any additional information.

In Latimer County, respondents who are familiar with BMPs conducted an average of 1.2 more management activities than respondents who are not familiar with BMPs (Table 43). In McCurtain County, this figure increases to an average of 2 more management activities.

There was no significant difference in age, education, income, gender, occupation, or residence status between landowners who were familiar with BMPs compared with landowners who were not familiar with BMPs (Tables 44-49).

Over 50% of retired and employed landowners are familiar with BMPs ($p = 0.03$) (Table 50). Eighty-two percent of retired landowners are not familiar with BMPs.

There was also a significant difference ($p = 0.01$) in size of forest ownership between landowners who were familiar with BMPs compared to those that were not familiar with BMPs (Table 51). Those landowners who are familiar with BMPs own, on average, 343 more acres than landowners who are not familiar with BMPs. While larger ownership's that provide more financial opportunity may cause landowners to search out information on proper road construction and harvesting practices, this result may also be explained by the greater average ownership of McCurtain County residents (Table 9) who also had greater knowledge of BMPs (Table 36).

Landowners who receive technical or financial assistance are more likely to be knowledgeable about BMPs (Table 52). Approximately half of the landowners receiving assistance know about BMPs while this figure drops to 18% for landowners not receiving any kind of assistance.

There was no significant differences ($p = 0.45$) were found between landowner knowledge of BMPs and a general assessment of whether they give highest priority to the economy or the environment in forest management issues (Table 53).

There was no significant relationship found between gender, age, education, income, or occupation and factors that had encouraged landowner implementation of BMPs (Table 54-58).

TABLE 36. ARE YOU FAMILIAR WITH BEST MANAGEMENT PRACTICES? (Q14).

Familiarity with BMPs	Latimer County	McCurtain County	Total
Familiarity	20 (50%) 13.2%	20 (50%) 35.1%	40 (100%) 19.1%
No Familiarity	132 (78.1%) 86.8%	37 (21.9%) 64.9%	169 (100%) 80.9%

chi-square=12.9, df=1, p<0.001

TABLE 37. IF FAMILIAR WITH BMPS, DO YOU USE BMPS ON YOUR FOREST LAND? (Q14).

Current BMP implementation rates	Latimer County	McCurtain County	Total
Use BMPs	4 (20%) 20%	16 (80%) 80%	20 (100%) 50%
Do Not Use BMPs	5 (83.3%) 25%	1 (16.7%) 5%	6 (100%) 15%
Sometimes Use BMPs	11 (78.6%) 55%	3 (21.4%) 15%	14 (100%) 35%

chi-square=14.4, df=2, p=0.001

TABLE 38. IF YOU USE BMPS, WHAT ENCOURAGED YOUR IMPLEMENTATION OF BMPS? (Q15).

Factors encouraging implementation of BMPs	Latimer County	McCurtain County	Total
Cost-sharing	5 (41.7%) 31.3%	7 (58.3%) 35%	12 (100%) 33.4%
Because I have to by law	0 (0%) 0%	1 (100%) 5%	1 (100%) 2.8%
I just want to minimize any possibilities of erosion	9 (33.3%) 56.3%	18 (66.7%) 90%	27 (100%) 75.0%
Information from a forestry professional	7 (41.2%) 43.8%	10 (58.8%) 50%	17 (100%) 47.2%
I saw a neighbor doing it that way	2 (66.7%) 12.5%	1 (33.3%) 5%	3 (100%) 8.3%
Other	2 (40%) 12.5%	3 (60%) 15%	5 (100%) 13.9%

chi-square=1.19, df=5, p=0.47

TABLE 39. IF YOU HAVE NOT USED BMPS, WHAT MIGHT ENCOURAGE YOU TO USE THEM WHILE MANAGING YOUR FOREST LAND? (Q16).

Factors that would encourage implementation of BMPs	Latimer County	McCurtain County	Total
Financial assistance	36 (78.3%) 31.0%	10 (21.7%) 34.5%	46 (100%) 31.7%
Nothing will encourage me	20 (90.9%) 17.2%	2 (9.1%) 6.9%	22 (100%) 15.2%
More information	84 (79.2%) 72.4%	22 (20.8%) 75.9%	106 (100%) 73.1%

chi-square=0.73, df=2, p=0.53

TABLE 40. SHOULD LANDOWNERS BE REQUIRED TO USE BMPS OR SHOULD THEY BE VOLUNTARY IN NATURE? (Q23).

Opinions about BMP regulation	Latimer County	McCurtain County	Total
Required	6 (46.2%) 4.0%	7 (53.8%) 12.7%	13 (100%) 6.3%
Voluntary	113 (75.8%) 75.3%	36 (24.2%) 65.5%	149 (100%) 72.7%
Not sure	31 (72.1%) 20.7%	12 (27.9%) 21.8%	43 (100%) 21.0%

chi-square=5.40, df=2, p=0.067

TABLE 41. IN OKLAHOMA, ARE LANDOWNERS WHO MANAGE AND HARVEST TIMBER REQUIRED TO USE BMPS OR ARE THEY VOLUNTARY? (Q24).

Are BMPs voluntary or regulatory	Latimer County	McCurtain County	Total
Voluntary	51 (65.4%) 33.6%	27 (34.6%) 49.1%	78 (100%) 37.7%
Required	1 (100%) 0.7%	0 (0%) 0%	1 (100%) 0.5%
Not sure	100 (78.1%) 65.8%	28 (21.9%) 50.9%	128 (100%) 61.8%

chi-square=4.40, df=2, p=0.111

TABLE 42. LANDOWNER RESPONSE THAT NOTHING WILL ENCOURAGE THEIR USE OF BMPs (Q16) COMPARED WITH THOSE LANDOWNERS WHO DO NOT WANT CONTACT FROM ANYONE ABOUT FOREST MANAGEMENT (Q18).

Contact about forest management	Contact okay	Want no contact
Total		
Can be encouraged to use BMPs	124 (95.4%) 93.9%	6 (4.6%) 31.6%
Cannot be encouraged to use BMPs	8 (38.1%) 6.1%	13 (61.9%) 68.4%

chi-square=53.9, df=1, $p < 0.001$

TABLE 43. ARE YOU FAMILIAR WITH BMPs (Q14) COMPARED WITH AVERAGE NUMBER OF MANAGEMENT ACTIVITIES CONDUCTED ON FOREST LAND IN THE PAST TEN YEARS (Q10).

LATIMER COUNTY

	Familiarity with BMPs	No familiarity with BMPs
Number	20	120
Average management activities	2.45	1.25
Standard deviation	1.36	1.27
Standard error	0.30	0.12

t-test, $F=1.14$, $df=138$, $p = 0.002$

MCCURTAIN COUNTY

	Familiarity with BMPs	No familiarity with BMPs
Number	19	37
Average management activities	4.05	2.05
Standard deviation	1.87	1.54
Standard error	0.43	0.25

t-test, $F=1.47$, $df=54$, $p= 0.0001$

TABLE 44. ARE YOU FAMILIAR WITH BMPs (Q14) BY MEAN AGE (Q32).

	Familiarity with BMPs	No familiarity with BMPs
Number	41	179
Mean age	62	63.8
Standard deviation	12.8	12.3
Standard error	2.0	0.92

t-test, df=58, p = 0.42

TABLE 45. ARE YOU FAMILIAR WITH BMPs (Q14) BY EDUCATION (Q35).

	Familiar with BMPs	Not familiar with BMPs
Total		
<u>Education</u>		
Less than high school graduate	3 (14.3%) 7.0%	18 (85.7%) 10.3%
High school graduate	7 (14.6%) 16.3%	41 (85.4%) 23.4%
Some college	8 (16.3%) 18.6%	41 (83.7%) 23.4%
Trade/technical/vocational training	5 (26.3%) 11.6%	14 (73.7%) 8%
College graduate	6 (17.6%) 14%	28 (82.4%) 16%
Post-graduate work/degree	14 (29.8%) 32.6%	33 (70.2%) 18.9%

chi-square=5.17, df=5, p= 0.395

TABLE 46. ARE YOU FAMILIAR WITH BMPs (Q14) BY INCOME (Q36).

	Familiar with BMPs	Not familiar with BMPs
	Total	Total
<u>Income</u>		
Under \$15,000	2 (7.1%) 5.4%	26 (92.9%) 17.8%
\$15,000-\$29,999	4 (10.3%) 10.8%	35 (89.7%) 24%
\$30,000-\$49,999	14 (26.4%) 37.8%	39 (73.6%) 26.7%
\$50,000-\$69,999	6 (21.4%) 16.2%	22 (78.6%) 15.1%
\$70,000-\$99,999	4 (28.6%) 10.8%	10 (71.4%) 68.5%
\$100,000- \$149,000	4 (40%) 10.8%	6 (60%) 4.1%
\$150,000- \$499,000	2 (28.6%) 5.4%	5 (71.4%) 3.4%
\$500,000+	1 (25%) 2.7%	3 (75%) 2.1%

chi-square=10.1, df=7, p= 0.186

TABLE 47. ARE YOU FAMILIAR WITH BMPS (Q14) BY GENDER (Q31).

	Familiar with BMPs	Not familiar with BMPs
Total		
<u>Gender</u>		
Male	36 (21.3%) 85.7%	133 (78.7%) 73.5%
Female	6 (11.1%) 14.3%	48 (88.9%) 26.5%

chi-square=2.78, df=1, p= 0.112

TABLE 48. ARE YOU FAMILIAR WITH BMPS (Q14) BY OCCUPATION (Q34).

	Familiar with BMPs	Not familiar with BMPs
Total		
<u>Occupation</u>		
Student	0 (0%) 0%	0 (0%) 0%
Professional/managerial	11 (23.4%) 40.7%	36 (76.6%) 39.6%
Secretarial/clerical	0 (0%) 0%	2 (100%) 2.2%
Services/labor	2 (18.2%) 7.4%	9 (81.8%) 9.9%
Sales/retail sales	1 (20%) 3.7%	4 (80%) 4.4%
Farmer/rancher	9 (28.1%) 33.3%	23 (71.9%) 25.3%
Military	0 (0%) 0%	0 (0%) 0%
Forest industry/forestry	2 (50%) 7.4%	2 (50%) 2.2%
Other	2 (11.8%) 7.4%	15 (88.2%) 16.5%

chi-square=4.12, df=6, p= 0.66

TABLE 49. ARE YOU FAMILIAR WITH BMPS (Q14) BY RESIDENCE STATUS (Q2).

	Familiar with BMPs	Not familiar with BMPs
	Total	Total
Resident	29 (23.2%) 67.4%	96 (76.8%) 52.7%
Non-Resident	14 (14.0%) 32.6%	86 (86.0%) 47.3%

chi-square=3.04, df=1, p = 0.09

TABLE 50. ARE YOU FAMILIAR WITH BMPS (Q14) BY EMPLOYMENT STATUS (Q33).

	Familiar with BMPs	Not familiar with BMPs
Total		
<u>Employment Status</u>		
Employed	14 (13.7%) 33.3%	88 (86.3%) 49.2%
Retired	6 (18.2%) 14.3%	27 (81.8%) 15.1%
Retired and employed	22 (25.6%) 52.4%	64 (74.4%) 35.8%

chi-square=4.28, df=2, p= 0.030

TABLE 51. ARE YOU FAMILIAR WITH BMPs (Q14) COMPARED WITH (Q1) HOW MANY ACRES OF FOREST LAND YOU OWN IN OKLAHOMA.

	Familiarity with BMPs	No familiarity with BMPs
Number	43	177
Average forest acreage	548.1 acres	205.1 acres
Standard deviation	822.8	309.1
Standard error	125.5	23.2

t-test, $F=7.08$, $df=44.9$, $p=0.010$

TABLE 52. ARE YOU FAMILIAR WITH BMPs (Q14) COMPARED WITH (Q22) DO YOU CURRENTLY RECEIVE ANY TYPE OF TECHNICAL OR FINANCIAL ASSISTANCE FROM THE GOVERNMENT FOR MANAGING YOUR FOREST LAND?

Total		
	Receive assistance	Do not receive assistance
Familiar with BMPs	6 (14%) 50%	37 (86%) 17.9%
Not familiar with BMPs	6 (3.4%) 50%	170 (96.6%) 82.1%

$p = 0.015$; chi-square

TABLE 53. ARE YOU FAMILIAR WITH BMPS (Q14) COMPARED WITH (Q27) MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW?

	Familiar with BMPs	Not Familiar with BMPs
Total		
Highest priority to environment over the economy	3 (17.7%) 7.7%	14 (82.4%) 9.2%
Both important but environment comes first	19 (18.5%) 48.7%	84 (81.6%) 55.3%
Both important but the economy comes first	13 (25.5%) 33.3%	38 (74.5%) 25%
Highest priority to economy over environment	4 (20%) 10.3%	16 (80%) 10.5%

chi-square=1.14, df=3, p = 0.42

TABLE 54. IF YOU USE BMPS, WHAT ENCOURAGED YOUR IMPLEMENTATION OF BMPS (Q15) BY GENDER (Q31).

	Male	Female
Cost-sharing	9 (75%) 18.4%	3 (25%) 23%
Because I have to by law	0 (0%) 0%	0 (0%) 0%
I just want to minimize any possibilities of erosion	23 (82.1%) 46.9%	5 (17.9%) 38.5%
Information from a forestry professional	14 (73.7%) 28.6%	5 (26.3%) 38.5%
I saw a neighbor doing it that way	3 (100%) 6.1%	0 (0%) 0%

chi-square=1.06, df=4, p = 0.64

TABLE 55. IF YOU USE BMPS, WHAT ENCOURAGED YOUR IMPLEMENTATION OF BMPS (Q15) BY AGE (Q32).

Total					
	Number	Average Age	Chi-square	DF	p value
Cost-sharing	12	65.2	1.35	35	0.49
Because I have to by law	0	63	0	0	not applicable
I just want to minimize any possibilities of erosion	27	63.9	1.01	35	0.50
Information from a forestry professional	18	67.1	1.52	35	0.06
I saw a neighbor doing it that way	3	77	5.77	35	0.05

t-test

TABLE 56. IF YOU USE BMPS, WHAT ENCOURAGED YOUR IMPLEMENTATION OF BMPS (Q15) BY EDUCATION (Q35).

	Cost-sharing	Because I have to by law	I just want to minimize any possibilities of erosion	Information from a forestry professional	I saw a neighbor doing it that way
Education					
Less than high school graduate	1 (16.7%) 7.7%	0 (0%) 0%	3 (50%) 10.3%	2 (33.3%) 10%	0 (0%) 0%
High school graduate	2 (25%) 15.4%	0 (0%) 0%	4 (50%) 13.8%	1 (12.5%) 5%	1 (12.5%) 33.3%
Some college	2 (15.4%) 15.4%	0 (0%) 0%	5 (38.5%) 17.2%	4 (30.8%) 20%	2 (15.4%) 66.7%
Trade/technical/vocational training	1 (11.1%) 7.7%	0 (0%) 0%	5 (55.6%) 17.2%	3 (33.3%) 15%	0 (0%) 0%
College graduate	2 (18.2%) 15.4%	0 (0%) 0%	4 (36.4%) 13.8%	5 (45.5%) 25%	0 (0%) 0%
Post-graduate work/ degree	5 (26.3%) 38.5%	1 (5.3%) 100%	8 (42.1%) 27.6%	5 (26.3%) 25%	0 (0%) 0%

chi-square=3.86, df=20, p= 0.60

TABLE 57. IF YOU USE BMPS, WHAT ENCOURAGED YOUR IMPLEMENTATION OF BMPS (Q15) BY INCOME (Q36).

	Cost-sharing	Because I have to by law	I just want to minimize any possibilities of erosion	Information from a forestry professional	I saw a neighbor doing it that way
<u>Income</u>					
Under \$15,000	0 (0%) 0%	0 (0%) 0%	1 (100%) 4.3%	0 (0%) 0%	0 (0%) 0%
\$15,000-\$29,999	1 (14.3%) 9.1%	0 (0%) 0%	4 (57.1%) 17.4%	2 (28.6%) 14.3%	0 (0%) 0%
\$30,000-\$49,999	6 (26.1%) 54.5%	3 (13%) 100%	7 (30.4%) 30.4%	6 (26.1%) 42.9%	1 (4.3%) 50%
\$50,000-\$69,999	2 (18.2%) 18.2%	0 (0%) 0%	4 (36.4%) 17.4%	4 (36.4%) 28.6%	1 (9.1%) 50%
\$70,000-\$99,999	1 (20%) 9.1%	0 (0%) 0%	3 (60%) 13%	1 (20%) 7.1%	0 (0%) 0%
\$100,000-\$149,000	1 (16.7%) 9.1%	0 (0%) 0%	2 (33.3%) 8.7%	1 (16.7%) 7.1%	0 (0%) 0%
\$150,000-\$499,000	0 (0%) 0%	0 (0%) 0%	2 (100%) 8.7%	0 (0%) 0%	0 (0%) 0%
\$500,000 +	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%

chi-square=17.7, df=28, p=0.73

TABLE 58. IF YOU USE BMPS, WHAT ENCOURAGED YOUR IMPLEMENTATION OF BMPS (Q15) BY OCCUPATION (Q34).

	Cost-sharing	Because I have to by law	I just want to minimize any possibilities of erosion	Information from a forestry professional	I saw a neighbor doing it that way
<u>Occupation</u>					
Student	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%
Professional/managerial	4 (28.6%) 80%	0 (0%) 0%	6 (42.9%) 35.3%	4 (28.6%) 44.4%	0 (0%) 0%
Secretarial/clerical	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%
Services/labor	0 (0%) 0%	0 (0%) 0%	1 (50%) 5.9%	1 (50%) 11.1%	0 (0%) 0%
Sales/retail sales	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	1 (50%) 11.1%	1 (50%) 50%
Farmer/rancher	1 (7.7%) 20%	0 (0%) 0%	8 (61.5%) 47.1%	3 (23.1%) 33.3%	1 (7.7%) 50%
Military	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%	0 (0%) 0%
Forest industry/forestry	0 (0%) 0%	0 (0%) 0%	1 (100%) 5.9%	0 (0%) 0%	0 (0%) 0%
Other	0 (0%) 0%	0 (0%) 0%	1 (100%) 5.9%	0 (0%) 0%	0 (0%) 0%

chi-square=7.17, df=36, p= 0.55

ENVIRONMENTAL ATTITUDES

In an effort to evaluate what priority landowners place on the environment, they were asked which should be given highest priority in forest management issues, the economy or the environment. Almost 63% of landowners replied that protecting the environment should have priority over the economy (Table 59). Over 80% of the landowners believe that both the environment and economy are important. While 20% of landowners are inclined to be more on the extremes clearly giving the highest priority to one or the other. There was no significant difference by County regarding this question.

Results of the same question by Bliss (1994) confirm the finding that NIPF owners have viewpoints on the environment-economy scale that are slightly pro-environment.

These results also confirm Jones' (1994) finding that NIPF owners are not what traditionally perceived to be: (1) rural and land-connected, (2) anti-environmentalist, (3) timber-oriented, and (4) rabidly pro-private property rights. Landowners and the general public alike are committed to environmental objectives. Jones' (1994) informal survey revealed that landowners (at least two dozen) are eager, within broad limits, to contribute to environmental well-being.

In our study, approximately 78% think that landowners should be compensated for economic losses incurred because of enforced forestry regulations while about 17% are not sure about the compensation for loss issue (Table 60). Approximately 5% did not indicate that it is necessary for landowners to be compensated.

Respondents were also asked to respond on a scale from 0-100 what importance they would place on harvesting practices that minimize erosion (Table 61). Over 74% of respondents indicated between 75 and 100 on the scale implying that they think that using harvesting practices to minimize erosion is important. Only about 16% scored the scale from 0 to 25. This is roughly equivalent to the 15% of landowners who indicated that

nothing would encourage them to use BMPs and the 10% who clearly favor the economy over the environment.

Jones (1994) found that 86% of respondents felt that private property rights were important, but only if the environment is not hurt; 76% said that private property rights should be limited to protect the environment; 61% believed that protecting 'scenic beauty' on private property is sufficient cause to impose timber harvesting regulations.

Gender, education, age, employment status, income, residence status, and forest acreage owned had insignificant influence on forest management priorities (Tables 62-69).

One-hundred percent of those respondents who give highest priority to the economy also think that landowners should be paid for economic losses incurred because of regulation. While only 59% of those who feel the environment is the highest priority favor payment for economic loss due to regulation ($p = 0.001$) (Table 70).

There is no significant difference between those respondents who give highest priority to the economy or to the environment compared to how important they think forest harvesting practices are that minimize erosion (Table 71). However, the difference becomes statistically significant ($p = 0.0068$) when the question is grouped in two categories (priority to economy and priority to environment) (Table 71).

There is a significant difference between landowners who think that they should be required to use BMPs versus those that give highest priority to the economy or the environment in forest management ($p = 0.006$) (Table 72). Eighty-five percent of landowners who think BMPs should be required give highest priority to the environment. While only 55% of landowners who think BMPs should be voluntary give the environment the highest priority. More respondents who give higher priority to the environment classify themselves as not sure about whether BMPs should be regulated or left voluntary (80%).

There was no significant difference between those respondents who give highest priority to the economy or to the environment versus whether or not they want more information about minimizing soil erosion, protecting water quality and BMPs (Table 73).

Landowners who give highest priority to the environment are willing to travel an average of 105 miles to attend an informational meeting about minimizing soil erosion, protecting water quality and the use of BMP's. Landowners who give highest priority to the economy are only willing to travel an average of 36 miles to attend an informational meeting about minimizing soil erosion, protecting water quality and the use of BMPs (Table 74).

No significant differences were found between landowners in Latimer and McCurtain Counties on their opinions about forests in general (Table 75) except for two statements. There were significant differences for the following statements: harvesting trees can improve the health of the forests for the future ($p = 0.06$), and it makes good sense for a forest landowner to have an overall plan for using and taking care of the forest ($p = 0.008$). McCurtain County landowners rated these two statements significantly higher.

There were significant differences between landowners who are familiar with BMPs versus their opinions on whether people who own forest land have the right to use that land as they see fit ($p = 0.05$), whether harvesting trees can improve the health of the forests for the future ($p = 0.0001$), and whether it makes good sense for a forest landowner to have an overall plan for using and taking care of the forest ($p = 0.0001$). On a scale ranging from 1 (strongly disagree) to 7 (strongly agree), landowners who are familiar with BMPs scored 4.8 (4-neither agree or disagree; 5-slightly agree) and landowners who were not familiar with BMPs scored 5.5 (5-slightly agree; 6-agree) on the statement that "people who own forest land have the right to use the land as they see fit" (Table 76). Landowners who are familiar with BMPs scored 6.3 (6-agree; 7-strongly agree) and landowners who were not familiar with BMPs scored 5.3 (5-slightly agree; 6-agree) on the statement that "harvesting can improve the health of the forests for the future" (Table 76). Landowners who are familiar with BMPs scored 6.5 (6-agree, 7-strongly agree) and landowners who were not familiar with BMPs scored 5.5 (5-slightly agree; 6-agree) on the statement that "it makes good sense for a landowner to have an overall plan for using and taking care of the forest" (Table 76).

No significant differences were found between landowners in Latimer and McCurtain Counties on their opinions about forest management in general (Table 77), except on three statements. Significant differences were found for the following statements: “there are too many acres of hardwood being converted to pine” ($p = 0.0001$), “the amount of forest in the region today is less than it was 50 years ago” ($p = 0.002$); and “we should save American forests by importing wood and wood products” ($p = 0.016$). The interesting thing is that Latimer County rated higher on the Likert scale (5.2) than McCurtain County (4.4) on the statement that the amount of the forest in the region today is less than it was 50 years ago, but McCurtain County rated higher (5.2) than Latimer County (4.2) on the statement that there are too many acres of hardwood being converted to pine.

Significant differences were found between landowners who give highest priority to the economy and those that give highest priority to the environment on their opinions about forest management in general (Table 78). Significant differences were found for the following statements: “trees are like any other crop and they should be cut and replanted to provide consumer products” ($p = 0.03$), “there are too many acres of hardwood being converted to pine” ($p = 0.0001$), “the amount of forest in the region today is less than it was 50 years ago” ($p = 0.0007$), “we should save American forests by importing wood and wood products from other countries” ($p = 0.02$), “private forest owners have the right to do as they please with their forests regardless of what it does to the environment” ($p = 0.0001$), “private property rights are important but only if they don’t hurt the environment” ($p = 0.0001$), “private property rights should be limited if necessary to protect the environment” ($p = 0.0001$), “forests have a right to exist for their own sake, regardless of human concerns and uses” ($p = 0.0001$), “the primary use of forest should be for products are useful to humans” ($p = 0.0001$), and “humans should have more appreciation for forests” ($p = 0.013$).

There were also some significant differences between landowners who are familiar with BMPs versus their opinions about forest management. Landowners who are familiar with BMPs scored 4.0 and landowners who are not familiar with BMPs scored

5.2 on the statement that “the amount of forest in the region today is less than it was 50 years ago” (Table 79).

TABLE 59. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27).

	Latimer County	McCurtain County	Total
Highest priority for the environment over the economy	14 (53.1%) 10.8%	1 (43.8%) 2.0%	17 (100%) 8.7%
Both important, environment comes first	70 (51.2%) 53.8%	30 (34.1%) 61.2%	105 (100%) 53.8%
Both important, economy comes first	31 (53.5%) 23.8%	15 (31.3%) 30.6%	53 (100%) 27.2%
Highest priority for the economy over the environment	15 (52.6%) 11.5%	3 (39.5%) 6.1%	20 (100%) 10.3%

chi-square=5.25, df=3, p = 0.15

	Latimer County	McCurtain County
Economy	46 (71.9%) 35.3%	18 (28.1%) 36.7%
Environment	84 (73.0%) 64.6%	31 (27.0%) 63.3%

chi-square=0.028, df=1, p = 0.86

TABLE 60. IF A FOREST LANDOWNER WAS PREVENTED FROM CUTTING TREES ON THEIR LAND BECAUSE OF REGULATIONS, DO YOU THINK THE LANDOWNER SHOULD BE PAID FOR THE ECONOMIC LOSS? (Q29)

Should landowners be paid for economic loss because of regulation?	Latimer County	McCurtain County	Total
Agree with payment for economic loss due to regulation	113 (69.8%) 75.3%	49 (30.2%) 86.0%	175 (100%) 78.1%
Do not agree with payment for economic loss due to regulation	7 (70%) 4.7%	3 (30%) 5.3%	12 (100%) 5.4%
Not sure	30 (85.7%) 20.0%	5 (14.3%) 8.8%	37 (100%) 16.5%

chi-square=3.71, df=2, p = 0.16

TABLE 61. ON A SCALE FROM 0-100, HOW IMPORTANT DO YOU THINK IT IS TO USE FOREST HARVESTING PRACTICES THAT MINIMIZE SOIL EROSION? (Q17).

	Latimer County	McCurtain County	Total
0-25	25 (75.8%) 16.2%	8 (24.2%) 13.8%	33 (100%) 15.6%
26-50	13 (86.7%) 8.4%	2 (13.3%) 3.5%	15 (100%) 7.1%
50-75	13 (68.4%) 8.4%	6 (31.6%) 10.3%	19 (100%) 9.0%
75-100	103 (71%) 66.9%	42 (29%) 72.4%	145 (100%) 68.4%

chi-square=2.01, df=3, p= 0.571

LATIMER AND MCCURTAIN COUNTIES MEAN SCORES ON PRACTICES THAT MINIMIZE EROSION (Q17).

	Latimer County	McCurtain County
Number	135	53
Average rating on importance of forest harvesting practices that minimize erosion	85.9	87.7
Standard deviation	22.8	22.5
Standard error	1.96	3.1

t-test, $F=1.06$, $df=188$, $p = 0.68$

TABLE 62. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY AGE (Q32).

Total		
	Number	Mean Age
Highest priority to environment over the economy	17	65.4
Both important but environment comes first	103	61.1
Both important but economy comes first	51	62.9
Highest priority to economy over the environment	19	66.2

anova, $F=1.34$, $df=3$, $p = 0.26$

TABLE 63. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY EDUCATION (Q35).

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
<u>Education</u>				
Less than high school graduate	1 (5.9%) 6.3%	9 (52.9%) 8.7%	4 (23.5%) 8.2%	3 (17.6%) 15%
High school graduate	6 (16.2%) 37.5%	14 (37.8%) 13.6%	11 (29.7%) 22.5%	6 (16.2%) 30%
Some college	3 (7.3%) 18.8%	24 (58.5%) 23.3%	10 (24.4%) 20.4%	4 (9.8%) 20%
Trade/technical/vocational training	2 (11.8%) 12.5%	12 (70.6%) 11.7%	3 (17.6%) 6.1%	0 (0%) 0%
College graduate	2 (6.5%) 12.5%	17 (54.8%) 16.5%	8 (25.8%) 16.3%	4 (12.9%) 20%
Post-graduate work/degree	2 (4.4%) 12.5%	27 (60%) 26.2%	13 (28.9%) 26.5%	3 (6.7%) 15%

chi-square= 12.4, df=15, p=0.642

TABLE 64. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY INCOME (Q36).

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
Income				
Under \$15,000	1 (5%) 10%	13 (65%) 14.3%	3 (15%) 6.8%	3 (15%) 20%
\$15,000-\$29,999	1 (3.1%) 10%	17 (53.1%) 18.7%	10 (31.3%) 22.7%	4 (12.5%) 26.7%
\$30,000-\$49,999	5 (10.2%) 50%	32 (65.3%) 35.2%	9 (18.4%) 20.5%	3 (6.1%) 20%
\$50,000-\$69,999	1 (3.6%) 10%	15 (53.6%) 16.5%	10 (35.7%) 22.7%	2 (7.1%) 13.3%
\$70,000-\$99,999	1 (8.3%) 10%	6 (50%) 6.6%	4 (33.3%) 9.1%	1 (8.3%) 6.7%
\$100,000-\$149,000	0 (0%) 0%	5 (55.6%) 5.5%	3 (33.3%) 6.8%	1 (11.1%) 6.7%
\$150,000-\$499,000	1 (16.7%) 10%	1 (16.7%) 1.1%	3 (50%) 6.8%	1 (16.7%) 6.7%
\$500,000 -	0 (0%) 0%	2 (5%) 2.2%	2 (5%) 4.6%	0 (0%) 0%

chi-square=14.9, df=21, p=0.828

TABLE 65. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY GENDER (Q31).

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
Male	13 (8.5%) 76.5%	80 (52.3%) 76.9%	43 (28.1%) 84.3%	17 (11.1%) 85%
Female	4 (10.3%) 23.5%	24 (61.5%) 23.1%	8 (20.5%) 15.7%	3 (7.7%) 15%

chi-square=1.62, df=3, p= 0.654

TABLE 66. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY EMPLOYMENT STATUS (Q33).

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
Employment Status				
Employed	8 (9.8%) 47.1%	42 (51.2%) 40.4%	20 (24.4%) 39.2%	12 (14.6%) 60%
Retired	3 (10.3%) 17.7%	15 (51.7%) 14.4%	9 (31%) 17.7%	2 (6.9%) 10%
Retired and employed	6 (7.4%) 35.3%	47 (58%) 45.2%	22 (27.2%) 43.1%	6 (7.4%) 30%

chi-square=3.6, df=6, p=0.737

TABLE 67. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY RESIDENCE STATUS (Q2).

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
Live on land	3 (4.1%) 17.6%	46 (63%) 44.7%	16 (21.9%) 30.8%	8 (11%) 40%
Same County	4 (11.8%) 23.5%	14 (41.2%) 13.6%	12 (35.3%) 23.1%	4 (11.8%) 20%
Same state	3 (8.1%) 17.6%	18 (48.6%) 17.5%	12 (32.4%) 23.1%	4 (10.8%) 20%
Different state	7 (14.6%) 41.2%	25 (52.1%) 24.3%	12 (25%) 23.1%	4 (8.3%) 20%

chi-square=8.7, df=9, p = 0.468

TABLE 68. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY RESIDENCE STATUS (Q2).

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
Resident	7 (6.5%) 41.2%	60 (56.1%) 58.3%	28 (26.2%) 53.8%	12 (11.2%) 60%
Non-resident	10 (11.8%) 58.8%	43 (50.6%) 41.7%	24 (28.2%) 46.2%	8 (9.4%) 40%

chi-square=1.95, df=3, p = 0.62

TABLE 69. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) NATURAL RESOURCE DECISIONS BY (Q1) HOW MANY ACRES OF FOREST LAND DO YOU OWN IN OKLAHOMA?

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	Highest priority to economy over environment
Number	16	102	50	20
Average acreage	200.8	263	309	278

anova, F=0.25, df=3, p= 0.86

TABLE 70. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) COMPARED WITH (Q29) IF A FOREST LANDOWNER WAS PREVENTED FROM CUTTING TREES ON THEIR LAND BECAUSE OF REGULATIONS, DO YOU THINK THE LANDOWNER SHOULD BE PAID FOR THE ECONOMIC LOSS?

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	Highest priority to economy over environment
Landowner should be paid for economic loss	10 (6.7%) 58.8%	70 (47%) 70%	49 (32.9%) 94.2%	20 (13.4%) 100%
Landowner should not be paid for economic loss	2 (18.2%) 11.8%	7 (63.4%) 7.0%	2 (18.2%) 3.8%	0 (0%) 0%
Not sure whether landowner should be paid for economic loss	5 (17.2%) 29.4%	23 (79.3%) 23%	1 (3.4%) 1.9%	0 (0%) 0%

chi-square=22.5, df=6, p= 0.001

TABLE 71. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY (Q17) ON A SCALE FROM 0-100 HOW IMPORTANT DO YOU THINK IT IS TO USE FOREST HARVESTING PRACTICES THAT MINIMIZE SOIL EROSION?

	Highest priority to environment over economy	Both important but environment comes first	Both important but the economy comes first	Highest priority to economy over environment
0-25	3 (13%) 17.6%	9 (39.1%) 8.6%	7 (30.4%) 13.5%	4 (17.4%) 20%
25-50	1 (6.7%) 5.9%	4 (26.7%) 3.8%	7 (4.7%) 13.5%	3 (20%) 15%
50-75	2 (11.8%) 11.8%	8 (47.1%) 7.6%	6 (35.3%) 11.5%	1 (5.9%) 5%
75-100	11 (7.9%) 64.7%	84 (60.4%) 80%	32 (23%) 61.5%	12 (8.6%) 60%

chi-square=11.8, df=9, p= 0.59

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
Number	14	100	49	18
Average rating on forest harvesting practices that minimize erosion	92.1	89.6	78.5	76.8
Standard deviation	15.1	21.1	26.1	30.3

anova, $p = 0.012$

	Environment	Economy
0-25	11 (47.8%) 15.3%	12 (52.2%) 9.8%
25-50	10 (66.7%) 13.9%	5 (33.3%) 4.1%
50-75	7 (41.2%) 9.7%	10 (58.8%) 8.2%
75-100	44 (31.7%) 61.1%	95 (68.3%) 77.9%

$p = 0.007$; chi-square

<u>Priorities in forest management issues:</u>	Environment	Economy
Number	114	67
Average rating on forest harvesting practices that minimize erosion	89.9	78.0
Standard deviation	20.5	27.1
Standard error	1.9	3.3

t-test, $F=1.75$, $df=111$, $p = 0.0023$

TABLE 72. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) COMPARED WITH (Q23) SHOULD LANDOWNERS BE REQUIRED TO USE BMPS OR SHOULD THEY BE VOLUNTARY IN NATURE?

	Environment	Economy
Required to use BMPs	11 (84.6%) 9.4%	2 (15.4%) 2.8%
Use of BMPs should be voluntary	78 (55.3%) 66.7%	63 (44.7%) 87.5%
Not sure	28 (80%) 23.9%	7 (20%) 9.7%

chi-square=10.3, df=2, p=0.006

TABLE 73. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY (Q25) WOULD YOU LIKE TO HAVE MORE INFORMATION ABOUT MINIMIZING SOIL EROSION, PROTECTING WATER QUALITY AND THE USE OF BMPS?

	Highest priority to environment over economy	both important but environment comes first	both important but the economy comes first	highest priority to economy over environment
more information on specific forest management issues	11 (8.8%) 64.7%	70 (56%) 69.3%	35 (28%) 68.6%	9 (7.2%) 45%
no more information on specific forest management issues	6 (9.4%) 35.3%	31 (48.4%) 30.7%	16 (25%) 31.4%	11 (17.2%) 55%

chi-square=4.6, df=3, p = 0.204; Gamma = 0.28

TABLE 74. MANY FOREST MANAGEMENT ISSUES INVOLVE DIFFICULT TRADE-OFFS BETWEEN ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS. WHICH OF THE FOLLOWING STATEMENTS BEST DESCRIBES YOUR VIEW? (Q27) BY (Q26) HOW FAR WOULD YOU BE WILLING TO TRAVEL TO ATTEND AN INFORMATIONAL MEETING ABOUT MINIMIZING SOIL EROSION, PROTECTING WATER QUALITY AND THE USE OF BMPS?

	Highest priority to environment over economy	Both important but environment comes first	Both important but the economy comes first	Highest priority to economy over environment
Number	15	78	42	19
Average miles	105	49.7	47.3	35.9
Standard deviation	196	66.8	64.5	48.7

anova, $F=2.20$, $df=3$, $p = 0.09$

	Environment	Economy
Number	93	61
Average miles	58.6	43.8
Standard deviation	100	60
Standard error	10.4	7.7

t-test, $F=2.79$, $df=151$, $p=0.25$

TABLE 75. LANDOWNER OPINIONS ABOUT FORESTS IN GENERAL (Q13).

	Latimer County	McCurain County	Total			
	Number Average likert rating	Number Average likert rating	Number Average likert rating	F	DF	P value
You don't have to worry about the woods because Mother Nature will always take care of the trees	149 3.1	56 2.7	205 2.9	1.11	203	0.17
People who own forest land have the right to use that land as they see fit	150 5.3	58 5.1	208 5.2	1.02	206	0.44
Harvesting trees can improve the health of the forests for the future	149 5.4	58 5.8	207 5.6	1.03	205	0.06
There is not much we can do to protect the forests	150 2.2	57 2.1	207 2.2	1.22	205	0.74
With proper care, people can use the forests for many different purposes without a lot of conflict among these uses	148 5.7	57 5.9	205 5.8	1.50	203	0.47
It makes good sense for a forest landowners to have an overall plan for using and taking care of the forest	149 5.5	58 6.1	207 5.8	1.00	205	0.008
Landowners need more information on what could be done to better care for the forests	149 5.5	57 5.6	206 5.6	1.83	136	0.63
Only land fit for nothing else should be used for growing trees	150 3.1	57 2.7	207 2.9	1.02	205	0.17
Trying to teach people about the forests is a waste of time and money	149 2.3	56 2.4	205 2.4	1.15	203	0.81
Taxpayers should share in the cost with private landowners to protect water quality	144 4.7	56 4.8	200 4.8	1.03	198	0.51
Any harvesting of trees will cause erosion	148 3.1	56 2.8	204 2.95	1.06	202	0.20

Average likert rating based on the likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

TABLE 76. LANDOWNERS OPINIONS ABOUT FORESTS (Q13) BY (Q14) ARE YOU FAMILIAR WITH BMPs.

	Familiarity with BMPs	No familiarity with BMPs			
	Number Average likert rating	Number Average likert rating	F	DF	P value
You don't have to worry about the woods because Mother Nature will always take care of the trees	43 2.7	177 3.0	1.19	218	0.31
People who own forest land have the right to use that land as they see fit	44 4.8	179 5.5	1.42	221	0.05
Harvesting trees can improve the health of the forests for the future	44 6.3	177 5.3	2.33	99	0.0001
There is not much we can do to protect the forests	44 1.8	178 2.3	1.31	220	0.13
With proper care, people can use the forests for many different purposes without a lot of conflict among these uses	44 6.0	176 5.7	1.60	218	0.10
It makes good sense for a forest landowners to have an overall plan for using and taking care of the forest	44 6.5	178 5.5	3.34	123	0.0001
Landowners need more information on what could be done to better care for the forests	43 5.6	178 5.5	1.01	219	0.68
Only land fit for nothing else should be used for growing trees	43 2.5	179 3.1	1.14	220	0.07
Trying to teach people about the forests is a waste of time and money	43 2.1	177 2.4	1.12	218	0.35
Taxpayers should share in the cost with private landowners to protect water quality	42 4.5	173 4.6	1.20	213	0.75
Any harvesting of trees will cause erosion	43 2.7	176 3.1	1.17	217	0.20

Average likert rating based on the likert scale ranging from 1(strongly disagree) to 7(strongly agree).

TABLE 77. LANDOWNERS OPINONS ABOUT FOREST MANAGEMENT IN GENERAL (Q28)

	Latimer County	McCurtain County	Total	F	DF	P value
	Number Average likert rating	Number Average likert rating	Number Average likert rating			
Trees are like any other crop and they should be cut and replanted to provide consumer products	145 4.8	55 5.1	200 4.95	1.15	198	0.38
There are too many acres of hardwood being converted to pine	141 4.2	54 5.2	195 4.7	1.13	193	0.0001
The amount of forest in the region today is less than it was 50 years ago	141 5.2	54 4.4	195 4.8	1.30	193	0.002
We should save American forests by importing wood and wood products from other countries	143 2.9	53 2.3	196 2.6	1.99	131	0.016
Private forest owners have the right to do as they please with their forests regardless of what it does to the environment	146 3.7	57 3.6	203 3.65	1.14	201	0.82
Private property rights are important but only if they don't hurt the environment	145 4.3	54 4.2	199 4.25	1.01	197	0.71
Private property rights should be limited if necessary to protect the environment	144 3.7	55 3.8	199 3.75	1.21	197	0.71
Forest have a right to exist for their own sake, regardless of human concerns and uses	143 4.2	56 3.8	199 4.0	1.38	197	0.10
The primary use of forests should be for products that are useful to humans	147 4.4	54 4.2	201 4.3	1.11	199	0.53
Humans should have more appreciation for forests	147 6.0	56 6.3	203 6.15	2.21	147	0.10
Forest resources can be improved through human management	147 6.0	56 6.2	203 6.1	1.27	201	0.20

Average likert rating based on the likert scale ranging from 1(strongly disagree) to 7(strongly agree).

TABLE 79. OPINIONS ABOUT THE MANAGEMENT OF FORESTS IN GENERAL (Q28) BY (Q14) ARE YOU FAMILIAR WITH BMPs

	Familiarity with BMPs	No familiarity with BMPs	F	DF	P value
	Number Average likert scale rating	Number Average likert scale rating			
Trees are like any other crop and they should be cut and replanted to provide consumer products	40 5.3	174 4.8	1.01	212	0.20
There are too many acres of hardwood being converted to pine	39 4.8	170 4.5	1.06	207	0.22
The amount of forest in the region today is less than it was 50 years ago	40 4.0	168 5.2	1.27	206	0.0001
We should save American forests by importing wood and wood products from other countries	41 1.7	169 1.6	1.11	208	0.19
Private forest owners have the right to do as they please with their forests regardless of what it does to the environment	42 3.3	175 3.8	1.26	215	0.24
Private property rights are important but only if they don't hurt the environment	40 3.9	173 4.4	1.08	211	0.20
Private property rights should be limited if necessary to protect the environment	42 3.8	171 3.5	1.03	211	0.42
Forests have a right to exist for their own sake, regardless of human concerns and uses	42 3.5	171 4.1	1.02	211	0.06
The primary use of forests should be for products that are useful to humans	41 4.3	174 4.3	1.11	213	0.84
Humans should have more appreciation for forests	42 6.2	175 6.0	2.32	93	0.34
Forest resources can be improved through human management	42 6.2	175 6.0	1.11	215	0.19

Average likert rating based on the likert scale ranging from 1(strongly disagree) to 7(strongly agree).

TABLE 79. OPINIONS ABOUT THE MANAGEMENT OF FORESTS IN GENERAL (Q28) BY (Q14) ARE YOU FAMILIAR WITH BMPs

	Familiarity with BMPs	No familiarity with BMPs	F	DF	P value
	Number Average likert scale rating	Number Average likert scale rating			
Trees are like any other crop and they should be cut and replanted to provide consumer products	40 5.3	174 4.8	1.01	212	0.20
There are too many acres of hardwood being converted to pine	39 4.8	170 4.5	1.06	207	0.22
The amount of forest in the region today is less than it was 50 years ago	40 4.0	168 5.2	1.27	206	0.0001
We should save American forests by importing wood and wood products from other countries	41 1.7	169 1.6	1.11	208	0.19
Private forest owners have the right to do as they please with their forests regardless of what it does to the environment	42 3.3	175 3.8	1.26	215	0.24
Private property rights are important but only if they don't hurt the environment	40 3.9	173 4.4	1.08	211	0.20
Private property rights should be limited if necessary to protect the environment	42 3.8	171 3.5	1.03	211	0.42
Forest have a right to exist for their own sake, regardless of human concerns and uses	42 3.5	171 4.1	1.02	211	0.06
The primary use of forests should be for products that are useful to humans	41 4.3	174 4.3	1.11	213	0.84
Humans should have more appreciation for forests	42 6.2	175 6.0	2.32	93	0.34
Forest resources can be improved through human management	42 6.2	175 6.0	1.11	215	0.19

Average likert rating based on the likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

INCENTIVES TO ADOPT BMPS

A variety of methods are available to encourage private landowners to modify or adopt certain management practices. Some of these include regulation, financial assistance, tax incentives, technical assistance and education. The following discussion addresses each of these methods.

Regulation

Forest practices acts are sometimes used to regulate forest practices on private lands with purposes to sustain forest productivity and meet water quality goals or standards. There is a high cost to implement these laws (Le Master and Rans, 1996). Direct costs are attributed to increased government capacity to administer compliance programs while indirect costs may occur when productive timber management activities are inadvertently discouraged by restrictions. Experience indicates that while regulation is reasonably successful in achieving a minimum standard of performance, it is not successful in achieving much beyond the minimum.

In the southern United States, most states have voluntary BMP programs. Only North Carolina and Florida report programs which include mandatory aspects to these programs. One of the reasons, in addition to the cost to taxpayers, for the focus on voluntary programs may be the philosophical opposition by landowners to regulation which they perceive to be an infringement upon their private property rights. Landowners in this study generally agreed when asked if they disagreed or agreed with the statement that "People who own forest land have the right to use the land as they see fit" (average 5.2 on a 7-point scale, Table 76). One interpretation is that landowners in Oklahoma would be generally protective of their private property rights.

However, when faced with possible negative environmental effects of blind attachment to private property rights, landowners softened their stance. In general,

landowners slightly disagreed with the statement “Private forest owners have the right to do as they please with their forests regardless of what it does to the environment” (average 3.7 on a 7-point scale, Table 77). But private property rights as a concept remained important as landowners on average appeared slightly positive about the statement “Private property rights are important but only if they don’t hurt the environment” (4.4 on a 7-point scale) and slightly disagreed with the statement that “Private property rights should be limited if necessary to protect the environment” (3.7 on a 7-point scale).

There were no significant differences in how landowners from the two Counties answered these questions related to private property rights. As discussed before, however, how the respondent attributed economic or environmental priorities to forest management issues did significantly influence their answers regarding private property rights and the environment. This diversity of NIPF owners was also reported in a survey of landowners who had harvested timber under the water protection rules of the Oregon Forest Practices Act. Where 55 percent of landowners supported or strongly supported the rules (some support them in fear of more stringent regulations), 18 percent indicated strong support while 17 percent indicated strong opposition (Hairston and Adams, 1996).

Financial Assistance

Financial assistance is commonly interpreted as cost-share programs but may also include tax incentives such as capital gains and tax credits and other compensation mechanisms. Approximately 5% of the questionnaire respondents for this study currently receive technical or financial assistance from the government (Table 80). However, in a question dealing with BMP implementation, 33% of landowners who have implemented BMPs indicated that cost-sharing encouraged their BMP adoption (Table 38). Approximately 30% of landowners who had not used BMPs responded (Table 39) that financial assistance would encourage their implementation of BMPs.

The number of landowners receiving technical or financial assistance differed significantly by County ($p = 0.001$). Only 2% of Latimer County landowners receive assistance compared to just over 14% for McCurtain County respondents. More

McCurtain County respondents are receiving technical or financial assistance which might explain why more of them are implementing BMPs, have written management plans and have done more forest management activities on their forest land than landowners in Latimer County.

While almost 33% of respondents indicated that financial assistance could be a motivating factor in their adoption of BMPs, they did not indicate overwhelming agreement that taxpayers should share the cost with private landowners to protect water quality. On a 7-point scale, Oklahoma landowners only indicated slight agreement with an average score of 4.5 (4-neutral; 5-slightly agree) (Table 76). An Oregon study found that about 60 percent of landowners perceived favorable capital gains treatment tax credits and compensation as mostly or highly effective methods for government to influence forest practices on private lands (Hairston and Adams, 1996).

Tax Incentives

The questionnaire used in this study did not examine tax incentives separate from other financial incentives. Tax and cost-sharing assistance programs provide various types of financial assistance to NIPF landowners to encourage desirable forest practices such as tree planting, timber stand improvement, and forest retention (Cubbage, 1993). Tax benefits for forest landowners include reductions of federal and associated state taxes on timber sale income, and in-state and local property taxes (Cubbage, 1993).

One way to make forest management attractive to the NIPF sector is to cut the cost of it (Franklin, 1980). To reduce the major cost of regeneration, pre-harvest planning, including BMP and water quality education, needs to be provided to the NIPF owner. Financial incentives may increase adoption of BMPs because some of the potential risks are negated. The landowner is able to implement some forest management techniques with less fear of economic loss or personal failure.

An analysis of eight federal tax incentives to improve management of non-industrial private forests showed that deduction of reforestation expenses and green IRA accounts allowing landowners to deposit pre-tax dollars into forest management accounts to be used for management expenses have the best benefit-cost ratios. Income averaging,

flat taxes and favorable capital gains treatment had less favorable ratios but may remain popular because of powerful cash flow effects (Greene, 1996). Green IRAs (Investment/Reinvestment Accounts which allow forest owners to accumulate pre-tax dollars to pay future forest management expenses and to provide retirement income) may not only address such problems as forest fragmentation and premature liquidation of timber, but also could encourage landowners to invest in long-term conservation measures such as erosion control (Decoster, 1996).

Technical Assistance

When asked which program (technical assistance, cost-sharing, forest tax laws) they would prefer if budgets only allowed one, Tree Farm Award winners in Wisconsin unanimously agreed it would be technical assistance from professional foresters (Bliss and Martin, 1990). While this comparison was not examined in this study, results did show that during the past ten years, 23.8% of landowners had used a professional forester (Table 27), 14% of landowners had written management plans (Table 22) and almost 40% of these landowners had sought advice in managing their woodland (Table 23). Almost 60% of the landowners seeking advice sought advice from a government agency while 40%, 23%, 18% went to a professional resource manager, timber buyer or friend, respectively. Approximately 14% sought a logger for advice.

A majority (63%) of landowners in this study reported that they would like to have more information about minimizing soil erosion, protecting water quality and using BMPs (Table 82). Additionally, 25% of the respondents indicated that personal visits from professional foresters would be their preferred way of receiving additional information (Table 83). A higher percentage of McCurtain County residents (38%) felt this way as compared to Latimer County landowners (21%).

When asked if they agreed with the statement "It makes good sense for a forest landowner to have an overall plan for using and taking care of the forest" respondents scored an average of 5.7 on a 7-point scale (5-slightly agree; 6-agree). McCurtain County landowners agreed more strongly to this statement than Latimer County landowners

(Table 75). A significant difference was also found between landowners familiar with BMPs who scored 6.5 (6-agree, 7-strongly agree) and landowners not familiar with BMPs who scored 5.5 (5-slightly agree, 6-agree) (Table 76).

Perhaps most telling is that approximately 47% of landowners that use BMPs responded that information from a forestry professional had encouraged them to use BMPs on their forest land (Table 38).

Education

Landowners in McCurtain and Latimer Counties generally agree (5.6 on a 7-point scale) that landowners need more information on what could be done to better care for forest land and they disagree (2.2 on a 7-point scale) that trying to teach people about the forests is a waste of time and money (Table 75). While 63 percent of the landowners want more information about BMPs and water quality (Table 81) over 73 percent of landowners not currently using BMPs replied that more information about what BMPs are and how much they would cost would encourage them to adopt BMPs in their land management (Table 39).

Currently, landowners indicate that they rely mostly on television, newspapers and magazines for information about environmental issues (Table 84). When asked how best they would like to receive information about forest management, almost 75 percent of the respondents cited newsletters as a preferred vehicle (Table 82). While Extension publications can contribute to increased knowledge and basic levels of cognitive learning, the higher levels of effectively evaluating information may require more creative contact with clientele (Boone and Smith, 1996). This means that while knowledge of BMPs may be effectively improved by using publications such as newsletters, publications cannot be relied on alone to produce changes in landowner practices. Some landowners indicated their preference to continue receiving information by traditional channels such as newspapers (26%); magazines (26%); and television (18%). Only 7 percent responded that radio would be a preferred method of receiving more information. About 7 percent of respondents were supportive of a higher level of contact through a correspondence course method.

(Table 75). A significant difference was also found between landowners familiar with BMPs who scored 6.5 (6-agree, 7-strongly agree) and landowners not familiar with BMPs who scored 5.5 (5-slightly agree, 6-agree) (Table 76).

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About 7 percent of respondents thought that educational programs by satellite dish would be a good way to receive more forest management information. The question, however, did not differentiate between receiving satellite programs at home or in some central location. Only 25% of the landowners indicated that they owned satellite dishes (Table 87). While satellite educational programs have been effective in transferring forestry related information to large audiences of non-industrial private forest landowners (Anderson, 1993), it does not appear that landowners prefer this method if other avenues are available and cost-effective.

About 30 percent of the respondents own computers (Table 85). Of these home computer owners only 18 percent subscribe to computer services such as America Online, CompuServe, Prodigy, etc. (Table 86). This same segment of landowners (about 5.4 percent of the total) indicated that they would prefer to receive information by computer. While educational programs by computer or through the Internet does not appear to be a currently viable method of reaching a large number of landowners in Oklahoma, it can be expected that computer use will increase and technology transfer by computer and the world wide web will be one tool to reach a segment of landowners. Because the profile of a typical Internet user (male, urban dweller, technically savvy and average age in the low thirties) does not fit the traditional forest landowner it may be precisely for this reason that electronic delivery of programs should receive more attention (Megalos and Payne, 1995).

Almost 20 percent of the respondents indicate that they would best like to receive forest management information by traditional meetings. This method has been effective in the past and continues to be widely used for Extension programming. While only 20 percent of the respondents indicate that informational meetings would be the preferred way to receive forest management information, over 72 percent reported that they would travel up to 50 miles to attend an informational meeting about minimizing soil erosion, protecting water quality and using BMPs (Table 83).

About 14% of landowners would prefer to talk with other landowners for their information. Thirteen states have implemented Master Woodland Owner type programs which intensively train a few landowners who then multiply the Extension efforts by

meeting with other landowners to share forestry information (Fletcher and Reed, 1996). Because some of the assistance provide by the Master Woodland Owners include answering basic forestry questions, equipping other landowners for future management decisions; helping to clarify goals and values; and identifying alternatives for management, these type of programs would be natural ways to transfer information about BMPs and water quality.

A significantly higher percentage of McCurtain County landowners compared to Latimer County landowners indicated that they prefer newsletters, newspapers, and personal visits from forestry professionals. These results, combined with many other differences identified between the two Counties indicate that County differences should be examined when planning educational programs.

TABLE 80. DO YOU CURRENTLY RECEIVE ANY TYPE OF TECHNICAL FINANCIAL ASSISTANCE FROM THE GOVERNMENT FOR MANAGING YOUR FOREST LAND? (Q22).

	Latimer County	McCurtain County	Total
Receive assistance	3 (27.3%) 2.0%	8 (72.7%) 14.0%	11 (100%) 5.3%
Do not receive assistance	146 (74.9%) 98.0%	49 (25.1%) 86.0%	195 (100%) 94.7%

chi-square=11.8, df=1, p=0.001

TABLE 81. WOULD YOU LIKE TO HAVE MORE INFORMATION ABOUT MINIMIZING SOIL EROSION, PROTECTING WATER QUALITY AND THE USE OF BMPS? (Q25).

	Latimer County	McCurtain County	Total
More information	87 (68.5%) 58.8%	40 (31.5%) 75.5%	127 (100%) 63.2%
No information	61 (82.4%) 41.2%	13 (17.6%) 24.5%	74 (100%) 36.8%

chi-square=4.67, df=1, p=0.031

TABLE 82. HOW BEST WOULD YOU LIKE TO RECEIVE INFORMATION ABOUT FOREST MANAGEMENT? (Q18).

	Latimer County	McCurain County	Total	Chi- square	DF	P value
Newsletters	101 (66.4%) 69.2%	51 (33.6%) 87.9%	152 (100%) 74.5%	7.69	1	0.006
Correspondence course	11 (73.3%) 7.5%	4 (26.7%) 6.9%	15 (100%) 7.4%	0.025	1	0.88
Television	29 (80.6%) 19.9%	7 (19.4%) 12.1%	36 (100%) 17.7%	1.74	1	0.19
Radio	10 (71.4%) 6.9%	4 (28.6%) 6.9%	14 (100%) 6.9%	5.00	1	0.99
Newspapers	32 (60.4%) 21.9%	21 (39.6%) 36.2%	53 (100%) 26.0%	4.41	1	0.04
Educational programs by satellite dish	10 (66.7%) 6.9%	5 (33.3%) 8.6%	15 (100%) 7.4%	0.19	1	0.66
Magazines	37 (68.5%) 25.3%	17 (31.5%) 29.3%	54 (100%) 26.5%	0.34	1	0.56
Talking to other landowners	19 (65.5%) 13.0%	10 (34.4%) 17.2%	29 (100%) 14.2%	0.61	1	0.44
Personal visits from forestry professionals	30 (57.7%) 20.6%	22 (42.3%) 37.9%	52 (100%) 25.5%	6.60	1	0.010
Informational meetings	25 (62.5%) 17.1%	15 (37.5%) 25.9%	40 (100%) 19.6%	2.01	1	0.16
By computer	10 (90.9%) 6.9%	1 (9.1%) 1.7%	11 (100%) 5.4%	2.14	1	0.14
I don't want contact from anyone	23 (85.2%) 15.8%	4 (14.8%) 6.9%	27 (100%) 13.2%	2.84	1	0.09
other	5 (71.4%) 3.4%	2 (28.6%) 3.5%	7 (100%) 3.4%	0.001	1	0.99

TABLE 83. HOW FAR WOULD YOU BE WILLING TO TRAVEL TO ATTEND AN INFORMATIONAL MEETING ABOUT MINIMIZING SOIL EROSION, PROTECTING WATER QUALITY AND THE USE OF BMPS? (Q26).

	Latimer County	McCurtain County	Total
0-49	114 (73.5%) 74.0%	41 (26.5%) 68.3%	165 (100%) 72.1%
50-99	20 (71.4%) 13.0%	8 (28.6%) 13.3%	32 (100%) 14.0%
100-399	18 (62.1%) 11.7%	11 (37.9%) 18.3%	29 (100%) 12.7%
400-799	1 (100%) 0.6%	0 (0%) 0%	2 (100%) 0.9%
8000- 1000	1 (100%) 0.6%	0 (0%) 0%	1 (100%) 0.4%

chi-square

TABLE 84. WHAT SOURCE DO YOU MOST OFTEN RELY UPON TO GET YOUR NEWS/INFORMATION ABOUT ENVIRONMENTAL ISSUES? (Q30).

Source of environmental information	Latimer County	McCurtain County
Television	41 (83.7%) 44.1%	8 (16.3%) 19.5%
Radio	3 (100%) 3.2%	0 (0%) 0%
Newspapers	21 (58.3%) 22.6%	15 (41.7%) 36.6%
Magazines	21 (67.7%) 22.6%	10 (32.3%) 24.4%
Talking to others	3 (33.3%) 3.2%	6 (66.7%) 14.6%
Other	4 (66.7%) 4.3%	2 (33.3%) 4.9%

p = not applicable due to unstable sample size

TABLE 85. DO YOU HAVE A COMPUTER AT HOME? (Q21).

	Latimer County	McCurtain County	Total
Own computer	47 (78.3%) 33.1%	13 (21.7%) 23.2%	60 (100%) 30.3%
Do not own computer	95 (68.8%) 66.9%	43 (31.2%) 76.8%	138 (100%) 69.7%

chi-square=1.86, df=1, p=0.173

TABLE 86. IF YOU HAVE A COMPUTER AT HOME, DO YOU SUBSCRIBE TO ANY COMPUTER SERVICES? (Q21).

	Latimer county	McCurtain County	Total
Subscribe to computer services	9 (81.8%) 18.8%	2 (18.2%) 15.4%	11 (100%) 18.0%
Do not subscribe to computer services	39 (78%) 81.3%	11 (22%) 84.6%	50 (100%) 82.0%

p=0.78; chi-square

TABLE 87. DO YOU HAVE A SATELLITE DISH AT HOME? (Q20).

	Latimer County	McCurtain County	Total
Own satellite dish	31 (63.3%) 21.8%	18 (36.7%) 31.6%	49 (100%) 24.6%
Do not own satellite dish	111 (74%) 78.2%	39 (26%) 68.4%	150 (100%) 75.4%

chi-square=2.08, df=1, p=0.149

CONCLUSIONS/RECOMMENDATIONS

This study examined the knowledge, attitudes and opinions of forest landowners about forest management, BMPs and water quality. NIPF landowners from two Oklahoma Counties were sampled and a 28% return rate was obtained on questionnaires. The demographic character of the population sampled in this study was similar to populations sampled in other similar studies. Comparisons of our results to those of other studies are therefore informative and enlightening.

A special concern was the proportion of resident and non-resident landowners responding to our survey did not reflect the proportion in the sampled population. Because few differences were found between resident and non-resident responses, this situation was not considered critical.

Walkingstick (1992) looked at the land use perceptions and motivations affecting southeastern Oklahoma non-industrial private forest landowners. Walkingstick constructed a database for eighteen eastern Oklahoma Counties and sampled 1/3 of the NIPF population in Latimer and McCurtain Counties. In contrast, our study sampled the entire NIPF population in Latimer and McCurtain Counties. Results of our study show that the NIPF population is similar to the one studied by Walkingstick in 1990.

Demographics

The average NIPF landowner is male, over 56 years old and is a high school graduate. Over 60% of NIPF owners are retired and only 10% are 45 years of age or younger. Income level of respondents varied widely but 65% have incomes less than \$50,000 per year. Almost 77% of respondents own 250 acres or less of forest land.

The demographics of landowners in this study are generally similar to landowners across the nation (Rosson, Jr. and Doolittle, 1987; U.S Forest Service, 1990; Birch, 1994).

Some of the differences in landowner demographics between this study and Walkingstick's include such things as forest acreage owned, levels of education, residence status and technical assistance received. Our study shows an increase in the level of education from what was seen by Walkingstick (1992). In addition, our study had a higher percentage of resident landowners.

Another contrast between our study and Walkingstick (1992) was that more landowners were identified as managers even though the definition of manager for this study was the same as the one used by Walkingstick. One reason for this may be the increased forest harvesting that has occurred since Walkingstick's study (forest harvesting was considered a management practice). Another difference was that Walkingstick had a higher questionnaire return rate (Latimer- 50%; McCurtain- 43.6%) than did this study (Latimer-29.1%; McCurtain- 26.2%).

Although the sample population of the two studies appeared to be more similar than different, the differences do highlight the need to assess sampling techniques in determining changes in landowners status over time. Significant differences were found between landowners in Latimer and McCurtain Counties based on size of forest ownership, residence status, familiarity with BMPs, implementation of BMPs on forest land, occupation and technical or financial assistance. McCurtain County landowners owned on average more forest land acreage than did Latimer County landowners. McCurtain County landowners own an average of 247 more acres than landowners in Latimer County. McCurtain County had more resident landowners, more landowners who were familiar with BMPs and more landowners currently implementing BMPs on

their forest land. McCurtain County also had a higher percentage of farmers and people working in forestry as well as more landowners who receive technical or financial assistance.

A statistically significant difference ($p = 0.003$) in employment status was found among resident/non-resident landowners. There was also a statistically significant difference ($p < 0.001$) between resident/non-resident landowners in the size of the home community because resident landowners by definition would probably live in rural areas.

Landowner Objectives and Management Status

In our study, approximately 77% of landowners were classified as managers compared to 48% for Walkingstick (1992). Both studies used the same definition for manager which was a landowner who had performed at least one management activity on their land in the last ten years.

Only 14% of landowners have written management plans while almost 40% have sought advice in managing their forest land. There is a statistically significant difference between Latimer and McCurtain Counties on landowners who have written management plans (Latimer- 9%; McCurtain- 26%), and landowners who have sought advice (Latimer- 30%; McCurtain- 66%).

There were no significant differences between Counties on landowner objectives or their future plans for forest land. However, in every category, except two, McCurtain County landowners reported a higher percentage than landowners in Latimer County. About 78% of respondents expect to pass their forest land on to their children. This figure is larger than the percentage of landowners who reported that one of their objectives in owning forest land was as an estate to pass on to their children (57%). This decrease was evident in both Counties. This fact indicates a potential disconnect between landowner long-term expectations and their current objectives.

Harvesting Participation

Approximately 62% of landowners have at one time harvested timber on their land, but only 50% of landowners intend to harvest in the future. For those that plan to harvest in the future, 50% plan to do it in the next 5 years, 25% in the next 6-10 years and 25% in 11 or more years.

Over 60% of resident landowners have harvested timber in the past compared to only about 39% of non-resident landowners. However, there were no significant differences between resident/non-resident landowners on plans to sell timber in the future. These findings agree with Walkingstick (1992) who found past timber harvest activity to be significantly different between residents and non-residents, but who did not find plans to sell timber in the future significantly different.

BMP knowledge and attitudes

Only 19% of landowners have any knowledge of BMPs. However, the great majority (85%) of the 19% indicated that they employ them sometimes or on a consistent basis. Landowner knowledge of BMPs differed significantly by County (Latimer-13%; McCurtain- 35%). Eighty percent of landowners in McCurtain County who know about BMPs use them compared to 20% of landowners in Latimer County.

There was not a significant difference between Counties on factors that encouraged landowners to implement BMPs or on factors that would encourage landowners who don't currently employ BMPs. There was also no significant differences between Counties on their opinions on whether landowners should be required to use BMPs or on their knowledge about whether landowners are currently required to use BMPs in Oklahoma.

Over 90% of respondents who replied that they could be encouraged to use BMPs on their forest land, also wanted more information about BMPs and water quality. Comparatively, over 68% of landowners who responded that they could not be encouraged to use BMPs did not want any additional information.

Others differences shown were that more landowners who are familiar with BMPs are retired, own a higher mean number of acres of forest land, and are more likely to receive technical or financial assistance.

Environmental ethic as a predictor

Results show that over 80% of the landowners believe that both the environment and economy are important. The remaining 20% are more inclined to be on the extremes giving top priority to the environment or the economy.

More landowners characterized as giving highest priority to the economy in forest management issues think landowners should be compensated for economic losses incurred by government regulation. For the most part, these landowners also think that implementation of BMPs should be voluntary. Landowners with an environment view toward issues of forest management rate higher on a scale from 0-100 the importance of forest harvesting practices that minimize erosion.

There was a statistically significant difference between the view of landowners on forest management issues versus their opinion on whether or not a landowner should receive payment for economic loss incurred because of regulation (100% of respondents who give highest priority to economy think landowners should be compensated for economic loss compared to 59% of those who give highest priority to the environment).

These results indicate that forest landowners have differing philosophies toward resource management issues. A simple environmental ethic indicator may help professionals identify landowners who are more inclined to adopt BMPs.

Incentives to adopt BMPs

Approximately 47% of landowners responded that information from a forestry professional had encouraged them to use BMPs on their forest land. Approximately 26% of landowners best like to receive information about forest management through visits from forestry professionals. Forty percent of landowners have sought advice from a professional resource manager in managing their forest land.

The largest percentage of landowners responded that they would rather receive information about forest management through traditional channels such as newsletters (75%), newspapers (26%), magazines (26%), and television (18%). While extension publications are valuable to increased knowledge and basic levels of cognitive learning, the higher levels of effectively evaluating information may require more creative contact with clientele (Boone and Smith, 1996). This means that while traditional channels are effective, there are other methods that could be incorporated in order to influence landowner practices.

Sixty-three percent of landowners want more information about minimizing soil erosion, protecting water quality and the use of BMPs. Seventy-three percent of landowners respond that more information about what BMPs are and how much they cost would encourage them to use BMPs on their forest land. For the most part, McCurtain County landowners seem to be more open to receiving information about forest management as well as welcoming contact by forestry professionals.

In addition, more McCurtain County residents are receiving technical or financial assistance which might explain why more of them are implementing BMPs, have written management plans and have done more forest management activities on their forest land than landowners in Latimer County. Possible explanations include the presence of forest industry within McCurtain County and that there are more service foresters assigned to McCurtain County than there are to Latimer County. This could mean more effective communication with McCurtain County landowners.

While almost 33% of respondents indicated that financial assistance could motivate their adoption of BMPs, they did not indicate overwhelming agreement that taxpayers should share the cost with private landowners to protect water quality. On a 7-point scale, Oklahoma landowners only indicated slight agreement with an average 4.5 score (4-neutral; 5-slightly agree).

Overall, landowners value their private property rights. Landowners agreed when asked if they agreed or disagreed with the statement that "People who own forest land have the right to use the land as they see fit" (average 5.2 on a 7-point scale). However, landowners slightly disagreed with the statement that "Private forest owners have the

right to do as they please with their forest regardless of what it does to the environment” (average 3.7 on a 7-point scale). But private property rights as a concept remained important as landowners on average appeared slightly positive about the statement “Private property rights are important but only if they don’t hurt the environment”. (4.4 on a 7-point scale) and slightly disagreed with the statement that “Private property rights should be limited if necessary to protect the environment” (3.7 on a 7-point scale). Approximately 63% of respondents give priority to the environment over the economy when making forest management decisions. This does not mean, however, that they want to give up private property rights to protect the environment. Seventy-eight percent of respondents who agreed that landowners should be compensated for economic loss incurred from regulation. It appears that landowners are agreeable to protecting the environment if there are no infringements on their private property rights.

Recommendations

This pilot study indicates that in Oklahoma the focus of efforts to encourage adoption of BMPs should be on education and technical assistance. Clearly a majority of landowners indicate this as a preferred incentive.

A comprehensive regional survey of this nature should be conducted to assess differences in state and county needs for incentives to adopt BMPs. It is expected that there will be differences by state and by county which emphasizes the need to determine the most effective incentives on a locally specific basis.

Target audiences for educational or technical assistance programs can be different based on landowner objectives and knowledge. A landowner who does not manage for timber does not necessarily need to attend a program on proper management activities to undertake before and after harvest of trees. A landowner information program on best management practices might be more successful if geared to the particular knowledge of the landowner about BMPs. A landowner who is not familiar with BMPs needs different information than a landowner who is currently employing BMPs on their forest land.

The forest industry has the opportunity to play a part in improving BMP implementation rates on NIPF land. There are certain instances where forest industry has

conducted programs for NIPF landowners. Active communication between industry and private landowners can act to increase BMP implementation rates. Industry is often ahead of private landowners in forest management activities. Industry can encourage private landowners to take more active management roles by sharing the successful results of active management.

Study results provide valuable information on private landowners. There is insight into landowner demographics, knowledge and opinions about BMPs and forest management, and objectives. The situation on NIPF land should not be only the concern of private landowners because society, in general, can benefit from the priority forest landowners give to prudent management of their forest land.

Recommendations to improve future surveys include the following:

- a) The length of time a landowner owns land could affect how they view their management role.
- b) Technical and financial assistance should have been separated in order to assess the respondent's answer correctly.
- c) Analysis of questionnaire results could have been even more valuable if landowners had been asked what specific BMPs they had implemented on their forest land.
- d) The means by which landowners gained ownership of their forest land may have been helpful in analyzing how forest land is being passed from one person to the other whether by inheritance, purchase, or some other means.
- e) Analyses of questionnaire results would have been more specific if terminology involving forestry professionals was made more clear (ie. differentiated between government official and professional natural resource manager).
- f) In the future, this researcher would consider carefully the use of likert scales. The concern is the usefulness of likert scales. Does the agreement of one respondent to a certain statement mean the same thing as the agreement of another respondent?

CHAPTER 4

NON-INDUSTRIAL PRIVATE FOREST LANDOWNER
KNOWLEDGE ABOUT
BEST MANAGEMENT PRACTICES
AND WATER QUALITY

Abstract

Non-industrial private forest (NIPF) landowners own about 58 percent of the commercial forest resource in the United States and about 70 percent in the South (USDA Forest Service, 1982; Bliss, 1994). Harvesting on NIPF lands account for approximately 40 percent of the total U.S. softwood harvest and 68 percent of the nation's hardwood removals (Cubbage and Wear, 1993). For these reasons, NIPF owners can have significant impacts on water quality through their forest harvest and regeneration decisions. Failure of some landowners and loggers to use best management practices (BMPs) is perceived to be an important cause of water quality problems associated with forest management. The purpose of this study was to investigate factors affecting private landowner knowledge, attitudes and opinions about water quality and BMPs as well as their adoption of BMPs. Demographic characteristics, management status and resident status of landowners were examined as well as their preferences for incentives and communication methods. It is hoped by using these variables to assess landowner knowledge and attitudes that insight into the most effective ways to encourage NIPF use of BMPs will be identified.

Materials and Methods

The study area selected for this research included Latimer and McCurtain Counties in Oklahoma. The study population consisted of NIPF landowners in the two target Counties who owned at least 40 acres of forest land. A database previously compiled by the Extension Forest, Wildlife and Aquaculture Program at Oklahoma State University (Donovan, 1987) and continuously updated was used as a mailing list for this study.

Based on time and cost constraints, a mail questionnaire was the method selected to collect data. The questionnaire design and administration was based on a well established and effective method, the "total design method" (Dillman, 1978). The total design method incorporates cover letters, follow-up reminders, and postcards, visual appeal of the instrument, and careful questionnaire design and structure.

Landowner responses were grouped by County. Responses by County were examined using chi-square analyses to determine statistically significant differences using an alpha of 0.05.

There were 843 landowners in both Counties included in the database (Latimer-599, McCurtain-244). A final response rate of 28.2% was obtained. The Latimer County response rate was 29.1% and the McCurtain County response rate was 26.2%.

Description of Landowners

NIPF owner demographics in our study are generally similar to landowners across the nation (Rosson, Jr. And Doolittle, 1987; U.S Forest Service, 1990; Walkingstick, 1992; Birch, 1994) although this study found that landowners in Latimer and McCurtain Counties own more acres (Latimer- 105 acres, McCurtain- 352 acres) on average than was documented for NIPF landowners in a 1990 USFS study (69 acres).

The NIPF landowners ranged in age from 31-93. About 70% of the respondents are 56 years of age or older. Only 10% of landowners are 45 years or younger. The majority of landowners are high school graduates (91%), while about 40% are college graduates and 24% have done post-graduate work. Incomes range from under \$15,000 to

over \$500,000 per year. Almost 38% of the landowners have annual incomes under \$30,000. Three fourths of the landowners in the two Counties combined are male. Over 60% are retired. One fourth of the retired landowners remain employed. A majority of the landowners cite professional/managerial (39%) or farmer/rancher (29%) as their occupation.

County data were compared in order to see if there were any statistically significant differences. Demographic characteristic that differed significantly by County were occupation, average forest acreage owned and residence status. McCurtain County had a higher percentage of both farmer/ranchers (44%) and people working in forestry (12%) than Latimer County (22%, 0%).

Almost 77% of respondents own 250 acres or less of forest land (Table 1). Latimer County respondents own an average of 105 acres whereas McCurtain County respondents own an average of 352 acres ($p = 0.006$).

TABLE 1. HOW MANY ACRES OF FOREST LAND DO YOU OWN IN OKLAHOMA?

Forest Acreage	Latimer County	McCurtain County	Total
	Number (Row percent) Column Percent	Number (Row percent) Column Percent	Number (Row percent) Column Percent
0-40	38 (82.6%) 24.7%	8 (17.4%) 13.3%	51 (100%) 22.1%
41-100	46 (73%) 29.9%	17 (27%) 28.3%	65 (100%) 28.1%
101-250	45 (77.6%) 29.2%	13 (22.4%) 21.7%	61 (100%) 26.4%
251-500	13 (59.1%) 8.4%	9 (40.9%) 15.0%	27 (100%) 11.7%
501-1000	5 (33.3%) 3.2%	10 (66.7%) 16.7%	16 (100%) 6.9%
1001-5000	7 (70%) 4.5%	3 (30%) 5.0%	11 (100%) 4.8%

chi-square=16.4, df=5, $p = 0.006$

all tabular form will follow this format

County	Average total acreage	Minimum	Maximum
Latimer	104.6	5	2541
McCurtain	351.5	20	3400

p= 0.006; t-test

Resident landowners were defined as those landowners who either live directly on their forest land or who live in the same County as their forest land. Landowners were considered non-residents living in a different Oklahoma County than their forest land or in another state. By this definition, 55% of the landowners in our study were resident landowners. McCurtain County had a significantly higher percentage of resident landowners (68%) than Latimer County (50%) (Table 2).

TABLE 2. RESIDENCE STATUS.

Total number and percent of residents and non-residents for study

	Latimer County	McCurtain County	Total
Resident	77 (66.4%) 50%	39 (33.65) 68.4%	116 (100%) 55%
Non-Resident	77 (81.1%) 50%	18 (18.9%) 31.6%	95 (100%) 45%

chi-square=5.70, df=1, p= 0.017

Management Status

Only 14% of respondents have written management plans. A significantly greater percentage of McCurtain County landowners (26%) had written management plans compared to Latimer County landowners (9%) (p = 0.003).

A manager was classified as a landowner who had performed at least one management activity on their land in the last ten years. In this study, almost 77% of respondents are classified as managers. The management activities most reported by landowners was selling timber from forest land (46%) followed by planting trees (29%), vegetation control (29%) and using a professional forester (23%).

Landowner Knowledge of BMPs

Only 19% of respondents were familiar with BMPs. Of the 19% who knew what BMPs were, 85% indicated that they employ them sometimes or on a consistent basis.

Landowner familiarity with BMPs differed significantly between Counties ($p < 0.001$). Only 13% of Latimer County respondents had any familiarity with BMPs compared to 35% of McCurtain County respondents. (Table 3). The use of BMPs also differed significantly by County. Twenty-five percent of landowners in Latimer County who know about BMPs do not employ them while this figure was only 5% in McCurtain County. Also, 80% of McCurtain County landowners with knowledge about BMPs employed them consistently compared to only 20% in Latimer County (Table 4). Consistent with these results is that McCurtain County landowners also reported a higher percentage of written management plans (26% vs. 9%).

There was only one demographic difference between landowners on familiarity with BMPs. Approximately 23% of resident landowners are familiar with BMPs compared to 14% of non-resident landowners ($p = 0.09$).

TABLE 3. ARE YOU FAMILIAR WITH BEST MANAGEMENT PRACTICES?

Familiarity with BMPs	Latimer County	McCurtain County	Total
Familiarity	20 (50%) 13.2%	20 (50%) 35.1%	40 (100%) 19.1%
No Familiarity	132 (78.1%) 86.8%	37 (21.9%) 64.9%	169 (100%) 80.9%

chi-square=12.9, df=1, $p<0.001$

TABLE 4. IF FAMILIAR WITH BMPS, DO YOU USE BMPS ON FOREST LAND?

Current implementation rates	Latimer County	McCurtain County	Total
Use BMPs	4 (20%) 20%	16 (80%) 80%	20 (100%) 50%
Do Not Use BMPs	5 (83.3%) 25%	1 (16.7%) 5%	6 (100%) 15%
Sometimes Use BMPs	11 (78.6%) 55%	3 (21.4%) 15%	14 (100%) 35%

chi-square=14.4, df=2, p=0.001

Incentives to Adopt BMPs

A variety of methods are available to encourage private landowners to modify or adopt certain management practices. Some of these include regulation, financial assistance, tax incentives, technical assistance and education.

Landowners who use BMPs were asked what had encouraged them to adopt BMPs. Approximately 47% were encouraged from information given by a forestry professional while 75% were encouraged because they wanted to minimize any possibilities of erosion (Table 5). Another 33% indicated they participate in a cost-sharing program which enables them to implement BMPs. About 8% said they use BMPs because they saw a neighbor using BMPs.

Landowners who do not use BMPs were asked what would encourage them to adopt BMPs. Approximately 32% of 174 respondents indicated that financial assistance would encourage them to use BMPs while 73% indicated that more information would encourage them (Table 6). About 15% of landowners indicated that nothing would encourage them to use BMPs.

Approximately 5% of respondents in the study currently receive technical or financial assistance from the government. Only 2% of Latimer County landowners

receive assistance compared to just over 14% of McCurtain County respondents ($p = 0.001$) (Table 7). However, in a question dealing with BMP implementation, 33% of landowners who have implemented BMPs indicated that cost-sharing encouraged their BMP adoption. Approximately 32% of landowners who had not used BMPs responded that financial assistance would encourage their implementation of BMPs.

More McCurtain County respondents are receiving technical or financial assistance which might explain why more of them are implementing BMPs, have written management plans and have done more forest management activities on their forest land than landowners in Latimer County.

A majority (63%) of landowners in this study reported that they would like to have more information about minimizing soil erosion, protecting water quality and using BMPs. In addition, over 73 percent of landowners not currently using BMPs replied that more information about what BMPs are and how much they would cost would encourage them to adopt BMPs in their land management.

When asked how best they would like to receive information about forest management, almost 75 percent of the respondents cited newsletters as a preferred vehicle (Table 8). While Extension publications can contribute to increased knowledge and basic levels of cognitive learning, the higher levels of effectively evaluating information may require more creative contact with clientele (Boone and Smith, 1996). This means that while knowledge of BMPs may be effectively improved by using publications such as newsletters, publications cannot be relied on alone to produce changes in landowner practices. Some landowners indicated their preference to continue receiving information by traditional channels such as newspapers (26%); magazines (26%); and television (18%). Almost 20 percent of the respondents indicate that they would best like to receive forest management information by traditional meetings. This method has been effective in the past and continues to be widely used for Extension programming.

In addition, about 25% of respondents indicated that personal visits from professional foresters was their preferred way of receiving additional information about forest management. A higher percentage of McCurtain County residents (38%) felt this way as compared to Latimer County landowners (21%).

About 30 percent of the respondents own computers. Of these home computer owners, only 18% subscribe to computer services such as America Online, CompuServe, Prodigy. This same segment of landowners (about 5.4 percent of the total) indicated that they would prefer to receive information by computer. While educational programs by computer or through the Internet does not appear to be a currently viable method of reaching a large number of landowners in Oklahoma, it can be expected that computer use will increase and technology transfer by computer and the world wide web will be one tool to reach a segment of landowners. Because the profile of a typical Internet user (male, urban dweller, technically savvy and average age in the low thirties) does not fit the demographic pattern of landowners in our study it may be precisely for this reason that electronic delivery of programs should receive more attention (Megalos and Payne, 1995).

About 14% of landowners would prefer to talk with other landowners for their information. Thirteen states have implemented Master Woodland Owner type programs which intensively train a few landowners who then multiply the Extension efforts by meeting with other landowners to share forestry information (Fletcher and Reed, 1996). Because some of the assistance provide by the Master Woodland Owners include answering basic forestry questions, equipping other landowners for future management decisions; helping to clarify goals and values; and identifying alternatives for management, these type of programs would be naturals for transferring information about BMPs and forest management.

TABLE 5. IF YOU USE BMPS, WHAT ENCOURAGED YOUR IMPLEMENTATION OF BMPS?

Factors encouraging implementation of BMPs	Latimer County	McCurtain County	Total
Cost-sharing	5 (41.7%) 31.3%	7 (58.3%) 35%	12 (100%) 33.4%
Because I have to by law	0 (0%) 0%	1 (100%) 5%	1 (100%) 2.8%
I just want to minimize any possibilities of erosion	9 (33.3%) 56.3%	18 (66.7%) 90%	27 (100%) 75.0%
Information from a forestry professional	7 (41.2%) 43.8%	10 (58.8%) 50%	17 (100%) 47.2%
I saw a neighbor doing it that way	2 (66.7%) 12.5%	1 (33.3%) 5%	3 (100%) 8.3%
Other	2 (40%) 12.5%	3 (60%) 15%	5 (100%) 13.9%

chi-square=1.19, df=5, p=0.47

TABLE 6. IF YOU HAVE NOT USED BMPS, WHAT MIGHT ENCOURAGE YOU TO USE THEM WHILE MANAGING YOUR FOREST LAND?

	Latimer County	McCurtain County	Total
Financial assistance	36 (78.3%) 31.0%	10 (21.7%) 34.5%	46 (100%) 31.7%
Nothing will encourage me	20 (90.9%) 17.2%	2 (9.1%) 6.9%	22 (100%) 15.2%
More information	84 (79.2%) 72.4%	22 (20.8%) 75.9%	106 (100%) 73.1%

chi-square=0.73, df=2, p=0.53

TABLE 7. LANDOWNER RESPONSE THAT NOTHING WILL ENCOURAGE THEIR USE OF BMPs COMPARED WITH THOSE LANDOWNERS WHO DO NOT WANT CONTACT FROM ANYONE ABOUT FOREST MANAGEMENT.

Contact about forest management	Contact okay	Want no contact
Can be encouraged to use BMPs	124 (95.4%) 93.9%	6 (4.6%) 31.6%
Cannot be encouraged to use BMPs	8 (38.1%) 6.1%	13 (61.9%) 68.4%

chi-square=53.9, df=1, p<0.001

TABLE 8. DO YOU CURRENTLY RECEIVE ANY TYPE OF TECHNICAL OR FINANCIAL ASSISTANCE FROM THE GOVERNMENT FOR MANAGING YOUR FOREST LAND?

	Latimer County	McCurtain County	Total
Receive assistance	3 (27.3%) 2.0%	8 (72.7%) 14.0%	11 (100%) 5.3%
Do not receive assistance	146 (74.9%) 98.0%	49 (25.1%) 86.0%	195 (100%) 94.7%

chi-square=11.8, df=1, p=0.001

TABLE 9. HOW BEST WOULD YOU LIKE TO RECEIVE INFORMATION ABOUT FOREST MANAGEMENT?

	Latimer County	McCurtain County	Total	Chi- square	DF	P value
Newsletters	101 (66.4%) 69.2%	51 (33.6%) 87.9%	152 (100%) 74.5%	7.69	1	0.006
Correspondence course	11 (73.3%) 7.5%	4 (26.7%) 6.9%	15 (100%) 7.4%	0.025	1	0.88
Television	29 (80.6%) 19.9%	7 (19.4%) 12.1%	36 (100%) 17.7%	1.74	1	0.19
Radio	10 (71.4%) 6.9%	4 (28.6%) 6.9%	14 (100%) 6.9%	5.00	1	0.99
Newspapers	32 (60.4%) 21.9%	21 (39.6%) 36.2%	53 (100%) 26.0%	4.41	1	0.04
Educational programs by satellite dish	10 (66.7%) 6.9%	5 (33.3%) 8.6%	15 (100%) 7.4%	0.19	1	0.66
Magazines	37 (68.5%) 25.3%	17 (31.5%) 29.3%	54 (100%) 26.5%	0.34	1	0.56
Talking to other landowners	19 (65.5%) 13.0%	10 (34.4%) 17.2%	29 (100%) 14.2%	0.61	1	0.44
Personal visits from forestry professionals	30 (57.7%) 20.6%	22 (42.3%) 37.9%	52 (100%) 25.5%	6.60	1	0.010
Informational meetings	25 (62.5%) 17.1%	15 (37.5%) 25.9%	40 (100%) 19.6%	2.01	1	0.16
By computer	10 (90.9%) 6.9%	1 (9.1%) 1.7%	11 (100%) 5.4%	2.14	1	0.14
I don't want contact from anyone	23 (85.2%) 15.8%	4 (14.8%) 6.9%	27 (100%) 13.2%	2.84	1	0.09
other	5 (71.4%) 3.4%	2 (28.6%) 3.5%	7 (100%) 3.4%	0.001	1	0.99

Conclusions and Recommendations

Our study examined the knowledge, attitudes and opinions about forest management and BMPs of landowners in two Counties in Oklahoma. A 28% return rate was obtained. The respondent population was similar in many demographic characteristics compared to other studies. Comparisons of our results to other studies are therefore informative and enlightening.

Landowners seem willing to receive information on minimizing erosion, protecting water quality and using BMPs (63.2%) and would be encouraged to use BMPs by receiving more information about them and how much they cost (73%). It would appear from our study that demographics such as gender and education are not that crucial when determining the most viable methods of information delivery to landowners. On the other hand, characteristics such as amount of forest land owned and residence status are demographics that may prove to be very beneficial for this purpose. In addition, a large percentage of landowners are retired. This may indicate that landowners become more willing to take precautionary steps to protect their forest land, have more time to spend on forest management issues or are wiser about potential land use problems.

Only 19% of landowners reported knowledge of BMPs, but when they knew about BMPs a large percentage (85%) employ them sometimes or on a consistent basis. Landowner knowledge of BMPs differed significantly by County (Latimer-13%; McCurtain- 35%). Twenty-five percent of landowners in Latimer County who know about BMPs use them compared to 5% of landowners in McCurtain County.

Over 90% of respondents who replied that they could be encouraged to use BMPs on their forest land, also wanted more information about BMPs and water quality. McCurtain County landowners seem to be more open to receiving information about forest management as well as welcoming contact by forestry professionals. In addition, over 68% of landowners who responded that they could not be encouraged to use BMPs did not want any additional information.

The study indicates that although 62% of landowners have at one time harvested timber on their forest land, only 50% intend to harvest trees in the future. This in itself may limit how many landowners may need to use BMPs.

Approximately 5% of the questionnaire respondents in this study currently receive technical or financial assistance. This differed significantly by County (Latimer- 2%; McCurtain- 14%). The low percentage of landowners who receive assistance indicates that landowners might not be aware of the various types of assistance that are available or that they are satisfied to manage their land without any government assistance.

The results of the study show that no one way of contact will be effective with all landowners. Differences by County and philosophical disposition are evident from this study.

Recommendations

Our study indicates that in Oklahoma the focus of efforts to encourage adoption of BMPs should be on education and technical assistance. Clearly a majority of landowners indicate this as a preferred incentive. Although, in Oregon, 60% of landowners responded that financial assistance is the most effective means by which to influence forest practices (Hairston and Adams, 1996). Secondary efforts in financial incentives especially tax incentives such as green IRA's or more deduction for management expenses is a potential method to increase BMP implementation rates on NIPF land.

This pilot study found numerous differences between landowners in two Counties, indicating that such surveys should be conducted on a local basis to identify the most effective ways of encouraging private landowners to adopt BMPs.

Recommendations to improve future surveys include asking how long a landowner has owned their tract of land in order to assess average land tenure and turnover rates. Information on the specific BMPs landowners had used would indicate the extent of landowner knowledge about BMPs and also what types of forest management activities were most prevalent. The way landowners acquired their forest land would have indicated whether land remains predominantly within families or if there are other factor that affect land ownership.

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APPENDIXES

APPENDIX A
COVER LETTERS

October 18, 1995

Dear Oklahoma Forestland owner:

never before has there been so much discussion about the environment and how we use our natural resources, particularly private forests. One of the products our forests provide is high quality water. With so much discussion about the environment, people are genuinely concerned about how our forests are managed and how we maintain water quality. Part of our charge in the Oklahoma Cooperative Extension Service is to make education available to you and other landowners that will help you get more out of your land while maintaining the capacity of the land to grow more trees. Knowing what landowners in Oklahoma think about forestland and water quality will help in making decisions about future forestry extension programs.

Your household was chosen based on the county in which you live to allow you to voice opinions on these matters. In order that the results will truly represent the thinking of landowners in Oklahoma it is very important that each questionnaire be completed and returned before November 10, 1995. We have provided a self-addressed postage paid envelope for your convenience.

You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so that we may check your name off of the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire or associated with the results.

I would be most happy to answer any questions you might have. Please write or call. The telephone is (405)744-9431 or (405)744-8269.

Thank you for your assistance.

Sincerely,

Steven Anderson
Professor of Forestry

Christy Davis
Graduate Assistant

Dear Oklahoma forestland owner,

A few weeks ago you received a survey in regard to the forestland you own. We sincerely thank you if you have already returned your survey. If you have not, this is a reminder to please take a few minutes to fill it out and return it in the postage paid return envelope that was provided. You are one of a select group of landowners who received this survey and so each survey is very important for representing landowners throughout Oklahoma. If you do not have your survey and would like to participate, please contact Dr. Steve Anderson (405)744-9431. Please feel free to call with any other questions. Thank you for your cooperation.

Dr. Steven Anderson
Professor of Forestry

December 8, 1995

Dear Oklahoma Landowners:

Several weeks ago a questionnaire asking you to participate in a research project was mailed to you. The questionnaire concerns you feelings and opinions on forest management and water quality.

If you have already completed and returned it to use please accept our sincere thanks. If not, please do so at your earliest convenience. In case the questionnaire was misplaced or lost in the mail, I have included another copy in this package. I would appreciate it if you would complete and mail back the questionnaire to me by December 22, 1995 or at your earliest convenience.

Because it was sent to only a small sample of Oklahoma landowners it is extremely important that your opinions be included in the study. The person who should fill out the survey is that person who currently or most recently owns or cares for the forest land. Forest land means any land covered mostly by trees of some type.

I thank your for your willingness to participate in my research project. Please feel free to call at (405) 744-6432 or (405)744-8269 if you have any questions. I look forward to receiving your reply.

Thank you for your assistance. Have a Happy Holiday Season.

Sincerely,

Christy Davis
Project Coordinator
Ag Hall Room 259
Stillwater, OK 74078

Dr. Steven Anderson
Extension Forester
Ag Hall Room 243
Stillwater, OK 74078

APPENDIX B
SAMPLE QUESTIONNAIRE

OKLAHOMA NONINDUSTRIAL PRIVATE FOREST LANDOWNER QUESTIONNAIRE

Section 1

This section will ask questions specifically concerning your forest land and your reasons for maintaining ownership.

1. How many acres of forest land do you own in **Oklahoma**?
_____acres
 2. Where do you live in relation to your forest land?
(please circle one)
 1. live on forest land
 2. live in same county but not on forest tract
 3. live in the same state, but different county
 4. live in another state; it is _____
 5. other(please specify)_____
-
3. If you do not live on your forest land, approximately how far from where you live is your nearest tract of forest land (one way) in **Oklahoma**? _____miles
 4. How would you describe where you live?
 1. a farm
 2. a rural area, not on a farm
 3. a town, under 10,000
 4. a city, 10,000 to under 100,000
 5. a city, 100,000 or larger
 6. a suburb of a city, 100,000 or larger
 5. For which of the following reasons do you maintain ownership of forested land?
(circle all that apply)
 1. land investment (hope to sell all or most of my woodland at a profit)
 2. hunting and camping or other recreational activities
 3. growing timber for sale
 4. personal uses such as firewood and fence posts
 5. enjoyment of owning woodland
 6. woodland is part of my residence
 7. for an estate to pass on to my children
 8. income from other than selling trees
 9. wildlife
 10. solitude
 11. to protect forests for the future

12. scenic enjoyment
13. grazing
14. stewardship
15. other (please specify) _____

6. Please select the three most important reasons for maintaining ownership that you circled above.
(Please identify the numbers here in order of importance)

_____, _____, _____.

7. Thinking about the future, what do you think will most likely happen to your forest land? (please circle all that apply)

1. will be passed on to children
2. broken into tracts and sold
3. sold to children or grandchildren
4. sold for retirement money
5. maintained in an estate/trust
6. have never thought about it
7. other (please specify) _____

Section II

This section concentrates on management activities that you may or may not have conducted on your property. Please answer as best you can.

8. Have you sold timber from your land during the time you have owned your woodland? (please circle one)

- a. yes year of most recent harvest _____
- b. no

IF YES: What would you say the main reason for your harvest?
(Please circle one)

1. timber was mature
2. to release the 'crop trees'
3. thin and improve the timber stand
4. timber was diseased or damaged
5. needed some emergency money
6. the market price was good
7. cleared to convert to other use
8. needed money to pay taxes
9. part of overall management plan
10. other (please specify) _____

IF NO: What are the main reasons behind your decision not to harvest?
(please circle all that apply)

1. no market
 2. timber is too immature
 3. not enough volume
 4. timber is of a poor quality
 5. opposed to cutting timber
 6. land value would be lowered
 7. privacy would be lost
 8. land is tied up in an estate
 9. too much work involved
 10. mistrust loggers
 11. plan to sell land
 12. would change wildlife habitat
 13. would change the natural beauty of land
 14. too old or ill
 15. cutting trees has serious environmental consequences
 16. other(please specify)
-

9. Do you plan to sell timber in the future?(please circle one)

1. yes 2. no

IF YES: When do you think you will sell timber?
(please circle one)

1. 0-5 years
2. 6-10 years
3. 11 or more years

10. During the past ten years, have you done any of the following?
(please circle all that apply)

1. have sold timber from your land
 2. planted trees on your land
 3. controlled weeds and/or undesirable trees competing with crop trees
 4. intentionally burned your forest for management purposes
 5. used a professional forester
 6. improved wildlife habitat on your land
 7. built a permanent road through forest land
 8. site prepared your land for seeding or planting
 9. have not conducted any forest management activities
 10. other(please specify)_____
-

11. Do you have a written management plan for your woodland?
(please circle one)

1. yes 2. no

12. Have you ever sought advice or help in managing your woodland?
(please circle one)

1. yes 2. no

IF YES: From which of the following did you seek help?
(please circle all that apply)

1. friend or neighbor
2. professional resource manager
3. government agency
4. logger
5. timber buyer
6. other(please describe) _____
-

Section III

The next section will deal with your opinions of forests in general.

13. With each of the following statements would you please indicate whether you:

- 1-strongly disagree
2-disagree
3-slightly disagree
4-neither agree or disagree
5-slightly agree
6-agree
7-strongly agree

(Please circle one number for each statement)

- | | strongly disagree | | | | strongly agree | | |
|--|-------------------|---|---|---|----------------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. you don't have to worry about the woods because Mother Nature will always take care of the trees | | | | | | | |
| 2. people who own forest land have the right to use that land as they see fit | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. harvesting trees can improve the health of the forests for the future | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. there is not much we can do to protect the forests | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. with proper care, people can use the forests for many different purposes without a lot of conflict among these uses | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6. it makes good sense for a forest landowner to have an overall plan for using and taking care of the forest | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. landowners need more information on what could be done to better care for the forests | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. only land fit for nothing else should be used for growing trees | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. trying to teach people about the forests is a waste of time and money | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. taxpayers should share in the cost with private forest landowners to protect water quality | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. any harvesting of trees will cause erosion | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Section IV

The next section deals with your knowledge of Best Management Practices (BMP's). Please answer the best you can.

14. Are you familiar with Best Management Practices (BMP's)?
(please circle one)

1. yes 2. no

IF YES: Do you use BMP's on your forest land?
(please circle one)

1. yes 2. no 3. sometimes

NOTE: In forestry, BMP's are common sense practices used in road construction, harvesting, and site preparation that minimize erosion and protect streams and water quality.

15. If you use BMP's, what encouraged your implementation of BMP's?
(please circle all that apply)

1. cost-sharing
 2. because I have to by law
 3. I just want to minimize any possibilities of erosion
 4. information from a forestry professional
 5. I saw a neighbor doing it that way
 6. other(please specify)_____
-

16. If you have not used BMP's, what might encourage you to use them while managing your forest land?(please circle all that apply)
1. financial assistance
 2. nothing will encourage me
 3. more information about what they are and how much they cost
 4. other(please specify)_____
-
17. On a scale from 0-100, how important do you think it is to use forest harvesting practices that minimize soil erosion?_____.
18. How best would you like to receive information about forest management? (please circle all that apply)
1. newsletters
 2. correspondence course
 3. television
 4. radio
 5. newspapers
 6. educational programs by satellite dish
 7. magazines
 8. talking to other landowners
 9. personal visits from forestry professionals
 10. informational meetings
 11. by computer (Worldwide Web, Internet, CompuServe, etc.)
 12. I don't want any contact from anyone
 13. other (please specify) _____
-
19. Please select the single best way you would like to receive information about management that you circled in the question above (Identify the number here)_____.
20. Do you have a satellite dish at home?(please circle one)
1. yes 2. no
21. Do you have a computer at home?(Please circle one)
1. yes 2. no
- IF YES: Do you subscribe to any Computer Services? (Prodigy, Online, CompuServe, etc.)
1. yes 2. no

IF YES: (please specify to which ones you subscribe)

22. Do you currently receive any type of technical or financial assistance from the government for managing your forest land? (please circle one)

1. yes 2. no

IF YES: (please specify which ones you receive)

23. Should landowners be required to use BMP's or should they be voluntary in nature? (please circle one)

1. required to use BMP's
2. use of BMP's should be voluntary
3. not sure

24. In Oklahoma, are landowners who manage and harvest timber required to use BMP's or are they voluntary? (please circle one)

1. voluntary
2. required by the government
3. not sure

25. Would you like to have more information about minimizing soil erosion, protecting water quality and the use of BMP's? (please circle one)

1. yes 2. no

26. How far would you be willing to travel to attend an informational meeting about minimizing soil erosion, protecting water quality and the use of BMP's?
_____miles

Section V

The next section asks more questions concerning your opinions about the management of forests in general.

27. Many forest management issues involve difficult trade-offs between environmental and economic considerations. Which of the following statements best describes your view? (please circle one)

1. the highest priority should be given to protecting the environment, even if it hurts the economy
2. both the environment and the economy are important but the environment should come first
3. both the environment and the economy are important but the economy should come first
4. the highest priority should be given to economic considerations such as jobs even if it hurts the environment

28. With each of the following statements please indicate whether you:

- 1-strongly disagree
- 2-disagree
- 3-slightly disagree,
- 4-neither agree or disagree
- 5-slightly agree
- 6-agree
- 7-strongly agree

(Please circle one number per statement)

- | | strongly disagree | | | | strongly agree | | |
|--|-------------------|---|---|---|----------------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. trees are like any other crop and they should be cut and replanted to provide consumer products | | | | | | | |
| 2. there are too many acres of hardwood being converted to pine | | | | | | | |
| 3. the amount of forest in the region today is less than it was 50 years ago | | | | | | | |
| 4. we should save American forests by importing wood and wood products from other countries | | | | | | | |

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5. private forest owners have the right to do as they please with their forests regardless of what it does to the environment | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. private property rights are important but only if they don't hurt the environment | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. private property rights should be limited if necessary to protect the environment | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. forests have a right to exist for their own sake, regardless of human concerns and uses | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. the primary use of forests should be for products that are useful to humans | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. humans should have more appreciation for forests | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. forest resources can be improved through human management | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
29. If a forest landowner was prevented from cutting trees on their land because of regulations, do you think the landowner should be paid for the economic loss? (please circle one)
1. yes 2. no 3. not sure
30. What source do you most often rely upon to get your news/information about environmental issues? (please circle one)
1. television
 2. radio
 3. newspapers
 4. magazines
 5. talking to others
 6. other (please specify) _____
-

Section VI

Personal characteristics can have an influence on the decisions we make. To help us understand this influence, we would like you to answer some questions about yourself.

31. Gender

1. male 2. female

32. What was your age on your last birthday? _____

33. What is the employment status of the primary wage earner of the household?

1. employed 2. retired
3. retired and employed 4. unemployed

34. If still employed, what is his or her occupation?(please circle one)

1. student
2. professional/managerial
3. secretarial/clerical
4. services/labor
5. sales/retail sales
6. farmer/rancher
7. military
8. forest industry/forestry
9. other (please specify) _____
-

35. What is the highest level of education you have completed?
(please circle one)

1. less than high school graduate
2. high school graduate
3. some college
4. trade/technical/vocational training
5. college graduate
6. post-graduate work/degree

36. Before taxes, what is your total annual household income? (please circle one)

1. under \$15,000
2. \$15,000-\$29,999
3. \$30,000-\$49,999
4. \$50,000-\$69,999
5. \$70,000-\$99,999
6. \$100,000-\$149,999
7. \$150,000-\$499,000
8. \$500,000 or more

VITA

CHRISTY LYNN DAVIS

CANDIDATE FOR THE DEGREE OF MASTER OF SCIENCE

Thesis: Non-industrial private forest landowners knowledge and opinions about forest management and best management practices.

Major Field: Forest Resources

Biographical:

Personal data: Born in Tulsa, Oklahoma, September 13, 1972, the daughter of Russell and Brenda Davis.

Education: Graduated from Caney Valley High School, Ramona, Oklahoma, May, 1990; Bachelor of Science, Environmental Science, Phillips University, Enid, Oklahoma, May 1994; Completed requirements for Master of Science, Oklahoma State University, December, 1996

Professional Involvement: Phillipian Scholarship, Phillips University, August 1990. Michael Redding Environmental Science Award, Spring 1993. Dean's Honor Roll. Member, Xi Sigma Pi, Honor Society of Forestry. Member, Society of Environmental Scientists.

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 01-25-96

IRB#: AG-96-012

Proposal Title: KNOWLEDGE AND ATTITUDES OF NONINDUSTRIAL PRIVATE
FOREST LANDOWNERS TO BEST MANAGEMENT PRACTICES AND WATER
QUALITY

Principal Investigator(s): Steven Anderson, Christy Davis

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

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