

# THE EFFECT OF TRENDS IN FOREST AND OWNERSHIP CHARACTERISTICS ON RECREATIONAL USE OF PRIVATE FORESTS

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Probit analysis was used to estimate correlations between recreational use of private woodland and forest, owner, and surrounding community characteristics. Land held by more highly educated owners or those reared in large cities was more likely to be used for recreation, while the opposite was true for land held by older owners.

## Introduction

Forests provide opportunities for recreational and aesthetic relief from the pressures of modern society, as well as the raw material for a diverse wood products industry. Ownership changes are taking place that may drastically alter the flow of forest benefits.

Diamond International's recent sale of nearly 1 million acres in northern Vermont and New Hampshire focused attention on the public benefits associated with large undeveloped parcels. Fears emerged over the possibility, if not inevitability, that corporate restructuring and leveraged buyouts would bring extensive forest acreage, traditionally open to the public, to the auction block. Increased demands for recreation has led to overcrowding on many public lands. Recreational use is expected to become an increasingly important reason for owning woodland, particularly in the highly populated Northeast (USDA Forest Service 1989).

This study identified landowner characteristics associated with recreational use of nonindustrial private forest land. The influences of forest characteristics and population density in the surrounding community on recreational use were also examined. The results aid in understanding the effects of trends in landownership characteristics on recreational use of forests. Since landowners who use their land for recreation may manage differently, insight may be provided into a variety of forestry concerns.

## Data and Methods

Information on forest characteristics were obtained for privately owned plots sampled in conjunction with the U.S. Forest Service's periodic survey of Vermont and ownership data were obtained from a questionnaire sent to the owner of each plot. Frieswyk and Malley (1985) and Widmann and Birch (1988) provide detailed discussions of survey techniques for the respective forest and ownership surveys. These data included species composition, elevation, proximity to a maintained road, parcel size, and owner characteristics, such as, age, education level, occupation, tenure of ownership, and whether the land was used for any of a variety of recreational pursuits (e.g. hunting, hiking, camping, bird watching or winter sports). Observations for 258 individually owned nonindustrial private ownerships were analyzed.

A nonlinear regression technique (probit) was used to estimate the relationship between a dichotomous dependent variable, coded "1" if the woodland was used for recreation and "0" otherwise, and variables measuring characteristics of the forest, owner, and surrounding community. Probit analysis provided estimates of the strength of correlations between recreational use and selected explanatory variables, as well as the probability that parcels with a given set of characteristics are used for recreation. Judge and others (1982) provide a thorough discussion of probit models.

## Results

It appears that much of Vermont's privately owned woodland is used for recreation. Approximately 77 percent of the 258 sample plots were within ownerships that were used for recreation.

Table 1 provides a brief description of the variables and Table 2 shows the probit results and estimated elasticities. The signs for the coefficients indicate the direction of change estimated to result from an increase in an explanatory variable, but since the model is nonlinear, the magnitude of the change is influenced by the values for all the variables and coefficients. Elasticities estimate the percentage change in the probability that woodland is used for recreation resulting from a 1-percent increase in an explanatory variable, and those listed in Table 2 were evaluated at the mean values of the explanatory variables. The estimated probability that a parcel with characteristics equivalent to the sample means was used for recreation was 0.57. (See Tables 1 and 2, next page.)

Forest stands with larger portions of eastern white pine were more likely to be used for recreation. There is no clear intuitive explanation for this correlation other than preference for the aesthetic appeal of white pine or that white pine is more likely to occur on better drained sites. Other parcel characteristics examined but not statistically discernible at the 10-percent level included: size of ownership, proximity to a maintained road, per-acre timber volume, and several variables measuring species composition other than white pine. However, since forest characteristics were measured on only one plot per ownership and may not portray average conditions or indicate diversity, results with respect to forest characteristics should be used with caution.

Stronger correlations were found between landowner characteristics and recreational use. A strong positive correlation was found between recreational use and the landowner's level of formal education. Woodland held by owners who were reared in large cities also was more likely to be used for recreation. It appears that recreation is a more important reason for owning woodland for these owners than for those with a more rural background. Preliminary regressions provided weak evidence significant only at the 20-percent level, that farmers were less likely to use their woodlots for recreation.

Woodland held by older or professionally employed landowners was less likely to be used for recreation. These results were statistically significant at the 2.7-percent and 12.9-percent levels, respectively. Older owners may face physical restrictions, while professionals may have less free time or may prefer more developed types of recreation.

Several other ownership variables were examined but the correlations were not statistically discernible. Population density in the surrounding community, tenure of ownership, retirement status, and income levels were not correlated with recreational use.

Table 1. Definition of variables.

Variable	Definition
REC	Dependent variable, coded "1" if woodland is used for recreational purposes and "0" otherwise
PINE	Proportion of eastern white pine in stand
ED	Years of formal education
AGE	Age of landowner (years)
PRO	Variable, coded "1" if owner is employed in a white collar or professional occupation and "0" otherwise
CITY	Variable, coded "1" if landowner spent the first 12 years of his or her life in a large city (population > 100,000) and "0" otherwise

Table 2. Probit results and estimated elasticities.

Explanatory Variable	Coefficient	Standard Error	Mean		Elasticity
			Recreational Use	No Recreational Use	
Constant	0.511	0.613	1.00	1.00	-----
PINE	0.828*	0.432	0.13	0.06	0.05
ED	0.083**	0.028	14.90	13.00	0.60
AGE	-0.017**	0.008	55.58	60.51	-0.47
PRO	-0.308	0.204	0.42	0.41	-0.06
CITY	0.506*	0.302	0.19	0.07	0.04

N = 258

-2 LOG (Likelihood Ratio) = 26.63

\*\* Significant at 5-percent level.

\* Significant at 10-percent level.

## Discussion

Several correlations were found between owner characteristics and recreational use of private woodland. Parcels held by more highly educated owners or those reared in large cities were more likely to be used for recreation. The opposite was true for land held by older individuals. Although trends show increases in the education level of landowners, the owners are also growing older as the baby boom generation ages. Baby boomers have generally been more active in their recreational pursuits than the preceding generation and may continue using their woodland for recreation as they grow older. The low estimated elasticities indicate that changes in the portion of forest land used for recreation, resulting from shifts in the characteristics of the landowning population will come about slowly.

Demands for both timber and recreation are expected to increase. Concerns over the loss of recreational opportunities on some large industrial holdings and intense use on many public lands may motivate more individuals to purchase forest land for recreation. Understanding the characteristics of these individuals provides insight into a variety of forestry concerns. Timber harvesting, forest management, posting, and participation in voluntary forestry programs have been linked to forest and landowner characteristics (Binkley 1981, Widmann and Birch 1988, Dennis 1989, Dennis and Sendak, in press). For example, more highly educated owners were less likely to harvest timber and more likely to post their land and participate in voluntary tax saving programs even when these programs required management stipulations. This suggests that voluntary tax relief programs that encourage timber harvesting and discourage posting may be effective in mitigating potential negative effects of changes in land ownership motivated by increased demand for recreation.

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