

# THE NATIONAL PRIVATE LAND OWNERSHIP STUDY: ESTABLISHING THE BENCHMARK

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*Abstract—This paper presents the findings of the 1986 National Private Land Ownership Study. The study develops a better understanding of the individuals who own rural lands and the reasons for that ownership. Estimates of tract sizes, amount of land dedicated to specific land uses, and leasing and posting practices currently employed by landowners were established as a framework for examining recreational access dimensions and policies.*

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Availability of private lands is crucial if America is to meet increasing demands for a number of types of outdoor recreation. Private land and water resources provide businesses for such activities as camping, skiing, boating, horseback riding, fee fishing, and hunting. Noncommercial private lands are also critical to meeting national demands for hunting and fishing. Such private lands also have important regional implications for meeting demands for other wildlife-associated recreation activities, hiking, camping, and snowmobiling.

Unlike public lands, which are managed for public purposes including recreation, private, nonindustrial lands are managed by thousands of individual landowners, primarily for their own private objectives. Many of these private acres provide excellent recreation opportunities, but often they are closed to the public unless permission is obtained. Programs to obtain public access to private lands have most frequently been implemented at State and substate levels. However, it is important that the Federal government periodically monitor recreational access

to private lands on national and regional bases to ascertain whether sufficient public and private acres in combination are available to meet demands for a host of outdoor activities. The 1986 National Private Landownership Study was implemented for this purpose.

This paper summarizes the importance of the private recreation estate to Americans in the latter half of the 1980's. It examines the literature for factors associated with decisions of private landowners to grant or restrict recreation access. It then presents results of the 1986 national study, and examines trends from the previous study conducted in 1976.

## ROLE AND IMPORTANCE OF PRIVATE LANDS

The total private, nonindustrial land base in the United States amounts to about 1.3 billion acres (Resources for the Future 1983). About 90 percent of these lands are in the Eastern states. Because Eastern states have greater population densities and fewer public lands than the West, availability of private lands for recreation in the East is critical to meet growing demands for resources for a number of outdoor activities.

The private sector contributes to the recreation resource base in two ways. Thousands of businesses now provide camping, skiing, boating, horseback riding, hunting, and fishing opportunities. These businesses provide important sources of additional income. They often provide complementary recreational experiences to those provided by the public sector, and they substantially reduce pressures associated with even greater numbers of recreationists on public lands. In addition to private businesses, thousands of rural landowners across America willingly open their lands to hunters, anglers, hikers, and others free of charge. Particularly in the east, where much of choice habitat for wildlife species is found on

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private lands; continued availability of private lands is crucial to meeting demands for hunting and other wildlife-related recreational activities.

## THE PRIVATE LAND BASE AND ITS OWNERS

Of 1.3 billion acres of private lands in America, the largest single category, cropland, occupies 464 million acres, 35 percent of the total (Frey and Hexem 1985). About 30 percent, 393 million acres, is forested, while 28 percent, 373 million acres, is in grassland, pasture, and range. The remaining 99 million acres, about seven percent of the total, is in miscellaneous uses. Private land comprises 99 percent of the nation's cropland, 62 percent of grassland pasture and range, and 55 percent of forest lands.

Using the most recent comprehensive landowner study in the U.S. (Lewis 1978), information on amount of land farmed (U. S. Department of Commerce 1978), and estimates of land area of States (U. S. Department of Commerce 1984), a regional view of the preponderance of land in private ownership and proportion of private acreage in farms can be assembled. Although about one-third of the continental U. S. is publicly owned, most of the Eastern and Central regions have less than ten percent of acreage in public ownership (table 1). Thus, the importance of private lands in supplementing the public recreation base becomes apparent.

In the Northeast, Appalachia, and the South, less than half of private acreage is in farms. In Central and Western regions, most private acreage is owned by farmers or ranchers. In the three Corn Belt and Plains Regions, ranging from Ohio west to Kansas, table 1 shows a combination of very little public acreage and high proportions of private acreage in farms. In these States, land owned by farmers is a critically important wildlife recreation resource.

Considerable concern has been expressed in recent years that the supply of land on which to pursue outdoor recreation activities is decreasing at alarming rates (Brown and others 1984; Guynn and Schmidt 1984; Wright and Kaiser 1986). Land is being permanently removed from the open space land base for population expansion and urban development. For example, the U.S. Department of Agriculture estimates 1.5 million acres of agricultural land are being converted to nonagricultural uses annually (Resources for the Future 1983). Moreover, additional amounts of remaining open space are being closed and/or posted by private landowners, thus denying access to the public (Brown 1974; Brown

Table 1.--Percentage of U.S. land area in private ownership and percentage of private acreage farmed

Region <sup>1</sup>	Privately owned <sup>2</sup>	Private acreage in farms
<u>Percent</u>		
United States <sup>3</sup>	67	55
Northeast	84	28
Lake States	75	66
Appalachian	95	45
Southeast	90	42
Delta States	92	48
Corn Belt	95	81
Northern Plains	92	102
Southern Plains	94	87
Mountain	38	107
Pacific	49	68

<sup>1</sup>Regions defined in Lewis (1980).

<sup>2</sup>Includes public lands leased for farming and some Indian reservation lands still considered to be public domain.

<sup>3</sup>Exclusive of Alaska and Hawaii.

and others 1984; Guynn and Schmidt 1984; Resources for the Future 1983; Wright and Kaiser 1986). The problem of providing sufficient access to the public for recreation is exacerbated because these decreases in land resources have come during a period of increasing public demands for outdoor activities (President's Commission on Americans Outdoors 1987).

## RURAL LANDOWNERS' ACCESS DECISIONS

At least two conceptual models of landowner decisions regarding hunting access have been developed. Wright and others (1988) depicted a landowner hunting access model in which information from three domains went into landowners' decisions: landowner attributes, user behavior, and resource attributes. Landowner attributes included demographic characteristics, ownership objectives, attitudes,

and posting policies. User behavior included various types of property damages and nuisances that are so often associated with irresponsible recreationists.

Resource attributes included existing land uses, wildlife availability and habitat quality, and acreage. Based on information from these three domains, each landowner decided whether to allow open access, restrictive access, exclusive access, or no access (implied is that no fee is charged). The other option is to allow access on a fee basis (Wright and others 1988).

Decker and others (1987) developed a slightly different model of hunting access dynamics of private landowners and hunters. In its most general form, landowners' values, beliefs, and attitudes provided bases for this model of landowner access policies. Through imperfect communications, hunters interpreted these policies and/or developed perceptions of them, from which hunters reacted and displayed certain behaviors toward hunting on private lands. These hunter reactions and behaviors in turn were seen and interpreted by landowners, and fed back into landowner attitudes, beliefs, and values. Each of these models was developed further as background and literature review regarding landowner decisions about public access.

Five primary domains influenced landowners' values, beliefs, and attitudes, and thus formed the bases for their access policies. Although not included among these domains, it was recognized that socioeconomic and demographic characteristics were correlated to some degree with access behavior. Such characteristics as age, sex, education, and whether the landowner resides on the property have been shown to be correlated with posting or hunting access behaviors of landowners, but these factors had low predictive power (Brown and others 1984; Wright and Fesenmaier 1988).

The first domain found to be a basis for landowner access policies is landowner beliefs about hunters and other recreationists, both as individuals that landowners know and as a group that landowners perceive collectively. Brown and Thompson (1976) found that landowner inputs to access decisions came not only from their own personal experiences, but also from those of friends and neighboring landowners. Landowners' perceptions of inappropriate user behaviors have been shown to be a major disincentive for allowing access (Brown 1974; Holecek and Westfall 1977; Rounds 1973). Ninety-seven percent of New York landowners who restricted access

in 1972 reported a behavior-related reason on the part of recreationists contributed to their restrictive decisions (Brown 1974).

A second domain that influences landowner access policies is land use interests of the landowner. In the mind of the owner, land use has two components, recreational and nonrecreational. Brown and others (1983) found that the more active the landowner in wildlife-associated recreation on the property, the greater the likelihood he/she limited access. This has been termed an attitude of "exclusivity" (Gramann and others 1985) and it has been suggested that this attitude poses ". . . the toughest access problem of all to resolve" (Wildlife Management Institute 1983). Previous national recreation studies have not dealt with the importance of exclusive owner and family recreational use of property as a barrier to public access. The recreational component has several important subcomponents. Frequency of use, proportion of total activity days for which property is the primary resource, time and monetary investment in enhancing property for wildlife or other activities and the perception of crowding are important aspects of exclusivity.

A third domain that influences landowner access policies is liability. This domain includes more than actual legal liability a landowner would have for an injured recreationist or injury one recreationist might inflict upon another. It also includes threat of being sued (Kaiser and Wright 1985, Kozlowski 1986). Psychological stress, lost time and money in preparing a legal defense, and adverse publicity often accompanying involvement in an incident of this type are also major disincentives. Nearly all (49) States have enacted legislation that limits landowner liability in situations where the landowner receives no fee from recreationists. Although states have varied considerably in their efforts and abilities to convey this information to the landowning public, some experts close to this topic believe that legal actions must either limit the degree to which landowners can be sued, or transfer responsibility of defending sued landowners to the State or another public entity before substantial progress can be made in increasing public access to private lands.

A fourth factor believed to influence public access is opportunity for landowners to derive income or other benefits from hunting or fishing, in particular. Increasingly, landowners are leasing lands to individuals or clubs for hunting. While this benefits some individuals, it prohibits access for all others. Leasing of lands for hunting has a prominent history in Texas (Pope and others 1984), and throughout the South,

and for waterfowl in Maryland (Brunori 1987) and other parts of the Northeast. It is evident that as demands for hunting increase relative to diminishing supply of lands available to the public, increasing numbers of recreationists turn to the option of leases.

The fifth factor that likely influences landowner access behavior specifically for hunting is owners' attitudes about appropriateness of hunting. As recently as 15 years ago this was not an important factor (Brown and Thompson 1976). However, as larger proportions of rural landowners have urban backgrounds, and as animal rights movements gain momentum, attitudes about hunting become increasingly important considerations for landowners.

Access policies that landowners adopt as a result of the five domains of influence include both posting and various levels of access. Brown and others (1984) stressed the importance of not viewing posting and access prohibition synonymously. The majority of landowners who post lands in New York do so at least partly to control and regulate access, while allowing some hunting by others on their properties. On the other hand, some owners who do not post will not allow hunting or other recreation activities. Posting behavior is important both in terms of intent of landowners and how it is perceived by recreationists.

Wright and others (1988) noted that landowners' decisions regarding access were not purely dichotomous choices, but choices of degree to allow or restrict access. Their rural landowner-hunter access model categorized access into one of five distinct policies: prohibitive, exclusive, restrictive, open, or fee (leasing). Prohibitive, open, and fee choices are self-explanatory. Those who adopted an exclusive policy used the resource themselves, and allowed no other uses. Restrictive policies varied by degree, but generally were grounded in an acquaintanceship between landowner and recreationist. Although restrictive, available evidence suggested that such policies allow many an opportunity to find recreation resources. Thomas and Adams (1982) found that 60 percent of Texas hunters found access through friendship or kinship networks.

## **LANDOWNER ACCESS AND ACTIVITY PARTICIPATION**

The last National Private Land Ownership Study (NPLOS), conducted in 1976, identified six principal recreation activities often permitted by private

landowners: hunting, hiking, fishing, picnicking, camping, and horseback riding (Cordell and others 1985). Participation in all of these activities had grown since 1960. However, days of participation in the two most frequently permitted activities, fishing and hunting, declined from 1975 to 1980. Preliminary data from the 1985 Hunting, Fishing and Wildlife-Associated Recreation Survey suggested that fishing participation may have increased from 1980 to 1985, but hunting participation remained constant or declined slightly. Almost certainly, increasing urban population and other demographic factors exacerbated access problems to the extent that participation is being greatly inhibited. Since a previous study projected continued increases in participation in all outdoor activities through the year 2000 (Outdoor Recreation Resources Review Commission 1962), declines since 1975 suggested that these factors may be in part to blame.

Generally, little quantitative data exist on availability of private industrial lands for recreation. A study reported by Resources for the Future (1983) indicated that forest industries held title or managerial control to 68 million acres nationally. In 1960, 97 percent of this land was open to the public for recreation. However, "... by 1977, that figure had fallen to 58 percent, representing a loss of 23 million acres of land available for public recreation use" (Resources for the Future 1983). Cordell and others (1985) noted that at some point in the mid-1960s, industrial forest lands began to shift from being open to charging an entry fee to help cover rising costs associated with providing recreation to the public. A majority of corporate landowners in Virginia (94 percent) followed this strategy (Wright 1986). These landowners made available over a million acres of land to recreationists who were required to purchase use permits prior to entering corporate properties. Thirty percent of these properties were exclusively leased to hunting clubs.

As income generation becomes a more important objective, the preponderance of corporations leasing their lands to individuals and clubs will undoubtedly increase. Overall, leasing (\$0.99 per acre) provided significantly more income to Virginia corporations than did sale of permits (\$0.34 per acre) (Wright 1986).

These factors, all of which lessen likelihood for increased public access to private lands, set the stage for the 1986 National Private Land Ownership Study. Many variables that State-level studies have shown to affect access, and which were not adequately investigated in previous national surveys, were covered in the 1986 study. This inevitably should

provide improved insight into deficiencies of recreational access to private lands, and measures which might alleviate those deficiencies.

## METHODS

### The Sample

NPLOS was designed to survey nonindustrial, private rural landowners. Counties with high population densities of 200 or more people per square mile or a high concentration of government-owned land (50 percent or more) were eliminated from consideration using the National Outdoor Recreation Supply Inventory System (U.S. Department of Agriculture, Forest Service 1987) county-level data files on population and land area. Of 3,107 counties in the contiguous United States, 338 were too urban and 162 had too much government-owned land to be included in the potential sample. Fifty-one counties had insufficient data available on the amount of government-owned land to make a determination whether or not the county was eligible. These counties were left in the pool of potentials because there was too little information to eliminate them. After eliminating ineligible counties, there was a total of 2,556 counties from which to draw the national sample.

A SAS Graph (SAS Institute 1983) was used to draw six regional maps of the United States. Each map included county boundaries and FIPS codes identifying the counties; ineligible counties were eliminated from consideration. A 36 x 36 cell grid was drawn on a piece of clear acetate and either enlarged or reduced as necessary to cover an entire state. The grid was placed on the state with it aligned with the longest boundary of the state. Three dice were rolled to determine a row, column, and cell block. The county appearing under the chosen block, if it was an eligible county, was selected for the national sample. The grid was used to ensure even geographic distribution of counties chosen from each state.

Alphabetized master tax rolls, available in county tax appraisal offices, were used as sampling frames from which to obtain names and addresses of tract owners in sample counties. Each county was given a randomly selected "starting letter" at which point the search was initiated. Each county provided 25 names randomly drawn from the following size strata to ensure that the total county sample would be representative of tracts: 20-99 acres, 100-499 acres, and 500+ acres.

## Data Collection

Procedures similar to those outlined by Dillman (1978) were used to collect needed data. For each landowner, a mailing packet contained a cover letter explaining the survey, tract description, general instructions for completing the questionnaire, number 2 lead pencil, questionnaire, and a return envelope.

Individuals who failed to respond to initial requests were sent postcard reminders to complete questionnaires and return them as soon as possible. Nonrespondents to the first two mailings were sent third requests that included a followup letter, questionnaire, and return envelope. By the end of the data collection period, 4,236 of the 11,687 questionnaires had been returned. As a result, a response rate of 36.25 percent and a sampling error of less than 4 percent was obtained. A 5 percent sample of nonrespondents was contacted by telephone to determine if any nonresponse bias was present. Analyses of frequency of responses between the two samples did not reveal any significant differences between the two groups.

### Sample Weighting

Because a random sample was used that was known to be disproportionate to the population, post-sample weighting was required. This weighting procedure involved use of baseline information from the National Resource Inventory (U.S. Soil Conservation Service 1982). These baseline numbers provided information regarding number of owners, acreages by region and tract sizes owned. Individual case data within the NPLOS data base were weighted to reflect the population-to-sample ratio of strata proportions (table 2). The end result was a data base that enabled researchers to compute means, conduct multivariate analyses and extrapolate findings to regional and national estimates.

### Data Analyses

Analyses of data collected in the survey were conducted in two phases. First, a general description of rural landowners and their properties was provided using simple descriptive statistics. Comparisons of frequency of responses given by respondents nationally and regionally were made.

Second, to understand the factors associated with policy adoption more fully, an effort was made to evaluate each landowner in terms of all access policies implemented. Since landowners may not operate under a single access policy, this required

Table 2.--Sample sizes and population-to-sample weighting ratios for National Private Land Ownership Study, 1986-87

Region	Tract size	Frequency (n)	Percentage	Weight
North	20 - 99	749.00	49.77	1.19
	100 - 499	651.00	43.26	0.91
	500 or more	105.00	6.98	0.23
South	20 - 99	530.00	47.83	1.17
	100 - 499	458.00	41.34	0.92
	500 or more	120.00	10.83	0.57
Rocky Mtn./ Great Plains	20 - 99	170.00	36.56	1.46
	100 - 499	192.00	41.29	0.69
	500 or more	103.00	22.15	0.82
Pacific Coast	20 - 99	174.00	52.73	0.94
	100 - 499	122.00	36.97	0.78
	500 or more	34.00	10.30	2.12

calculation of an "Access Coefficient" (AC) for each respondent. This represented the amount of recreational acreage available under each of their respective policies. To compute this statistic, the percentage of total land reported by respondents being controlled under each of the five access policies (prohibitive = 1; exclusive = 2; restrictive = 3; leasing = 4; and open = 5) was multiplied by the factor corresponding to that policy's position on the access continuum and summed. Landowners were then ranked according to their Access Coefficients and categorized into one of five levels of access.

## RESULTS AND DISCUSSION

### Owners

The sample of landowners responding to the National Private Landowner Survey was predominately male (79.6 percent) and slightly less than 58 years of age. The overwhelming majority of respondents was white (96.1 percent) and married (82.1 percent); family size averaged 2.6 people. These landowners claimed a variety of occupations; however, 45 percent were retired. Landowners reported earning an average of \$35,303 in total family income for 1985.

Levels of educational attainment represented in the sample were relatively high—58 percent of property owners indicated they had graduated from high school and gone on to complete some college work. Further, 15.6 percent had obtained a college degree and another 14.9 percent had completed some graduate work.

Private land ownership in the U.S. appeared to be family-oriented. Eighty-six percent of landowners reported owning their lands either solely (38.4 percent) or as part of family ownership (47.7 percent) (table 3). They had owned that property for an average of 23.3 years. Further, 38 percent of respondents were resident owners, indicating they lived on their property. Moreover, 90 percent of all landowners lived within a 20 mile radius of their properties.

Regional differences regarding characteristics of rural landowners were found with several variables. Respondents in the Southern region were significantly older (59.5 years) than landowners in all other regions ( $p < 0.017$ ). Family incomes in 1985 were highest among persons from Pacific Coast (\$42,872) and Southern (\$39,321) regions. Incomes of these owners were significantly higher than those earned by owners in Rocky Mountain and Northern regions ( $p < 0.001$ ). Accordingly, landowners in the Pacific Coast Region made more money from their lands in 1985 (\$12,399) than landowners in other regions ( $p < 0.001$ ). Ironically, Southern owners were least dependent on their lands as sources of income (\$5,058). No significant differences were found among landowners in different regions regarding amount of property taxes paid in 1985.

As might have been expected, motives for owning rural lands appear to be changing. Traditional agriculture-related reasons such as growing crops for sale were found not to be as important today as they were in the past. Four out of ten respondents rejected crops/agriculture as an important reason for owning rural land. As shown in table 4, crops/

Table 3.--Percentage distribution of respondents (above) and acreage in selected ownership categories (below)

Owners	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
Sole owner	36.09 77,889	46.00 82,266	32.04 45,693	33.00 21,531	38.44 227,380
Family owner	52.33 82,556	40.31 57,612	50.87 61,375	47.00 32,037	47.73 233,580
Family partnership	8.13 23,586	8.62 20,849	11.43 19,232	11.92 31,589	9.11 95,256
Other partnership	1.48 2,371	1.71 3,028	1.61 1,220	3.02 3,031	1.72 9,649
Family corporation	0.80 2,792	1.40 5,312	2.62 5,762	2.65 4,523	1.42 18,389
Other corporation	0.13 449	0.50 1,489	0.0 0.0	0.25 342	0.24 2,280
Other	1.05 2,121	1.46 3,034	1.44 558	2.15 2,995	1.34 8,707

Table 4.--Importance of selected motivations for owning rural land (percentage of respondents ranking as important/very important)

Motive	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
Fee recreation	99.32	98.08	100.00	98.82	98.98
Timber	90.75	80.93	97.00	82.33	87.56
Investment	86.52	85.23	85.86	81.41	85.52
Making estate	79.90	72.82	77.07	74.19	76.78
Livestock	80.78	72.71	62.44	73.44	75.03
Personal recreation	60.17	68.19	82.62	65.77	65.95
Living/rural environment	56.60	64.46	71.45	65.53	61.78
Crops/ agriculture	54.90	68.71	54.51	66.69	60.19

agriculture were reported as the least important ownership objective of those investigated. Landowners did report that making money from fee recreation (99 percent), timber (88 percent), and investment (86 percent) were very important reasons why they owned their properties.

## The Land

Respondents owned an average of 183 acres. Those from Pacific Coast and Rocky Mountain Regions reported owning largest tracts of land ( $\bar{x}$  = 310.1 acres and 304.2 acres, respectively). These tracts were significantly larger ( $p < 0.001$ ) than tracts owned by Eastern landowners. Southern and Northern landowners owned tracts of 163 acres and 132 acres, respectively (table 5).

Ironically, cropland was reported as the largest single land use across the nation ( $\bar{x}$  = 63.4 acres), even though many owners rejected crops/agriculture as an important ownership objective. This was followed closely by land in forests ( $\bar{x}$  = 53.3 acres), even though less than one percent of landowners leased timberland on their properties.

Further, only 39 percent of forest owners had ever sold timber from their forests. Pasture ( $\bar{x}$  = 31.5 acres) and range ( $\bar{x}$  = 25.2 acres) accounted for the remaining major uses of rural lands. Forty-two percent of respondents used these lands for grazing livestock, primarily beef cattle (83 percent). Barren lands, water and other land in farms accounted for less than five acres of the respondents' total acreage.

Regionally, Pacific Coast landowners reported the largest mean number of acres in forest lands ( $\bar{x}$  = 75.7 acres) as compared to Rocky Mountain owners who possessed only an average of 9.1 acres of timber. Tracts in the Rocky Mountain Region were found to be significantly smaller ( $p < 0.036$ ) than tracts in other regions in the amount of land in forests. Landowners in the Rocky Mountain Region joined those from the Pacific Coast in having significantly more land employed as range ( $\bar{x}$  = 71 acres and  $\bar{x}$  = 91.3 acres,  $p < 0.001$ ) and row crops ( $\bar{x}$  = 96.1 acres and  $\bar{x}$  = 102.2 acres,  $p < 0.001$ ) than owners from Eastern regions. Rocky Mountain owners also possessed significantly more acreage as pasture ( $\bar{x}$  = 112.4 acres,  $p < 0.001$ ). No other regional disparities were found among land uses employed by respondents.

Recreation is another common use of land even though it appeared that few landowners were physically altering the landscape to enhance recreational opportunities. Landowners were asked to indicate whether each of 15 different recreational activities was inappropriate, given resources available on their tracts of land. Table 6 reports suitability of private land resources owned by respondents to these activities.

Overall, hunting was reported as the activity most conducive to private lands. Driving off-road vehicles, shooting, photography, nature study, hiking, birdwatching, picnicking, riding horses, and camping also were reported as being compatible activities by a majority of property owners. Water-related activities such as fishing, swimming, canoeing, and boating were much less compatible. This undoubtedly could be attributed to paucity of water resources owned by respondents (30 percent reported owning surface water). Ninety-three percent of respondents' properties accommodated recreation in some manner.

## Recreational Access Policies

The degree to which private landowners allow recreation is a question of high priority to recreation planners. As described previously, recreational access policies adopted by private landowners in this study took many forms. Some properties were closed to recreation. Others were maintained for exclusive recreation of owners or restricted to invited guests. Still others were open to the general public, whether it was for a fee or free of charge. Furthermore, landowners often controlled implementation of these policies by posting their properties. Even though posting is not a policy, in and of itself, it does have a significant impact on perceptions of land availability.

## Posting Practices

Thirty-three percent of respondents ( $n = 1,431$ ) indicated they posted at least a portion of their lands against trespass. Of these, 85 percent posted all of their properties. In general, it appeared that landowners did not bother with selective posting; that is, posting only a particular section of their lands. On average, owners posted 232 acres of land.

Pacific Coast owners reported the highest percentage of their land posted (40 percent). Southern owners were second (34 percent), followed by landowners from the Northern region (33 percent). Respondents from the Rocky Mountain Region posted the smallest percentage of their lands (24 percent).

Table 5.--Major land uses employed by private, nonindustrial landowners (mean acres)

Land use	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
Forests	55.97	61.42	9.13	75.67	53.26
Crops	55.19	49.27	96.12	102.17	63.39
Pasture	9.36	28.37	112.37	29.11	31.49
Range	4.04	15.05	71.03	91.28	25.19
Barren	0.74	1.75	0.65	1.88	1.16
Water	1.25	2.48	1.15	1.94	1.70
Other farm	5.80	4.43	13.70	8.06	6.42
Total acres (mean)	132.35	162.77	304.15	310.11	182.61

Table 6.--Suitability of private land resources to selected recreational activities (percentage of respondents indicating property suitable for activity)

Activity	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
Hunting	89.6	87.6	79.9	86.8	87.5
ORV Driving	83.6	77.3	68.7	75.9	79.0
Shooting	79.2	78.7	66.5	76.0	77.1
Photography	79.7	76.7	68.2	76.0	77.0
Nature study	78.0	73.6	68.5	74.1	75.0
Hiking	76.8	72.0	60.3	71.3	72.7
Bird watching	75.5	72.9	58.9	73.1	72.4
Picnicking	72.7	75.2	61.5	69.9	72.3
Horseback riding	71.9	71.9	65.7	74.7	71.4
Camping	64.9	70.0	51.2	61.4	64.5
Fishing	45.3	56.5	32.0	42.1	46.9
Swimming	37.3	47.2	28.7	34.7	39.1
Canoeing	31.6	37.7	22.1	29.0	32.1
Boating	29.8	36.1	19.8	25.2	30.0

When this practice is viewed in relation to total acreage owned, respondents from the Rocky Mountain Region posted significantly more land ( $\bar{x}$  = 648.66 acres) than did other landowners ( $p < 0.001$ ). Conversely, Northern owners reported posting the smallest number of acres ( $\bar{x}$  = 125.58 acres), which was significantly smaller than the amount of land posted in all other regions ( $p < 0.001$ ).

The relationship between posting and recreational access is not clearly understood. Brown and others (1984) theorized that posting is not necessarily indicative of land closures. Rather, it is more an indication of a landowners' tolerance and a method of controlling varying degrees of access to their properties. This point is aptly demonstrated in findings from the NPLOS study.

Given the total of 1,431 owners who posted their lands, only 14 percent of landowners prohibited all recreational access. Eighty percent of posting landowners provided recreational access for members of their families regardless of whether they lived with them. Sixty-five percent of these owners allowed friends and neighbors to use their lands for recreational purposes. Additionally, 19.2 percent posted their properties to protect rights of persons leasing their lands for recreation, and another 8.1 percent of owners allowed the general public to use their lands as long as they asked permission. Therefore, it would be erroneous to view posting as a single policy of recreational access.

## Prohibitive Policies

Very few landowners proscribed all recreation (< 5 percent). Landowners from the Southern Region showed the highest propensity for closing their lands to recreation (6 percent), even though differences found among owners closing their properties from each region were marginal. Numbers of persons closing their lands varied from 3.5 percent of respondents in the North to 6 percent in the South. This, in effect, closed only 5 percent of total land owned by respondents. Table 7 shows effects of respondents' policies on distribution of total acreage.

## Exclusive Policies

Thirty-eight percent of respondents reported closing a total of 206,910 acres of land to all but personal recreation. This figure represented 26 percent of respondents' total land base.

Approximately 40 percent of owners in the North, South, and Pacific Coast Regions reported excluding access to all but family members on some portion of their land. Only 22 percent of Rocky Mountain owners indicated they reserved land for private recreation. Acreage affected by these policies was most severe in the Pacific Coast Region. Thirty-nine percent of the respondents acreage in that region was operated under a policy of exclusion.

Table 7.--Distribution of land in acres controlled under specific recreational access policies adopted by private, nonindustrial landowners (above) and percentage of total acreage in region (below)

Policy	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
Prohibitive	7,479 (3.46)	17,216 (6.22)	7,445 (3.32)	5,703 (4.88)	37,843 (4.54)
Exclusive	53,289 (24.64)	77,847 (28.14)	30,196 (13.47)	45,578 (38.99)	206,910 (24.81)
Restrictive	99,183 (45.86)	119,911 (43.34)	115,892 (51.70)	34,827 (29.79)	369,813 (44.34)
Leased	4,543 (2.10)	23,062 (8.34)	1,562 (0.70)	14,280 (12.22)	43,447 (5.21)
Open	50,927 (23.55)	35,499 (12.83)	64,805 (28.91)	16,380 (14.01)	167,610 (20.10)
Total	215,421	273,535	219,900	116,768	825,624

## Leasing and Fee Recreation

Although research literature has implied that the incidence of landowners adopting fee recreation policies has increased in recent years, relatively few respondents to this study corroborated this. Only 5 percent of all landowners in the sample indicated they leased any portion of their properties for recreation (< 6% of total acreage). This seemed to contradict the importance respondents placed on fee recreation as a reason for owning rural land. Those found to be operating land under this policy reported leasing an average of 253 acres. Approximately 60 percent of these owners leased to clubs or groups of individuals. Slightly less than 40 percent leased to individuals and very few ( $n = 5$ ) leased lands to government agencies.

The largest number of landowners undertaking a "fee recreation" policy was found in the Southern region ( $n = 74$ , 7 percent). Between 2 and 3 percent of owners in remaining regions charged for recreational access to their properties. Southern owners also dedicated the largest amount of land to fee recreation (23,062 acres).

Motivations behind leasing were fairly consistent among all landowners. Respondents reported monetary reasons for adopting a leasing policy, such as "helping to pay taxes" and "gaining additional income." Other perceived advantages were lessees' enhanced "stewardship of the land" (32 percent) and their ability to aid in "controlling trespass" (32 percent).

Overwhelmingly, hunting was the most common type of lease. Forty-seven percent of these owners leased their lands for hunting, a majority (60 percent) indicating that big game was the primary type of hunting, even though other types of hunting were allowed under conditions of most leases. These activities generated an average of \$531 per landowner. Fees charged for hunting leases ranged from less than \$10 to a high of \$8,000. Twelve percent of these persons indicated they would lease an average of an additional 116 acres if the right incentives were provided. Other recreational activities appeared to be insignificant in terms of revenue generation.

## Open Policies

Respondents (25 percent) allowed the general public to use 167,610 acres of their lands for recreation. This equated to 20 percent of total acreage owned by all persons in the sample.

Greatest regional disparities regarding amount of private recreational land made available to the general public was found in the East. Thirty-one percent of Northern owners allowed a portion of their lands to be used by people other than personal acquaintances for recreation. In contrast, less than 13 percent of Southern landowners allowed open access.

Rocky Mountain landowners reported the largest percentage of lands open to the public. Slightly less than 29 percent of private lands in this region were open to public recreation (64,805 acres). Twenty-four percent of Northern lands were open as well. Southern and Pacific Coast landowners reported the smallest percentages of total land available to the public under this policy (13 percent and 14 percent, respectively).

## National Estimates

By applying the percentage of total acreage under each of the five access policies identified in the study to the total amount of private farm and ranch land in each region, statistical inferences can be drawn. Estimates of the amount of land available for recreation can be seen in table 8.

Of the estimated 1.21 billion acres of land in private ownership in the United States, approximately 63.1 million acres are closed to recreation. Furthermore, over 295 million acres are closed to all but exclusive use of owners. This, in effect, decreases the supply of private land available for recreation of most Americans by almost one-third (30 percent).

The largest blocks of recreational lands are operated under policies based on familiarity. Access to 47 percent of the private land base was estimated to be restricted to persons who were personally acquainted with the owner. Over 568 million acres of land fall under this policy.

Land available to persons without friendship and/or kinship networks to draw upon for recreation amounts to approximately 23 percent of the land in private ownership. Slightly more than 53 million acres were estimated to be operated under some form of leasing arrangement and 230 million acres are open to the public. Persons gaining access to this open acreage may be required to obtain prior permission of the owner (either written or verbal) in order to use these lands, but generally, these lands are open to the general public.

Table 8.--Estimated total acres of private, nonindustrial land available for recreation by access policy (acres x 1,000's)

Policy	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
Prohibitive	11,857	27,377	13,361	10,557	63,152
Exclusive	84,614	123,789	54,241	32,365	295,009
Restrictive	156,310	188,041	206,731	17,891	568,973
Fee	5,923	34,719	3,194	9,500	53,336
Open	66,663	53,658	97,799	11,544	229,664
Total <sup>1</sup>	325,367	427,584	375,326	81,857	1,210,134

<sup>1</sup>Numbers may not sum due to rounding errors.

Table 9.--Landowners receptivity to selected recreational activities (percentage allowing access)<sup>1</sup>

Activity	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
Hunting	71.5	64.0	64.2	59.9	67.2
Photography	68.5	56.6	62.7	65.8	63.9
Bird watching	66.0	52.7	63.1	60.4	60.9
Nature study	64.7	51.9	59.8	62.4	59.9
Hiking	64.0	50.7	60.1	55.4	58.7
Picnicking	53.6	47.6	51.8	52.9	51.4
Fishing	50.3	53.4	42.5	46.8	50.6
Horseback riding	50.7	43.0	62.8	51.6	49.8
Shooting	36.2	30.7	36.2	34.3	34.3
Camping	33.8	29.7	45.3	29.4	33.1
Swimming	22.0	25.8	18.5	29.8	23.9
ORV driving	31.4	14.9	18.8	14.3	23.4
Canoeing	24.0	19.1	19.4	16.8	21.2
Boating	15.7	12.3	7.0	15.1	13.6

<sup>1</sup>Based only on landowners who indicated owning resources compatible with respective activities.

## Receptivity to Specific Recreational Activities

Failure of past research to capture activity-specific access policies of landowners was a weakness in attempts to better understand landowner policy behaviors. Researchers' abilities to document these types of access policies have been limited. Highly detailed inquiries required to overcome this weakness quickly become burdensome to respondents and are not congruent with many research designs, especially mail surveys. The NPLOS questionnaire solicited activity-specific data from landowners, and although these data did not allow owners to be categorized into specific policies along the access continuum, increased insights were gained into receptivity of landowners regarding specific activities.

By eliminating landowners who indicated their lands were not appropriate for each activity and calculating the allow/disallow ratio for all persons having resources compatible with each activity, a better idea of landowners' tolerance for different activities was gained. Inasmuch as hunting was perceived to be the activity most suitable to private resources, it was the activity most often allowed. Sixty-seven percent of landowners allowed hunting on their lands (table 9). Non-consumptive activities such as photography, birdwatching, nature study, hiking, and picnicking also were allowed by a majority of respondents.

However, even though the majority of owners felt their lands were highly conducive to shooting, camping, and off-road vehicle use, these activities were prohibited by over 65 percent of landowners. Perceptions of dangers and/or resource damages associated with these activities may provide some explanation for landowners' intolerance of these pastimes.

## Total Access: The Effect of Multiple Policies

The importance of understanding the amount of land available for recreation and landowners' receptivity to specific recreation activities is second only to understanding the landowners who implement these policies, since landowners are the key to future access. Furthermore, it is important to recognize that rarely do landowners operate these lands under a single policy. Rather, respondents reported managing their properties under multiple policies. Therefore, it is beneficial to view landowners in relation to the total amount of access allowed.

To accomplish this, landowners were categorized according to the total effect of all policies implemented. Segmentation of respondents into one of five access policy levels was accomplished based on their "Access Coefficient" (AC). As described in the methodology, this statistic reflects the acreage controlled under each of the five access policies, multiplied by a factor corresponding to that policy's position on the access continuum (prohibition to open). For example, a landowner who owned a 100 acre farm which was used exclusively for his family's personal recreation would produce an access coefficient of 2.0 ( $100 \text{ acres}/100 \text{ acres} \times 2 = 2.0$ ). Should that landowner decide to open 50 acres of that tract to friends and other personal acquaintances, then their coefficient would be increased to 2.5 ( $50 \text{ acres}/100 \text{ acres} \times 2 + 50 \text{ acres}/100 \text{ acres} \times 3 = 2.5$ ).

It is important to note that these policy levels are not identical to the policies of prohibition, exclusion, restriction, fee, and open. However, the scaling of landowners within policy levels was designed to have the levels correlate as closely as possible with the corresponding policies.

To test the accuracy of this scaling, landowners of all levels were compared by means of a one-way ANOVA and Duncan's Multiple Range Test, regarding variables pertaining to the amount of land operated under individual access policies. Owners in the first level were the most likely to prohibit all recreational access to their land ( $p < 0.004$ ). Those landowners segmented into Access Level II restricted significantly more land to the exclusive recreational use of their families ( $\bar{x} = 176.3 \text{ acres}$ ,  $p < 0.001$ ) than owners at other levels. Furthermore, respondents in Level IV leased the most land ( $\bar{x} = 67.7 \text{ acres}$ ,  $p < 0.002$ ) and respondents in Level V had the most open acreage ( $\bar{x} = 203.2 \text{ acres}$ ,  $p < 0.001$ ). Therefore, it appears that the Access Levels used in these analyses closely approximate the corresponding policies.

Distribution of respondents within these access levels can be seen in table 10. As with total acreage operated under each of the respective policies, landowners segmented into the most restrictive level numbered less than four percent. Slightly more than 18 percent were categorized into AC Level II and the largest segment by far, again was Level III. Fifty-six percent of all owners fell into this level. The remaining owners were almost equally distributed between Levels IV and V (11.62 percent and 10.2 percent, respectively).

Table 10.--Distribution of respondents within five access policy levels based on access coefficients (percentage of total respondents, n = 3,382)

Access level	North	South	Rocky Mtn./ Great Plains	Pacific Coast	U.S.
I	1.30	1.57	0.47	0.56	3.90
II	7.04	7.78	1.45	2.04	18.30
III	24.69	17.33	9.08	4.88	55.97
IV	5.50	3.67	1.09	1.36	11.62
V	5.59	2.22	1.57	0.83	10.20
Total	44.12	32.55	13.66	9.67	100.00

## CONCLUSIONS

Respondents to the National Private Land Ownership Study were typically in their mid-to-late fifties, married, white, and predominately male. These landowners owned an average of 183 acres of rural, nonindustrial land and had owned that land for approximately 23 years. Ownership of this property was usually family oriented; that is, land was either owned solely by respondents or by the respondent's family. Owners lived in close proximity to their properties. Ninety percent lived within a 20 mile radius of their lands and 38 percent actually resided on the properties.

Reasons reported by respondents for owning rural lands were much different from traditional agricultural-related ownership objectives of the past. Making money through "Fee Recreation," "Growing Timber for Sale," and "Investment Potential of Rural Land" were reported to be most important reasons for owning rural land. "Raising Livestock," "Living in a Rural Environment," and "Crop Agriculture" were much less important to today's landowners. Moreover, respondents were less dependent on land as a source of income. Less than 20 percent of respondents' total family incomes for 1985 were generated from the lands ( $\bar{x}$  = \$6,778).

While it appeared that landowners possessed latent desires to generate income through the outdoor recreation potential of their properties, this desire has not come to fruition to date. Less than 4 percent of owners were actively leasing or charging fees for outdoor recreation. Although leasing practices usually required larger blocks of land than other access policies, the number of acres operated under a fee policy totaled less than 6 percent of total land owned by the sample of respondents.

## Implications

Based on results of this study and related research to date, several points become readily evident. First, the nation's undeveloped land base will continue to erode. Population increases and resultant urban expansion will require an increasing amount of rural land be converted to urban uses. Estimates of between one and two million acres of rural land being taken physically out of the inventory on an annual basis are not uncommon (Resources for the Future 1983; President's Commission on Americans Outdoors 1987).

Physical losses of these lands notwithstanding, perhaps an even more severe effect of urbanization occurs in the American mind. Urban Americans are quickly losing touch with the land. They have limited, if any, relationship with the land and its communities. Socio-psychological effects of urbanization may be felt in loss of political support for resource protection and other issues important to perpetuating outdoor recreation opportunities. Moreover, public ignorance resulting from disassociation with the land will continue to affect recreationist behavior, which in turn, will have negative impacts on land access. As property damage, liability, litter, trespass, and other problems which dissuade landowners from allowing recreational access to their lands continue, land closures and restrictions of access to private lands will undoubtedly become more severe.

Also, it is highly likely that there will be major turnovers in land ownership over the next 10 to 15 years. With 45 percent of owners reporting being retired, there is a distinct possibility of major changes in ownership. New owners may bring on even more strict access policies. As this progresses, ownership

for reasons of exclusive resource use, will probably increase. This will, in effect, lock up many recreation resources and further polarize those persons who can afford to purchase land for recreation and those who cannot.

To ensure adequate recreation opportunities on private lands in the future, one of two things must happen—problems with recreationists and other disincentives to landowners must be lessened or eliminated, and/or incentives to provide recreational opportunities that are sufficient to overcome problems being experienced, must be provided to landowners. Educational and legislative implications of this must be addressed by resource management agencies and private organizations dedicated to recreation and resource management purposes.

It has been stated often that behavioral problems associated with recreationists are results of actions of an unconcerned minority that cause the majority of recreationists to suffer. Even if this is true, no longer can Americans find solace in this fact. Landowners' perceptions regarding the severity of these problems are reflected in their increasingly restrictive access policies.

Therefore, innovative approaches must be found to reduce or eliminate these problems. As a first step, more information must be obtained regarding significance of, and causal factors associated with depreciative behavior. Presently, pathetically little research has been conducted in this area.

The alternative to eradicating disincentives is providing incentives to landowners in exchange for allowing access to their properties. Incentives to landowners could be economic (i.e., cash payments or tax relief), legislative (i.e., improved liability protection), technical (i.e., assistance in forest, wildlife and/or recreation management), and/or legal (i.e., increased law enforcement for controlling trespass, stiffer penalties).

One approach to encouraging landowners to allow more access has been through private leasing of recreational access. But as reported, only a small percentage of rural landowners have undertaken leasing as an access alternative. It appears that processes of the free market system have not worked well for all forms of outdoor recreation. Of the few landowners who reported assessing a fee for access, the majority of these transactions were for hunting. Hunters are accustomed to paying for their recreation;

they have traditionally paid for licenses, permits, stamps, and other fees associated with the sport. Moreover, it could be argued that hunting has more tangible benefits associated with it (i.e., trophies, meat, and animal by-products) than other recreational activities; therefore, it is more conducive to commercialization. Without the ability to receive economic incentives, most landowners will be reluctant to open their lands for recreation unless other types of incentives are provided or measures to eradicate disincentives are undertaken by resource management agencies.

To ensure a sufficient supply of private lands for recreation in the future, Federal and State land management agencies should seek to form closer ties to landowners in the private sector, especially those whose lands are in close proximity to public lands. These agencies should emphasize the benefits of conservation assistance programs and encourage the concept of multiple use management. Moreover, inconsistencies in governmental policies send mixed signals to landowners regarding leasing. First, few States have offered tax breaks for property owners who allow public recreation on their lands, whether it be free or for a fee. The State of Texas has been the leader in commercialization of wildlife resources for many years, yet many landowners are reportedly hesitant to participate in State leasing programs or report revenues as income.

Second, State legislation designed to encourage access by eliminating fear of legal liability for recreational injury has been largely ineffective. Protection afforded under recreational-use statutes, now enacted in 49 States, is unknown to a majority of rural landowners. Even though little research has been conducted at the State level to document this fact, Wright and Kaiser (1986) reported that 44 percent of State wildlife administrators surveyed had no knowledge of liability protection provided by these laws. If State officials are not cognizant of these statutes, how can landowners be expected to be aware of them? This has tremendous implications for State information and education divisions. Also, protection afforded by these laws may be inconsequential compared to fear and burdens of being taken to court, on which these statutes have no effect. Having to pay lawyer fees, time away from work, and anxieties associated with litigating court cases are major disincentives in and of themselves.

Further, the vast majority of these statutes predicate insulation from liability on access being made available to recreationists free of charge. Landowners who choose to assess a fee for access lose their protection in most states. This poses a rhetorical question: Is assessing a fee for access, which may only partially cover expenses incurred by landowners for allowing recreational use, inconsistent with purposes of recreational-use statutes? It is the opinion of the authors that it is not! Can a constitutionally valid way be found whereby landowners can charge an access or admission fee to their properties on an "as is" basis, in which they would be subject to lawsuits only in cases involving gross negligence? Much needs to be done to eliminate these inconsistencies in the legal language of liability legislation if the intended purpose of the legislation is to be accomplished.

## SUMMARY

The National Private Land Ownership Study is the most comprehensive research effort to date, directed at documenting the supply of private, nonindustrial lands available for outdoor recreation. Through this study, a better understanding of individuals who own rural lands and reasons for that ownership has been gained. Furthermore, estimates of the amount of land in various land uses, leasing practices currently undertaken by landowners, and amount of land controlled under specific recreational access policies were established.

However, now that the NPLOS has established the benchmark from which researchers can monitor changes in the private recreation estate, more in-depth studies of factors associated with landowner behavior, particularly access policy behavior, need to be conducted. This research must go beyond merely understanding the "what" and "how much" of recreational access to private lands, to a greater understanding of "why" landowners adopt specific access policies. A deeper understanding of recreation-related problems experienced by landowners, their attitudes toward providing recreational access, and preferences for incentives is prerequisite to undertaking programs that will encourage additional access in the future. To date, no research at the national level has attempted to model landowner access decisions.

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