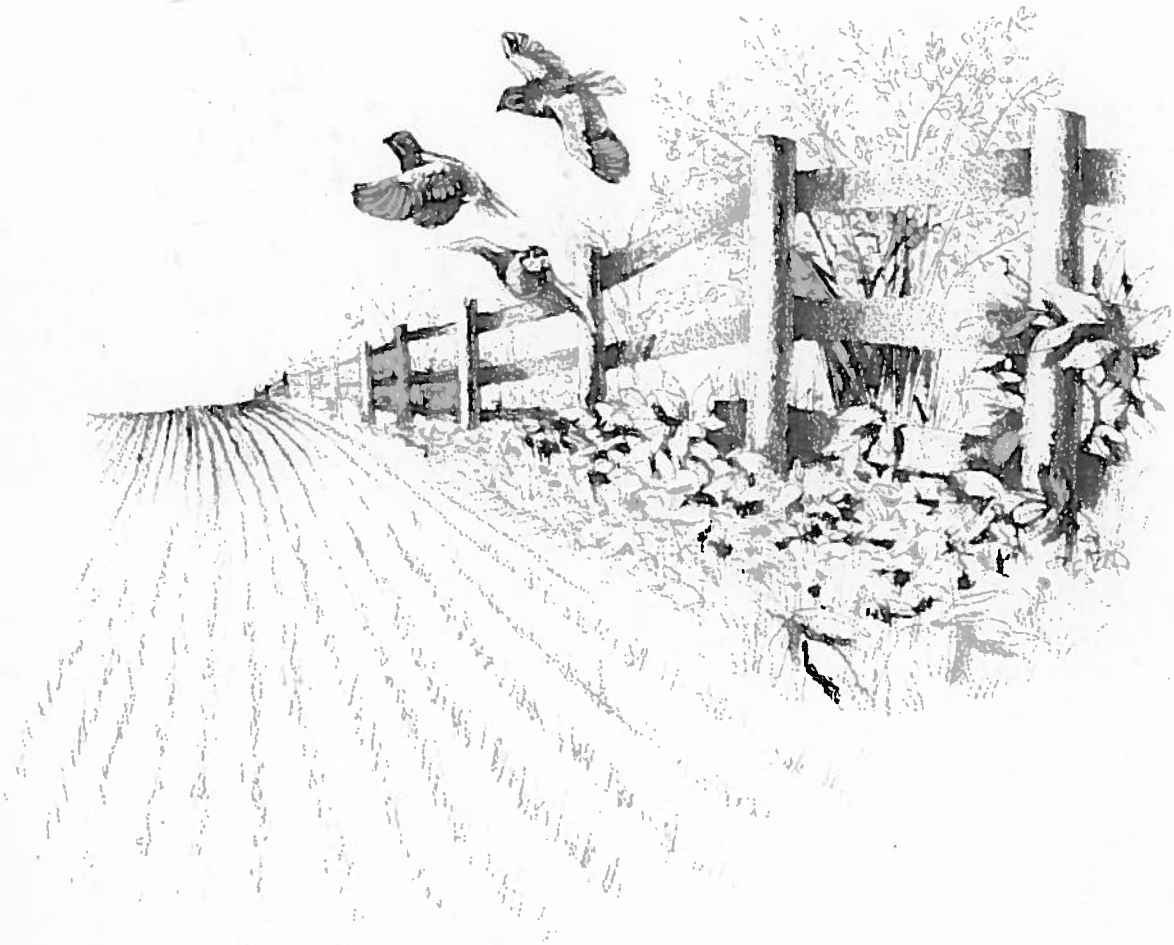
Virginia Landowner Wildlife Management Study



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EXECUTIVE SUMMARY

The Virginia Landowners Wildlife Management Study was designed to solicit information from rural, non-industrial landowners relative to their interest and participation in a variety of conservation-related programs and to determine the availability of private land for hunting. The 10-county, 2,000 landowner survey resulted in a total of 1,110 usable questionnaires and a data base with over 170,000 units of information pertaining to landowners, their land uses, objectives, attitudes and preferences for incentives.

Within the state, rural landowners appear to be a stable, well defined population who were somewhat traditional in their objectives,attitudes and practices. They were slightly less than 58 years of age, had 13 years of formal education, and received approximately $35,000.00 a year in total family income. Most resided on their property and had lived there for over 20 years.

Of the three regions—Mountain, Piedmont and Tidewater-landowners from the Mountain Region seemed to be the most dissimilar. Unlike owners in other regions, these owners had dedicated the largest percentage of their lands to hay and pasture. Mountain landowners generally reported less wildlife present on their properties and perceived themselves to have the lowest quality habitat of all owners. Two species, bear and ruffed grouse, were significantly more abundant in the Mountains than in other regions, but even then, landowners reported vast intraregional differences in the quality of these habitats.

In the Piedmont, landowners possessed larger tracts of land than their western neighbors. Sixty-one percent of these lands were forested. These owners allowed more hunting, but, as a result, were more concerned about the problems associated with hunting, i.e., behavior, liability etc. Behavior-related disincentives on the part of hunters were the most prevalent in this region.

Landowners from the Tidewater Region owned the largest tracts of land of all landowners ($\bar{x}$ = 270.76 acres). But, unlike land owners in other regions,they dedicated the largest percentage of land to row crop agriculture. Understandably, these respondents placed the most importance on farming and ranching as a reason for ownership. They also perceived themselves to have the highest quality habitat and reported significantly more wildlife than landowners in any other region, especially waterfowl, dove, bobwhite quail and furbearers. White-tailed deer and wild turkeys were also plentiful. As a result, these owners allowed more hunting and were more likely to lease the hunting rights to their lands than landowners from any other region.

Respondents to this study also were segmented into one of five distinct policies of access based on the degree of access allowed. But, inasmuch as it is important to know the number of landowners who adopt a specific type of access policy, it is more important to understand the impact these policies have on the supply of hunting acreage.

Even though persons who prohibited hunting (Prohibitionists) were fully 10 percent of the total sample of respondents, total land closures accounted for less than six percent of the land base. By extrapolating this statistic to the total number of private acres throughout the state (21.864 million), 1.265 million acres are estimated to be closed to hunting. Persons closing their lands to hunting possessed stronger anti-hunting beliefs than owners allowing more open access. These owners often believed that sport hunting was morally wrong. They believed hunters killed defenseless animals and there was no longer a need to hunt to survive, therefore hunting should not be permitted. Beyond lands closed to hunting, relatively little acreage was found to be restricted to the exclusive use of its owners (< 715,000 acres). These owners, like owners with prohibitive policies, were more often female than less restrictive landowners.

The largest number of acres of huntable land was controlled under a policy that restricted access to persons familiar to the landowner. Hunters must work through friendship and kinship networks to gain access to almost 10 million acres or 45 percent of the land base.

Almost 27 percent of the respondents' lands were open to the public, irregardless of their familiarity with the owner. From this, a statewide estimate of almost 6 million acres of land open to the general public was derived. Owners with open policies were significantly less concerned about hunters' behavior, liability and other disincentives associated with the provision of hunting opportunities for the public.

Landowners adopting a leasing, or fee hunting policy, comprised 12.6 percent of the landowner population and controlled 19 percent of the land base (42,075 acres). But, owners did not always lease 100 percent of their properties. Landowners in this study leased only two-thirds of their total acreage (67.5%). Leasing, therefore, is estimated to affect 12.83 percent of the state's lands or 2,805,151 acres. The majority of these leases involved agreements with local citizens from rural areas. Few landowners were found to be leasing to urban dwellers. It appears, therefore, that large markets for leasing have yet to be tapped.

Implications of these findings and policy recommendations are discussed in depth.

TABLE OF CONTENTS (Cont.)

Prohibition 33
Exclusion 37
Restriction 38
Open 38
Fee (Leasing) 40
Incentives for Increasing Access 41

V. CONCLUSIONS AND IMPLICATIONS 45

VI. REFERENCES 52

VII. ACKNOWLEDGEMENTS 60

VIII. APPENDIX A Mail Survey Instrument A1

APPENDIX B Mountain Region Profile B1

APPENDIX C Piedmont Region Profile C1

APPENDIX D Tidewater Region Profile D1

APPENDIX E Rockingham County Profile E1

APPENDIX F Botetourt County Profile F1

APPENDIX G Wythe County Profile G1

APPENDIX H Orange County Profile H1

APPENDIX I Buckingham County Profile I1

APPENDIX J Dinwiddie County Profile J1

APPENDIX K Halifax County Profile K1

APPENDIX L Westmoreland County Profile L1

APPENDIX M King William County Profile M1

APPENDIX N Southampton County Profile N1

APPENDIX O Fauquier County Profile (pretest) O1

List of Tables

Table

Page

1. Importance of Selected Reasons Why Virginia Landowners Owned Rural Land 23
2. Mean Tract Sizes Owned by Virginia Landowners by Region 24
3. Selected Land Uses Employed by Virginia Landowners 24
4. Presence of Selected Wildlife Species on Respondents' Property 25
5. Respondents' Perceptions of Wildlife Habitat Quality for Selected Wildlife Species 27
6. Frequency Distribution of Rural Landowners' Level of Awareness Regarding Selected Conservation Programs 29
7. Frequency Distribution of Landowners' Level of Interest in Future Wildlife and Hunter Management Programs 31
8. Distribution of Landowners and Acreage by Access Policy 33
9. Selected Socio-Economic Statistics of Rural Virginia Landowners by Access Policy 34
10. Distribution of Current Land Uses by Access Policy 34
11. Importance of Selected Reasons Why Respondents Owned Rural Land by Access Policy 35
12. Presence of Selected Wildlife Species on Respondents' Property by Access Policy 36
13. Respondents' Perception of Habitat Quality For Selected Wildlife Species by Access Policy 36
14. Preferences of Virginia Landowners Regarding Incentives For Allowing Hunter Access by Access Policy 42
15. Potential Land Increases Through Seven Preferred Incentives of Virginia Rural Landowners 43
16. Estimated Availablity of Private, Non-Industrial Land for Hunting by Access Policy 49

List of Figures

Figure

Page

1. Model of Rural Landowners' Hunter Access Decisions 18a
2 Counties Selected 19a

Chapter I

Introduction

State wildlife management agencies serve a variety of constituent groups—i.e., consumptive users, non-consumptive users, private landowners. Although agencies' concerns about environmental protection remain strong, and interests in threatened and endangered species continue to grow, attention has focused sharply on the need for agency efficiency, as costs of programs have increased and levels of use have grown (Driver, 1985). To serve these constituent groups efficiently, knowledge of constituent needs, current problems regarding wildlife and wildlife-associated recreation conflicts, and preferences for programs designed to alleviate these problems must be obtained.

Traditionally, consumptive users (i.e. hunters, trappers, and fishermen) and more recently, non-consumptive users (i.e., birdwatchers, nature enthusiasts), have been the control focus in non-biological wildlife research. However, it could be argued that private landowners are the single most important constituency since they control approximately 75 percent of wildlife habitat across the nation (Wildlife Management Institute, 1983). Even though sportsmen have helped pioneer and have largely funded wildlife management in the United States, private landowners control resources through the provision of wildlife habitat and access to those resources for wildlife-associated recreation.

Aldo Leopold (1930) defined game management as the art of making land produce sustained annual crops of game for recreational use. Land, and subsequently landowners, are central in this definition. Without a doubt, understanding needs and preferences of private landowners is extremely important to the success of most wildlife management agencies. Relative to other types of research, studies of private landowners' preferences for assistance programs, attitudes regarding hunting and wildlife management, and willingness to provide recreational access have been sorely lacking.

Inasmuch as private lands are important to the success of wildlife management programs, the private land base, as a natural resource, may be becoming threatened (Cordell et al., 1988). The United States Department of Agriculture estimates that 1.5 million acres of agricultural land is converted to nonagricultural uses annually. Additionally, wetlands, open water and other areas of critical importance to wildlife are being drained and filled at a rate of 400,000 acres per year (Resources For The Future, 1983). Overcrowding at federal and state owned recreation and wildlife management areas results as burgeoning numbers of recreationists compete for public open space.

With the reduction of federal funding, fee simple acquisition of lands by government agencies appears to be an impractical solution for providing more outdoor recreation opportunities. Therefore, the President's Commission on Americans Outdoors (1987) sug-

gested a need to encourage the assistance of the private sector in providing more recreational open space.

Insufficient access has far reaching implications for the biological management of the wildlife resource. State fish and wildlife agencies are dependent on recreational hunting and fishing to regulate animal age and sex ratios, especially among large herbivores. Lack of hunter access often leads to overpopulation and can result in serious deterioration of habitat and high rates of animal mortality.

Insufficient access also raises both economic and political concerns. License sales, excise taxes on sporting goods expenditures, and other sportsmen–generated revenues are primary sources of funds for management programs that aid in propagation of wildlife species. As availability of hunting acreage declines, so do hunter numbers and proportionately, wildlife program revenues.

Lack of access also affects political support wildlife agencies need from their constituencies. Persons who have never experienced the joys of wildlife recreation are seldom ardent supporters of wildlife programs. If political support is to be maintained, then recruitment and retention of members to the hunters' ranks, as well as cultivation of nonconsumptive constituents, are critical. Therefore, current trends in land closures must be reversed.

Statement of Purpose

The purpose of this study was to serve as a diagnostic stage in the Department of Game and Inland Fisheries' efforts to develop fully the potential of wildlife resources throughout the Commonwealth of Virginia. The study explored the dynamics of Virginia non–industrial, rural landowners' wildlife management policies by measuring their attitudes and other related attributes concerning hunting and wildlife–related assistance programs. Primary objectives were:

- Determine how the Commission of Game and Inland Fisheries can better serve the Commonwealth's landowner constituency by examining landowners' awareness of, and preferences for wildlife management assistance programs.
- Determine the availability of private land for public wildlife–associated recreation opportunities by assessing access policies of private landowners.
- Delineate factors inhibiting hunter access to private lands and assess the extent to which these factors dissuade landowners from allowing additional access.
- Determine incidences, types, features, and costs of hunting leases offered by landowners.
- Determine landowners' preferences for selected incentives to allow more public hunting on their properties in the future.

Limitations of the Research

The research reported here was limited to . . .

- geographic confines of the Commonwealth of Virginia, and
- those rural, private, non-industrial landowners whose land holdings equalled or exceeded 40 contiguous acres and who were willing to cooperate in the study.

Definitions of Terms

The following definitions or explanations of terms were adhered to during conduct of the research.

- *Attitude*—learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object (Fishbein and Ajzen, 1975).
- *Landowner*—persons owning or having managerial control over wildlife management decisions on 40 or more contiguous acres of rural land in the Commonwealth of Virginia.
- *Hunter Access*—permission to hunt on another persons' land whether the hunter pays a fee to the landowner, hunts free, or gains access through some other arrangement.
- *Wildlife Management Policies*—generic term describing owners' decisions regarding wildlife habitat enhancement and/or hunter access.
- *Mountain Region*—consists of the following counties; Alleghany, Augusta, Bath, Bland, Botetourt, Buchanan, Carroll, Clarke, Craig, Dickenson, Floyd, Frederick, Giles, Grayson, Highland, Lee, Montgomery, Page, Pulaski, Roanoke, Rockbridge, Rockingham, Russell, Scott, Smyth, Shenandoah, Tazewell, Warren, Washington, Wise, and Wythe.
- *Piedmont Region*—consists of the following counties: Amelia, Albemarle, Amherst, Appomattox, Arlington, Bedford, Brunswick, Buckingham, Campbell, Charlotte, Chesterfield, Culpeper, Cumberland, Dinwiddie, Fairfax, Fauquier, Fluvanna, Franklin, Goochland, Green, Halifax, Henry, Loudoun, Louisa, Lunenburg, Madison, Mecklenburg, Nelson, Nottoway, Orange, Patrick, Pittsylvania, Powhatan, Prince Edward, Prince William, Rappahannock, Spotsylvania, and Stafford.
- *Tidewater Region*—consists of the following counties: Accomack, Caroline, Chesapeake, Essex, Gloucester, Greensville, Hampton, Hanover, Henrico, Isle of Wright, King and Queen, King George, King William, Lancaster, Mathews, Middlesex, New Kent, Northampton, Northumberland, Prince George, Richmond, Southampton, Suffolk, Surry, Sussex, Westmoreland, and York.

A theoretical model of rural landowners' policies regarding hunter access and wildlife management is developed and empirically tested in the following chapters. Chapter II examines the scope of the problem nationally by providing a thorough synthesis of related literature to date. Contributing factors to denial of access to private lands as well as incentives and strategies used to obtain access are discussed in depth. Chapter III dis-

cusses the theoretical foundations of the research, research design, and selection of statistical analyses used to test data collected. Results from the data analyses are presented in Chapter IV, which explains the interactive relationships among land uses, ownership objectives, wildlife presence, habitat quality, and current access policies mandated by landowners. Chapter V concludes with a discussion of policy implications of study findings and presents recommendations for future policy.

Chapter II

Review of Related Literature

Wildlife management on private lands and recreational access to those resources are multifaceted and complex problems. While agencies have difficulty providing efficient, widespread management assistance programs and effects from insufficient access have far reaching implications to the nation's natural resource base, in its simplest form, the problem is one of decreasing supply and increasing demand. Demand for outdoor recreation opportunities is continuing to increase nationwide (President's Commission on Americans Outdoors, 1987). Population growth, increasing free time, and rapid rise of leisure expenditures are but three aspects clearly indicating that demand for recreation will continue to increase. When the Outdoor Recreation Resources Review Commission presented its findings in 1962, it predicted that the demand for these activities would triple by the year 2000 (ORRRC, 1962). Since that time however, studies have indicated that mark may have been surpassed by 1976 (Resources For The Future, 1983).

Supplies of land on which to pursue outdoor recreation activities have decreased at alarming rates on two fronts. Land is being taken out of the nation's undeveloped land base permanently due to urban expansion. The United States Department of Agriculture estimated that 1.5 million acres of agricultural land were converted to nonagricultural uses annually. (Resources For The Future, 1983). In addition, areas such as wetlands, bogs and marshes that are critical to the propagation of many wildlife species, were being destroyed at a rate of 400,000 acres each year (Resources For The Future, 1983).

Second, a vast majority of the remaining open space was being closed and/or posted by private landowners, thus denying access to the public. A study of rural landowners in Massachusetts revealed that 41 percent of the private land was closed to hunting (Larson, 1958).

More recent studies have shown that this phenomenon is ubiquitous and has continued to progress. Waldbauer (1966) researched the nature, extent, and reasons for posting of private lands in New York during a three year period from 1962 to 1964. The author found that 25 percent of rural acreage was posted against trespass and that unfavorable experiences with respect to the behavior of sportsmen was the underlying factor. Using Waldbauer's efforts as a baseline for incidence and causes of posting, Brown (1974) updated the study by measuring landowner attitudes toward letting others use their lands for recreation. It was found that during the nine-year interim, the incidence of posting had increased to 43 percent. "This represented an increase of approximately 72 percent in acreage posted over a nine year period, or almost 3.5 million acres of land posted since 1963" (Brown, 1974:174).

More recently, Wright et al. (1988a:155) reported that in addition to behavior-related disincentives, East Texas landowners were "heavily influenced by past experiences and their salient beliefs concerning legal liability, opposition to hunting, and lack of economic incentives." Thirty-one percent of the land in that region was closed to all outsiders, including personal acquaintances.

As a result of decreasing availability of private land for recreation, overcrowding of federal and state owned recreation and wildlife management areas has increased. Clawson stated, "From all indications, congestions in the national forests, national, state, county, and city parks and other recreation areas is not a case of temporary growing pains, but rather a mild taste of a real crisis" (Shilling, 1971:1).

State and federal wildlife administrators have voiced concerns for many years regarding this problem (Leopold, 1930; Howard and Longhurst, 1956; Berryman, 1957; Knott, 1963; Graham, 1964; Durrell, 1969; Stoddard and Day, 1969; Arnett, 1972; Kent, 1973; Wildlife Management Institute, 1983). Heeringa (1986), in a report to the Wildlife Conservation Fund of America, stated that the most pressing problems currently facing the wildlife profession are (1) loss of wildlife habitat and (2) lack of access for sportsmen. Obviously, private landowners are key to solutions to both of these problems.

Wright and Kaiser (1986) conducted a national assessment of state wildlife administrators' perceptions in order to understand the problem better. The study revealed that 100 percent of the states had difficulties with hunter access, and 52 percent indicated that hunter access was a major problem. This would appear to be directly dependent on availability of public land and its ability to absorb a portion of the unsatisfied demand. Surprisingly, the authors found that the most severe problems with access were generally associated with those states in the Mountain and Pacific regions where public land holdings are greatest (Wright and Kaiser, 1986).

Contributing Factors to Denial of Access to Private Lands And the Provision of Wildlife Habitat

Ownership Objectives

Motivations for owning rural land and primary land uses have changed significantly over the past several decades. Historically, rural land was owned or purchased for producing agricultural products– crops, livestock, or timber. However, recent surveys have indicated that this is no longer true (Holecek and Westfall, 1977; Birch and Kingsley, 1978; Birch and Powell, 1978; Birch, 1979; Birch and Dennis, 1980; Pope and Goodwin, 1983). Rising inflation, liberal tax laws, and rapid urbanization of society have encouraged many Americans to purchase rural land for investment, tax relief, recreation, and second residency.

Holecek and Westfall (1977), in a survey of 239 rural landowners in Kent County, Michigan, found that only a slight majority of respondents (54.3 percent) owned land for its income producing potential (farming = 31.3 percent, investments = 12.8 percent, and other economic = 10.2 percent). Desire to live in a rural setting was the primary consideration for 27.2 percent of the sample population.

The United States Forest Service initiated a series of research projects to assess the characteristics, attitudes, and objectives of forest owners in several eastern states (Birch and Powell, 1978; Birch and Kingsley, 1978; Birch, 1979; Birch and Dennis, 1980). Contrary to the original hypothesis, the researchers found that few landowners owned forested tracts for their timber production potential. Less than 3 percent of the forest owners in Kentucky, West Virginia, Ohio, and Pennsylvania indicated that timber production was their primary motivation for owning that land. By and large, the most commonly given reason was farm and domestic use. However, investments and recreational and aesthetic reasons were cited frequently (Birch and Powell, 1978; Birch and Kingsley, 1978; Birch, 1979; Birch and Dennis, 1980).

A survey of rural land brokers in Texas found that investment was the primary reason for their clients' purchase of land (29 percent). Use for hunting, fishing, and other outdoor recreation activities and a desire to live in the country also were given as the primary objective of 21 percent and 20 percent, of the owners respectively. Persons seeking to make a living from the land through farming and ranching accounted for only 13 percent of the sample (Pope and Goodwin, 1983).

Public access to private lands for recreation and maintenance of wildlife habitat were directly dependent on objectives held by owners of the land. When conflicts with these ownership objectives occurred, they were usually manifested in two distinct areas. The first occurred when provision of wildlife habitat was in direct opposition to the primary use of the land. The second problem occurred when recreational use conflicts with other land uses.

Conflicts Between Land Use and Provision of Wildlife Habitat

The small family farm is no longer the hub of American agricultural production. High interest rates, increasing costs of labor, and deflated market prices for agricultural products have sent many smaller owners into financial ruin. Those that remain in business are faced with the reality of maximizing their return on every available acre of land. Therefore, "...every ten-acre patch of brush or weeds represents a significant investment for the owners" (Durrell, 1969:181). To compensate for this potential loss of income, "...farmers have undoubtedly caused much of the decline in game habitat through more intensive use of the land. They have drained wetlands, harvested mast and den trees, filled open fields with pine seedlings and cleaned up vast acreage of good wildlife cover"

(Durrell, 1968:85). Elderkin, cited in Ryder and Boag (1981:36) stated, "It is not that farmers and ranchers are against wildlife, on the contrary the vast majority enjoy wildlife and are avid hunters. But they are in the business to make money and land not producing a cash crop is losing them money."

However, agriculture is not the only land use that is practiced at the detriment of wildlife habitat. Many parcels of land are owned as either primary or secondary residences. The quiet and solitude of the countryside have lured many away from the noise and congestion of the city (Pope and Goodwin, 1983). Aesthetic enjoyment of the rural setting is also a major motivational factor in ownership decisions (Birch and Powell, 1978; Birch and Dennis, 1980; Pope and Goodwin, 1983). Wildlife cover is often indiscriminantly sacrificed, especially along road frontages, in an effort to attain a more aesthetic appeal.

Pope and Goodwin (1983) found that the most commonly given reason for acquiring rural land in Texas was for investment. These lands provide the owner with tax advantages and a hedge against inflation. Since lands that are most advantageous for investment are those in closest proximity to urban population centers, subdivision and development are thought to be prime motivators for this segment of the rural land market.

Conflicts Between Landowners and Sportsmen

Many landowners look to the opening of another hunting season with foreboding. The fall season brings an army of hunters with requests for permission to hunt. Each year landowners must re-evaluate their access policies, weighing their bad experiences with perceived incentives for allowing access, often few or non-existent.

> There is an unappreciated emotion a man feels about his own land, as opposed to his thinking when he owns no land. It is the emotion of a man who loves to hunt, and for others to hunt, mixed up with emotions involved in making a living on the same land (Bowers, 1960:16).

Trends in land closures, attributable to conflicts between landowners and sportsmen, continue to persist.

Landowners' reasons for restricting public access have been widely publicized. Although these impediments to access take many forms, they can be grouped into four broad categories: (1) behavior-related disincentives, (2) perceived liability, (3) protectionism, and (4) lack of economic incentives (Wildlife Management Institute, 1983).

Behavior-Related Disincentives

Behavior of the hunting public often has been cited as the major reason landowners prohibit public access (Larson, 1958; Waldbauer, 1966; Stoddard and Day, 1969; Rounds,

1973; Brown, 1974; Westfall, 1975; Thorwardson, 1979; Oesterle, 1981). Not all hunters act in an inproprietary manner but it is felt that actions of the unconcerned minority are causing closure of lands.

Larson (1958:485) reported that "the Massachusetts Posted Land Survey established the main reasons for posting land in that state. The most frequently given reason for posting land was destruction of property. Second, in terms of importance, was discharge of firearms too close to buildings. Together these two reasons accounted for more posted land than did all the other reasons combined."

A survey of Colorado landowners was conducted in 1969 (Rounds, 1973). Landowners were stratified into two sampling frames representing eastern and western Colorado. Landowners of both regions cited "property damage" and "livestock protection" as their primary reasons for controlling access. Since livestock is property, actual or potential damage to property accounted for 89 percent and 84 percent, respectively, of the controlled access in the eastern and western regions.

The level of posting in rural New York increased from 25 percent of private acreage posted in 1963 to 43 percent in 1973, representing an increase of approximately 72 percent over a nine year period, a loss of 3.5 million acres. Ninety-seven percent of the posting landowners indicated that a behaviorally-related reason on the part of recreationists contributed to their decisions to post (Brown, 1974). Brown further stated that of all landowners surveyed, only 11 percent reported never having a bad experience with hunters.

Westfall's survey of rural landowners in Kent County, Michigan (1975) revealed that "damages" were viewed by 36 percent of the respondents as the main reason for not allowing public hunting. Twenty percent felt "personal safety" was their primary concern, and an additional 16 percent felt "control of hunters" was most important in their decisions.

In another Michigan study, Feltus (1979) surveyed past participants of that state's "Public Access Stamp" program. Only 35 percent of the landowners presently participating in that program felt that they had had any significant problems with hunter behavior, while behavior-related problems were reported by 66 percent of those who had dropped out of the program. Feltus found that problems encountered with hunters, combined with a tendency to be less receptive to hunting, helped account for those landowners decisions to discontinue participation in the program. Thorwardson (1979) reported similar findings in Oklahoma where 43 percent of the landowners not allowing hunting on their property had experienced past damages attributable to hunters and did not wish to risk having it happen again.

Perceived Liability

Potential liability incurred by landowners for injuries sustained by hunters while on their property is an incessant worry, especially in light of today's large court settlements. The threat of being taken to court has served as a disincentive to landowners in their access decisions.

The significance of liability was documented in three studies in 1975 (Westfall, 1975; Womach et al., 1975; Wright et al., 1988b). Michigan landowners were asked to rank the importance of liability in relation to public recreational use of their land. Sixty-four percent of the respondent landowners indicated that it was "very important" (Westfall, 1975). In a nationwide survey of landowners participating in the Agriculture Stabilization Conservation Service Pilot Public Access Program, Womach et al. (1975) found that respondents indicated liability was second to littering in terms of problems encountered as a result of public recreational use of private lands. Wright et al. (1988a) found that East Texas landowners perceived themselves to be succeptible to lawsuits when injuries occurred on their properties. Concerns about liability weighed heavily in owner's access decisions.

In an attempt to protect landowners from threats of liability and to encourage recreational access of private land, the Council of State Governments drafted a model "Recreational Use Statute" in 1965. Since that time, 49 states have mandated similar legislation (Kozlowski and Wright, 1988). Most insulate the landowner from liability as long as access is permitted without charge. However, Kaiser and Wright (1985) reported that these statutes have been "splendidly ineffective" in curbing trends of land closures. The authors also pointed out distinct differences between being legally liable and being taken to court, over which these statutes have no effect.

Protectionism

Protectionism is one of the most damaging attitudes to increasing the supply of private hunting lands and is deeply rooted in the personal values of the landowner. A private land ethic, in which landowners feel that on their land they are free to do as they "damn well please," is prevalent throughout America. "Many landowners believe that resources on their property, whether public or private, should provide benefits only to them and their invited guests" (Wildlife Management Institute, 1983:2). This attitude of **exclusivity** perpetuates and amplifies under utilization of both land and wildlife resources.

Protectionists also include those landowners who express some form of antihunting sentiment. Although antihunting attitudes were not commonly assessed in past landowner studies, Brown (1974) stated that 23 percent of sampled New York landowners indicated some opposition to hunting. "Attitudes against hunting were found to be most strongly

related to landowners having urban backgrounds and owning rural property in areas of population and land use pressures" (Brown, 1974:175). Colorado landowners precluding access for protectionist reasons were more significant in number. Thirty-seven percent of the land owned in the eastern region and 40 percent of the western acreage was found to be operated under protectionist policies (Rounds, 1973).

Deficits in Economic Incentives

Speaking at the 16th American Game Conference in 1929, Seth Gordon said:

> Free hunting in America today is nothing more than a mythical ideal to which many of us still cling, but which never again will fill the American game bag.... Either we will put more business into conservation, or conservation will be swallowed up by business.... Steps should be taken to encourage private landowners and cooperative groups in closely hunted territory actually to engage in the husbanding of game crops to be harvested by the sportsmen (Kozicky, 1972:68).

Wildlife resources therefore, exist in a paradox—they are considered a public resource that is dependent on private land for its habitat. Finding ways to encourage private landowners to provide both habitat for wildlife and opportunities for public hunting is considered one of the foremost challenges facing the wildlife management profession.

> This places the landowner in a position of being steward to a public resource and sometimes at a significant expense. To a large degree, the landowner has to choose between producing timber, row crops, cattle and other commodities that promise a cash return or producing wildlife benefits that have uncertain cash returns (Wildlife Management Institute, 1983:2).

Ryder and Boag (1981:36) addressed this very point stating,

> The result is that the landowner has no incentive to retain his unimproved land in its native state and, in fact, the incentive may be to improve his "wasteland" to realize some return on the taxes he pays out annually on it.

Ways in which to compensate the landowner for producing game crops has been a topic of conversation among wildlife professionals for years. In 1930, Aldo Leopold originally suggested monetary compensation to the landowner (Johnson, 1966). Berryman (1961), Stoddard and Day (1969) and Kozicky (1972) also advocated this policy. Others have argued against paying for the right to hunt since, theoretically, this is counter to American customs and laws (Knott, 1963; Graham, 1964).

The argument of "Free Hunting versus Fee Hunting" continues. Allen, in the *Report of the Committee on North American Wildlife Policy* (1973:171) stated, "Free hunting has been an assumption with American outdoorsmen. In a sense, the hunter has been subsidized by the landowner, who produces something that is a common property and from which he may profit little, if at all." Few can argue the fact that landowners bear the brunt of the

costs in sustaining wildlife habitat, and some form of compensation is necessary. If public hunting is to continue, "public access must compete with other land uses in justifying any diminution of opportunities which the actual or potential presence of visitors may entail" (Thompson and Whitby, 1976:308).

Incentives for Allowing Access

Leopold (1930) stated that wildlife management is a partnership enterprise to which landowners, sportsmen, and the public each contribute appropriate services and from which each derives appropriate rewards. Historically, landowners have not derived "appropriate rewards" for their stewardship of the nation's wildlife resources.

Rewards or incentives to landowners have been discussed in professional media for years. Cash payments, tax breaks, cost sharing, technical advice, fencing supplies, and loan of equipment have been mentioned as possible ways of encouraging landowners to provide this critical service. However, "...consumed in the debate over free versus fee hunting, we have neglected to consult with the owner of the resource—the landowner. Without any basis, we have decided that each landowner has a latent sense of moral obligation to provide the public with free wildlife" (Harmon, 1981:377). Currently, little data exist concerning landowners' preferences for such incentives or wildlife management assistance programs.

Shilling and Bury (1971) investigated the attitudes of East Texas forest owners toward recreational development potentials. These authors found that 85 percent of the respondents believed private recreational development was income-producing and 49 percent favored the idea of restricting "quality recreation" to those who could pay.

New York landowners were found to hold different attitudes (Brown, 1974). Only 9 percent were interested in fees for recreational use of their land. Brown interpreted the reason for this as "most landowners feel they have made little monetary investment toward developing the recreational value of their property, and that imposing a user fee is unwarranted" (1974:177).

Holecek and Westfall (1977) discovered that Michigan landowners they surveyed were not farmers by occupation and did not necessarily view income generation as a primary motivation for land ownership. Therefore, "incentives other than the promise of additional earnings may need to be included if (public access) programs are to be favorably received" (Holecek and Westfall, 1977:6).

The most extensive study of landowners' willingness to accept incentives was conducted in Missouri by Kirby, Babcock, Sheriff, and Witter in 1981. Landowners were asked to rank their preference for certain incentives for maintaining wildlife habitat. The most commonly preferred response was "seeds for food plots," favored by 27 percent of

the respondents. "Technical advice" ranked second (25 percent); "plants for wildlife cover" (11 percent) and "tax considerations" (10.7 percent) were third and fourth with "cash payments" a surprising fifth (10.6 percent).

The previously held conviction that cash payments would be the incentive most sought by landowners was erroneous. The authors offered a possible explanation for this finding, stating that "...some farmers hesitate to consider cash payments because of 'strings,' particularly pressures to allow access. Real or imagined obligations to permit access undoubtedly dissuade some farm operators from accepting the assistance of wildlife agencies" (Kirby et al., 1981:93).

Thorwardson (1979:39) found that "non-monetary compensation may be more successful (than monetary) in obtaining landowner cooperation in providing hunter access to private lands." Technical assistance with game management was mentioned as a possible alternative strategy. Additional law enforcement also was articulated.

Access Strategies

Strategies to ensure the public of hunting access have been debated with four basic methods resulting. These methods can be viewed along a continuum from free hunting to the European hunting system— from public to private ownership of wildlife resources. As ownership of game moves from public to private, restrictions on access increase and, consequently, so does cost to the individual. "It is contended here that the access issue can be seen as the economic problem of allocating and exploiting the various rights over the land among interested parties in such a way as to maximise social welfare" (Thomson and Whitby, 1976:308). Questions of property rights, equity, and social welfare are central to choice of strategies.

Free Hunting

There is a deep rooted ethic in America that implies that hunting is a free privilege. Many cling to these convictions (Harmon, 1981), however, pressures of economic law dictate otherwise.

Free hunting, in its purest sense, ended in 1864 when the State of New York required hunters to purchase hunting licenses. Many states operate under administrative policies that endorse the concept of free access to wildlife resources. Several states, however, are finding it necessary to initiate organized programs that provide incentives to private landowners to maintain public hunting (Johnson, 1966).

State Public Access Programs

Since 1936 the State of Pennsylvania has taken an active involvement in hunter-farmer relations through the Cooperative Farm Game Program, which has served as a model for other state programs (Johnson, 1966).

Under this program, the landowner gives the commission control of hunting rights for five years in return for which the landowners are given free signs, increased patrol by enforcement officers, advice and instruction in habitat management, stocked game, seeds and seedlings, forest edge thinning and a free subscription to the Commission's magazine, *Pennsylvania Game News*" (Gottschalk, 1977:240).

At present, the program includes approximately 19,000 landowners and covers 2.3 million acres (Byerly, pers. comm.). Funding comes from license sales and federal aid.

The California Department of Fish and Game developed a cooperative pheasant hunting program in 1949 (Richards, 1964). The landowner relinquished control of hunting to the department for a specified period of time. The land was posted and patrolled by the department, which also issued use permits to the hunters. This program operated until 1954 when competition from the private sector and increased operating costs made it no longer feasible. The private sector picked up where the state left off by operating "community areas" for pheasant hunting. Profits generated under this system went to worthwhile community projects (Richards, 1964:93). "This is one example where a program was initiated by government, but once started was more efficiently handled under private enterprise, Richards (1964) stated.

The State of New York, under legislative support of the Fish and Wildlife Management Act of 1958, has taken responsibility for management of wildlife on private lands and improving hunter–landowner relations (Johnson, 1966). The state entered into agreements with landowners in 45 cooperative areas totaling 450,000 acres (Gottschalk, 1977). Individual agreements negotiated between landowners and department provide a variety of services such as trees and shrubs for wildlife cover, increased law enforcement patrols, posted safety zones around buildings, and unharvested crops and technical advice on habitat management (Johnson, 1966).

Active leasing of hunting lands in southern lower Michigan was initiated by the Michigan Department of Natural Resources in 1976 under a "Public Access Stamp" program. Anyone hunting in that area of Michigan is required to purchase a "Public Access Stamp" ($1) in addition to the regular hunting license. Revenues from this program are used to lease private lands for hunting (Westfall, 1981).

Program success in Michigan was evaluated in 1981 after five years of operation and was extended for an additional five years (Holecek, 1982). This program not only provided landowners with incentives to keep their land open to the public, but also acted to decrease hunter conduct problems by requiring participating hunters to pass the state hunter education course.

Federal Access Programs

The federal government also tried to increase public access to private lands through the Food and Agriculture Act of 1965, the Agricultural Act of 1970, and the 1985 Farm

Bill. Under the 1965 act Cropland Adjustment Program, landowners could enter into long term agreements (up to ten years) to allow recreational access. In return, cash subsidies were paid for harvesting fewer acres and for leaving the remainder as winter food for wildlife (Hunter, 1972).

The 1970 Act "authorized the Secretary of Agriculture to make additional payments to producers participating in annual set-aside programs for feed grain, wheat, and upland cotton if such producers permitted without compensation, access for hunting, trapping, fishing, and hiking" (Hunter, 1972:57).

The Farm Bill, passed in 1985 to provide economic assistance to financially strapped farm community, contained "set-aside" clauses which mandated providing of some recreational access. Furthermore, the program contained both "sodbuster" and "swampbuster" provisions whereby landowners could not till erodible soil or drain wetlands. These provisions were intensely supported by federal wildlife interests.

Private Leasing of Hunting Rights

The concept of charging hunters for the right to access private lands has not been a widely instituted policy throughout the nation even though it appears to be increasing (Wright et al., 1988a). Many feel it will be an agreeable incentive to landowners for allowing the public to hunt on their lands (Kozicky, 1972; Price, 1978).

Texas is undoubtedly the forerunner in commercializing wildlife resources. "The (commercial hunting) industry began in the early 1920's and is the most highly developed commercial system of harvesting game animals on the continent" (Burger and Teer, 1981:256). Sargent et al. (1958) conducted interviews with Texas farm and ranch managers concerning leasing practices and attitudes toward leasing. The season lease was found to be the most common and accounted for 68 percent of all leases. Attitudes of farmers and ranchers concerning hunting leases may be divided into three categories: (1) those who look upon leasing, not as a source of income, but as a method of controlling and regulating hunters; (2) those who view leasing as an unimportant, but welcome income; and (3) those who feel leasing is a potentially significant source of income (Sargent et al., 1958).

In a survey of Texas hunters, Berger (1974) reported that hunters paid landowners $108 million for hunting rights in 1971, which pointed to the magnitude of the Texas commercial hunting system. Three characteristics lend themselves to this leasing system: (1) relatively little public land to which the public has free access, (2) large ownership tracts with an abundance of game, and (3) strictly enforced trespass laws (Burger and Teer, 1981).

However, the entire state is not under lease. Thomas and Adams (1982) found that only two out of every five hunters actually paid a fee to hunt on another's land. The remainder cited friendship and kinship networks as means of finding a place to hunt.

Texas is not the only state in which leasing has become established. Wright et al., (1988b) found that almost seven percent of the nation's landowners charged fees for access to recreational lands. For example, in California, pheasant clubs (sportsmen that lease and control large blocks of pheasant habitat) began appearing in 1939 (Johnson, 1966). Johnson (1966), predicted that nearly all of California's best pheasant hunting areas will be controlled by either licensed pheasant clubs or private hunting leases by 1990.

The monopolistic aspect of leasing has been cited as a major disadvantage and is looked upon, in certain cases, as an impediment to access. Charles Graham, Chairman of the Washington State Game Commission (1964:104), presented an example of the effect leasing had on pheasant hunting opportunities in his state.

> A group of landowners in the Columbia Basin in eastern Washington banded together and charged for hunting on their collective properties. They controlled 22,000 acres of prime pheasant land, on which they sold 610 permits. This, in effect, provided 35.5 acres of land per hunter. In the same area, there was an additional 450,000 acres of open land on which 40,760 individuals hunted—11 acres per man.
>
> It did not take much additional arithmetic for me to realize that if this approach to hunting should spread, it could reduce the availability of hunting lands by 70 percent or more.

Ernest Swift in the April 15, 1963 issue of *Conservation News* was quoted as saying,

> Let no one doubt the fact that the United States is on a dead lope toward the European system of ultimate ownership of game by landowners and the establishment of hunting and fishing fees on all lands, public and private. It will be a gradual eroding process but it is coming as sure as death and taxes.

European Hunting System

Without a doubt the most restrictive strategy along the continuum is that of the European system. "In western European countries, including Great Britain and West Germany, game essentially belongs to the landowner, rather than the state. The landowner may sell both hunting rights and animals harvested, thus receiving direct economic rewards for producing game" (Burger and Teer, 1981:253). However, it is easy to see inequities that are inherent in this type of strategy and ways in which it runs counter to the American hunting traditions.

> Hunting is not managed on a democratic basis. Numbers of hunters are severely limited. The principle limitation is economic, since in order to qualify for hunting one must have mastered not only the legal and traditional requirements of skill and knowledge, but also

> have access to a place in which to hunt—a *revier*. To have a revier requires not only the capability to buy or lease a hunting area, but also an acceptance of the responsibility for the welfare of the game and for the protection of landowners, including those adjacent landowners who may be subject to crop depredation (Gottschalk, 1977:111).

Hunting in Europe, where population density is high and rural lands are a premium, is the sport of aristocrats and the landed gentry. If the objective of wildlife management is to ensure more hunting per game management dollar as Durrell (1969) has suggested, European methods will be counterproductive.

Summary

Much has been written concerning the dimensions of wildlife management on private lands and problems associated with hunter access. Although past research and literary efforts have been beneficial in identifying these problems, few researchers have attempted to go beyond these descriptive analyses to quantify bases for rural landowners' decisions concerning wildlife management policies. There is a need to foster a better understanding of landowner policy behavior so that incentive programs can be designed to channel that behavior into acceptable policies.

Research described in the following chapters attempts to establish a foundation for understanding the reasons behind landowners' management actions and their preferences for wildlife management assistance. Based on this foundation, it further examines the complexities of rural landowners' hunter access decisions in an attempt to formulate an index of the current supply of wildlife-associated recreational opportunities available to Virginia citizens. Alteration of these access policies is explored through analysis of landowners' preferences for incentives.

Chapter III

Methodology

Rural landowners' decisions concerning wildlife management practices and access to their properties for hunting are complex and many different variables serve as determinants of these policies. Using past studies as a foundation, the research reported here incorporates previously identified attributes of the decision-making process into a formal decision framework to explain the variance among landowners' access policies (Figure 1). This conceptual framework was first reported by Wright et al. (1988a) as a means of explaining owners' access policy decisions.

Aspects affecting landowners' decisions have been identified as socio-economic, resource-based, motivational, and attitudinal. Socio-economic variables are subjected to analysis to ascertain what differences exist in owners' decisions, given the socio-economic structure of the population. Resource-based variables such as land uses, presence of wildlife and perceptions of habitat quality, have been theorized to impinge upon landowners' decisions and also are included as components of the proposed framework (Birch and Kingsley, 1978; Birch and Powell, 1978; Birch, 1979; Birch and Dennis, 1980; Kirby et al., 1981).

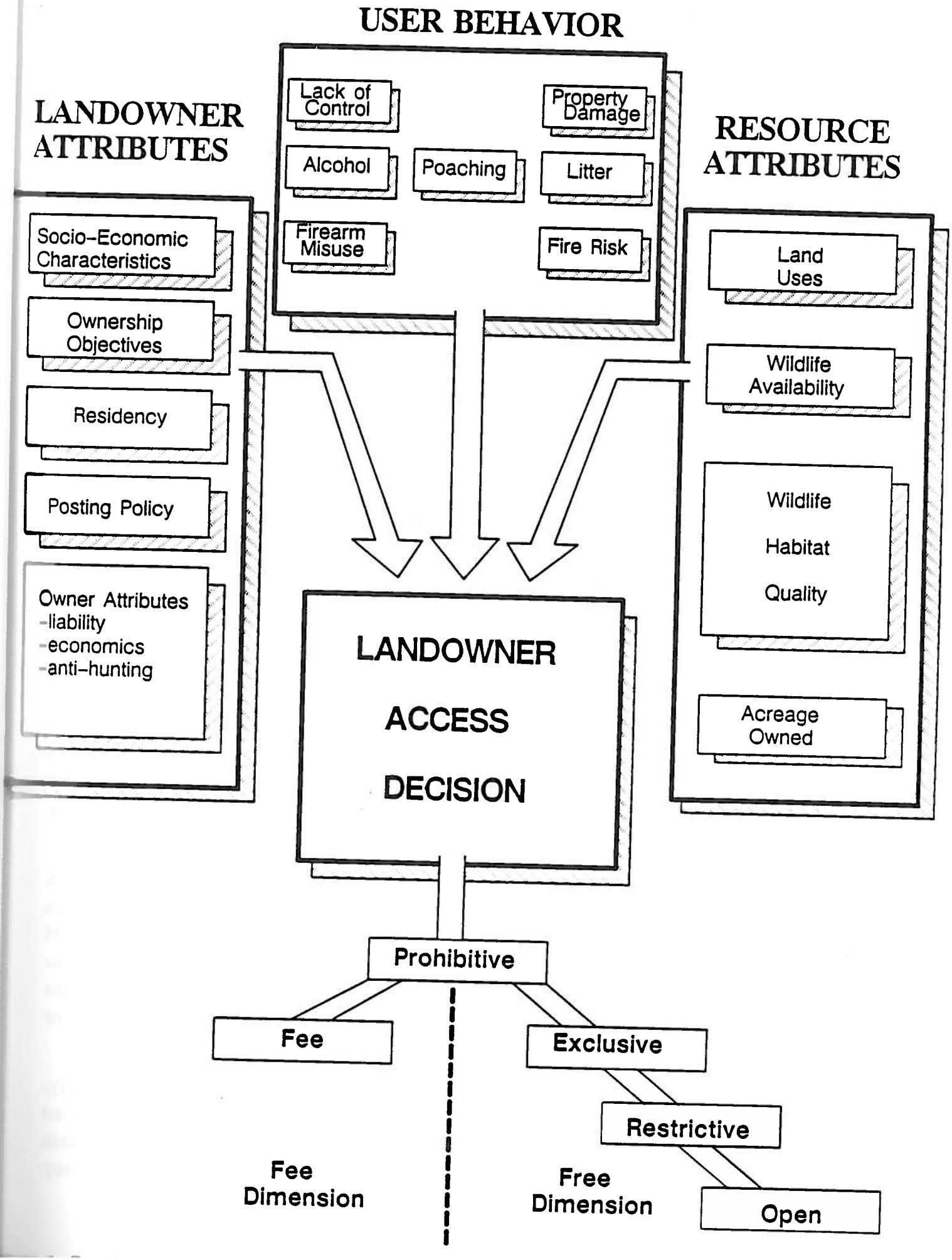
Motivational attributes are ownership objectives or basic reasons persons acquire rural land. These objectives influence management policies. For example, farming and ranching objectives may be in conflict with provision of wildlife habitat and recreational hunting, thus habitat is destroyed and access is restricted or prohibited. Respondents were asked to rate the importance of selected ownership objectives in their decisions to purchase rural land. In turn, these data are analyzed to determine if any correlation exists among reasons for ownership and landowner management policies.

Attitudes toward enhancing habitat, hunter behavior, liability, protectionism, and perceived lack of economic incentives to allow access or maintain habitat are assessed. Unlike resource-based variables, attitudes are complex and cannot be measured directly. Because attitudes are hypothesized to play such a significant role in management decisions of landowners, a great deal of the focus of this research is dedicated to this subject.

Research Design

Description of the Study Area

The Commonwealth of Virginia covers 40,767 square miles of land area (Center for Public Service, 1987) and exhibits a tremendous diversity of terrain. Based on similarities


USER BEHAVIOR
Lack of Control
Property Damage
Alcohol
Poaching
Litter
Firearm Misuse
Fire Risk
LANDOWNER ATTRIBUTES
Socio-Economic Characteristics
Ownership Objectives
Residency
Posting Policy
Owner Attributes
-liability
-economics
-anti-hunting
RESOURCE ATTRIBUTES
Land Uses
Wildlife Availability
Wildlife Habitat Quality
Acreage Owned
LANDOWNER ACCESS DECISION
Prohibitive
Fee
Exclusive
Restrictive
Open
Fee Dimension
Free Dimension

in climate, soils, topography, vegetation, and animal populations, the state can be divided into three geographic regions (Figure 2). They are: (1) Mountains, (2) Piedmont, and (3) Tidewater Regions.

Selection of Counties

Within the state, 10 counties were systematically selected. Use of a random sampling technique was deemed inappropriate for county selection because several counties within the state are dominated by national forest land or are predominately urban. Consideration was given to choosing counties that were similar in terms of wildlife habitat and percentage of total land area vested in public land. Administrators and biologists from the Virginia Department of Game and Inland Fisheries provided a list of counties that offered similar habitat types, animal populations, and public/private land ratios thereby allowing the sample of 10 counties to be drawn.

Sampling Within Counties

Past landowner research often has suffered from the inability to secure adequate response rates, especially when surveys are conducted by mail. A determined effort was made to overcome this problem.

After evaluating several sampling media, it was decided that the *Block Books of Rural Land Ownership by Abstract*, available in each county's tax appraisal office, were the most efficient sampling frames available. Use of "Block Books" offered three distinct advantages. Addresses obtained were current to within six months. Those statements that were undeliverable due to an inaccurate address were duly noted on tax rolls, thus enabling researchers to disregard these landowners. Inadvertent drawing of land parcels unsuitable for hunting was reduced since "Block Books" were arranged by survey abstracts. This allowed only those parcels located in rural areas to be selected.

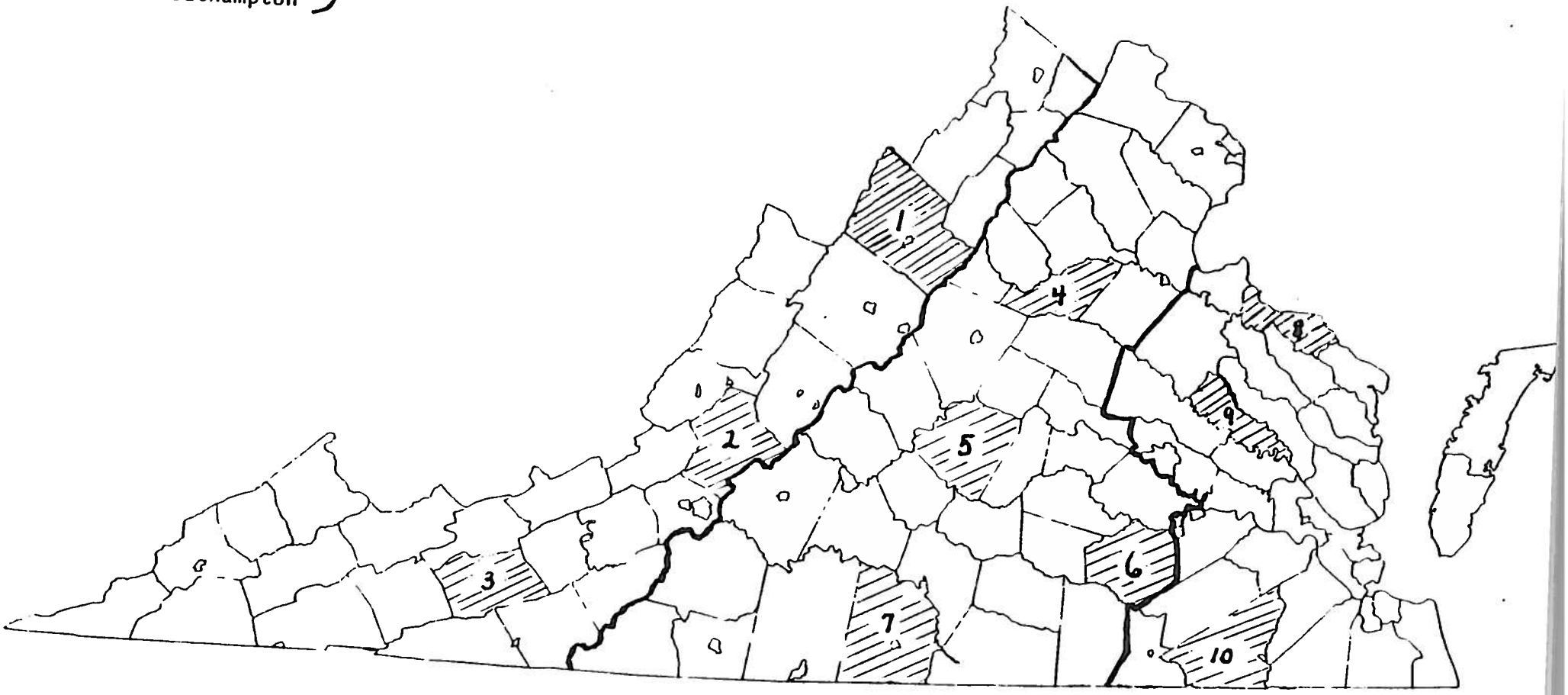
As a third advantage, tax rolls contained information concerning number of acres owned. This enabled researchers to select only those owners of 40 or more contiguous acres since smaller parcels are not well suited for hunting. This technique is supported by Holecek and Westfall's finding (1977) that small parcels were of reduced recreational value to Michigan residents. This procedure also allowed the sample to be stratified according to amount of acreage owned, guaranteeing equal representation of large and small landowners. This strengthened the external validity of the research design.

To draw the sample, a team of researchers visited each of the 10 county tax appraisal offices. All parcels of land that met the qualification criteria (those in rural areas and having at least 40 acres) were entered into the files of a portable microcomputer. Then a data base management program sorted acreages so that the county could be divided into quartiles. From each quartile, a random sample of 50 landowners was selected. State-

Figure 2. Ten Counties selected for Virginia Landowner Wildlife Management Study.

1. Rockingham
2. Botetourt
3. Wythe
4. Orange
5. Buckingham
6. Dinwiddie
7. Halifax
8. Westmoreland
9. King William
10. Southampton

Mountain: 1–3
Piedmont: 4–7
Tidewater: 8–10



wide, researchers selected a total sample of 2,000 landowners who would be asked to complete a mail questionnaire (county n = 200). A sample of this size was deemed sufficient to allow results to be generalized to the region as a whole and produced an estimated sampling error of less than three percent.

Data Collection

Development of the Survey Instrument

To meet the basic objectives of the study, the survey questionnaire was designed to assess landowners' awareness of, and interest in assistance programs, attitudes concerning access policies, the existing disincentives for allowing hunter access, preferences for certain incentives for allowing access, motives for ownership, land uses, and other demographic information. A review of past landowner research provided a list of attitudinal statements concerning specific problems landowners face while allowing hunters on their properties. Then, on the basis of discussions with wildlife administrators, landowners and other knowledgeable people, a list of possible incentives and future programs used to encourage landowners to allow access and enhance habitat was developed for use in the questionnaire. Closed-ended and multi-item questions were used throughout the instrument. Each question was reviewed carefully for any ambiguities or wording that might bias responses. To strengthen further internal or content validity, these statements were scrutinized by VDGIF administrators and research directors to ensure that all possible impediments to access as well as all feasible incentives were considered.

Pretesting the Survey Instrument

A pretest of the instrument was conducted on a sample of 200 rural landowners in Fauquier County. The purpose of the pretest was to determine wording or format problems of the instrument and to check the consistency in the attitudinal scales.

A 13-page questionnaire was mailed to landowners. After two follow-up mailings, 133 questionnaires had been returned resulting in a response rate of 66.5 percent. Solidity of the research design was verified since few questionnaires were returned as undeliverable.

Researchers conducted a visual analysis of the data collected from the pretest sample to see if there was any confusion or misunderstanding of questions. Minor modifications were made to the instrument's format to eliminate ambiguities found in two questions.

Respondent fatigue was a concern during the pretest of the instrument. The number of attitudinal items was kept purposefully large so as to allow systematic inclusion or exclusion of items to maximize the reliability of scales. Phone conversations with several re-

spondents and the relatively high response rate indicated that fatigue was not a factor. Therefore, the number of items was left unchanged. The survey questionnaire is included as Appendix A.

Administration of the Survey

To collect needed data, a modified version of procedures outlined by Dillman (1978) was employed. A questionnaire, a self-addressed prestamped envelope, and a cover letter explaining the importance of the study were mailed to each of the 2,000 landowners. Timing of the mailings was thought to be important since landowners commonly reevaluate their hunter access policies prior to the hunting season each fall. Therefore, the initial mailing was scheduled to reach landowners late in the fall of 1987, after the opening of hunting season. One week after the first mailing, a post card reminder was sent to each landowner to encourage early response.

By the end of the data collection period, a total of 1,404 questionnaires had been returned. Of this total, 174 questionnaires were not completed due to reasons beyond the control of the researcher (i.e., deceased landowner,no longer own the property) and were removed from the sample. This resulted in an absolute response rate of 67.3 percent. Another 120 questionnaires were incomplete and unusable. Discounting these respondents, the effective response rate was 65.1 percent (n = 1,110). A telephone follow-up to test for non-response bias was conducted with a five percent sample of non-respondents and no significant differences were found between frequencies of responses of respondents and non-respondents.

Data Analyses

Respondents were categorized into homogenous groups based on their interest in/preferences for wildlife management assistance programs, and level of hunter access allowed. This segmentation process facilitated the comparison of land-owners regarding land uses, ownership objectives, wildlife presence, attitudes, and other variables contained in the model shown in Figure 1.

A one-way analysis of variance and Duncan's Multiple Range Test (Nie et al., 1975) (95% confidence level) were used to compare landowners across access and interest levels, using the individual factors of the model as independent variables. These analyses, as well as descriptive statistics, provided a base of understanding regarding differences that existed among landowners, given their observed wildlife management policies.

Chapter IV

Results

The diversity of the Old Dominion can be seen not only in the many different types of terrain found in the state, but also in the characteristics, attitudes, and behavior of its people. It should be recognized that findings from one region of the state may not necessarily be applicable to landowners in other regions. For this reason, regional comparisons are made among landowners and considerable discussion is offered as a means of understanding similarities and differences that exist throughout the Commonwealth.

The Landowners

The sample of Virginia landowners was predominantly male (81.9%) and slightly less than 58 years of age. Their level of educational attainment was relatively high; they had completed an average of 13 years of formal education. Moreover, 13 percent of the owners had completed a college degree and another 18 percent had completed some graduate work. Respondents reported earning approximately $35,000.00 in total family income in 1987.

Respondents had owned their properties for an average of 23 years, with 56 percent of the landowners living on their lands. Those persons who did not reside on the properties lived within an average of a 40 mile radius. Landowners from the Mountain Region were the most likely to reside on their property ($p < 0.028$) whereas respondents from the Piedmont and Tidewater Regions were significantly less likely to be resident owners.

Landowners motives for owning rural lands in Virginia continue to be highly traditional even though national trends in land ownership are not. Sixty-one percent of Virginia landowners rated **farming/ranching** as an important or extremely important ownership objective (Table 1). Conversely, less than 19 percent of the respondents rejected agriculture as an important reason they owned their properties. When compared with a recent study of national trends in land ownership (Wright et al., 1988), fewer Virginians rejected agricultural ownership motives than did landowners across the nation (40% rejected agriculture as an important reason for owning rural lands). Owners from the Tidewater placed significantly more importance on farming and ranching ($p < 0.001$) than owners from other regions. Landowners from the Piedmont placed the least emphasis on agriculture ($p < 0.001$).

Table 1. **Importance of Selected Reasons Why Virginia Landowners Owned Rural Land.** (Percentage of Respondents)

	Not Important	Slightly Important	Moderately Important	Important	Extremely Important	$\bar{X}$
a. For farming/ranching	18.3	9.7	11.0	27.3	33.7	3.49
b. To live in a rural environment	15.7	4.9	7.3	36.5	35.4	3.71
c. For aesthetic enjoyment	14.3	8.3	14.5	37.8	25.1	3.51
d. To have privacy	10.8	5.0	10.6	36.7	36.9	3.84
e. To enjoy outdoor recreation	10.3	9.3	12.9	36.1	31.4	3.68
f. To have an inexpensive place to live	37.3	11.8	16.5	22.7	11.6	2.59
g. As an investment	16.4	11.1	13.8	34.6	23.9	3.38

However, farming was not evaluated as the primary reason for owning land by a majority of respondents. **Privacy, living in a rural environment, outdoor recreation** and **aesthetic enjoyment** were reported to be more important to most landowners.

The 1970's trend of moving back to the country may still be evident as **to have privacy** and **to live in a rural environment** were the most important reasons voiced by respondents. **Outdoor recreation** potential of their properties and **aesthetic enjoyment** of their rural environs also were cited as important reasons for ownership by a majority of owners (67.5% and 62.9%, respectively). But even though reasons of a favorable residence appear to be major reasons Virginians own rural lands, owners rejected the common perception that their lands provided them with **an inexpensive place to live.** This reason was reported as the least important motive for all respondents.

Purchasing land for **investment** purposes was found to be important to 58.5 percent of the owners. Persons from the Tidewater Region placed significantly more importance on investment than did owners from other regions ($p < 0.022$). Perhaps, this can be explained by the fact that this region has a higher population density and land closer to metropolitan areas are more valuable for development and urban expansion.

The Land

Virginia landowners owned an average of 202 acres of rural land. As shown in Table 2, those persons from the Tidewater Region owned significantly larger tracts of land ($p < 0.025$) than persons from the Piedmont or the Mountain Regions. Regional land holdings in the Mountains were smallest, averaging 112 acres.

Table 2. Mean Tract Sizes Owned By Virginia Landowners By Region (acres).

	Mountain	Piedmont	Tidewater	Statewide
Acreage	112.30	188.89	270.76	202.40

Land Uses

Regional disparities became readily evident when land resources were evaluated in terms of land uses employed by landowners (Table 3). Forested land was the largest, single land use reported by landowners statewide. Forests covered 51.5 percent of respondents' properties ($\bar{X}$ = 104.15 acres). Landowners from the Piedmont dedicated significantly more land to woodlands than did all other owners ($p < 0.001$). Respondents from the Tidewater Region also had significantly more forested land than did owners from the Mountain Region.

Table 3. Selected Land Uses Employed by Virginia Landowners

	Pct. Total Acreage*	Mean Acres
a. row crops	16.99%	34.39
b. woodlands	51.46%	104.15
c. hay and pastureland	24.33%	49.24
d. marsh or wetlands	2.02%	4.09
e. water	1.00%	2.02
f. buildings and yards	3.00%	6.07
g. other (Please specify)	2.00%	4.05

*Total may not equal 100% due to rounding error.

The second largest land use was hay and pastureland, which accounted for 24.3 percent of the total acreage owned. Pasture was most often found in the Mountain Region ($p < 0.001$). Owners from the Tidewater Region dedicated less than five percent of their lands to pasture which was significantly less than all other landowners ($p < 0.001$).

Row crop agriculture, however, was primarily found in the Tidewater Region. The larger tracts of land and fertile coastal soils lend themselves to this type of land use. These owners dedicated 12 percent and 10 percent of their properties to crops, respectively ($p < 0.001$).

The only other regional differences found with land uses were with marsh and wetlands which, overall, accounted for only two percent of total acreage. However, almost five percent of the acreage in the Tidewater Region was classified as wetlands, significantly more than that of the other two regions ($p < 0.001$).

Presence of Wildlife Species

Having reported types of land dedication, respondents were questioned regarding presence of selected wildlife species on their properties and the quality of their land as habitat for these species. As with land use, regional differences in distribution of certain wildlife species were evident.

Rabbits and squirrels were the most common species reported by landowners (Table 4). Over 94 percent of all landowners reported the presence of these species on their properties. No regional differences were found with these two species, with the exception of squirrels, which were not as prevalent in the Mountain Region as they were in the Piedmont and Tidewater Regions ($p < 0.001$).

Table 4. **Presence of Selected Wildlife Species on Respondents' Property.** (Percentage of Landowners Reporting Presence)

Bear	8.2%	Ruffed Grouse	16.9%
Deer	93.6%	Bobwhite Quail	74.7%
Turkey	75.8%	Rabbits	94.3%
Waterfowl (Ducks & Geese)	33.1%	Squirrel	94.4%
Dove	74.1%	Furbearers (Fox, Raccoon, Beaver, etc.)	79.2%

The presence of white-tailed deer also was reported by an overwhelming majority of respondents (93.6%). The greatest presence of deer was found in the Piedmont Region,

followed closely by the Tidewater Region. Mountain Region landowners reported significantly less deer than owners in all other regions ($p < 0.001$).

An almost identical distribution pattern was reported for wild turkeys since these two species often coexist in the same type of habitat. Turkeys were common to Piedmont and Tidewater lands, but significantly less prevalent on lands in the Mountain Region ($p < 0.001$).

Waterfowl ($p < 0.001$), dove ($p < 0.008$), furbearers ($p < 0.005$), and bobwhite quail ($p < 0.004$) were most often reported in the Tidewater Region. In every case, significantly more landowners from this region indicated the presence of these species than did owners from the Piedmont or Mountains Regions.

On the other hand, bear ($p < 0.001$) and ruffed grouse ($p < 0.001$) were predominantly Mountain species, even though ruffed grouse also were reported more commonly in the Piedmont than in the Tidewater Region. However, as can be seen in Table 4, these species have the smallest distribution of all species posed to respondents. They were reported by only 8.2 percent and 16.9 percent of the landowners, respectively.

Perceptions of Habitat Quality

Landowners also were queried regarding their perceptions of the quality of their lands as habitats for the aforementioned species. It is important to note that even though landowners are generally not qualified to make professional evaluations of habitat on their properties, their perceptions are realities which influence their management decisions. For example, owners who perceive their lands to be excellent habitat for quail are not likely to seek professional help by enrolling in a habitat management assistance program offered by the state. Conversely, persons who perceive they have little quail habitat (or few quail) are not likely to allow hunting access for that species. Therefore, knowledge of landowners' perceptions regarding habitat quality is important to wildlife managers.

Since over half the land owned by respondents was reported as being wooded, it comes as no surprise that habitat for deer, squirrels, turkeys, and other species that are dependent on wooded habitat was rated quite high (Table 5). Statewide, deer habitat was rated the best by landowners ($\bar{X} = 4.04$). This was followed closely by habitat for squirrel, rabbits, furbearers, and turkeys.

Table 5. Respondents' Perceptions of Wildlife Habitat Quality for Selected Wildlife Species. (Percentage of Respondents and Overall Quality Rating.*)

	No Habitat	Poor Habitat	Fair Habitat	Good Habitat	Excellent Habitat	$\bar{X}$*
Bear	49.9	22.0	16.9	8.6	2.4	1.91
Deer	2.3	3.4	17.7	40.6	36.0	4.04
Turkey	6.2	8.8	24.4	35.4	25.1	3.64
Waterfowl (Ducks & Geese)	30.9	22.7	21.3	17.1	7.9	2.48
Dove	6.0	11.2	27.1	37.7	17.7	3.49
Ruffed Grouse	31.6	16.9	22.5	21.0	7.6	2.55
Bobwhite Quail	4.0	12.2	33.8	34.0	15.8	3.45
Rabbits	1.1	6.1	27.5	41.1	24.2	3.80
Squirrel	1.6	3.7	20.5	41.1	30.0	3.47
Furbearers (Fox, Raccoon, Beaver, etc.)	4.4	9.2	25.5	35.9	24.5	3.65

*1 = No Habitat, 2 = Poor, 3 = Fair, 4 = Good, 5 = Excellent

Regionally, deer habitat was perceived as being best in the Tidewater Region ($p < 0.001$). But this type of habitat also was perceived to be significantly better in the Piedmont Region than in the Mountains Region ($p < 0.001$). Wild turkey ($p < 0.001$) and squirrel habitat ($p < 0.004$) were rated highest in the Tidewater and Piedmont Regions, which also was significantly better than habitat in the Mountain Region. Habitat for mourning doves ($p < 0.001$) and bobwhite quail ($p < 0.037$) was best along the coast (Tidewater).

Again, regional disparities regarding bear and ruffed grouse were evident thereby making ratings of habitat quality on a statewide basis (as shown in Table 5) misleading.

Bear habitat was significantly better in the Mountains Region ($p < 0.045$) than in other regions. But even within the region, it appeared that the quality of habitat for bears varies greatly, evidenced by the relatively low regional rating of habitat quality ($\bar{X} = 2.05$). Ruffed grouse habitat also was rated best in the Mountain Region ($p < 0.001$), but was significantly better in the Piedmont than along the coast. Habitat for grouse in all regions was rated higher in quality than was habitat for bear.

Landowners and Conservation–Related Programs

Overall, rural landowners appeared to be conservation–oriented and generally concerned about the welfare of wildlife on their lands. They believed that as landowners, they were responsible for the well–being of wildlife on their lands (83% either agreed or strongly agreed with this statement). A vast majority of respondents agreed/strongly agreed that landowners play important roles in modern wildlife management. Further, 79 percent of the respondents reported feeling an obligation to help protect species that are threatened by extinction. However, when owners were asked whether landowners should be paid to provide adequate habitat for wildlife, their opinions were mixed. Thirty–seven percent of the owners either disagreed or strongly disagreed with this statement, while 30 percent agreed/strongly agreed and 33 percent had no opinion.

Given knowledge of current land uses, perceptions of wildlife habitat quality and landowners' perceptions of their roles in wildlife management, what efforts should be made to increase distribution of wildlife across the state through state habitat enhancement programs? Prerequisite to initiation (or in some cases, continuance) of such programs, is a better understanding of landowners' awareness of, and participation in ongoing assistance programs. As shown in Table 6, **technical advice on farm management** provided by the Soil Conservation Service was the program in which landowners most often participated. Almost 14 percent of the respondents were currently participating in the program and slightly more than 24 percent of the owners had participated previously. Ironically, no regional differences were reported among landowners regarding their participation in this program, even though significant regional differences were found regarding the importance of farming and amount of land dedicated to row crops.

Table 6. **Frequency Distribution of Rural Landowners' Level of Awareness Regarding Selected Conservation Programs.** (Percentage)

	Not Aware of Program	Aware but Not Interested	Aware, Would like more Information	Have Partic-ipated	Currently Participating
a. Technical advice on wildlife management (VA Dept. of Game)	45.2	18.8	31.0	4.2	0.9
b. Technical advice on forest management (VA Dept. of For.)	18.2	26.3	26.7	19.8	9.0
c. Technical advice on farm management (Soil Cons. Serv.)	12.2	28.7	21.3	24.1	13.8
d. Coop. Forest Mgmt. Program (Private Forest Prod. Corps.)	40.8	31.3	18.7	5.7	3.5
e. Conservation Reserve Program (direct payment by ASCS for 10 yr. removal of erodible cropland)	26.2	43.0	19.4	4.8	6.6
f. Conservation Cost Share Prog. (any state/fed. cost share prog. for cons. purposes)	30.7	24.7	22.4	14.1	8.1
g. Conservation Easement through Virginia Outdoors Found. (provides prop. tax reduction)	57.8	19.7	21.2	0.8	0.6
h. Conservation Easement through 1985 Farm Bill (provides debt reduction on farm loans by Farmers Home Administration)	52.3	34.5	12.0	0.3	0.9

Forest management programs offered by the Virginia Department of Forestry also showed a relatively high rate of participation. Almost 29 percent of the respondents had participated in this program at one time or another (9% were currently participating). Significant regional participation differences were found with this program. More participation was reported in the Tidewater and Piedmont Regions than in the Mountain Region ($p < 0.004$).

ASCS's Conservation Reserve Program and **state/federal cost share programs** had more than 10 percent of the respondents participate. Over six percent of the landowners currently have placed at least a portion of their erodible cropland in the Conservation

Reserve Program. Another five percent of the owners had set aside land in the past. Further, over eight percent of the respondents indicated they had been involved with some type of state/federal conservation cost share program, and over 14 percent had participated previously. No regional differences were found regarding participation in either program.

The lowest rates of participation were found with **technical assistance with wildlife management** offered by Virginia Department of Game and Inland Fisheries, **conservation easements through the Virginia Outdoors Foundation,** and **conservation easements associated with the 1985 Farm Bill.** Obviously, some explanation for this can be found in the relative newness of these programs or absence of aggressive promotion efforts due to lack of personnel and/or funding. Even though participation is low, a relatively high level of interest in these programs was expressed by landowners. For example, 31 percent of the respondents would like more information on game management programs.

Moreover, large segments of the landowner population were unaware of the existence of these programs. Almost half of the respondents (45.2%) were not aware that they could apply for assistance in wildlife management and other farm game programs. The same was true of conservation easements through the Virginia Outdoors Foundation and the 1985 Farm Bill (57.8% and 52.3%, respectively).

Preferences for Future Programs

Respondents also were asked their interest in a variety of technical assistance programs specifically pertaining to wildlife and hunter management that could be offered in the future. Table 7 shows respondents' levels of interest in these programs. Even though at first glance it appears that the largest segments of respondents were not interested in any of the programs, significant numbers of landowners either wanted more information or were already definitely interested. For example, although 52 percent of the respondents were not interested in entering into **cooperative management agreements** with the state, 43 percent of the owners wanted more information and five percent were definitely interested. Interest in cooperative agreements was greatest in the Tidewater and Piedmont Regions ($p < 0.006$). Landowners from the Mountain Region were much less receptive to this type of program.

Table 7. **Frequency Distribution of Landowners' Level of Interest in Future Wildlife and Hunter Management Programs. (Percentage)**

	Not Interested	Would Like More Information	Definitely Interested
Cooperative Mgmt. Agreements	52.0	43.2	4.9
Wildlife Management Technical Assistance			
a. On-site Exam. of Property	48.6	34.8	16.5
b. Workshops and Seminars	61.1	27.9	10.9
c. Bulletins and Pamphlets	35.0	41.9	23.0
d. Assistance in Locating Seeds/Seedlings for Wildlife Food and Cover	36.4	33.0	30.5
Hunter Management Technical Assistance			
a. Leasing Consultation	68.0	24.9	7.0
b. Liability Consultation	47.7	39.8	12.5
c. Property Damages Consultation	47.6	39.2	13.3

Overall, landowners were much more receptive to specific wildlife management assistance programs. Over 30 percent definitely wanted **assistance in locating seeds and/or seedlings** to be planted for wildlife food and cover. Another 33 percent wanted more information about this service.

Technical **bulletins and pamphlets, on-site habitat evaluations** (16.5%), and **workshops and seminars** (10.9%) also were of interest to respondents. No regional differences were found regarding landowners' receptivity to these programs, with exception of on-site examinations. Owners from the Mountain Region were significantly less receptive to this service than were owners from other regions ($p < 0.021$). In terms of hunter management programs, 32 percent of the owners either wanted more information or were definitely interested in obtaining **leasing consultation.** Since this can only be interpreted as a significant number of landowners are actively considering leasing their lands for hunting, it

appears that leasing may become more prevalent in the future. Further, a majority of landowners showed interest in **consultation regarding lessening their vulnerability to liability and minimizing property damages.** In comparing level of program interest across regions, landowners from the Mountain Region were significantly less interested in hunter management programs in every case ($p < 0.002$, $p < 0.001$, $p < 0.001$, respectively).

Hunter Access Policies

Access to private lands for hunting is not merely a dichotomous question of whether or not to allow access. Wright et al. (1988a) have argued that landowners' access decisions involved the degree to which access is allowed or restricted. Their model, shown in Figure 1, categorizes access into one of five policies: (a) prohibitive, (b) exclusive, (c) restrictive, (d) open, or (e) fee (leasing). The first four policies (prohibitive to open) constitute a free access continuum. This continuum represents policies of increasing levels of access. Landowners who adopt **prohibitive** access policies totally preclude hunting. Others who adopt a policy of **exclusion,** purchase or own land because of exclusive rights a person receives from the land-based resources present on that property. These owners, in effect, lock up wildlife resources for personal enjoyment. Property owners who increase access to their lands to include personal acquaintances maintain a **restrictive** policy.

Persons allowing individuals who are not personal acquaintances to hunt on their properties practice an **open** policy of access. Owners may require hunters to obtain written or verbal permission before hunting as a means of controlling access for "undesirables," but generally access is made available to the general public. In contrast are those landowners who restrict access to hunters who are willing to pay for the privilege. **Fee** policies, or leasing, can take many forms but is generally based on the requirement that hunters compensate landowners for ingress rights to their property in the form of money, services, or other considerations valuable to the landowner. Further, landowners often controlled implementation of these policies by posting their properties against trespass. It should be emphasized that posting is not synonymous with prohibition or any one particular policy. But, even though posting is not a policy, in and of itself, posting behavior is important both in terms of intent of landowners and how it is perceived by hunters.

For purposes of this research, comparisons among different levels of access were conducted in two phases. First, comparisons were made among landowners who had adopted one of the four free access policies. The model of rural landowners' access decisions (Figure 1) is based on past empirical evidence that those policies represent a unidimensional continuum of increasing access. Therefore, comparisons of groups of respondents based on these free access policies are statistically sound. Lastly,comparisons were made between landowners who leased their lands for hunting and those who did not, since leasing can, and sometimes does, preclude free use of land by friends and family

members. Further, landowners do not necessarily lease all of their property. Therefore, the question of leasing was not addressed in the first phase of analysis.

Prohibition

Of all respondents, only 10.4 percent of the owners (n = 116) totally proscribed hunting (Table 8). This statistic is twice as high as the national average of land closures (5%) reported by Wright et al. (1988b). These owners controlled a total of 14,321 acres ($\bar{x}$ = 123.46 acres). When compared with owners adopting one of the other more liberal policies, several important distinctions were observed. First, owners who adopted prohibitive policies were significantly older than those who practiced a restrictive or open policy ($p < 0.036$), and were only exceeded in age by landowners maintaining exclusive policies (Table 9). Therefore, the most conservative landowners in terms of access, were older than landowners who allowed higher degrees of access. Also, Prohibitionists, like Exclusionists, were more often female ($p < 0.001$). Landowners within these two policy groups had a higher percentage of females (33% and 35 %, respectively) than owners who practiced more open access.

Table 8. Distribution of Landowners Within 1 of 5 Hunter Access Policies.

Policy	n	Pct	Mean Tract Size (Acres	Total Acreage Under Policy
Prohibitive	111	10.1	115.52	12,823
Exclusive	40	3.6	181.43	7,257
Restrictive	521	47.6	191.57	99,807
Open	285	26.1	307.12	59,468
Fee	137	12.6	307.12	42,075
Total	1,0941	100.0	202.40	221,430

[1] Reflects loss of 16 cases due to missing acreage data.

Table 9. **Selected Socio-Economic Statistics of Rural Virginia Landowners by Access Policy.**

Variable	Access Policy			
	Prohibitive	Exclusive	Restrictive	Open
Age (mean yrs.)	59.85	60.44	56.83	57.19
Sex (Pct. M/F)	67/33	65/35	83/17	87/13
Education (mean yrs.)	14.54	12.32	12.89	13.05
Family Income (mean score)[1]	9.21	8.38	8.35	8.72

[1] 8 = $30,000 to $34,999, 9 = $35,000 to $39,999

Additionally, these owners possessed a significantly higher level of education ($p < 0.001$). Prohibitionists averaged well over 14 years of formal education, whereas respondents within other policy groups averaged 13 years or less. No significant differences were found regarding total family income in 1987.

In terms of land use, owners who proscribed hunting had significantly less land planted in crops ($\bar{x} = 11.22\%$, $p < 0.001$) than other owners (Table 10). However, these owners had the highest percentage of lands dedicated as pasture ($p < 0.032$). No distinction could be made among policy groups regarding the amount of land in woodlands.

Table 10. **Distribution of Current Land Uses by Access Policy.** (Pct. of Total Acreage)

Land Use	Access Policy			
	Prohibitive	Exclusive	Restrictive	Open
Row Crops	11.22	15.48	16.17	20.49
Woodlands	45.29	53.42	53.08	50.47
Hay/Pasture	31.85	21.57	24.36	22.13
Wetlands	1.28	2.78	2.05	2.10
Water	1.24	1.56	0.98	0.90
Buildings/Yards	4.69	4.74	3.09	2.26

Generally, Prohibitionists placed the least importance of any group on farming and ranching as an ownership objective ($p < 0.022$). They did place the highest degree of importance on aesthetic enjoyment and privacy provided by living in the country ($p < 0.050$, $p < 0.022$, respectively) (Table 11).

Table 11. Importance of Selected Reasons Why Respondents Owned Rural Land by Access Policy. (Mean Responses)

Reason	Access Policy			
	Prohibitive	Exclusive	Restrictive	Open
Farming/Ranching	3.20	3.52	3.43	3.68
Living in Rural Env.	3.70	3.62	3.74	3.68
Athletic Enjoyment	3.83	3.29	3.50	3.46
Privacy	4.01	3.74	3.91	3.66
Outdoor Recreation	3.37	3.51	3.80	3.62
Inepensive Living	2.46	2.34	2.67	2.54
Investment	3.32	3.81	3.33	3.43

1 = Not Important, 2 = Slightly Important, 3 = Moderately Important, 4 = Important, 5 = Extremely Important.

Owners with prohibitive access policies also reported less wildlife on their properties as a general rule. Specifically, they reported significantly fewer deer ($p < 0.012$), ruffed grouse ($p < 0.023$), bobwhite quail ($p < 0.010$), rabbits ($p < 0.028$), and squirrels ($p < 0.001$) than other owners (See Table 12). Furthermore, the quality of their lands as habitat for deer ($p < 0.001$) and wild turkey ($p < 0.014$) was perceived to be lowest among all landowners (Table 13).

Table 12. Presence of Selected Wildlife Species on Respondents' Property by Access Policy. (Pct. of Landowners Reporting Presence)

Species	Access Policy			
	Prohibitive	Exclusive	Restrictive	Open
Bear	2.7	11.1	9.5	7.4
Deer	87.5	92.8	95.0	92.6
Turkey	67.9	68.9	76.7	77.9
Waterfowl	34.8	28.9	31.5	35.9
Dove	65.2	66.7	74.8	76.8
Furbearers	70.5	77.8	79.3	82.1
Ruffed Grouse	8.0	13.3	19.3	15.9
Bobwhite Quail	63.4	73.3	74.5	79.1
Rabbits	89.3	91.1	94.2	96.5
Squirrels	86.6	93.3	95.5	95.3

Table 13. Respondents' Perceptions of Habitat Quality for Selected Wildlife Species by Access Policy. (Mean Responses)

Species	Access Policy			
	Prohibitive	Exclusive	Restrictive	Open
Bear	1.78	2.07	1.93	1.92
Deer	3.59	3.98	4.05	4.16
Turkey	3.30	3.90	3.66	3.68
Waterfowls	2.51	2.70	2.46	2.49
Dove	3.31	3.55	3.45	3.62
Ruffed Grouse	2.58	2.72	2.61	2.42
Bobwhite Quail	3.39	3.56	3.47	3.42
Rabbits	3.87	3.93	3.82	3.77
Squirrels	3.79	4.24	3.93	3.98
Furbearers	3.37	4.03	3.68	3.64

1 = No habitat, 2 = Poor habitat, 3 = Fair habitat, 4 = Good habitat, 5 = Execellent habitat.

Attitudinally, Prohibitionists possessed evidence of strong anti-hunting beliefs. More than any other type of landowner, they were significantly more likely to agree with statements that hunting should not be permitted because (1) **"hunters are killing defenseless animals"** ($p < 0.001$) and (2) **"there is no longer a need to hunt to survive"** ($p < 0.001$). Furthermore, they were significantly less likely to agree that **"hunting is an important part of modern wildlife management"** ($p < 0.001$).

Landowners who prohibited hunting were also the least likely group to be swayed from their no hunting policies through provision of incentives to open their lands. They rejected the idea that they would be encouraged to allow more hunting than they presently allow if the right incentive was provided ($p < 0.011$).

Exclusion

By far the smallest access policy group ($n = 46$), owners who excluded all but personal hunting presented a relatively small subsample for comparative purposes. These owners represented only 4.6 percent of the total sample of landowners. When compared to 38 percent of landowners who adopted an exclusive policy in the national study, this statistic is a very positive sign for Virginia land managers and hunters because the Wildlife Management Institute (1983) termed "protectionism" or "exclusivity" an extremely difficult problem to resolve.

Like Prohibitionists, Exclusionists tended to be older ($\bar{X} = 60.44$ years) and more often female ($p < 0.001$) than less restrictive owners. However, owners with exclusive policies had the lowest level of education attainment ($\bar{X} = 12.32$ years).

They reported owning an average of 181.56 acres. Exclusionists dedicated the second smallest percentage of their lands to row crops ($\bar{X} = 15.48\%$) and had the lowest percentage of land in hay and pastureland ($\bar{X} = 21.57\%$). These owners also posted significantly more lands (78.5%) than any other policy group ($p < 0.001$).

On average, they placed more importance on farming and ranching than did Prohibitionists. However, these owners were not significantly different from other owners regarding the importance they placed on outdoor recreation as a motive for ownership, which, historically, has been a readily distinguishable trademark among Exclusionists. The most important ownership objective for these owners was owning land for investment purposes. Owners which adopted an exclusive policy placed significantly more importance on buying land for its investment potential than all other policy groups ($p < 0.087$).

One possible reason for adopting a policy of exclusion is that these landowners were more likely to agree that hunting conflicted with their present land use practices ($p < 0.001$). In addition, they felt that most hunters do not respect landowners' rights ($p < 0.001$).

Unlike prohibitive owners, Exclusionists were more likely to be influenced by monetary incentives. These owners felt strongly that **"privately owned hunting areas should be restricted to those who are willing to pay to hunt"** ($p < 0.001$) and that **"private landowners should be paid to provide wildlife habitat on their properties'** ($p < 0.002$).

Both prohibitive and exclusive policy holders were more concerned over the possibility of being sued by hunters if accidents occur on their properties than were restrictive or open owners ($p < 0.001$). But, Exclusionists felt more confident that state laws would protect them in case of a lawsuit ($p < 0.023$).

Restriction

The largest number of Virginia landowners had adopted an access policy based on familiarity ($n = 605$). It appears as though traditional ways of gaining access to hunting acreage through friendship and kinship networks is still very much alive in the Old Dominion as 54.5 percent of the respondents maintained policies that based access on personal acquaintanceship. These owners had an average tract size of 197.29 acres and controlled 53 percent of the total acreage.

Respondents of this policy group were youngest of all landowners ($\overline{X} = 56.83$ years). As with owners who had open access policies, Restrictionists represented significantly fewer females than did prohibitive or exclusive policy holders ($p < 0.001$). They had slightly less than 13 years of formal education and received between $30,000.00 and $35,000.00 in total family income in 1987. These owners dedicated significantly more land to row crops ($p < 0.001$) than did more conservative policy groups. Generally, restrictive owners placed less importance on farming and ranching than they did on other reasons for rural land ownership. For example, they rated aesthetic enjoyment and privacy associated with living in the country as being of more importance than agriculture-related reasons. Yet, these owners were significantly more likely to seek professional assistance for farm management than were Prohibitionists or Exclusionists ($p < 0.001$). Moreover, these owners placed significantly more importance on outdoor recreation potential of property than did other policy groups ($p < 0.007$).

As part of this potential, they felt more strongly (than conservative policy holders) that by allowing hunting, it gave them more control over actions of hunters ($p < 0.001$). They were also generally less concerned about improper behavior of hunters.

Open

As is commonly the case, persons who take positions at extremes of an issue are more easily distinguishable than those who hold the middle ground. Such was the case with rural landowners regarding access policies. Like landowners who prohibited all hunting,

those adopting open policies (n = 343) were significantly different from other owners regarding several variables. Persons allowing open access were slightly more than 57 years of age and predominately male (87%). They differed little from Restrictionists regarding their levels of education and total family incomes.

Their properties averaged 240.8 acres and they controlled 37 percent of the total acreage owned by respondents. Reasonably, landowners who allow the general public to hunt on their lands posted their properties against trespass significantly less than all other owners ($p < 0.001$). They also posted the smallest percentage of their properties ($x = 46\%$, $p < 0.001$). Row crops accounted for 20.5 percent of this acreage, which was the largest percentage of land dedicated for this land use by any policy group ($p < 0.001$). As a result, these owners reported farming and ranching to be a more important ownership objective than both Prohibitionists and Restrictionists ($p < 0.022$). No differences were found between open policy holders and Exclusionists. Owners with open policies reported the highest quality deer habitat of all respondents ($p < 0.001$).

The most remarkable finding regarding owners with open access policies was their interest and participation in conservation–related programs. Without exception, significant findings regarding interest and participation in conservation programs were attributable to owners with open access policies. Of eight programs posed to respondents, five programs had a higher degree of participation from within the open policy group than any other group. These owners could be differentiated from owners with prohibitive and exclusive policies concerning their interest and participation in the following programs: (1) forest management programs provided by the Virginia Department of Forestry ($p < 0.016$); (2) farm management programs offered by the Soil Conservation Service ($p < 0.001$); (3) cooperative forest management programs provided through private, forest products corporations ($p < 0.036$); (4) ASCS's Conservation Reserve Program ($p < 0.001$); and (5) state/federal cost share programs for conservation purposes ($p < 0.002$).

Further, open policy holders were much more receptive to the idea of future programs. For example, they were more likely to be interested in entering into a cooperative management agreement with the Department of Game and Inland Fisheries than any other type of landowner ($p < 0.037$). They were also more likely to seek leasing consultation ($p < 0.001$), liability consultation ($p < 0.001$), and property damages consultation ($p < 0.002$). These data suggest that open policy landowners provide a ready market for most types of assistance programs should agencies desire to increase efforts in these areas.

Beyond program interests, open access landowners perceived little conflict between hunting and their present land uses ($p < 0.001$) and as a general rule, were not as concerned about behavior–related problems with hunters as were more restrictive owners. For example, they were least likely policy group to agree that(1) hunting reduced their privacy ($p < 0.001$), (2) most hunters do not comply with legal bag limits ($p < 0.001$), (3)

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most hunters litter their properties ($p < 0.001$), and (4) damages to crops were one reason they restricted access ($p < 0.001$).

On the other land, these owners were significantly more likely to agree that hunters were careful not to cause fires ($p < 0.001$), and not harm their livestock ($p < 0.001$), and would obey reasonable requests that they might make ($p < 0.001$).

Fee (Leasing)

Of 1,110 persons who responded to the survey, 139 landowners or 12.5 percent of the sample, leased at least a portion of their properties for hunting. Persons who assessed a fee for access rights to their properties were similar to those who allowed free access in many ways. They were slightly more than 57 years old, and male. They had just over 13 years of education and received almost $35,000.00 in total family income in 1987.

Leasing practices varied among landowners, but generally, landowners leased 100 percent of their properties. A few respondents leased as little as 10 percent of their lands. The smallest tract of land reported being leased was 15 acres. Overwhelmingly, deer was the game animal which was most often stipulated in the lease agreement (91%0). Small game (57%), wild turkey (54%), and waterfowl (22%) were also the focus of some leases. These leases accommodated between one and 150 hunters, but 20 hunters was the mode response. Twenty-seven percent of the leasors indicted there were other species available for hunting that were not specified under terms of their current leases. In addition, leasors had more interest in obtaining specific types of consultation, including leasing ($p < 0.001$), liability ($p < 0.001$), and property damages prevention ($p < 0.001$).

The most distinct difference between these owners involved total acreage owned. Leasors owned 307.12 acres which was significantly larger ($p < 0.001$) than tracts owned by non-leasors ($\bar{X} = 187.41$ acres). To control for unauthorized access, significantly more leasors posted their properties than did non-leasors ($p < 0.001$).

Several land use practices differentiated between leasors and non-leasors. Owners who leased had a greater percentage of their lands in row crops (26.1% vs. 15.7%, $p < 0.001$), but less land in hay and pasture (10.6% vs. 26.3%, $p < 0.001$). Leasing owners also had significantly more wetlands and water acreage than owners who did not lease ($p < 0.001$, $p < 0.027$, respectively).

Leasors were primarily motivated by farming and ranching objectives which differed from non-leasing landowners ($p < 0.009$). They cared less about the aesthetics of the countryside ($p < 0.001$) and the privacy afforded by living there than other owners ($p < 0.007$). They also placed more importance on the investment potential of their lands that their non-leasing counterparts ($p < 0.014$).

It would be reasonable to assume that requisite to undertaking a leasing policy, sufficient numbers of game animals should be present to make leasing worthwhile. However,

little evidence was found in this study to support the hypothesis that a greater percentage of leasors would report the presence of wildlife than would non-leasors. Rather, the only species reported more often by leasors than non-leasors was waterfowl ($p < 0.023$). Conversely, leasors were found to report less bear and ruffed grouse than their counterparts ($p < 0.006$ and $p < 0.003$, respectively). This suggests there may be regional differences in leasing patterns since all three species tend to be regional in their distributions.

One reason for adopting a fee policy may be the control leasing affords landowners over who is on their property. Leasors were significantly more likely to agree that "**it keeps trespassers off their land**" ($p < 0.001$). They also reported feeling that leasing minimizes property damages since they had someone under lease to hold responsible ($p < 0.001$). Leasors were also less concerned than non-leasors about fires ($p < 0.011$), litter ($p < 0.001$), crop damages ($p < 0.002$), firearm safety ($p < 0.004$), and theft ($p < 0.041$).

Incentives for Increasing Access

Considerable discussion in the past has been focused on the topic of encouraging landowners to increase the amount of access to their lands through providing incentives. The commonly-held conviction that landowners could be persuaded to open more land by providing cash awards was refuted by Kirby et al. (1981) in a study of Missouri landowners and this finding has been corroborated in subsequent studies in other states. Therefore, respondents were asked to rank their preferences for 10 selected monetary and non-monetary incentives to allow more hunter access in the future. Respondents also were given options of stating that no incentive would encourage them to allow additional access. Twenty-eight percent of the respondents indicated this was the case.

The most preferred incentive for allowing more access was **property tax relief** (Table 14). Fully one-fourth of the respondents ranked this as their number one incentive and 49 percent had it ranked as either first, second, or third.

Table 14. **Preferences of Virginia Landowners Regarding Incentives for Allowing Hunter Access by Access Policy.** (Mean Responses)

Incentive	Access Policy Prohibitive	Exclusive	Restrictive	Open	Overall	Rank
Cash	4.50	4.00	5.40	5.60	5.31	7
Advice—Wildlife Mgmt.	4.64	5.25	5.61	5.21	5.37	8
Advice—Hunter Mgmt.	5.07	5.31	6.10	5.95	5.92	9
Prop. Tax Relief	3.63	3.62	3.90	4.05	3.91	1
Income Tax Relief	4.23	3.51	4.48	5.12	4.61	3
Seeds/Seedlings	4.14	4.70	4.90	4.95	4.83	4
Add'l. Law Enf.	3.79	4.32	5.13	5.21	4.98	6
Fencing Supplies	4.91	5.03	6.50	7.00	6.44	10
Prop. Damage Ins.	3.62	4.03	5.05	5.03	4.86	5
Liability Ins.	3.60	3.91	4.53	4.75	4.48	2

1 = Most preferred, 10 = least preferred

Second in preference was insurance to protect against legal liability for recreational injuries. Seventeen percent of the owners ranked **liability insurance** as their first preferences. Third, in terms of preference, was **income tax relief.** This was followed closely by **seeds/seedlings, property damage insurance,** and **additional law enforcement. Cash payments** were ranked a distant seventh, but the first preference of 23 percent of respondents.

Assuming that owners would indeed increase the amount of access allowed if their first preferences were provided, an idea of potential land increases was gained by cross-tabulating landowners who preferred a particular incentive with total acreage owned. Table 15 shows estimated increases through providing the seven most preferred incentives.

It is important to note that overall means of landowners' preferences for program incentives can be extremely misleading if information is not also viewed in terms of acreage increases. As an example, consider the first, second, third, sixth, and seventh incentives in Table 15.

Table 15. Potential Land Increases Through Seven Most Preferred Incentives of Virginia Rural Landowners.

Incentive	n[1]	PCT. of Sample	Total Acreage Owned	Statewide Impact (acres)
Property Tax Relief	169	15.2%	40,529	4,001,112
Liability Ins.	105	9.5%	19,108	1,880,304
Income Tax Relief	74	6.7%	14,151	1,397,109
Seeds/Seedlings	79	7.1%	12,609	1,244,061
Property Damage Ins.	49	4.4%	11,319	1,115,064
Add'l. Law Enf.	97	8.7%	32,039	3,148,416
Cash Payments	160	14.4%	30,546	3,015,045

1 Number of respondents indicating this incentive as first preference.

Property tax relief was preferred (ranked first) by the largest number of respondents (n = 169, 15.2%). More importantly, these owners owned a total of 40,529 acres. Second was **liability insurance**, which was ranked first by 105 landowners (9.5%). These owners controlled 19,108 acres. Third was **income tax relief**, favored by 6.7% of the owners (n = 74, 14,151 acres).

However, the sixth and seventh incentives, **additional law enforcement** (n = 97 or 8.7%) and **cash payments** (n = 160 or 14.4%) would provide much greater increases in available land—32,039 acres and 30,546 acres, respectively. Therefore, viewing incentives in light of potential increases is an important consideration when analyzing the feasibility of various program alternatives.

Chapter V

Conclusions and Implications

The Virginia Landowners Wildlife Management Study was designed to solicit information from rural, non-industrial landowners relative to their interest and participation in a variety of conservation-related programs and to determine the availability of private land for hunting. The 10-county, 2,000 landowner survey resulted in a total of 1,110 usable questionnaires and a data base with over 170,000 units of information pertaining to landowners, their land uses, objectives, attitudes and preferences for incentives.

Within the state, rural landowners appear to be a stable, well defined population who were somewhat traditional in their objectives, attitudes and practices. They were slightly less than 58 years of age, fairly well educated, and received approximately $35,000.00 a year in total family income. Most resided on their property and had lived there for over 20 years.

Agency efforts to enhance landowner relations or develop and implement assistance programs must carefully consider the distinct regional differences found among respondents. Of the three regions—Mountain, Piedmont and Tidewater—landowners from the Mountain Region appeared to be the most dissimilar. Unlike owners in other regions, these owners had dedicated the largest percentage of their lands to hay and pasture. The average amount of pasture in the Mountain Region more than doubled the mean pasture acreage in the Piedmont and was 10 times greater than the amount of pasture in the Tidewater Region. Mountain landowners generally reported less wildlife present on their properties and perceived themselves to have the lowest quality habitat of all owners. Two species, bear and ruffed grouse, were significantly more abundant in the Mountains than in other regions, but even then, landowners reported vast intraregional differences in the quality of these habitats.

More importantly, landowners from the Mountain Region seemed to possess a private land ethic, whereby intrusions from outside, whether from hunters or Division of Game biologists, were not often welcome. Owners from this region participated less in conservation-related programs, were less receptive to the idea of future assistance programs, and allowed less hunting on their lands, including leasing. These owners were the most likely to post their properties against trespass.

In the Piedmont, landowners possessed larger tracts of land than their western neighbors. Sixty-one percent of these lands were forested. These owners allowed more hunting, but, as a result, were more concerned about the problems associated with hunting, i.e., behavior, liability etc. Behavior-related discentives were the most prevalent in this region. Landowners from the Piedmont were significantly more likely to believe most hunters:

(1) do not comply with legal bag limits,
(2) litter their property while hunting,
(3) are not careful regarding forest fires,
(4) drink alcohol while hunting, and
(5) are not necessarily careful about firearm safety.

Behavior-related disincentives were the most prevalent in this region.

Landowners from the Tidewater Region owned the largest tracts of land of all landowners ($\bar{X}$ = 270.76 acres). But, unlike landowners in other regions, they dedicated the largest percentage of land to row crop agriculture. Tidewater landowners had three times the amount of land dedicated to row crops as landowners in other regions. Understandably, these respondents placed the most importance on farming and ranching as a reason for ownership. They also perceived themselves to have the highest quality habitat and reported significantly more wildlife than landowners in any other region, especially waterfowl, dove, bobwhite quail and furbearers. White-tailed deer and wild turkeys were also plentiful. As a result, these owners allowed more hunting and were more likely to lease the hunting rights to their lands than landowners from any other region.

Conservation-related Programs

If agencies seek to expand sound conservation practices to more private lands in the future, data from this study answers many questions that are important to land managers and decision-makers. First, comparisons are made regarding the current level of participation in eight selected conservation programs. Programs such as the Soil Conservation Service's farm management program (13.8%) and the Virginia Department of Forestry's program for forest management (9.0%) had the highest rates of participation among all respondents. They also had impact on the largest amount of land(23.3% and 16.1% of the land base, respectively). The Conservation Reserve Program and state/ federal conservation cost-share programs also received a respectable number of participants (6.6% and 8.1%, respectively). However, wildlife management assistance programs and conservation easement programs currently are not highly sought after. These programs had less than one percent of the respondents participate.

A second question this study sought to answer involved determining landowners' awareness of these programs. Of the landowners who did not participate in these programs, were they aware of them? It it obvious that the aforementioned programs which have relatively high rate of participation are better established and more familiar to landowners. Only 20 percent of all respondents were unaware of the farm and forest management programs. On the other hand, many landowners were unaware of the availability of some programs. Large numbers of respondents had no idea they could:

(1) apply for technical assistance in wildlife management (45.2%),
(2) receive property tax reductions through Virginia Outdoor Foundation conservation easements (57.8%), or
(3) reduce their farm loan debt by granting an easement through the 1985 Farm Bill (52.3%).

The data also suggests that between 12 and 30 percent of all respondents were aware of the programs and would like more information about them.

Participation in these programs also shows a regional bias as was suggested by previous discussion. Owners from the Tidewater and Piedmont Regions were the most likely to become a client of these programs, significantly more likely than the owners from the Mountains. Also, correlation was found between owners' access policies and program participation. Although much depended on the program in question, participation overall was higher among respondents who allowed the greatest amounts of access. Open policy holders were significantly more likely to participate in a broad range of programs.

Lastly, information was obtained regarding landowners' preferences for future programs which were specific to wildlife and hunter management. Respondents were most interested in programs that provided them with immediate benefits or had the least cost associated with participation. For example, 30.5 percent of the owners were definitely interested in assistance locating and obtaining seeds and seedlings for wildlife food and cover. They also were interested in on-site evaluation of their land as habitat and information (bulletins and pamphlets) regarding suggested wildlife management practices. On-site examinations and printed materials offer landowners suggestions on how to improve their lands for wildlife, yet costs very little in terms of time and/or monetary expenditures. These programs were preferred over workshops and seminars, which may be perceived to cost more (time, travel, etc.) and are unproven in their worth. With printed media programs, owners can quickly decide the value of the information in the comfort of their own home and at a time that is convenient to them. Workshops, on the other hand, are on a set schedule that may or may not be convenient and are a gamble regarding their perceived worth (one has to attend to find out—a time cost).

When formulating assistance programs, it is important to approach the planning process from a marketing or consumer perspective. Data discussed herein regarding preferences for future programs is one diagnostic step to that end. Other considerations encompass the old marketing adage concerning "the four P's"—Product, Place, Price and Promotion.

In regards to hunter management, the programs in which landowners showed the highest degree of interest were the ones which attacked problems landowners are currently facing—property damages and perceived liability. Thirteen percent of the respondents

were interested in obtaining consultation regarding how to lessen property damages and 12.5 percent were interested in lessening their vulnerability of legal liability.

Another seven percent of the respondents (n = 68) indicated they would like to receive consultation regarding leasing their lands for hunting. Of these, 56 percent are not currently leasing any acreage. Therefore, a potential increase of 8,965 acres of leased land is possible, given consultation.

Land Available for Hunting

The other major focus of this research was an effort to determine the availability of private lands for hunting across the state. As previously reported, respondents to this study were segmented into one of five distinct policies of access based on the degree of access allowed. These data were shown in Table 8. But, inasmuch as it is important to know the number of landowners who adopt a specific type of access policy, it is more important to understand the impact these policies have on the supply of hunting acreage. Table 16 shows the effect of these policies on the total acreage owned by respondents and provides estimates of their impact on statewide totals. These estimates are based on a total of 21,864,000 acres of private farm and forest lands throughout the Commonwealth.

Table 16. Estimated Availability of Private, Non-Industrial Land for Hunting By Access Policy (Acres).

Policy	n	Total Acreage (Sample)	PCT. Sampled Acreage	Estimated Statewide[1]
Prohibitive	111	12,823	5.79%	1,265,925
Exclusive	40	7,257	3.27%	714,953
Restrictive	521	99,807	45.07%	9,854,105
Open	285	59,468	26.86%	5,872,670
Fee	137	28,421 (42,075)[2]	12.83% (19.00%)	2,805,151 (4,154,160)
Total [3]	1,094[3]	221,430	100.00%	21,864,000 [4]

1 Based on estimated 21.864 million acres of rural, non-industrial private land.
2 Numbers in parenthesis reflect total number of acres owned by leasors.
3 Total reflects loss of 16 cases due to missing acreage data.
4 May not total exactly due to rounding error.

Even though Prohibitionists were fully 10 percent of the total sample of respondents, total land closures accounted for less than six percent of the land base. By extrapolating this statistic to the total number of private acres throughout the state (21.864 million), 1.265 million acres are estimated to be closed to hunting. Persons closing their lands to hunting possessed stronger anti-hunting beliefs than owners allowing more open access. These owners often believed that sport hunting was morally wrong. They believed hunters killed defenseless animals and there was no longer a need to hunt to survive, therefore hunting should not be permitted. They were the least likely to believe that hunting is an important facet of modern wildlife management. Prohibitionists, like owners with exclusive policies, were more often female, than less restrictive landowners.

Relatively little acreage was found to be restricted to the exclusive use of its owners (< 715,000 acres). This is somewhat surprising given the high rate of leasing reported. Usually, rates of leasing and exclusivity are correlated since leasing affixes a perceived monetary value on hunting acreage. When things are perceived to be valuable, they are often hoarded. Rarity in a marketplace increases the perceived value of the commodity. High rates of leasing and exclusion indicate a measure of stress in the supply system. This is a tell-tale indicator that should be monitored carefully in the future.

The largest number of acres of huntable land is controlled under a policy that is restricted to persons familiar to the landowner. Hunters must work through friendship and kinship networks to gain access to almost 10 million acres or 45 percent of the land base. Continued urbanization and current rates of family mobility will undoubtedly influence these networks and make access more difficult in the future. The number of persons adopting a policy based on familiarity should remain fairly stable, if for no other reason, because of the hunting demand of rural residents. The danger of finding comfort in these numbers involves the relative decreases in hunters from urban and suburban backgrounds. If agencies are to stay politically and economically viable, they must maintain a hunting constituency in the city as well.

Almost 27 percent of the respondents' lands were open to the public, irregardless of their familiarity with the owner. From this, a statewide estimate of almost 6 million acres of land open to the general public was derived. Owners with open policies were significantly less concerned about hunters' behavior, liability and other disincentives associated with the provision of hunting opportunities for the public. When owners become concerned about these problems, they tend to migrate toward more restrictive policies. It would be interesting to know the backgrounds of the hunters who utilize this type of land. If the majority of urban-based hunters use this type of property as would be reasonable, the future supply of open lands will greatly depend on the conduct of urban hunters. This implies that hunter education programs must be actively promoted in metropolitan areas. These programs must not only reach, but influence the behavior of urban-based hunters.

Landowners adopting a leasing, or fee hunting policy, comprised 12.6 percent of the landowner population and controlled 19 percent of the land base (42,075 acres). But, owners did not always lease 100 percent of their properties. Landowners in this study leased only two-thirds of their total acreage (67.5%). Leasing, therefore, is estimated to affect 12.83 percent of the state's lands or 2,805,151 acres.

The majority of these leases involved agreements with local citizens from rural areas. Few landowners were found to be leasing to urban dwellers. It appears, therefore, that large markets for leasing have yet to be tapped. If agencies desire to encourage leasing (either actively or passively) as a way to increase hunting opportunities and incomes in the rural-based economies, leasing registers, or other means of bring landowners and hunters together, may be required.

Recommendations

Based on the research literature and the data collected in this study, the following recommendations are made:

(1) Private landowners are a key constituent group to the success of any wildlife agency. For this reason, better public relations with these landowners can only help in the attainment of agency goals. More programs, both reactive and proactive to the needs of landowners should be offered in the future. These programs should be meticulously planned and evaluated from the perspective of the consumer. Data from this study should serve as a logical base from which to initiate the planning process.

(2) The supply of hunting opportunities in Virginia should be monitored carefully. Periodic sampling of landowners (every 4–5 years) should be built into planning budgets. One simple (and cost-effective) way to do this would be to impanel the respondents to the present study by asking them to participate in future studies. This dramatically cuts start up costs and provides a statistically sound data base for longitudinal comparisons.

(3) Agency efforts to lessen behavior-related problems with hunters need to be expanded, especially in the Piedmont region. Mandatory hunter education courses are only the first step. Another positive step would be to strengthen and streamline game laws and seek the cooperation of other law enforcement agencies in apprehending violators. Many landowners are frustrated by their lack of control over their own property and the inability of law enforcement officials to eliminate poaching and road hunting, etc. No incentive program will be very effective in opening land for hunting as long as these disincentives continue to persist.

(4) Innovative methods of bringing sportsmen and landowners together should be explored. Positive experiences with hunters will keep lands open. Programs whereby graduates of hunter education programs receive preferential treatment

from participating landowners have been used in other states. An analysis of programs in other states would be beneficial in formulating programs in Virginia. Private organizations such as the National Wildlife Federation and the Izaak Walton League can provide increased impetus to these programs.

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