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**Wildlife-Associated Recreation and Wildlife Management:**

**Views of Birders, Hunters, Environmentalists,  
Wildlife Professionals, and Forestry Professionals**

by

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April 21, 1987

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(ABSTRACT)

Few wildlife-associated recreation models have examined the contributions of wildlife to recreation experiences. In this study, a mail questionnaire was used to examine the wildlife experiences enjoyed by hunters, birders, environmentalists, wildlife professionals, and forestry professionals. In addition, the study also compared the surveyed groups' socioeconomic characteristics, recreation activities, and organizational affiliations, as well as their perceptions concerning approaches to wildlife management, habitat issues, and the social values attributed to wildlife.

While responses often differed according to populations, the surveyed groups enjoyed many of the same wildlife watching experiences and, if they hunted, many of the same hunting experiences. The subjects' outdoor recreation activities and organizational affiliations suggested that the populations' interests in wildlife varied according to primary/secondary- and consumptive/nonconsumptive-orientation.

Groups sometimes viewed the social values attributed to wildlife differently, but ecological value of wildlife and the value of wildlife to the enjoyment of future generations were important to all groups surveyed. The social values important to subjects personally sometimes differed from the values they believed justified tax expenditures.

Generally, both professional groups agreed with use of five wildlife management approaches, but viewed forest habitat issues differently. The user groups were divided about the use of hunting and timber harvesting to help manage some wildlife species and about the adequacy of forest lands in the Southeast U.S. to meet the needs of some species.

The professional groups had similar socioeconomic backgrounds. User groups varied according to age, sex, community type, education, and occupation; however, the user groups had similar household incomes.

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This thesis is dedicated to Hoover.

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## CHAPTER I: INTRODUCTION

### PROBLEM STATEMENT

#### Identification of Wildlife Values to Outdoor Recreation

Recreation researchers view recreation as an experience created by the user. The overall recreation experience is, in turn, composed of a set of specific experiences (Driver and Tocher 1970). Resources and resource management are viewed as inputs employed by the user to produce the component recreation experiences (Brown 1984, Shaw 1984).

Researchers have used this basic model of the recreation experience to help determine the values associated with outdoor recreation. Outdoor recreation activities are typically evaluated by attempting to quantify the component experiences through measurement of motivations, preferences, or satisfactions (Dorfman 1979, Bryan 1980, Crandall 1980). For example, motivation items developed by Driver (1980) to describe desired experiences included "chancing dangerous experiences," "developing your skills and abilities," and "being close to nature."

Models used to evaluate wildlife-associated recreation originated from outdoor recreation models. As a result, most wildlife-associated recreation research has emphasized users' experiences rather than contributions of wildlife to those experiences (Shaw 1984). For example, each of the sixteen categories of experiences Hendee and Bryan (1978)

attributed to wildlife- and fish-associated activities could also be applied to other outdoor recreation activities.

Shaw (1984) noted that the role of wildlife in wildlife-associated recreation was not well defined. Driver (1985) believed that wildlife components<sup>1</sup> had to be defined before they could be evaluated. He suggested that the opportunities to use wildlife should be defined by the relevant attributes of the animals, i.e., physical and social characteristics and relative scarcity of the animals, as well as the desired experiences and environmental settings.

However, few efforts have been made to identify the wildlife components of outdoor recreation activities. Examination of those efforts reveals that several different approaches have been used to represent wildlife. Nonconsumptive research has employed animal aesthetics, animal behavior (i.e., fascination with birdlife), identification of as many species as possible (Kellert 1985a), species diversity (Hay and McConnell 1979), species that users preferred to watch (Fazio and Belli 1977), and species watched (Shaw and Mangun 1984). Hunting research has specified harvest-related experiences (Potter et al. 1973), amount of animal sign seen, and number of animals seen, shot at, and killed (Kennedy 1970). Wildlife watching while hunting has been represented in fairly general terms, such as nature appreciation (e.g., Potter et al. 1973).

The lack of research conducted to identify wildlife components and the diversity of approaches used to represent wildlife suggest that fur-

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<sup>1</sup> Driver referred to these as wildlife-related goods and services used to create the recreation experience.

ther efforts are needed to identify the wildlife components of wildlife-associated recreation. Specifically, information is needed regarding which wildlife experiences are enjoyed during wildlife-associated recreation and whether the enjoyed experiences differ according to different user groups or the consumptive/nonconsumptive nature of the activity.

### Identification of Wildlife Users and Resource Managers

To provide effective management, resource managers need to accurately perceive the interests of their publics. However, managers perceive the interests of some groups better than others (Brown and Decker 1982, Wellman et al. 1982). Thus many researchers have emphasized the need to identify wildlife constituencies, particularly the nonconsumptive user, about whom little is known (Fazio and Belli 1977, Bromley and Bryan 1980, Shaw and Mangun 1984, Driver 1985, Kellert and Brown 1985, Moss 1985).

Information about users, their activities, their values concerning wildlife, and their opinions about wildlife management serve several functions. First, the knowledge can facilitate informed and equitable decision-making; it can provide information about the positive and negative impacts of management decisions, and about which users will be affected by the impacts. Second, the information can indicate areas of potential conflict between users. For instance, Jacob and Schreyer (1980) suggested that differences in users' activity styles, modes of experience, and uses of the recreation resource, in addition to intolerance for

alternate lifestyles, may result in conflicts between users. Third, managers can use the information to compare their personal beliefs to those of their constituents. Decisions affecting users are often based on managers' personal feelings and opinions, and large gaps between opinions of the managers and those of the users may result in discord (Peterson 1974). Finally, this information can be used to evaluate stereotypes of users and point out any misperceptions.

Identification of wildlife and forestry professionals' activities, values, and opinions is also justified: while management practices of both groups impact wildlife and wildlife-associated recreation, the objectives of the groups are often different (Giles 1978) and attempts to manage for both wildlife and timber resources sometimes leads to problems. Wildlife management may involve restricting the size or shape of harvested areas, increased rotation length, or exclusion of all timber management from an area--practices that result in decreased timber production, the traditional use of many public forests. In addition, competition between forest uses may increase: loss of forest land to non-forest uses coupled with increasing demands for outdoor recreation puts added pressures on public forest managers to emphasize wildlife-associated recreation and other forest recreation. Comparing the views of wildlife and forest managers can indicate which views are common to both professional groups and thus can serve as a basis for negotiation.

## STUDY OBJECTIVES

The primary goal of this study was to provide wildlife and forest managers with information for use in representing wildlife in wildlife-associated recreation valuation models. The specific objectives of the study were to:

1. Provide information that would aid in identifying wildlife components of wildlife-associated recreation for use in wildlife and multiple-use forest planning in Virginia.

2. Assess the perceptions of wildlife professionals, forestry professionals, hunters, birders, and environmentalists regarding the wildlife experiences to which value is attributable for on-site recreation.

- a. Determine preferred wildlife experiences for consumptive and nonconsumptive wildlife use.

- b. Compare and contrast these perceptions among the resource users and the resource professionals.

The secondary goal of this study was to provide a profile of the five populations regarding their characteristics and their perceptions about wildlife and wildlife management. Specific goals were to:

3. Identify the populations according to socioeconomic characteristics, recreational activities, and organizational affiliations.

4. Assess perceptions regarding social values of wildlife.

5. Assess perceptions regarding acceptable wildlife management approaches and habitat protection issues.

## DEFINITION OF TERMS

The definitions below will be used in this paper; results from other researchers will be interpreted in accordance with these terms. If it is necessary to use another author's definition of a term, that definition will be noted in the paper.

The overall recreation experience is the immediate psychological result of a recreation activity.

A component experience is one of many specific experiences that, together, comprise the overall recreation experience. If the specific experience involves wildlife, it is a wildlife component of the recreation activity.

A wildlife experience refers to any on-site encounter with wildlife that occurs during an outdoor recreation activity.

Wildlife-associated recreation refers to any outdoor recreation activity that involves wildlife. There are two classification systems for wildlife-associated recreation: (1) primary/secondary, whether the involvement with wildlife is the primary intent of the activity or secondary to some other outdoor recreation activity, and (2) consumptive/purely nonconsumptive, defined below.

Wildlife-based recreation includes all outdoor recreation in which the primary purpose involves wildlife. Wildlife-based recreation is either (1) consumptive or (2) primary nonconsumptive.

A consumptive activity is any harvest-oriented activity. All hunting, fishing, or trapping trips are consumptive activities, even if nonconsumptive encounters with wildlife occur.

A nonconsumptive activity refers to wildlife observation, wildlife photography, or other wildlife experience that is not harvest-oriented. A primary nonconsumptive activity is one in which the primary reason for participation in the activity involves wildlife, i.e., it is wildlife-based. Other nonconsumptive activities are secondary nonconsumptive activities, i.e., the wildlife encounter is incidental to some other outdoor recreation activity. Purely nonconsumptive activities refer to all wildlife-associated activities not classified as consumptive.

Wildlife is any non-domestic bird or land-dwelling animal (as defined by the questionnaire).

A birder is a person who observes or identifies birds in their natural environments (adapted from Merriam-Webster 1985).

## **CHAPTER II: LITERATURE REVIEW**

### **INTRODUCTION**

This chapter discusses literature related to this study. Four topics are covered: (1) the outdoor recreation experience, (2) how the wildlife component of wildlife-associated recreation has been represented in research, (3) the social values of wildlife, and (4) perceptions of wildlife management approaches and habitat issues.

### **THE OUTDOOR RECREATION EXPERIENCE**

The ideas put forth by Driver and Tocher (1970) regarding what recreation is and why people recreate are fundamental to current theories of outdoor recreation (e.g., Decker et al. 1987). Driver and Tocher (1970) described outdoor recreation as an intrinsically rewarding activity that occurs during free time and that requires personal commitment and free choice. Recreation is goal-directed, motivated by desires to realize specific experiences<sup>2</sup> such as stress release, escape, or excitement. The experiences actually realized during the recreation activity

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<sup>2</sup> Recreation researchers have described the desired experiences as goals, goal-objects, desired satisfactions, desired outcomes, and desired rewards. Experiences that are actually realized have been referred to as satisfactions, outcomes, and rewards.

create the overall recreation experience, and thus are components of the overall experience.

The multiple-satisfaction model proposed by Hendee (1974) to explain hunting recreation builds on the ideas of Driver and Tocher (1970). Hendee summarized the process by which value is generated by recreation:

1.     Satisfactions are direct products resulting from the pursuit and achievement of desired experiences.
2.     The satisfactions derived from realization of desired experiences, in turn, determine the quality or satisfaction of the overall recreation experience.
3.     Satisfactions derived from recreation experiences may result in benefits, defined as "more general and enduring improved conditions" such as improved physical health or psychological well-being. Benefits accrue to the individual and, hence, to society.

Recreation researchers have attempted to evaluate recreation experiences by determining which experiences are important to users. This is done by measuring users' motivations to participate in an activity, preferences for components of the overall experience, or the different satisfactions derived from the overall experience (Dorfman 1979, Bryan 1980, Crandall 1980). Driver (1980) has developed and tested a comprehensive 55-item list of motivations for outdoor recreation measured with Likert-type scales. Groups of similar items are expected to be ranked

similarly by users. For example, "enjoying the sights and sounds of nature" and "viewing scenic beauty" are expected to cluster with similar items Driver categorizes as "relationships with nature." Hendee and Bryan (1979) noted that almost all desired experiences of wildlife-associated recreation could be classified in one of sixteen general categories ranging from "nature appreciation" to "challenge," while Decker et al. (1987) suggested that most recreation experiences could be classified as either affiliative-oriented, achievement-oriented, or appreciative-oriented.

Experience-based models such as those proposed by Driver and Tocher (1970) and Hendee (1974) may help explain users' activity choices and preferences for specific settings, resources, and management activities. For example, it has been suggested that people choose those recreation activities and environmental settings that provide the opportunity for simultaneous pursuit and attainment of the desired recreational experiences (Hendee 1974, Brown and Ross 1982) or fulfillment of a set of psychological needs (Knopf et al. 1973, Crandall 1980, Raghed and Beard 1980). Knopf et al. (1973) suggested that preferences and activity choices reflect the users' greatest expectations of achieving the desired experiences.

However, while a user's desired experiences may influence his or her choice of recreation activity, not all participants in a given activity pursue the same experiences. For example, Brown et al. (1977) were able to classify eight different types of deer hunters based on the hunters' experience preferences.

Within the context of the above models of the outdoor recreation experience, the function of recreation management is to provide opportunities for users to pursue their desired psychological experiences. Probst and Lime (1982) noted that researchers needed to know which opportunities provided for quality experiences and which opportunities could be influenced by management.

### THE WILDLIFE COMPONENT IN WILDLIFE-ASSOCIATED RECREATION

As noted in the first section of this chapter, most wildlife-associated recreation models developed from experience-based recreation models. Hence, little work has been done to determine the wildlife components of outdoor recreation. Results of some of this research are detailed below.

Lyons (1982) and Shaw and Mangun (1984) reported the frequencies that different species or species groups were the subject of nonconsumptive activities. Their information, obtained from the 1980 National Survey of Hunting, Fishing, and Wildlife-associated Recreation, detailed the species observed, watched, or photographed during primary and secondary<sup>3</sup> nonconsumptive trips taken more than one mile from the respondents' residences.

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<sup>3</sup> Secondary nonconsumptive activities included only the respondents who stated that they had enjoyed encounters with wildlife incidental to a non-wildlife-based outdoor recreation trip.

The most frequently cited categories for all nonconsumptive trips were squirrels/chipmunks (Sciuridae), waterfowl (Anatidae), songbirds (Tasseres), deer (Odocoileus spp.), rabbits/hares (Leporidae), and birds of prey (Accipitres and Strigidae) (Lyons 1982). When ranked by frequencies, the squirrels/chipmunks, waterfowl, and birds of prey categories received higher ranks for primary trips than for secondary trips (Shaw and Mangun 1984). Both studies emphasized the importance of both game and nongame species to nonconsumptive activities.

The frequencies reported by the preceding studies were undoubtedly influenced by which species were present at the trip sites and the abundance of those species. Fazio and Belli (1977) went further and reported the species that users preferred to watch. Participation of Idaho residents in hunting, fishing, and seven primary nonconsumptive activities were used to classify wildlife-based recreation participants into three categories: 1) consumptive users--respondents who reported taking hunting and/or fishing trips only; 2) nonconsumptive users--those who participated only in the primary nonconsumptive activities; and combination users--subjects taking both primary nonconsumptive trips as well as hunting and/or fishing trips. Users were presented with a list of nineteen species or species groups and asked to rank the three they would "most like to watch, assuming (the species) could be found." Then, each species category was ranked according to the percent of each user group citing it as their first or second choice.

Fazio and Belli (1977) found that many species, particularly big game species, were important to all three user groups. This fact led the

researchers to suggest that competition between users groups might ensue. Still, while the three user groups did enjoy many of the same species, the groups differed in the species they preferred to watch. In order of descending preference, consumptive and combination users preferred to observe elk (Cervus canadensis), deer, bighorn sheep (Ovis canadensis), and bear (Ursus spp.), while nonconsumptive users preferred deer, bear, eagle (Haliaeetus spp. and Aquila chrysaetos), and elk. These results support the contention made by Kellert (1980) based on information obtained from a national survey of the general public: that positive attitudes about wildlife were associated with species having a high phylogenetic rank, aesthetic appeal, or practical importance.

Hay and McConnell (1979) attempted to predict the probability of participation in wildlife photography and wildlife watching, as well as participation rates for the two activities, through use of an index of bird species diversity. Respondents to the 1975 National Survey of Hunting, Fishing, and Wildlife-associated Recreation were the research subjects. Hay and McConnell described the species diversity index assigned to each state as "the maximum value of the number of breeding birds observed in each of several ecological strata within each state." These data were obtained from a 1968-1973 bird survey.

The researchers concluded that the probability of watching wildlife increased as the bird species diversity index increased, but found no relationship between wildlife photography and the index. Participation rates could not be estimated, possibly due to noise in the data or specification error.

Wildlife components specific to hunting or game animals have been the focus of hunting recreation research; little emphasis has been placed on nongame species or wildlife watching per se. For example, Potter et al. (1973) used 73 items to describe hunting trip experiences. Thirteen items were game-specific. Game-specific experiences included items such as "getting my bag limit," "bringing game home," and "stalking game." Only one wildlife experience was not game-specific; "at least seeing some wildlife" was classified by factor analysis in the experience category labeled "nature."

The study conclusions emphasized the importance of satisfaction gained from nature, escape, and companionship over the hunt-specific satisfactions of harvest, trophy-display, and skill. Subsequent studies that typed hunters based on the same 73 items indicated that the nature category was also important to some types of hunters (Brown et al. 1977, Hautaluoma and Brown 1978). However, the importance of wildlife watching to hunting, if any, cannot be ascertained from the experience items used.

Kennedy (1970) hypothesized that the importance of desired hunting experiences<sup>4</sup> could be approximated through measurements of quality variables. For example, he suggested using the numbers per hunter-day of deer seen, deer shot at, and deer sign seen as proxies for "the suspense and challenge of seeking the deer." Likewise, he believed the number of deer killed/hunter-day might be related to the importance of "actually killing the deer." Unfortunately, these hypotheses concerning the relationship

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<sup>4</sup> Kennedy referred to these as rewards.

between game factors and the desired hunting experiences were not tested. Kennedy also suggested that the degree that hunters' actual experiences matched their expectations regarding the amount of deer seen, the amount of deer sign seen, and the amount of deer shot at could be related to hunter satisfaction. However, the only game-specific variable that seemed to be consistent with the general satisfaction level of the hunting trip was the the degree to which hunters' experiences matched their expectations concerning the amount of deer seen.

To ascertain the relative importance of six component experiences of hunting, Kennedy asked hunters to rank their top three preferences for two hunt-specific experiences ("suspense and challenge of the hunt" and "actually killing the deer") and four other experiences ("companionship," "camping experience," "getting out-of-doors," and "getting away-from-it-all"). Kennedy concluded that the challenge experience was most preferred, followed by (in order of decreasing preference) the outdoor and companionship experiences (both were about equally preferred), getting away from it all, killing the deer, and camping.

The importance of the challenge item indicated that hunt-specific experiences were important to hunting satisfaction, but the relatively low preference assigned to the harvest experience supports the idea that measures of harvest success are inadequate indicators of satisfaction received from hunting trips (e.g., Hendee 1974). However, determining the relative importance of the different components of hunting recreation is apparently a complex problem: responses to a question that asked hunters to compare the satisfaction obtained from "hunting the deer" to

satisfaction resulting from companionship indicated that companionship was more important than hunt-specific experiences. Kennedy suggested that the discrepancy between the responses to this question and preference rankings of the six component experiences could be due to the hunters' "underlying" preferences or sublimation of non-hunt-specific experiences to compensate for not harvesting deer.

### SOCIAL VALUES OF WILDLIFE

The idea that wildlife contributes to the quality of life<sup>5</sup> is not new. In 1924, a speaker before the National Conference on Outdoor Recreation noted that wildlife had recreational and educational value, and submitted that land policies be based on these social values as well as economic (i.e., commercial) criteria (Adams 1924). Four years later, Pulling (1928) claimed that wildlife also had commercial value, and suggested that revenue generated from recreational uses and wildlife commodities could supplement the low rate of return typically associated with timber management. However, he also noted that the social and educational values of wildlife were sometimes so great that they overwhelmed its commercial values. In addition, Pulling (1928) suggested that wildlife values could be used to sell timber management to the public, i.e., that timber management would be more accepted if it were associated with good wildlife habitat.

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<sup>5</sup> This description was adopted from Kellert (1987).

More values were identified over time. As with the preceding examples, these values were often offered as competition for the commercial values of market resources or to justify wildlife conservation efforts. For example, King (1947) believed that the total economic value of wildlife was the sum of six values: 1) commercial value--income derived from wildlife commodities; 2) recreational value--monetary expenditures relating to wildlife-based recreation; 3) biological values--the value of biological services such as fertilization and pest control; 4) social values--"the values accruing to the community as a result of the presence of wild animals"; 5) aesthetic values--the beauty, inspiration, and historical significance of wildlife; and 6) scientific value--the use of wildlife in scientific research.

Other methods of classifying social values have been offered (Steinoff 1980; e.g. Giles 1978, Kellert 1984). Cocheba (1987) noted that many of these methods used value categories that overlapped, so he offered his own classification system to avoid "double-counting" values when performing economic analyses. First, he identified what he referred to as "sensory perception activities." Five were activities requiring direct, on-site interactions with wildlife; these were recreational hunting, commercial hunting, meat hunting, primary nonconsumptive activities, and secondary nonconsumptive activities.<sup>6</sup> The sixth sensory perception category was called "recording-based wildlife activities." These in-

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<sup>6</sup> Cocheba referred to these nonconsumptive activities as wildlife-based non-hunting activities and wildlife-related non-hunting activities.

cluded listening to recordings of wildlife sounds, watching wildlife films, and creating wildlife art (presumably off-site).

Cocheba listed several values not related to sensory perception. Satisfaction gained from just knowing wildlife existed was referred to as wildlife's existence value; this term apparently included satisfaction resulting from all vicarious enjoyment of wildlife. Option value was defined as the value of "retaining an option for future use of a species," while the bequest value was the value of ensuring that future generations have to opportunity to use wildlife. Other values were wildlife's contribution to the earth's ecology, its value to scientific research, and its "quasi-option value"--the value of possible future uses of wildlife in ways that are not yet known.<sup>7</sup>

Some studies have attempted to evaluate the relative importance of the various social values attributed to wildlife. A national survey of the general public indicated that ecological, existence, and wildlife watching values were greater than recreational hunting and commodity values (Arthur and Wilson 1979). Ecological, existence, and wildlife watching values were also deemed important in studies conducted by Shaw (1975) and Moss (1985).

However, research that measures the importance of broadly-stated social values does not reveal the entire story. For example, Kellert (1987) studied specific attitudes held by the U.S. general public and

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<sup>7</sup> If Cocheba's value categories truly are discrete, one must assume that his definition of option value refers to presently-known uses of wildlife.

found that utilitarian (e.g., commodity-oriented) attitudes were more frequent than ecologicistic or naturalistic (i.e., "interest and affection for wildlife and the outdoors") attitudes. Furthermore, he discovered that most positive attitudes toward wildlife were directed toward phylogenetically-higher species, aesthetically-appealing species, and species with practical importance. Thus, it appears that the public's concepts of wildlife's social values are abstract rather than specific.

### PERCEPTIONS OF WILDLIFE MANAGEMENT AND HABITAT ISSUES

This section reviews literature pertaining to perceptions of wildlife management approaches, habitat protection, and endangered species. The little research that has been conducted in these areas was done during the 1970s and probably does not reflect current viewpoints.

Results from a national survey indicate that the general public tends to support wildlife management: 60% disagreed and 32% agreed that, in most cases, wildlife would be better off without attempts by the government to control wildlife populations (Kellert 1979). On the other hand, Shaw (1975) found that there was a slight tendency for Michigan hunters and Michigan Audubon Society members to agree that "unsound wildlife management practices" were a threat to wildlife.

Research concerning approaches to wildlife management has been directed toward hunting as an approach to management. Generally, the user groups surveyed accepted hunting to manage wildlife. For example, most primary nonconsumptive users at birdwatching sites in Southeast Arizona

agreed that hunting was necessary to prevent some types of wildlife from overpopulating (Shaw et al. 1978). Likewise, in a survey of the national membership of the American Birding Association, Ducks Unlimited, and The Wildlife Society, Witter (1978) found that almost all wildlife professionals and members of the hunter group, as well as a large majority of the birders, believed that hunting was an essential management tool and that hunting should have a future role in wildlife management.

Research indicates that wildlife-associated recreation interest groups tend to support habitat protection. For instance, both Michigan hunters and Audubon Society members strongly agreed that habitat losses to development were a threat to wildlife, supported creation of more wilderness areas, and disagreed with the contention that housing and industry were more important than "protecting a few wild animals" (Shaw 1975). However, the hunters were more environmentally-oriented than birders regarding government regulation of stripmining on private lands.

Additionally, Witter (1978) found that hunters, birders, and wildlife professionals believed that the importance of preserving land for wildlife was more important than four other environmental quality concerns: reducing use of non-biodegradable pesticides, reducing oil spills, reducing water pollution, and reducing auto emission pollutants. However, when compared to six other national concerns, environmental quality ranked first for birders and wildlife professionals, but only fourth for hunters.

A national survey of the general public approached habitat protection issues by addressing the potential trade-offs involved (Kellert

1979). Generally, the public supported protection, but the degree of support varied with the trade-offs involved. Eighty-six percent supported limits to off-road vehicle use if such use harmed wildlife, and 76% agreed that timber should be harvested in ways that benefited wildlife, assuming those methods would mean higher lumber prices. Additionally, over half agreed that grazing on public lands should be limited to benefit wildlife, assuming higher meat costs would ensue; disagreed that housing and industrial development on marsh lands were more important than use of marshes by ducks and non-endangered wildlife; and disagreed that natural resources must be developed in wilderness areas, given that development resulted in much smaller wildlife populations. Respondents were divided about maintaining then-current agricultural production through use of pesticides harmful to wildlife.

Similar trade-off comparisons were used to analyze the importance attributed to endangered species by the U.S. general public. Kellert (1979) identified eleven factors<sup>8</sup> he believed influenced public support for endangered species: 1) aesthetic appeal of the species; 2) the species phylogenetic relation to human beings; 3) endangerment due to direct human exploitation, as opposed to more indirect means such as loss of habitat; 4) commercial value of the species; 5) the numbers and types of people affected by the trade-off; 6) the public's familiarity with or knowledge about the species; 7) cultural or historical significance of the species; 8) the perceived inhumaness of the threatening activity; 9) whether or

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<sup>8</sup> The first eight factors listed were identified by Kellert as "major variables;" the last three were taken from his research results.

not the trade-off involved essential human services; 10) monetary impact of the trade-off; and 11) sociodemographic factors.

Not surprisingly, Kellert (1979) found that support for endangered animals was higher among wildlife interest groups than among the general public. In order of diminishing support, those most supportive were members of environmental protection groups, followed by wildlife protection group members, birdwatchers, hunters, trappers, and the general public.

## **CHAPTER III: METHODS AND PROCEDURES**

### **INTRODUCTION**

The study required information from wildlife users and resource managers regarding (1) identification of wildlife experiences enjoyed during consumptive and nonconsumptive activities, (2) identification of the perceived social values of wildlife, (3) views concerning approaches to wildlife management, (4) participation in wildlife-based and other outdoor recreation activities, and (5) socioeconomic characteristics.

### **USER AND MANAGER GROUPS**

Three groups--hunters, birders, and environmentalists--were selected to represent wildlife users. Wildlife and forestry professionals were the two resource management groups surveyed.

#### **Hunters**

Holders of the 1983-1984 Virginia Resident License to Hunt who were age 18 or older were selected to represent consumptive wildlife users; an estimated 279,205 people met this criterion. License holders included small and large game hunters and people age 65 or older who held lifetime licenses to hunt and fish.

To obtain this sample, a randomly-generated list of 6000 license holders was obtained from the Virginia Commission of Game and Inland Fisheries. First, hunters who were less than 18 years of age at the time the license was purchased were eliminated from the list, then 225 of the remaining individuals were randomly selected using a random-number generator.

### **Birders**

Members of the 1985 Virginia Society of Ornithology (VSO) were selected to represent primary nonconsumptive users. This organization was formed "to promote the systematic study of birds in Virginia, to stimulate interest in birds, and to promote the conservation of wildlife and other natural resources" (Virginia Society of Ornithology 1986). Of the 940 members with Virginia addresses, 105 were randomly selected to participate in the study.

### **Environmentalists**

To represent secondary nonconsumptive users, the 1985 membership of an environmental organization was sampled. The 105 individuals in this sample were randomly selected from the 449 members residing in southwestern Virginia.

### Wildlife Professionals

Members of the 1985 Southeast Working Group of The Wildlife Society residing in the states of Virginia, North Carolina, Tennessee, and Kentucky were chosen to represent wildlife professionals. This group includes wildlife managers, wildlife biologists, biologists, students, and others whose work pertains to wildlife. Most members of the working group also belong to the national organization of The Wildlife Society. Of the 256 individuals in the specified population, 106 were randomly selected for the sample.

### Forestry Professionals

The 1985 Virginia membership of the Society of American Foresters (SAF) was surveyed to obtain opinions of forestry professionals. The SAF represents technicians, administrators, researchers, foresters, and students in all areas of the forestry profession, and also includes professionals in related fields. A random sample of 101 individuals was chosen from the 784 member population.

## DEVELOPMENT AND ADMINISTRATION OF THE QUESTIONNAIRE

### Development

Construction of the questionnaire was based on Dillman (1978). In addition, questionnaires developed by Moss (1985) and Cook (1986) were studied to facilitate construction. The questionnaire is presented in Appendix A and described below.

Section A was designed to elicit views regarding the perceived social values of wildlife. Specifically, the intent was to determine (1) which social values were most important to the subjects personally (2) the subjects' views about which social values best justified monetary expenditures (through taxes) for wildlife management. Wording of the ten social value items was adapted from Shaw (1975).

Information regarding the subjects' primary nonconsumptive, consumptive, and other outdoor recreation trips was gathered in Section B. Subjects were presented with a variety of trip categories and asked to indicate the number of trips of each category they had taken in a forest or natural area during the past year. Subjects were also asked to assess their enjoyment of wildlife during non-wildlife-based outdoor recreation trips.

Sections C and D gathered data on enjoyment of wildlife experiences during wildlife-associated activities. Wildlife watching experiences in natural areas (delimited to exclude watching wildlife during hunting, trapping, and scouting trips) were examined in section C, while section

D asked subjects who hunted about both wildlife watching and harvest-related experiences occurring during hunting trips.

The objective of Section E was to determine which wildlife management techniques were deemed acceptable by the surveyed populations and to assess the populations' views regarding two current forest habitat issues. The habitat issue items addressed wildlife biologists' concerns regarding loss of forest habitat to activities such as development and timber harvesting. These items were developed to ascertain opinions regarding the effects of such habitat alterations on species the subjects believed were important.

Background questions were included to assess importance of demographic variables and affiliation in wildlife, forest, and outdoor-recreation organizations (Section F). Some background questions were adapted from Cook (1986) and Moss (1985).

### **Pilot Study**

A pilot study was performed to detect problems in construction, to estimate the time required for completion of the questionnaire, and to obtain suggestions. Twenty-six questionnaires completed by graduate students and professors in the Virginia Polytechnic Institute and State University School of Forestry and Wildlife Resources were used in the pilot study. The resulting responses and suggestions were given consideration and incorporated in the construction of the questionnaire.

## Administration

Administration of the questionnaire was based on Dillman (1978). A package consisting of a questionnaire, a cover letter, and a stamped, addressed return envelope was mailed during August and September, 1986. An identification number written on the questionnaire was used to keep track of the returns and also permitted followups. The first followup, a postcard reminder, was mailed one week after the initial questionnaire package was mailed. Subjects not responding within three weeks were mailed a second package consisting of a followup cover letter, a questionnaire, and a stamped, addressed return envelope. (Cover letters and followup postcards are provided in Appendix B.)

Forty-one individuals were dropped from the sample, resulting in an overall sample size of 601. Subjects were dropped from the sample if the initial questionnaire package was returned by the Postal Service and a correct address could not be found, or if the subject was deceased. When only the followup postcard and/or followup questionnaire package were returned by the Postal Service, the subject was kept in the sample. This was done because in several cases it was evident that the subject had received the initial questionnaire, yet one or both of the followups were returned.

## DATA ANALYSIS PROCEDURES

To evaluate the populations sampled, responses of forestry professionals were compared with wildlife professionals and the three user groups were compared with one another. When reporting results, populations that did not differ significantly were combined if possible.

All analyses were performed using the Statistical Analysis System (SAS Institute 1985a, 1985b). The Statistical Analysis System procedures used were FREQ for frequencies, relative frequencies, and contingency tables; GLM for analysis of variance; MEANS for item means and Tukey tests; and NPAR1WAY for Kruskal-Wallis tests.

### Descriptive Analyses

Descriptive statistics were used for the initial analysis of data. Frequencies, relative frequencies, and, if appropriate, means were used to compare item responses within and among groups.

### Contingency Tables

Contingency tables were used to determine if populations differed according to sex, education, household income, or community type. If the  $\chi^2$  indicated a significant difference ( $P \leq 0.05$ ) then data were examined further to determine the source of the difference. When warranted, variable levels were eliminated or collapsed to test the suspected differ-

ences. In addition, variable levels with few observations were collapsed to lessen the likelihood of Type I errors.<sup>9</sup>

### The Kruskal-Wallis Test

The Kruskal-Wallis test is a nonparametric technique used to assess differences in ranks between two or more populations. The Kruskal-Wallis test is particularly suited to evaluate ordinal data that has many ties (Conover 1980), and thus was used in this study to assess Likert-type scale data (i.e. questions B-2b and D-5a - D-5d) and ranked data (i.e. questions A-1, A-2, C-3, and D-7). The significance level chosen for the test was  $P \leq 0.05$ .

Two types of comparisons were made. First, for all the relevant items, the test was used to evaluate differences between the two professional groups and among the three user groups. When the test indicated that the three user groups were not identical, pairwise comparisons were made to determine which groups differed from one another.

Second, responses to similar items were compared within each group. Specifically, for each social value item listed in section A, ranks assigned to the item in question A-1 were compared to ranks assigned in question A-2; and for each of the seven wildlife watching experiences listed in C-3 and D-7, the ranks given for an experience item in question C-3 were compared with those given for the item in question D-7.

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<sup>9</sup> Steel and Torrie (1980) discuss the problem of Type I errors associated with contingency tables.

## The Analysis of Variance

Analyses of variance (ANOVAs) were used to compare the ages of the different population memberships. This test is a parametric procedure that compares variations within each sample to the variations between the samples (Ott et al. 1983). If the resulting test statistic had a  $P$ -value of 0.05 or less, the sample means were considered significantly different.

### Tukey Tests

When an ANOVA reveals that the means of three or more populations differ, the Tukey test can be used to determine which populations differ from one another. The Tukey test makes pairwise comparisons of group means and thus indicates how the mean for a given group relates to the mean of each of the other groups tested (Steel and Torrie 1980). In this case, the test was used to analyze the ages of the three user populations. An  $\alpha$ -level of 0.05 was selected to be the significance criterion.

## **CHAPTER IV: RESULTS AND DISCUSSION**

### **QUESTIONNAIRE RESPONSE**

Responses were good for four of the populations: 91.1% of the birders and 80.0% of the environmentalists returned questionnaires, as did 86.1% of each professional group (Table 1). However, the response rate for hunters was only 58.1%, and nonrespondents were younger than respondents by about four years ( $P=0.0371$ ). Because the only information known about the nonrespondents was their ages, no corrections were performed on the responses of the hunters. Therefore, it is possible that responses of the hunters do not really represent Virginia hunters.

### **IDENTIFICATION OF THE USER AND MANAGER GROUPS**

In this section, information is provided to help identify the professional and user groups surveyed. Groups will be described according to socioeconomic characteristics, organizational affiliation, and outdoor recreation activities.

#### **Socioeconomic Characteristics**

Socioeconomic profiles for the professional groups are provided in Table 2. Table 3 lists the characteristics of the users.

Table 1. Response rates by population.

	Wildlife Prof.	Forestry Prof.	Birders	Environ- mentalists	Hunters
Number mailed	106	101	105	105	225
Dropped <sup>1</sup>	5	0	4	5	27
Sample size	101	101	101	100	198
Responded	87	87	92	80	115
Response rate	86.1%	86.1%	91.1%	80.0%	58.1%

<sup>1</sup> Subjects were dropped from the sample if deceased or if the initial questionnaire package was returned by postal service.

Table 2. Socioeconomic characteristics of Forestry and Wildlife Professionals

	Forestry Professionals (%)	Wildlife Professionals (%)
SEX	(N=87)	(N=87)
Male	93.1	93.1
Female	6.9	6.9
AGE	(N=87)	(N=86)
18 - 24	4.6	0.0
25 - 29	12.6	14.0
30 - 34	19.5	17.4
35 - 39	12.6	22.1
40 - 44	11.5	20.9
45 - 49	9.2	9.3
50 - 54	11.5	5.8
55 - 59	3.4	3.5
60 - 64	2.3	5.8
65 - 69	3.4	1.2
70 - 74	4.6	0.0
75 - 79	3.4	0.0
80+	1.1	0.0
* EDUCATION	(N=87)	(N=87)
High school graduate	3.4	1.1
Vo./tech. school <sup>1</sup>	1.1	1.1
Some college	1.1	0.0
B.A. or equivalent	46.0	14.9
Some graduate school	16.1	10.3
M.A. or equivalent	24.1	54.0
Ph.D. or equivalent	8.0	18.4
HOUSEHOLD INCOME	(N=83)	(N=86)
<\$ 5,000	0.0	2.3
\$ 5,000 - \$9,999	1.2	3.5
\$10,000 - \$14,999	1.2	1.2
\$15,000 - \$19,999	4.8	9.3
\$20,000 - \$24,999	9.6	8.1
\$25,000 - \$34,999	21.7	19.8
\$35,000 - \$49,999	26.5	22.1
\$50,000 - \$74,999	22.9	25.6
\$75,000 - \$100,000	9.6	7.0
>\$100,000	2.4	1.2

<sup>1</sup> Attended after high school.

\* Significant difference between populations ( $P \leq 0.05$ ).

Table 2, con't. Socioeconomic characteristics of Forestry and Wildlife Professionals

	Forestry Professionals (%)	Wildlife Professionals (%)
<b>OCCUPATION</b>	(N=87)	(N=87)
Professional specialty	59.8	65.5
Administrative	28.7	23.0
Craftsperson	0.0	1.1
Homemaker	0.0	0.0
Machine operative	1.1	0.0
Service	0.0	0.0
Clerical	0.0	0.0
Technician	8.0	4.6
Transport operative	0.0	0.0
Sales	0.0	0.0
Student	1.1	5.7
Farming	0.0	0.0
Supervisor	0.0	0.0
Laborer	0.0	0.0
Listed retired only	1.1	0.0
<b>NATURAL RESOURCES RELATED OCCUPATIONS</b>	(N=82)	(N=86)
Forest/range management	74.4	0.0
Logging/forest labor	3.7	0.0
Wildlife/fisheries	1.2	77.9
Forest/range mgmt. and wildlife	1.2	2.3
Recreation/interpretation	1.2	3.5
Resource management/scientist	4.9	8.1
Other related occupation	8.5	2.3
Not natural resources related	4.9	5.8
<b>COMMUNITY (population level)</b>	(N=87)	(N=87)
Large city (over 100,000)	13.8	19.5
Suburb of a large city	23.0	18.4
City (25,000 - 100,000)	11.5	10.3
Town/sm. city (2,500 - 25,000)	19.5	24.1
Small town (under 2,500)	8.0	5.7
Rural	24.1	21.8

Table 3. Socioeconomic characteristics of birders, environmentalists, and hunters.

	Birders (%)	Environ- mentalists (%)	Hunters (%)
<b>* SEX</b>	(N=92)	(N=80)	(N=115)
Male	55.4	56.3	96.5
Female	44.6	43.8	3.5
<b>** AGE</b>	(N=90)	(N=80)	(N=112)
18 - 24	1.1	7.5	7.1
25 - 29	2.2	6.3	17.0
30 - 34	10.0	16.3	14.3
35 - 39	12.2	15.0	15.2
40 - 44	11.1	13.7	8.9
45 - 49	6.7	6.3	7.1
50 - 54	3.3	5.0	8.9
55 - 59	13.3	5.0	10.7
60 - 64	6.7	7.5	7.1
65 - 69	12.2	5.0	3.6
70 - 74	10.0	5.0	0.0
75 - 79	5.6	5.0	0.0
80+	5.6	2.5	0.0
<b>*** EDUCATION</b>	(N=91)	(N=80)	(N=108)
<High school graduate	1.1	0.0	22.5
High school graduate	6.6	2.5	28.8
Vo./tech. school <sup>1</sup>	2.2	1.3	13.5
Some college	18.7	12.5	20.7
B.A. or equivalent	24.2	21.3	5.4
Some graduate school	8.8	7.5	2.7
M.A. or equivalent	26.4	23.8	4.5
Ph.D. or equivalent	12.1	31.3	1.8
<b>HOUSEHOLD INCOME</b>	(N=86)	(N=79)	(N=108)
<\$ 5,000	0.0	2.5	2.8
\$ 5,000 - \$9,999	4.7	3.8	3.7
\$10,000 - \$14,999	1.2	2.5	6.5
\$15,000 - \$19,999	4.7	6.3	5.6
\$20,000 - \$24,999	10.5	13.9	18.5
\$25,000 - \$34,999	26.7	16.5	24.1
\$35,000 - \$49,999	25.6	27.8	19.4
\$50,000 - \$74,999	17.4	20.3	13.9
\$75,000 - \$100,000	5.8	3.8	3.7
>\$100,000	3.5	2.5	1.9

<sup>1</sup> Attended after high school

\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) hunters and birders and (3) hunters and environmentalists ( $P \leq 0.05$ ).

\*\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) birders and hunters and (3) birders and environmentalists ( $P \leq 0.05$ ).

\*\*\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) all three pairs of populations ( $P \leq 0.05$ ).

Table 3, con't. Socioeconomic characteristics of birders, environmentalists, and hunters.

	Birders (%)	Environ- mentalists (%)	Hunters (%)
<b>OCCUPATION</b>	(N=89)	(N=79)	(N=113)
Professional specialty	40.4	66.7	11.5
Administrative	19.1	10.3	13.3
Craftsperson	1.1	1.3	29.2
Homemaker	14.6	6.4	0.9
Machine operative	2.2	1.3	13.3
Service	4.5	3.8	5.3
Clerical	6.7	2.6	3.5
Technician	3.4	2.6	4.4
Transport operative	0.0	0.0	8.8
Sales	5.6	0.0	0.9
Student	1.1	3.8	2.7
Farming	0.0	0.0	1.8
Supervisor	0.0	0.0	2.7
Laborer	0.0	0.0	1.8
Listed retired only	1.1	1.3	0.0
<b>NATURAL RESOURCES RELATED OCCUPATIONS</b>	(N=90)	(N=77)	(N=112)
Forest/range management	1.1	1.3	0.0
Logging/forest labor	0.0	0.0	1.8
Wildlife/fisheries	1.1	0.0	0.0
Forest/range mgmt. and wildlife	0.0	0.0	0.0
Recreation/interpretation	1.1	2.6	0.0
Resource management/scientist	1.1	2.6	0.0
Other related occupation	4.4	1.3	1.8
Not natural resources related	91.1	92.2	96.4
<b>* COMMUNITY (population level)</b>	(N=91)	(N=80)	(N=115)
Large city (over 100,000)	15.4	11.3	9.6
Suburb of a large city	14.3	8.7	7.0
City (25,000 - 100,000)	18.7	20.0	16.5
Town/sm. city (2,500-25,000)	23.1	32.5	18.3
Small town (under 2,500)	2.2	7.5	6.1
Rural	26.4	20.0	42.6

\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) hunters and birders and (3) hunters and environmentalists ( $P \leq 0.05$ ).

### Sex

As would be expected, professional and hunter groups were predominantly male. Both the wildlife and the forestry professionals were 93.0% male, while, for hunters, the percentage was slightly higher (96.5%). Conversely, the environmental and birder groups both had substantial and essentially equal percentages of females (43.8% and 44.6%, respectively).

### Age

An ANOVA indicated no age difference between professional groups ( $P=0.0917$ , combined  $\bar{X}=41.4$ ). However, mean ages of the user groups were different ( $P=0.0001$ ). A Tukey test ( $\alpha=0.05$ ) indicated that hunter and environmental groups were the same age (combined  $\bar{X}=42.9$ ), while the birders were older ( $\bar{X}=53.9$ ). Over 30% of the birders were between the ages of 55 and 65, and about one-fourth were age 70 or older.

### Education

The professional groups, birders, and environmentalists were highly educated, and a majority of each of the four groups were college graduates; education level of the hunters was lower and tended to reflect that of Virginia residents (U.S. Bureau of the Census 1985). Wildlife professionals held the largest percentages of bachelor's degrees (97.7%) and graduate degrees (72.4%), while almost one-third (31.3%) of the respondents from the environmental group held doctorates, the highest proportion for any group surveyed. Over three-fourths (77.5%) of the hunter

group had graduated from high school, and about half (51.4%) had received some education after high school.

### Occupation

The most important occupational categories for the professional, birder, and environmental groups were professional specialty (40.4% to 66.7%) and administrative (10.2% to 28.7%). Also, a third important category for the birders was homemaker, with 14.6% of the group falling into this category.

The hunter group was characterized by a greater diversity of occupational categories. In the modal category, 29.2% of the hunters were classified as skilled craftpersons, while the administrative, machine operative, and professional specialty categories each accounted for 11.5% to 13.3% of the population.

Occupations related to natural resources were classified according to emphasis of the jobs (see Table 2 or 3 for these job classifications). About 95% of each of the professional groups specified an occupation in a natural resources field. There appeared to be little overlap in occupation types between resource professionals: only two forestry professionals mentioned that their jobs involved wildlife, and vice versa.

Only 8.9% of the birders, 7.8% of the environmentalists and 3.6% of the hunters listed occupations classified as natural resources-related. Fewer still worked in either wildlife or forestry.

### Household Income

Contingency tables comparing income intervals showed no significant differences between either the professional groups or the user groups ( $P=0.630$  and  $P=0.552$ , respectively). For both professional groups combined, 24.3% reported household incomes between \$35,000 and \$49,999, and an equal percentage indicated incomes between \$50,000 and \$74,999. About 10% reported incomes of \$75,000 or more, and about 5% earned less than \$15,000.

Because there was no difference in household income among the user groups, the three groups were combined. Modal income intervals of the users were lower than those of the professionals: 23.8% of the users had incomes in the \$35,000 to \$49,999 range, and 22.7% earned between \$25,000 and \$39,999. About 10% of the users reported incomes under \$10,000, while fewer than 7% indicated earnings of \$75,000 or greater.

### Community Types

There was no significant difference between the professional groups in the types of communities they lived in, despite the difference in geographical areas surveyed ( $P=0.819$ ). The professionals were primarily urban residents: about 70% of the professionals lived in large cities, suburbs of large cities, or communities with populations of 2,500 or more. Twenty-three percent lived in rural areas, while only 6.9% lived in small towns (towns with populations under 2,500).

For the users, community-types were dependent on the user group ( $P=0.029$ ). Cell  $\chi^2$ s indicated that much of the difference could be at-

tributed to the relative frequency of hunters living in rural areas: over 40% of the hunters were rural residents, compared with only 20.0% of the environmentalists and 26.4% of the birders. To test for rural/non-rural differences, the user groups were again examined by collapsing all categories not classified as rural into one non-rural category, and then comparing it with the rural category. The difference was significant ( $P=0.002$ ), meaning that the rural/non-rural classifications were dependent on population. To confirm that the difference was related to the relative number of hunters living in rural areas, an analysis that compared the community types of only the birders and the environmentalists was performed. No difference was evident ( $P=0.272$ ).

### **Organizational Affiliation**

Subjects were asked to identify the wildlife, forestry, conservation, and outdoor recreation organizations to which they belonged. All wildlife organizations were grouped according four categories: (1) predominantly consumptive, (2) predominantly nonconsumptive, (3) general (organizations with both a consumptive and nonconsumptive orientation--primarily the National Wildlife Federation and its state affiliates), and (4) professional (not included in any of the above). In addition, other organizations were grouped as being forestry-related and environmental/preservation-related. These classifications are specified in Table 4.

Table 4. Organizations classified as wildlife-related (predominantly nonconsumptive, predominantly consumptive, general, and professional), forestry-related, and environmental/preservation.

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WILDLIFE-RELATED ORGANIZATIONS

Predominantly nonconsumptive

National Audubon Society  
World Wildlife Fund  
Other bird-related  
Other nonconsumptive

Predominantly consumptive

Isaak Walton League  
Local Sportsmen's Clubs  
National Wild Turkey Federation  
Ducks Unlimited  
Other consumptive

General

National Wildlife Federation  
National Wildlife Federation State Affiliates  
Other general

Professional

American Ornithologists' Union  
Cooper Ornithological Society  
The Wildlife Society  
Wilson Ornithological Society  
Other professional

FORESTRY-RELATED

American Forestry Association  
Society of American Foresters  
Other forestry-related

ENVIRONMENTAL/PRESERVATION

Environmental Defense Fund  
Friends of the Earth  
Greenpeace  
National Resources Defense Fund  
Nature Conservancy  
Sierra Club  
The Wilderness Society  
Other Conservation

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### Professional Groups

On the average, wildlife professionals belonged to 3.9 organizations, while forestry professionals belonged to 2.5 organizations ( $P=0.0001$ ). As would be expected, wildlife organizations were most important to the wildlife professionals (Appendix C, Table 1). In fact, over half (55.2%) were members of the National Wildlife Federation. Many (36.8%) belonged to consumptive-oriented organizations such as the National Wild Turkey Federation (21.8%) and local sportsmen's clubs (17.2%). Fewer (23.0%) were members of nonconsumptive organizations. The nonconsumptive group identified most often was the National Audubon Society, cited by 18.4% of the wildlife professionals.

About one-quarter (23.0%) of the wildlife professionals belonged to at least one environmental- or preservation-oriented organization; the most popular of these was the Nature Conservancy, mentioned by 16.1% of the respondents. Also notable were the proportions belonging to the National Rifle Association (25.3%) and forestry-related groups (14.9%).

Organizational affiliations for the forestry professionals are provided in Appendix C, Table 2. The two organizations cited most frequently other than the SAF were also forestry-related: about one-third (32.6%) were members of the American Forestry Association, and about a quarter were members of the Virginia Forestry Association (25.6%). Over one-fourth (27.9%) belonged to one or more wildlife organizations, including the National Wildlife Federation (19.8%), consumptive-oriented organizations (10.5%), and nonconsumptive groups (8.1%). Also, membership in the National Rifle Association (16.3%) may have reflected an in-

terest in hunting or shooting. Finally, 13.2% were members of at least one environmental or preservation organization.

### User Groups

A large majority (81.3%) of the birders belonged to wildlife organizations other than the VSO (see Appendix C, Table 3 for the birders' affiliations). Nonconsumptive organizations were much more important than consumptive ones (67.0% versus 7.7%). The most popular wildlife organizations were the National Audubon Society and the National Wildlife Federation, cited by 42.9% and 34.1%, respectively.

Environmental/preservation-oriented groups were mentioned by over half (52.7%) of the respondents from the birder group. The Nature Conservancy contributed most to this category; virtually half (49.5%) of the birders belonged to this group. The Wilderness Society, which ranked second in importance, was cited by only 11.0% of the birders.

Over half (52.5%) of the environmentalists indicated that they were affiliated with environmental/preservation groups other than the sample organization, the most important of which were the Nature Conservancy (32.5%), the Wilderness Society (28.8%), the Environmental Defense Fund (13.8%), and the the Natural Resources Defense Council (11.3%) (Appendix C, Table 4). Almost half (47.5%) were associated with a wildlife organization, notably the National Audubon Society (30.0%) and the National Wildlife Federation (25.0%). Only one respondent indicated membership in a consumptive group.

Only 46.8% of the hunters were affiliated with wildlife, forestry, conservation, or outdoor recreation organizations (Appendix C, Table 5). However, almost one-third (32.4%) of the respondents were members of the National Rifle Association, and about one-quarter (25.2%) belonged to a wildlife organization. The latter percentage includes the 21.6% who were members of local sportsmen's clubs. No respondents were affiliated with organizations that were predominantly nonconsumptive.

### **Wildlife-Based and Other Outdoor Recreation Trips**

#### **Professional Groups**

Both professional groups had, during the past year, participated in a variety of wildlife-based and non-wildlife-based outdoor recreation activities (Tables 5 and 6). Over one-third (34.9%) of the forestry group had taken a primary nonconsumptive trip, and even more (44.5%) had gone hunting, trapping, or scouting at least once. However, the most frequently-cited trips were not wildlife-based; almost 60% participated at least two non-wildlife-based outdoor recreation activities. The most popular activities were hiking trips and day visits to natural areas, each cited by over half of the forestry population.

Wildlife professionals also took many non-wildlife-based outdoor recreation trips, but, in addition, frequently participated in a variety of wildlife-based trips. For instance, while 57.5% took two or more non-wildlife-based outdoor recreation trips, 74.7% had participated in at least two kinds of wildlife-based trips. More wildlife professionals

Table 5. Number of wildlife-based and fishing trips in a forest or other natural area taken during the past year by forestry and wildlife professionals.

	Forestry Professionals (N=86) %	Wildlife Professionals (N=87) %
<b>VISITS PRIMARILY TO WATCH WILDLIFE</b>		
None	65.1	17.2
1 -10	31.4	67.8
11-20	3.5	10.3
21-30	0.0	1.1
31 +	0.0	3.4
<b>SCOUTING</b>		
None	70.9	37.9
1 -10	23.3	50.6
11-20	5.8	9.2
21-30	0.0	1.1
31 +	0.0	1.1
<b>FISHING</b>		
None	55.8	31.0
1 -10	29.1	44.8
11-20	11.6	16.1
21-30	2.3	5.7
31 +	1.2	2.3
<b>HUNTING</b>		
None	59.3	27.6
1 -10	26.7	28.7
11-20	4.7	20.7
21-30	7.0	12.6
31 +	2.3	10.3
<b>TRAPPING</b>		
None	97.7	89.7
1 -10	1.2	8.0
11-20	1.2	1.1
21-30	0.0	1.1
31 +	0.0	0.0
<b>OTHER</b>		
None	98.8	97.7
1 -10	1.2	1.1
11-20	0.0	0.0
21-30	0.0	0.0
31 +	0.0	1.1

Table 6. Number of non-wildlife-based outdoor recreation trips taken in a forest or other natural area taken during the past year by forestry and wildlife professionals.

	Forestry Professionals (N=86) %	Wildlife Professionals (N=87) %
<b>HIKING</b>		
None	45.3	47.1
1 -10	40.7	48.3
11-20	8.1	2.3
21-30	4.7	0.0
31 +	1.2	2.3
<b>DAY VISITS</b>		
None	40.7	49.4
1 -10	54.7	43.7
11-20	3.5	5.7
21-30	1.2	1.1
31 +	0.0	0.0
<b>BACKPACKING</b>		
None	77.9	77.0
1 -10	20.9	23.0
11-20	1.2	0.0
21-30	0.0	0.0
31 +	0.0	0.0
<b>CAMPING (Other than backpacking)</b>		
None	69.8	57.5
1 -10	27.9	42.5
11-20	2.3	0.0
21-30	0.0	0.0
31 +	0.0	0.0
<b>CANOEING</b>		
None	76.7	71.3
1 -10	22.1	27.6
11-20	1.2	1.1
21-30	0.0	0.0
31 +	0.0	0.0
<b>OTHER</b>		
None	86.0	93.1
1 -10	12.8	5.7
11-20	1.2	0.0
21-30	0.0	0.0
31 +	0.0	1.1

had taken primary nonconsumptive trips than any other wildlife-based trip; during the past year, 82.8% had taken at least one trip primarily to watch wildlife in a forest or natural area. A smaller proportion (72.4%) had been hunting in the past year, but over half of those who had hunted (43.7% of the respondents) took more than ten hunting trips. Scouting and fishing trips were taken by 62.1% and 69.0% of the hunters, and 24.1% had gone fishing more than ten times in the past year.

### User Groups

Participation by user group subjects in wildlife-based and non-wildlife-based trips are given in Tables 7 and 8, respectively. For the birders, wildlife-based activities were more important than other outdoor recreation activities. Not surprisingly, trips made primarily to watch wildlife were cited most often: 85.1% of the population had taken such a trip, and 10.3% had taken more than thirty trips. On the other hand, only 14.9% had been either hunting, trapping, or scouting that year.

Almost three-fourths of the birders reported taking some sort of non-wildlife-based recreation trip, but only one trip category--day visits to a natural area (other than hiking trips)--was cited by most of the birders. Over half (54.0%) had made at least one day visit, and 13.8% had made more than twenty day visits to a natural area.

Relative to the birders, a smaller percentage (60.8%) of the environmental group had taken a primary nonconsumptive trip. There were, however, some (7.6%) avid wildlife watchers who reported taking over thirty trips to watch wildlife. Only one (1.3%) had been hunting in the

Table 7. Number of wildlife-based and fishing trips in a forest or other natural area taken during the past year by birders, environmentalists, and hunters.

	Birders (N=87) %	Environ- mentalists (N=79) %	Hunters (N=106) %
<b>VISITS PRIMARILY TO WATCH WILDLIFE</b>			
None	14.9	39.2	38.7
1 -10	52.9	48.1	49.1
11-20	17.2	5.1	9.4
21-30	4.6	0.0	0.9
31 +	10.3	7.6	1.9
<b>SCOUTING</b>			
None	88.5	92.4	22.6
1 -10	11.5	5.1	49.1
11-20	0.0	2.5	12.3
21-30	0.0	0.0	11.3
31 +	0.0	0.0	4.7
<b>FISHING</b>			
None	73.6	82.3	17.9
1 -10	19.5	12.7	50.9
11-20	2.3	3.8	14.2
21-30	3.4	1.3	5.7
31 +	1.1	0.0	11.3
<b>HUNTING</b>			
None	89.7	98.7	22.6
1 -10	9.2	0.0	32.1
11-20	0.0	1.3	24.5
21-30	0.0	0.0	9.4
31 +	1.1	0.0	11.3
<b>TRAPPING</b>			
None	98.9	98.7	98.1
1 -10	0.0	1.3	1.9
11-20	0.0	0.0	0.0
21-30	1.1	0.0	0.0
31 +	0.0	0.0	0.0
<b>OTHER</b>			
None	100.0	100.0	98.1
1 -10	0.0	0.0	0.9
11-20	0.0	0.0	0.0
21-30	0.0	0.0	0.0
31 +	0.0	0.0	0.9

Table 8. Number of non-wildlife-based outdoor recreation trips in a forest or other natural area taken during the past year by birders, environmentalists, and hunters.

	Birders (N=87) %	Environ- mentalists (N=79) %	Hunters (N=106) %
<b>HIKING</b>			
None	54.0	25.3	64.2
1 -10	35.6	51.9	28.3
11-20	3.4	16.5	6.6
21-30	2.3	1.3	0.9
31 +	4.6	5.1	0.0
<b>DAY VISIT</b>			
None	46.0	45.6	58.5
1 -10	35.6	36.7	34.9
11-20	4.6	10.1	3.8
21-30	4.6	0.0	0.9
31 +	9.2	7.6	1.9
<b>BACKPACKING</b>			
None	85.1	74.7	86.8
1 -10	12.6	22.8	10.4
11-20	0.0	1.3	0.9
21-30	0.0	1.3	0.0
31 +	2.3	0.0	1.9
<b>CAMPING (Other than backpacking)</b>			
None	79.3	69.6	63.2
1 -10	19.5	27.8	28.3
11-20	1.1	1.3	5.7
21-30	0.0	0.0	0.9
31 +	0.0	1.3	1.9
<b>CANOEING</b>			
None	88.4	73.4	91.5
1 -10	11.6	22.8	6.6
11-20	0.0	3.8	0.9
21-30	0.0	0.0	0.0
31 +	0.0	0.0	0.9
<b>OTHER</b>			
None	95.4	92.4	95.3
1 -10	3.4	3.8	2.8
11-20	0.0	0.0	0.0
21-30	0.0	1.3	1.9
31 +	1.1	2.5	0.0

past year, and the same number had been trapping. However, 7.6% had taken scouting trips and 17.7% had fished that year.

Non-wildlife-based outdoor recreation trips were popular, especially hiking and other day visits to natural areas, reported by 74.7% and 54.4% of the respondents, respectively. For both hiking trips and day visits, about 20% of the respondents reported more than ten trips, and, like the wildlife watchers, a few (over 5%) participated in over thirty trips.

Wildlife-based and fishing activities were favored by hunters. While more than one-third (37.7%) took at least two kinds of non-wildlife-based recreation trips, there was no one non-wildlife-based activity in which a majority of the group participated. Conversely, trips made primarily to watch wildlife, scout, hunt, and fish were each taken by 61.3% to 82.1% of the hunter group. In addition, about 30% had scouted or fished more than ten times in the past year, and 45.3% of the respondents had been on more than ten hunting trips.

## **Discussion**

### Socioeconomic Characteristics

When examining these data, one should keep in mind the nature of the populations sampled. First, the user groups surveyed were imperfect representatives of wildlife users, particularly the populations chosen to represent nonconsumptive users. A more representative sample might have been based on actual participation in activities or on activity

specialization. Second, the populations represent different geographic regions (refer to Chapter III for details). Definitive socioeconomic comparisons can be made only between the hunters, birders, and forestry professionals, all of whom were Virginia residents.

Professional populations were remarkably similar, despite the differing geographic regions surveyed. Educational differences between the groups tended to reflect the different educational requirements of the professions.

Sex, education, age, and community-type differences among user groups were similar to differences between consumptive and nonconsumptive users found in previous studies (Fazio and Belli 1977, Witter 1978, Moss 1985). Birders and environmentalists were more likely to be female, and, in the case of birders, older than hunters. On the other hand, hunters were more likely to be rural residents, have blue-collar occupations, and have educational levels more typical of the general public. The similarity in household income has management implications. Unless the income intervals used in this study disguised actual population differences, income equity should not be an issue when making management decisions that might favor one of the three groups over another group.

#### Organizational Affiliations and Recreation Activities

Organizational affiliations of the wildlife professionals, birders, and hunters reflected the three groups' great interest in wildlife. Participation rates in wildlife-based recreation confirmed the interest.

Noteworthy was membership of wildlife professionals and birders (the groups most active in nonconsumptive recreation) in environmental- or preservation-oriented organizations, particularly the Nature Conservancy. This organization seeks to preserve unique ecological areas through land acquisition. Thus, organizations such as the Nature Conservancy are a means by which nonconsumptive users can contribute to wildlife conservation.

Organizational affiliations, participation rates in wildlife-based recreation, and considerable enjoyment of secondary wildlife encounters indicated that members of the forestry and environmental groups also had a substantial interest in wildlife. (Secondary encounters are discussed later in this chapter.) However, forestry professionals had both a consumptive and nonconsumptive interest, while the interest of the environmental group was essentially nonconsumptive.

#### **WILDLIFE MANAGEMENT APPROACHES AND HABITAT ISSUES**

In this section, subjects were asked their opinions regarding (1) whether or not wildlife should be managed, (2) five approaches to wildlife management (i.e., habitat modification, increasing the amount of habitat, habitat preservation, management through hunting, and management through timber harvesting), and (3) two habitat issues (i.e., effects of timber harvesting and adequacy of forest lands to meet the needs of wildlife). All items were presented as statements, and subjects used five-point Likert-type scales to express their opinions about the statements. Scale

values ranged from 1 = strongly disagree, to 3 = no opinion, to 5 = strongly agree.

### Professional Groups

Almost all respondents from the wildlife and forestry groups agreed<sup>10</sup> that wildlife should be managed, although the extent of agreement was greater for the wildlife professionals, i.e., they assigned higher values than the forestry professionals ( $P=0.001$ ). Similar tendencies were evident for four of the five approaches to wildlife management: wildlife professionals were more supportive than forestry professionals of habitat modification, habitat preservation, increasing the amount of wildlife habitat, and use of hunting as a wildlife management tool. Differences of opinion were greatest regarding habitat preservation and increasing wildlife habitat. In fact, of the five approaches to wildlife management, these two items received the highest mean scores from the wildlife professionals and the lowest mean scores from the forestry professionals. (For a comparison of mean scores assigned by the professional groups, see Figure 1. Frequencies and percentages of responses for each statement are listed in Table 9).

The management approach that forestry professionals most agreed with was the use of timber harvesting to help manage some wildlife spe-

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<sup>10</sup> For this discussion, both respondents who indicated that they "agree" and those who indicated that they "strongly agree" with a statement will simply be referred to agreeing with the statement. Likewise, "disagree" and "strongly disagree" will both be referred as disagreeing. However, categories were not collapsed when performing Kruskal-Wallis tests or calculating mean scores.

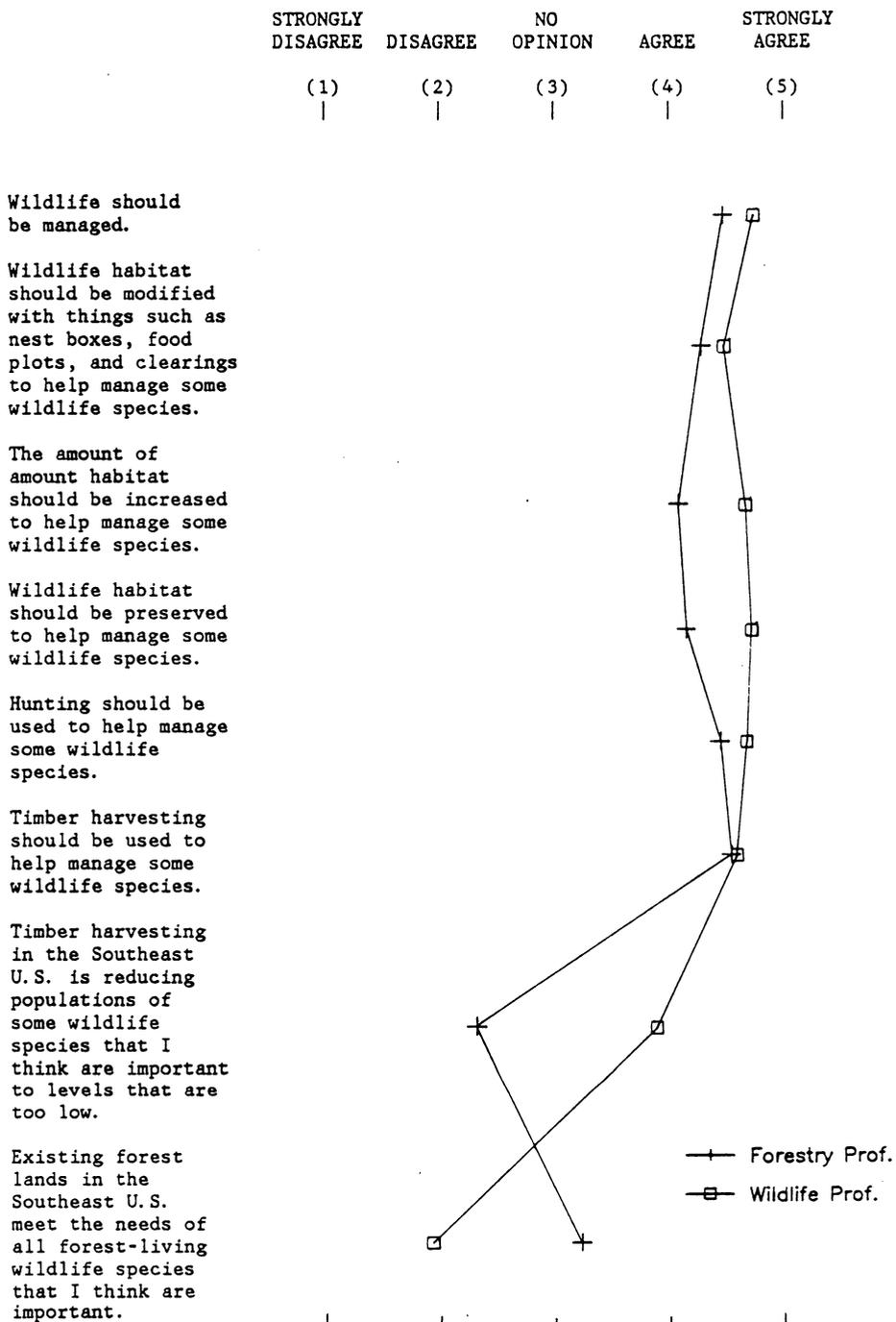


Figure 1. Forestry and wildlife professionals' views about wildlife management approaches and habitat issues, means.

Table 9. Views of forestry and wildlife professionals about wildlife management, approaches to wildlife management, and habitat issues.

		Forestry Prof.		Wildlife Prof.	
		freq.	%	freq.	%
		(N=86)		(N=87)	
* Wildlife should be managed.	SA <sup>1</sup>	45	52.3	70	80.5
	A	38	44.2	15	17.2
	NO	1	1.2	0	0.0
	D	2	2.3	1	1.1
	SD	0	0.0	1	1.1
		(N=87)		(N=87)	
* Wildlife habitat should be modified with things such as nest boxes, food plots, and clearings to help manage some wildlife species.	SA	28	32.2	51	58.6
	A	56	64.4	32	36.8
	NO	2	2.3	0	0.0
	D	1	1.1	3	3.4
	SD	0	0.0	1	1.1
		(N=85)		(N=87)	
* The amount of amount habitat should be increased to help manage some wildlife species.	SA	23	27.1	62	71.3
	A	51	60.0	24	27.6
	NO	6	7.1	0	0.0
	D	5	5.9	0	0.0
	SD	0	0.0	1	1.1
		(N=87)		(N=87)	
* Habitat should be preserved to help manage some wildlife species.	SA	32	36.8	68	78.2
	A	46	52.9	17	19.5
	NO	1	1.1	0	0.0
	D	5	5.7	1	1.1
	SD	3	3.4	1	1.1

<sup>1</sup> SA = strongly agree, A = agree, NO = no opinion, D = disagree, and SD = strongly disagree

\* Significant difference between populations ( $P \leq 0.05$ )

Table 9, con't. Views of forestry and wildlife professionals about wildlife management, approaches to wildlife management, and habitat issues

		Forestry Prof.		Wildlife Prof.	
		freq.	%	freq.	%
		(N=87)		(N=87)	
* Hunting should be used to help manage some wildlife species.	SA <sup>1</sup>	41	47.1	62	71.3
	A	44	50.6	23	26.4
	NO	2	2.3	1	1.1
	D	0	0.0	0	0.0
	SD	0	0.0	1	1.1
		(N=87)		(N=86)	
Timber harvesting should be used to help manage some wildlife species.	SA	51	58.6	55	64.0
	A	33	37.9	29	33.7
	NO	2	2.3	0	0.0
	D	1	1.1	1	1.2
	SD	0	0.0	1	1.2
		(N=87)		(N=86)	
* Timber harvesting in the Southeast U.S. is reducing populations of some wildlife species that I think are important to levels that are too low.	SA	4	4.6	24	28.9
	A	10	11.5	41	49.4
	NO	16	18.4	6	7.2
	D	36	41.4	10	12.0
	SD	21	24.1	2	2.4
		(N=87)		(N=83)	
* Existing forest lands in the Southeast U.S. meet the needs of all forest-living wildlife species that I think are important.	SA	9	10.3	3	3.6
	A	35	40.2	5	6.0
	NO	15	17.2	4	4.8
	D	23	26.4	42	50.6
	SD	5	5.7	29	34.9

<sup>1</sup> SA = strongly agree, A = agree, NO = no opinion, D = disagree, and SD = strongly disagree

\* Significant difference between populations ( $P \leq 0.05$ )

cies; for this item, there was no difference between the ranks of the professional groups ( $P=0.4591$ ).

The professional groups did not agree regarding the two habitat issues stated as these contentions: (1) timber harvesting in the Southeast U. S. is reducing populations of wildlife species the respondents consider to be important to levels that are too low ( $P=0.0001$ ), and (2) existing forest lands in the Southeast U. S. meets the needs of all forest-living wildlife species the respondents feel are important ( $P=0.0001$ ). A large majority (78.3%) of the wildlife professionals agreed with the former statement, although some (14.5%) disagreed. This resulted in a mean score of 3.90. Conversely, most (65.5%) of the forestry professionals disagreed with the statement, the rest were fairly evenly split between having no opinion and agreement or strong agreement. Thus, the mean score of the forestry group indicated slight disagreement ( $\bar{X}=2.31$ ).

Most (85.5%) of the wildlife professionals disagreed with the second assertion (regarding existing forest lands meeting the needs of wildlife species); this resulted in a mean score of 1.93. The forestry subjects were less uniform in their responses. Over half (55.6%) were in agreement, about a third (32.2%) disagreed, and 17.2% held no opinion. The mean for the responses was 1.93.

### User Groups

Over 90% of each user group believed that wildlife should be managed, but birders and hunters indicated "strongly agree" more frequently than environmentalists. In addition, user groups differed regarding the

extent of agreement with the five methods of management. (See Figure 2 for a comparison of the group means and Table 10 for frequencies and percentages.) For instance, over 90% of the birders and most hunters and environmentalists agreed that habitat should be modified to help manage some species, yet a substantial proportion of the environmentalists either disagreed (12.7%) or had no opinion (15.2%), and 13.8% of the hunters expressed disagreement.

About three-fourths (78.2%) of the hunters and almost all birders and environmentalists believed that increasing wildlife habitat was acceptable. Still, 17.2% of the hunters had no opinion.

Support was higher for the concept of habitat preservation. All birders and environmentalists and 94.4% of the hunters agreed with the preservation statement. The two former groups assigned average scores of 4.71 and 4.65, respectively, while the average for the hunters was 4.04. The hunters' ratings differed significantly from the other two user groups' ratings.

Acceptance of hunting as a management tool differed according to population; Kruskal-Wallis tests showed significant differences between all groups. As would be expected, hunters were most supportive of the approach: over 90% of the hunters agreed with the statement. A majority (69.2%) of the birders were also in agreement, but the remainder of that group were evenly divided between disagreement and holding no opinion. Environmentalists showed considerable differences of opinion. Of those expressing an opinion, almost two-thirds agreed. For the population as

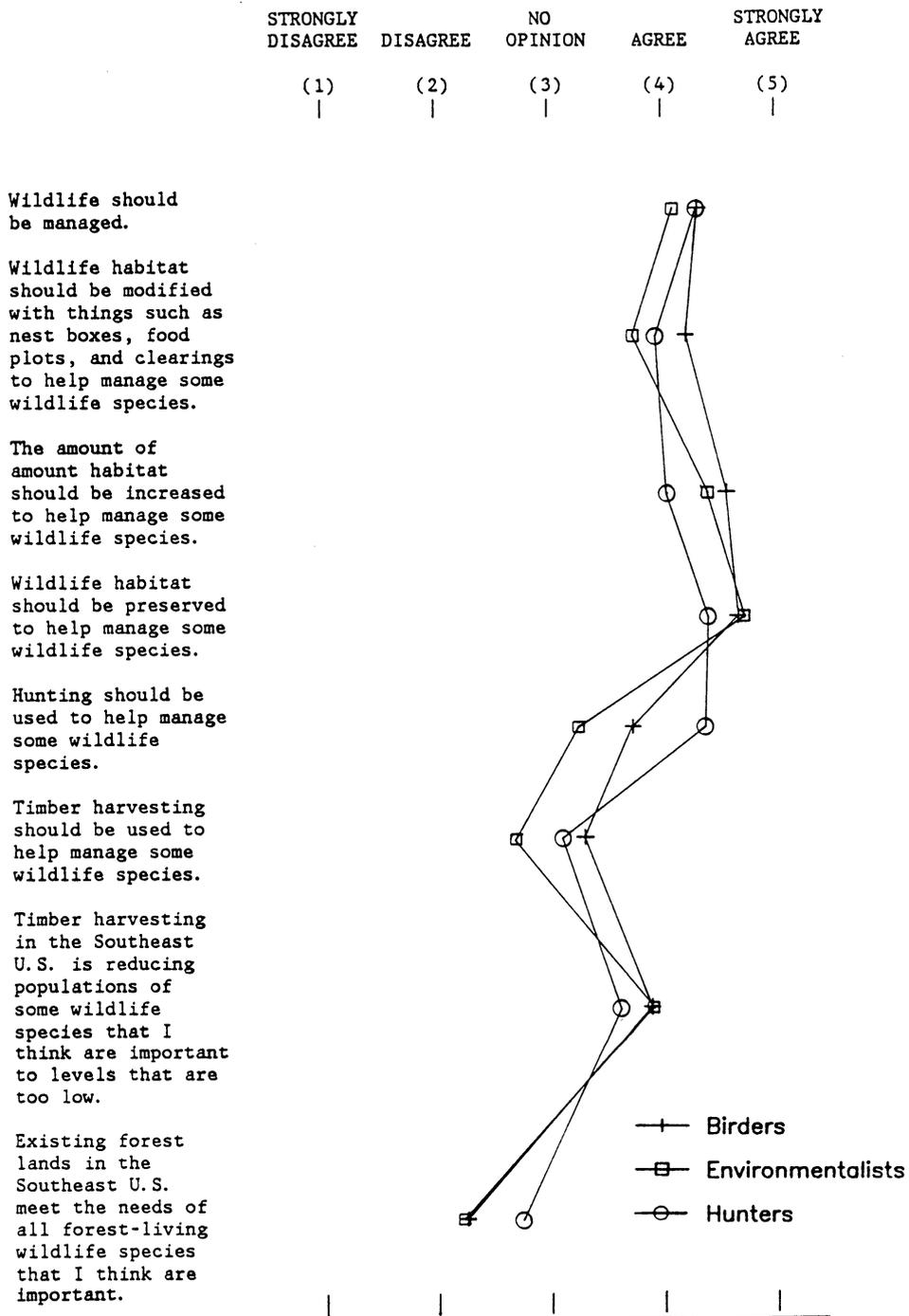


Figure 2. Birders', environmentalists', and hunters' views about wildlife management approaches and habitat issues, means.

Table 10. Views of birders, environmentalists, and hunters about wildlife management, approaches to wildlife management, and habitat issues.

		Birders		Environmentalists		Hunters	
		freq.	%	freq.	%	freq.	%
		(N=87)		(N=76)		(N=108)	
*	Wildlife should be managed.	SA <sup>1</sup>	34 39.1	18 23.7	51 47.2		
		A	48 55.2	51 67.1	47 43.5		
		NO	3 3.4	4 5.3	5 4.6		
		D	2 2.3	2 2.6	2 1.9		
		SD	0 0.0	1 1.3	3 2.8		
		(N=91)		(N=79)		(N=109)	
*	Wildlife habitat should be modified with things such as nest boxes, food plots, and clearings to help manage some wildlife species.	SA	32 35.2	14 17.7	35 32.1		
		A	52 57.1	43 54.4	52 47.7		
		NO	3 3.3	12 15.2	7 6.4		
		D	2 2.2	7 8.9	12 11.0		
		SD	2 2.2	3 3.8	3 2.8		
		(N=92)		(N=79)		(N=110)	
**	The amount of amount habitat should be increased to help manage some wildlife species.	SA	54 58.7	36 45.6	34 30.9		
		A	35 38.0	40 50.6	52 47.3		
		NO	3 3.3	1 1.3	19 17.3		
		D	0 0.0	2 2.5	4 3.6		
		SD	0 0.0	0 0.0	1 0.9		
		(N=92)		(N=78)		(N=107)	
**	Habitat should be preserved to help manage some wildlife species.	SA	60 65.2	55 70.5	51 47.7		
		A	32 34.8	23 29.5	50 46.7		
		NO	0 0.0	0 0.0	3 2.8		
		D	0 0.0	0 0.0	2 1.9		
		SD	0 0.0	0 0.0	1 0.9		

<sup>1</sup> SA = strongly agree, A = agree, NO = no opinion, D = disagree, and SD = strongly disagree

\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) environmentalists and hunters and (3) environmentalists and birders ( $P \leq 0.05$ ).

\*\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) environmentalists and hunters and (3) hunters and birders ( $P \leq 0.05$ ).

Table 10, con't. Views of birders, environmentalists, and hunters about wildlife management, approaches to wildlife management, and habitat issues.

		Birders		Environ- mentalists		Hunters	
		freq.	%	freq.	%	freq.	%
		(N=91)		(N=78)		(N=110)	
*** Hunting should be used to help manage some wildlife species.	SA <sup>1</sup>	20	22.0	5	6.4	53	48.2
	A	43	47.3	38	48.7	48	43.6
	NO	14	15.4	11	14.1	5	4.5
	D	10	11.0	18	23.1	2	1.8
	SD	4	4.4	6	7.7	2	1.8
		(N=90)		(N=78)		(N=108)	
* Timber harvesting should be used to help manage some wildlife species.	SA	10	11.1	1	1.3	17	15.7
	A	33	36.7	22	28.2	26	24.1
	NO	25	27.8	17	21.8	26	24.1
	D	18	20.0	28	35.9	28	25.9
	SD	4	4.4	10	12.8	11	10.2
		(N=92)		(N=79)		(N=110)	
Timber harvesting in the Southeast U.S. is reducing populations of some wildlife species that I think are important to levels that are too low.	SA	27	29.3	21	26.6	20	18.2
	A	32	34.8	34	43.0	41	37.3
	NO	28	30.4	21	26.6	38	34.5
	D	5	5.4	2	2.5	7	6.4
	SD	0	0.0	1	1.3	4	3.6
		(N=92)		(N=76)		(N=110)	
** Existing forest lands in the Southeast U.S. meet the needs of all forest-living wildlife species that I think are important.	SA	0	0.0	0	0.0	7	6.4
	A	8	8.8	7	8.8	21	19.1
	NO	26	28.6	22	27.5	33	30.0
	D	37	40.7	32	40.0	35	31.8
	SD	20	22.0	19	23.8	14	12.7

<sup>1</sup> SA = strongly agree, A = agree, NO = no opinion, D = disagree, and SD = strongly disagree

- \* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) environmentalists and hunters and (3) environmentalists and birders ( $P \leq 0.05$ ).
- \*\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) environmentalists and hunters and (3) hunters and birders ( $P \leq 0.05$ ).
- \*\*\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) all three pairs of populations ( $P \leq 0.05$ ).

a whole, 55.1% were in agreement, 30.8% disagreed, and 14.1% expressed no opinion.

Wildlife management through timber harvesting resulted in mixed responses from all user groups. The birders were most supportive, with almost half (47.8%) of the group showing agreement and about one-fourth (24.4%) expressing disagreement. Of the hunters, 39.8% agreed, while almost as many (36.1%) disagreed. The environmentalists were least supportive. Almost half (48.7%) were opposed, while 29.5% indicated that they agreed. Between 20% and 30% of each user group declared that they had no opinion.

When responding to the assertion that timber harvesting in the Southeast U. S. was reducing populations of some wildlife species important to the subjects to levels that were too low, the tendency of all three user groups was either to agree with the statement (55.5% to 69.6%) or concede having no opinion (26.6% to 34.5%). In addition, a few hunters (10.0%) disagreed.

The final habitat issue item asked users to respond to the contention that forests in the Southeast U. S. meet the needs of forest-living wildlife. As with the previous habitat issue, many users of each population (27.5% to 30.0%) indicated that they had no opinion. Of those who did express an opinion, over 87% of the birders and environmentalists disagreed; for the two samples as a whole, this was slightly over 60% of the respondents. Responses from hunters who expressed an opinion were mixed: over one-third (or about one-quarter of all hunters responding)

agreed that existing forest habitat was adequate; 63.3% (less than half of all respondents) disagreed.

## **Discussion**

### Professional Groups

Generally, wildlife professionals deemed all five approaches to wildlife management to be acceptable. Forestry professionals were also supportive of all five approaches, but showed the strongest support for the approach that favored timber management (i.e. wildlife management through timber harvesting) and the least support for those that might restrict it (i.e. habitat preservation and increasing the amount of wildlife habitat). An example of such restrictions are those associated with federally-designated wilderness areas. In Virginia, creation of such wilderness areas in two national forests precluded future timber management in the preserves and, in addition, the air quality requirements associated with federal wilderness areas caused concern for a corporation operating a nearby papermill (Payne 1984).

The professional groups showed substantial differences of opinion regarding the forest habitat issues. Differences within the professional groups were important, but even more striking were the differences between professional groups. This indicates large differences in perceptions of either the impacts of habitat alterations, or the value of the impacted wildlife, or both.

## User Groups

User groups were most divided on hunting and timber harvesting as a means of wildlife management. Differences in opinion within the birder and environmental groups regarding hunting as a management tool were not unexpected. In a survey of the Michigan Audubon Society, Shaw (1975) found that members held a wide range of attitudes toward hunting, rather than a single dominant belief. In addition, while sport hunting is often promoted as a means of wildlife population control (e.g. National Rifle Association 1979), population control arguments are sometimes viewed as a rationalization of hunting rather than a rationale for hunting. In addition, Shaw (1975) found that hunting was opposed more often on grounds of suffering and cruelty than on its ecological effects.

Opposition to use of timber harvesting to manage wildlife may have stemmed from opposition to clearcutting in general. For example, much of the controversy generated by the 1985 management plans for Virginia's two national forests revolved around clearcut harvesting. Of particular interest were hunters who did not agree that timber harvesting should be used to manage some species: habitat diversity and early seral stages created after harvest can benefit game species such as turkey and deer.

Generally, all user groups believed timber harvesting was detrimental to some species, even though many had agreed that timber harvesting was a valid management approach for some species. Thus, users perceive both advantages and disadvantages to timber harvesting.

Finally, in natural resources conflicts, advocates of a particular view often believe opposing views are rooted in ignorance or naivete (Shaw

1975; e.g., Eckles 1951, Bennett 1987, Williamson 1987). Therefore, it is interesting to note the willingness of user group subjects to concede that they had no opinion regarding the habitat issues. Many times, subjects wrote on the returned questionnaires that they had indicated "no opinion" because they simply did not know enough about the issue to form an opinion.

### SOCIAL VALUES OF WILDLIFE

Subjects were presented with a list of social values attributed to wildlife and asked to declare (1) which values best explained why wildlife was important to the subjects personally, and (2) which values best justified tax expenditures on wildlife management. Wildlife and forestry professionals regarded most of the values in a similar light, while user populations differed concerning the importance of many of the values. Respondents' choices are detailed in Appendix D, Tables 1 through 5.

#### Professional Groups

The value of wildlife as a part of the ecological balance was by far the most important reason given by professionals to explain why wildlife was important to them (Table 11). In fact, a majority of both populations selected wildlife's ecological value as their first choice. Next in importance were the value of wildlife to the future--its bequest value--and its heritage value. Less important were values more likely to immediately affect individuals--recreational values, food and fur

Table 11. Average ranks<sup>1</sup> for social values of wildlife assigned by forestry and wildlife professionals to explain why wildlife is important to them personally.

	Forestry Professionals (N=85)	Wildlife Professionals (N=87)
Wildlife is a part of the ecological balance	2.33	2.32
Future generations should have the opportunity to enjoy wildlife	0.92	0.94
Wildlife is an important part of our heritage	0.73	0.56
Wildlife has a right to exist	0.65	0.44
Watching wildlife is enjoyable	0.46	0.38
* Hunting wildlife is enjoyable	0.28	0.47
* Wildlife has scientific value	0.16	0.47
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	0.19	0.16
Wildlife helps the economy through tourism and expenditures for supplies and fees	0.14	0.07
Wildlife provides food and fur	0.12	0.06
Other	0.02	0.10

<sup>1</sup> The average rank of a social value was calculated by allocating 3 points each time a value was listed as a subject's first choice, 2 points for each second choice, and 1 point for each third choice, then dividing by the number of respondents for the respective population.

\* Significant difference between populations ( $P \leq 0.05$ ).

values, and value to the economy--in addition to scientific values, existence values (the value of knowing that wildlife exists), and the right of wildlife to exist. The professional populations differed only in their rankings of hunting recreation and scientific values, which the wildlife group ranked higher than the forestry group.

There were no significant differences between professional groups regarding which social values justified tax expenditures (Table 12). Relative to the first ranking, ecological value decreased in importance, while bequest value increased, leaving the two values nearly equal in importance. Also, the value of wildlife to the economy increased substantially, and hunting recreation and wildlife watching value lessened for the wildlife professionals.

#### User groups

Hunters differed from the birders and environmentalists regarding the importance of four of the ten social values: ecological, hunting recreation, and food/fur values, as well as the right of wildlife to exist (Table 13). Responses of the hunters will be assessed first.

Hunters rated highly and nearly equally the ecological, hunting recreation, and bequest values of wildlife. Also important were the right of wildlife to exist, wildlife watching recreation, and the value of wildlife to future generations.

With the exception of hunting recreation value, items that received the highest ranks from the hunters likewise received the highest ranks from the birders and environmentalists. As with the professional groups,

Table 12. Average ranks<sup>1</sup> for social values of wildlife assigned by forestry and wildlife professionals to explain why tax dollars should be spent on wildlife management.

	Forestry Professionals (N=79)	Wildlife Professionals (N=84)
Wildlife is a part of the ecological balance	1.70	1.56
Future generations should have the opportunity to enjoy wildlife	1.41	1.35
Wildlife helps the economy through tourism and expenditures for supplies and fees	0.75	0.89
Wildlife has scientific value	0.56	0.58
Wildlife is an important part of our heritage	0.54	0.50
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	0.16	0.32
Wildlife has a right to exist	0.39	0.10
Watching wildlife is enjoyable	0.24	0.15
Wildlife provides food and fur	0.15	0.13
Hunting wildlife is enjoyable	0.10	0.10
* Other	0.00	0.23

<sup>1</sup> The average rank of a social value was calculated by allocating 3 points each time a value was listed as a subject's first choice, 2 points for each second choice, and 1 point for each third choice, then dividing by the number of respondents for the respective population.

\* Significant difference between populations ( $P \leq 0.05$ )

Table 13. Average ranks<sup>1</sup> for social values of wildlife assigned by birders, environmentalists, and hunters to explain why wildlife is important to them personally.

	Birders (N=92)	Environ- mentalists (N=80)	Hunters (N=109)
* Wildlife is a part of the ecological balance	2.18	2.29	1.06
* Wildlife has a right to exist	1.01	1.35	0.65
Future generations should have the opportunity to enjoy wildlife	0.91	0.86	0.94
Watching wildlife is enjoyable	0.73	0.40	0.65
* Hunting wildlife is enjoyable	0.05	0.00	1.02
Wildlife is an important part of our heritage	0.45	0.36	0.59
Wildlife has scientific value	0.37	0.30	0.39
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	0.08	0.13	0.16
* Wildlife provides food and fur	0.05	0.00	0.27
Wildlife helps the economy through tourism and expenditures for supplies and fees	0.02	0.03	0.03
Other	0.11	0.16	0.00

<sup>1</sup> The average rank of a social value was calculated by allocating 3 points each time a value was listed as a subject's first choice, 2 points for each second choice, and 1 point for each third choice, then dividing by the number of respondents for the respective population.

\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) hunters and birders and (3) hunters and environmentalists ( $P \leq 0.05$ ).

the value of wildlife to the ecological balance was decidedly the highest rated value. Second in importance was the right of wildlife to exist. The importance placed on this value was considerably higher than that assigned by either the hunters or the professionals. Recreational hunting, a top-ranked item for the hunters, was ranked very low by the other user groups--not surprising considering that only 17 of the birders and 4 of the environmentalists hunted. Also, even though hunters did not consider the food or fur value of wildlife to be very important, it was no surprise that the nonconsumptive groups assigned a score that was significantly lower.

Reasons users cited to justify expenditure on wildlife management often differed from reasons used to explain why wildlife was important to them personally (Table 14). Generally, values that might be associated with social welfare increased in importance: wildlife's value to the economy increased in importance for all three user groups, the bequest value increased for the hunters, and the scientific value increased for the environmentalists. Values that diminished in importance for one or more groups were nonconsumptive and consumptive recreation values and wildlife's right to exist.

## **Discussion**

The social values listed were adapted from Shaw (1975), who asked Michigan hunters, Michigan Audubon Society members, and Michigan supporters for The Fund for Animals to indicate the importance of each value

Table 14. Average ranks<sup>1</sup> for social values of wildlife assigned by birders, environmentalists, and hunters to explain why tax dollars should be spent on wildlife management.

	Birders (N=90)	Environ- mentalists (N=79)	Hunters (N=92)
* Wildlife is a part of the ecological balance	1.91	2.16	1.09
Future generations should have the opportunity to enjoy wildlife	1.16	1.06	1.45
Wildlife helps the economy through tourism and expenditures for supplies and fees	0.43	0.46	0.47
Wildlife has a right to exist	0.53	0.85	0.66
Wildlife has scientific value	0.63	0.62	0.63
Wildlife is an important part of our heritage	0.59	0.46	0.63
Watching wildlife is enjoyable	0.23	0.14	0.17
** We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	0.18	0.01	0.23
*** Hunting wildlife is enjoyable	0.09	0.00	0.30
Wildlife provides food and fur	0.09	0.05	0.16
Other	0.11	0.10	0.00

<sup>1</sup> The average rank of a social value was calculated by allocating 3 points each time a value was listed as a subject's first choice, 2 points for each second choice, and 1 point for each third choice, then dividing by the number of respondents for the respective population.

\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) hunters and birders and (3) hunters and environmentalists ( $P \leq 0.05$ ).

\*\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, between (2) environmentalists and birders and (3) environmentalists and hunters ( $P \leq 0.05$ ).

\*\*\* Significant differences (1) among the three user populations and, in subsequent pairwise comparisons, each of the three pairs of populations ( $P \leq 0.05$ ).

by using a Likert-type scale. Moss (1985) also used these values in her survey of Virginia's residents, hunters, and contributors to the state's non-game fund; she asked her subjects to indicate which social values were important reasons for managing wildlife. Because different methods of measurement were used and items were not worded the same, definitive comparisons cannot be made between this study and studies conducted by Shaw and Moss. However, some similarities are evident.

Generally, ecological, heritage, wildlife watching, and scientific values were important in all three studies. (Two values that received fairly high ratings in this study--the value of wildlife to future generations and wildlife's right to exist--were not used in the other two studies.) Conversely, existence values were assigned relatively high ratings in Shaw's and Moss' research, but low ratings in this study.

Michigan hunters rated hunting recreation as important, but less important than either viewing recreation or ecological value. Moss found that Virginia hunters believed that hunting recreation was an important reason why wildlife should be managed; and in this study, hunting recreation was very important personally to Virginia hunters, but much less important as a reason why tax monies should be spent on wildlife management.<sup>11</sup>

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<sup>11</sup> It was evident from written comments that the questionnaire wording was confusing: some subjects assumed that "tax dollars" referred only to general tax funds, while other subjects probably included the excise taxes on hunting and fishing equipment as tax dollars. This undoubtedly influenced responses regarding which social values justified tax expenditures for wildlife management, and results should be interpreted in that light.

Moss noted that indirect benefits (benefits not requiring direct interaction with wildlife) such as existence, preservation<sup>12</sup> and land health benefits<sup>13</sup> were valued by both wildlife users and non-users. This fact may help explain the importance of indirect values in this study, also.

Another explanation might be that indirect values may incorporate an option value: the value of having the option to use the resource at a later time. Indeed, indirect values help ensure that direct values are possible, i.e., if the condition of the wildlife resource enables one to derive ecological, bequest, or existence values from it, then one could also probably realize direct benefits from consumptive and nonconsumptive activities.

Evaluation of social values may be complicated by overlap in the values as described on the questionnaire. For instance, "wildlife is a part of our cultural heritage" may incorporate the perceived value of wildlife to future generations, as well as the historical importance of wildlife to the present generation. Additionally, it could be argued that the item "wildlife has a right to exist" is in fact the existence value of wildlife to people--the value people derive just from knowing that wildlife exists.

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<sup>12</sup> Moss cited Giles (1978), who stated that preservation benefit was the value people got from knowing that wildlife preservation efforts were being made.

<sup>13</sup> Essentially, knowing that the land is ecologically sound.

## VALUED WILDLIFE EXPERIENCES IN WILDLIFE-ASSOCIATED RECREATION

### Wildlife Watching Experiences

To determine how wildlife itself contributed to wildlife-associated recreation, subjects were presented with seven different wildlife watching experiences and asked to indicate which three experiences they would most enjoy during nonconsumptive and consumptive trips. Subjects were asked to indicate enjoyment for: (1) seeing many different wildlife species, (2) seeing a large number of animals of one of your favorite species, (3) seeing a large number of animals of many different species, (4) seeing a family group of wildlife such as parents with young, (5) seeing a group of animals, such as a flock or herd, (6) seeing a rare or endangered animal, and (7) seeing a species you had never seen before.<sup>14</sup> First, enjoyment preferences were indicated for wildlife watching experiences during purely nonconsumptive trips, excluding scouting. Thus, these experiences were assessed for trips taken primarily to watch wildlife and for wildlife watching incidental to hiking, camping, and other non-wildlife-based outdoor recreation. Second, subjects who hunted and, while out hunting, watched wildlife were asked to assess the seven experiences. This provided information about wildlife watching during consumptive trips.

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<sup>14</sup> In this discussion, experience 7 will be described as seeing a new species.

### Professional Groups

For purely nonconsumptive trips, both manager groups gave their highest scores to seeing new species, seeing many different species, and seeing a rare or endangered animal (Table 15). In addition, forestry professionals assigned relatively high ranks to seeing family groups of wildlife; this experience was the only one for which preferences assigned by the professional groups differed ( $P=0.0028$ ).

When experiences enjoyed while hunting were compared to those enjoyed during purely nonconsumptive trips, there was a change in the relative importance of the ranks within populations. However, Kruskal-Wallis tests indicated there were no significant differences in ranks for any individual wildlife watching experience.

### User Groups

As with the forestry professionals, birders and environmentalists indicated they would most enjoy seeing new species, many different species, rare or endangered animals, and family groups during nonconsumptive trips (Table 16). However, birders clearly gave the highest rating to seeing new species.

As a group, hunters ranked seeing family groups of wildlife higher than all other experiences. Next, hunters enjoyed seeing many different species, rare or endangered animals, many animals of one of their favorite species, seeing new species, seeing a large number of animals of many different species, and seeing many different species. The only experience given a substantially lower rating was seeing a flock or herd of animals.

Table 15. Average ranks<sup>1</sup> assigned by forestry and wildlife professionals for wildlife watching experiences during purely nonconsumptive trips (excluding scouting).

	Forestry Professionals (N=74)	Wildlife Professionals (N=82)
WHILE WATCHING WILDLIFE, OF THE FOLLOWING EXPERIENCES WOULD YOU MOST ENJOY?		
Seeing a species you had never seen before	1.68	1.55
Seeing many different wildlife species	1.23	1.54
Seeing a rare or endangered animal	1.19	1.21
* Seeing a family group of wildlife, such as parents with their young	1.01	0.52
Seeing a large number of animals of many different species	0.47	0.68
Seeing a large number of animals of one of your favorite species	0.14	0.35
Seeing a group of animals, such as a flock or herd	0.28	0.13

<sup>1</sup> The average rank of a wildlife watching experience was calculated by allocating 3 points each time a value was listed as a subject's first choice, 2 points for each second choice, and 1 point for each third choice, then dividing by the number of respondents for the respective population.

\* Significant difference between populations ( $P \leq 0.05$ )

Table 16. Average ranks<sup>1</sup> assigned by birders, environmentalists, and hunters for wildlife watching experiences during purely nonconsumptive trips (excluding scouting).

	Birders (N=90)	Environ- mentalists (N=70)	Hunters (N=92)
WHILE WATCHING WILDLIFE, OF THE FOLLOWING EXPERIENCES WOULD YOU MOST ENJOY?			
Seeing many different wildlife species	1.23	1.34	1.03
* Seeing a species you had never seen before	1.69	1.36	0.77
* Seeing a rare or endangered animal	1.16	1.37	0.83
* Seeing a family group of wildlife, such as parents with their young	1.01	1.01	1.47
Seeing a large number of animals of many different species	0.40	0.36	0.70
* Seeing a large number of animals of one of your favorite species	0.19	0.11	0.77
Seeing a group of animals, such as a flock or herd	0.32	0.33	0.34

<sup>1</sup> The average rank of a wildlife watching experience was calculated by allocating 3 points each time a value was listed as a subject's first choice, 2 points for each second choice, and 1 point for each third choice, then dividing by the number of the respondents for the respective population.

\* Significant differences (1) among the three user populations and in subsequent pairwise comparisons between (2) hunters and birders, and (3) hunters and environmentalists ( $P \leq 0.05$ ).

Relative to the birders and environmentalists, hunters assigned significantly higher ranks to seeing family groups and to seeing a large number of animals of a favorite species, and gave somewhat lower ranks to seeing rare or endangered animals.

For the birder and environmental groups, there were no significant differences between enjoyment of experiences during a purely nonconsumptive trip and during a consumptive trip. However, the small numbers who hunted may have been inadequate to show any differences that might have existed. Of the 17 birders who hunted, only 47.1% rated the experiences to be the same for both nonconsumptive and consumptive trips, while two of the four members of the environmental group who hunted assigned identical ratings to the seven experiences.

Generally, hunters enjoyed the same wildlife watching experiences during hunting trips as they did during purely nonconsumptive trips. However, during hunting trips, seeing many different species received the highest rating, while seeing a family group lowered in importance.

### Hunting Experiences

Subjects who hunted were asked to indicate how five wildlife experiences would affect their enjoyment while out hunting the game species they most enjoyed hunting. The five wildlife experience items were: (1) shooting the game animal, or bagging your limit, (2) not shooting any of the game animals, or not bagging your limit, (3) seeing a large number of the game animals, (4) seeing other game species, and (5) seeing non-

game species. Subjects rated the items using a seven-point scale, ranging from -3 = strongly decrease enjoyment, to 0 = no effect, to +3 = strongly increase enjoyment (Appendix E, Tables 6-10).

### Professional Groups

The professional groups rated "seeing a large number of the game animals" highest (combined  $\bar{X}=2.46$ ), closely followed by "seeing other game species" (combined  $\bar{X}=2.22$ ). "Shooting the game animal, or bagging your limit" also increased hunting enjoyment (combined  $\bar{X}=1.92$ ). On the other hand, "not shooting any of the game animals, or not bagging your limit" only slightly decreased enjoyment (combined  $\bar{X}=-0.41$ ). The two groups differed significantly for the item "seeing non-game species" ( $P=0.0061$ ). Wildlife professionals enjoyed non-game species slightly more than forestry professionals ( $\bar{X}=2.18$  and  $\bar{X}=1.66$ , respectively).

### User Groups

Due to the small number of respondents from the environmental group who hunted, only the responses of the birders and hunters were compared. Both hunters and birders enjoyed harvest success (shooting the game animal or bagging the limit), but hunters indicated a significantly greater increase in enjoyment than did the birders ( $P=0.0373$ ); mean scores were 2.10 for the hunters and 1.50 for the birders. For both groups, not shooting any animals or not bagging the limit detracted slightly from hunting enjoyment (combined  $\bar{X}=-0.34$ ), and enjoyment ratings did not differ significantly ( $P=0.8842$ ).

There were no differences between the hunters and birders for the seeing game species: "seeing a large number of the game animals (being hunted)" received the highest mean score ( $P=0.1767$ , combined  $\bar{X}=2.56$ ), followed by "seeing other game species" ( $P=0.7254$ , combined  $\bar{X}=2.25$ ). Conversely, enjoyment of seeing non-game species was dependent on the user group ( $P=0.0061$ ); birders preferred this experience more than hunters ( $\bar{X}=2.18$  and  $\bar{X}=1.14$ , respectively). Notably, within the birder population, mean ratings for "seeing other game species" and "seeing non-game species" were the same ( $\bar{X}=2.18$ ).

### **Secondary Encounters with Wildlife**

To indicate the importance of wildlife encounters incidental to hiking, backpacking, or other non-wildlife-based outdoor recreation, subjects who had had such encounters during the past year were asked how the experience affected their enjoyment of a typical trip. A seven-point scale (where -3 = strongly decreased enjoyment, 0 = did not affect enjoyment, and +3 = strongly increased enjoyment) was used. The professionals' responses to this questions are reported in Appendix E, Table 11; Appendix E, Table 12 lists responses of the users.

Wildlife professionals rated the encounters higher than the forestry professionals ( $P=0.0003$ ). Mean scores were 2.73 for the former group and 2.30 for the latter.

All three user groups indicated that wildlife encounters substantially increased their enjoyment; birders rated the encounters highest

( $\bar{X}$ =2.79), while the enjoyment ratings of the hunters and environmentalists did not significantly differ from one another (combined  $\bar{X}$ = 2.56).

## **Discussion**

### Wildlife Watching Experiences

Preferences of birders for seeing new species seems to support the importance of identifying new species or of life lists.<sup>15</sup> The high rankings received by the items regarding seeing new species, rare or endangered animals, and many different species suggests that encounters with a less common species are preferred over species abundance (a large number of a species) or species groups such as flocks or herds.

Hunters may be an exception to the suggestion that less common encounters would be most enjoyable. While hunters as a group indicated they would receive most enjoyment from seeing family groups, mean scores for other wildlife experiences suggests that the group enjoys a wide range of experiences.

Surprisingly, family groups of wildlife were relatively important to all groups except the wildlife professionals. Professional groups may view seeing family groups as a relatively common experience, or perhaps they associate liking family groups as symptomatic of Bambiosis, the projection of positive human attributes on wild animals.

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<sup>15</sup> Life lists are kept by many birders to document the different species they have seen in their lifetime.

### Hunting Experiences

Many researchers have suggested that harvest is only one of many desired experiences resulting from hunting (Hendee 1974, Kennedy 1970), and the fact that the two items concerned with seeing game animals received higher ranks than the harvest item for all four groups seems to support this idea. Also, the desired experiences may be dependent on time. Jackson et al. (1981) have suggested that satisfaction derived from harvest depended on the time of the hunting season. For example, a hunter who bags the limit at the beginning of the season is excluded from the satisfaction derived from the additional hunting trips that he or she would have otherwise taken during the remainder of the season. Another possibility is that the items may have been assessed in light of subjects' perceived likelihood of the experience actually occurring. Thus, if subjects believed the probability of harvest success to be small, then they may have assigned a low score to the harvest item.

### Secondary Encounters with Wildlife

Interest in wildlife may explain why wildlife professionals assigned higher ratings to secondary encounters with wildlife than did forestry professionals, and also why birders reported higher ratings than environmentalists. However, if interest were the only factor, hunters would have assigned higher ratings than the environmental group.

## **CHAPTER V: SUMMARY AND CONCLUSIONS**

The primary goal of this study was to provide information regarding the wildlife components important to wildlife-associated recreation. This was done by assessing the wildlife experiences preferred by resource professionals and resource users during consumptive and nonconsumptive activities.

The secondary goal of the study was to identify the surveyed groups according to socioeconomic information, outdoor recreation activities, organizational affiliations, perceptions of the social values of wildlife, and perceptions regarding approaches to wildlife management and habitat issues. This objective will be discussed first.

### **IDENTIFICATION OF RESOURCE PROFESSIONALS AND USERS**

#### **Professional Groups**

The two professional groups were found to have similar backgrounds. Members of both groups could be characterized as well-educated males who lived in non-rural areas, were employed in professional or administrative positions in their respective fields, and had household incomes between \$35,000 and \$74,999. The education level of the wildlife group was higher than that of the forestry group: over two-thirds of the former group held graduate degrees, as compared with less than one-third of the latter group.

Organizational affiliations and the subjects' outdoor recreation activities indicated that the wildlife professionals had a considerable interest in wildlife, both consumptive and nonconsumptive. Forestry professionals appeared to have less of an interest in wildlife, and their interest was more consumptive-oriented. Also, wildlife professionals were more involved with environmental or preservation organizations than the forestry professionals were.

### User Groups

The birders and environmentalists were most likely to live in non-rural areas and hold professional or administrative positions. About 40% of the respondents from each group were female. Conversely, hunters were almost all male, most likely to hold blue-collar positions, and many (although not a majority) lived in rural areas. The average age for hunters and environmentalists was 42.9 years, while the birders were, on the average, eleven years older. The environmentalists had attained the highest educational level, and the birders were also well-educated. Hunters' educational levels were lower, more like those of Virginia residents. Typically, members of all three user groups had mid-level household incomes, and these income levels did not differ among groups.

Most hunters and birders had participated in wildlife-based activities during the past year, and many were frequent participants. However, hunters frequently cited both consumptive and nonconsumptive wildlife-based activities, while birders' activities were largely nonconsumptive.

For environmentalists, non-wildlife-based trips were more important than wildlife-based trips.

Environmental and preservation groups were very important to both environmentalists and birders. Hunters were much less likely than the other two user groups to be affiliated with wildlife, forestry, conservation, or outdoor recreation organizations. However, of the hunters who did belong to such a group, the National Rifle Association and local sportsmen's clubs were most frequently cited.

### **Implications**

The activities and organizational affiliations of the wildlife professionals suggest that wildlife professionals may evaluate management alternatives from both consumptive and nonconsumptive perspectives, as well as from an environmental viewpoint. The birders, the other group surveyed with a strong nonconsumptive recreation interest, were also active in environmental organizations.

Based on activity participation, consumptive users may also benefit from management for nonconsumptive recreation. Also, management that influences secondary nonconsumptive activities may benefit members of the environmental population.

## Critique

User backgrounds should be considered when evaluating impacts of management decisions. However, two of the user groups studied were chosen based on organizational affiliation rather than actual activity participation: backgrounds of the birder and environmental groups surveyed may not be typical of actual participants in primary and secondary nonconsumptive recreation. In addition, information about the types of communities that subjects were reared in and the subjects' race should have been collected.

## APPROACHES TO WILDLIFE MANAGEMENT AND HABITAT ISSUES

### Professional Groups

Generally, both professional groups supported wildlife management and the five approaches to wildlife management (i.e., habitat modification, increasing the amount of habitat, preserving habitat, management through hunting, and management through timber harvesting). However, in all cases except management of wildlife through timber harvesting, forestry professionals were less supportive than wildlife professionals.

Opinions about habitat issues differed within professional groups and, especially, between the professional groups. Wildlife professionals did not believe that existing forest lands in the Southeast U. S. met the needs of all forest-living wildlife species they felt were important. Furthermore, a large majority believed that timber harvesting in the same

region had an adverse effect on some species they believed were important. Conversely, about half of the forestry professionals believed existing forest lands were adequate (although about one-third disagreed), and a large majority did not believe that timber harvesting was detrimental to species they thought were important.

### User Groups

Generally the three user groups supported wildlife management, habitat modification, increasing the amount of habitat, and habitat preservation. The user groups differed in their opinions about use of hunting and timber harvesting to manage some wildlife species. While more than 90% of the hunters and a majority of the birders and environmentalists supported use of hunting to help manage some populations, about 30% of the environmentalists did not accept the approach. In addition, roughly 25% of each of the user populations indicated that they had no opinion regarding use of timber harvesting to manage some species. Of those expressing an opinion, most hunters and birders agreed with the approach, and most of the environmentalists disagreed.

Most birders and environmentalists and about 45% of the hunters did not believe that existing forest lands met the needs of all forest-living wildlife species they felt were important. However, about 30% of each group indicated they held no opinion.

When asked to express their opinions regarding the contention that timber harvesting in the Southeast U.S. was reducing populations of some wildlife species important to the subjects, a majority of each group

agreed with the statement. Again, however, 25% to 35% of each population stated they had no opinion.

### **Implications**

Forestry professionals may be less likely to make strong statements regarding wildlife management approaches simply because wildlife is not their field of expertise. Regardless, differing responses to habitat issues suggest that this area has a greater potential as a source of conflict than the various approaches to wildlife management.

In spite of attempts to educate the public about use of timber harvesting and hunting in wildlife management, many users still do not accept these as management tools. Users may perceive education efforts as rationalizations for timber management decisions rather than view these activities as effective means to manage wildlife.

### **Critique**

Information gathered about wildlife management and habitat issues could have been helped through use of a different scale, more specific statements, and a more thorough survey of the issues. Scale values of "agree," "tend to agree," "no opinion," "tend to disagree," and "disagree" may have more accurately reflected subjects' views. Questions that dealt with specific examples and tradeoffs (e.g. Kellert 1979) would be easier to cognize, easier to respond to, and provide more accurate information.

For example, subjects might have been asked to comment on the effects that management alternatives have on wildlife, and then asked whether or not they viewed these effects as being important, both to themselves personally and to the society as a whole. Finally, a more thorough survey of habitat issues would have put preservation and timber harvesting conflicts in a better perspective. Timber harvesting is but one activity that affects wildlife habitat, and forestry professionals may have felt that emphasis on timber management was unfair when compared to other activities that impact habitat.

### SOCIAL VALUES OF WILDLIFE

#### Professional Groups

"Wildlife is a part of the ecological balance" was cited by a majority of both professional groups as the most important reason why wildlife was important to them personally. Second in importance (but much less important than the ecological value) was the value of wildlife to future generations. Wildlife professionals assigned higher ranks than forestry professionals to the recreational hunting value of wildlife and to the scientific value of wildlife. Ranks for the other values did not differ between the populations.

The social value items were again ranked by the professionals to indicate the reasons that best explained why tax dollars should be spent on wildlife management. For each of the items, ranks did not differ between the two populations. However, within each population, the ecolog-

ical value of wildlife decreased in importance, while the value of wildlife to future generations and the value of wildlife to the economy significantly increased in importance.

### User Groups

Users were asked to indicate which social values were the most important reasons that explained why wildlife was important to them personally. Ranks assigned to four of the reasons differed among the populations, and subsequent pairwise comparisons of the populations indicated that it was the hunter group that differed from the other two user groups. The four social values that differed in rank were the ecological value, wildlife's right to exist, the hunting recreation value, and wildlife's food and fur value.

Like the professional groups, the ecological value of wildlife was most important to birders and environmentalists. Next in importance was the bequest value and the right of wildlife to exist. The ecological, bequest, and hunting recreation values were most important to the hunters.

Two social values received higher ranks as reasons justifying tax expenditures on wildlife management than as reasons explaining why wildlife was important to users: "Future generations should have the opportunity to enjoy wildlife" increased in importance to hunters, and was the most important reason cited by the hunters to justify tax expenditures; also, the value of wildlife to the economy significantly increased in importance to all three user populations. These were the same social values that increased in importance for the professional groups.

## **Implications**

In spite of differences in backgrounds, uses of the wildlife resource, and acceptance of the different wildlife management approaches, both the resource professionals and the users hold many of the same values about wildlife. This suggests that public education about wildlife and wildlife management may reach a broad range of people if approached from the perspective of these social values.

## **Critique**

Likert-type scales were deliberately avoided so that subjects would not be able to state that all social values were important. Unfortunately, measures based on partial ranks (e.g., first, second, and third choices) do not provide an indication of relative importance of the different social values. A better means of measurement might have been a Likert-type scale used in conjunction with careful wording that asked subjects to indicate relative importance of the values.

## **VALUED WILDLIFE EXPERIENCES IN WILDLIFE-ASSOCIATED RECREATION**

To meet the primary objective of this study, three aspects of wildlife associated recreation were studied: (1) subjects were given a list of seven wildlife watching experiences and asked to indicate which experiences would be most enjoyable during purely consumptive trips; (2)

subjects rated how five hunting experiences would effect their enjoyment while out hunting the game species they most enjoyed hunting; and (3) subjects indicated the effect that secondary encounters with wildlife had on their enjoyment of non-wildlife-based recreation activities.

### Wildlife Watching Experiences

#### Professional Groups

Both professional groups gave the highest ranks to seeing a species they had never seen before, seeing many different species, and seeing rare or endangered species. Seeing family groups of wildlife was also highly ranked by forestry professionals. Ranks assigned to the seven wildlife watching experiences by the professional groups did not differ between purely consumptive activities and hunting activities.

#### User Groups

For purely nonconsumptive activities, birders ranked seeing a species they had never seen before as the most enjoyable of the seven experiences. Also important were seeing many different wildlife species, seeing a rare or endangered animal, and seeing a family group of wildlife. These four experiences were also most important to environmentalists.

Seeing family groups of wildlife was most important to the hunters. Five of the six remaining experiences received ratings similar to one another; seeing many different wildlife species, a rare or endangered animal, a large number of a favorite species, and a large number of many

different species were mentioned by many hunters. The least important experience was seeing a group of animals, such as a flock or herd.

The birders' and environmentalists' enjoyment ranks did not differ according to the consumptive/nonconsumptive nature of the recreation trip. However, hunters assigned higher ranks to seeing many different wildlife species during hunting trips, and lower ranks to seeing family groups of wildlife while hunting.

### Hunting Experiences

#### Professional Groups

The professional groups gave relatively high ratings to all four positive hunting experiences: seeing a large number of the game animals being hunted, seeing other game animals, shooting an animal or bagging the limit, and seeing non-game species. The only significant difference between the populations was the higher rating given by wildlife professionals to seeing non-game species.

Forestry professionals gave the harvest success experience a rating that was slightly lower than the rating given to the two wildlife watching experiences pertaining to game species. Wildlife professionals rated all three wildlife watching experiences higher than harvest success. Both populations indicated that lack of harvest success would only slightly detract from their enjoyment of the hunting trip.

### User Groups

The environmental group was not included in statistical analyses of users' hunting experiences due to the small number of environmentalists who hunted. Both hunters and birders gave higher enjoyment ratings to the two game-specific wildlife watching experiences than the harvest success experience. Hunters indicated higher ranks than birders for harvest success, while birders rated seeing non-game species higher than the hunters (and higher than their own rating of harvest success). Both groups indicated that not shooting any game animals or not bagging the limit would only slightly detract from their enjoyment of a hunting trip.

### Secondary Encounters with Wildlife

#### Professional and User Groups

Both wildlife and forestry professionals indicated that secondary encounters with wildlife during the past year had increased their enjoyment of non-wildlife-based recreation trips, however, the encounters were enjoyed more by the wildlife group. Likewise, birders gave higher scores to secondary encounters than either the hunters or the environmentalists.

### **Implications**

For all populations except the hunters, wildlife watching preferences would be attained through encounters with less common species. Thus, nonconsumptive recreation management to benefit these groups should

be directed towards encounters with less common species. Also, habitats with less common species would be of greater value to nonconsumptive recreation than habitats with common species, if all else were equal.

The two groups most active in consumptive recreation, the hunters and wildlife professionals, rated seeing a large number of a favorite species higher than the other groups did. This may be related to expectations concerning harvest success while out hunting, i.e., the belief that harvest success is related to species abundance.

The hunters' preferred wildlife watching experiences--seeing a family group of wildlife--can be viewed as a relatively uncommon experience. However, such an encounter is more dependent on the time of year and, possibly, the abundance of species, than on presence of less common species. Enjoyment of a variety of encounters suggests either that hunters as a group are generalists and can be satisfied by a variety of experiences, or that group is diverse and is not easily typified.

Many researchers have emphasized that those who hunt also enjoy nonconsumptive activities. However, consumptive users in all groups indicated that the greatest increase in enjoyment was associated with seeing a large number of the game animals they were hunting. As previously mentioned, this may be associated with expectations regarding harvest success. Thus, management for hunting recreation should continue to emphasize abundance of game species.

Management for secondary wildlife encounters should lead to increased enjoyment of outdoor recreation activities. However, people who

enjoy such encounters the most will be those who already have a strong interest in nonconsumptive recreation.

### **Critique**

Eliciting the valued wildlife experiences would have been facilitated by a better research design. An open ended pre-survey would have allowed better specification of users' valued wildlife experiences. In addition, subjects should have been selected based on actual participation in a wildlife-associated recreation activity, and their experiences for that activity should have been assessed. The previously discussed problems in using partially-ranked measures is also applicable to this section.

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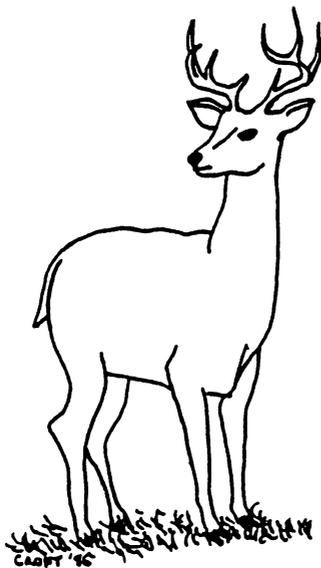
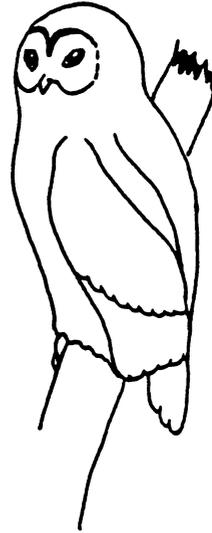
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APPENDIX A. THE QUESTIONNAIRE

# Wildlife-Associated Recreation

A SURVEY OF RESOURCE PROFESSIONALS  
AND OTHER INDIVIDUALS  
INTERESTED IN WILDLIFE AND FORESTS



**DIRECTIONS:**

For the purpose of this survey, wildlife is defined as non-domestic birds and land-dwelling animals. Please answer all of the questions, unless you are instructed otherwise. If you wish to comment on a question, feel free to write in the margins.

Thank you for your help in this study.

Please return the completed survey to:

Viola Ritchie  
School of Forestry and  
Wildlife Resources  
Virginia Tech  
Blacksburg, VA 24061

SECTION A.

Below are some reasons which explain why people may believe that wildlife is important. Please read the reasons, then use them to answer Questions A-1 and A-2.

- 1 WILDLIFE HAS SCIENTIFIC VALUE
- 2 WILDLIFE HAS A RIGHT TO EXIST
- 3 WATCHING WILDLIFE IS ENJOYABLE
- 4 HUNTING WILDLIFE IS ENJOYABLE
- 5 WILDLIFE PROVIDES FOOD AND FUR
- 6 WILDLIFE IS AN IMPORTANT PART OF OUR HERITAGE
- 7 FUTURE GENERATIONS SHOULD HAVE THE OPPORTUNITY TO ENJOY WILDLIFE
- 8 WILDLIFE HELPS THE ECONOMY THROUGH TOURISM AND EXPENDITURES FOR SUPPLIES AND FEES
- 9 WILDLIFE IS A PART OF THE ECOLOGICAL BALANCE
- 10 WE BENEFIT FROM KNOWING THAT WILDLIFE EXISTS, EVEN IF WE NEVER WATCH OR HUNT WILDLIFE
- 11 OTHER (Please specify) \_\_\_\_\_
- 12 OTHER (Please specify) \_\_\_\_\_

A-1 Do you personally believe that wildlife is important?

- ( ) NO —————> If no, skip to Question A-2.  
( ) YES —————> If yes, which of the above reasons best explain why wildlife is important to you personally? (Write the number of your answer in the appropriate box below.)

- MOST IMPORTANT REASON  
 SECOND MOST IMPORTANT REASON  
 THIRD MOST IMPORTANT REASON

A-2 Do you believe that tax dollars should be spent on wildlife management?

- ( ) NO —————> If no, skip to Section B (page 2).  
( ) YES —————> If yes, which of the above reasons best explain why tax dollars should be spent on wildlife management? (Write the number of your answer in the appropriate box below.)

- MOST IMPORTANT REASON  
 SECOND MOST IMPORTANT REASON  
 THIRD MOST IMPORTANT REASON



SECTION C.

In Section C, watching wildlife will refer to watching or observing wildlife in a forest or other natural area, except while hunting, trapping, scouting for hunting or trapping sites, or any time watching wildlife is required for your job.

C-1 Do you watch wildlife?

- ( ) NO —————> If no, skip to Section D (below on this page).
- ( ) YES

C-2 What do you most enjoy about watching wildlife?

\_\_\_\_\_

C-3 While watching wildlife, which of the following experiences would you most enjoy? (Write the number of your answer in the appropriate box.)

- |  |   |
|--|---|
| <input type="checkbox"/> MOST ENJOYABLE<br><br><input type="checkbox"/> SECOND MOST ENJOYABLE<br><br><input type="checkbox"/> THIRD MOST ENJOYABLE | 1 SEEING MANY DIFFERENT WILDLIFE SPECIES<br><br>2 SEEING A LARGE NUMBER OF ANIMALS OF ONE OF YOUR FAVORITE SPECIES<br><br>3 SEEING A LARGE NUMBER OF ANIMALS OF MANY DIFFERENT SPECIES<br><br>4 SEEING A FAMILY GROUP OF WILDLIFE, SUCH AS PARENTS WITH THEIR YOUNG<br><br>5 SEEING A GROUP OF ANIMALS, SUCH AS A FLOCK OR HERD<br><br>6 SEEING A RARE OR ENDANGERED ANIMAL<br><br>7 SEEING A SPECIES YOU HAD NEVER SEEN BEFORE |
|--|---|

===== SECTION D.

In Section D, we would like to know about enjoyment of wildlife while hunting.

D-1 Do you hunt? (Exclude trapping, fishing, and activities required for your job.)

- ( ) NO —————> If no, skip to Section E (page 5).
- ( ) YES

D-2 What do you enjoy the most about hunting?

\_\_\_\_\_

D-3 Please list the game species you hunt: \_\_\_\_\_

\_\_\_\_\_

(Section D continues on page 4).

SECTION D, continued.

D-4 Which one game animal do you most enjoy hunting?

---

D-5 While out hunting the game animal you listed in Question D-4, how would the following experiences affect your enjoyment of the trip? (Circle number.)

	STRONGLY DECREASE ENJOYMENT	-2	-1	NO EFFECT	0	+1	+2	STRONGLY INCREASE ENJOYMENT	+3
1. SHOOTING THE GAME ANIMAL, OR BAGGING YOUR LIMIT	-3	-2	-1	0	+1	+2	+3		
2. NOT SHOOTING ANY OF THE GAME ANIMALS, OR NOT BAGGING YOUR LIMIT	-3	-2	-1	0	+1	+2	+3		
3. SEEING A LARGE NUMBER OF THE GAME ANIMALS	-3	-2	-1	0	+1	+2	+3		
4. SEEING OTHER GAME SPECIES	-3	-2	-1	0	+1	+2	+3		
5. SEEING NON-GAME SPECIES	-3	-2	-1	0	+1	+2	+3		

D-6 While you are out hunting, do you enjoy watching or observing any wildlife species other than the game animals you are hunting?

- ( ) NO → If no, skip to Section E (page 5).  
 ( ) YES

D-7 Below are six experiences that refer to wildlife species you watch or observe other than the game animals you are hunting. While you are out hunting, which of the following experiences would you most enjoy? (Write the number of your answer in the appropriate box.)

- |                          |                       |   |
|--------------------------|-----------------------|---|
| <input type="checkbox"/> | MOST ENJOYABLE        | 1 SEEING MANY DIFFERENT WILDLIFE SPECIES                              |
| <input type="checkbox"/> | SECOND MOST ENJOYABLE | 2 SEEING A LARGE NUMBER OF ANIMALS OF ONE OF YOUR FAVORITE SPECIES    |
| <input type="checkbox"/> | THIRD MOST ENJOYABLE  | 3 SEEING A LARGE NUMBER OF ANIMALS OF MANY DIFFERENT SPECIES          |
|                          |                       | 4 SEEING A FAMILY GROUP OF WILDLIFE, SUCH AS PARENTS WITH THEIR YOUNG |
|                          |                       | 5 SEEING A GROUP OF ANIMALS, SUCH AS A FLOCK OR HERD                  |
|                          |                       | 6 SEEING A RARE OR ENDANGERED ANIMAL                                  |
|                          |                       | 7 SEEING A SPECIES YOU HAD NEVER SEEN BEFORE                          |

SECTION E.

Please circle the number that best describes how you feel about each of the statements below.

	<u>STRONGLY DISAGREE</u>	<u>DISAGREE</u>	<u>NO OPINION</u>	<u>AGREE</u>	<u>STRONGLY AGREE</u>
Wildlife should be managed.	1	2	3	4	5
Wildlife habitat should be modified with things such as nest boxes, food plots, and clearings to help manage some wildlife species.	1	2	3	4	5
The amount of wildlife habitat should be increased to help manage some wildlife species.	1	2	3	4	5
Wildlife habitat should be preserved to help manage some wildlife species.	1	2	3	4	5
Hunting should be used to help manage some wildlife species.	1	2	3	4	5
Timber harvesting should be used to help manage some wildlife species.	1	2	3	4	5
Timber harvesting in the Southeast U.S. is reducing populations of some wildlife species that I think are important to levels that are too low.	1	2	3	4	5
Existing forest lands in the Southeast U.S. meet the needs of all forest-living wildlife species that I think are important.	1	2	3	4	5

SECTION F.

Finally, the following background information will help us learn more about the people responding to this questionnaire. All of your answers will be kept confidential.

F-1 Age: \_\_\_\_\_

F-2 Sex:

- MALE
- FEMALE

F-3 Please check all wildlife, forestry, conservation, or outdoor-recreation organizations to which you belong.

- |  |  |
|--|--|
| <input type="checkbox"/> NONE                              | <input type="checkbox"/> NATURE CONSERVANCY            |
| <input type="checkbox"/> AMERICAN FORESTRY ASSOCIATION     | <input type="checkbox"/> SIERRA CLUB                   |
| <input type="checkbox"/> AMERICAN ORNITHOLOGISTS' UNION    | <input type="checkbox"/> SOCIETY OF AMERICAN FORESTERS |
| <input type="checkbox"/> COOPER ORNITHOLOGICAL SOCIETY     | <input type="checkbox"/> THE WILDERNESS SOCIETY        |
| <input type="checkbox"/> ENVIRONMENTAL DEFENSE FUND        | <input type="checkbox"/> THE WILDLIFE SOCIETY          |
| <input type="checkbox"/> FRIENDS OF THE EARTH              | <input type="checkbox"/> VA. CONSERVATION LEAGUE       |
| <input type="checkbox"/> ISAAK WALTON LEAGUE               | <input type="checkbox"/> VA. FORESTRY ASSOCIATION      |
| <input type="checkbox"/> LOCAL SPORTSMEN'S CLUB            | <input type="checkbox"/> VA. SOCIETY OF ORNITHOLOGISTS |
| <input type="checkbox"/> NATURAL RESOURCES DEFENSE COUNCIL | <input type="checkbox"/> WILSON ORNITHOLOGICAL SOCIETY |
| <input type="checkbox"/> NATIONAL AUDUBON SOCIETY          | <input type="checkbox"/> OTHER (PLEASE LIST)           |
| <input type="checkbox"/> NATIONAL RIFLE ASSOCIATION        | _____  |
| <input type="checkbox"/> NATIONAL WILD TURKEY FEDERATION   | _____  |
| <input type="checkbox"/> NATIONAL WILDLIFE FEDERATION      |  |

F-4 What was the highest level of school you completed?  
(Check one.)

- HAVE NOT ATTENDED SCHOOL
- SOME GRADE SCHOOL OR HIGH SCHOOL
- HIGH SCHOOL GRADUATE
- VOCATIONAL OR TECHNICAL SCHOOL (AFTER HIGH SCHOOL)
- SOME COLLEGE
- B.A. OR EQUIVALENT
- SOME GRADUATE SCHOOL
- M.A. OR EQUIVALENT
- Ph.D. OR EQUIVALENT

F-5 Which category below best describes the total annual income (before taxes) of all the members of your immediate family in your household? (Check one.)

- |  |   |
|--|---|
| <input type="checkbox"/> UNDER \$5,000     | <input type="checkbox"/> \$25,000 - 34,999  |
| <input type="checkbox"/> \$5,000 - 9,999   | <input type="checkbox"/> \$35,000 - 49,999  |
| <input type="checkbox"/> \$10,000 - 14,999 | <input type="checkbox"/> \$50,000 - 74,999  |
| <input type="checkbox"/> \$15,000 - 19,999 | <input type="checkbox"/> \$75,000 - 100,000 |
| <input type="checkbox"/> \$20,000 - 24,999 | <input type="checkbox"/> OVER \$100,000     |

SECTION F, continued.

F-6 Please describe the community in which you live. (Check one.)

- LARGE CITY (OVER 100,000 PEOPLE)
- SUBURB OF A LARGE CITY
- CITY (25,000 - 100,000 PEOPLE)
- TOWN OR SMALL CITY (2,500 - 25,000 PEOPLE)
- SMALL TOWN (UNDER 2,500 PEOPLE)
- RURAL

F-7 What is your zip code? \_\_\_\_\_

F-8 Please describe your usual occupation. If retired, describe your usual occupation before retirement.

JOB TITLE: \_\_\_\_\_

OCCUPATION OR TYPE OF WORK: \_\_\_\_\_

TYPE OF BUSINESS OR AGENCY: \_\_\_\_\_

F-9 Have you ever participated in land use planning for a forest or other natural area? (Check all that apply.)

- NO
- YES, AS A PRIVATE CITIZEN
- YES, AS A PART OF MY JOB

F-10 If yes, have you ever participated in land use planning efforts that related to wildlife? (Check all that apply.)

- NO
- YES, AS A PRIVATE CITIZEN
- YES, AS A PART OF MY JOB

This is the end of the survey. If you would like of copy of the results of this study, please write your name and address and "Results Requested" on the back of the envelope in which you return the questionnaire.

Please use the postage-paid envelope to return the completed questionnaire.

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY!

**APPENDIX B. COVER LETTER, FOLLOWUP POSTCARD, AND FOLLOWUP LETTER**



COLLEGE OF AGRICULTURE AND LIFE SCIENCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

*Blacksburg, Virginia* 24061 USA

SCHOOL OF FORESTRY AND WILDLIFE RESOURCES

8 August 1986

Dear V.S.O. Member:

Knowing the views of people who are interested in wildlife and forests can help ensure that wildlife and forest management decisions on public lands serve the public.

We would like to learn some of your views concerning wildlife-associated recreation and wildlife management. This questionnaire is being sent to special groups of private citizens interested in wildlife and professionals who work in wildlife and forestry. Only a small number of people were selected from each group. Therefore, it is very important that you complete and return your questionnaire, so that the study will fairly represent each group surveyed.

The questionnaire has an identification number for mailing purposes only; this is so your name can be checked off the the list when your questionnaire is returned. Your name will never be placed on the questionnaire, and your responses will be held in the strictest confidence.

If you would like a summary of the results, please print your name, address, and "Results Requested" on the back of the return envelope. Please do not write this information on the questionnaire itself.

Thank you for your time and assistance in this study.

Sincerely,

Viola Ritchie  
Graduate Research Assistant  
School of Forestry and Wildlife Resources

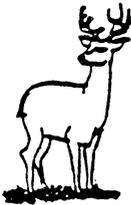
Dear V.S.O. Member:

Recently, a questionnaire seeking your views on wildlife-associated recreation and wildlife management was mailed to you. Your name was chosen from a random sample of a group of private citizens interested in wildlife or a group of professionals who work in wildlife or forestry.



If you have already completed and returned the questionnaire, please accept our sincere thanks. If not, please do so as soon as possible. We have sent questionnaires to only a small number of people from each of the groups surveyed. It is important that the opinions of each person who received a questionnaire be included in the study, so that the study will accurately represent the groups studied.

Sincerely,



Viola Ritchie  
School of Forestry and Wildlife Resources  
Virginia Tech  
Blacksburg, Virginia 24061



COLLEGE OF AGRICULTURE AND LIFE SCIENCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061 USA

SCHOOL OF FORESTRY AND WILDLIFE RESOURCES (703) 961-5481

Dear V.S.O. Member:

About three weeks ago, you received a questionnaire seeking some of your views about wildlife-associated recreation and wildlife management. As of today, we have not received your response.

Your response is important. Your name was chosen as part of a small but representative sample of a group of private citizens interested in wildlife or a group of professionals who work in wildlife or forestry. In order that the results of this study truly represent the groups surveyed, it is essential that each person complete and return his or her questionnaire--it is especially important that we receive more responses from V.S.O. members.

Your responses will be held in the strictest confidence. The identification number on the questionnaire will be used only to check your name off the list when your questionnaire is returned.

A new questionnaire is enclosed in case you have misplaced the original. Please disregard this reminder if you have already returned your questionnaire.

Thank you for your time and assistance in this study.

Sincerely,

Viola Ritchie  
Graduate Research Assistant  
School of Forestry and Wildlife Resources

**APPENDIX C. RESPONSES: ORGANIZATIONAL AFFILIATIONS**

Appendix C, Table 1. Organizational affiliations of wildlife professionals.

Organization	Frequency N=87	Percent
No affiliations	1	1.1
American Forestry Association	6	6.9
American Ornithologists' Union	8	9.2
Cooper Ornithological Society	3	3.4
Environmental Defense Fund	4	4.6
Ducks Unlimited	5	5.7
Friends of the Earth	0	0.0
Greenpeace	0	0.0
Isaak Walton League	0	0.0
Local Sportsmen's Club	15	17.2
Natural Resources Defense Council	3	3.4
National Audubon Society	16	18.4
National Rifle Association	22	25.3
National Wild Turkey Federation	19	21.8
National Wildlife Federation	48	55.2
National Wildlife Federation State Affiliate	7	8.0
Nature Conservancy	14	16.1
Sierra Club	3	3.4
Society of American Foresters	8	9.2
The Wilderness Society	3	3.4
The Wildlife Society	79	90.8
World Wildlife Fund	0	0.0
Virginia Forestry Association	0	0.0
Virginia Society of Ornithology	3	3.4
Wilson Ornithological Society	5	5.7
Other Organizations: <sup>1</sup>		
- Conservation		
(1)	9	10.3
(2)	1	1.1
- Fish-related	4	4.6
- Forestry	5	5.7
- Natural History	6	6.9
- Outdoor Recreation	0	0.0
- Scientific		
(1)	6	6.9
(2)	2	2.3
- Wildlife-related		
- Bird-related	6	6.9
- Consumptive-oriented		
(1)	3	3.4
(2)	2	2.3
- General	3	3.4
- Nonconsumptive-oriented	0	0.0
- Professional		
(1)	9	10.3
(2)	2	2.3

<sup>1</sup>If a subject was affiliated with more than one organization in a category, the number of organizations are specified in parentheses.

Appendix C, Table 2. Organizational affiliations of forestry professionals.

Organization	Frequency N=86	Percent
No affiliations	2	2.3
American Forestry Association	28	32.6
American Ornithologists' Union	0	0.0
Cooper Ornithological Society	0	0.0
Environmental Defense Fund	2	2.3
Ducks Unlimited	1	1.2
Friends of the Earth	0	0.0
Greenpeace	0	0.0
Isaak Walton League	2	2.3
Local Sportsmen's Clubs	3	3.5
Natural Resources Defense Council	2	2.3
National Audubon Society	7	8.1
National Rifle Association	14	16.3
National Wild Turkey Federation	3	3.5
National Wildlife Federation	17	19.8
National Wildlife Federation State Affiliate	0	0.0
Nature Conservancy	6	7.0
Sierra Club	3	3.5
Society of American Foresters	82	95.3
The Wilderness Society	1	1.2
The Wildlife Society	3	3.5
World Wildlife Fund	1	1.2
Virginia Forestry Association	22	25.6
Virginia Society of Ornithology	0	0.0
Wilson Ornithological Society	0	0.0
Other Organizations:		
- Conservation	2	2.3
- Fish-related	4	4.7
- Forestry	2	2.3
- Natural History	1	1.2
- Outdoor Recreation	3	3.5
- Scientific	1	1.2
- Wildlife-related		
- Bird-related	0	0.0
- Consumptive-oriented	0	0.0
- General	1	1.2
- Nonconsumptive-oriented	0	0.0
- Professional	1	1.2

Appendix C, Table 3. Organizational affiliations of birders.

Organization	Frequency N=91	Percent
No affiliations	1	1.1
American Forestry Association	3	3.3
American Ornithologists' Union	5	5.5
Cooper Ornithological Society	1	1.1
Environmental Defense Fund	7	7.7
Ducks Unlimited	5	5.5
Friends of the Earth	1	1.1
Greenpeace	2	2.2
Isaak Walton League	1	1.1
Local Sportsmen's Club	4	4.4
Natural Resources Defense Council	8	8.8
National Audubon Society	39	42.9
National Rifle Association	6	6.6
National Wild Turkey Federation	0	0.0
National Wildlife Federation	31	34.1
National Wildlife Federation State Affiliate	0	0.0
Nature Conservancy	45	49.5
Sierra Club	10	11.0
Society of American Foresters	0	0.0
The Wilderness Society	12	13.2
The Wildlife Society	4	4.4
World Wildlife Fund	6	6.6
Virginia Forestry Association	1	1.1
Virginia Society of Ornithology	83	91.2
Wilson Ornithological Society	2	2.2
Other Organizations: <sup>1</sup>		
- Conservation		
(1)	4	4.4
(2)	1	1.1
- Fish-related	2	2.2
- Forestry	0	0.0
- Natural History	0	0.0
- Outdoor Recreation		
(1)	4	4.4
(2)	3	3.3
- Scientific	0	0.0
- Wildlife-related		
- Bird-related		
(1)	24	26.4
(2)	2	2.2
- Consumptive-oriented	1	1.1
- General	1	1.1
- Nonconsumptive-oriented	1	1.1
- Professional	1	1.1

<sup>1</sup>If a subject was affiliated with more than one organization in a category, the number of organizations are specified in parentheses.

Appendix C, Table 4. Organizational affiliations of environmentalists.

Organization	Frequency N=80	Percent
No affiliations	4	5.0
American Forestry Association	2	2.5
American Ornithologists' Union	2	2.5
Cooper Ornithological Society	2	2.5
Environmental Defense Fund	11	13.8
Ducks Unlimited	0	0.0
Friends of the Earth	6	7.5
Greenpeace	6	7.5
Isaak Walton League	1	1.3
Local Sportsmen's Club	0	0.0
Natural Resources Defense Council	9	11.3
National Audubon Society	24	30.0
National Rifle Association	1	1.3
National Wild Turkey Federation	0	0.0
National Wildlife Federation	20	25.0
National Wildlife Federation State Affiliate	0	0.0
Nature Conservancy	26	32.5
Sierra Club	71	88.8
Society of American Foresters	3	3.8
The Wilderness Society	23	28.8
The Wildlife Society	1	1.3
World Wildlife Fund	3	3.8
Virginia Forestry Association	0	0.0
Virginia Society of Ornithology	5	6.3
Wilson Ornithological Society	2	2.5
Other Organizations: <sup>1</sup>		
-Conservation		
(1)	5	6.3
(2)	2	2.5
(4)	1	1.3
-Fish-related	1	1.3
-Forestry	0	0.0
-Natural History	2	2.5
-Outdoor Recreation		
(1)	6	7.5
(2)	1	1.3
-Scientific	0	0.0
-Wildlife-related		
-Bird-related		
(1)	3	3.8
(2)	1	1.3
- Consumptive-oriented	0	0.0
- General	1	1.3
- Nonconsumptive-oriented	2	2.5
- Professional	0	0.0

<sup>1</sup>If a subject was affiliated with more than one organization in a category, the number of organizations are specified in parentheses.

Appendix C, Table 5. Organizational affiliations of hunters

Organization	Frequency N=111	Percent
No affiliations	59	53.2
American Forestry Association	0	0.0
American Ornithologists' Union	0	0.0
Cooper Ornithological Society	0	0.0
Environmental Defense Fund	0	0.0
Ducks Unlimited	2	1.8
Friends of the Earth	1	0.9
Greenpeace	0	0.0
Isaak Walton League	2	1.8
Local Sportsmen's Club <sup>1</sup>		
(1)	23	20.7
(2)	1	0.9
Natural Resources Defense Council	0	0.0
National Audubon Society	0	0.0
National Rifle Association	36	32.4
National Wild Turkey Federation	5	4.5
National Wildlife Federation	3	2.7
National Wildlife Federation State Affiliate	0	0.0
Nature Conservancy	1	0.9
Sierra Club	0	0.0
Society of American Foresters	0	0.0
The Wilderness Society	1	0.9
The Wildlife Society	1	0.9
World Wildlife Fund	0	0.0
Virginia Forestry Association	0	0.0
Virginia Society of Ornithology	0	0.0
Wilson Ornithological Society	0	0.0
Other Organizations:		
- Conservation	1	0.9
- Fish-related	4	3.6
- Forestry	0	0.0
- Natural History	2	1.8
- Outdoor Recreation	0	0.0
- Scientific	0	0.0
- Wildlife-related		
- Bird-related	0	0.0
- Consumptive-oriented	3	2.7
- General	0	0.0
- Nonconsumptive-oriented	0	0.0
- Professional	0	0.0

<sup>1</sup>The number of local sportsmen's clubs subjects were affiliated with is specified in parentheses.

**APPENDIX D. RESPONSES: SOCIAL VALUES OF WILDLIFE**

Appendix D, Table 1. Forestry professionals' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=85)		(N=79)	
		freq.	%	freq.	%
* Wildlife is a part of the ecological balance	FIRST	56	65.9	34	43.0
	SECOND	12	14.1	13	16.5
	THIRD	6	7.1	6	7.6
* Future generations should have the opportunity to enjoy wildlife	FIRST	4	4.7	17	21.5
	SECOND	23	27.1	20	25.3
	THIRD	20	23.5	20	25.3
Wildlife is an important part of our heritage	FIRST	7	8.2	4	5.1
	SECOND	14	16.5	11	13.9
	THIRD	13	15.3	9	11.4
* Wildlife has a right to exist	FIRST	10	11.8	7	8.9
	SECOND	10	11.8	5	6.3
	THIRD	5	5.9	0	0.0
Watching wildlife is enjoyable	FIRST	4	4.7	1	1.3
	SECOND	11	12.9	4	5.1
	THIRD	5	5.9	8	10.1
Hunting wildlife is enjoyable	FIRST	2	2.4	0	0.0
	SECOND	6	7.1	2	2.5
	THIRD	6	7.1	4	5.1

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 1, con't. Forestry professionals' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=85)		(N=79)	
		freq.	%	freq.	%
Wildlife has scientific value	FIRST	0	0.0	7	8.9
	SECOND	4	4.7	8	10.1
	THIRD	6	7.1	7	8.9
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	FIRST	1	1.2	0	0.0
	SECOND	2	2.4	3	3.8
	THIRD	9	10.6	7	8.9
* Wildlife helps the economy through tourism and expenditures for supplies and fees	FIRST	0	0.0	8	10.1
	SECOND	2	2.4	11	13.9
	THIRD	8	9.4	13	16.5
Wildlife provides food and fur	FIRST	1	1.2	1	1.3
	SECOND	1	1.2	2	2.5
	THIRD	5	5.9	5	6.3
Other	FIRST	0	0.0	0	0.0
	SECOND	0	0.0	0	0.0
	THIRD	2	2.4	0	0.0

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 2. Wildlife professionals' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT  (N=87)		REASONS TO JUSTIFY TAXES FOR MANAGEMENT  (N=84)	
		freq.	%	freq.	%
* Wildlife is a part of the ecological balance	FIRST	60	69.0	36	42.9
	SECOND	9	10.3	8	9.5
	THIRD	4	4.6	7	8.3
* Future generations should have the opportunity to enjoy wildlife	FIRST	4	4.6	17	20.2
	SECOND	25	28.7	22	26.2
	THIRD	20	23.0	18	21.4
Wildlife is an important part of our heritage	FIRST	5	5.7	5	6.0
	SECOND	13	14.9	10	11.9
	THIRD	8	9.2	7	8.3
* Wildlife has a right to exist	FIRST	5	5.7	1	1.2
	SECOND	11	12.6	1	1.2
	THIRD	1	1.1	4	4.8
* Watching wildlife is enjoyable	FIRST	3	3.4	2	2.4
	SECOND	8	9.2	3	3.6
	THIRD	8	9.2	1	1.2
* Hunting wildlife is enjoyable	FIRST	4	4.6	0	0.0
	SECOND	5	5.7	1	1.2
	THIRD	19	21.8	7	8.3

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 2, con't. Wildlife professionals' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=87)		(N=84)	
		freq.	%	freq.	%
Wildlife has scientific value	FIRST	1	1.1	3	3.6
	SECOND	10	11.5	15	17.9
	THIRD	18	20.7	10	11.9
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	FIRST	1	1.1	4	4.8
	SECOND	5	5.7	6	7.1
	THIRD	1	1.1	3	3.6
* Wildlife helps the economy through tourism and expenditures for supplies and fees	FIRST	1	1.1	11	13.1
	SECOND	3	3.4	11	13.1
	THIRD	0	0.0	20	23.8
Wildlife provides food and fur	FIRST	1	1.1	1	1.2
	SECOND	0	0.0	2	2.4
	THIRD	2	2.3	4	4.8
Other	FIRST	0	0.0	4	4.8
	SECOND	2	2.3	3	3.6
	THIRD	3	3.4	1	1.2

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 3. Birders' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=92)		(N=90)	
		freq.	%	freq.	%
Wildlife is a part of the ecological balance	FIRST	52	56.5	44	48.9
	SECOND	17	18.5	15	16.7
	THIRD	11	12.0	10	11.1
Future generations should have the opportunity to enjoy wildlife	FIRST	8	8.7	10	11.1
	SECOND	19	20.7	23	25.6
	THIRD	22	23.9	28	31.1
Wildlife is an important part of our heritage	FIRST	5	5.4	8	8.9
	SECOND	6	6.5	12	13.3
	THIRD	14	15.2	5	5.6
* Wildlife has a right to exist	FIRST	14	15.2	8	8.9
	SECOND	20	21.7	7	7.8
	THIRD	11	12.0	10	11.1
* Watching wildlife is enjoyable	FIRST	6	6.5	0	0.0
	SECOND	18	19.6	5	5.6
	THIRD	13	14.1	11	12.2
Hunting wildlife is enjoyable	FIRST	1	1.1	1	1.1
	SECOND	2	2.2	1	1.1
	THIRD	0	0.0	3	3.3

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 3, con't. Birders' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=92)		(N=90)	
		freq.	%	freq.	%
Wildlife has scientific value	FIRST	2	2.2	8	8.9
	SECOND	8	8.7	9	10.0
	THIRD	12	13.0	15	16.7
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	FIRST	0	0.0	2	2.2
	SECOND	1	1.1	4	4.4
	THIRD	5	5.4	2	2.2
* Wildlife helps the economy through tourism and expenditures for supplies and fees	FIRST	0	0.0	6	6.7
	SECOND	1	1.1	9	10.0
	THIRD	0	0.0	3	3.3
Wildlife provides food and fur	FIRST	1	1.1	1	1.1
	SECOND	1	1.1	2	2.2
	THIRD	0	0.0	1	1.1
Other	FIRST	3	3.3	2	2.2
	SECOND	0	0.0	2	2.2
	THIRD	1	1.1	0	0.0

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 4. Environmentalists' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=80)		(N=79)	
		freq.	%	freq.	%
Wildlife is a part of the ecological balance	FIRST	47	58.8	43	54.4
	SECOND	18	22.5	17	21.5
	THIRD	6	7.5	8	10.1
Future generations should have the opportunity to enjoy wildlife	FIRST	2	2.5	10	12.7
	SECOND	21	26.3	17	21.5
	THIRD	21	26.3	20	25.3
Wildlife is an important part of our heritage	FIRST	3	3.8	3	3.8
	SECOND	5	6.3	8	10.1
	THIRD	10	12.5	11	13.9
* Wildlife has a right to exist	FIRST	22	27.5	12	15.9
	SECOND	17	21.3	12	15.9
	THIRD	8	10.0	7	8.9
* Watching wildlife is enjoyable	FIRST	2	2.5	1	1.3
	SECOND	6	7.5	2	2.5
	THIRD	14	17.5	4	5.1
Hunting wildlife is enjoyable	FIRST	0	0.0	0	0.0
	SECOND	0	0.0	0	0.0
	THIRD	0	0.0	0	0.0

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 4, con't. Environmentalists' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=80)		(N=79)	
		freq.	%	freq.	%
* Wildlife has scientific value	FIRST	1	1.3	6	7.6
	SECOND	6	7.5	9	11.4
	THIRD	9	11.3	13	16.5
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	FIRST	0	0.0	0	0.0
	SECOND	2	2.5	0	0.0
	THIRD	6	7.5	1	1.3
* Wildlife helps the economy through tourism and expenditures for supplies and fees	FIRST	0	0.0	2	2.5
	SECOND	0	0.0	10	12.7
	THIRD	1	1.3	10	12.7
Wildlife provides food and fur	FIRST	0	0.0	0	0.0
	SECOND	0	0.0	1	1.3
	THIRD	0	0.0	2	2.5
Other	FIRST	3	3.8	2	2.5
	SECOND	1	1.3	1	1.3
	THIRD	2	2.5	0	0.0

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 5. Hunters' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT		REASONS TO JUSTIFY TAXES FOR MANAGEMENT	
		(N=109)		(N=92)	
		freq.	%	freq.	%
Wildlife is a part of the ecological balance	FIRST	27	24.8	21	22.8
	SECOND	14	12.8	15	16.3
	THIRD	7	6.4	7	7.6
* Future generations should have the opportunity to enjoy wildlife	FIRST	16	14.7	23	25.0
	SECOND	16	14.7	24	26.1
	THIRD	22	20.2	16	17.4
Wildlife is an important part of our heritage	FIRST	10	9.2	10	10.9
	SECOND	10	9.2	9	9.8
	THIRD	14	12.8	10	10.9
Wildlife has a right to exist	FIRST	16	14.7	12	13.0
	SECOND	8	7.3	8	8.7
	THIRD	7	6.4	9	9.8
* Watching wildlife is enjoyable	FIRST	11	10.8	1	1.1
	SECOND	14	12.8	3	3.3
	THIRD	10	9.2	7	7.6
* Hunting wildlife is enjoyable	FIRST	14	12.8	1	1.1
	SECOND	23	21.1	7	7.6
	THIRD	23	21.1	11	12.0

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

Appendix D, Table 5, con't. Hunters' first-, second- and third-most important reasons explaining (1) why wildlife is important to them and (2) why tax dollars should be spent on wildlife management.

	Choice	REASONS IMPORTANT TO SUBJECT (N=109)		REASONS TO JUSTIFY TAXES FOR MANAGEMENT (N=92)	
		freq.	%	freq.	%
Wildlife has scientific value	FIRST	8	7.3	12	13.0
	SECOND	8	7.3	8	8.7
	THIRD	2	1.8	6	6.5
We benefit from knowing that wildlife exists even if we never hunt or watch wildlife	FIRST	2	1.8	3	3.3
	SECOND	2	1.8	2	2.2
	THIRD	7	6.4	8	8.7
* Wildlife helps the economy through tourism and expenditures for supplies and fees	FIRST	0	0.0	8	8.7
	SECOND	1	0.9	6	6.5
	THIRD	1	0.9	7	7.6
Wildlife provides food and fur	FIRST	3	2.8	1	1.1
	SECOND	6	5.5	4	4.3
	THIRD	8	7.3	4	4.3
Other	FIRST	2	1.8	0	0.0
	SECOND	0	0.0	0	0.0
	THIRD	0	0.0	0	0.0

\* Significant difference between (1) ranks assigned this reason to explain why wildlife is important and (2) ranks assigned to explain why tax dollars should be spent on wildlife management ( $P \leq 0.05$ ).

**APPENDIX E. RESPONSES: VALUED WILDLIFE EXPERIENCES**

Appendix E, Table 1. Forestry professionals' first-, second-, and third-most enjoyable wildlife watching experiences (1) during purely nonconsumptive trips (excluding scouting) and (2) during hunting trips. There were no significant differences between the two types of trips.

		NONCONSUMPTIVE TRIPS (N=74)		HUNTING TRIPS (N=41)	
		freq.	%	freq.	%
<b>WHILE WATCHING WILDLIFE, OF THE FOLLOWING EXPERIENCES WOULD YOU MOST ENJOY?</b>					
Seeing a species you had never seen before	FIRST	22	29.7	7	17.1
	SECOND	22	29.7	13	31.7
	THIRD	14	18.9	12	29.3
Seeing many different wildlife species	FIRST	18	24.3	11	26.8
	SECOND	8	10.8	4	9.8
	THIRD	21	28.4	7	17.1
Seeing a rare or endangered animal	FIRST	13	17.6	11	26.8
	SECOND	20	27.0	7	17.1
	THIRD	9	12.2	5	12.2
Seeing a family group of wildlife, such as parents with their young	FIRST	12	16.2	7	17.1
	SECOND	13	17.6	3	7.3
	THIRD	13	17.6	3	7.3
Seeing a large number of animals of many different species	FIRST	6	8.1	2	4.9
	SECOND	6	8.1	8	19.5
	THIRD	5	6.8	4	9.8
Seeing a large number of animals of one of your favorite species	FIRST	0	0.0	1	2.4
	SECOND	3	4.1	3	7.3
	THIRD	4	5.4	4	9.8
Seeing a group of animals, such as a flock or herd	FIRST	3	4.1	2	4.9
	SECOND	2	2.7	3	7.3
	THIRD	8	10.8	5	12.2

Appendix E, Table 2. Wildlife professionals' first-, second-, and third-most enjoyable wildlife watching experiences (1) during purely nonconsumptive trips (excluding scouting) and (2) during hunting trips. There were no significant differences between the two types of trips.

		NONCONSUMPTIVE TRIPS (N=82)		HUNTING TRIPS (N=72)	
		freq.	%	freq.	%
WHILE WATCHING WILDLIFE, OF THE FOLLOWING EXPERIENCES WOULD YOU MOST ENJOY?					
Seeing a species you had never seen before	FIRST	19	23.2	15	20.8
	SECOND	25	30.5	18	25.0
	THIRD	20	24.4	18	25.0
Seeing many different wildlife species	FIRST	29	35.4	28	38.9
	SECOND	10	12.2	8	11.1
	THIRD	19	23.2	16	22.2
Seeing a rare or endangered animal	FIRST	14	17.1	10	13.9
	SECOND	19	23.2	15	20.8
	THIRD	19	23.2	19	26.4
Seeing a family group of wildlife, such as parents with their young	FIRST	5	6.1	3	4.2
	SECOND	10	12.2	9	12.5
	THIRD	8	9.8	5	6.9
Seeing a large number of animals of many different species	FIRST	9	11.0	11	15.3
	SECOND	11	13.4	11	15.3
	THIRD	7	8.5	7	9.7
Seeing a large number of animals of one of your favorite species	FIRST	4	4.9	4	5.6
	SECOND	7	8.5	10	13.9
	THIRD	3	3.7	3	4.2
Seeing a group of animals, such as a flock or herd	FIRST	2	2.4	1	1.4
	SECOND	0	0.0	1	1.4
	THIRD	5	6.1	3	4.2

Appendix E, Table 3. Birders' first-, second-, and third-most enjoyable wildlife watching experiences (1) during purely nonconsumptive trips (excluding scouting) and (2) during hunting trips. There were no significant differences between the two types of trips.

		NONCONSUMPTIVE TRIPS (N=90)		HUNTING TRIPS (N=17)	
		freq.	%	freq.	%
WHILE WATCHING WILDLIFE, OF THE FOLLOWING EXPERIENCES WOULD YOU MOST ENJOY?					
Seeing a species you had never seen before	FIRST	27	30.0	5	29.4
	SECOND	23	25.6	5	29.4
	THIRD	25	27.8	5	29.4
Seeing many different wildlife species	FIRST	26	28.9	9	52.7
	SECOND	9	10.0	1	5.9
	THIRD	15	16.7	2	11.8
Seeing a rare or endangered animal	FIRST	13	14.4	3	17.6
	SECOND	25	27.8	4	23.5
	THIRD	15	16.7	6	35.3
Seeing a family group of wildlife, such as parents with their young	FIRST	13	14.4	0	0.0
	SECOND	15	16.7	4	23.5
	THIRD	22	24.4	2	11.8
Seeing a large number of animals of many different species	FIRST	6	6.7	0	0.0
	SECOND	6	6.7	2	11.8
	THIRD	6	6.7	1	5.9
Seeing a large number of animals of one of your favorite species	FIRST	2	2.2	0	0.0
	SECOND	4	4.4	1	5.9
	THIRD	3	3.3	0	0.0
Seeing a group of animals, such as a flock or herd	FIRST	3	3.3	0	0.0
	SECOND	8	8.9	0	0.0
	THIRD	4	4.4	1	5.9

Appendix E, Table 4. Environmentalists' first-, second-, and third-most enjoyable wildlife watching experiences (1) during purely nonconsumptive trips (excluding scouting) and (2) during hunting trips. There were no significant differences between the two types of trips.

		NONCONSUMPTIVE TRIPS (N=70)		HUNTING TRIPS (N=4)	
		freq.	%	freq.	%
WHILE WATCHING WILDLIFE, OF THE FOLLOWING EXPERIENCES WOULD YOU MOST ENJOY?					
Seeing a species you had never seen before	FIRST	12	17.1	2	50.0
	SECOND	21	30.0	1	25.0
	THIRD	17	24.3	1	25.0
Seeing many different wildlife species	FIRST	21	30.0	1	25.0
	SECOND	9	12.9	1	25.0
	THIRD	13	18.6	2	50.0
Seeing a rare or endangered animal	FIRST	16	22.9	0	0.0
	SECOND	18	25.7	1	25.0
	THIRD	12	17.1	1	25.0
Seeing a family group of wildlife, such as parents with their young	FIRST	11	15.7	0	0.0
	SECOND	12	17.1	1	25.0
	THIRD	14	20.0	0	0.0
Seeing a large number of animals of many different species	FIRST	6	8.6	0	0.0
	SECOND	1	1.4	0	0.0
	THIRD	5	7.1	0	0.0
Seeing a large number of animals of one of your favorite species	FIRST	0	0.0	0	0.0
	SECOND	4	5.7	0	0.0
	THIRD	0	0.0	0	0.0
Seeing a group of animals, such as a flock or herd	FIRST	4	5.7	1	25.0
	SECOND	3	4.3	0	0.0
	THIRD	5	7.1	0	0.0

Appendix E, Table 5. Hunters' first-, second-, and third-most enjoyable wildlife watching experiences (1) during purely nonconsumptive trips (excluding scouting) and (2) during hunting trips.

		NONCONSUMPTIVE TRIPS (N=92)		HUNTING TRIPS (N=101)	
		freq.	%	freq.	%
<b>WHILE WATCHING WILDLIFE, OF THE FOLLOWING EXPERIENCES WOULD YOU MOST ENJOY?</b>					
Seeing a species you had never seen before	FIRST	8	8.7	14	13.9
	SECOND	7	7.6	10	9.9
	THIRD	33	35.9	29	28.7
* Seeing many different wildlife species	FIRST	23	25.0	35	34.7
	SECOND	7	7.6	14	13.9
	THIRD	12	13.0	14	13.9
Seeing a rare or endangered animal	FIRST	10	10.9	8	7.9
	SECOND	17	18.5	16	15.8
	THIRD	12	13.0	14	13.9
* Seeing a family group of wildlife, such as parents with their young	FIRST	26	28.3	16	15.8
	SECOND	24	26.1	24	23.8
	THIRD	9	9.8	11	10.9
Seeing a large number of animals of many different species	FIRST	12	13.0	13	12.9
	SECOND	11	12.0	14	13.9
	THIRD	6	6.5	14	13.9
Seeing a large number of animals of one of your favorite species	FIRST	11	12.0	14	13.3
	SECOND	17	18.5	12	11.9
	THIRD	4	4.3	5	5.0
Seeing a group of animals, such as a flock or herd	FIRST	2	2.2	1	1.0
	SECOND	6	6.5	5	5.0
	THIRD	13	14.1	8	7.9

\* Significant difference between (1) ranks assigned for nonconsumptive trips and (2) ranks assigned for hunting trips ( $P \leq 0.05$ )

Appendix E, Table 6. Enjoyment of hunting experiences by forestry professionals.

WHILE OUT HUNTING THE GAME ANIMAL YOU MOST ENJOY HUNTING, HOW WOULD THE FOLLOWING EXPERIENCES AFFECT YOUR ENJOYMENT OF THE TRIP?	effect <sup>1</sup> on enjoyment	freq.	%
Shooting the game animal, or bagging your limit	.	46	
	-1	1	2.4
	0	4	9.8
	+1	8	19.5
	+2	15	36.6
	+3	13	31.7
Not shooting any of the game animals, or not bagging your limit	.	46	
	-3	2	4.9
	-2	3	7.3
	-1	10	24.4
	0	22	53.7
	+1	2	4.9
	+2	2	4.9
Seeing a large number of the game animal	.	45	
	+1	6	14.3
	+2	13	31.0
	+3	23	54.8
Seeing other game species	.	46	
	0	1	2.4
	+1	11	26.8
	+2	14	34.1
	+3	15	36.6
Seeing non-game species	.	46	
	0	5	12.2
	+1	15	36.6
	+2	10	24.4
	+3	11	26.8

<sup>1</sup> -3 = strongly decrease enjoyment, 0 = no effect, and +3 = strongly increase enjoyment. An ellipsis indicates non-respondents.

Appendix E, Table 7. Enjoyment of hunting experiences by wildlife professionals.

WHILE OUT HUNTING THE GAME ANIMAL YOU MOST ENJOY HUNTING, HOW WOULD THE FOLLOWING EXPERIENCES AFFECT YOUR ENJOYMENT OF THE TRIP?	effect <sup>1</sup> on enjoyment	freq.	%
Shooting the game animal, or bagging your limit	.	16	
	0	4	5.6
	+1	25	35.2
	+2	12	16.9
	+3	30	42.3
Not shooting any of the game animals, or not bagging your limit	.	16	
	-3	1	1.4
	-2	2	2.8
	-1	32	45.1
	0	30	42.3
	+1	3	4.2
	+2	3	4.2
Seeing a large number of the game animal	.	17	
	0	2	2.9
	+1	5	7.1
	+2	20	28.6
	+3	43	61.4
Seeing other game species	.	16	
	+1	12	16.9
	+2	24	33.8
	+3	35	49.3
Seeing non-game species	.	16	
	+1	14	19.7
	+2	30	42.3
	+3	27	38.0

<sup>1</sup> -3 = strongly decrease enjoyment, 0 = no effect, and +3 = strongly increase enjoyment. An ellipsis indicates non-respondents.

Appendix E, Table 8. Enjoyment of hunting experiences by birders.

WHILE OUT HUNTING THE GAME ANIMAL YOU MOST ENJOY HUNTING, HOW WOULD THE FOLLOWING EXPERIENCES AFFECT YOUR ENJOYMENT OF THE TRIP?	effect <sup>1</sup> on enjoyment	freq.	%
Shooting the game animal, or bagging your limit	.	76	
	-2	1	6.3
	0	1	6.3
	+1	6	37.5
	+2	4	25.0
Not shooting any of the game animals, or not bagging your limit	.	76	
	-3	1	6.3
	-2	1	6.3
	-1	4	25.0
	0	8	50.0
Seeing a large number of the game animal	.	75	
	+1	2	11.8
	+2	5	29.4
	+3	10	58.8
Seeing other game species	.	75	
	+1	5	29.4
	+2	4	23.5
	+3	8	47.1
Seeing non-game species	.	75	
	0	1	5.9
	+1	4	23.5
	+2	3	17.6
	+3	9	52.9

<sup>1</sup> -3 = strongly decrease enjoyment, 0 = no effect, and +3 = strongly increase enjoyment. An ellipsis indicates non-respondents.

Appendix E, Table 9. Enjoyment of hunting experiences by environmentalists.

WHILE OUT HUNTING THE GAME ANIMAL YOU MOST ENJOY HUNTING, HOW WOULD THE FOLLOWING EXPERIENCES AFFECT YOUR ENJOYMENT OF THE TRIP?	effect <sup>1</sup> on enjoyment	freq.	%
Shooting the game animal, or bagging your limit	.	77	
	-3	1	33.3
	+2	2	66.7
Not shooting any of the game animals, or not bagging your limit	.	76	
	0	4	100.0
Seeing a large number of the game animal	.	76	
	+2	1	25.0
	+3	3	75.0
Seeing other game species	.	76	
	+2	1	25.0
	+3	3	75.0
Seeing non-game species	.	76	
	+1	1	25.0
	+2	2	50.0
	+3	1	25.0

<sup>1</sup> -3 = strongly decrease enjoyment, 0 = no effect, and +3 = strongly increase enjoyment. An ellipsis indicates non-respondents.

Appendix E, Table 10. Enjoyment of hunting experiences by hunters.

WHILE OUT HUNTING THE GAME ANIMAL YOU MOST ENJOY HUNTING, HOW WOULD THE FOLLOWING EXPERIENCES AFFECT YOUR ENJOYMENT OF THE TRIP?	effect <sup>1</sup> on enjoyment	freq.	%
Shooting the game animal, or bagging your limit	.	23	
	-3	1	1.1
	-2	1	1.1
	-1	2	2.2
	0	4	4.3
	+1	16	17.4
	+2	20	21.7
Not shooting any of the game animals, or not bagging your limit	.	24	
	-3	11	12.1
	-2	5	5.5
	-1	20	22.0
	0	35	38.5
	+1	11	12.1
	+2	5	5.5
Seeing a large number of the game animal	.	24	
	-3	1	1.1
	-1	2	2.2
	+1	7	7.7
	+2	11	12.1
Seeing other game species	.	24	
	0	2	2.2
	+1	14	15.4
	+2	33	36.3
Seeing non-game species	.	24	
	-3	6	6.6
	-1	2	2.2
	0	16	17.6
	+1	30	33.0
	+2	17	18.7
	+3	20	22.0

<sup>1</sup> -3 = strongly decrease enjoyment, 0 = no effect, and +3 = strongly increase enjoyment. An ellipsis indicates non-respondents.

Appendix E, Table 11. Enjoyment of secondary encounters with wildlife by forestry and wildlife professionals.

effect <sup>1</sup> on enjoyment	Forestry Professionals (N=71)		Wildlife Professionals (N=70)	
	freq.	%	freq.	%
.	16	.	17	.
0	3	4.2	0	0.0
+1	8	11.3	4	5.7
+2	25	35.2	11	15.7
+3	35	49.3	55	78.6

<sup>1</sup> -3 = strongly decrease enjoyment, 0 = no effect, and +3 = strongly increase enjoyment. An ellipsis indicates non-respondents.

Appendix E, Table 12. Enjoyment of secondary encounters with wildlife by birders, environmentalists, and hunters during non-wildlife-based recreation trips.

effect <sup>1</sup> on enjoyment	Birders (N=67)		Environ- mentalists (N=69)		Hunters (N=75)	
	freq.	%	freq.	%	freq.	%
.	25	.	11	.	40	.
-3	1	1.5	2	2.9	1	1.3
0	0	0.0	1	1.4	0	0.0
+1	2	3.0	2	2.9	4	5.3
+2	4	6.0	13	18.8	17	22.7
+3	60	89.6	51	73.9	53	70.7

<sup>1</sup> -3 = strongly decrease enjoyment, 0 = no effect, and +3 = strongly increase enjoyment. An ellipsis indicates non-respondents.

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