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**THE DEMAND FOR
NONCONSUMPTIVE
WILDLIFE USES:**

A REVIEW OF THE LITERATURE



**FOREST SERVICE GENERAL TECHNICAL REPORT NE-52
1979
FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE
NORTHEASTERN FOREST EXPERIMENT STATION
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MANUSCRIPT RECEIVED FOR PUBLICATION 5 FEBRUARY 1979

Abstract

Nonconsumptive wildlife use is a generic term for a variety of recreational activities related to wildlife. Primary nonconsumptive uses include general wildlife observation, birdwatching, birdfeeding, and wildlife and bird photography. Secondary activities include nature walks, membership in animal-related organizations, ownership of wildlife pets, and zoo visitation. This report reviews the literature about the demand for nonconsumptive wildlife, based on surveys of the attitudes, preferences, participation, and expenditures for related activities.

INTRODUCTION

AMERICANS have always been interested in wildlife. From the colonial era throughout the 19th century, wildlife served as an important source of food and clothing. As recently as 1910, the United States was primarily a rural nation with the majority of its population residing on farms or in rural areas (Moeller and More 1976). As the 20th century progressed, however, we witnessed the growth of a modern urban-industrial society where the vast majority of Americans live and work in large cities.

Along with this dramatic shift in place of residence have come major changes in values—many traditional rural values have been supplanted by new urban and suburban lifestyles. Yet, surprisingly, these sweeping changes have had little impact on our interest in wildlife: one recent survey in Oregon found that 95 percent of the adult population participated in some wildlife-oriented activity (Aney and Cowan 1975). Similar surveys in other states might well produce comparable results. But while our interest in wildlife has remained quite high, the expression that we give to this interest (in terms of activity participation) is shifting. Participation in hunting and fishing has not kept pace with the growth of many other activities, and some researchers have even predicted declines in absolute numbers of hunters and fishermen in the not too distant

future (Hauser 1962, Chichetti et al. 1969, Hendee and Potter 1976). Conversely, the demand for many nonconsumptive wildlife uses appears to be increasing, both in the population as a whole (Hendee 1969) and as a proportion of the total recreational use that a given area receives (Talbot 1974, Mead and Bookhout 1977). Because such shifts may have important implications for wildlife management agencies, we must examine this demand and some of its underlying factors. In this report I review the literature about the demand for nonconsumptive wildlife use.

Each human use of wildlife can be generally categorized as consumptive or nonconsumptive. Consumptive uses are those that result in or attempt the death of an individual animal (Langenau 1976, Witter 1978). This category encompasses hunting, trapping, fishing, and, in some cases, the collection and use of animals for scientific research.

Nonconsumptive wildlife use, frequently stereotyped as birdwatching, certainly includes birdwatching and general wildlife observation, but also includes wildlife photography, membership in animal-welfare organizations, nature walks and study, and birdfeeding. More marginally, this group of activities might include pet ownership and visits to zoos, circuses, and museums. While such activities are appreciative uses of wildlife and do not result in the death of an animal, they are marginal because they involve observing the animal in other than its natural surroundings.

A variety of typologies of nonconsumptive use have been suggested. For example, Langenau (1975) described four levels of appreciative use: (1) active or passive use of the animal to view, photography, or study; (2) secondary benefit derived from seeing the animal, while engaged in other outdoor recreation; (3) intellectual benefits from reading, thinking, and talking about the animal; and (4) option demand—the value of the animal to nonusers who may wish to use the animal in the future.

Another typology (More 1977) describes the varieties of encounters through which people can experience wildlife: direct-natural, where the animal is encountered in its natural habitat; direct-artificial, where the animal is encountered directly but in an artificial habitat (zoos, circuses, museums, etc.), and vicarious encounters (movies, TV, etc.). These typologies, while conceptually useful, are insufficient for examining the demand for a given activity. Consequently, the remainder of this paper is focused on the specific nonconsumptive activities described above.

Ordinarily demand is expressed in the form of a schedule—the quantity of something purchased at different price levels. This works well for most of the goods and services produced in our society, but some fall outside the market system and are provided by the public sector at only nominal prices. Wildlife and many forms of public outdoor recreation are examples of such “merit” goods. Because such goods are not included in the ordinary market-pricing system, a persistent problem for economists has been to place a value on them so that they can be compared to other resources. In the recreation field, this has led to the development of demand curves based on sophisticated location analysis and willingness-to-pay studies. For nonconsumptive wildlife use, the two major methods of economic valuation are expenditure studies and participation rate studies.

Before turning to the individual studies, however, a word of caution is in order. Social science is less exact than biological science; subtle connotations, definitions, phrasings—all can affect the data reported in a survey. To take these statistics at face value would impute a degree of accuracy that simply does

not exist. Prudent readers will recognize these problems and search for similarity of results across several studies, and treat the results of any single report skeptically.

EXPENDITURE STUDIES

Expenditure studies attempt to determine the economic value of an activity by assessing the amount of money participants spend to engage in it. Several such studies have focused on nonconsumptive wildlife use. The first, a 1966 survey of 35 Calgary Bird Club members (Myers 1968), concluded that the average expenditure for equipment was \$199 per member per year. In addition, members spent an average of \$168 per person per year on transportation. Both of these figures greatly exceeded hunter expenditures. Furthermore, the average Calgary naturalist was willing to travel much greater distances in pursuit of his hobby than was the comparable Canadian prairie sportsman. Unfortunately, this small sample makes it difficult to generalize the findings to other groups of birders.

In the southeastern United States, 6.1 percent of the households surveyed in 1971 reported expenditures related solely to wildlife enjoyment, wildlife observation, and photography (Horvath 1974a). The average annual expenditure was \$197. Based on these figures, an estimated 446,001 southeastern households spent more than \$89 million on nonconsumptive activities. These figures do not reflect the expenditures for wildlife enjoyment activities of hunters and fishermen.

Shaw et al. (1978a) questioned avid wildlife observers visiting seven sites in southern Arizona about the replacement value of the equipment they used primarily for nonhunting wildlife appreciation. Most respondents (62 percent) valued their equipment between \$100 and \$1,500. Seven percent, however, valued it at over \$5,000.

A fourth study attempted to assess the economic impact of nonconsumptive wildlife use by estimating total expenditures on an industry-wide basis (DeGraaf and Payne 1975). It concluded that the total direct expenditures attributable to the enjoyment of nongame birds in the United States during

1974 was approximately \$500 million, of which \$170 million was for birdseed, \$15 million for birdhouses and feeders, \$3 million for field guides, and \$4 million for gift books. Also included were \$3.1 million spent on organizational memberships, \$115 million for binoculars, and \$190 million spent on photographic equipment and processing. The trend in most of these expenditures is upward, perhaps even exceeding the general inflation rate. This could indicate that participation is increasing throughout the population or that expenditures by individual participants are increasing, or both.

Despite the fact that the price of birdseed nearly doubled between 1972 and 1974, the quantity purchased remained nearly constant (Payne and DeGraaf 1975). This suggests that the demand for seed (and the related recreational activity) is relatively inelastic.

By any measure, nonconsumptive wildlife recreation is big business; individuals who enjoy these activities are often prepared to spend large amounts of money pursuing them.

PARTICIPATION RATE STUDIES

Expenditure studies, while useful in assigning an economic value to an activity, which draws attention to its importance, have been of limited use in helping to understand the underlying dynamics of the activity. To counter this, other studies have focused on participation. Although they vary widely, these studies generally establish participation rates for an activity to examine how the rate is affected by basic factors—typically socioeconomic and demographic variables. When these relationships are known, the demand for the activity can be forecast on the basis of changes in the factors.

Although extensive studies of participation in hunting and fishing have been conducted, far fewer have been attempted for nonconsumptive uses. Studies that have been done were primarily concerned with participation in wildlife observation (including birdwatching and feeding), and wildlife and bird photography. Related activities like nature walking, zoo visitation, pet ownership, and membership

in wildlife-related organizations have also received some attention.

Wildlife observation

As an activity, wildlife observation is a fairly new category for research. Defined as trips made primarily to see or look at wild animals, fish, etc. in natural settings (excluding photographic trips and trips to zoos), it was first included as a specific category in the National Survey of Hunting, Fishing and Associated Wildlife Recreation in 1975. This survey estimated that, in 1975, some 49,314,000 people (about 27 percent of the total U.S. population) participated for a total of 1,589,546,000 visitor days (U.S. Fish and Wildlife Service 1977). Nearly half of these people were also fishermen and/or hunters. The age distribution appears similar to that of the population as a whole, with most participants under age 45 (about 60 percent). Participation declines somewhat in the older age brackets. The income of participants also appears to follow a normal distribution with most participants in the middle to upper middle income classes. Slightly more men (52.6 percent) participated than women (47.4 percent).

A 1971 survey of households in the southeastern United States reports somewhat lower participation than the nation as a whole (Horvath 1974a). In these states, 17.3 percent of the sample population reported participation in wildlife enjoyment activity (including both observation and photography). The population estimates for the southeast as a whole were 1,027,319 households with 471.7 million days of participation. By including questions about the dollar value of these activities to participants, Horvath (1974b) estimated the total value of wildlife activity to exceed \$24 billion. The highest use rates were for birds, followed by "animals" and fish.

As in the U.S. Fish and Wildlife Service's national survey, income appeared to be normally distributed. Participation was highest, however, for single females, followed by couples with no children. Generally, increasing numbers of children tended to reduce participation. Little relationship was found between wildlife enjoyment and vacation time or weekends—evidently the activity occurs

throughout the week all during the year. Finally, there was some relationship between participation in wildlife enjoyment activities and occupational status: highest rates were found among retired people (19.2 percent of the total sample) and professional groups (15.2 percent).

In Oregon, 33 percent of the population (505,000 people) were active wildlife viewers (Aney and Cowan 1975). People who viewed wildlife tended to be younger than nonviewers and have incomes either above or below the income level of nonviewers. Other socioeconomic and demographic variables did not differ between the groups (Aney and Cowan 1974).

A 1977 survey of residents of New York State's metropolitan areas found 64 percent of the survey respondents participated in wildlife observation (Brown and Dawson 1978). As a population estimate, however, this may be somewhat high due to nonresponse; the authors note that only 50 percent of the sample population responded to the questionnaire and when nonrespondents were contacted for a subsample they seemed to be somewhat less interested in wildlife than were the respondents. However, sighting birds was a common everyday experience for most (62 percent) of those who did respond, while sighting mammals was common on a weekly basis. Other forms of wildlife (for example, reptiles and amphibians) were not commonly sighted. Interestingly, 44 percent felt there was not enough wildlife in their neighborhoods to give them sufficient observation opportunities, and most people attributed this to the general detrimental effects of city environments on wildlife. As for location, most of the wildlife observation was around the respondents' homes (80 percent), followed by public parks (8 percent).

In Michigan, an estimated 71.2 percent of students in grades 7 through 12 participated in wildlife observation (Pomerantz 1977). In addition, 56 percent had driven and 51 percent had hiked to view wildlife. Driving and hiking to see wildlife was more frequent in rural areas. Participation rates varied little across grades and there were virtually no differences between the sexes. Finally, the esthetic values of wildlife outweighed the utilitarian

for these students—77.8 percent said there should be more areas set aside for viewing wildlife. While these figures are impressive, there is some evidence that adult participation in many appreciative uses of wildlife is less tied to childhood experience than are hunting and fishing (Yeosting and Burkhead 1973). Nonetheless, it appears that high school students constitute a major group of nonconsumptive wildlife users.

Wildlife observation consists of more than birdwatching. In Michigan, Langenau (1976) estimated that about 2.6 million people hiked or drove to look for and attempt to see deer. Both participation rates and the actual number of successful sightings were highest in rural areas. About 25 percent of the people who participated in these observation activities had also hunted deer during the preceding year. Most people indicated that they enjoyed seeing deer at any time, but when preferences were given, people preferred seeing moderate numbers of deer in forest habitats during autumn. When compared to nonparticipants, more males were engaged in deer observation, but there were no differences in marital status or number of children. The effects of education and residence are mixed—important in some areas but not in others.

While most wildlife is observed close to home, there are some sites that attract enthusiasts from all over the country. Witter et al. (1978) surveyed visitors to seven such sites in Arizona. Their "typical" respondent was a middle to older aged, well educated, affluent, urban resident. Nearly all (92 percent) respondents were birdwatchers, over 50 percent were wildlife photographers, while 7 percent were hunters. Most (88 percent) belonged or contributed to one or more private organizations that promote nonconsumptive uses.

Overall, the information on wildlife observation is confusing and contradictory. Apparently, participation is casual for the most part, with participants coming from all segments of society. Yet some categories of wildlife observation attract such a devoted following (cf. Witter et al. 1978) that they deserve separate consideration. This is especially true of birdwatching, birdfeeding, and wildlife photography.

Birdwatching

Birdwatching was first examined as a separate activity by the Bureau of Outdoor Recreation (BOR) in 1965. At that time they estimated that there were 7.1 million birders (5 percent of the total population) in the United States (U.S. Bureau of Outdoor Recreation 1967). In 1970, the National Survey of Fishing and Hunting estimated 6.8 million birdwatchers in the nation (U.S. Bureau of Sport Fisheries and Wildlife 1972), and in 1972, another national survey found 4 percent of the U.S. population participating (U.S. Bureau of Outdoor Recreation 1973).

The most recent national survey (Kellert 1977) disclosed that 22 percent of the population might be considered birdwatchers. However, by examining both interest in and knowledge of birds, three subgroups were defined: committed birders who had both high interest and high knowledge constituted 5 percent of the population; 9 percent had high interest but low knowledge; while an additional 8 percent had high knowledge but little interest. It may be that those who are interested but not knowledgeable participate in activities like birdfeeding; Kellert (1977) speculates that the high knowledge but low interest groups may treat birding as a sort of collecting game focused on the number of species seen. Finally, 78 percent of the people in Kellert's national sample were neither knowledgeable nor interested in birds.

Regional differences in birdwatching participation rates are difficult to assess. Kellert (1977) found no differences between regions, but the 1972 national survey of outdoor recreation (U.S. Bureau of Outdoor Recreation 1973) found participation rates highest in the North Central states. Supporting this, Langenau (1975) reports approximately 35 percent of Michigan residents participated, and in 1974, birdwatching ranked as the 28th most popular activity on southern Michigan game and recreation areas, accounting for 0.3 percent of their total use (Belyea and Lerg 1976). Similarly, in Ohio wildlife areas an estimated 11,147 man-hours of participation represented 0.4 percent of total use (Mead and Bookhout 1977). On the other hand, an even higher rate was reported in Oregon where 48 percent of the population (719,000 peo-

ple) participated during 1973-1974 (Aney and Cowan 1975). In Idaho, approximately 60 percent of the population was estimated to have participated in birdwatching in 1976 (Fazio and Belli 1977). However, most people participated only occasionally, with the highest participation rates found among purely nonconsumptive users (as opposed to those who participated in both consumptive and nonconsumptive uses).

Evidence of the effects of other socioeconomic and demographic variables is even more equivocal. The 1972 BOR survey described the typical birder as over 25, white, urban, and college educated (U.S. Bureau of Outdoor Recreation 1973). However, Langenau (1975) reported slightly lower levels of participation in highly urban southern Michigan than in the more rural upper peninsula, and Kellert (1977) found no differences between the characteristics of birders and those of the general population, except that people who were knowledgeable tended to be more highly educated regardless of interest. In Saskatchewan, no differences were found between urban and rural residents in their attitudes toward birdwatching (Schweitzer et al. 1973).

As an activity, most birdwatching is done close to home, although many birders do visit other states to pursue their hobby (Horvath 1974a). Seventy-five percent of the activity is on weekends on 1-day outings or outings of shorter duration (U.S. Bureau of Outdoor Recreation 1973). The average duration of an outing is 2.1 hours. For many, birding ranks as their favorite recreational activity (Shaw et al. 1978a).

Based on this information, it appears that birders constitute a small but highly dedicated portion of the population. They appear to come from all walks of life and from every region of the country. In the future, the numbers of dedicated birdwatchers will probably grow slightly, but it is difficult to foresee any major changes in participation.

Birdfeeding

A second subcategory of wildlife observation is birdfeeding. The market for birdseed (and hence the activity) began to mushroom about 1960 and sales have risen 5 to 10 percent annually since then (Wildlife Management In-

stitute 1975). On a national basis, DeGraaf and Payne (1975) estimated that 20 percent of U.S. households purchased an average of 60 pounds of seed each year, based on data from five major cities (Table 1). Substantial regional variation exists, however. In Massachusetts, the state Audubon Society found that 33 percent of Massachusetts households bought an average of 60 pounds of seed per year, while DeGraaf and Thomas (1974) found 43 percent of the households in Amherst, Massachusetts fed birds. Fifty percent of the residents of New York State metropolitan areas reported feeding wildlife (not limited to birds), mostly around the home; 34 percent had birdfeeders, 16 percent provided water structures for wildlife, 11 percent erected birdhouses, and 10 percent had made plantings to attract wildlife (Brown and Dawson 1978). In the southeast, 17.2 percent of the residents fed birds, while 15.9 percent had birdhouses and 14.2 percent had birdbaths (Horvath 1974a). On the west coast, Aney and Cowan (1975) found that 46 percent (688,000 people) of all Oregonians fed birds, while 245,000 (16 percent) put up birdhouses or nest boxes. Finally, 63 percent of Michigan high school students fed wildlife (not limited to birds) (Pomerantz 1977).

Based on these figures, an estimate of 20 to 25 percent of U.S. households engaged in bird-feeding does not seem unreasonable. Demand appears to be greatest in the Pacific Northwest and North Central regions, and lowest in the southeast (although data from all regions are not available). Demand is apparently inelastic, which indicates that participants are highly committed to this activity or that the

value they receive from participation greatly exceeds the cost of seed. Finally, the demand for birdfeeding appears to be increasing slightly, but dramatic rises in participation seem doubtful.

Bird and wildlife photography

The last subgroup of wildlife observation to require separate treatment is wildlife photography. Certainly the participants are a dedicated group: Henry (1976) reports that wildlife photography is perhaps the major motivation to visit some African national parks and that photographers in pursuit of a particular shot will usually resist any restrictions placed on their activity. Apart from the intensity of their participation, perhaps the principal reason that this group has been singled out for study is because of its economic importance—without doubt the per capita expenditures for this group greatly exceed those of any other nonconsumptive wildlife users.

In 1965, the estimated number of wildlife photographers in the United States was 2.8 million (U.S. Bureau of Outdoor Recreation 1967). By 1970 this had increased to an estimated 4,519,000 people, an increase of 61 percent (U.S. Bureau of Sport Fisheries and Wildlife 1972). In 1972, 2 percent of the U.S. population participated (U.S. Bureau of Outdoor Recreation 1973), while the 1975 National Survey of Hunting, Fishing and Wildlife Associated Recreation (U.S. Fish and Wildlife Service 1977) estimated 7.8 million participants nationally.

On a national level, most participants tend to be white males less than 25 years of age.

Table 1. Birdseed purchases in five major U.S. cities in 1972.

City	Number of households in city	Percentage of households that purchase birdseed	Average amount of seed purchased per household (lb.)
Milwaukee	442,804	19.4	64.5
Cleveland	649,487	24.7	57.6
St. Louis	750,164	19.8	64.5
New York	3,949,454	15.1	49.2
Boston	861,024	23.8	69.6

Source: DeGraaf and Payne 1975.

They are college educated, reside in urban areas, and possess the high income levels required to pursue this expensive hobby. Fifty-six percent of the activity takes place on weekends and has an average duration of 1.6 hours (U.S. Bureau of Outdoor Recreation 1973).

Regionally, the highest participation is found in the West (U.S. Bureau of Outdoor Recreation 1973). In Oregon, for example, 13 percent (184,000 people) of the state's population participated during 1973-1974, and 1 percent (14,000 people) listed photography as their primary viewing activity (Aney and Cowan 1974). In Michigan, however, the rate may be even higher—Langenau (1975) reports approximately 22 percent of the state's population participated in nature photography, with participation somewhat higher in rural areas. In addition, 39 percent of Michigan students reported photographing wildlife during 1976 (Pomerantz 1977). Wildlife was photographed on 1 or more days annually by 18 percent of New York metropolitan residents, although most respondents reported less than 20 days of participation (Brown and Dawson 1978). The sites most often used for photography were around home (33 percent), in urban or suburban parks (21 percent), on private rural property (18 percent), and at rural public parks (15 percent).

In sum, wildlife and bird photography is the least frequent observation activity, but may be the most economically significant. Participation is dominated by white, college educated, urban males. Although it appears to be increasing, the high income required to pursue this expensive hobby may place a ceiling on future growth.

Secondary wildlife-related activities

A second general category of nonconsumptive wildlife use includes activities where the actual contact with wildlife is but one aspect of an experience, or where the contact is less direct than in those activities previously discussed. This category includes nature walks, zoo visits, ownership of wild or exotic pets, and membership in animal welfare organizations.

Nature walks. Nature walks are outings taken primarily to be close to nature. They differ from wildlife observation trips because they are more concerned with natural history as a whole, including plant communities and the nonliving features of an area. Nevertheless, wildlife is an important component of the nature walk.

In 1960, 14 percent of the U.S. population took nature walks (Mueller and Gurin 1962). In 1965, the percentage of the total population participating was the same, but—perhaps due to total population growth—the total number of people participating had risen by 8 percent to nearly 20 million (U.S. Bureau of Outdoor Recreation 1967). In addition, the number of occasions had increased by 15 percent. By 1970, total participation had risen to nearly 26 million (U.S. Bureau of Sport Fisheries and Wildlife 1972), while in 1972, 17 percent of the U.S. population participated (U.S. Bureau of Outdoor Recreation 1973).

Most nature walks are taken fairly close to home—approximately 70 percent of the activity is on the weekends with an average duration of 2 hours (U.S. Bureau of Outdoor Recreation 1973). Participation increases slightly as income and educational level increase (ORRR Commission 1962, Mueller and Gurin 1962), with highest participation rates found among college educated people in moderate to high income brackets (U.S. Bureau of Outdoor Recreation 1973). Participation is slightly higher for age groups under 25 (ORRR Commission 1962, U.S. Bureau of Outdoor Recreation 1973), female participants tend to outnumber males (U.S. Bureau of Outdoor Recreation 1973), and whites greatly outnumber blacks (Hauser 1962, U.S. Bureau of Outdoor Recreation 1973). Most participants come from urban areas (U.S. Bureau of Outdoor Recreation 1973) and participation rates are highest in the West, followed by the North Central and Northeast regions (U.S. Bureau of Outdoor Recreation 1973, Mueller and Gurin 1962). Lowest participation rates are found in the South.

Overall, nature walks are a popular activity and there seems to be a rather steady increase in participation, at a rate of approximately 19 percent per year (averaging both total par-

ticipants and total occasions). The BOR estimates that by 1980, 35 million Americans will participate on an average of 7 times per year, and by the year 2000, 53 million people will participate at this rate (U.S. Bureau of Outdoor Recreation 1967). Since nature study constitutes an important use of many forest game and recreation areas (Belyea and Lerg 1976, Tyre and James 1971, Mead and Bookhout 1977), the impact of this activity may be considerable.

Zoo visits. Few studies have been conducted to examine zoo visitors despite the fact that "going to the zoo" is one of the most widely shared experiences in modern America. In fact, it is so widely shared that 94 percent of Americans have visited a zoo at least once (Kellert 1977), and to most (77 percent), it is a fascinating and enjoyable experience. On the other hand the commitment to this activity is low—only 16 percent of the people in Kellert's sample indicated frequent zoo visits at some point during their lives. Still, this may make for a surprisingly large industry—in Oregon, an estimated 658,000 people (44 percent of the state's population) visited zoos and wildlife parks in order to view wildlife during 1973-1974 (Aney and Cowan 1974).

Overall, figures taken from the London Zoological Society's attendance estimates indicate that in 1970, 211 zoos in the United States attracted some 109.4 million visits, an average of 519,000 per zoo (Lucas and Duplaix-Hall 1972). By 1976, this had declined to 88.6 million visits to 183 zoos (\bar{x} = 484.5 thousand), a decrease of 6.6 percent (Olney 1978).

Kellert (1977) further examined zoo enthusiasts—the 16 percent of his sample described above. Demographically, they tended to be young, white females with fathers in professional or skilled occupations. They were raised and currently reside in urban areas of 1 million or more population, and were most heavily concentrated in the mid-Atlantic and East Central states.

Generally, zoo enthusiasts were less interested in and knowledgeable about animals than other groups of appreciative users. They may be motivated more by a general sense of affection for animals (especially pets) than by any special attraction to wild animals.

Thus zoos seem to function largely as animal-oriented entertainment centers for residents of large cities.

Zoo visitation may continue to experience a slight decline as the American population ages. However, going to the zoo will remain a popular activity, and individual zoos in large metropolitan areas will continue to attract large numbers of people.

Pet ownership. Each year, millions of animals are imported into the United States. While these animals serve a variety of functions ranging from scientific research to culinary specialties, there is little doubt that a great many find their way into the pet trade.

The demand for pets is huge—so large, in fact, that 88 percent of those Kellert (1977) sampled reported owning a pet at some point in their lives, while 72 percent said they had had a pet during the preceeding 5 years. Nearly three-quarters of the respondents said that pets were a major source of satisfaction in their lives. Not surprisingly, companionship was the most frequent reason given for owning a pet, and many owners expressed a strong sense of affection for animals. This affection did not necessarily extend to wildlife as a whole, however.

Socially, pet owners tended to be young, white, and native born, with disproportionate numbers of single, separated, or divorced persons represented. No differences were found either regionally, or between urban and rural residents (Kellert 1977).

With such a high percentage of the population already owning pets, further increases seem unlikely except insofar as they reflect total population growth. However, the type of animal owned may be subject to fads and trends, such as the current interest in snakes. In Kellert's (1977) study, dogs were the most common (cited by over 80 percent of the owners), followed by cats (50 percent), reptiles (25 percent), small rodents (14 percent), fish (10 percent), and horses and ponies (9 percent). In Michigan, 22.5 percent of all students reported keeping wild pets (Pomerantz 1977), while in Oregon, 8 percent of the population kept a native wildlife pet (Aney and Cowan 1974). Thus, pet ownership and trends in the type of animals owned are capable of having major effects on wildlife populations.

Membership in animal-related organizations. The interest and concern that many Americans have for animals is reflected in the swelling memberships of various animal-related organizations. These range from small groups with highly specific interests to large, multimillion dollar national and international organizations with a plethora of concerns. In recent years there have been increases in both the numbers of organizations and in the numbers of people who belong to them. One count shows that the number of national animal welfare organizations increased from 9 in 1900 to 128 in 1972 (Witter 1977). Of these 128, 32 were founded from 1951 to 1960, 41 between 1961 and 1970, and 14 in 1971 through 1972. The increase in national animal welfare organizations during the 1960's was the largest of any decade in the 20th century.

Individual memberships also increased at a rapid rate. From 1960 to 1975, membership in the Humane Society rose from 25,000 to 75,000, Defenders of Wildlife from 3,500 to 35,000, and the National Audubon Society from 32,000 to 260,000 (Sheffer 1976).

Despite these large numbers, we know very little about the social characteristics of members. Generally, most conservation organizations draw their members from the upper middle class (Harry et al. 1969, Devall 1970). This was confirmed by the recent survey of Audubon subscribers which found that most were employed in professional or technical occupations and had an average household income of over \$35,000 per year (National Audubon Society 1977). Male subscribers outnumbered females by 15 percent, and most subscribers were extremely well educated (43 percent had a graduate degree or more). The median age of subscribers was 44, and the majority were married heads of households. They tended to have multiple environmental interests and were active in a variety of civic affairs.

As part of a larger study, Witter (1978) surveyed 200 members of the American Birding Association. In this organization, men outnumbered women by 44 percent, members averaged 17 years of education, the average age was 49, and 37 percent had incomes above \$30,000. An impressive 91 percent belonged or contributed to three or more wildlife or-

ganizations with a nonconsumptive orientation.

Readers of *National Wildlife* also follow this same pattern: the median age is 47; 27 percent are professionals, with 36 percent living in the suburbs and 26 percent in small towns; two out of three attended college, and 48 percent were graduated; the mean income level is \$25,400 (National Wildlife Federation 1977). Birdwatching was the second most popular outdoor activity of these readers, exceeded only by gardening. Politically, members of this group are quite involved, with about one-third having written to their congressman in the preceding year, and as many as 86 percent willing to write if requested.

The highest growth rates in membership in animal-related organizations were between 1950 and 1970, and the rate seems to have declined slightly in recent years. Nevertheless, substantial growth can still be expected through the next decade.

Finally, it should be noted that many people who belong to these organizations also participate in other animal-related activities. The sheer numbers of groups and the divergent interests they represent make it difficult to generalize about the social characteristics of the members.

Incidental wildlife use. The final subgroup of wildlife-related activities that deserves attention is "incidental" use. Here, nonconsumptive wildlife use is incidental to a person's primary activity, but may greatly enhance the quality of the recreational experience. Thus hunters or fishermen may enjoy observing birds while pursuing their activity, or backpackers may deviate from their route to examine the tracks of a fox. In some cases, even the feeling that wildlife is near may be important to people—recall Leopold's (1966) description of Old Bigfoot the grizzly, and how the mountain Escudilla seemed to lose its meaning after the bear had been destroyed.

The extent and importance of incidental contacts with wildlife are difficult to determine. Only 8 percent of auto campers in the Superior National Forest cited wildlife as a primary reason for their visit; yet 90 percent of them had seen at least some wildlife during their stay and 96 percent of these people

felt that this had added to their experience (Lime and Cushwa 1969). Similarly, 89 percent of Michigan residents reported that seeing a deer added to the enjoyment of their most frequent recreation (Langenau 1976). The people most affected by sighting a deer were engaged in such activities as small game hunting, deer hunting, camping, and hiking. Birdwatchers, boaters, skiers, and swimmers were less interested.

STUDIES OF ATTITUDES, PREFERENCES, AND KNOWLEDGE ABOUT WILDLIFE

Underlying, and perhaps even determining, the demand for specific recreational activity are factors such as the attitudes, preferences, and knowledge levels of the participants. To understand the activity, we must understand its participants and nonparticipants at this level as well as at the aggregate demand level. A number of studies have examined these factors and their relationship to nonconsumptive wildlife use.

Attitude Studies

The vast majority of Americans seem to have a positive attitude toward animals, even if they do not participate in any of the activities discussed here. However, these attitudes may take a variety of forms (cf. Kellert 1976, Pomerantz 1977), or be expressed in a multitude of ways. The attitude most frequently studied has been the antihunting sentiment.

On a national basis, approval of hunting exceeds disapproval. Kellert's (1978) survey, conducted during 1975, found 29 percent of those sampled disapproved of sport hunting, and a national survey conducted in 1976 estimated that 45 percent of the population disapproved of all hunting (Shaw et al. 1978).

Regionally, there are substantial differences in attitudes toward hunting. Kellert (1978) found that hunters were more frequently from the Rocky Mountain and central plains states, antihunters were concentrated in the mid-Atlantic and Pacific Coast states, and non-

hunters (those who did not participate and who were not opposed to hunting) were from the Central and Northeast states. Shaw et al. (1978b) reported the greatest disapproval of hunting in the mid-Atlantic and New England states, and the most approval (70 percent) in the South Central states Pacific Coast states were nearly evenly divided. In New Jersey, 38 percent of the population disapproved of hunting during 1972 (Applegate 1973) and this had increased by 5 percent in 1974 (Applegate 1975). During 1975, 32 percent of Michigan residents disapproved (Langenau 1975), while in Iowa, 11 percent disapproved (Dahlgren et al. 1977). In Western states, Gum et al. (1973) found that 16 percent of Arizona residents felt hunting to be cruel, and Aney and Cowan (1974) found that 31 percent of Oregonians expressed disapproval in 1973.

Other factors affect attitudes as well. In virtually all surveys, females have expressed more disapproval of hunting than males (Aney and Cowan 1974, Shaw and Gilbert 1974, Shaw et al. 1978b, Applegate 1973, Pomerantz 1977). Disapproval also increases with urbanization (Applegate 1973, Shaw et al. 1978b), and Kellert (1978) reported that people who are opposed to hunting tend to have been raised in areas of over 1 million population. This may explain why this sentiment is so strong in the Northeast and in mid-Atlantic states.

Another factor of major importance is age. Generally, the greatest amount of antihunting sentiment is found among the young (Shaw et al. 1978b). In fact, Shaw and Gilbert (1974) found 75 percent of U.S. college students were opposed to hunting. Similarly, 75 percent of Michigan students in grades 7 through 12 were opposed to sport hunting, while 25 percent were opposed to all hunting (Pomerantz 1977). Presumably these students, now perhaps several generations removed from rural backgrounds, will continue to oppose hunting throughout their adult life.

Finally, it should be noted that educational level and income appear to have little effect on antihunting sentiment (Aney and Cowan 1974, Shaw et al. 1978b).

What is the future of the antihunting movement, and how will this affect the demand for

the nonconsumptive uses of wildlife? On a national basis, Kellert (1978) foresees modest increases in antihunting sentiment while in New Jersey, Applegate (1975) reported a 5 percent increase over a period of 2 years. On a short-term basis, the age-related findings suggest a moderate growth in antihunting sentiment. Long-term growth rates are somewhat more difficult to predict. It is evident that urbanization has been the underlying cause of the growth in antihunting sentiment, and most sociologists expect that urbanization will continue for some time to come. However, major changes in energy and food supplies could have an ameliorative effect on both antihunting sentiment and urbanization.

The increase in antihunting sentiment frequently has been considered a causal factor in the growing demand for nonconsumptive uses of wildlife (cf. Lime 1976), but its long-term effects are difficult to assess. Certainly the attitude has been partially responsible for the growth in the membership of animal welfare organizations, and this growth can be expected to continue as the current generation of high school and college students join the labor force and are increasingly able to lend financial support to these organizations. Apart from this, the relationship between antihunting sentiments and other nonconsumptive uses is more complex. Most opponents of hunting can be categorized as having either humanistic attitudes (strong affection for individual animals) or moralistic attitudes (concern about exploitation and cruelty) (Kellert 1978). In some instances, participation in an activity may precede the development of antihunting sentiment—thus, pet ownership may lead to the development of humanistic attitudes. In other cases, there is no apparent causal link between these attitudes and participation in the activity. Birdwatching and wildlife and bird photography are specialized activities that require a high level of knowledge and are not dependent upon these attitudes. In fact, most committed birdwatchers, perhaps because they are so knowledgeable, tend to support rather than oppose hunting (Kellert 1977, Witter 1978).

In sum, the antihunting movement will continue to grow over the next few years, but (with the exception of membership in animal-related organizations) this growth will have

little effect on the demand for nonconsumptive wildlife activities.

Knowledge about wildlife

Knowledge of a subject frequently leads to an increasing appreciation of it and hence to an increased demand for associated activities. Much the same process probably applies to wildlife and wildlife-related activities, both consumptive and nonconsumptive. Unfortunately, few studies have investigated people's knowledge about wildlife; those that have, have generally adopted a quiz format where the number of correct responses is used to determine a person's knowledge. With this format, Kellert (1977) found that 20 percent of the respondents in his national sample had a high knowledge of animals, 28 percent scored moderate to high, 28 percent scored moderate to low, and 24 percent had a low level of knowledge.

A variety of factors influence knowledge levels, not the least of which is activity participation. In Kellert's study, committed birdwatchers had by far the highest knowledge level, with naturalistic hunters (those who hunt primarily for the pleasure of being outdoors and near wildlife) a distant second. Surprisingly, antihunters were among the least knowledgeable of all the groups. Other studies have confirmed that hunters tend to be more knowledgeable about wildlife than antihunters (Pomerantz 1977, Dahlgren et al. 1977).

Males tend to be more knowledgeable about wildlife than females, as do people who were raised in rural areas. Both Pomerantz (1977) and Dahlgren et al. (1977) found that knowledge increased with age, but Dahlgren et al. found that knowledge was inversely related to years of education—people with a grade school education outscored others.

Socioeconomic factors may influence people's preferences for different sources of information about wildlife, just as they do participation rates. It remains to be investigated throughout a broad spectrum of the population, but age, educational level, and sex might play major roles in determining such preferences—I can readily imagine that high school students have access to and rely upon different sources than do adults. Indeed, even within a homogenous subpopulation, differences exist.

Among her Michigan 7th to 12th graders, Pomerantz (1977) found that boys were likely to be influenced by a relative, while girls responded more to teachers. This suggests that wildlife information and education may reach substantially different audiences depending upon the communications medium used.

Although we have treated these mediums as sources of information, they also are potential sources of *mis-information* that can have a profound effect on people's perceptions of animals (More 1977). Regrettably, we have no information of the relative accuracy of the different media.

Wildlife preference studies

Studies based on participation rate and expenditures examine the total demand for a given activity. Yet, even within a given activity there may be substantial variation in demand—are all birds equally attractive to a birder or all the animals at the zoo equally popular? Undoubtedly not! In our rush to estimate total demand, we have largely ignored the species-specific aspects of demand. Of course, such estimates are not easily obtained—the birder may observe a number of different species on a single trip; the zoo visitor dutifully makes the rounds. One approach that has been used to surmount this difficulty has been the wildlife preference survey. Typically, these surveys ask people to rate their preferences for a variety of species, assuming (probably quite correctly) that these preferences are highly correlated with demand.

Few preference surveys have been conducted, and their results seem contradictory. Dagg (1970, 1973) found that the "likability" of birds exceeded that of mammals for the urban residents of Waterloo, Ontario. This may be attributed, in part, to the nuisance value of some of the urban mammals. On the other hand, Bart (1972) found the greatest preference for mammals, specifically horses and dogs. Henry (1976) reported that most visitors to a Kenya National Park devoted by far the greatest amount of their viewing time to two large carnivores—lions and cheetahs; other species in the park attracted little more than a passing glance. In Idaho, nonconsumptive users expressed greatest preference for

deer, followed by bear, eagles, elk, bass, and songbirds (Fazio and Belli 1977).

A survey of Massachusetts conservation commissioners (Gray 1975) indicated greatest preferences for mammals (especially deer and moose, beavers, and marine mammals) and birds (particularly raptors, waterfowl, and upland game birds). The least preferred animals included snakes (both poisonous and harmless), porcupines, opossums, salamanders, mudpuppies and newts, bats, mice, moles, and shrews. In New York State, metropolitan area residents preferred to see butterflies, robins, cardinals, sparrows, bluejays, hummingbirds, and squirrels around their homes, while in nearby public parks or the country they preferred woodpeckers, blackbirds and starlings, chipmunks, ducks and geese, frogs and toads, rabbits, pheasants, and turtles (Brown and Dawson 1978). The least preferred species included pigeons, raccoons, foxes, skunks, and snakes. Finally, in a study confined to birds, Saskatchewan residents who enjoyed bird observation rated songbirds the highest, followed by upland game birds, geese, ducks, other water and shorebirds, and birds of prey (Schweitzer et al. 1973). It is worth noting that, while these were ranked in descending order, preference ratings for all were highly positive.

There are many factors that may affect preferences. Socioeconomic and demographic influences undoubtedly exist but have yet to be studied. Participation in a recreational activity group is an important influence; consumptive users, for instance, may rank species differently from nonconsumptive users (cf. Fazio and Belli 1977). The level of knowledge about wildlife may also modify preferences, and relative scarcity certainly plays a most important role—the sighting of a Ross' gull, a very rare bird, attracted more than 1 thousand people per day from all over the United States.¹ Preferences also may vary with viewing situations—it can be one thing to enjoy watching a squirrel in a park, but quite another to discover it in your birdfeeder. Finally, physical characteristics of

¹*Boston Globe*, 9 March, 1975, p. 1.

an animal—form, size, color, voice, etc. may have a major effect on preferences.

We have very limited knowledge of wildlife preferences. This important and neglected research topic should receive more attention in the future.

SUMMARY AND CONCLUSION

Research in outdoor recreation is relatively new though some activities—like hunting, fishing, and wilderness use—have received a reasonable amount of research attention. Where this is the case, research has progressed in a series of stages, with a different type of question being asked at each stage. Hunting provides an example. Here, we began with studies like the National Surveys of Hunting and Fishing, which attempted to estimate total participation and the expenditures of participants. The basic question asked was How much?—both in terms of participation and economic impact. This was a logical starting point, and such studies often dramatize the importance of an activity.

During the 1960's the emphasis began to shift, and increasing numbers of studies examined the socioeconomic and demographic characteristics of hunters—the question became Who hunts? In the 1970's, the question has again shifted, this time to ask more subtle and difficult questions about *why* people hunt; there have been increasing numbers of studies on hunter attitudes, behavior, satisfactions, and motives. These categories are greatly oversimplified and often overlap, yet they do provide an interesting perspective from which to assess the current state of our knowledge about nonconsumptive wildlife activities.

On this basis, I believe that studies of nonconsumptive uses are currently in a transitional phase. Many of the studies discussed here are concerned primarily with establishing total participation rates for an activity, and this concern will probably continue to be important. However, the number of studies concerned with the characteristics of participants has been increasing rapidly in the past several years and can be expected to be the dominant type of study in the immediate future. With a few exceptions (cf. Kellert 1977), studies of

the underlying motives for these activities have been relatively rare. However, these, too, will increase in frequency as we begin to develop our knowledge of participants' characteristics.

Under the circumstances, a certain amount of confusion is inevitable. Different surveys use different definitions and activity categories; or perhaps ask the same questions in different ways, which produces different results. For example, one survey might define birdwatching as trips taken to observe birds, while another survey might include all the casual observations a person makes around home—a situation bound to lead to different estimates of the number of birders. Langenau (1976) suggested that the lack of standardized categories and definitions is a major factor impeding progress in this field, and I believe he is well justified. Standardization takes time and effort, and doubtless we will improve as we go along. In the meantime, readers should accept the figures in this report with appropriate caution—they are not invalid in and of themselves, but comparisons made between surveys must be considered provisional.

Despite the disparities among surveys, it is evident that a large number of Americans (including those who also hunt and fish) enjoy nonconsumptive uses of wildlife. Based upon the series of recent surveys examined here, approximately 27 percent of the U.S. population participates in wildlife observation, 5 percent enjoy birdwatching, 2 percent are wildlife photographers, and 20 to 30 percent of U.S. households feed birds. Most of these activities appeal to people from all walks of life—there are few socioeconomic or demographic differences between participants and the general population. Overall, participation appears to be highest in the West, the north-central and northeastern regions, and lowest in the South.

Recently a panel of "experts" predicted that by the year 2000, nonconsumptive use would be the dominant form of wildlife-related recreation (Shafer and Moeller 1974). Depending on their point of view, others have hailed or decried the decline of hunting and growth of nonconsumptive uses, but always with a sense of inevitability. However, this sense that we are undergoing or about to undergo dramatic changes in activity participation rates may

not be correct. Certainly if one added together all the participation in each of the nonconsumptive uses discussed here, it would probably greatly exceed the total consumptive uses today. In 1975, the number of wildlife observers alone exceeded the number of hunters (U.S. Fish and Wildlife Service 1977). But growth is another matter. For wildlife observation there is too little data to project any trend. Birdwatching, however, seems to be increasing slightly, but may not even be keeping pace with total population growth. Wildlife photography is increasing rapidly, but the number of participants is still so small that such changes may pass unnoticed. In addition, the high cost of this activity may establish a ceiling on the number of participants.

Zoo visits and pet ownership are both extremely common in the United States today. In fact they are so common that the growth potential is very limited. However, the ownership of wildlife pets is subject to fads, and we would do well to monitor it.

Other activities associated with wildlife appreciation do appear to be increasing. Nature walks (already popular with 17 percent of the population) and membership in animal-related organizations will continue to grow moderately during the next few years, as will the amount of antihunting sentiment. However, it is unclear how increases in these activities will influence the demand for other nonconsumptive uses, so their total impact on wildlife populations may be small.

If this is the case, where is the growth we've heard so much about in recent years? The answer is simple—it's in our increasing recognition of a phenomenon that has been an actuality for a long time: the tremendous public interest in wildlife and the variety of expressions it has. Only now are we beginning to appreciate the scope of the interest.

ACKNOWLEDGMENTS

I am indebted to Dr. Dennis Schweitzer, USDA Forest Service Resources Planning Act Assessment Staff, for his support of this review. I am also most grateful to Drs. Stephen Kellert, Dale Potter, William Shaw, and Daniel Witter for their excellent criticism of an earlier draft.

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