

Resource Publication 154

Nonconsumptive Use of Wildlife in the United States

DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

19970319 022

Fish and Wildlife Service

U.S. Department of the Interior

DTIC QUALITY INSPECTED 1

RESOURCE PUBLICATIONS

This publication of the Fish and Wildlife Service is a miscellaneous series for separately issued popular or instructional materials dealing with investigations related to wildlife and sport fish. Each is published as a separate paper. The Service distributes a limited number of these reports for the use of Federal and State agencies and cooperators. A list of recent issues appears on inside back cover.

Library of Congress Cataloging in Publication Data

Shaw, William W.

Nonconsumptive use of wildlife in the United States.

(Resource publication ; no. 154)

Supt. of Docs. no.: I 49.66:

1. Wildlife conservation—United States.
2. Wildlife management—United States. 3. Wildlife watching—United States. 4. Hunting—United States. 5. Fishing—United States. 6. Wildlife refuges—United States—Recreational use.
7. Wilderness areas—United States—Recreational use. I. Mangun, William Russell. II. Title. III. Series: Resource publication (U.S. Fish and Wildlife Service) ; no. 154. S914.A3 no. 154a 333.95'4'0973 s 84-600206 [QL84.2] [333.95'0973]

NOTE: Use of trade names does not imply U.S. Government endorsement of commercial products.

NONCONSUMPTIVE USE OF WILDLIFE IN THE UNITED STATES

By William W. Shaw
William R. Mangun



**UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**

Resource Publication 154

Washington, D.C. • 1984

Contents

	Page
Abstract	1
Characteristics of Nonconsumptive Users of Wildlife	3
Typology of Nonconsumptive Wildlife - Oriented Activities	3
Sociodemographic Characteristics of Nonconsumptive Participants	4
Activities of Participants in Nonconsumptive Wildlife-Associated Activities	8
Locations, Habitats, and Types of Animals Involved in Nonconsumptive Use of Wildlife	11
Locations of Activities	11
Habitats	12
Types of Wildlife	13
Wildlife Management Implications	13
Potential Mechanisms for Funding Conservation of Nongame Wildlife	13
Attitudes Toward Nongame Funding	15
Expenditures on Items Used in Nonconsumptive Activities	16
Distribution of Cost Among Those Who Benefit	17
Potential Base for Taxation	17
Primary Uses of Equipment	18
Influence of Income and Age on Expenditures	18
Conclusion	19
Acknowledgment	19
References	19

Nonconsumptive Use of Wildlife in the United States

An Analysis of Data from the *1980 National Survey of Fishing, Hunting and Wildlife-Associated Recreation*

by

William W. Shaw¹
and
William R. Mangun

*U.S. Fish and Wildlife Service
Division of Program Plans
Washington, D.C. 20240*

Abstract

Sections of the *1980 National Survey of Fishing, Hunting and Wildlife-Associated Recreation* that dealt with nonconsumptive uses of wildlife are analyzed. The data are based on 5,997 detailed personal interviews of Americans 16 years old and older who participated in some form of nonconsumptive use of wildlife. This represents the first detailed nationwide data base dealing with the characteristics of nonconsumptive users, the types of activities and wildlife involved, and the potential for development of new methods for funding nongame management.

Estimated participation by the United States population 16 years old and older in 1980, for selected categories, was as follows: 55% (93 million) participated in some form of nonconsumptive use of wildlife; 46% (79 million) enjoyed wildlife while on a trip away from home and, of these, 28 million took trips primarily for nonconsumptive enjoyment of wildlife; and 54% (89 million) enjoyed wildlife in residential settings and, of these, 79 million took special interest in observing, identifying, photographing, or feeding wild animals. Residential environments were especially important as locations for nonconsumptive activities. About one-third of the American public took special interest in wildlife or fed wildlife near their homes; 26 million maintained bird feeders, and more than 2 million put out more than 100 pounds of birdseed. Woodlands were the habitats most frequently used by nonconsumptive enthusiasts, and songbirds, squirrels, and chipmunks were the wildlife types most often involved. However, all major types of habitats and wildlife were included. People appeared to enjoy opportunities to observe, photograph, and feed almost any type of wildlife in any type of habitat. Game species—particularly rabbits, waterfowl, and deer—were very important in providing these opportunities.

Collectively, nonconsumptive participants favored the general idea of identifying new sources of revenue to support nongame conservation. However, they were more inclined to support voluntary contributions and general taxes than a special tax on purchases related to wildlife appreciation. Expenditures for more than 20 items that might be used in wildlife-oriented activities are summarized; of these, 5 are used primarily for nonconsumptive wildlife appreciation: field guides, birdseed, bird feeders, birdhouses, and birdbaths. Expenditures for these items in 1980 were estimated to exceed \$600 million, birdseed alone accounting for more than \$500 million. These results suggest that nonconsumptive uses of wildlife are an important aspect of American life. Data from the *1980 National Survey of Fishing, Hunting and Wildlife-Associated Recreation* can provide resource managers and policy-makers with important insights into how these valuable public resources can be managed to provide increased public benefits from nonconsumptive uses of wildlife.

The ways in which people benefit from wildlife are diverse, ranging from direct recreational uses like sport

hunting to the intangible benefits associated with simply knowing that wildlife exists. The extent to which these human uses of wildlife are understood by resource managers varies considerably. Hunters and fishermen, because of their prominent position in supporting wild-

¹Present address: University of Arizona, School of Renewable Natural Resources, Tucson, Arizona.

life management activities and because they are relatively easy to identify (through license records), have been studied extensively (Schole [1973] cited more than 100 studies). But far less is known about the other ways in which people use or benefit from wildlife. Three major questions constitute important issues for resource managers concerned with providing a range of opportunities for wildlife use by the public: Who participates in nonconsumptive uses of wildlife?¹ What types of wildlife and wildlife habitats are involved? What are the potential mechanisms for funding nongame conservation?

Several previous investigations have suggested that nonconsumptive wildlife use is of substantial importance to Americans and warrants closer study by resource managers (More 1979). The *1975 National Survey of Fishing Hunting and Wildlife-Associated Recreation* (U.S. Department of the Interior [USDI] 1977) revealed that more than 49 million Americans spent 1.6 billion days engaged in wildlife observation. DeGraaf and Payne (1975) estimated that the various expenditures associated with bird-watching and wildlife enjoyment (excluding hunting) exceeded \$500 million in 1974. Studies by Kellert (1979, 1980), focusing on the attitudes of Americans toward wildlife, provided further evidence of the importance of wildlife to Americans; for example, he reported that about 25% of American adults are bird-watchers.

It seems clear that a large and perhaps growing segment of the American public is interested in wildlife. Unfortunately, most information about nonconsumptive uses of wildlife is too general to guide specific management decisions, or is based on studies of specific categories of users in a limited regional context. Thus, although some studies have focused on wildlife enthusiasts who actively pursue wildlife observation as a form of outdoor recreation (Fazio and Belli 1977; Shaw 1980), these studies have been based on local samples. Attempts to generalize the findings of these studies to the Nation as a whole must therefore be made with caution.

The *1980 National Survey of Fishing, Hunting and Wildlife-Associated Recreation* (USDI 1982; herein termed the 1980 Survey or the National Report) provided the first comprehensive collection of nationwide data for nonconsumptive wildlife-related recreation. In

response to the recommendation of State members of the International Association of Fish and Wildlife Agencies, the 1980 Survey was designed to gather these detailed data on participation in nonconsumptive activities. For the first time, national, regional, and selected State data are available to assess the nature and extent of participation in nonconsumptive activities.

These data are based on personal interviews with 5,997 persons who participated in some form of nonconsumptive wildlife-oriented activity and who were selected to represent the 93 million Americans 16 years old and older who participated in similar activities. The sample size was designed to provide statistically reliable results for U.S. Bureau of the Census geographic regions, and each respondent was assigned a weight factor proportionate to the national population represented by each interview. These weights were used to project all data used in this report to estimates of national populations 16 years old or older. Further details on the sampling methodology are given in the Appendix of the 1980 National Report (USDI 1982).

Data used in the present report came from two related sources:

1. The *1980 National Survey of Fishing, Hunting and Wildlife-Associated Recreation* (USDI 1982). This document contains summaries of selected data prepared by the U.S. Bureau of the Census for the Fish and Wildlife Service.

2. Public Use Files. The survey of 1980 generated considerably more information than that summarized in the National Report. The complete data file is available on magnetic tape from the Bureau of the Census. Where Public Use Files are used in this report, the category of "data unavailable" frequently appears. These missing data reflect certain sociodemographic variables that were deleted from the file by the Bureau of the Census to ensure anonymity of the respondents.

We provide interpretation and analysis of the 1980 Survey data with the intention of complementing the short summaries provided in the National Report based on that survey. Thus, the present report is organized into three major sections addressing key questions concerning nonconsumptive uses of wildlife resources:

1. Characteristics of nonconsumptive users of wildlife: Who are the participants in nonconsumptive wildlife-oriented activities and what kinds of activities are involved?

2. Management implications: What types of habitat, wildlife, and land ownerships are involved, and where should the efforts of wildlife managers be focused in response to nonconsumptive activities?

3. Alternative mechanisms for funding wildlife conservation: How do participants feel about different schemes for nongame conservation and what are the expenditure patterns for equipment and materials used in wildlife appreciation?

¹The term "nonconsumptive" is used throughout this report to refer to wildlife-oriented activities that do not involve the removal or intended removal of animals from their natural habitats. Use of this term is not meant to imply that nonconsumptive activities have no effects on wildlife resources. The term is a useful and widely adopted means of categorizing an important group of human activities involving wildlife resources. Also, though the term nonconsumptive is used for describing certain categories of human behavior, it should not be confused with distinctions between game and nongame, which describe legal designations for kinds of wildlife.

Characteristics of Nonconsumptive Users of Wildlife

In this section we address two key questions: (1) Who are the participants in nonconsumptive wildlife-associated activities? and (2) What do they do? We begin by describing a typology of nonconsumptive activities and show the numbers of people who participated in each category of activity. We then discuss the sociodemographic characteristics of participants and compare them with those of the general U.S. population. Comparisons are also made among various subpopulations of nonconsumptive wildlife users. Finally, we discuss specific activities and total days of recreation involved.

Typology of Nonconsumptive Wildlife-Oriented Activities

One of the difficulties in developing programs and policies for wildlife conservation is the diversity of ways in which people benefit from wildlife. As Brookshire et al. (1982) noted, human uses of fish and wildlife resources range along a continuum from fundamental uses such as the consumption of wildlife products like meat and furs to less measurable concepts such as existence values (the satisfaction that people derive from knowing that wildlife exists) or ecological values (the importance of wild animals in ecological processes). We deal here with only a part of that continuum of uses—the activities that involve direct human interaction with wildlife but do not normally involve the removal or killing of animals. Therefore, we include no information on participation in activities such as hunting, fishing, and trapping, except as they may relate to nonconsumptive uses. Similarly, neither existence nor ecological values are considered in detail.

The basic survey instrument for the nonconsumptive portion of the 1980 Survey reflected a typology of activities developed by Lyons (1980). Uses of wildlife were categorized according to two factors: level of interest

(primary versus secondary) and location (residential versus nonresidential). That typology is used throughout the present report; the main definitions are outlined here and examples of corresponding activities are shown in Table 1.

- *Primary activities* are those in which seeing, hearing, photographing, or feeding wildlife are the primary objectives of the activity.
- *Secondary activities* are those in which wildlife is enjoyed in the context of a trip or event undertaken for some other primary purpose.
- *Residential activities* are those that occur within 1 mile of a person's home. All other activities are classified as nonresidential.

Participation in each of the categories of use as determined by the 1980 Survey is provided for the entire country in Table 2. Nearly 55% (93 million) of all Americans 16 years old or older engaged in some form of nonconsumptive wildlife use in 1980. The magnitude of this participation is well illustrated by comparing it with the numbers of people who hunted or fished in 1980 (17 and 42 million, respectively).

An important observation about the level of participation shown in Table 2 deals with the importance of wildlife appreciation in residential environments. Although nonresidential activities involved large numbers of people, the highest participation percentages were associated with residential activities. Nearly 47% of Americans 16 years old or older (about 80 million people) participated in primary residential activities at least once in 1980. This number compares with 17% of the population (about 29 million people) who took one or more trips longer than 1 mile, for the primary purpose of nonconsumptive wildlife use. It is clear, then, that a high proportion of nonconsumptive wildlife use occurred in residential settings. Since most traditional wildlife management activities have occurred in rural or undeveloped environments, management efforts aimed at benefiting nonconsumptive users appear to require a greater orientation toward urban and suburban wildlife programs.

Table 1. *Examples illustrating typology of nonconsumptive wildlife-oriented activities.*^a

Type of activity	Relation of locality to home of participant	
	Nonresidential	Residential
Primary	Trips or outings of at least 1 mile from home for the primary purpose of observing, photographing, or feeding wildlife. (Trips to zoos, circuses, or aquariums, and trips to fish or hunt, are not included.)	Activities near the home whose primary purpose is wildlife-related, including closely observing, identifying, photographing, or feeding wildlife, maintaining natural areas or plants for wildlife; and visiting public parks within 1 mile from home to see wildlife.
Secondary	Seeing or hearing wildlife while on a trip or outing at least 1 mile from home that is taken for some other purpose, such as camping, driving for pleasure, or boating.	Unplanned opportunities to see or hear wildlife while pursuing other activities near home (e.g., watching birds while doing yardwork).

^aAdapted from Lyons (1980).

Table 2. Numbers (thousands) and (in parentheses) percentages of Americans 16 years old or older who participated in nonconsumptive wildlife-oriented activities in 1980.

Type of activity	Relation of activities to home of participant		
	Nonresidential	Residential	Nonresidential or residential ^a
Primary	28,822 (17.0)	79,670 (46.9)	83,173 (48.9)
Secondary	73,773 ^b (43.4)	80,475 (47.4)	88,805 ^b (52.3)
Primary or secondary ^b	79,079 (46.5)	89,153 (52.5)	93,249 (54.9)

^aThe numbers are not additive in rows or columns because some persons participated in more than one category of activity.

^bThese values differ slightly from those in the National Report (USDI 1982), which did not include shopping trips or traveling to work in the secondary nonresidential category.

Sociodemographic Characteristics of Nonconsumptive Participants

There are two basic approaches to a description of the sociodemographic characteristics of people who participated in nonconsumptive activities. One approach would be to list the percentages of people in any category of the U.S. population who participated in a particular activity (i.e., through participation rates). However, because the U.S. population is not equally distributed among various sociodemographic groups, participation rates alone would not necessarily reflect the precise distribution of these variables within populations of non-

consumptive users. Consequently we use a different approach in the tables and discussions that follow, which addresses the distribution of sociodemographic characteristics within the entire population of users and two subpopulations—primary nonresidential users and primary residential users.

Data used in the tables presented here came from two related sources: The 1980 Survey (USDI 1982), which contains selected data summaries; and the Public Use File, a magnetic tape containing all of the data from the 1980 Survey. As we mentioned previously, the Public Use File does not include certain sociodemographic data and thus the category "data unavailable" is included where appropriate.

Table 3. Age distributions for U.S. population and selected subpopulations of participants in nonconsumptive wildlife-associated activities in 1980 (numbers in thousands).

Age (years)	Participants in nonconsumptive uses										
	Total U.S. population ≥ 16 years old ^a		Total nonconsumptive users ^b			Primary nonresidential		Primary residential ^a			
	Number	Percent of U.S. population	Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population
16-17	8,612	5.1	3,931	45.7	4.2	1,383	16.1	4.8	3,229	37.5	4.1
18-24	28,546	16.8	14,354	50.3	15.4	5,960	20.9	20.7	10,967	38.4	13.8
25-34	37,742	22.2	23,789	63.0	25.5	9,236	24.5	32.0	20,154	53.4	25.3
35-44	26,117	15.4	15,335	58.7	16.5	4,796	18.4	16.6	13,172	50.4	16.5
45-54	22,555	13.3	11,908	52.8	12.8	3,340	14.8	11.6	10,575	46.9	13.3
55-64	21,723	12.8	11,370	52.3	12.2	2,482	11.4	8.6	10,663	49.1	13.4
>64	24,648	14.5	11,551	46.9	12.4	1,625	6.6	5.6	10,909	44.3	13.7
Data unavailable	0	0	1,012	1.1	0	0					
Total or average	169,942	—	93,250	54.9	—	28,822	17.0	—	79,669	46.9	—

^aData from National Report (USDI 1982).

^bData from Public Use File.

Table 4. Sex distribution for U.S. population and selected subpopulations of participants in nonconsumptive wildlife-associated activities in 1980 (numbers in thousands).

Sex	Total U.S. population ≥ 16 years old ^a		Participants in nonconsumptive uses									
	Number	Percent of U.S. population	Total nonconsumptive users ^b			Primary nonresidential		Primary residential ^a		Number	Percent of U.S. population	Percent of sub- population
			Number	Percent of U.S. population	Percent of sub- population	Number	Percent of U.S. population	Percent of U.S. population	Percent of sub- population			
Male	80,753	47.5	44,224	54.8	47.4	14,911	18.5	51.7	37,012	45.8	46.5	
Female	89,190	52.5	48,013	53.4	51.5	13,912	15.6	48.3	42,657	47.8	53.5	
Data un- available	—	—	1,012	0	1.1	—	—	—	—	—	—	
Total	169,943	—	93,249	54.9	—	28,823	17.0	—	79,669	46.9	—	

^aData from National Report (USDI 1982).

^bData from Public Use File.

Age

Wildlife was enjoyed by people of all age groups (Table 3). Participation rates exceeded 50% for all age categories, except the youngest (16–17 years, 46%) and oldest (65 and older, 47%); rates were highest for the 25–34 (63%) and 35–44 (59%) age groups. Within the subpopulation of nonconsumptive users, about 45% were less than 35 years old, reflecting the larger numbers of people in those age cohorts in the U.S. population.

Sex

Unlike hunting and fishing, which were dominated by male participants (92% and 69%, respectively; USDI 1982), nonconsumptive use of wildlife was nearly equivalent for both sexes. Although slightly more women participated in these activities than men (48 million women versus 44 million men), this difference is probably a reflection of the greater numbers of women in our population, rather than a significant difference in participation rates; 55% of all men participated in nonconsumptive activities compared with 53% of all women (Table 4).

Education

There appeared to be a strong association between education level and participation in nonconsumptive activities (Table 5). Participation rates ranged from 30% for people with 7 or fewer years of education to more

than 77% for those with 5 or more years of college. In fact, the participation rate of people in all groups with 1 or more years of college exceeded 70%. It should be noted, however, that although a higher proportion of people with an advanced education participated in these activities, nonconsumptive users were still predominately persons with a high school education or less. This relation is a reflection of the fact that most of the U.S. population (68%) was in these lower education categories.

Race

More than 90% of those who reported participating in some form of nonconsumptive use were white (Table 6)—a reflection of the fact that about 87% of all Americans 16 years old or older in 1980 were white. However, participation rates for white people in general (58%) were nearly double those for people of other races (less than 30%). Some of these differences may be a result of factors treated separately elsewhere—particularly education, income, and place of residence.

Income

When stratified by household income categories, participation in nonconsumptive activities ranged from 40% (under \$5,000) to 71% (\$30,000–\$39,999) and there appeared to be a consistent relation between income and participation rates (Table 7). As with other variables however, the distinction between the proportion of a U.S. population subgroup who participated (participa-

Table 5. *Education distribution for U.S. population and selected subpopulation of participants in nonconsumptive wildlife-associated activities in 1980 (numbers in thousands).*

Years of education	Total U.S. population ≥ 16 years old ^a		Participants in nonconsumptive uses								
	Number	Percent of U.S. population	Total nonconsumptive users ^b			Primary nonresidential			Primary residential ^a		
			Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population
Pre-college											
0	1,452	0.9	0	0.0	0.0	0	0.0	0.0	344	23.7	0.4
1-7	12,453	7.3	3,761	30.2	4.0	865	6.9	3.0	3,823	30.7	4.8
8	11,401	6.7	3,908	34.3	4.2	756	6.6	2.6	3,801	33.3	4.8
9-11	28,555	16.8	11,656	40.8	12.5	3,543	12.4	12.3	11,672	40.9	14.7
12	62,538	36.8	33,618	53.8	36.1	10,580	16.9	36.7	29,455	47.1	37.0
College											
1-3	26,250	15.4	18,996	72.4	20.4	6,100	23.2	21.2	14,437	55.0	18.1
4	13,936	8.2	9,699	71.0	10.4	3,359	24.1	11.7	7,856	56.4	9.9
5	13,359	7.9	10,363	77.6	11.1	3,588	26.9	12.4	8,281	62.0	10.4
Data un- available	—	—	1,247	—	1.3	—	—	—	—	—	—
Total	169,944	—	93,248	54.9	—	28,822	17.0	—	79,670	46.9	—

^aData from National Report (USDI 1982).^bData from Public Use File.

tion rate) and the percentage of the overall nonconsumptive population represented by a particular group is important. Thus, even though larger percentages of people in higher income groups participated, the greatest numbers of participants were in middle and lower income categories because most Americans were in these categories. Indeed, more than 65% of the participants in nonconsumptive activities had household incomes of less than \$30,000.

Primary Nonresidential Participants

About 30% of the total population of nonconsumptive participants (an estimated 28.82 million people) took at least one trip of more than 1 mile from home for the primary purpose of looking at wildlife. The sociodemographic characteristics of people who took such trips were similar to those of the overall population of nonconsumptive users, with a few exceptions. For example,

Table 6. *Race distributions for U.S. population and selected subpopulations of participants in nonconsumptive wildlife-associated activities in 1980 (numbers in thousands).*

Race	Total U.S. population ≥ 16 years old ^a		Participants in nonconsumptive uses								
	Number	Percent of U.S. population	Total nonconsumptive users ^b			Primary nonresidential			Primary residential ^a		
			Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population
White	146,999	86.5	85,467	58.1	91.7	27,347	18.6	94.9	73,926	50.3	92.8
Black	18,175	10.7	5,400	29.7	5.8	961	5.3	3.3	4,511	24.8	5.7
Other	4,768	2.8	1,369	28.7	1.4	514	10.8	1.8	1,233	25.9	1.5
Data un- available	—	—	1,012	—	1.1	—	—	—	—	—	—
Total	169,942	—	93,248	54.9	—	28,822	17.0	—	79,670	46.9	—

^aData from National Report (USDI 1982).^bData from Public Use File.

Table 7. *Income distributions for U.S. population of people 16 years old or older and selected population participants in nonconsumptive wildlife-associated activities in 1980 (numbers in thousands).*

Income	Total U.S. population ≥ 16 years old ^a		Participants in nonconsumptive uses								
	Number	Percent of U.S. population	Total nonconsumptive users ^b			Primary nonresidential			Primary residential ^a		
			Number	Percent of U.S. population	Percent of sub- population	Number	Percent of U.S. population	Percent of sub- population	Number	Percent of U.S. population	Percent of sub- population
<5,000	12,997	7.6	5,258	40.4	5.6	1,495	11.5	5.2	4,644	35.7	5.8
5,000-9,999	22,976	13.5	9,966	43.6	10.7	2,327	10.2	8.1	9,067	39.6	11.4
10,000-14,999	21,210	12.5	11,153	52.6	12.0	3,802	17.9	13.2	9,688	45.7	12.2
15,000-19,999	19,310	11.4	11,175	57.9	12.0	3,447	17.9	12.0	9,497	49.2	11.9
20,000-24,999	21,966	12.9	14,432	65.7	15.5	4,999	22.8	17.3	12,412	56.5	15.6
25,000-29,999	16,379	9.6	10,066	61.5	10.8	3,572	21.8	12.4	8,641	52.8	10.8
30,000-39,999	13,764	8.1	9,776	71.0	10.5	3,278	23.8	11.4	8,145	59.2	10.2
40,000-49,999	5,664	3.3	3,452	61.0	3.7	1,034	18.3	3.6	2,924	51.6	3.7
≥50,000	5,854	3.4	3,735	63.8	4.0	1,171	20.0	4.1	3,014	51.3	3.8
Not reported	29,923	17.6	14,236	—	15.3	3,697	—	12.8	11,637	—	14.6
Total	169,943	—	93,249	54.9	—	28,822	17.0	—	79,669	46.9	—

^aData from National Report (USDI 1982).

^bData from Public Use File.

as shown in Table 3, more trip-takers were in the age categories of 18-34 (53%) than in the total U.S. population (39%) or in the overall population of nonconsumptive users (41%). Table 8 shows that regional participation rates were higher in the Mountain, Pacific, and North Central (East and West) regions than in the other regions of the country.

Primary Residential Participants

Of the people who engaged in nonconsumptive wildlife-oriented activities, 85% participated as primary residential participants. Consequently, one would not expect major differences between this subpopulation (79,670,000) and the larger overall nonconsumptive

Table 8. *Geographic distribution of nonconsumptive population 16 years old or older and selected populations of participants in nonconsumptive wildlife-associated activities in 1980 (numbers in thousands).*

Geographic division	Total U.S. population ≥ 16 years old ^a		Participants in nonconsumptive uses					
	Number	Percent of U.S. population	Primary nonresidential participants ^a			Primary residential participants ^a		
			Number	Percent of U.S. population	Percent of sub- population	Number	Percent of U.S. population	Percent of sub- population
New England	9,362	5.5	1,657	17.7	5.7	4,952	52.9	6.2
Middle Atlantic	27,867	16.4	4,111	14.8	14.3	11,872	42.6	14.9
North Central								
East	30,791	7.5	6,099	19.8	21.2	17,936	58.3	22.5
West	12,774	18.1	3,000	23.5	10.4	6,783	53.1	8.5
South Atlantic	28,066	16.5	3,739	13.3	13.0	11,270	40.2	14.1
South Central								
East	10,792	6.4	1,173	10.9	4.1	4,117	38.2	5.2
West	17,550	10.3	1,842	10.5	6.4	6,837	39.0	8.6
Mountain	8,415	5.0	2,125	25.2	7.4	4,133	49.1	5.2
Pacific	24,326	14.3	5,076	20.9	17.6	11,770	48.4	14.8
Total	169,943	—	28,822	17.0	—	79,670	46.9	—

^aData from National Report (USDI 1982).

population (93,249,000) of which it is a part. However, participation rates differed among different geographic regions. Residential participation was more prevalent in the North Central (East and West) and New England regions, where more than 50% of the population engaged in such activities, than in the South Central (East and West) regions, where this percentage was less than 40 (Table 8).

Activities of Participants in Nonconsumptive Wildlife-Associated Activities

We now examine the question of how people participated in nonconsumptive uses of wildlife and the frequency of participation in these activities. Before we discuss activities that focused directly on wildlife (primary activities), it is important to restate the significance of secondary uses of wildlife. More than half of all Americans (52%) enjoyed the presence of wildlife while engaged in other activities in 1980 (Table 2). Furthermore, secondary enjoyment of wildlife could be characterized as almost a daily event for many people, especially in residential environments. For example, nearly 31 million Americans enjoyed unplanned opportunities to see or hear wildlife near their homes on more than 100 days in 1980 (Table 9).

Primary Nonresidential Activities

Frequency of trips. Of the total U.S. population, 29 million people (17%) took at least one trip in 1980 for the primary purpose of observing, photographing, or

Table 9. *Enjoyment of wildlife by persons engaged in other activities in residential settings (secondary use of wildlife; numbers in thousands).*

Frequency in 1980 (No. of days)	Number of participants	Percent of U.S. population ≥ 16 years old
1-10	16,258	9.6
11-20	10,123	10.4
21-50	12,381	7.3
51-100	10,155	6.0
100-200	7,865	4.6
> 200	23,512	13.8
Data unavailable	181	—

feeding wildlife; of these, 90% took at least one trip within their home State, 24% traveled to another State at least once, and 4% visited another country (Table 10). The most common pattern of behavior involved one or two trips annually lasting only 1 day each to destinations within the State of residence. However, many people took trips involving long distances and many days. About 9 million Americans took trips to other States or out of the country for nonconsumptive activities, and well over 2 million spent more than 24 days in 1980 engaged in these primary nonresidential activities.

Activities on wildlife-oriented trips. Table 11 shows the percentage of days in which primary trip-takers observed, photographed, or fed wildlife. The most common activity on these trips was simply that of watching wildlife. Somewhat surprising, however, was

Table 10. *Percent frequencies of trips taken to different destinations for the primary purpose of observing, photographing, or feeding wildlife.*

Total number of trips and total number of days spent watching wildlife on trips in 1980	Destination and (in parentheses) total number of trips taken (in thousands)		
	State of residence (26,072)	Other State (6,970)	Other country (1,179) ^a
Number of trips			
< 5	47.0	72.7	76.2
5-9	24.2	12.8	8.3
10-24	18.9	10.3	7.2
> 24	9.9	1.9	1.2
Data unavailable	0.2	2.3	7.0
Number of days			
< 5	43.0	41.9	
5-9	24.5	23.8	
10-24	19.6	24.7	
> 24	12.3	6.1	
Data unavailable	0.6	3.5	

^aData on number of days were not collected for nonconsumptive uses of wildlife by travelers to other countries.

Table 11. *Specific activities engaged in during trips taken primarily for wildlife appreciation.*

Activity	Percent of trip-days involving this activity
Observation	99.1
Photography	19.7
Feeding	34.1

the relatively high frequency of wildlife feeding that occurred; primary trip-takers fed wildlife on about one-third of the days included in these trips. Most discussions of wildlife feeding have focused on residential rather than nonresidential environments—an activity that should be recognized by managers of public lands as a significant source of recreational benefit to visitors at their facilities.

Expenditures. The National Report (USDI 1982) summarized expenditures associated with wildlife-oriented trips. Total expenditures for these trips were estimated to be about \$4 billion annually. Nearly all of these expenses involved transportation (48%) and food and lodging (49%). Of further interest was the relation of income to expenditures (Tables 12 and 13). Total expenditures by individuals ranged up to \$3,600. For those who reported trip expenditures, the mean was \$156 and the median was about \$30. Average annual expenditures within income categories indicated a clear association between income and expenditures for trips (Table 13). Trip-takers with household incomes less than \$10,000 spent an average of less than \$100 on these trips, whereas those in the highest income group averaged more than \$270. Additional information on expenditures for items used during wildlife appreciation activities is given in a later section.

Table 12. *Expenditures on wildlife-oriented trips in 1980.*

Total expenditures	Percent of primary trip-taking population
\$ 0 ^a	10.9
1-9	19.6
10-24	15.2
25-99	25.7
100-499	21.1
500-999	5.3
≥ 1,000	2.2

^aNone, or not reported.

Primary Residential Activities

Frequency of participation. Wildlife enjoyment in residential environments was an important aspect of American life in 1980 (Table 14). Almost 50% of the U.S. population (79.7 million) engaged in at least one primary residential nonconsumptive wildlife activity (i.e., took special interest in wildlife, photographed wildlife, fed wildlife, or maintained plants especially for wild animals). For many of these people, enjoying wildlife near their homes was almost a daily activity. For example, nearly 23% (18.2 million) of the people who took special interest in wildlife near their homes did so on at least 200 days during 1980 (Table 15). Similarly, about one-third (19.4 million) of the people who fed birds at their homes did so during every month of the year (Table 16).

Activities. Several nonconsumptive activities were defined as primary residential (Table 14). The two most frequent were feeding wildlife and taking special interest in wildlife (62.5 and 55.9 million participants,

Table 13. *Mean total expenditures on wildlife-oriented trips in 1980 by people with different incomes.*

Income in 1980	Average annual expenditures on wildlife-oriented trips	Number	Percent of population of trip-takers
\$ < 5,000	\$ 84.37	1,389	4.8
5,000- 9,999	98.43	2,272	7.9
10,000-14,999	124.14	3,691	12.8
15,000-19,999	145.74	3,340	11.6
20,000-24,999	133.37	4,871	16.9
25,000-29,999	131.85	3,542	12.3
30,000-39,999	148.70	3,261	11.3
40,000-49,999	171.13	1,034	3.6
> 49,999	276.85	1,171	4.1
Data unavailable	—	4,251	14.8

Table 14. *Numbers of participants (16 years old and older) in primary residential nonconsumptive activities in 1980.*

Activity	Number (thousands)	Percent of U.S. population
Took special interest in wildlife near home (closely observed or tried to identify it)	55,871	32.9
Photographed wildlife near home	12,401	7.3
Fed wild birds	62,463	36.8
Fed other wildlife	20,833	12.3
Maintained natural areas for wildlife	10,146	6.0
Maintained plantings for wildlife	12,476	7.3
Visited a park within 1 mile from home to enjoy wildlife	13,477	7.9

respectively). About one-third of the adult American public participated in each of these activities.

More than 26 million people maintained bird feeders. The importance of this avocation is reflected in the amount of seed that was put out for wild birds (Table 17). The largest group of people (15.4 million) offered 5 to 25 pounds of birdseed in 1980. However, some people fed much more substantial quantities: nearly 3.4 million put out more than 100 pounds.

In addition to wild birds, squirrels and chipmunks were fed at or near a large number of homes in 1980: more than 15 million Americans fed these animals.

Residential wildlife observation was most often focused on songbirds. About 90% of the people who took special interest in wildlife in residential settings during

1980 focused their attention on songbirds at least once in that year. Other animals that received attention by more than half of the people who participated in primary residential wildlife observation were squirrels and chipmunks (70%), rabbits and hares (52%), and butterflies (50%). Further details about the species involved are given later.

Participation in Hunting and Fishing

It is important to note that there is considerable overlap between consumptive and nonconsumptive users of wildlife. Nonconsumptive participants were more likely to engage in hunting and fishing than the

Table 15. *Number of days of participation in selected nonconsumptive activities (number in thousands).*

Number of days in 1980	People who took special interest in wildlife near home		People who photographed wildlife near home	
	Number	Percent of total	Number	Percent of total
1-10	11,010	19.7	10,647	85.2
11-20	6,164	11.0	980	7.9
21-50	7,984	14.3	449	3.6
51-100	6,908	12.4	137	1.1
101-200	5,226	9.4	100	0.8
>200	18,156	22.5	0	0
Data unavailable	436	0.8	180	1.4
Total	55,884		12,493	

Table 16. *Number of months during which people fed wild birds in 1980.*

Number of months	People who fed wild birds	
	Number (thousands)	Percent of total
1	4,156	6.7
2	4,631	7.4
3	9,452	15.1
4	5,986	9.6
5	4,891	7.8
6	5,978	9.6
7	921	1.5
8	944	1.5
9	966	1.6
10	970	1.6
11	75	0.1
12	19,412	31.1
Data unavailable	4,081	6.5
Total	62,463	

Table 17. *Pounds of seed put out for wild birds in 1980.*

Pounds of seed	Number of people (thousands)	People who reported using seed to feed wild birds near home (%)
<5	7,465	21.7
5-25	15,365	44.5
26-50	4,641	13.5
51-100	3,324	9.6
101-200	1,833	5.3
201-300	723	2.1
>300	816	2.4
Data unavailable	320	0.9

general public. Almost 13% of the people who participated in some form of nonconsumptive activity also hunted and about 34% also fished (Table 18). These percentages are substantially higher than national participation rates of 10% for hunting and 25% for fishing (USDI 1982). Similarly, sportsmen tended to participate in nonconsumptive activities more often than the general public: 69% of the people who hunted and 75% of those who fished also engaged in nonconsumptive activities, compared with an overall U.S. population participation rate of 55%. The types of wildlife involved in consumptive and nonconsumptive activities overlapped considerably; as we show later, game animals were often the object of nonconsumptive activities.

Locations, Habitats, and Types of Animals Involved in Nonconsumptive Use of Wildlife

The data already presented have clearly indicated that there is a substantial demand for nonconsumptive wildlife-associated recreational opportunities in all parts of the United States. To respond to this public interest in wildlife, resource managers need specific information about the resources involved. With this need in mind, we here address three basic questions:

- Where do nonconsumptive wildlife appreciation activities occur?
- What types of habitats are involved?
- What types of wildlife are involved?

Locations of Activities

The 1980 Survey (USDI 1982) developed information about two aspects of the question of where nonconsump-

Table 18. *Participation in hunting and fishing by selected populations of participants in nonconsumptive wildlife-associated activities in 1980 (numbers in thousands).*

Activity	Total U.S. population ≥ 16 years old ^a		Participants in nonconsumptive uses								
	Number	Percent of U.S. population	Total nonconsumptive users ^b			Primary nonresidential ^a			Primary residential ^a		
			Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population	Number	Percent of U.S. population	Percent of sub-population
Hunting	17,444	10.3	11,949	68.5	12.9	4,879	28.0	16.9	9,611	55.1	12.1
Fishing	42,059	24.8	31,436	74.7	33.9	10,994	26.1	38.1	26,338	62.6	33.1

^aData from National Report (USDI 1982).

^bData from Public Use File.

Table 19. *Use of public lands by primary trip-takers in 1980.*

Areas visited	Number of primary trip-takers (thousands)	Percent of primary trip-takers	Total trips (thousands)
Local or regional	9,820	34.1	11,659
State-owned	12,545	43.5	16,655
National Wildlife Refuges	4,561	15.8	5,564
Other Federal lands	6,283	21.8	9,495

tive activities occurred that had important implications for wildlife management policies. The first concerned whether these activities occurred in a residential or nonresidential setting and the second concerned whether public lands were involved.

Residential versus Nonresidential

Perhaps the most important finding related to this question concerned the tremendous magnitude of residential wildlife appreciation (defined as that occurring within 1 mile from home). According to the 1980 Survey, 89,153,000 Americans 16 years old and older participated in some form of residential wildlife appreciation (including both primary and secondary activities). This number represented 52% of the U.S. population 16 years old or older. Furthermore, most of these people (79,670,000) were classified as primary participants. By comparison, although large numbers of people engaged in nonresidential activities (79,079,000), only about one-third of these were classified as primary participants.

The importance of residential wildlife appreciation was further demonstrated by the fact that people engaged in these activities far more often than in nonresidential activities. Thus, although about 377 million days were involved in primary nonresidential activities, the comparable figure for primary residential activities was about 5 billion days (USDI 1982).

Since any wildlife-oriented activity that occurred within a radius of 1 mile of home was classified as residential, these figures include such activities as visits to parks or public areas located within 1 mile from a person's home. The Survey indicated that nearly 13.5 million Americans 16 years old or older participated in these types of activities.

To determine the extent to which these residential activities occurred in urban versus rural environments, we examined information about the type of environment where each respondent lived. The definition of "urban" used by the U.S. Bureau of the Census in this survey included any residential area with more than 2,500 people; as judged by this rather broad criterion, 68% (57,742,000) of the people who engaged in some form of residential wildlife appreciation activity lived in urban environments; the rest (32%; 27,648,000) lived in rural environments.

Use of Public Lands

In some parts of the United States, public lands figure prominently in wildlife management efforts, and it would be useful to know how important public lands are for nonconsumptive wildlife appreciation. We previously mentioned that more than 13 million Americans visited parks and public areas within 1 mile from their homes to enjoy wildlife.

Data are also available on the role of public lands for people who take trips for wildlife appreciation (Table 19). Of the people who took trips to see wildlife in 1980, 75% (21.7 million) indicated that one or more of their trips involved public lands. The values in Table 19 suggest that the availability of public lands played an important role in providing opportunities for nonresidential wildlife enjoyment. As might be expected, a review of regional participation rates revealed that the supply of different types of public lands played an obvious and dominant role in these participation patterns. However, local, regional, and state-owned lands were more important overall than Federal lands. These categories of lands were visited by the largest numbers of primary trip-takers and accounted for over 60% of the trips that involved public lands.

Table 20. *Habitat types visited by primary trip-takers in 1980.*

Habitat type	Percent who visited at least once in 1980	Percent who visited this habitat type most often in 1980
Woodland	72.5	47.6
Brush-covered area	44.1	7.8
Open field	43.7	8.1
Desert	6.9	2.1
Marsh, wetland, swamp	27.9	5.4
Lake or streamside	51.8	17.6
Ocean side	18.8	5.7
Alpine	10.1	1.9
Man-made area	17.4	4.0

Habitats

Since a principal tool in wildlife management is habitat improvement, it is useful to know the types of habitats that figured prominently in nonconsumptive use of wildlife. A summary of the habitat types visited by primary trip-takers (Table 20) showed that all types of habitat were involved. When geographic patterns of participation were examined, it became clear that the

supply of different habitat types was a dominant factor in determining what kinds of areas were visited. An additional item in the survey instrument asked respondents to indicate what type of habitat they visited most often for wildlife enjoyment in 1980. When asked in this context, woodlands appeared to provide more wildlife appreciation opportunities than any other habitat type. More than 47% of the people who took trips for nonconsumptive activities indicated that woodlands were visited most often.

Table 21. *Wildlife involved in different types of nonconsumptive activities in 1980 (NA=not applicable).*

Type of wildlife	Primary trips, total contacts	Secondary trips, numbers of people who enjoyed wildlife	Primary residential		Secondary residential, numbers of people who enjoyed wildlife
			Numbers of people who observed wildlife	Numbers of people who photographed wildlife	
Birds					
Songbirds	27,967	52,885	50,230	6,615	73,361
Birds of prey	21,248	31,536	17,210	1,251	19,524
Waterfowl	26,458	40,949	16,871	2,021	20,273
Shorebirds	11,303	22,590	6,211	780	6,899
Upland game birds	13,213	24,173	13,559	675	14,124
Mammals					
Deer	20,161	38,539	10,731	1,182	13,642
Elk	2,235	3,324	NA	NA	NA
Bears	2,869	3,690	NA	NA	NA
Coyotes, wolves	4,236	7,470	2,294	45	2,593
Other large mammals	3,281	4,491	882	186	901
Squirrels, chipmunks	28,743	51,576	38,977	3,888	49,787
Rabbits, hares	20,367	41,312	28,978	1,918	36,305
Raccoons	NA	NA	11,193	732	10,380
Other small mammals	13,277	21,870	9,713	531	9,134
Marine mammals	3,567	7,368			
Invertebrates					
Butterflies	17,648	33,735	28,125	1,232	34,663
Spiders, insects	16,902	23,776	23,935	806	23,282
Fishes					
Fish			5,670	466	5,237
Trout, salmon	5,579	9,378			
Other fish ^a	10,416	15,896			
Reptiles and amphibians	16,596	23,996	17,822	710	16,222
Other ^b	1,844	2,586	9,713	531	9,134

^aSharks, rays, eels, bluefish, bass, marlins, catfishes, minnows, sunfishes, and others.

^bOther=Anything not classified in one of the other categories.

Types of Wildlife

Data on the kinds of animals that are the object of wildlife appreciation activities were collected for five items in the survey instrument (Table 21) and the importance of the nine most used categories of wildlife were ranked (Table 22).

We offer several observations about these data. First, virtually every kind of wildlife was enjoyed by a large number of people. Even insects and fish appeared to provide significant incentives for wildlife enjoyment. There were, however, some categories of wildlife that provided more opportunities than others. Songbirds and squirrels and chipmunks, were consistently cited by more people than other kinds of wildlife. However, it should be emphasized that these data did not provide a direct measure of preference. It is also difficult to determine the extent to which these participation data were influenced by the availability of opportunities to enjoy these wildlife groups, as opposed to preferences for specific types of wildlife. However, some useful insights can be gained by comparing the different measures used in Tables 21 and 22. For example, spiders, as well as beetles and other insects, were frequently observed in residential settings. However, when compared with other kinds of wildlife, they were less often the objects of photographic efforts, suggesting that their high ranking was due more to availability than to preference.

A number of game species were important subjects of nonconsumptive use. Squirrels, rabbits, waterfowl, and deer were among the kinds of wildlife that were most often enjoyed in a nonconsumptive sense, as well as being important in providing hunting opportunities. An obvious implication of this finding is that the term "non-

consumptive" should not be used synonymously with "nongame." "Nonconsumptive" describes certain types of human behavior that often involve game as well as nongame species. Indeed, these findings suggest that substantial opportunities for nonconsumptive wildlife appreciation are provided as a direct consequence of game management activities subsidized by currently existing funding mechanisms.

Wildlife Management Implications

Traditionally, most wildlife management activities by public agencies have been on public lands in rural or undeveloped environments. Although these settings are important for people who take trips for wildlife appreciation, the greatest portion of nonconsumptive activities in terms of numbers of participants and total days involved appeared to occur in residential environments—most often in urban or suburban settings. An obvious implication for wildlife agencies interested in providing opportunities for nonconsumptive wildlife recreation is that they could possibly place greater emphasis on activities that would enhance wildlife use in urban and residential settings.

It is not obvious, however, what kinds of habitats or wildlife species should receive the greatest attention. Several of the findings in this study suggested that availability, more than preference for particular types of wildlife or habitats, was the most important factor in providing nonconsumptive opportunities for wildlife appreciation. People appeared to enjoy opportunities to observe, photograph, or feed almost any type of wildlife. It would thus be inappropriate to recommend focusing

Table 22. *Wildlife involved in nonconsumptive uses, ranked according to number of users in 1980.*^a

Type of wildlife	Primary trips, total contacts	Secondary trips, numbers of people who enjoyed wildlife	Primary residential		Secondary residential, numbers of people who enjoyed wildlife
			Numbers of people who observed wildlife	Numbers of people who photographed wildlife	
Songbirds	2	1	1	1	1
Squirrels, chipmunks	1	2	2	2	2
Rabbits, hares	5	3	3	4	3
Waterfowl	3	4	8	3	6
Birds of prey	4	7	7	5	7
Butterflies	7	6	4	6	4
Deer	6	5	9	7	9
Spiders; beetles and other insects	8	8	5	8	5
Reptiles and amphibians	9	9	6	9	8

^aSee Table 1 for description of types of users and trips.

on any particular wildlife or habitat types on a national level. Perhaps the best general recommendation is for wildlife managers to look for ways to enhance and increase opportunities for enjoyment of whatever wild animals are indigenous to a given area (with the realization that some species, of course, are not tolerant of human contact or pose health or safety hazards). However, the tremendous numbers of people involved in non-consumptive wildlife activities identified in the 1980 Survey tend to suggest that many types of wild animals live in close association with humans and that the presence of these animals is an important and enjoyable aspect of the lives of many Americans.

Potential Mechanisms for Funding Conservation of Nongame Wildlife

In his introduction of Senate Bill 2181 for the establishment of the Fish and Wildlife Conservation Act of 1980 (P.L. 96-366), Senator John Chafee noted the weak support given to nongame species by State fish and wildlife agencies. The bill was designed to assist the States in developing fish and wildlife conservation plans and taking actions that would increase the emphasis on nongame species. The purpose of the Act was to alter the historical approach to wildlife management by State agencies, which was focused primarily or entirely on game species partly as a direct result of the funding process.

Most funds for the management of fish and wildlife have been derived from the sale of hunting and fishing licenses and from excise taxes collected on selected pieces of hunting and fishing equipment, as specified by the 1937 Pittman-Robertson Federal Aid in Wildlife Restoration Act (PR) and amendments, and the 1950 Dingell-Johnson Sport Fish Restoration Act (DJ). Inasmuch as hunters and fishermen have been providing the bulk of the money for wildlife management, game species have been given far greater emphasis than nongame species. This relation will continue until adequate funding arrangements are established to support non-consumptive wildlife uses. The key to finding an appropriate funding mechanism may be in identifying an equitable means of taxing items used by nonconsumptive users primarily in the pursuit of recreational opportunities, to give them the chance to contribute adequately to the continuing maintenance of such opportunities—as in the PR and DJ programs. Such a tax on nonconsumptive wildlife users should (a) affect most of the users, (b) represent a large tax base, and (c) focus on wildlife-oriented uses.

Various revenue-generating mechanisms have been considered for the support of comprehensive wildlife management (including nongame species), ranging from voluntary contributions to general taxes and special ex-

cise taxes on equipment used in pursuit of nonconsumptive wildlife use. Senate Bill 2181 made provisions for conducting a study of the alternative funding means available for the support of such uses. A detailed analysis of funding alternatives required by the Act was begun by the U.S. Fish and Wildlife Service in 1983 and is expected to culminate in a report to Congress in December 1984.

Attitudes Toward Nongame Funding

Several items in the 1980 Survey (USDI 1982) dealt with people's opinions about nongame funding. The population was limited to adults of voting age by addressing these questions only to respondents who were 18 years old or older. Consequently the national population represented in these items was composed of nonconsumptive users, 18 years old or older (i.e., about 88.8 million instead of the 93.2 million that included the 16- and 17-year-olds in the larger sample). The sample was further reduced to the 63 million who indicated a willingness to support new sources of nongame funding.

Strong support was expressed by respondents for the general concept of funding for the conservation of nongame species. Among those asked whether they would favor new sources of nongame funding, 71% responded affirmatively. Of those who did not favor this idea, only about half (15% of the total sample) actually opposed it and a substantial percentage (14%) responded that they "did not know," or had no opinion (Table 23).

Table 23. *Attitudes of nonconsumptive participants toward new sources of nongame funding: Responses to the question, "Would you favor new sources of nongame funding?"*

Response	Respondents	
	Number (thousands)	Percent
Yes	63,021	71.0
No	12,981	14.6
Do not know	12,563	14.2
Missing data	204	0.2
Total	88,769	

The respondents who favored the idea of nongame funding were asked to rate specific funding mechanisms in terms of whether they favored or opposed certain potential systems for supporting nongame conservation. Although this list represented only a small sample of the mechanisms being considered, it did provide some insights into potential support for, or opposition to, different types of funding (Table 24).

Table 24. *Attitudes of nonconsumptive participants 18 years old and older regarding specific mechanisms for funding nongame management (numbers in thousands; percentage shown in parentheses).*

Potential funding mechanism	Favor (strongly or slightly)	Neither favor nor oppose	Oppose (strongly or slightly)	Missing data ^a
General tax money	33,382 (53.0)	9,935 (15.8)	18,768 (29.8)	935 (1.5)
Special tax on items purchased for wildlife observation	26,252 (41.7)	9,334 (14.8)	26,440 (42.0)	996 (1.6)
Voluntary purchase of conservation stamp	50,445 (80.0)	6,531 (10.4)	5,479 (8.7)	566 (0.9)
Voluntary checkoff on income tax	38,695 (61.4)	7,392 (11.7)	15,510 (24.5)	1,423 (2.3)

^aMissing data refer to people who said they favored the general idea of nongame funding, but did not respond to this item.

When people were asked to rate systems that involve financial contributions, the most favored systems were those that are purely voluntary (e.g., conservation stamps or income tax checkoffs). Secondly, people would like to distribute the burden of costs as broadly as possible (e.g., general tax money). And least popular were systems that would focus taxation on a specific group that would include the respondents (e.g., purchasers of items used in wildlife observation).

The most favored system—voluntary purchase of conservation stamps or similar items—has been tried in a number of States, but unfortunately has not generated significant amounts of revenue. The voluntary income tax checkoff was used in 1983 by 28 States: Alabama, Arizona, Arkansas, Colorado, Delaware, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, Montana, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Utah, Virginia, West Virginia, and Wisconsin. Minnesota's \$570,000 in 1981 represented the largest first-year checkoff contribution in any of these States; this total decreased to \$523,000 in the second year. In 1982, Colorado received the largest total contribution (\$692,000). For comparison, the PR and DJ funds allocated to Minnesota and Colorado in 1982 were \$4,313,000 and \$3,605,000 and license revenues were \$18,068,000 and \$24,495,000, respectively. Although the checkoff approach may be generating significant amounts of revenue, many conservationists regard such revenue as not much more than a starting point for nongame conservation, and far from adequate in the long-term perspective.

Of particular interest were the high percentages of people who supported the suggested funding mechanisms (Table 24). More than 50% supported all but the special tax item and, even though the special tax option

Table 25. *Rank order of most acceptable means of raising new funds for nongame wildlife to survey respondents (numbers in thousands).*

Potential funding mechanism	Number	Percent of population
Conservation stamps	23,190	36.8
Tax checkoff	15,389	24.4
General tax money	12,874	20.4
Special tax on wildlife purchases	7,834	12.4
Other	2,620	4.2
Missing data	1,114	1.8
Total	63,021	

would focus costs directly on this group, over 40% indicated that they would still support that system. These findings are supported by another survey item in which respondents were asked to indicate which one of these possible funding schemes they regarded as being the most acceptable means of raising funds for nongame wildlife (Table 25). Asked in this context—where respondents could choose only one of these mechanisms—the rank remained the same.

Expenditures on Items Used in Nonconsumptive Activities

Much of the discussion of potential mechanisms for funding nongame wildlife conservation focuses on systems modeled after the highly successful special excise taxes used to generate funds for game species—the PR and DJ funds. In evaluating potential items that could be taxed in a similar way as a source of revenue for

nongame conservation, at least four questions should be addressed: (1) Which items would best distribute the cost among those who would benefit (nonconsumptive participants)? (2) Which items would provide the broadest base for taxation? (3) Which items are used primarily for wildlife appreciation? and (4) How are the effects of taxation influenced by income level and age? The 1980 National Survey of Fishing, Hunting and Wildlife-Associated Recreation generated data relevant to each of these issues.

Distribution of Cost Among Those Who Benefit

Expenditure data were gathered for 20 specific types of equipment that have been discussed as possible targets for a nongame excise tax (Table 26). Of particular interest was the finding that no single category of equipment was purchased by a majority of the nonconsumptive users in 1980. In fact, only two items were purchased by more than 10% of these users in that year (birdseed, 28% and film and developing, 17%); bird feeders were purchased by 6% but no other items were purchased by more than 5%.

With the exception of birdseed and film, all of the items for which expenditure data were gathered would be considered durable goods. In other words, they could be used for more than the year in which they were purchased. For further clarification, the 1980 Survey (USDI

1982) included questions to determine which types of equipment were available or already owned in 1980. The percentages of nonconsumptive users who either bought an item in 1980 or already owned one or had one available for their use (Table 26) reflect how a tax on these items would be distributed among wildlife users over a period of years. Although no specific product was available to a majority of the population, birdseed and five durable items (cameras, binoculars, other camping equipment, tents and tarps, and bird feeders) were bought, owned, or available to more than 25% of this population.

Potential Base for Taxation

An important question must be answered in evaluating the potential revenue from a special tax: What is the base for taxation in terms of annual sales? The items included in this study can be separated logically into two groups: products that are used almost exclusively for wildlife appreciation, and those having uses in other than wildlife-oriented activities.

An obvious potential target for taxation is any item that is used almost exclusively for wildlife appreciation. The 1980 Survey data provided estimates of average and total expenditures for several items that meet this criterion (Table 27). Collectively these items involved an annual expenditure of well over \$500 million. Of partic-

Table 26. Purchases of equipment used by nonconsumptive users of wildlife.

Type of equipment	1980 purchasers (thousands)	Percent of nonconsumptive users who bought, owned, or had available different equipment items in 1980	
		Bought in 1980	Bought in 1980 or earlier, owned, or had available
Field guides	1,787	1.9	11.2
Binoculars	2,471	2.6	39.6
Spotting scopes	168	0.2	4.3
Cameras	4,367	4.7	46.7
Special lenses	1,524	1.6	10.0
Other photo equipment	1,404	1.5	9.1
Film and developing	16,063	17.2	NA
Satchels, daypacks, carrying cases	2,203	2.4	13.4
Special clothing	2,812	3.0	13.2
Birdseed	25,959	27.8	31.1
Bird feeders	5,969	6.4	25.5
Birdhouses	1,652	1.8	12.2
Birdbaths	1,916	2.1	12.7
Tents and tarps	2,819	3.0	27.3
Frames and backpack equipment	1,727	1.9	17.4
Other camping equipment	4,362	4.7	29.7
Snowshoes and skis	1,675	1.8	10.1
Travel or tent trailer	458	0.5	7.5
Pickup or camper van	1,335	1.4	13.3
Motor home	235	0.3	3.6

Table 27. *Expenditures for items used exclusively for wildlife appreciation.*

Type of equipment	Numbers of purchasers (thousands)	Average expenditures in 1980 (per person)	Total expenditures in 1980 (thousands of dollars)
Field guides	1,787	\$10.60	\$ 17,960
Birdseed	25,959	21.67	517,053
Bird feeders	5,969	9.91	54,740
Birdhouses	1,652	14.54	20,237
Birdbaths	1,916	14.30	25,891
Total			\$635,888

ular interest was the observation that birdseed alone accounted for over 80% of this total expenditure.

Most of the equipment for which data were gathered was purchased not only by nonconsumptive wildlife users but also by other people. Therefore, the total expenditure figures for these items represent only a fraction of the actual tax base (Table 28). Data from other sources will be required to estimate the tax base for these items.

Primary Uses of Equipment

Because the items listed in Table 24 are also used for purposes other than wildlife appreciation, it is important to know whether wildlife is the primary use of these items. Consequently, persons who indicated that they either bought an item in 1980 or already owned or had one available were asked, "Was the use (of this item) primarily for observing, photographing, or feeding

wildlife?" For all of these items, less than 50% of the nonconsumptive users who had access to them indicated that wildlife appreciation was their primary use (Table 29). However, several items were used primarily for wildlife appreciation by more than 25% of those people with access to a particular item: binoculars; spotting scopes; special lenses; satchels, day packs, and carrying cases; and special clothing. One additional consideration should be mentioned. The 1980 Survey developed expenditure information on these items only for participants in nonconsumptive activities. In evaluating any of these products as a potential target for a special tax for wildlife conservation, information from other sources concerning expenditures by people who were not participants in nonconsumptive activities should also be evaluated.

Influence of Income and Age on Expenditures

A variety of sociodemographic information gathered in the 1980 Survey could facilitate the evaluation of potential funding mechanisms for nongame conservation. For example, an important question that should be addressed is how a tax burden might be distributed among different income and age categories. Since birdseed appears to be an obvious candidate for serious consideration as a nongame funding source, these relations were examined and are presented in Tables 30 and 31 as illustrations of the kinds of data that are available for more comprehensive analyses in the future.

An overwhelming majority (89%) of people who purchased birdseed in 1980 spent \$25 or less (Table 30). Total expenditures for the rest of the purchasers ranged from \$26 to \$1,300. Although there appeared to be some relation between household income and expenditures on birdseed, this relation was not strong. Even in the high-

Table 28. *Expenditures by nonconsumptive users for items that are not used exclusively for wildlife appreciation.*

Type of equipment	Numbers of purchasers (thousands)	Average expenditures in 1980	Total expenditures in 1980 (thousands of dollars) ^a
Binoculars	2,471	\$ 58.05	\$ 133,019
Spotting scopes	168	57.74	8,290
Cameras	4,367	168.38	701,773
Special lenses	1,524	168.48	247,205
Other photo equipment	1,404	92.78	123,556
Film and developing	16,063	48.03	739,495
Satchels, daypacks, carrying cases, etc.	2,203	23.48	49,877
Tents and tarps	2,819	77.57	208,323
Frames and backpack equipment	1,727	53.63	88,478
Other camping equipment	4,362	82.70	337,149
Snowshoes and skis	1,675	150.76	245,960
Travel or tent trailer	458	1,885.07	864,244
Pickup camper or van	1,335	3,567.66	4,734,383
Motor home	235	7,618.09	1,324,266

^aTotal expenditures are conservative because some people who indicated that they purchased these items did not show cost.

Table 29. Percentage of people who had equipment available (bought, already owned, or available), who indicated nonconsumptive use of wildlife as primary activity.

Equipment	Percent ^a
Field guides	NA
Binoculars	42.7
Spotting scopes	39.5
Cameras	11.6
Special lenses	28.0
Other photo equipment	18.7
Film and developing	NA
Satchels, daypacks, carrying cases	26.1
Special clothing	34.1
Birdseed	NA
Bird feeders	NA
Birdhouses	NA
Birdbaths	NA
Tents and tarps	13.6
Frames and backpack equipment	18.4
Other camping equipment	13.1
Snowshoes and skis	7.9
Travel or tent trailer	9.3
Pickup or camper van	7.6
Motor home	8.3

^aNA=not applicable

est expenditure category (over \$100), all income levels were represented.

There appeared to be a strong relation between age and expenditures on birdseed. Overall, more than 36% of the people who purchased birdseed were 55 years old or older. Furthermore, the older age categories were disproportionately represented among those who spent more than \$100 for birdseed in 1980; 64% were 55 years old or older. These relations are illustrated in slightly different terms when categories are stratified on the basis of expenditures for birdseed (Table 31).

Table 30. Expenditures for birdseed by persons in different income categories.

Income	Expenditures for birdseed in 1980		
	<\$1-\$25	\$26-\$100	>\$100
<\$5,000	88.8	7.9	3.4
5,000-10,000	84.6	13.3	2.2
11,000-15,000	79.0	15.1	5.9
16,000-20,000	81.9	16.6	1.6
21,000-25,000	81.4	15.5	2.9
26,000-30,000	81.5	16.8	1.7
31,000-40,000	79.0	20.3	0.6
41,000-50,000	77.8	18.2	4.0
>50,000	69.9	25.8	4.3

Table 31. Percentages of persons of different age groups who spent different amounts of money for birdseed in 1980.

Age (years)	Expenditures for birdseed in 1980		
	<\$1-\$25	\$26-\$100	>\$100
16-17	100	0	0
18-24	91.7	8.2	0
25-34	87.2	11.6	1.2
35-44	84.0	14.4	1.1
45-54	79.1	17.8	3.1
55-64	71.1	24.2	4.6
>64	73.0	22.8	4.3

Conclusion

Perhaps the most significant aspect of this study is the demonstration that large numbers of people enjoy wildlife. Nonconsumptive uses of wildlife are pervasive and important aspects of American life. One of the major challenges facing the agencies and individuals concerned with wildlife conservation is to respond to this public interest. This response will require a better understanding of how people use and benefit from wildlife, the sociodemographic characteristics of these people, and the types of wildlife and habitats that are involved. In addition, it will require new and innovative approaches to funding wildlife conservation. Fortunately, there is ample evidence that both the public and the managers of public lands and resources are committed to the goal of maintaining and enhancing this valuable part of our natural heritage.

Acknowledgment

We are grateful for the helpful comments of James R. Lyons on an earlier draft of this paper.

References

- Brookshire, D. S., L. S. Eubanks, and A. Randall. 1983. Estimating option prices and existence values for wildlife resources. *Land Econ.* 59(1): 1-15.
- DeGraaf, R., and B. Payne. 1975. Economic values of non-game birds and some urban wildlife research needs. *Trans. N. Am. Wildl. Nat. Resour. Conf.* 40:281-287.
- Fazio, J. R., and L. A. Belli. 1977. Characteristics of nonconsumptive wildlife users in Idaho. *Trans. N. Am. Wildl. Nat. Resour. Conf.* 42:110-128.
- Kellert, S. R. 1979. Public attitudes toward critical wildlife and natural habitat issues. U.S. Department of the Interior, Fish and Wildlife Service and Yale School of Forestry and Environmental Studies. Washington, D.C.

- Kellert, S. R. 1980. Activities of the American public relating to animals. Phase II Report. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.
- Lyons, J. R. 1980. A conceptual framework for the identification of recreational users of the wildlife resource: Who is the clientele of wildlife management? Paper presented at the National Symposium on Leisure Research, Phoenix, Arizona. October 19-23.
- More, T. A. 1979. The demand for nonconsumptive wildlife uses: A review of the literature. U.S. Department of Agriculture, For. Serv. Tech. Rep. NE-52.
- Schole, B. J. 1973. A literature review on characteristics of hunters. Colorado Division of Wildlife, Wildlife Research Section and Cooperative Wildlife Research Unit. Spec. Rep. No. 33.
- Shaw, W. W., and E. H. Zube, editors. 1980. Wildlife values. Center for Assessment of Noncommodity Natural Resource Values. Inst. Rep. #1. University of Arizona, Tucson, Arizona.
- U.S. Department of the Interior. 1977. The 1975 national survey of fishing, hunting and wildlife-associated recreation. Fish and Wildlife Service. Washington, D.C.
- U.S. Department of the Interior and the U.S. Department of Commerce. 1982. The 1980 national survey of fishing, hunting and wildlife-associated recreation. Fish and Wildlife Service. Washington, D.C.

A list of current *Resource Publications* follows.

133. A Handbook for Terrestrial Habitat Evaluation in Central Missouri, edited and compiled by Thomas S. Baskett, Deretha A. Darrow, Diana L. Hallett, Michael J. Armbruster, Jonathan A. Ellis, Bettina Flood Sparrower, and Paul A. Korte. 1980. 155 pp.
134. Conservation of the Amphibia of the United States: A Review, by R. Bruce Bury, C. Kenneth Dodd, Jr., and Gary M. Fellers. 1980. 34 pp.
135. Annotated Bibliography for Aquatic Resource Management of the Upper Colorado River Ecosystem, by Richard S. Wydoski, Kim Gilbert, Karl Seethaler, Charles W. McAda, and Joy A. Wydoski. 1980. 186 pp.
136. Blackbirds and Corn in Ohio, by Richard A. Dolbeer. 1980. 18 pp.
137. Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates, by Waynon W. Johnson and Mack T. Finley. 1980. 98 pp.
138. Waterfowl and their Wintering Grounds in Mexico, 1937-64, by George B. Saunders and Dorothy Chapman Saunders. 1981. 151 pp.
139. Native Names of Mexican Birds, researched and compiled by Lillian R. Birkenstein and Roy E. Tomlinson. 1981. 159 pp.
140. Procedures for the Use of Aircraft in Wildlife Biotelemetry Studies, by David S. Gilmer, Lewis M. Cowardin, Renee L. Duval, Larry M. Mechlin, Charles W. Shaiffer, and V. B. Kuechle. 1981. 19 pp.
141. Use of Wetland Habitats by Birds in the National Petroleum Reserve—Alaska, by Dirk V. Derksen, Thomas C. Rothe, and William D. Eldridge. 1981. 27 pp.
142. Key to Trematodes Reported in Waterfowl, by Malcolm E. McDonald. 1981. 156 pp.
143. House Bat Management, by Arthur M. Greenhall. 1982. 30 pp.
144. Avian Use of Sheyenne Lake and Associated Habitats in Central North Dakota, by Craig A. Faanes. 1982. 24 pp.
145. Wolf Depredation on Livestock in Minnesota, by Steven H. Fritts. 1982. 11 pp.
146. Effects of the 1976 Seney National Wildlife Refuge Wildfire on Wildlife and Wildlife Habitats, compiled by Stanley H. Anderson. 1982. 28 pp.
147. Population Ecology of the Mallard. VII. Distribution and Derivation of the Harvest, by Robert E. Munro and Charles F. Kimball. 1982. 126 pp.
148. Management of Seasonally Flooded Impoundments for Wildlife, by Leigh H. Fredrickson and T. Scott Taylor. 1982. 29 pp.
149. Mitigation and Enhancement Techniques for the Upper Mississippi River System and Other Large River Systems, by Rosalie A. Schnick, John M. Morton, Jeffrey C. Mochalski, and Jonathan T. Beall. 1982. 714 pp.
150. Microscopic Anatomy of Salmonids: An Atlas, by William T. Yasutake and Joseph H. Wales. 1983.
151. Avian Use of Forest Habitats in the Pembina Hills of Northeastern North Dakota, by Craig A. Faanes and Jonathan M. Andrew. 1983. 24 pp.
152. National Pesticide Monitoring Program: Organochlorine Residues in Freshwater Fish, by Christopher J. Schmitt, Michael A. Ribick, J. Larry Ludke and Thomas W. May. 1983. 62 pp.
153. Handbook of Toxicity of Pesticides to Wildlife, by Rick H. Hudson, Richard K. Tucker and M. A. Haegle. 1984. 97 pp.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.



**UNITED STATES
DEPARTMENT OF THE INTERIOR**
FISH AND WILDLIFE SERVICE
OFFICE OF INFORMATION TRANSFER
EDITORIAL SECTION
AYLESWORTH HALL, CSU
FORT COLLINS, COLORADO 80523

POSTAGE AND FEES PAID
U S DEPARTMENT OF THE INTERIOR
INT 423



NOTE: Mailing lists are computerized. Please return address label with change of address.