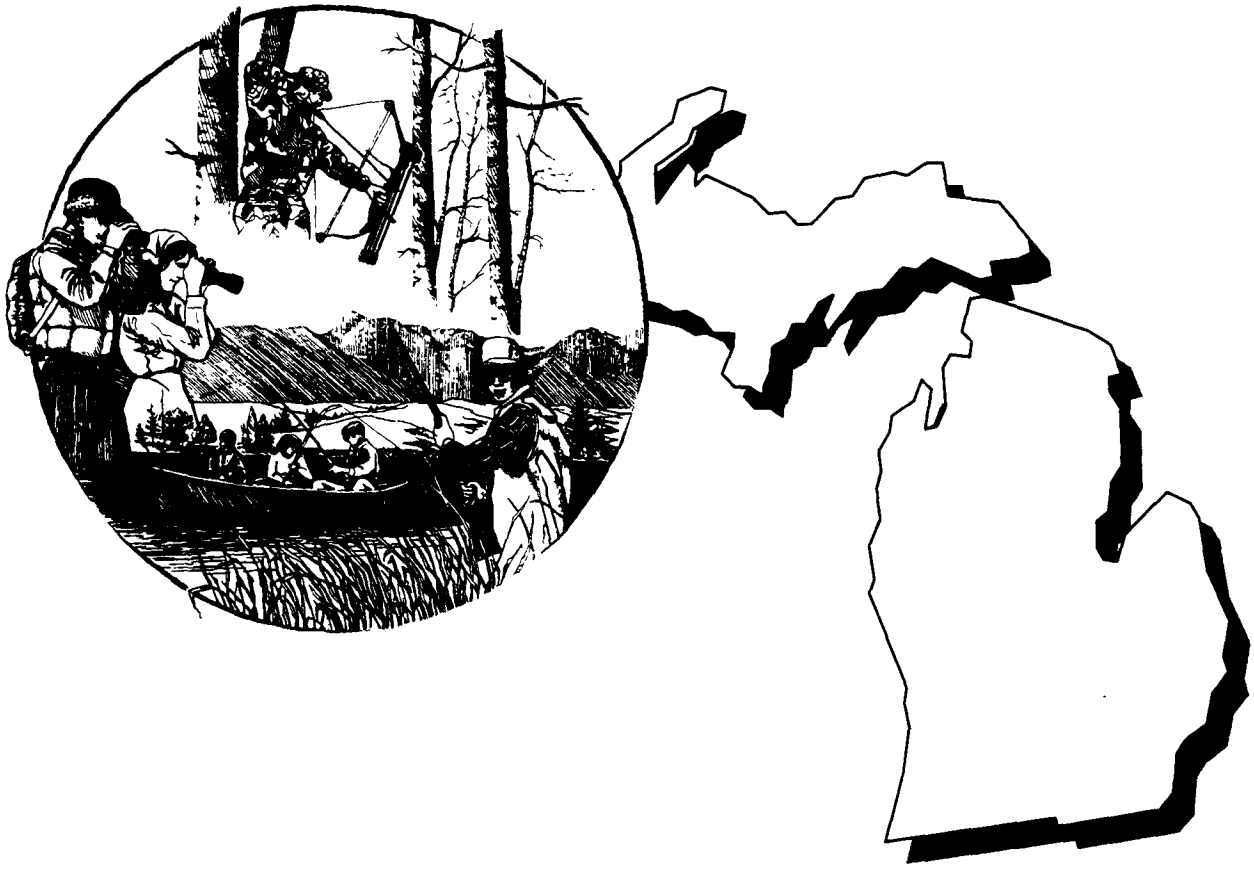
(Revised)

1991

National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

Michigan



U.S. Department of the Interior
U.S. FISH AND WILDLIFE SERVICE

U.S. Department of Commerce
Economics and Statistics Administration
BUREAU OF THE CENSUS

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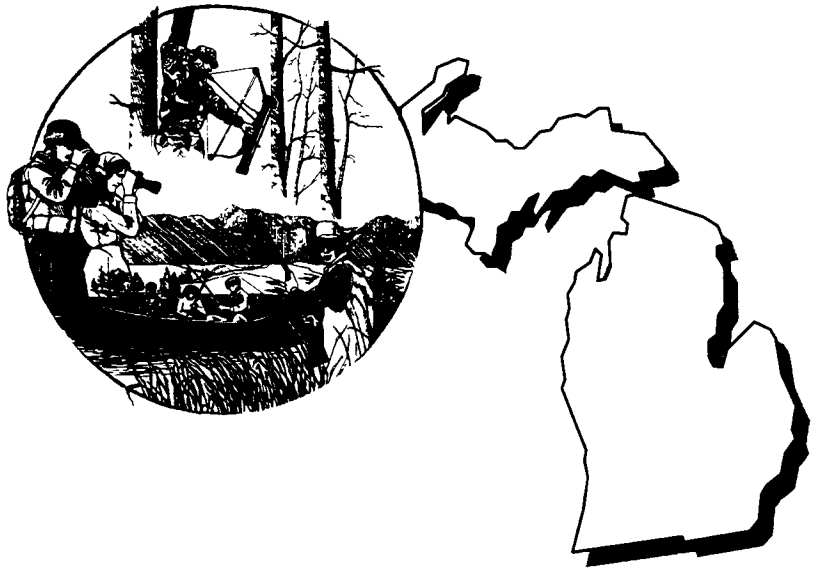

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U.S. Department of the Interior
Bruce Babbitt, Secretary

FISH AND WILDLIFE SERVICE
John F. Turner, Director

U.S. Department of Commerce
Ronald H. Brown, Secretary

Economics and Statistics Administration

BUREAU OF THE CENSUS
Harry A. Scarr, Acting Director

U.S. Department of Interior
Bruce Babbitt, Secretary

FISH AND WILDLIFE SERVICE
John F. Turner, Director

Division of Federal Aid
Columbus H. Brown, Chief

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 their development 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.

The mission of the Department's Fish and Wildlife Service is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The Service is responsible for national programs of vital importance to our natural resources, including administration of the Federal Aid in Sport Fish Restoration and the Federal Aid of Wildlife Restoration Programs. These two grant programs provide financial assistance to the States for projects to enhance and protect fish and wildlife resources and to assure their availability to the public for recreational purposes. Funds from the administrative portion of these programs are used to pay for the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

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Economics and Statistics Administration

BUREAU OF THE CENSUS
Harry A. Scarr, Acting Director
William P. Butz, Associate Director for Demographic Programs

Demographic Surveys Division
Sherry L. Courtland, Chief

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Foreword

In 1991, more than half of the people in the United States 16 years old and older enjoyed some type of wildlife-related recreation. Whether they were fishing, hunting, or engaging in some other outdoor activity, millions of Americans enjoyed our country's fish and wildlife. In order to continue providing such opportunities, careful planning based on detailed information on resource use is necessary. The National Survey of Fishing, Hunting, and Wildlife-Associated Recreation is a unique source of such information. The Survey is an important tool not only for natural resource managers who use it to track trends in fish and wildlife-related recreation for future planning, but for everyone who cares about outdoor recreation.

The 1991 Survey was requested by the States through the International Association of Fish and Wildlife Agencies. It is the eighth in a series of surveys conducted for the U.S. Fish and Wildlife Service since 1955. The Survey is financed by hunters, anglers, and boaters through excise taxes on sporting arms, ammunition, fishing equipment, and motorboat fuels as authorized under the Federal Aid in Sport Fish and Wildlife Restoration Acts.

The Survey reports resource use by anglers, hunters, and those who enjoyed nonconsumptive activities such as observing, feeding, and photographing wildlife. It also shows wildlife-related recreation to be a boom to our economy. The $59 billion Americans spent to enjoy wildlife supported hundreds of thousands of jobs.

Our American heritage is enriched by visions of bald eagles soaring gracefully, a flock of geese gliding into a placid lake and a 10-point buck bounding across a golden meadow in the fall. These and other beautiful wild creatures have the power to captivate us, to transcend the mundane in life, and fill us with awe The value we place on such things is well documented in this Survey. Let us use this information wisely in the stewardship of our land and its wildlife.

John F. Turner, Director
Fish and Wildlife Service
U.S. Department of the Interior

Survey Background and Method

The National Survey of Fishing, Hunting, and Wildlife Associated Recreation has been conducted since 1955 and is one of the oldest and most comprehensive continuing recreation surveys. The purpose of the Survey is to gather information on the number of anglers, hunters, and nonconsumptive participants in our country, as well as how often they participate and how much they spend on these activities.

The planning process for the 1991 Survey began in 1988 when the International Association of Fish and Wildlife Agencies (IAFWA) passed a resolution asking the Fish and Wildlife Service to conduct the eighth National Survey of wildlife-associated recreation. Funding for the Survey came from the administrative portion of the Federal Aid in Sport Fish and Wildlife Restoration Programs.

Consultations with State and Federal agencies and nongovernmental organizations such as the Wildlife Management Institute, Sport Fishing Institute, American Fishing Tackle Manufacturers Association, B.A.S.S., Inc., Wild Bird Feeding Institute, The Wildlife Society, National Wildlife Federation, and American Fisheries Society started in early 1989 to ascertain survey content. Other sportsmen's organizations and conservation groups, industry representatives, and researchers also provided valuable advice on questionnaire development, and data collection and reporting.

Four regional technical committees were set up under the auspices of the IAFWA to ensure that State fish and wildlife agencies had an opportunity to participate in all phases of survey planning and design. The committees were made up of agency representatives.

The Survey was conducted in two phases by the U.S. Bureau of the Census for the Fish and Wildlife Service. The first phase interviewed a sample of 129,500 households nationwide, primarily by telephone, to determine who in the household had fished, hunted, or engaged in a nonconsumptive wildlife-related activity in 1990, and who planned to engage in those activities in 1991. In most cases, one adult household member provided information for all household members.

The first phase was conducted in January and February 1991 and achieved a 95 percent response rate from those households that were eligible. It is important to note that the first phase covered 1990 activities while the next, more in-depth phase covered 1991 activities. For more detailed information on the 1990 data refer to appendix B.

The second phase of the Survey consisted of three detailed interviews conducted every 4 months with samples of likely anglers, hunters, and nonconsumptive participants who were identified in the initial screening phase. These interviews were conducted primarily by telephone, with in-person interviews for those respondents who could not be reached by telephone. Respondents in the second interviewing phase were limited to those at least 16 years old. Each respondent provided information pertaining only to his/her activities and expenditures. Sample sizes were designed to provide statistically reliable results at the State

level for fishing, hunting, and nonconsumptive activities. Altogether, interviews were completed for 23,179 anglers and hunters and 22,723 nonconsumptive participants More detailed information on sampling procedures and response rates is found in appendix D.

Comparability With 1980 and 1985 Surveys

The 1991 Survey questionnaires were similar to those used in the 1980 and 1985 Surveys, and the sample sizes for the three Surveys were roughly the same. Ways in which the 1991 Survey differed from the 1980 and 1985 Surveys are:

1) The interviews were conducted primarily by telephone rather than by in-person interviews The previous two Surveys required in-person interviews because data were collected for sub-state activity which required the use of visual aids.

2) The first phase interview was done at the beginning of the Survey year, rather than at the end. This meant people had to be screened into the second phase based on anticipated activity, rather than past activity as in the previous National Surveys.

3) In 1985 the Bureau of the Census made a weighting adjustment to account for persons incorrectly screened out of the sample. It caused a positive bias in estimates of totals, but had little effect on summary estimates such as percentages and means. In 1991, this adjustment was not appropriate because of the change in the screening procedures. The Bureau of the Census did make an adjustment to account for persons who were screened out in 1991 but did participate in fishing or hunting that year. This adjustment was smaller than the 1985 and 1980 adjustments.

4) Three 4-month recall periods for each respondent were used rather than the one 12-month recall period used in previous Surveys. The recall period was changed as a result of research on recall bias, which found that the amount of activity and expenditures reported in 12-month recall surveys was over-estimated in comparison with that of shorter recall periods.

The 1991 Survey estimates are more accurate as a result of changes in methodologies. However, because of these changes, the 1991 estimates are not directly comparable with similar estimates of previous Surveys. The differences in data between the 1991 Survey and that of previous Surveys will be due at least in part to changes in the recall length and weighting adjustment and not due to actual declines in participation in those activities.

National and Regional Trends

Wildlife-related recreation continues to be popular among millions of Americans. National trends information from the screening phases of the 1991 and 1985 Surveys indicate an increase of 11 percent in the number of anglers 6 years old and older who fished in the United States from 1985 to 1990. The number of hunters remained constant.

The number of nonconsumptive recreationists 6 years old and older who took trips away from home for the primary purpose of observing, feeding, or photographing wildlife in the United States increased by 10 percent from 1985 to 1990. Those who enjoyed these activities around their homes decreased 6 percent.

National and regional trends information is presented in appendix C of this state report. The trends information is based on estimates from the screening phases of the surveys and not on estimates from the detailed phases of the surveys.

Introduction

The National Survey of Fishing, Hunting, and Wildlife-Associated Recreation reports results from interviews with U.S. residents about their fishing, hunting, and other fish and wildlife-related recreation. This report focuses on 1991 participation and expenditures of State residents 16 years of age and older.

The numbers reported should not be directly compared with those in previous survey reports because of changes in survey methodology in 1991. These changes were made to improve accuracy in the information provided.

The report also provides information on participation in wildlife-related recreation by persons 6 to 15 years of age, in 1990. The 1990 information is provided in appendix B. Additional information about the scope and coverage of the Survey can be found in the Survey Background and Method section of this report. The remainder of this section defines important terms used in the Survey.

Wildlife-Associated Recreation

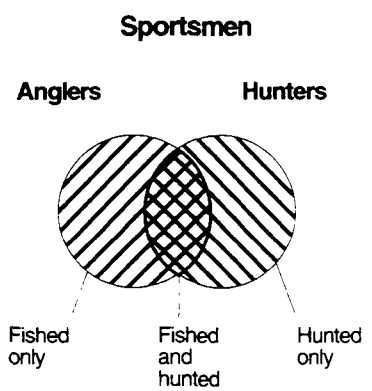
Wildlife-associated recreation includes fishing, hunting, and primary nonconsumptive wildlife activities. These categories are not mutually exclusive because many individuals enjoyed fish and wildlife in several ways in 1991. Wildlife-associated recreation is reported in two major categories: (1) fishing and hunting, and (2) primary nonconsumptive uses of wildlife resources such as observing, feeding, and photographing wildlife.

Fishing and Hunting

This Survey reports information about residents of the United States who fished or hunted in 1991, regardless of whether they were licensed. The fishing and hunting sections of this report are organized to report three groups: (1) sportsmen, (2) anglers, and (3) hunters.

Sportsmen

Sportsmen are persons who fish or hunt. Individuals who fished or hunted commercially in 1991 are reported as sportsmen only if they fished or hunted for recreation. The sportsmen group is composed of the three subgroups in the diagram below (1) those who fish and hunt, (2) those who only fish, and (3) those who only hunt. The total number of sportsmen is not equal to the sum of anglers and hunters because those people who both fish and hunt are not counted twice



Anglers

Anglers are sportsmen who only fish plus those who fish and hunt. The angler group includes not only licensed hook and line anglers, but also those who have no license and those who use special methods such as spears for fishing. Three types of fishing are reported: (1) freshwater, excluding the Great Lakes, (2) Great Lakes, and (3) saltwater. Since many anglers enjoy more than one type of fishing, the total number of anglers is less than the sum of the three types of fishing.

Hunters

Hunters are sportsmen who only hunt plus those who hunt and fish. The hunter group includes not only licensed hunters using common hunting practices, but also those who have no license and those who engage in hunting with a bow and arrow, muzzleloader, other primitive firearm, or a pistol or handgun. Four types of hunting are reported: (1) big game, (2) small game, (3) migratory bird, and (4) other animals. Since many hunters enjoy more than one type of hunting, the sum of hunters for big game, small game, migratory bird, and other animals exceeds the total number of hunters.

Primary Nonconsumptive Wildlife Activities

Since 1980, the National Survey of Fishing, Hunting and Wildlife-Associated Recreation has included information on nonconsumptive activities in addition to fishing and hunting. However, the 1991 Survey, unlike the 1980 and 1985 Surveys, reports data only for primary nonconsumptive activities.

Secondary nonconsumptive activities, such as incidentally observing wildlife while pleasure driving, are not included.

Many people, including sportsmen, enjoy wildlife-associated recreation other than fishing or hunting. These nonharvesting activities, such as observing, feeding, or photographing fish and other wildlife, are called nonconsumptive wildlife activities. Two types of nonconsumptive activity are reported: (1) nonresidential and (2) residential. Because some people participate in more than one type of nonconsumptive wildlife activity, the sum of participants in each type will be greater than the total number of nonconsumptive participants. Only those engaged in activities whose primary purpose was nonconsumptive are included in the Survey. The two types of nonconsumptive wildlife activities are defined below.

Primary Nonresidential

This group includes persons who take trips or outings of at least 1 mile for the primary purpose of observing, feeding, or photographing fish and wildlife. Trips to fish or hunt or scout and trips to zoos, circuses, aquariums, and museums are not considered nonconsumptive wildlife activities.

Primary Residential

This group includes those whose activities are within 1 mile of home and involve one or more of the following: (1) closely observing or trying to identify birds or other wildlife, (2) photographing wildlife, (3) feeding birds or other wildlife on a regular basis, (4) maintaining natural areas of at least one-quarter acre for which benefit to wildlife is the primary purpose, (5) maintaining plantings (shrubs, agricultural crops, etc.) for which benefit to wildlife is the primary concern, or (6) visiting public parks within 1 mile of home for the primary purpose of observing, feeding, or photographing wildlife.

Detail of Tables
Summary

Activities by Michigan Residents 16 Years Old and Older

Fishing	
Anglers	1,437,000
Days of fishing	23,644,000
Average days per angler	16
Total expenditures	$1,286,368,000
Trip-related	$500,836,000
Equipment and other	$785,532,000
Average per angler	$895
Average per day	$54
Hunting	
Hunters	785,000
Days of hunting	14,955,000
Average days per hunter	19
Total expenditures	$873,442,000
Trip-related	$205,197,000
Equipment and other	$668,246,000
Average per hunter	$1,113
Average per day	$58
Primary Nonconsumptive	
Total nonconsumptive participants	3,273,000
Nonresidential	1,395,000
Residential	3,167,000
Total expenditures	$893,451,000
Trip-related	$300,175,000
Equipment and other	$593,276,000

Activities by Participants 16 Years Old and Older in Michigan

Fishing	
Anglers	1,762,000
Days of fishing	25,319,000
Average days per angler	14
Trip-related expenditures	$535,735,000
Food and lodging	$222,894,000
Transportation	$130,709,000
Other	$182,132,000
Hunting	
Hunters	826,000
Days of hunting	15,087,000
Average days per hunter	18
Trip-related expenditures	$189,722,000
Food and lodging	$117,684,000
Transportation	$68,158,000
Other	$3,880,000
Primary Nonconsumptive	
Primary nonresidential participants	1,546,000
Days of participation	14,159,000
Average days per participant	9
Trip-related expenditures	$267,141,000

The 1991 Survey data reported herein should not be directly compared with that of previous National Surveys because of changes in survey methodology. An explanation of the changes is presented in the Survey Background and Method Section.

Wildlife-Associated Recreation

The 1991 Survey revealed that 4.6 million Michigan residents 16 years old and older engaged in fishing, hunting, or nonconsumptive activities. Of the total number of participants, 1.4 million fished, 785 thousand hunted, and 3.3 million participated in nonconsumptive activities where the enjoyment of wildlife was the primary purpose of the activity. Nonconsumptive activities included observing, feeding, and photographing wildlife.

The sum of anglers, hunters, and nonconsumptive participants exceeds the total number of participants in wildlife-associated recreation because many individuals engaged in more than one wildlife-related activity.

In 1991, state residents spent $3.5 billion on wildlife-associated recreation. Of that total, trip-related expenditures were $1 billion and equipment purchases totaled $2 billion.

The remaining $532 million was spent on licenses, contributions, land ownership and leasing, and other items and services.

Participants In Wildlife-Associated Recreation

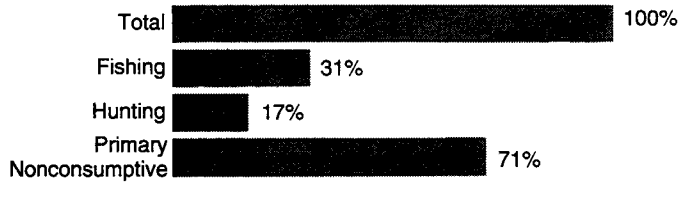
(State residents 16 years old and older)

Total	**4.6 million**
Sportsmen	
Total	**1.7 million**
Anglers	1.4 million
Hunters	785 thousand
Primary Nonconsumptive	
Total	**3.3 million**
Residential	3.2 million
Nonresidential	1.4 million

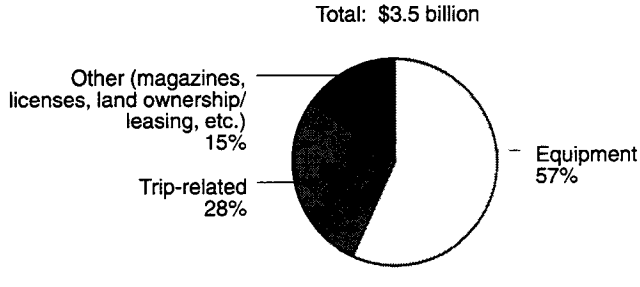
Source: Tables 3 and 22

Detail does not add to total because of multiple responses.

Percent of State Residents Participating, by Activity



Resident Wildlife-Associated Recreation Expenditures



Sportsmen

In 1991, there were 2 million state resident and nonresident sportsmen 16 years old and older who fished or hunted in Michigan. This group included 1.8 million anglers (86 percent of all sportsmen) and 826 thousand hunters (40 percent of all sportsmen). Of the 2 million sportsmen who fished or hunted in the state, 1.2 million (60 percent) fished but did not hunt in Michigan. Another 287 thousand (14 percent) hunted but did not fish there. The remaining 540 thousand (26 percent) fished and hunted in Michigan in 1991

Sportsmen Participation in State

(State residents and nonresidents 16 years old and older)

Sportsmen (Fished or hunted)	**2.0 million**
Anglers	**1.8 million**
Fished only	1.2 million
Fished and hunted	540 thousand
Hunters	**826 thousand**
Hunted only	287 thousand
Hunted and fished	540 thousand

Source: Table 1

Detail does not add to total because of multiple responses.

Anglers

Participants and Days of Fishing

In 1991, there were 1.8 million state residents and nonresidents 16 years old and older who fished in Michigan. Of this total, 1.4 million anglers (81 percent) were state residents and 344 thousand anglers (19 percent) were nonresidents. Anglers fished a total of 25.3 million days in Michigan, an average of 14 days per angler. State residents fished 22.8 million days, 90 percent of all fishing days within Michigan, while nonresidents fished 2.5 million days, 10 percent of all fishing days in the state.

There were 1.4 million Michigan residents 16 years old and older who fished in the United States in 1991. These anglers fished a total of 23.6 million days. One million four hundred thousand resident anglers (99 percent) fished in Michigan. They spent 22.8 million days, 97 percent of their total fishing days, fishing in their resident state.

Some state residents fished only in other states or fished in other states as well as Michigan. In 1991, 154 thousand Michigan anglers fished in other states, 11 percent of the resident angler total. They fished 819 thousand days as nonresidents representing 3 percent of all days fished by Michigan residents. For further details about fishing in Michigan, see table 3.

Anglers in State

(State residents and nonresidents 16 years old and older)

Anglers	**1.8 million**
Resident	1.4 million
Nonresident	344 thousand
Days of fishing	**25.3 million**
Resident	22.8 million
Nonresident	2.5 million

Source: Table 3

In-State/Out-of-State

(State residents 16 years old and older)

Michigan anglers	**1.4 million**
In Michigan	1.4 million
In other states	154 thousand
Days of fishing	
Total	**23.6 million**
In Michigan	22.8 million
In other states	819 thousand

Source: Table 3

Detail does not add to total because of multiple responses.

Resident Fishing Expenditures

Michigan residents 16 years old and older spent $1.3 billion on fishing expenses in the United States in 1991. Trip-related expenditures including food and lodging, transportation, and other expenses such as equipment rental or boat fuel, totaled $501 million, 39 percent of all their fishing expenditures. Each resident angler spent an average of $349 on trip-related costs during 1991.

Michigan anglers spent $495 million on equipment in 1991, 38 percent of all fishing expenditures. Fishing equipment (rods, reels, line, etc.) totaled $177 million, 36 percent of the equipment total. Auxiliary equipment expenditures (tents, special fishing clothes, etc.) and special equipment expenditures (boats, trail bikes, etc.) amounted to $318 million, 64 percent of the equipment total. Special and auxiliary equipment are items that were purchased primarily for fishing but could be used in activities other than fishing.

The purchase of other items such as magazines, membership dues, licenses, permits, stamps, and land leasing and ownership amounted to $290 million, 23 percent of all fishing expenditures. For more details about fishing expenditures by state residents, see tables 17 and 19.

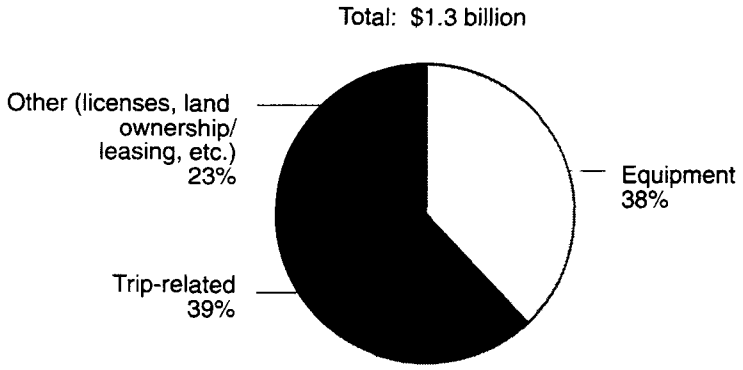
Fishing Expenditures

(State residents 16 years old and older)

Total	**$1.3 billion**
Trip-related	501 million
Equipment	495 million
Fishing	177 million
Auxiliary and Special	318 million
Other	290 million

Source: Table 17

Resident Fishing Expenditures



In-State Trip-Related Expenditures

Resident and nonresident anglers spent a total of $536 million on trip-related expenditures in Michigan, an average of $304 per person in 1991. They spent $223 million on food and lodging and $131 million on transportation. Other trip-related expenses such as equipment rental, bait, and fuel totaled $182 million. For more information on trip-related expenditures by resident and nonresident anglers, see table 20.

Hunters

Participants and Days of Hunting

In 1991, there were 826 thousand residents and nonresidents 16 years old and older who hunted in Michigan. Resident hunters numbered 783 thousand accounting for 95 percent of the hunters in Michigan. There were 44 thousand nonresidents who hunted in Michigan, 5 percent of the state's hunters. Residents and nonresidents hunted 15.1 million days in 1991, an average of 18 days per hunter. Residents hunted on 14.7 million days in Michigan or 98 percent of all hunting days, while nonresidents spent 355 thousand days hunting in Michigan, 2 percent of all hunting days.

There were 785 thousand Michigan residents 16 years old and older who hunted in the United States in 1991. Of the total 15 million days of hunting by state residents, 14.7 million days (99 percent of the total) were spent pursuing game within Michigan.

Some state residents hunted only in another state or in another state as well as in Michigan. Altogether, 33 thousand Michigan hunters, 4 percent of the total, hunted as nonresidents in other states. Their 222 thousand days of hunting in other states represented 1 percent of all the days Michigan residents spent hunting in 1991. For more information on hunting activities by Michigan residents, see table 3.

Hunters in State

(State residents and nonresidents 16 years old and older)

Hunters	**826 thousand**
Resident	783 thousand
Nonresident	44 thousand
Days of hunting	**15.1 million**
Resident	14.7 million
Nonresident	355 thousand

Source: Table 3

In-State/Out-of-State

(State residents 16 years old and older)

Michigan hunters	**785 thousand**
In Michigan	783 thousand
In other states	33 thousand
Days of hunting	**15.0 million**
In Michigan	14.7 million
In other states	222 thousand

Source: Table 3

Detail does not add to total because of multiple responses.

Resident Hunting Expenditures

Resident hunters 16 years old and older spent $873 million in the United States in 1991. Trip-related expenses such as food and lodging, transportation, and other trip costs, including equipment rental fees, cost hunters $205 million, 24 percent of their total expenditures. The average trip-related expenditure for resident hunters was $262.

Hunters spent $464 million on equipment, 53 percent of all hunting expenditures. Hunting equipment (guns, ammunition, etc.) garnered 37 percent of all equipment costs, $174 million for state residents. Hunters spent $290 million on auxiliary equipment (tents, special hunting clothes, etc.) and special equipment (boats, trail bikes, etc.), accounting for 63 percent of total equipment expenditures for hunting. Special and auxiliary equipment are items that were purchased primarily for hunting but could be used in activities other than hunting.

The purchase of other items such as magazines, membership dues, licenses, permits, and land leasing and ownership cost hunters $204 million, 23 percent of all hunting expenditures. For more details on hunting expenditures by Michigan residents, see tables 18 and 19.

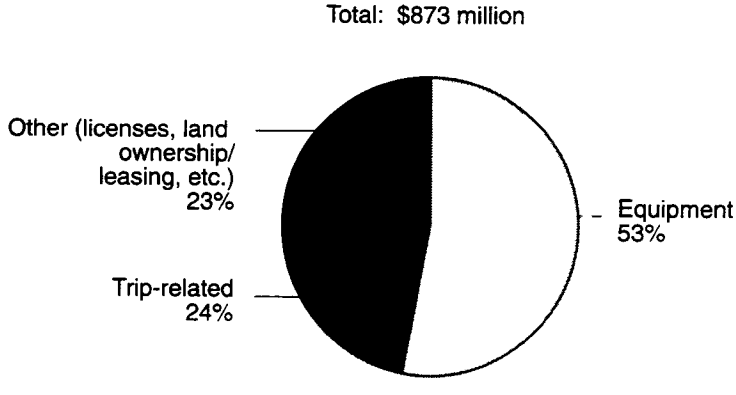
Hunting Expenditures

(State residents 16 years old and older)

Total	**$873 million**
Trip-related	205 million
Equipment	464 million
Hunting	174 million
Auxiliary and Special	290 million
Other	204 million

Source: Table 18

Resident Hunting Expenditures



In-State Trip-Related Expenditures

In 1991, resident and nonresident hunters spent $190 million on trip-related expenditures in Michigan, an average of $230 per person. They spent $118 million on food and lodging and $68 million on transportation. Other expenses such as equipment rental totaled $3.9 million for the year. For more information on trip-related expenditures by resident and nonresident hunters, see table 20.

Primary Noncon-sumptive Activities

Participants and Days of Activity

In 1991, 3.3 million state residents 16 years old and older participated in nonconsumptive activities such as observing, feeding, or photographing wildlife. Some state residents enjoyed their activities close to home and are called "residential" participants. Those whose primary purpose was to enjoy wildlife at least 1 mile from home are called "nonresidential" participants. There were 3.2 million residential participants accounting for 97 percent of the nonconsumptive participants in Michigan.

People participating in nonresidential activities in Michigan numbered 1.5 million, of which 1.3 million were state residents and 285 thousand were nonresidents.

In 1991, 1.3 million Michigan residents 16 years old and older enjoyed primary nonresidential nonconsumptive recreation activities within their state of residence. Of this group, 1.2 million participants observed wildlife, 717 thousand fed wildlife, and 510 thousand photographed wildlife. Since some individuals engaged in more than one of the three primary nonresidential activities during the year, the sum of wildlife observers, feeders, and photographers exceeds the total number of primary nonresidential participants.

Primary Nonresidential In-State

(State residents and nonresidents 16 years old and older)

Participants	
Total	**1.5 million**
Observe wildlife	1.4 million
Feed wildlife	803 thousand
Photograph wildlife	625 thousand
Days	
Total	**14.2 million**
Observe wildlife	12.5 million
Feed wildlife	5.8 million
Photograph wildlife	2.8 million

Source: Table 23

Detail does not add to total because of multiple responses.

Michigan residents spent 12.8 million days engaged in primary nonresidential activities in their state. During 1991, they spent 11.8 million days observing wildlife, 5.6 million days feeding wildlife, and 2.5 million days photographing wildlife. The sum of days of observing, feeding, and photographing wildlife may exceed the total days of primary nonresidential activity because individuals may have engaged in more than one activity on some days. For further details about nonresidential activities, see table 23.

Michigan residents also took an active interest in wildlife around their homes. In 1991, 3.2 million state residents enjoyed observing, feeding, and photographing wildlife within one mile of their homes. Of this primary residential group, 2.4 million observed wildlife, 2.9 million fed wildlife, and 921 thousand photographed wildlife around their homes. Another 674 thousand residential participants visited public parks and natural areas within a mile of home; 489 thousand participants maintained natural areas of 1/4 acre or more for the primary benefit of wildlife; and 428 thousand participants maintained plantings for the benefit of wildlife. Adding the participants in these six activities results in a sum that exceeds the total number of residential participants because many people participated in more than one type of residential activity. For further details about Michigan residents participating in residential nonconsumptive activities, see table 25.

Primary Residential Participants
(State residents 16 years old and older)

Total	**3.2 million**
Observe wildlife	2.4 million
Feed wildlife	2.9 million
Photograph wildlife	921 thousand
Visit public areas	674 thousand
Maintain natural areas	489 thousand
Maintain plantings	428 thousand

Source: Table 25
Detail does not add to total because of multiple responses.

Primary Nonconsumptive Expenditures

Michigan residents 16 years old and older spent $893 million on primary nonconsumptive activities in the United States in 1991. Trip-related expenditures for primary nonconsumptive participants, including food and lodging ($185 million), transportation ($104 million), and other expenses such as equipment rental ($11 million), amounted to $300 million, 34 percent of all nonconsumptive expenditures by state residents. The average trip-related expenditure for nonresidential participants was $215 per person in 1991.

Nonconsumptive participants spent a total of $566 million on equipment, 63 percent of all their expenditures. Specifically, nonconsumptive equipment (binoculars, special clothing, etc.) totaled $312 million, 55 percent of the equipment total. Auxiliary equipment expenditures (tents. backpacking equipment, etc.) and special equipment expenditures (campers, trucks, etc.) amounted to $254 million, 45 percent of all equipment costs.

Special and auxiliary equipment are items that were purchased primarily for nonconsumptive wildlife-related recreation but can be used in activities other than nonconsumptive wildlife-related activities.

Other items purchased by primary nonconsumptive participants such as magazines, membership dues, and contributions totaled $27 million, 3 percent of all nonconsumptive expenditures. For more details about nonconsumptive expenditures by state residents see table 27.

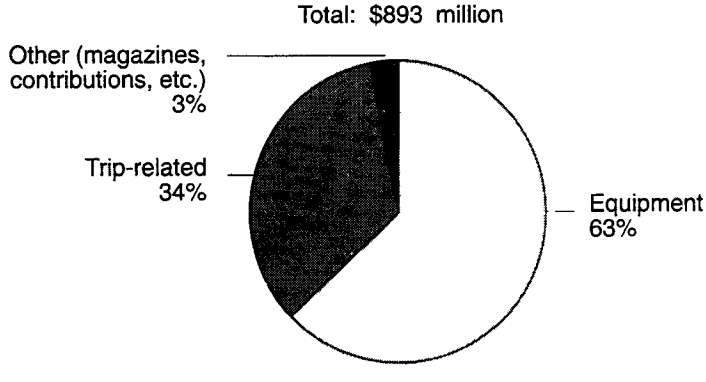
Primary Nonconsumptive Expenditures

(State residents 16 years old and older)

Total	**$893 million**
Trip-related	300 million
Equipment	566 million
Nonconsumptive	312 million
Auxiliary and Special	254 million
Other	27 million

Source: Table 27

Resident Nonconsumptive Expenditures



Guide to Statistical Tables

Purpose and Coverage of Tables

The statistical tables of this report were designed to meet a wide range of needs of those interested in knowing about wildlife-associated recreation. Special terms used in these tables are defined in appendix A.

The tables are based on responses to the 1991 Survey which was designed to collect data about participation in wildlife-associated recreation. To take part in the Survey a respondent must have been a U.S. resident (a resident of one of the fifty states or the District of Columbia) No one residing outside the United States (including U.S. citizens) was eligible for interviewing. Therefore, reported state and national totals do not include participation by those who were not U.S. residents or who were residing outside the United States.

Comparability With Previous Surveys

The methodology for the 1991 Survey was changed to improve accuracy. As a result, the data estimates presented in the following tables for participation and expenditures should not be compared with similar estimates from previous National Surveys. An explanation of the differences between the 1991 Survey and the 1980 and 1985 Surveys is presented in the Survey Background and Method section.

Coverage of an Individual Table

Since the Survey covers many activities in various places by participants of different ages, all table titles, headnotes, stubs, and footnotes are designed to identify and articulate each item being reported in the table. For example, the title of table 1 shows that individuals, including both residents of the state and nonresidents, who fished or hunted in the state are being reported. In contrast, the title of table 2 shows that data about anglers and hunters, their days of participation, and number of trips are being reported for state residents only.

Percentages Reported in the Tables

Percentages are reported in the tables for the convenience of the user. When exclusive groups are being reported, the base of a percentage is apparent from its context because the percents add to 100 percent (plus or minus a rounding error). For example, table 10 reports the number of trips taken by big game hunters, those taken by small game hunters, those taken by migratory bird hunters, and those taken by sportsmen hunting other animals. These form 100 percent because they are exclusive categories

Percents should not add to 100 when non-exclusive groups are being reported. Using table 10 as an example again, note that adding the percentages associated with total number of big game hunters, total small game hunters, total migratory bird hunters, and total hunters of other animals will not yield total hunters (100 percent) because types of game are not exclusive categories.

When the base of the percentage may not be apparent in

context, it is identified in a footnote. For example, table 13 reports 2 percentages with different bases: one for the number of sportsmen who participated in the activity and one for the percent of state residents who participated. Footnotes are used to clarify the bases of the reported percentages.

Footnotes to the Tables

Footnotes are used to clarify the information or items that are being reported in a table. Symbols in the body of a table indicate important footnotes. These symbols are used in the tables to refer to the same footnote each time they appear:

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

W Less than .5 dollars.

Z Less than .5 percent.

X Not applicable.

Estimates based upon fewer than ten responses are regarded as being based on a sample size that is too small for reliable reporting. An estimate based upon at least ten but fewer than thirty responses is treated as an estimate based on a small sample size. Other footnotes appear, as necessary, to qualify or clarify the estimates reported in the tables.

In addition, these two important footnotes appear frequently:

- Detail does not add to total because of multiple responses.
- Detail does not add to total because of multiple responses and nonresponses.

"Multiple responses" is a term used to reflect the fact that individuals or their characteristics fall into more than one category. Using table 2 as an example, those who hunted in big game and small game appear in both of these totals. Yet each hunter is represented only once in the "Total, all hunting" row. Similarly, those who fish in freshwater and salt water are counted only once as an angler. Therefore, totals may be smaller than the sum of subcategories when multiple responses exist.

"Nonresponse" exists because the Survey questions were answered voluntarily. Some respondents did not answer all of the questions. The effect of nonresponses may be illustrated by table 14, where the reported total for fishing and hunting expenditures is greater than the sum of reported fishing expenditures plus reported hunting expenditures. This occurs because some respondents did not respond to the questions about the primary purpose of their expenditures. As a result, it is known that the expenditures were for fishing or hunting, but it is not known whether they were for fishing or whether they were for hunting. Totals are greater than the sum of subcategories when nonresponses have occurred.

Table 1. Fishing and Hunting in State, by Resident and Nonresident Sportsmen: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Sportsmen	Total, residents and nonresidents		Residents		Nonresidents	
	Number	Percent of sportsmen	Number	Percent of resident sportsmen	Number	Percent of nonresident sportsmen
Total sportsmen	2,048.9	100	1,672.7	100	376.2	100
Total anglers	1,762.3	86	1,418.7	85	343.6	91
Fished only	1,222.6	60	889.8	53	332.8	88
Fished and hunted	539.7	26	528.9	32	...	...
Total hunters	826.3	40	782.8	47	43.5	12
Hunted only	286.6	14	254.0	15	*32.7	*9
Hunted and fished	539.7	26	528.9	32	...	...

Note: Detail does not add to total because of multiple responses.
* Estimate based on a small sample size.
.. Sample size too small to report data reliably.

Table 2. Resident Anglers and Hunters, Days of Participation, and Trips, by Type of Fishing and Hunting: 1991

MICHIGAN

[State population 16 years old and older. Numbers in thousands]

Type of fishing and hunting	Participants		Days of participation		Trips	
	Number	Percent	Number	Percent	Number	Percent
Fishing						
Total, all fishing	1,436.8	100	23,644.0	100	19,971.6	100
Total, all freshwater	1,427.7	99	23,454.0	99	19,832.6	99
Freshwater, except Great Lakes	1,148.9	80	13,782.4	58	11,737.3	59
Great Lakes	693.9	48	10,109.1	43	8,095.3	41
Saltwater	*62.3	*4	*196.8	*1	*139.0	*1
Hunting						
Total, all hunting	784.7	100	14,955.2	100	12,596.0	100
Big game	727.6	93	9,180.4	61	6,599.3	52
Small game	388.1	49	5,286.1	35	5,010.0	40
Migratory bird	88.0	11	726.9	5	629.9	5
Other animals	*29.9	*4	*441.6	*3	*356.8	*3

Note: Detail does not add to total because of multiple responses.
* Estimate based on a small sample size.

Table 3. Anglers and Hunters, Trips, and Days of Participation: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Anglers and hunters, trips, and days of participation	Activity in state						Activity by state residents					
	Total, state residents and nonresidents		State residents		Nonresidents		Total, in state of residence and in other states		In state of residence		In other states	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Fishing												
Total anglers	1,762.3	100	1,418.7	81	343.6	19	1,436.8	100	1,418.7	99	154.1	11
Total trips	20,642.8	100	19,467.6	94	1,175.3	6	19,971.6	100	19,467.6	97	504.1	3
Total days of fishing	25,319.0	100	22,825.0	90	2,495.0	10	23,644.0	100	22,825.0	97	819.0	3
Average days of fishing	14.4	(X)	16.1	(X)	7.3	(X)	16.5	(X)	16.1	(X)	5.3	(X)
Average one-way distance traveled per trip (miles)	37.0	(X)	29.9	(X)	154.5	(X)	33.0	(X)	29.9	(X)	154.6	(X)
Hunting												
Total hunters	826.3	100	782.8	95	43.5	5	784.7	100	782.8	100	*32.8	*4
Total trips	12,617.3	100	12,515.5	99	101.8	1	12,596.0	100	12,515.5	99	*79.4	*1
Total days of hunting	15,087.1	100	14,732.3	98	354.8	2	14,955.2	100	14,732.3	99	*221.6	*1
Average days of hunting	18.3	(X)	18.8	(X)	8.2	(X)	19.1	(X)	18.8	(X)	*6.7	(X)
Average one-way distance traveled per trip (miles)	39.8	(X)	36.8	(X)	408.9	(X)	38.4	(X)	36.8	(X)	*273.3	(X)

Note: Detail does not add to total because of multiple responses.
(X) Not applicable.
* Estimate based on a small sample size.

Table 4. Freshwater Anglers, Trips, and Days of Fishing, and Type of Water: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands. Excludes Great Lakes fishing]

Anglers, trips, and days of fishing	Activity in state					
	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Total anglers	1,304.9	100	1,131.7	87	173.2	13
Total trips	12,115.0	100	11,463.7	95	651.4	5
Total days of fishing	14,815.8	100	13,327.1	90	1,488.7	10
Average days of fishing	11.4	(X)	11.8	(X)	8.6	(X)
Average one-way distance traveled per trip (miles)	34.5	(X)	28.1	(X)	149.0	(X)
Anglers						
Total, all types of water	1,304.9	100	1,131.7	87	173.2	13
Lakes or reservoirs, 10 acres or more	1,007.9	100	862.3	86	145.6	14
Ponds, less than 10 acres	283.7	100	266.5	94	...	...
Rivers or streams	446.7	100	405.4	91	*41.3	*9
Days of fishing						
Total, all types of water	14,815.8	100	13,327.1	90	1,488.7	10
Lakes or reservoirs, 10 acres or more	9,824.4	100	8,863.9	90	960.5	10
Ponds, less than 10 acres	1,487.0	100	1,404.7	94	...	...
Rivers or streams	2,977.9	100	2,695.8	91	*282.1	*9

Note: Detail does not add to total because of multiple responses.
(X) Not applicable.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

Table 5. Freshwater Anglers and Days of Fishing, by Type of Fish: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands. Excludes Great Lakes fishing]

Anglers and days of fishing	Activity in state					
	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Anglers						
Total, all types of fish	1,304.9	100	1,131.7	87	173.2	13
Crappie	251.0	100	195.1	78	*55.9	*22
Panfish	892.5	100	817.9	92	74.6	8
White bass, striped bass, striped bass hybrids	179.9	100	159.8	89	*20.1	*11
Black bass	517.2	100	455.9	88	*61.3	*12
Catfish, bullheads	134.5	100	118.8	88	...	...
Walleye, sauger	283.0	100	236.7	84	*46.3	*16
Northern pike, pickerel, muskie	302.8	100	241.1	80	*61.7	*20
Trout	165.3	100	161.4	98	...	...
Salmon	*31.6	*100	*24.8	*78	...	...
Steelhead	*28.4	*100	*24.5	*86	...	...
Anything[1]	146.2	100	135.9	93	...	...
Other freshwater fish	93.3	100	82.3	88	...	...
Days of fishing						
Total, all types of fish	14,815.8	100	13,327.1	90	1,488.7	10
Crappie	1,670.9	100	1,381.5	83	*289.5	*17
Panfish	9,098.6	100	8,488.6	93	610.0	7
White bass, striped bass, striped bass hybrids	1,389.0	100	1,245.7	90	*143.3	*10
Black bass	4,796.5	100	4,421.7	92	*374.9	*8
Catfish, bullheads	1,079.4	100	1,027.3	95	...	...
Walleye, sauger	3,110.4	100	2,789.7	90	*320.7	*10
Northern pike, pickerel, muskie	2,762.7	100	2,405.4	87	*357.3	*13
Trout	1,215.2	100	1,198.5	99	...	...
Salmon	*171.7	*100	*152.6	*89	...	...
Steelhead	*160.7	*100	*134.4	*84	...	...
Anything[1]	1,124.9	100	1,105.9	98	...	...
Other freshwater fish	476.5	100	420.2	88	...	...

Note: Detail does not add to total because of multiple responses. Excludes species where the estimate of the total was based on a sample size that was too small to report data reliably.

[1] Respondent identified "Anything" from a list of categories of fish.

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

Table 6. Great Lakes Anglers, Trips, and Days of Fishing: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Anglers, trips, and days of fishing	Activity in state					
	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Total anglers	885.9	100	686.8	78	199.1	22
Total trips	8,527.8	100	8,003.9	94	523.9	6
Total days of fishing	11,060.2	100	9,906.6	90	1,153.6	10
Average days of fishing	12.5	(X)	14.4	(X)	5.8	(X)
Average one-way distance traveled per trip (miles)	42.2	(X)	33.7	(X)	183.1	(X)

Note: Detail does not add to total because of multiple responses.
(X) Not applicable.

Table 7. Great Lakes Anglers and Days of Fishing, by Type of Fish: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Anglers and days of fishing	Activity in state					
	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Anglers						
Total, all types of fish	885.9	100	686.8	78	199.1	22
Perch	393.5	100	325.6	83	67.9	17
Black bass	195.4	100	137.8	71	*57.6	*29
Walleye, sauger	349.8	100	294.2	84	*55.6	*16
Northern pike, pickerel, muskie	127.8	100	102.3	80	*25.5	*20
Salmon	238.1	100	180.1	76	57.9	24
Steelhead	132.1	100	100.2	76	*31.8	*24
Lake trout	134.4	100	109.1	81	*25.3	*19
Other trout	82.9	100	71.4	86	...	...
Anything[1]	113.5	100	80.4	71	*33.1	*29
Other Great Lakes fish	133.4	100	115.6	87	...	..
Days of fishing						
Total, all types of fish	11,060.2	100	9,906.6	90	1,153.6	10
Perch	4,335.8	100	4,001.7	92	334.1	8
Black bass	2,023.6	100	1,687.0	83	*336.6	*17
Walleye, sauger	4,901.4	100	4,592.5	94	*308.9	*6
Northern pike, pickerel, muskie	1,823.8	100	1,725.5	95	*98.3	*5
Salmon	1,711.9	100	1,479.9	86	232.0	14
Steelhead	1,027.6	100	885.5	86	*142.1	*14
Lake trout	524.1	100	403.2	77	*121.0	*23
Other trout	847.9	100	812.0	96	...	...
Anything[1]	721.1	100	501.6	70	*219.5	*30
Other Great Lakes fish	1,244.5	100	1,099.5	88	...	...

Note: Detail does not add to total because of multiple responses. Excludes species where the estimate of the total was based on a sample size that was too small to report data reliably.
[1] Respondent identified " Anything " from a list of categories of fish.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

Table 8. Saltwater Anglers, Trips, and Days of Fishing: 1991

MICHIGAN

[Not applicable to this state]

Table 9. Saltwater Anglers and Days of Fishing, by Type of Fish: 1991

MICHIGAN

[Not applicable to this state]

Table 10. Hunters, Trips, and Days of Hunting, by Type of Hunting: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Hunters, trips, and days of hunting	Activity in state					
	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Hunters						
Total, all hunting	826.3	100	782.8	95	43.5	5
Big game	757.1	100	720.9	95	*36.1	*5
Small game	401.3	100	388.0	97	...	...
Migratory bird	92.3	100	88.0	95	...	...
Other animals	*29.9	*100	*29.9	*100	...	...
Trips						
Total, all hunting	12,617.3	100	12,515.5	99	101.8	1
Big game	6,623.2	100	6,563.3	99	*59.9	*1
Small game	5,015.3	100	4,978.1	99	...	...
Migratory bird	623.7	100	619.1	99	...	...
Other animals	*355.0	*100	*355.0	*100	...	...
Trips for the primary purpose of hunting						
Total, all hunting	12,246.8	100	12,152.6	99	94.2	1
Big game	6,452.0	100	6,393.0	99	*59.1	*1
Small game	4,888.4	100	4,857.9	99	...	...
Migratory bird	565.6	100	561.0	99	...	...
Other animals	*340.7	*100	*340.7	*100	...	...
Days of hunting						
Total, all hunting	15,087.1	100	14,732.3	98	354.8	2
Big game	9,218.6	100	8,948.7	97	*270.0	*3
Small game	5,327.7	100	5,251.9	99	...	...
Migratory bird	721.8	100	700.0	97	...	...
Other animals	*429.0	*100	*429.0	*100	...	...
Average one-way distance traveled per trip (miles)						
Total, all hunting	39.8	(X)	36.8	(X)	408.9	(X)
Big game	50.8	(X)	46.9	(X)	*476.9	(X)
Small game	28.1	(X)	26.3	(X)	...	(X)
Migratory bird	33.4	(X)	29.3	(X)	...	(X)
Other animals	...	(X)	...	(X)	...	(X)

Note: Detail does not add to total because of multiple responses.
(X) Not applicable.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

Table 11. Hunters and Days of Hunting in State, by Type of Game: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Type of game	Hunters, state residents and nonresidents		Days of hunting	
	Number	Percent	Number	Percent
Total, all types of game	826.3	100	15,087.1	100
Big game, total	757.1	92	9,218.6	61
Deer	741.9	90	8,800.2	58
Wild turkey	*35.5	*4	*145.6	*1
Small game, total	401.3	49	5,327.7	35
Rabbit, hare	321.2	39	3,741.4	25
Quail	*25.8	*3	*238.2	*2
Grouse/prairie chicken	98.7	12	1,150.4	8
Squirrel	188.8	23	1,814.7	12
Pheasant	123.8	15	1,360.6	9
Other	112.5	14	837.7	6
Migratory birds, total	92.3	11	721.8	5
Geese	*51.8	*6	*404.0	*3
Duck	*45.2	*5	*374.9	*2
Other animals, total	*29.9	*4	*429.0	*3

Note: Detail does not add to total because of multiple responses. Excludes species where the estimate of the total was based on a sample size that was too small to report data reliably.
* Estimate based on a small sample size.

Table 12. Hunters and Days of Hunting in State, by Type of Land: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Hunters and days of hunting	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Hunters						
Total, all types of land	826.3	100	782.8	100	43.5	100
Public land, total	458.4	55	440.4	56	*18.0	*41
Public land only	133.3	16	125.3	16	...	...
Public and private land	325.1	39	315.1	40	...	...
Private land, total	690.1	84	654.6	84	*35.5	*82
Private land only	365.0	44	339.5	43	*25.5	*59
Private and public land	325.1	39	315.1	40	...	...
Days of hunting						
Total, all types of land	15,087.1	100	14,732.3	100	354.8	100
Public land[1]	5,508.2	37	5,375.0	36	*133.2	*38
Private land[2]	10,584.2	70	10,324.4	70	*259.8	*73

Note: Detail does not add to total because of multiple responses and nonresponse.
[1] Days of hunting on public land includes both days spent solely on public land and those spent on public and private land.
[2] Days of hunting on private land includes both days spent solely on private land and those spent on private and public land.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

ıble 13. Selected Characteristics of Resident Anglers and Hunters: 1991

ICHIGAN

tate population 16 years old and older. Numbers in thousands]

Characteristic	Population		Sportsmen (fished or hunted)			Anglers			Hunters		
	Number	Percent	Number	Percent who partici-pated	Percent of sportsmen	Number	Percent who partici-pated	Percent of anglers	Number	Percent who partici-pated	Percent of hunters
ɔtal persons	7,015.4	100	1,690.8	24	100	1,436.8	20	100	784.7	11	100
ɔpulation density of esidence											
Urban	4,948.9	71	957.6	19	57	824.8	17	57	394.6	8	50
Rural	2,066.5	29	733.2	35	43	612.0	30	43	390.1	19	50
ɜx											
Male	3,396.2	48	1,276.6	38	76	1,048.9	31	73	731.8	22	93
Female	3,619.2	52	414.1	11	24	387.9	11	27	*52.8	*1	*7
ge											
16 to 17 years	267.8	4	*53.2	*20	*3	*51.3	*19	*4	*28.4	*11	*4
18 to 24 years	900.4	13	222.2	25	13	175.0	19	12	116.1	13	15
25 to 34 years	1,657.5	24	507.2	31	30	440.5	27	31	213.3	13	27
35 to 44 years	1,430.4	20	394.0	28	23	324.1	23	23	204.8	14	26
45 to 54 years	1,055.5	15	256.7	24	15	230.6	22	16	109.2	10	14
55 to 64 years	754.1	11	159.6	21	9	140.5	19	10	*56.6	*8	*7
65 years and older	949.8	14	97.9	10	6	74.7	8	5	*56.3	*6	*7
ace											
White	6,028.2	86	1,591.3	26	94	1,340.5	22	93	769.4	13	98
Black	807.3	12	*72.2	*9	*4	*69.0	*9	*5	...	...	..
All others	179.9	3	...	...	...	...	...	...	...	...	..
ınnual household income											
Under $10,000	650.9	9	*79.7	*12	*5	*72.2	*11	*5	*27.5	*4	*4
$10,000 to $19,999	968.4	14	239.7	25	14	201.6	21	14	99.4	10	13
$20,000 to $24,999	554.7	8	174.8	32	10	148.4	27	10	92.9	17	12
$25,000 to $29,999	583.6	8	147.1	25	9	130.2	22	9	*56.3	*10	*7
$30,000 to $49,999	1,564.1	22	472.3	30	28	395.3	25	28	223.0	14	28
$50,000 or more	1,420.8	20	367.2	26	22	329.4	23	23	171.8	12	22
Not reported	1,272.9	18	210.0	16	12	159.7	13	11	113.7	9	14
:ducation											
8 years or less	340.3	5	*57.9	*17	*3	*43.9	*13	*3	*26.5	*8	*3
9 - 11 years	863.7	12	200.7	23	12	173.5	20	12	107.6	12	14
12 years	3,080.7	44	726.2	24	43	605.1	20	42	347.0	11	44
1 - 3 years college	1,470.8	21	381.1	26	23	324.3	22	23	184.6	13	24
4 years college or more	1,241.3	18	324.9	26	19	290.0	23	20	119.1	10	15

Note: Detail does not add to total because of multiple responses. Percent who participated shows the percent of each row's population who participated in the activity named by the column (the percent of those living in urban areas who fished, etc.). Remaining percent columns show the percent of each column's participants who are described by the row heading (the percent of anglers who lived in urban areas, etc.).

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

Table 14. Summary of Expenditures in the U.S. by State Residents for Fishing and Hunting: 1991

MICHIGAN

[State population 16 years old and older]

Expenditure item	Fishing and hunting			Fishing			Hunting		
	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)
Total	1,673.5	2,655,348.6	1,587	1,419.6	1,286,367.9	906	779.0	873,442.4	1,121
Food and lodging	1,434.4	320,494.2	223	1,212.2	200,530.2	165	625.6	119,964.0	192
Transportation	1,480.0	192,857.6	130	1,229.3	118,245.3	96	666.7	74,612.3	112
Other trip costs	1,210.3	192,681.0	159	1,193.5	182,060.5	153	80.3	10,620.5	132
Equipment (fishing, hunting)	1,224.0	376,354.2	307	951.9	177,176.2	186	606.7	173,937.0	287
Licenses, stamps, tags, and permits	1,384.1	40,018.0	29	1,051.8	22,095.4	21	734.0	22,721.1	31
Auxiliary equipment	599.8	103,214.3	172	227.0	34,561.7	152	293.1	44,021.0	150
Special equipment	187.2	964,712.6	5,153	123.0	283,664.1	2,305	*35.8	*246,465.9	*6,886
Magazines	422.6	10,647.3	25	133.1	2,018.5	15	88.1	2,005.7	23
Membership dues and contributions	290.2	19,379.3	67	85.4	2,910.2	34	69.3	7,210.7	104
Land leasing and ownership	109.8	434,990.2	3,960	*34.3	*263,105.8	*7,677	84.4	171,884.4	2,036

Note: Detail does not add to total because of multiple responses and nonresponse. See tables 17-19 for a detailed listing of expenditure items. Expenditures reported according to primary use of item. Includes expenditures by state residents in other states.

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

Table 15. Summary of Trip and Equipment Expenditures in the U.S. by State Residents for Fishing, by Type of Fishing: 1991

MICHIGAN

[State population 16 years old and older]

Expenditure item	Total, all fishing			Total, all freshwater			Freshwater, except Great Lakes		
	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)
Total	1,402.4	996,238.1	710	1,383.6	909,543.3	657	1,145.0	333,443.8	291
Food and lodging	1,212.2	200,530.2	165	1,199.5	188,387.9	157	917.3	95,446.7	104
Transportation	1,229.3	118,245.3	96	1,220.2	113,287.6	93	950.0	54,040.3	57
Other trip costs	1,193.5	182,060.5	153	1,182.7	171,823.7	145	927.3	50,805.2	55
Equipment	981.8	495,402.0	505	911.3	436,044.2	478	685.8	133,151.6	194

Expenditure item	Great Lakes			Saltwater		
	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)
Total	689.5	576,099.5	836	83.3	28,553.6	343
Food and lodging	608.7	92,941.1	153	*55.7	*12,142.3	*218
Transportation	610.1	59,247.3	97	*40.3	*4,957.8	*123
Other trip costs	562.6	121,018.5	215	*54.0	*10,236.8	*190
Equipment	343.6	302,892.6	881	...	...	...

Note: Detail does not add to total because of multiple responses and nonresponse. Includes expenditures by state residents in other states.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

Table 16. Summary of Trip and Equipment Expenditures in the U.S. by State Residents for Hunting, by Type of Hunting: 1991

MICHIGAN

[State population 16 years old and older]

Expenditure item	Total, all hunting			Big game			Small game		
	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)
Total	751.5	669,620.7	891	688.5	528,685.5	768	408.8	90,789.6	222
Food and lodging	625.6	119,964.0	192	565.9	88,390.3	156	283.7	27,505.4	97
Transportation	666.7	74,612.3	112	610.8	47,756.5	78	331.2	22,166.4	67
Other trip costs	80.3	10,620.5	132	*61.1	*7,773.3	*127	*32.6	*2,512.7	*77
Equipment	635.2	464,423.9	731	507.6	384,765.4	758	252.6	38,605.1	153

Expenditure item	Migratory bird			Other animals		
	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)
Total	82.7	10,739.7	130	...	...	...
Food and lodging	*45.8	*3,483.8	*76	...	...	...
Transportation	65.3	4,070.7	62	...	...	...
Other trip costs	...	...	...	...	...	...
Equipment	*31.6	*2,850.6	*90	...	...	...

Note: Detail does not add to total because of multiple responses and nonresponse. Includes expenditures by state residents in other states.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

Table 17. Expenditures in the U.S. by State Residents for Fishing: 1991

MICHIGAN

[State population 16 years old and older. Includes Great Lakes and saltwater fishing expenditures]

Expenditure item	Expenditures		Spenders		
	Amount (thousands of dollars)	Average per angler (dollars)	Number (thousands)	Percent of anglers	Average per spender (dollars)
Total, all items	1,286,367.9	895	1,419.6	99	906
Trip-related expenditures					
Total trip-related	500,836.1	349	1,371.3	95	365
Food and lodging, total	200,530.2	140	1,212.2	84	165
Food	161,717.7	113	1,204.9	84	134
Lodging	38,812.5	27	267.8	19	145
Transportation	118,245.3	82	1,229.3	86	96
Other trip costs, total	182,060.5	127	1,193.5	83	153
Privilege and other fees[1]	11,956.6	8	264.1	18	45
Boat launching, mooring, storage, maintenance, insurance, and fuel	126,820.6	88	617.1	43	206
Bait	35,330.8	25	1,069.4	74	33
Ice	7,952.5	6	484.8	34	16
Equipment and other expenditures primarily for fishing					
Fishing equipment, total	177,176.2	123	951.9	66	186
Reels, rods, and rod making components	44,500.3	31	506.8	35	88
Lines, hooks, sinkers, etc	14,572.8	10	708.9	49	21
Artificial lures and flies	25,265.6	18	698.3	49	36
Creels, stringers, fish bags, landing nets, and gaff hooks	1,134.0	1	91.3	6	12
Minnow seines, traps, and bait containers	2,181.2	2	91.4	6	24
Other fishing equipment[2]	89,522.2	62	298.7	21	300
Licenses, stamps, tags, and permits, total	22,095.4	15	1,051.8	73	21
Licenses	19,457.3	14	1,049.0	73	19
Stamps, tags, and permits	2,638.1	2	264.3	18	10
Auxiliary equipment	34,561.7	24	227.0	16	152
Special equipment	283,664.1	197	123.0	9	2,305
Other fishing costs[3]	268,034.5	187	217.7	15	1,231

Note: Detail does not add to total because of multiple responses and nonresponse. Includes expenditures by state residents in other states.

[1] Includes boat or equipment rental and fees for guides, pack trip (party and charter boats, etc.), public land use, and private land use.

[2] Includes electronic fishing devices (depth finders, fish finders, etc.), tackle boxes, spearfishing equipment, ice fishing equipment, and other fishing equipment.

[3] Includes magazine subscriptions, membership dues and contributions, and land leasing and ownership.

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

Table 18. Expenditures in the U.S. by State Residents for Hunting: 1991

MICHIGAN

[State population 16 years old and older]

Expenditure item	Expenditures		Spenders		
	Amount (thousands of dollars)	Average per hunter (dollars)	Number (thousands)	Percent of hunters	Average per spender (dollars)
Total, all items	873,442.4	1,113	779.0	99	1,121
Trip-related expenditures					
Total trip-related	205,196.8	262	700.0	89	293
Food and lodging, total	119,964.0	153	625.6	80	192
Food	109,059.8	139	625.6	80	174
Lodging	10,904.2	14	78.3	10	139
Transportation	74,612.3	95	666.7	85	112
Other trip costs[1]	10,620.5	14	80.3	10	132
Equipment and other expenditures primarily for hunting					
Hunting equipment, total	173,937.0	222	606.7	77	287
Guns and rifles	68,158.4	87	174.6	22	390
Ammunition	22,515.9	29	514.2	66	44
Other hunting equipment[2]	83,262.7	106	340.2	43	245
Licenses, stamps, tags, and permits, total	22,721.1	29	734.0	94	31
Licenses	20,567.4	26	724.5	92	28
Federal duck stamps	*797.0	*1	*53.1	*7	*15
Other stamps, tags, and permits	1,356.7	2	169.0	22	8
Auxiliary equipment	44,021.0	56	293.1	37	150
Special equipment	*246,465.9	*314	*35.8	*5	*6,886
Other hunting costs[3]	181,100.7	231	193.6	25	935

Note: Detail does not add to total because of multiple responses and nonresponse. Includes expenditures by state residents in other states.

[1] Includes guide fees, pack trip or package fees, public and private land use access fees, and rental of equipment such as boats and hunting or camping equipment.

[2] Includes bows, arrows, archery equipment, telescopic sights, decoys and game calls, handloading equipment and components, hunting dogs and associated costs, hunting knives, and other hunting equipment.

[3] Includes magazine subscriptions, membership dues and contributions, and land leasing and ownership.

* Estimate based on a small sample size.

Table 19. Expenditures by State Residents for Special and Auxiliary Equipment Purchased Primarily for Fishing or Hunting: 1991

MICHIGAN

[State population 16 years old and older]

Equipment item	Expenditures		Spenders		
	Amount (thousands of dollars)	Average per sportsman (dollars)	Number (thousands)	Percent of sportsmen	Average per spender (dollars)
Special equipment, total	964,712.6	571	187.2	11	5,153
Boats and canoes	*228,702.3	*135	*45.0	*3	*5,077
Boat motors, boat trailer/hitch, and other boat accessories	*20,490.6	*12	*59.9	*4	*342
Travel or tent trailer, pickup, camper, van, motor home, cabin	*600,768.4	*355	*46.4	*3	*12,939
Trail bike, dune buggy, 4x4 vehicle, 3-wheeler, snowmobile	*110,898.9	*66	*37.0	*2	*2,999
Other special equipment	*3,852.4	*2	*55.9	*3	*69
Auxiliary equipment, total	103,214.3	61	599.8	35	172
Camping equipment	35,764.7	21	165.1	10	217
Special fishing or hunting clothing[1]	33,672.3	20	366.9	22	92
Other auxiliary equipment[2]	33,777.4	20	291.5	17	116

Note: Detail does not add to total because of multiple responses and nonresponse. Includes expenditures by state residents in other states.

[1] Also includes foul weather gear, rubber boots, and waders.

[2] Includes binoculars, field glasses, telescopes, snow shoes and skis, maintenance and repair of equipment, processing and taxidermy costs, and other equipment.

* Estimate based on a small sample size.

Table 20. In-State Trip-Related Expenditures for Fishing and Hunting: 1991

MICHIGAN

(Population 16 years old and older.)

Expenditure item	Total, state residents and nonresidents			State residents			Nonresidents		
	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)	Spenders (thousands)	Amount (thousands of dollars)	Average per spender (dollars)
Trip-related expenditures for fishing and hunting, total	1,909.7	725,456.5	380	1,568.2	617,491.5	394	341.5	107,965.0	316
Trip-related expenditures for fishing									
Total	1,658.5	535,734.7	323	1,342.0	440,990.6	329	316.5	94,744.1	299
Food and lodging	1,463.3	222,894.5	152	1,181.1	174,366.0	148	282.2	48,528.5	172
Transportation	1,486.4	130,708.8	88	1,199.9	103,814.7	87	286.5	26,894.1	94
Privilege and other fees[1]	351.6	14,203.5	40	272.3	9,530.9	35	79.4	4,672.6	59
Boat launching, mooring, storage, maintenance, insurance, and fuel	707.6	122,448.0	173	583.8	113,291.9	194	123.9	9,156.1	74
Bait	1,265.8	36,744.0	29	1,045.3	32,428.2	31	220.6	4,315.7	20
Ice	604.8	8,736.0	14	477.4	7,558.9	16	127.3	1,177.1	9
Trip-related expenditures for hunting									
Total	732.6	189,721.8	259	698.2	176,500.9	253	*34.4	*13,220.9	*384
Food and lodging	651.4	117,684.3	181	620.2	109,400.9	176	*31.2	*8,283.4	*266
Transportation	699.4	68,157.6	97	664.9	63,270.0	95	*34.4	*4,887.6	*142
Privilege and other fees[1]	72.2	3,879.9	54	71.3	3,829.9	54	...	...	...

Note: Detail does not add to total because of multiple responses and nonresponse.
[1] Includes boat and equipment rental and fees for guides, pack trips, public land use, and private land use.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

Table 21. Resident Anglers and Hunters by Place Fished or Hunted and One-Way Distance Traveled on In-State Trips: 1991

MICHIGAN

[State population 16 years old and older. Numbers in thousands]

Place and distance traveled	Anglers		Hunters	
	Number	Percent	Number	Percent
Place fished or hunted				
Total, all places	1,436.8	100	784.7	100
In-state only	1,282.6	89	751.8	96
In-state and other states	136.0	9	*31.0	*4
In other states only	...	..	...	...
One-way distance traveled on in-state trips[1]				
Total	1,418.7	100	782.8	100
5 miles or less	447.1	32	244.9	31
6-24 miles	395.2	28	182.2	23
25-49 miles	297.8	21	147.9	19
50-99 miles	191.0	13	95.5	12
100-249 miles	273.4	19	210.8	27
250 miles or more	87.2	6	78.3	10

Note: Detail may not add to total because of multiple responses and nonresponse.
[1] Every angler or hunter is classified according to the one-way distance traveled to the place used most often.
* Estimate based on a small sample size.
... Sample size too small to report data reliably.

Table 22. State Residents Participating in Primary Nonconsumptive Activities: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Participants	Number	Percent of participants	Percent of population
Total primary participants	3,273.1	100	47
Nonresidential	1,394.9	43	20
Residential	3,167.3	97	45
Observe wildlife	2,442.0	75	35
Photograph wildlife	920.6	28	13
Feed wild birds or other wildlife	2,921.7	89	42
Maintain plantings or natural areas	750.8	23	11
Visit public parks	673.7	21	10

Note: Detail does not add to total because of multiple responses. The column showing percent of participants is based on total primary participants. The column showing percent of population is based on the state population 16 years old and older, including those who did not participate in nonconsumptive activities.

Table 23. Participants, Trips, and Days of Participation in Primary Nonresidential Activities: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Participants, trips, and days of participation	Activity in state					
	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Participants						
Total participants	1,546.2	100	1,261.4	100	284.8	100
Observe wildlife	1,448.2	94	1,246.8	99	201.4	71
Photograph wildlife	624.9	40	510.5	40	114.4	40
Feed wildlife	803.1	52	717.4	57	*85.7	*30
Trips						
Total trips	11,633.5	100	11,131.5	100	502.0	100
1 day trips	10,059.6	86	9,809.8	88	249.9	50
2 or more day trips	1,573.9	14	*1,321.8	*12	252.1	50
Average days per trip	1.2	(X)	1.1	(X)	2.7	(X)
Average one-way distance traveled per trip (miles)	38.8	(X)	30.9	(X)	212.6	(X)
Days of participation						
Total days	14,159.0	100	12,791 7	100	1,367.3	100
Observing wildlife	12,521.5	88	11,808.3	92	713.2	52
Photographing wildlife	2,786.7	20	2,488.4	19	298.3	22
Feeding wildlife	5,803.4	41	5,554.5	43	*248.9	*18
Average days per participant	9.2	(X)	10.1	(X)	4.8	(X)
Observing wildlife	8.6	(X)	9.5	(X)	3.5	(X)
Photographing wildlife	4.5	(X)	4.9	(X)	2.6	(X)
Feeding wildlife	7.2	(X)	7.7	(X)	*2.9	(X)

Note: Detail does not add to total because of multiple responses and nonresponse.
(X)Not applicable.
* Estimate based on a small sample size.

Table 24. Primary Nonresidential Participants Visiting Public Areas In-State: 1991

MICHIGAN

[Population 16 years old and older. Numbers in thousands]

Participants	Total, state residents and nonresidents		State residents		Nonresidents	
	Number	Percent	Number	Percent	Number	Percent
Total participants	1,546.2	100	1,261.4	100	284.8	100
Visited public areas	1,236.2	80	1,003.8	80	232.5	82
Did not visit public areas	310.0	20	257.7	20	*52.3	*18

* Estimate based on a small sample size.

Table 25. State Residents Participating in Primary Residential Activities: 1991

MICHIGAN

State population 16 years old and older. Numbers in thousands]

Primary residential activity	Participants		Primary residential activity	Participants	
	Number	Percent		Number	Percent
Total primary residential participants	3,167.3	100	**Visit public parks**[1]		
Observe wildlife	2,442.0	77	Participants visiting:		
Visit public parks[1]	673.7	21	Total, 1 day or more	673.7	100
Photograph wildlife	920.6	29	1-5 days	365.3	54
Feed wildlife	2,921.6	92	6-11 days	*129.0	*19
Maintain natural areas	489.1	15	12 days or more	*169.3	*25
Maintain plantings	427.8	14	**Photograph wildlife**		
Observe wildlife			Participants photographing:		
Participants observing:			Total, 1 day or more	920.6	100
Total, all wildlife	2,442.0	100	1-3 days	393.9	43
Birds	2,305.7	94	4-10 days	265.9	29
Mammals	1,793.7	73	11 or more days	230.7	25
Amphibians or reptiles	443.5	18	**Feed wildlife**		
Insects or spiders	639.6	26	Participants feeding:		
Fish and other wildlife	586.1	24	Total, all wildlife	2,921.7	100
Participants observing:			Wild birds	2,758.2	94
Total, 1 day or more	2,442.0	100	Other wildlife	1,619.1	55
1-10 days	483.3	20	Average months feeding wild birds[2]	8.2	(X)
11-50 days	599.9	25	Average months feeding other wildlife[3]	5.0	(X)
51-200 days	1,049.5	43			
201 days or more	250.2	10			

Note: Detail does not add to total because of multiple responses and nonresponse.

[1] Includes visits only to parks or publicly owned areas within 1 mile of home.
[2] Based on the number of months where participant fed wild birds at least once a week.
[3] Based on the number of months where participant fed other wildlife at least once.
(X) Not applicable.
* Estimate based on a small sample size.

Table 26. Selected Characteristics of State Residents Participating in Primary Nonconsumptive Activities: 1991

MICHIGAN

[State population 16 years old and older. Numbers in thousands]

Characteristic	Population		Primary participants								
			Total			Nonresidential			Residential		
	Number	Percent	Number	Percent who participated	Percent	Number	Percent who participated	Percent	Number	Percent who participated	Percent
Total persons	7,015.4	100	3,273.1	47	100	1,394.9	20	100	3,167.3	45	100
Population density of residence											
Urban	4,948.9	71	2,032.0	41	62	835.1	17	60	1,971.2	40	62
Rural	2,066.5	29	1,241.1	60	38	559.9	27	40	1,196.1	58	38
Sex											
Male	3,396.2	48	1,555.1	46	48	710.5	21	51	1,509.6	44	48
Female	3,619.2	52	1,718.0	47	52	684.4	19	49	1,657.7	46	52
Age											
16 to 17 years	267.8	4	...	...	...	...	...	...	...	...	...
18 to 24 years	900.4	13	348.1	39	11	189.5	21	14	325.7	36	10
25 to 34 years	1,657.5	24	734.9	44	22	429.3	26	31	697.4	42	22
35 to 44 years	1,430.4	20	929.6	65	28	398.3	28	29	919.3	64	29
45 to 54 years	1,055.5	15	479.9	45	15	*194.6	*18	*14	467.1	44	15
55 to 64 years	754.1	11	388.0	51	12	*86.3	*11	*6	388.0	51	12
65 years and older	949.8	14	337.3	36	10	...	...	...	326.8	34	10
Race											
White	6,028.2	86	3,013.6	50	92	1,312.2	22	94	2,910.5	48	92
Black	807.3	12	*217.1	*27	*7	*75.2	*9	*5	*214.5	*27	*7
All others	179.9	3	...	...	...	...	...	...	...	...	...
Annual household income											
Under $10,000	650.9	9	279.2	43	9	*89.5	*14	*6	276.6	42	9
$10,000 to $19,999	968.4	14	378.8	39	12	*170.2	*18	*12	368.5	38	12
$20,000 to $24,999	554.7	8	365.7	66	11	*90.7	*16	*7	345.0	62	11
$25,000 to $29,999	583.6	8	240.7	41	7	*104.9	*18	*8	238.3	41	8
$30,000 to $49,999	1,564.1	22	908.7	58	28	452.3	29	32	873.7	56	28
$50,000 or more	1,420.8	20	757.2	53	23	350.4	25	25	722.7	51	23
Not reported	1,272.9	18	342.6	27	10	*137.0	*11	*10	342.6	27	11
Education											
8 years or less	340.3	5	*79.4	*23	*2	...	...	...	*79.4	*23	*3
9 - 11 years	863.7	12	343.1	40	10	*135.9	*16	*10	315.0	36	10
12 years	3,080.7	44	1,381.8	45	42	550.4	18	39	1,357.4	44	43
1 - 3 years college	1,470.8	21	882.4	60	27	421.0	29	30	857.0	58	27
4 years college or more	1,241.3	18	576.8	46	18	263.8	21	19	548.8	44	17

Note: Detail does not add to total because of multiple responses and nonresponse. Percent who participated shows the percent of each row's population who participated in the activity named by the column (the percent of those living in urban areas who participated, etc.). Percent columns show the percent of each column's participants who are described by the row heading (the percent of those who participated who live in urban areas, etc.).

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

Table 27. Expenditures in the U.S. by State Residents for Primary Nonconsumptive Wildlife-Related Recreation: 1991

MICHIGAN

[State population 16 years old and older.]

Expenditure item	Expenditures (thousands of dollars)	Spenders		
		Number (thousands)	Percent of nonconsumptive participants[1]	Average per spender (dollars)
Total, all items	893,450.8	2,393.2	73	373
Trip expenditures				
Total trip-related	300,175.2	1,311.0	94	229
Food and lodging	185,064.7	1,071.3	77	173
Food	123,939.2	1,071.3	77	116
Lodging	61,125.4	275.2	20	222
Transportation	104,099.9	1,278.8	92	81
Other trip costs[2]	11,010.6	396.6	28	28
Equipment and other expenditures				
Total	593,275.6	2,102.3	64	282
Nonconsumptive equipment, total	311,847.7	1,972.4	60	158
Binoculars, spotting scopes	*9,648.5	*166.0	*5	*58
Film and developing	96,211.4	873.3	27	110
Cameras, special lenses, and other photographic equipment	*38,463.1	*174.2	*5	*221
Day packs, carrying cases, and special clothing	*10,896.6	*160.4	*5	*68
Bird food	132,780.7	1,969.0	60	67
Nest boxes, bird houses, bird feeders, and bird baths	20,446.8	752.2	23	27
Other nonconsumptive equipment	*3,400.6	*171.8	*5	*20
Auxiliary equipment[3]	*12,627.7	*113.0	*3	*112
Special equipment[4]	...	...	...	...
Magazines	10,137.6	487.1	15	21
Membership dues and contributions	16,871.4	481.7	15	35

Note: Detail does not add to total because of multiple responses and nonresponse. Includes expenditures by state residents in other states.

[1] Percent of nonconsumptive participants column for trip-related expenditures is based on nonresidential participants. For equipment and other expenditures, the percent of nonconsumptive participants column is based on total nonconsumptive participants.

[2] Includes equipment rental and fees for guides, pack trips, public land use and private land use.

[3] Includes tents, tarps, frame packs and other backpacking equipment, and other camping equipment.

[4] Includes travel or tent trailers, off-the-road vehicles, pickups, campers or vans, motor homes, and other special equipment.

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

TABLE 28. PARTICIPATION OF STATE RESIDENT PRIMARY NONCONSUMPTIVE PARTICIPANTS IN FISHING AND HUNTING: 1991

MICHIGAN

(16 years and older. Numbers in thousands)

	TOTAL, NONRESIDENTIAL AND RESIDENTIAL		PRIMARY NONCONSUMPTIVE ACTIVITY			
			NONRESIDENTIAL		RESIDENTIAL	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
TOTAL, PARTICIPANTS	3273.1	100	1410.3	100	3167.3	100
NONCONSUMPTIVE PARTICIPANTS WHO:						
DID NOT FISH OR HUNT	2290.5	70	820.1	58	2328.9	74
FISHED OR HUNTED	982.6	30	590.2	42	838.4	26
FISHED	861.7	26	510.2	36	747.2	24
HUNTED	496.1	15	316.8	22	415.8	13

NOTE: DETAIL DOES NOT ADD TO TOTAL BECAUSE OF MULTIPLE REPONSES AND NONRESPONSE.

Table 29. Participation of State Resident Sportsmen in Primary Nonconsumptive Activities: 1991

MICHIGAN

[State population 16 years old and older. Numbers in thousands]

Sportsmen	Sportsmen		Anglers		Hunters	
	Number	Percent	Number	Percent	Number	Percent
Total sportsmen	1,707.3	100	1,459.1	100	784.7	100
Sportsmen who:						
Did not engage in primary nonconsumptive activities	724.7	42	597.4	41	288.5	37
Engaged in primary nonconsumptive activities	982.6	58	861.7	59	496.1	63
Primary nonresidential	590.2	35	510.2	35	316.8	40
Primary residential	838.4	49	747.2	51	415.8	53

Note: Detail does not add to total because of multiple responses and nonresponse. Includes persons who participated only in Canada.

Table 30. Participants in Wildlife-Associated Recreation, by Participant's State of Residence: 1991

Population 16 years old and older. Numbers in thousands)

Participant's state of residence	Population	Total participants		Sportsmen		Primary nonconsumptive participants	
		Number	Percent of population	Number	Percent of population	Number	Percent of population
U.S., total	189,966	108,745	57	39,979	21	76,111	40
Alabama	3,110	1,755	56	756	24	1,229	40
Alaska	369	343	93	152	41	229	62
Arizona	2,707	1,451	54	467	17	1,083	40
Arkansas	1,807	1,209	67	575	32	812	45
California	22,366	9,167	41	2,913	13	6,480	29
Colorado	2,514	1,690	67	639	25	1,161	46
Connecticut	2,500	1,371	55	351	14	1,075	43
Delaware	528	282	53	93	18	211	40
Florida	10,320	5,578	54	2,038	20	3,866	37
Georgia	4,840	2,628	54	1,071	22	1,756	36
Hawaii	842	334	40	154	18	230	27
Idaho	746	578	77	295	40	385	52
Illinois	8,899	4,833	54	1,670	19	3,452	39
Indiana	4,267	2,810	66	968	23	2,033	48
Iowa	2,164	1,597	74	628	29	1,060	49
Kansas	1,882	1,275	68	510	27	876	47
Kentucky	2,826	1,816	64	737	26	1,191	42
Louisiana	3,161	1,765	56	882	28	1,060	34
Maine	953	746	78	274	29	548	57
Maryland	3,659	1,938	53	598	16	1,456	40
Massachusetts	4,639	2,401	52	612	13	1,882	41
Michigan	7,014	4,640	66	1,691	24	3,273	47
Minnesota	3,308	2,914	88	1,205	36	1,953	59
Mississippi	1,914	1,105	58	591	31	742	39
Missouri	3,940	2,965	75	1,156	29	2,006	51
Montana	601	469	78	227	38	312	52
Nebraska	1,210	834	69	316	26	602	50
Nevada	914	486	53	180	20	337	37
New Hampshire	864	588	68	189	22	449	52
New Jersey	6,007	2,853	47	828	14	2,152	36
New Mexico	1,126	636	56	225	20	466	41
New York	13,803	6,011	44	1,917	14	4,301	31
North Carolina	5,104	2,999	59	1,153	23	2,152	42
North Dakota	477	326	68	162	34	200	42
Ohio	8,306	5,196	63	1,692	20	3,696	44
Oklahoma	2,411	1,692	70	704	29	1,146	48
Oregon	2,223	1,615	73	626	28	1,124	51
Pennsylvania	9,405	5,526	59	1,763	19	4,103	44
Rhode Island	777	454	58	101	13	368	47
South Carolina	2,645	1,367	52	630	24	863	33
South Dakota	525	347	66	166	32	228	43
Tennessee	3,818	2,410	63	900	24	1,701	45
Texas	12,548	6,548	52	2,964	24	4,016	32
Utah	1,139	736	65	313	28	504	44
Vermont	446	367	82	131	29	276	62
Virginia	4,721	2,962	63	1,022	22	2,070	44
Washington	3,709	2,919	79	1,030	28	2,076	56
West Virginia	1,420	846	60	372	26	584	41
Wisconsin	3,700	3,005	81	1,180	32	2,058	56
Wyoming	345	262	76	141	41	190	55

Note: Detail does not add to total because of multiple responses. U.S. totals include responses from participants residing in the District of Columbia, as described in the statistical reliability appendix.

Appendix A. **Definitions**

Annual household income - Total 1990 income of household members before taxes and other deductions.

Auxiliary equipment - Items of equipment such as camping gear that are owned primarily for wildlife-associated recreation. Items of auxiliary equipment are listed in table 19 (fishing and hunting) and table 27 (nonconsumptive).

Big game - Antelope, bear, deer, elk, moose, wild turkey, and similar large animals which are hunted.

Day - Any part of a day spent in a given activity. For example, if someone hunted 2 hours one day and 3 hours another day, it would be recorded as 2 days of hunting. If someone hunted 2 hours in the morning and 3 hours in the evening of the same day, it would be considered 1 day of hunting.

Education - The highest completed grade of school or year of college.

Expenditures - Money spent in 1991 for wildlife-related recreation trips in the U.S. or wildlife-related recreational equipment purchased in the U.S. Expenditures include both money spent by participants for themselves and the value of gifts they received.

Federal land - Public land owned by the Federal government such as National Forests and National Wildlife Refuges.

Fishing - The sport of catching or attempting to catch fish with a hook, line, net, bow and arrow, or spearfishing equipment; also catching or gathering shellfish (clams, crabs, etc.). The noncommercial seining or netting of fish, unless the fish are for use as bait. For example, seining for smelt is fishing, but seining for bait minnows is not included as fishing.

Fishing equipment - Items owned primarily for fishing. These items are listed in table 17.

Freshwater - Reservoirs, lakes, ponds, and the non-tidal portions of rivers and streams.

Great Lakes fishing - Fishing in Lakes Superior, Michigan, Huron, St. Clair, Erie, and Ontario; their connecting waters such as the St. Mary's River system, Detroit River, St Clair River, and the Niagara River; and the St. Lawrence River south of the bridge at Cornwall, New York. Great Lakes fishing includes fishing in tributaries of the Great Lakes for smelt, steelhead, and salmon.

Home - The starting point of a wildlife-related recreational trip. It may be a permanent residence, or a temporary or seasonal residence such as a cabin.

Hunting - The sport of shooting or attempting to shoot wildlife with firearms or archery equipment.

Hunting equipment - Items owned primarily for hunting. These items are listed in table 18

Local land - Public land owned by local governments such as county parks or municipal watersheds.

Maintain natural areas - To set aside one-quarter acre or more of natural environment such as wood lots or open fields for the primary purpose of benefiting wildlife.

Maintain plantings - To introduce or encourage the growth of food and cover plants for the primary purpose of benefiting wildlife.

Migratory birds - Birds that regularly migrate from one region or climate to another. The Survey focuses on migratory birds which may be hunted, including band-tailed pigeons, coots, ducks, doves, gallinules, geese, rails, and woodcock.

Multiple responses - The term used to reflect the fact that individuals or their characteristics fall into more than one reporting category. An example of a big game hunter who hunted for deer and elk demonstrates the effect of multiple responses. In this case, adding the number of deer hunters (1) and elk hunters (1) would overstate the number of big game hunters (1) because deer and elk hunters are not mutually exclusive categories. In contrast, total participants is the sum of male and female participants because male and female are mutually exclusive categories.

Nonconsumptive activity - Feeding, photographing, or observing fish or other wildlife. (See also primary residential and primary nonresidential activities.)

Nonconsumptive equipment - Items owned primarily for observing, photographing, or feeding wildlife. These items are listed in table 27.

Nonresidents - Individuals who do not live in the state being reported. For example, a person living in Texas who watches whales in California is a nonresident participant in California.

Nonresponse - Nonresponse is a term used to reflect the fact that some survey respondents provide incomplete sets of information. For example, a survey respondent may have been unable to identify the primary type of hunting for which a gun was bought. Hunting expenditures will reflect the gun purchase, but it will not appear as spending for big game or any other type of hunting. In general, nonresponses result in reported totals that are greater than the sum of their apparent parts.

Observe - To take special interest in or try to identify birds, fish, or other wildlife.

One-day trips - Trips on which the individual went and returned on the same day without an overnight stay.

Other animals - Coyotes, crows, foxes, groundhogs, prairie dogs, raccoons, and similar animals that are often regarded as varmints or pests. Other animals may be classified as unprotected or nongame animals by the state in which they are hunted.

Participants - Individuals who engage in fishing, hunting, or a nonconsumptive activity.

Primary nonresidential activity - Trips or outings at least one mile from home for the primary purpose of observing, photographing, or feeding wildlife. Trips to zoos, circuses, aquariums, and museums are not included.

Primary purpose - The principal motivation for an activity, trip, or expenditure.

Primary residential activity - Activity within 1 mile of home with a primary purpose that is wildlife-related: (1) closely observing or trying to identify birds or other wildlife, (2) photographing wildlife, (3) feeding birds or other wildlife on a regular basis, (4) maintaining natural areas of at least one-quarter acre for which benefit to wildlife is the primary purpose, (5) maintaining plantings (shrubs, agricultural crops, etc.) for which benefit to wildlife is the primary purpose, or (6) visiting public parks within 1 mile of home for the purpose of observing, photographing, or feeding wildlife.

Public areas - Public lands owned by local, state, or Federal governments.

Public land - Land that is owned by the local, state, or Federal government.

Private land - Land that is owned by a private individual, group of individuals, or nongovernmental organization.

Residents - Individuals who live in the state being reported. For example, persons who live in California and watch whales there are resident participants in California.

Rural - The non-urban population is classified as rural (see urban).

Saltwater - Oceans, tidal bays and sounds, and the tidal portions of rivers and streams.

Screening interviews - The first survey contact with a household. Screening interviews use brief conversations with either the respondent or a household representative in each household to identify participants who are eligible for in-depth interviews. In addition, screening interviews are used

to gather some data about the individuals in the households, such as their age and sex. Screening interviews are discussed in the Survey Background and Method section of this report.

Small game - Grouse, partridge, pheasants, quail, rabbits, squirrels, and similar small animals and birds for which many states have small game seasons and bag limits.

Special equipment - Items of equipment including boats or pickup trucks that are owned primarily for wildlife-related recreation. Items of special equipment are listed in table 26 (fishing and hunting) and table 50 (nonconsumptive).

Spenders - Individuals who reported an expenditure value for fishing, hunting, or nonconsumptive activities or equipment.

Sportsmen - Individuals who engage in fishing, hunting, or both.

State Land - Public land owned by a state such as state parks or state wildlife management areas.

Trip - An outing involving fishing, hunting, or nonconsumptive activities. In the context of this survey, a trip may begin from an individual's principal residence or from another place, such as a vacation home or the home of a relative, and a trip may last an hour, a day, or many days.

Type of fishing - Three types of fishing are reported: Fishing in (1) freshwater, except Great Lakes, (2) Great Lakes, and (3) saltwater.

Type of hunting - Four types of hunting are reported: Hunting for (1) big game, (2) small game, (3) migratory bird, and (4) other animals.

Urban - All persons living in urbanized areas and in places of 2,500 or more inhabitants outside urbanized areas. An urbanized area is a central city of 50,000 or more inhabitants, or twin cities (i.e., cities with contiguous boundaries and constituting, for general social and economic purposes, a single community) with a combined population of at least 50,000, and surrounding closely settled territory of 2,500 or more inhabitants.

Wildlife - Animals such as birds, fish, insects, mammals, and reptiles that are living in natural or wild environments. Wildlife does not include animals living in aquariums, zoos, and other artificial surroundings, or domestic animals such as farm animals or pets.

Wildlife-Associated Recreation - Recreational fishing, hunting, or nonconsumptive wildlife use.

Appendix B. **Selected Data From Screening Interviews**

The 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation was carried out in two phases. The first (or screening) phase was conducted in January and February 1991. The main purpose of this phase was to collect information about persons 16 years old and older in order to develop a sample of potential sportsmen and nonconsumptive participants for the second (or detailed) phase. Information was also collected on the number of persons 6 to 15 years old who participated in wildlife-related recreation activities in 1990. These data are reported here in order to include the recreation activity of 6 to 15 year olds in this report. It is important to emphasize that the information presented in the tables in this appendix relate to activity in 1990. Also, these data were based on long-term recall (at least 12-month recall was required for these tables) and were reported, in most cases, by one household respondent speaking for all household members rather than the short-term recall of the actual participant, as in the case of the 1991 detailed phase.

Tables B-1 to B-4 report data on participants 6 to 15 years old in 1990. Detailed expenditures and recreational activity data were not gathered for the 6 to 15 year-old participants.

Because of the difference in methodologies between the screening phase and the detailed phase of the 1991 Survey, the data collected are not comparable. Only participants 16 years old and older were eligible for the detailed phase. The detailed phase was a series of three interviews conducted at 4-month intervals while the screening interviews were all 1-year recall. The shorter recall period of the detailed phase improved data accuracy. It has been found in Survey studies that in many cases longer recall periods result in over-estimating participation in and expenditures on wildlife-related recreation activities.

Table B-1. State Residents 6 to 15 Years Old Participating in Fishing and Hunting: 1990

MICHIGAN

[State population 6 to 15 years old. Numbers in thousands]

Sportsmen	Sportsmen 6 to 15 years old		
	Number	Percent of sportsmen	Percent of population
Total sportsmen	587.1	100	43
Total anglers	572.9	98	42
Fished only	514.2	88	38
Fished and hunted	58.7	10	4
Total hunters	72.9	12	5
Hunted only	...	...	...
Hunted and fished	58.7	10	4

Note: Detail does not add to total because of multiple responses. Column showing percent of sportsmen is based on the "Total sportsmen" row. Column showing percent of population is based on the state population 6 to 15 years old, including those who did not fish or hunt. Data reported on this table are from screening interviews in which one adult household member responded for household members 6 to 15 years old. The screening interview required the respondent to recall 12 months worth of activity. Includes state residents who fished or hunted only in other countries.

... Sample size too small to report data reliably.

Table B-2. Fishing in State by Residents and Nonresidents 6 to 15 Years Old: 1990

MICHIGAN

[Population 6 to 15 years old. Numbers in thousands]

Anglers	Activity in state	
	Number	Percent
Total anglers	631.2	100
State residents	514.0	81
Nonresidents	117.2	19

Note: Data are from screening interviews in which one adult household member responded for all household members 6 to 15 years old. The screening interview required the respondent to recall 12 months worth of activity.

Table B-3. Selected Characteristics of Resident Anglers and Hunters 6 to 15 Years Old: 1990

MICHIGAN

[State population 6 to 15 years old. Numbers in thousands]

Characteristic	Population		Sportsmen (fished or hunted)			Anglers			Hunters		
	Number	Percent	Number	Percent who partici-pated	Percent of sportsmen	Number	Percent who partici-pated	Percent of anglers	Number	Percent who partici-pated	Percent of hunters
Total persons	1,354.0	100	587.1	43	100	572.9	42	100	72.9	5	100
Population density of residence											
Urban	874.2	65	286.4	33	49	284.8	33	50	*16.0	*2	*22
Rural	479.8	35	300.7	63	51	288.1	60	50	56.9	12	78
Sex											
Male	639.2	47	351.0	55	60	339.9	53	59	66.6	10	91
Female	714.8	53	236.1	33	40	233.0	33	41	...	...	...
Age											
6 to 8 years	399.0	29	162.4	41	28	160.9	40	28	...	...	...
9 to 11 years	418.3	31	195.0	47	33	195.0	47	34	...	...	...
12 to 15 years	536.7	40	229.7	43	39	217.0	40	38	58.7	11	81
Race											
White	1,146.6	85	567.1	49	97	552.8	48	97	72.9	6	100
Black	165.6	12	...	...	...	...	...	...	...	...	...
All others	*41.8	*3	...	...	...	...	...	...	...	...	...
Annual household income											
Under $10,000	119.4	9	*36.8	*31	*6	*36.8	*31	*6	...	...	...
$10,000 to $19,999	186.9	14	67.2	36	11	67.2	36	12	...	...	...
$20,000 to $24,999	102.2	8	49.2	48	8	47.7	47	8	...	...	...
$25,000 to $29,999	112.0	8	54.1	48	9	51.0	46	9	...	...	...
$30,000 to $49,999	401.2	30	191.1	48	33	186.4	46	33	*30.0	*7	*41
$50,000 or more	302.7	22	153.4	51	26	148.6	49	26	...	...	...
Not reported	129.7	10	*35.1	*27	*6	*35.1	*27	*6	...	...	...

Note: Percent who participated shows the percent of each row's population who participated in the activity named by the column (the percent of those living in urban areas who fished, etc.). Remaining percent columns show the percent of each column's participants who are described by the row heading (the percent of anglers who lived in urban areas, etc.). Data reported on this table are from screening interviews in which one adult household member responded for 6 to 15 year olds. The screening interview required the respondent to recall 12 months worth of activity. Includes state residents who fished or hunted only in other countries.

* Estimate based on a small sample size.

... Sample size too small to report data reliably.

Table B-4. State Residents 6 to 15 Years Old Participating in Primary Nonconsumptive Activities: 1990

MICHIGAN

[State population 6 to 15 years old. Numbers in thousands]

Participants	Number	Percent of participants	Percent of population
Total primary participants	886.5	100	65
Nonresidential	385.8	44	28
Residential	837.1	94	62
Observe wildlife	580.2	65	43
Photograph wildlife	92.4	10	7
Feed wild birds or other wildlife	673.0	76	50
Maintain plantings or natural areas	205.5	23	15

Note: Detail does not add to total because of multiple responses. The column showing percent of participants is based on total primary participants. The column showing percent of population is based on the state population 6 to 15 years old, including those who did not participate in nonconsumptive activities. Data reported on this table are from screening interviews in which one adult household member responded for household members 6 to 15 years old. The screening interview required the respondent to recall 12 months worth of activity.

Appendix C. National and Regional Trends

Changes in the methodology of the 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation make the data incomparable with past surveys. As such, trends cannot be established through direct comparisons of the detailed data of the past surveys with those of this survey. However, the screening surveys done for the 1980, 1985, and 1991 Surveys were consistent in their methodologies. Therefore, the trend information presented in this report is from the screening surveys which cover the calendar years 1980, 1985, and 1990. While the estimates derived from the screening interviews are not as accurate as those derived from the detailed interviews, they do provide a valid basis for trend analysis.

National Trends

Between 1980 and 1990, the U.S. population 6 years old and older increased 10 percent. Meanwhile, the number of sportsmen in the United States increased 17 percent. They spent 55 percent more in 1990 on expenditures than in 1980, and there was a 10 percent increase in days spent fishing and hunting.

From 1980 to 1990, the number of anglers in the United States increased 20 percent. Anglers increased their expenditures 56 percent and spent 15 percent more days fishing.

Hunting participation held steady from 1980 to 1990. Between 1980 and 1990 there was a 4 percent decrease in the number of days spent hunting and a 7 percent decrease in expenditures.

Nonconsumptive activities have been monitored since 1980. The surveys include information on primary nonconsumptive activities such as observing, feeding, and photographing wildlife. Primary activities are those activities whose main purpose is to enjoy wildlife. This group is divided into those participants who enjoyed wildlife away from home (nonresidential) and those who observed, fed, or photographed wildlife within a mile of home (residential). The screening interview did not include expenditures and days of participation for nonconsumptive participants.

Between 1980 and 1990 there was a 63 percent increase in primary nonresidential participation for nonconsumptive activity and a decrease of 13 percent in primary residential participants Overall, there has been a decrease in nonconsumptive participation. Between 1980 and 1990 there was a 10 percent decline in all primary nonconsumptive participation.

Over the past decade, the national survey has undergone a number of changes in order to improve its accuracy and to better meet the needs of its constituents. An understanding of the changes in methodology will clarify how the trend analysis was done.

Methodology

Each National Survey of Fishing, Hunting and Wildlife-Associated Recreation is conducted in two phases. First, an initial screening of households is conducted to identify wildlife-related recreation participants 6 years old and older; and second, a detailed interview is conducted to collect detailed information on participation and expenditures for persons 16 years old and older.

The 1980 to 1990 trend information is based on data from the screening phases rather than

the detailed phases of the 1980, 1985, and 1991 National Surveys because of significant changes in the methodology used in the detailed phase of the 1991 Survey. As a result, the 1991 estimates are not directly comparable with estimates from previous surveys. However, the methodology used for the 1991 Survey's screening phase, which collected information on 1990 participation, was similar to that used for the other surveys' screening phases, making those data comparable. All screening phases used a 12-month recall period and collected information for household members 6 years of age and older.

In 1991, changes were made in the survey's detailed phase to improve the accuracy of the data collected. The detailed phase of the 1991 Survey used a 4-month period for respondents to recall their recreation activities and expenditures. Previous surveys used a 12-month recall period. Research in 1988 on recall bias found that 12-month recall periods involving detailed information on participation and expenditures resulted in over-estimations.

Another difference between the 1991 Survey and previous surveys was that the 1980 and 1985 screening surveys covered the years 1980 and 1985, while the 1991 screening survey covered the year 1990. The annual recall period used for the 1980 and 1985 Surveys allowed respondents to be screened into the detailed phases of the surveys after the 1980 and 1985 survey years were over, while the 1991 trimester interviews required respondents to be screened into the detailed phase during the first part of 1991 before their activity took place. The respondents selected for the detailed phase of the survey were then asked about their activities and expenditures every 4 months between January and December 1991.

The data from the screening interviews were subject to similar biases such as:

- The data came from household respondents rather than the self-response of participants, and
- A 12-month recall period was used in each screening interview.

These biases resulted in estimates that were not as accurate as the estimates from the second (detailed) phase of each survey, in which the hunters, anglers, and nonconsumptive participants themselves were interviewed about their activities over the surveyed year (with 4-month recall in the case of the 1991 Survey). These biases were allowed because the screening survey was not intended for use as a measure of a particular year's recreation, but only to select a sample for the more in-depth and reliable second (detailed) survey. The screening survey estimates are not comparable with the estimates from the detailed phases of the surveys because of the differences in methodologies. The information from the detailed phase of each year's survey is more accurate.

The following is an explanation of how estimates were derived for the trend tables:

- *Participation Estimates.* The hunting, fishing, nonresidential, and residential nonconsumptive total and regional participation estimates came directly from the 1980, 1985, and 1991 screening data files. Estimates of participation by type of hunting and fishing (eg. big game, freshwater) were calculated by using their proportions of total hunting and fishing observed in the detailed phases of the 1980, 1985, and 1991 Surveys. Indexes were calculated using 1980 as the base year.

- *Expenditure and Day Estimates.* The expenditure and day information from the screening files was not used in the expenditure and day sections of table 1 because this information was not collected the same way in each screening survey. Each survey used different ranges to categorize the respondent's answer, and the last range was open-ended, making the calculation of a single expenditure or day estimate difficult. Therefore, these estimates were calculated by multiplying the participation estimates by the average expenditure and day estimates from the 1980 and 1985 detailed phases and from a 1991 annual recall survey conducted as part of the 1991 Survey to provide further information on recall bias. The 1991 expenditure averages were used to approximate the 1990 expenditure averages by adjusting for the inflation from 1990 to 1991. The expenditure averages for the 3 survey years do not include land leasing and ownership. The fishing expenditure averages for 1980 lumped together Great Lakes and other freshwater fishing; the average of total freshwater fishing expenditures was used for both the 1980 Great Lakes and other freshwater fishing expenditure calculations.

Table C-1. Trends in Wildlife-Related Recreation In the U.S.: 1980 to 1990

Item	1980	1985	1990
Total sportsmen	100	107	117
Anglers	100	109	120
Hunters	100	97	100
Total sportsmen expenditures	100	119	155
Total days by sportsmen	100	112	110
Nonconsumptive participants	100	95	90
Residential	100	92	87
Nonresidential	100	149	163

Index of participation, 1980 = 100

The base year for this analysis is 1980. Participation estimates for 1985 and 1990 are relative to 1980. To calculate the percent change between two survey years, divide the later year's index number by the earlier year's index number, subtract 1 from the quotient, and multiply the result by 100. For example, to get the percent change in sportsmen from 1985 to 1990, dividing 117 by 107 yields 1.09, subtracting 1 yields 0.09, and multiplying by 100 we arrive at a 9 percent increase in sportsmen from 1985 to 1990. Small percentage changes, those up to 3 percent, are not statistically significant.

Table C-2. Index of Change in the Number of Anglers and Hunters by Census Division: 1980 to 1990

(6 years old and older.)

Division	Total population	Sportsmen	Anglers	Hunters
Total, U.S.				
1980	100	100	100	100
1985	105	107	109	97
1990	110	117	120	100
New England				
1980	100	100	100	100
1985	103	104	107	92
1990	105	116	121	92
Middle Atlantic				
1980	100	100	100	100
1985	102	108	112	96
1990	102	117	123	97
East North Central				
1980	100	100	100	100
1985	100	102	103	95
1990	102	111	111	109
West North Central				
1980	100	100	100	100
1985	102	106	109	99
1990	105	110	113	98
South Atlantic				
1980	100	100	100	100
1985	109	111	112	100
1990	117	123	126	100
East South Central				
1980	100	100	100	100
1985	104	101	102	90
1990	106	115	118	99
West South Central				
1980	100	100	100	100
1985	111	112	114	106
1990	113	122	127	98
Mountain				
1980	100	100	100	100
1985	112	111	114	101
1990	120	120	124	100
Pacific				
1980	100	100	100	100
1985	109	106	107	87
1990	121	120	121	99

Index of participation, 1980 = 100

Table C-3. Index of Change in the Number of Nonconsumptive Participants, by Census Division: 1980 to 1990

(6 years old and older.)

Division	Total population	Total nonconsumptive	Residential	Nonresidential
Total, U.S.				
1980	100	100	100	100
1985	105	95	92	149
1990	110	90	87	163
New England				
1980	100	100	100	100
1985	103	91	89	158
1990	105	84	81	181
Middle Atlantic				
1980	100	100	100	100
1985	102	84	81	141
1990	102	75	72	140
East North Central				
1980	100	100	100	100
1985	100	91	88	150
1990	102	84	81	151
West North Central				
1980	100	100	100	100
1985	102	97	93	155
1990	105	97	94	167
South Atlantic				
1980	100	100	100	100
1985	109	96	94	146
1990	117	96	93	187
East South Central				
1980	100	100	100	100
1985	104	93	91	158
1990	106	91	87	208
West South Central				
1980	100	100	100	100
1985	111	100	98	156
1990	113	93	89	161
Mountain				
1980	100	100	100	100
1985	112	117	114	164
1990	120	115	111	176
Pacific				
1980	100	100	100	100
1985	109	107	104	139
1990	121	102	98	156

Index of participation, 1980 = 100

Appendix D. **Sample Design and Statistical Accuracy**

This appendix is partitioned into two parts. The first part of this appendix is the U.S. Bureau of the Census 'Source and Accuracy Statement' for the survey. This statement describes the sampling design for the 1991 survey and highlights the steps that were taken to produce estimates from the completed questionnaires. The statement explains the use of standard errors and confidence intervals. Finally, it provides comprehensive information about errors that are characteristic of surveys, and it provides the formulas and parameters that can be used to calculate an approximate standard error or confidence interval for each number published in this report.

The second part, tables D-1 to D-3, reports approximate standard errors for selected measures of participation and expenditures for wildlife-related recreation.

Source and Accuracy Statement for the Michigan State Report of the 1991 National Survey of Fishing, Hunting, and Wildlife–Associated Recreation

Source of Data

The estimates shown in this report are based on the data collected in the 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (FHWAR).

The 1991 FHWAR survey was designed to provide state-level estimates of the number of people who participated in recreational hunting and fishing, and other forms of wildlife-related activities (e.g., wildlife observation) referred to as nonconsumptive use. Information was collected on the number of people engaged in the activities, where and how often they pursued them, the type of wildlife encountered, and the amounts of money spent for these activities.

The survey was conducted in two stages: an initial screening of households to identify likely sportsmen and nonconsumptive participants, and a series of follow-up interviews of selected persons to collect detailed data about their wildlife-related recreation during 1991.

The 1991 FHWAR state samples were selected from expired samples from the Current Population Survey (CPS). As such, they are multistage stratified samples of the U.S. population within each state.

Sample Design

A. CPS-Current Population Survey

The expired CPS samples used for the 1991 FHWAR survey had been selected initially from the 1980 census files with coverage in all 50 states and the District of Columbia. The samples, while active, had been continually updated to reflect new construction. The addresses from the state samples were located in more than 729 areas comprising more than 1,973 counties, independent cities, and minor civil divisions in the nation.

B. The FHWAR Screening Sample

The screening sample consisted of households identified from previously interviewed CPS households. Michigan's sample households were last contacted for CPS sometime between August 1989 and March 1990. Beginning with

March 1990 and working back, expired CPS sample households were accumulated until the designated sample size was obtained. About 2,850 households were contacted. Of these roughly 14.3 percent were found to be vacant or otherwise not to be enumerated. Of the remaining households roughly 6.2 percent could not be enumerated because the occupants were not found at home after repeated calls or were unavailable for some other reason. Overall, about 2,290 completed household interviews were obtained for a response rate of approximately 93.8 percent. Roughly 68 percent of the interviewed households were contacted by telephone and the remaining interviewed households were contacted by personal visit. The field representatives asked the screening questions for all household members 6 years old and older. Interviewing for the screening sample was conducted during January and February of 1991.

The screening sample was split into two groups: self-respondent and proxy-respondent. Seventy five percent of the households were designated as proxy-respondents where a household respondent answered for all household members. The household respondent was a knowledgeable household member at least 18 years old. The remaining 25 percent of the sample households were self-respondents where each household member age 16 or older responded for himself or herself. A household respondent answered for persons less than 16 years old. Splitting the sample into two respondent types will allow us to see if the respondent type has an effect on the screener data.

C. The Detailed Samples

1. Sportsmen

The state sportsmen sample was selected based on information reported during the screening phase. Every person 16 years of age and older was assigned to a category based on time devoted to hunting/fishing in the past or time expected to be devoted to hunting/fishing in the future. The three sportsmen categories are:

Active - a person who participated in hunting/fishing in 1990, already had participated in 1991 or intended to participate in 1991.

Inactive - a person who did not participate in hunting/fishing in 1990, participated in 1986-1989, and did not intend to participate in 1991.

Nonparticipant - a person who did not participate in hunting/fishing in 1986-1990, and did not intend to participate in 1991.

The active and inactive groups were eligible for interview in the sportsmen detail sample.

The active sportsmen category included two groups, those who hunted/fished in 1990 and those who did not participate in 1990 but planned to or already had in 1991. Sportsmen who hunted/fished in 1990 were stratified into two substrata based on expenditures on hunting or fishing and the number of days of participation in hunting or fishing. The two substrata are:

Avid - a person who hunted or fished at least 30 days or spent at least $600 on either hunting or fishing.

Nonavid - a person who hunted or fished at least 1 day but not more than 29 days and did not spend more than $600 on either hunting or fishing.

Of the 485 sportsmen identified from the screening sample as avid or having already participated in 1991, all were selected for interviews. Nonavid sportsmen and those sportsmen who did not participate in 1990 were subsampled to yield the desired number of active sportsmen in Michigan.

Active sportsmen selected for the detail sample were contacted three times: May 1991, September 1991, and January 1992. The reference period was the preceding 4 months. If we were not able to obtain an interview, we attempted to interview the person in the next interviewing period. The recall period for these persons was longer. After the last interview, we had obtained data on the person's activities for the entire year of 1991. Inactive sportsmen selected for interview were contacted one time in January or February of 1992. The reference period was the preceding year.

About 1,220 persons were designated for interviews in Michigan. Overall, about 1,150 detailed sportsmen interviews were completed for a response rate of 95.1 percent.

2. Nonconsumptive Users

The state nonconsumptive user sample was also selected based on information reported during the screening phase. Every person 16 years of age and older was assigned to a

category based on time devoted to nonconsumptive activities in the past or time expected to be devoted to nonconsumptive activities in the future. The two categories are:

Active - a person who participated in a nonconsumptive activity in 1990, already had participated in 1991 or intended to participate in 1991.

Nonparticipant - a person who did not participate in a nonconsumptive activity in 1990, and did not intend to participate in 1991.

The active group was eligible for interview in the nonconsumptive user detail sample.

The active nonconsumptive user category included two groups, those who participated in 1990 and those who did not participate in 1990 but planned to or already had in 1991. Nonconsumptive users who participated in 1990 were stratified into two strata based on the distance traveled by the individual to participate in the nonconsumptive activity. The two strata are

Primary Nonresidential - a person who took a trip of 1 mile or more to participate in a nonconsumptive activity

Primary Residential - a person who participated in a nonconsumptive activity less than 1 mile from home

The first stratum, primary nonresidential, was further categorized into two substrata based on expenditures on nonconsumptive activities and the number of days of participation in nonconsumptive activities. The two substrata are:

Avid - a person who participated at least 30 days or spent at least $300 on nonconsumptive activities.

Nonavid - a person who participated between 1 and 29 days and spent less than $300 on nonconsumptive activities.

Of the 166 nonconsumptive users identified from the screening sample as avid or having already participated in nonresidential activities in 1991, 126 were selected for interview. The rest of the active group was subsampled to get the desired sample size in Michigan.

The nonconsumptive user sample was interviewed at the same time as the active sportsmen detail sample.

About 540 persons were designated for interviews in Michigan. Overall, about 510 interviews were completed for a response rate of 95 1 percent.

Estimation Procedure

Several stages of adjustments were involved in the estimation procedure used to derive the final 1991 FHWAR person weights. A brief description of the major components of the weights by sample is given below

All statistics for the population 6 to 15 years of age were derived from the screening interview. Statistics for the population 16 and over come from both the screening and the detailed interviews. Estimates which come from the screening sample are presented in appendix B.

A. Screening Sample

Every interviewed person in the screening sample received a weight that was the product of the following factors:

1. **Base Weight.** The base weight is the inverse of the household's probability of selection.
2. **Household Noninterview Adjustment.** The noninterview adjustment inflates the weight assigned to interviewed households to account for households eligible for interview but for which no interview was obtained.
3. **First-Stage Adjustment.** The 729+ areas designated for our state samples were selected from roughly 1,900 such areas of the United States. Some of our sample areas represent only themselves, and are referred to as self-representing. The remaining areas represent other areas similar in selected characteristics, and are thus designated nonself-representing. The first-stage factor reduces the component of variation arising out of sampling the nonself-representing areas.
4. **Second-Stage Adjustment.** This adjustment brings the estimates of the total population in each state into agreement with census-based estimates of the civilian noninstitutional and nonbarrack military populations for each state.

B. Sportsmen Sample

Every interviewed person in the sportsmen detail sample received a weight that was the product of the following factors:

1. **Screening Weight.** This is the person's final weight from the screening sample.

2. **Stratum Adjustment.** This factor inflates the weights of persons selected for the detail sample to account for the subsampling done within each sportsmen stratum.

3. **Sportsmen Noninterview Adjustment.** This factor adjusts the weights of the interviewed sportsmen to account for sportsmen selected for the detail sample for which no interview was obtained. A person was considered a noninterview if he/she was not interviewed in the third wave of interviewing.

4. **Sportsmen Ratio Adjustment Factor.** This is a ratio adjustment of the detail sample to the screening sample within sportsmen sampling strata. This adjustment brings the population estimates of persons age 16 or older from the state detail sample into agreement with the same estimates from the state screening sample, which was a much larger sample.

5. **Long-Time Inactive Adjustment.** This is an adjustment designed to reduce the bias caused by not sampling unlikely participants.

   The survey sample was drawn from categories of potential participants in wildlife-related recreation activities identified by a screening of households in January 1991. Persons with a low probability of participating - i.e., persons who said they had not gone hunting or fishing in the last 5 years and who had no intention of going in 1991 - were omitted from the detailed interviews for efficiency. There is no standard statistical method of adjusting for the persons in that group who participated in 1991. An adjustment for their participation was made based on data collected from the detailed and screening interviews.

   Persons who said in the screener that they had not hunted in the previous 5 years and did not intend to hunt in 1991 were not eligible for selection for the detail sample as hunters. Some of these people were selected because of their fishing activity or plans. We adjusted the weights of the hunters in the sample for these people by assuming same participation rates for the people who did hunt and who were selected into the sample because of their fishing activity and those that were not selected into the sample.

   We made a similar adjustment for persons who fished in 1991 but in the screener said they had not fished in the previous 5 years and did not intend to fish in 1991.

C. Nonconsumptive User Sample

Every interviewed person in the nonconsumptive user detail sample received a weight that was the product of the following factors:

1. **Screening Weight.** This is the person's final weight from the screening sample.

2. **Nonconsumptive User Stratum Adjustment.** This factor inflates the weights of the persons selected for the detail sample to account for the subsampling done within each nonconsumptive user stratum.

3. **Nonconsumptive User Noninterview Adjustment.** This factor adjusts the weights of the interviewed nonconsumptive users to account for nonconsumptive users selected for the detail sample for which no interview was obtained. A person was considered a noninterview if he/she was not interviewed in the third wave of interviewing.

4. **Nonconsumptive User Ratio Adjustment Factor.** This is a ratio adjustment of the detail sample to the screening sample within nonconsumptive user sampling strata. This adjustment brings the population estimates of persons age 16 or older from the state detail sample into agreement with the same estimates from the state screening sample, which was a much larger sample.

An adjustment for long-time inactive nonconsumptive users similar to the sportsmen long-time inactive adjustment was not made because there were no inactives included in the nonconsumptive users sample upon which an adjustment could be based.

Accuracy of the Estimates

Since the 1991 estimates come from a sample, they may differ from figures from a complete census using the same questionnaires, instructions, and enumerators. This occurs because a sample survey estimate has two possible types of error: sampling and nonsampling. The accuracy of an estimate depends on both types of error, but the full extent of the nonsampling error is unknown.

Consequently, one should be particularly careful when interpreting results based on a relatively small number of cases or on small differences between estimates. The standard errors for the 1991 FHWAR estimates primarily indicate the magnitude of sampling error. They also partially measure the effect of some nonsampling errors in responses and enumeration, but do not measure systematic biases in the data. (Bias is the average over all possible samples of the differences between the sample estimates and the actual value).

Nonsampling Variability

Let us suppose that a comparable complete enumeration was conducted, that is, an interview is attempted for every person 16 years old and over in the United States. Chances are we will not correctly estimate every parameter (for example, the proportion of people who fished) under consideration. In this instance the difference is due solely to nonsampling errors. Nonsampling errors also occur in sample surveys and can be attributed to several sources including the following:

- The inability to obtain information about all cases in the sample.
- Definitional difficulties.
- Differences in the interpretation of questions.
- Respondents' inability or unwillingness to provide correct information.
- Respondents' inability to recall information.
- Errors made in data collection such as in recording or coding the data.
- Errors made in processing the data.
- Errors made in estimating values for missing data.
- Failure to represent all units with the sample (undercoverage).

There were three particular undercoverage problems in this survey: sample attrition, i.e., loss of the original sample due to nonreturns from the field, processing, etc.; failure to represent new construction in the sampling frame for the period roughly between November 1986 and March 1990; and failure to give all potential participants a chance of selection for the detail sample.

Sportsmen and nonconsumptive users in 1991 who were either participating for the first time or were participating after a period of inactivity are somewhat underrepresented in the 1991 survey estimates. Unless at the time of the screening interview they had intentions of participating during 1991, they were not given a chance of selection for the detail sample. We tried to partially adjust for the missed long-time inactive participants with the long-time inactive sportsmen weighting adjustment.

Overall CPS undercoverage as compared to the level of the 1980 decennial census is about 7 percent. Generally, undercoverage is larger for males than for females and larger for Blacks and other races combined than for Whites. Ratio estimation to independent population controls, as described previously, partially corrects for the bias due to survey undercoverage. However, biases exist in the estimates to the extent that missed persons in missed households or missed persons in interviewed households have different characteristics from those of interviewed persons in the same age group. Further, the independent population controls used have not been adjusted for undercoverage in the 1980 census.

Comparability of Data. Data obtained from the 1991 FHWAR survey and other sources are not entirely comparable. This results from differences in field interviewer training and experience and in differing survey processes. This is an example of nonsampling variability not reflected in the standard errors. Use caution when comparing results from different sources. (See appendix C.)

Note When Using Small Estimates. Because of the large standard errors involved, summary measures (such as medians and percentage distributions) would probably not reveal useful information when computed on a smaller base than 65,000 for sportsmen and 105,000 for nonconsumptive users. Take care in the interpretation of small differences. For instance, even a small amount of nonsampling error can cause a borderline difference to appear significant or not, thus distorting a seemingly valid hypothesis test.

Sampling Variability

The particular state sample used for the 1991 survey is one of a large number of all possible probability samples of the same size that could have been selected using the same sample design. Estimates derived from the different samples would differ from each other. This sample-to-sample variability is referred to as sampling variability and is generally measured by the standard error. The exact sampling error is unknown. However, guides to the potential size of the sampling error are provided by the standard error of the estimate.

Since the standard error of a survey estimate attempts to provide a measure of the variation among the estimates from the possible samples, it is a measure of the precision with which an estimate from a particular sample approximates the average result of all possible samples. Standard errors, as calculated by methods described next in "Standard Errors and Their Use," are primarily measures of sampling variability, although they may include some nonsampling error.

The sample estimate and its standard error enable one to construct a confidence interval, a range that would include the average result of all possible samples with a known probability. For example, if all possible samples were surveyed under essentially the same general conditions and using the same sample design, and if an estimate and its standard error were calculated from each sample, then approximately 90 percent of the intervals from 1.645 standard errors below the estimate to 1.645 standard errors above the estimate would include the average result of all possible samples.

A particular confidence interval may or may not contain the average estimate derived from all possible samples. However, one can say with specified confidence that the interval includes the average estimate calculated from all possible samples.

Standard errors may also be used to perform hypothesis testing, a procedure for distinguishing between population parameters using sample estimates. One common type of hypothesis is that the population parameters are different. An example of this would be comparing the proportion of anglers to the proportion of hunters.

Tests may be performed at various levels of significance, where a significance level is the probability of concluding that the characteristics are different when, in fact, they are the same. To conclude that two parameters are different at the 0.10 level of significance, for example, the absolute value of the estimated difference between characteristics must be greater than or equal to 1.645 times the standard error of the difference.

The Census Bureau uses 90-percent confidence intervals and 0.10 levels of significance to determine statistical validity. Consult standard statistical textbooks for alternative criteria.

Standard Errors and Their Use. A number of approximations are required to derive, at a moderate cost, standard errors applicable to all the estimates in this report. Instead of providing an individual standard error for each estimate, parameters are provided to calculate standard errors for each type of characteristic. These parameters are listed in tables D-4 to D-9. Methods for using the parameters to calculate standard errors of various estimates are given in the next sections.

Standard Errors of Estimated Numbers. The approximate standard error, s_x, of an estimated number shown in this report can be obtained using the following formulas. Formula (1) is used to calculate the standard errors of levels of sportsmen, anglers, hunters, nonconsumptive users.

$$s_x = \sqrt{ax^2 + bx} \qquad (1)$$

Here, x is the size of the estimate and a and b are the parameters in the tables associated with the particular characteristic.

Formula (2) is used for standard errors of aggregates, i.e., trips, days, and expenditures.

$$s_x = \sqrt{ax^2 + bx + \frac{cx^2}{y}} \qquad (2)$$

Here, x is again the size of the estimate, y is the base of the estimate; and a, b, and c are the parameters in the tables associated with the particular characteristic.

Illustration of the Computation of the Standard Error of an Estimated Number.

Suppose that a table shows that 39,979,000 persons 16+ either fished or hunted in the United States in 1991. Using formula (1) with the parameters a = -0.000032 and b = 4,395 from table D-5, the approximate standard error on the estimated number of 39,979,000 sportsmen 16+ is

$$s_x = \sqrt{-0.000032 \times 39{,}979{,}000^2 + 4{,}395 \times 39{,}970{,}000} = 352{,}900$$

The 90-percent confidence interval for the estimated number of sportsmen 16+ is from 39,398,500 to 40,559,500, i.e., 39,979,000 ± 1.645 x 352,900. Therefore, a conclusion that the average estimate derived from all possible samples lies within a range computed in this way would be correct for roughly 90 percent of all possible samples.

Suppose that another table shows that 14,063,000 hunters 16+ engaged in 235,806,000 days of participation in 1991 in the United States. Using formula (2) with the parameters a = 0.000069, b = 9,445, and c = 5,567 from table D-7, the approximate standard error on 235,806,000 estimated days on an estimated base of 14,063,000 hunters is

$$s_x = \sqrt{0.000069 \times 235{,}806{,}000^2 + 9{,}445 \times 235{,}806{,}000 + \frac{5{,}567 \times 235{,}806{,}000^2}{14{,}063{,}000}} = 5{,}298{,}600$$

The 90-percent confidence interval on the estimate of 235,806,000 days is from 227,089,800 to 244,522,200, i.e., 235,806,000 ± 1.645 x 5,298,600. Again, a conclusion that the average estimate derived from all possible samples lies within a range computed in this way would be correct for roughly 90 percent of all possible samples.

Standard Errors of Estimated Percentages. The reliability of an estimated percentage, computed using sample data for both numerator and denominator, depends on the size of the percentage and its base. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more. When the numerator and denominator of the percentage are in different categories, use the parameter in the tables indicated by the numerator.

The approximate standard error of an estimated percentage, $s_{x,p}$, can be obtained by use of the formula

$$s_{x,p} = \sqrt{bp(100 - p)/x} \qquad (3)$$

Here, x is the total number of sportsmen, hunters, etc., which is the base of the percentage; p is the percentage ($0 \leq p \leq 100$); and b is the parameter in the tables associated with the characteristic in the numerator of the percentage.

Illustration of the Computation of the Standard Error of an Estimated Percentage.

Assume that a table in this report shows that of the 14,063,000 hunters 16+ in the United States, 2.1 percent were Black. From table D-5 the appropriate b parameter is 2,872. Using formula (3), the approximate standard error on the estimate of 2.1 percent is

$$s_{x,p} = \sqrt{2{,}872 \times 2.1 \times 97.9/14{,}063{,}000} = 0.20$$

Consequently, the 90-percent confidence interval for the estimated percentage of Black hunters 16+ is from 1.8 percent to 2.4 percent, i.e., $2.1 \pm 1.645 \times 0.20$.

Standard Error of a Difference. The standard error of the difference between two sample estimates is approximately equal to

$$s_{x-y} = \sqrt{s_x^2 + s_y^2} \qquad (4)$$

where s_x and s_y are the standard errors of the estimates x and y. The estimates can be numbers, percentages, ratios, etc. This will represent the actual standard error quite accurately for the difference between estimates of the same characteristic in two different areas, or for the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive (negative) correlation between the two characteristics, the formula will overestimate (underestimate) the true standard error.

Illustration of the Computation of the Standard Error of a Difference.

Suppose that a table shows that of the 14,063,000 hunters in the United States, 3,930,000 were in the age group 25-34, and 3,369,000 were in the age group 35-44. The corresponding percents are 28.0 percent and 24.0 percent, respectively. The apparent difference between the percent of hunters 25-34 and hunters 35-44 is 4.0 percent. Using formula (3) and the appropriate b parameter from table D-5, the approximate standard errors of 28.0 percent and 24.0 percent are 0.64 and 0.61, respectively. Using formula (4), the approximate standard error of the estimated difference of 4.0 percent is

$$s_{x-y} = \sqrt{0.64^2 + 0.61^2} = 0.88$$

The 90-percent confidence interval on the difference between hunters aged 25-34 and hunters aged 35-44 is from 2.6 to 5.4 percent, i.e., $4.0 \pm 1.645 \times 0.88$. Since this interval does not contain zero, we can conclude with 90 percent confidence that the percentage of hunters aged 25-34 is larger than the percentage of hunters aged 35-44.

Standard Errors of Estimated Averages. Certain mean values for sportsmen, anglers, etc., shown in the report were calculated as the ratio of two numbers. For example, average days per angler is calculated as:

$$\frac{x}{y} = \frac{\text{total days}}{\text{total anglers}}$$

Standard errors for these averages, may be approximated by the use of formula (5) below

$$s_{x/y} = \frac{x}{y} \sqrt{\left[\frac{s_x}{x}\right]^2 + \left[\frac{s_y}{y}\right]^2 - 2r\,\frac{s_x s_y}{xy}} \qquad (5)$$

In formula (5), r represents the correlation coefficient between the numerator and the denominator of the estimate. In the above formula, use 0.7 as an estimate of r.

Illustration of the Computation of the Standard Error of an Estimated Average.

Suppose that a table shows that the average days per hunter 16+ in the United States was 16.8 days. Using formulas (1) and (2) above, we compute the standard error on total days, 235,806,000, and total hunters, 14,063,000, to be 5,298,600 and 194,000, respectively. The approximate standard error on the estimated average of 16.8 days is

$$s_{x/y} = \frac{235{,}806{,}000}{14{,}063{,}000} \sqrt{\left[\frac{5{,}298{,}600}{235{,}806{,}000}\right]^2 - \left[\frac{194{,}000}{14{,}063{,}000}\right]^2 - 2 \times 0.7 \times \frac{5{,}298{,}600 \times 194{,}000}{235{,}806{,}000 \times 14{,}063{,}000}} = 0.27$$

Therefore, the 90-percent confidence interval on the estimated average of 16.8 days is from 16.4 to 17.2, i.e., $16.8 \pm 1.645 \times 0.27$.

Table D-1. Approximate Standard Errors of Resident Anglers, Days of Fishing by State Residents, and Expenditures for Fishing by State Residents

[Numbers in thousands]

State	Participation		Days		Expenditures	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
Alabama	678	41	10,854	1,194	$728,501	$142,843
Alaska	141	7	1,888	263	$239,166	$34,946
Arizona	388	29	4,438	636	$299,592	$47,475
Arkansas	493	26	8,942	1,219	$286,091	$36,399
California	2,707	146	25,974	3,759	$1,795,949	$311,306
Colorado	567	29	5,364	599	$319,283	$36,898
Connecticut	343	20	5,241	587	$252,997	$42,236
Delaware	83	5	1,153	177	$79,456	$13,400
Florida	1,968	89	35,081	3,311	$1,654,594	$275,376
Georgia	987	49	16,235	1,335	$534,539	$80,772
Hawaii	149	10	2,384	471	$75,519	$13,346
Idaho	247	12	2,706	264	$145,456	$16,603
Illinois	1,503	78	21,970	2,462	$1,111,262	$128,845
Indiana	886	46	12,861	879	$404,367	$54,132
Iowa	529	27	6,571	670	$320,730	$31,178
Kansas	445	20	5,687	586	$288,710	$38,826
Kentucky	647	33	9,426	542	$468,930	$80,099
Louisiana	801	42	13,807	1,975	$686,201	$131,294
Maine	236	13	3,647	257	$177,931	$25,132
Maryland	549	35	6,318	1,395	$467,292	$81,044
Massachusetts	583	31	9,786	1,024	$454,240	$68,246
Michigan	1,437	63	22,984	2,007	$1,286,368	$191,642
Minnesota	1,109	43	16,131	1,846	$846,246	$104,159
Mississippi	506	32	8,758	590	$263,084	$41,463
Missouri	1,039	48	14,072	1,829	$439,234	$52,721
Montana	171	10	1,967	229	$71,200	$8,782
Nebraska	269	16	3,199	367	$147,806	$19,338
Nevada	160	11	1,428	163	$80,123	$13,601
New Hampshire	176	10	2,583	244	$86,978	$10,442
New Jersey	789	41	11,384	1,475	$774,375	$99,352
New Mexico	179	13	1,617	263	$112,863	$18,386
New York	1,656	92	21,995	2,492	$867,242	$93,709
North Carolina	1,052	50	15,245	1,422	$577,540	$77,049
North Dakota	126	7	1,456	200	$69,515	$8,260
Ohio	1,468	69	20,644	1,856	$861,554	$88,257
Oklahoma	649	31	10,836	1,011	$422,036	$52,808
Oregon	540	27	7,013	1,301	$461,297	$53,101
Pennsylvania	1,425	79	26,254	3,663	$677,512	$83,866
Rhode Island	97	6	1,892	358	$63,523	$10,557
South Carolina	595	32	8,952	1,011	$398,587	$55,140
South Dakota	129	8	1,565	184	$87,217	$12,594
Tennessee	804	40	12,940	1,307	$493,174	$68,132
Texas	2,650	123	36,752	3,455	$1,475,470	$191,689
Utah	251	14	2,436	242	$154,205	$24,253
Vermont	110	6	1,863	194	$64,238	$8,210
Virginia	929	46	12,806	1,334	$431,082	$59,247
Washington	967	47	12,655	1,251	$1,009,310	$111,503
West Virginia	259	17	3,897	254	$109,209	$10,759
Wisconsin	970	49	16,323	2,335	$782,388	$94,748
Wyoming	115	7	1,283	114	$66,270	$10,653

Table D-2. Approximate Standard Errors of Resident Hunters, Days of Hunting by State Residents, and Expenditures for Hunting by State Residents

[Numbers in thousands]

State	Participation		Days		Expenditures	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
Alabama	311	24	5,748	870	$275,883	$57,589
Alaska	55	4	737	95	$88,589	$11,287
Arizona	153	17	1,516	295	$153,601	$39,055
Arkansas	264	19	5,177	561	$288,060	$49,696
California	537	56	6,369	1,212	$643,150	$153,043
Colorado	206	19	1,838	356	$154,499	$26,502
Connecticut	50	7	936	243	$43,335	$10,470
Delaware	25	3	424	82	$20,546	$4,462
Florida	348	39	5,946	1,602	$323,749	$87,016
Georgia	336	29	5,695	932	$548,301	$132,602
Hawaii	17	3	289	104	$17,250	$5,585
Idaho	161	11	1,985	284	$97,947	$13,407
Illinois	457	43	7,238	1,049	$326,957	$59,620
Indiana	320	26	7,208	1,071	$243,627	$49,481
Iowa	246	19	3,735	516	$443,965	$93,512
Kansas	202	15	2,862	319	$125,617	$28,528
Kentucky	340	22	6,112	807	$236,506	$41,377
Louisiana	333	24	7,398	1,017	$433,808	$94,354
Maine	123	10	1,998	285	$66,716	$9,818
Maryland	149	17	2,491	565	$345,996	$68,026
Massachusetts	120	13	1,973	309	$113,459	$20,017
Michigan	785	42	14,955	1,549	$873,442	$107,178
Minnesota	452	27	5,137	622	$289,690	$30,050
Mississippi	292	20	7,986	720	$402,096	$72,932
Missouri	479	32	7,269	833	$339,226	$51,029
Montana	158	9	1,950	197	$88,196	$10,204
Nebraska	138	11	2,055	256	$67,626	$12,050
Nevada	57	7	586	205	$65,345	$12,146
New Hampshire	65	6	1,111	156	$44,051	$7,985
New Jersey	139	16	2,564	405	$123,625	$23,662
New Mexico	98	10	1,021	241	$57,082	$12,632
New York	688	51	12,788	1,338	$504,491	$55,917
North Carolina	401	29	7,412	779	$270,660	$48,532
North Dakota	89	5	1,266	134	$51,770	$6,459
Ohio	580	41	9,451	1,172	$381,711	$61,342
Oklahoma	229	22	3,803	878	$158,708	$36,391
Oregon	240	18	2,506	324	$122,739	$16,618
Pennsylvania	919	58	15,626	1,355	$536,917	$83,506
Rhode Island	16	2	340	88	$20,785	$5.806
South Carolina	186	17	3,619	476	$128,010	$23,944
South Dakota	103	6	1,688	193	$78,955	$10,987
Tennessee	336	23	7,595	816	$311,721	$44,125
Texas	1,018	72	14,953	2,549	$1,006,433	$121,031
Utah	162	13	1,402	220	$86,214	$12,476
Vermont	69	5	1,541	169	$48,186	$12,183
Virginia	368	29	8,570	1,852	$255,822	$45,797
Washington	251	29	3,546	1,226	$191,609	$50,171
West Virginia	271	19	5,677	950	$165,081	$20,916
Wisconsin	647	37	10,983	1,297	$624,436	$89,270
Wyoming	74	5	733	69	$50,249	$9,395

Table D-3. Approximate Standard Errors of Resident Primary Nonresidential Participants, Days of Primary Nonresidential Participation by State Residents, and Trip-Related Expenditures for Primary Nonresidential Activities by State Residents

(Numbers in thousands)

State	Participation		Days		Expenditures	
	Estimate	Standard error	Estimate	Standard error	Estimate	Standard error
Alabama	347	27	3,077	522	$73,608	$14,056
Alaska	143	9	1,923	289	$49,024	$9,202
Arizona	435	37	5,026	914	$101,912	$19,261
Arkansas	279	23	2,276	413	$44,869	$9,162
California	3,408	256	46,556	14,357	$1,157,836	$304,018
Colorado	571	38	6,179	1,622	$132,069	$37,444
Connecticut	361	28	5,271	962	$94,607	$16,980
Delaware	84	6	878	128	$15,714	$2,966
Florida	1,678	125	15,421	1,863	$556,366	$109,989
Georgia	400	39	4,570	1,245	$106,614	$21,424
Hawaii	84	7	967	190	$33,041	$7,881
Idaho	224	13	2,308	335	$39,563	$6,047
Illinois	1,182	90	12,512	1,671	$435,454	$95,204
Indiana	664	51	7,564	992	$119,869	$21,443
Iowa	398	30	4,547	825	$61,179	$10,371
Kansas	323	25	2,668	343	$45,768	$8,826
Kentucky	382	31	3,967	830	$59,936	$11,742
Louisiana	306	27	2,625	727	$60,678	$12,623
Maine	217	15	2,453	315	$39,660	$6,154
Maryland	531	43	6,461	1,612	$118,235	$18,781
Massachusetts	868	54	10,707	1,471	$216,609	$32,419
Michigan	1,395	95	15,099	2,281	$300,175	$72,217
Minnesota	782	55	11,023	2,629	$181,883	$34,629
Mississippi	231	21	2,856	616	$58,562	$12,486
Missouri	740	54	7,186	1,225	$126,749	$30,837
Montana	185	11	1,921	251	$34,174	$6,452
Nebraska	237	17	1,893	342	$38,632	$6,811
Nevada	175	12	1,981	313	$73,101	$15,895
New Hampshire	186	12	2,202	346	$31,212	$4,806
New Jersey	765	56	6,692	1,000	$210,435	$33,139
New Mexico	231	16	2,493	648	$61,194	$13,712
New York	1,611	123	14,737	2,442	$380,928	$70,950
North Carolina	540	44	6,041	1,072	$115,652	$18,544
North Dakota	78	6	768	147	$9,711	$1,743
Ohio	1,373	97	15,206	2,376	$275,703	$42,157
Oklahoma	394	37	4,453	1,263	$81,515	$19,865
Oregon	524	34	6,348	989	$119,014	$23,813
Pennsylvania	1,790	112	23,161	4,047	$456,147	$70,375
Rhode Island	116	9	1,375	208	$30,285	$6,394
South Carolina	179	20	2,363	709	$23,353	$5,013
South Dakota	96	7	1,278	241	$19,067	$4,705
Tennessee	632	51	7,221	1,185	$127,306	$26,870
Texas	1,481	121	17,933	3,135	$423,218	$96,966
Utah	284	19	2,572	332	$58,848	$12,515
Vermont	109	7	1,827	272	$20,263	$3,120
Virginia	786	62	6,867	1,170	$141,648	$21,058
Washington	875	64	13,125	1,959	$298,941	$50,235
West Virginia	214	19	2,946	920	$32,684	$5,293
Wisconsin	958	59	11,087	1,179	$140,584	$21,898
Wyoming	112	7	1,195	163	$24,171	$4,001

Table D-4. a and b Parameters for Calculating Approximate Standard Errors of Sportsmen, Anglers, Hunters, and Nonconsumptive Users[1]

State	6 years old and over		6 to 15 year olds only	
	a	b	a	b
United States	−0.0000118	2,669	−0.0000673	2,391
Alabama	−0.0006116	2,282	−0.0031691	1,968
Alaska	−0.0013864	629	−0.0045765	389
Arizona	−0.0006194	2,013	−0.0025525	1,386
Arkansas	−0.0007403	1,611	−0.0036775	1,357
California	−0.0001953	5,202	−0.0011774	5,032
Colorado	−0.0005021	1,501	−0.0030379	1,443
Connecticut	−0.0003050	887	−0.0022934	938
Delaware	−0.0004916	306	−0.0030632	291
Florida	−0.0002670	3,180	−0.0017448	2,776
Georgia	−0.0004358	2,551	−0.0022912	2,321
Hawaii	−0.0004746	474	−0.0024268	381
Idaho	−0.0008082	749	−0.0032099	581
Illinois	−0.0002717	2,858	−0.0013644	2,209
Indiana	−0.0003748	1,908	−0.0020777	1,712
Iowa	−0.0005406	1,392	−0.0029781	1,224
Kansas	−0.0004502	1,017	−0.0027162	1,024
Kentucky	−0.0004634	1,562	−0.0027266	1,486
Louisiana	−0.0005713	2,208	−0.0024716	1,740
Maine	−0.0007030	790	−0.0037719	645
Maryland	−0.0004325	1,855	−0.0026079	1,643
Massachusetts	−0.0002129	1,138	−0.0015340	1,083
Michigan	−0.0003476	2,909	−0.0019313	2,615
Minnesota	−0.0005451	2,154	−0.0028866	1,859
Mississippi	−0.0007184	1,686	−0.0035566	1,540
Missouri	−0.0004485	2,092	−0.0021324	1,546
Montana	−0.0008103	588	−0.0036880	461
Nebraska	−0.0007032	1,021	−0.0037975	919
Nevada	−0.0005222	562	−0.0027778	450
New Hampshire	−0.0004595	468	−0.0028000	434
New Jersey	−0.0002130	1,488	−0.0014061	1,378
New Mexico	−0.0007202	996	−0.0026031	669
New York	−0.0002120	3,423	−0.0012354	2,892
North Carolina	−0.0003168	1,903	−0.0018173	1,641
North Dakota	−0.0006465	374	−0.0030495	308
Ohio	−0.0002246	2,220	−0.0013278	2,094
Oklahoma	−0.0006190	1,788	−0.0029140	1,390
Oregon	−0.0004238	1,114	−0.0026995	1,096
Pennsylvania	−0.0003050	3,348	−0.0020045	3,151
Rhode Island	−0.0003436	310	−0.0021600	270
South Carolina	−0.0004618	1,469	−0.0025578	1,371
South Dakota	−0.0007407	471	−0.0039279	436
Tennessee	−0.0004086	1,849	−0.0022994	1,628
Texas	−0.0002984	4,553	−0.0016448	4,454
Utah	−0.0006587	998	−0.0027660	1,040
Vermont	−0.0006589	346	−0.0039241	310
Virginia	−0.0004226	2,335	−0.0021343	1,716
Washington	−0.0004833	2,133	−0.0033565	2,363
West Virginia	−0.0007768	1,307	−0.0040573	1,063
Wisconsin	−0.0005539	2,445	−0.0033165	2,368
Wyoming	−0.0011709	494	−0.0057532	443

[1]These parameters are to be used only to calculate estimates of standard errors for characteristics developed from the screening sample.

Table D-5. a and b Parameters for Calculating Approximate Standard Errors of Levels for the Detail Sportsmen Sample

State	Sportsmen and anglers 16+		Hunters 16+	
	a	b	a	b
United States	–0.000032	4,395	–0.000014	2,872
Alabama	–0.001284	3,350	–0.000452	2,028
Alaska	–0.001049	534	–0.000533	389
Arizona	–0.001024	2,542	–0.000653	2,057
Arkansas	–0.000984	1,874	–0.000688	1,555
California	–0.000726	9,809	–0.000284	5,976
Colorado	–0.000802	1,936	–0.000729	1,830
Connecticut	–0.001130	1,585	–0.000381	951
Delaware	–0.001214	459	–0.000350	276
Florida	–0.000757	5,471	–0.000570	4,598
Georgia	–0.000638	3,018	–0.000469	2,627
Hawaii	–0.001467	824	–0.000381	441
Idaho	–0.000969	835	–0.001275	998
Illinois	–0.000965	5,509	–0.000668	4,374
Indiana	–0.000983	3,220	–0.000534	2,252
Iowa	–0.000905	1,826	–0.000729	1,616
Kansas	–0.000644	1,217	–0.000592	1,163
Kentucky	–0.000899	2,232	–0.000514	1,640
Louisiana	–0.001103	3,073	–0.000360	1,864
Maine	–0.000958	916	–0.000833	854
Maryland	–0.001090	2,776	–0.000521	1,979
Massachusetts	–0.000910	2,189	–0.000462	1,513
Michigan	–0.000525	3,538	–0.000218	2,451
Minnesota	–0.000661	2,415	–0.000415	1,860
Mississippi	–0.001820	2,905	–0.000585	1,538
Missouri	–0.000949	3,179	–0.000611	2,445
Montana	–0.001371	819	–0.001189	744
Nebraska	–0.001090	1,273	–0.000671	1,000
Nevada	–0.001357	958	–0.001135	853
New Hampshire	–0.001420	861	–0.000653	547
New Jersey	–0.000873	2,822	–0.000369	1,804
New Mexico	–0.001087	1,210	–0.001122	1,230
New York	–0.000931	6,658	–0.000354	4,061
North Carolina	–0.000888	3,274	–0.000502	2,347
North Dakota	–0.000911	455	–0.000562	348
Ohio	–0.000837	4,486	–0.000490	3,202
Oklahoma	–0.000696	1,898	–0.001058	2,412
Oregon	–0.000966	1,836	–0.000681	1,456
Pennsylvania	–0.001028	5,797	–0.000520	4,077
Rhode Island	–0.001104	517	–0.000219	276
South Carolina	–0.001248	2,463	–0.000621	1,670
South Dakota	–0.001170	607	–0.000779	483
Tennessee	–0.000861	2,723	–0.000331	1,700
Texas	–0.000808	7,823	–0.000442	5,473
Utah	–0.000631	979	–0.000986	1,226
Vermont	–0.001037	444	–0.000786	379
Virginia	–0.000685	2,917	–0.000469	2,439
Washington	–0.000981	3,234	–0.001141	3,590
West Virginia	–0.000793	1,318	–0.001212	1,596
Wisconsin	–0.001093	3,578	–0.000559	2,455
Wyoming	–0.001606	603	–0.001019	456

Table D-6. a, b, and c Parameters for Calculating Approximate Standard Errors for Expenditures for the Detail Sportsmen Sample

State	Sportsmen and anglers 16+			Hunters 16+		
	a	b	c	a	b	c
United States	0.000745	34,470	16,835	−0.000274	17,643	16,954
Alabama	0.028530	−38,534	6,557	0.030372	−54,158	4,026
Alaska	0.018611	−1,076	384	0.004880	7,829	623
Arizona	0.013489	−3,777	4,390	0.042530	−68,524	3,446
Arkansas	0.009865	−1,423	3,087	0.004490	−89,190	6,649
California	0.027217	273,355	7,227	0.031160	−168,238	12,140
Colorado	0.007850	−4,466	3,093	0.009625	−47,715	4,096
Connecticut	0.021108	−7,442	2,286	0.020330	−12,693	1,932
Delaware	0.017594	−3,713	889	0.029927	−3,775	425
Florida	0.023619	30,561	7,698	0.046200	−176,405	8,906
Georgia	0.017015	6,534	5,515	0.022700	−130,448	11,910
Hawaii	0.022298	−846	1,288	0.077950	−5,020	467
Idaho	0.007513	−3,331	1,367	0.009691	−6,013	1,457
Illinois	0.005565	−9,417	1,598	0.018169	−87,947	6,690
Indiana	0.008574	−43,203	8,233	0.024170	−124,142	5,444
Iowa	0.002365	−15,013	3,719	0.034476	−42,093	2,366
Kansas	0.013822	−7,587	1,872	0.039090	−54,605	2,611
Kentucky	0.023614	11,585	3,464	0.020540	−27,324	3,376
Louisiana	0.030260	−28,497	5,042	0.025550	−115,743	7,292
Maine	0.012997	−9,830	1,612	0.010974	−8,335	1,284
Maryland	0.023826	−686	3,308	0.011030	−20,197	4,064
Massachusetts	0.013047	−31,394	5,442	0.013405	13,784	2,105
Michigan	0.014449	−96,888	11,103	0.004782	−37,776	8,038
Minnesota	0.010570	−23,060	5,043	0.001701	−13,909	4,092
Mississippi	0.002090	−74,387	10,961	0.011080	−102,074	6,251
Missouri	0.009317	−24,336	5,227	0.013525	−67,063	4,390
Montana	0.007344	−1,738	1,323	0.005268	114	1,279
Nebraska	0.009074	−5,195	2,139	0.018807	−18,565	1,790
Nevada	0.014154	−15,238	2,314	0.013870	−6,060	1,161
New Hampshire	0.001028	−17,581	2,364	0.018435	−9,120	948
New Jersey	0.007586	−36,453	6,828	0.018993	7,371	2,363
New Mexico	0.018114	−1,548	1,491	0.031320	−10,448	1,732
New York	0.001665	−34,650	6,464	0.002663	112,661	6,318
North Carolina	0.011615	−24,756	6,173	0.018443	−47,032	5,470
North Dakota	0.008821	−2,124	666	0.009315	−6,902	569
Ohio	0.004213	−35,115	8,926	0.012912	−62,926	7,384
Oklahoma	0.009985	−14,260	3,595	0.043804	−834	1,963
Oregon	0.005453	−11,903	4,228	0.007854	−1,130	2,479
Pennsylvania	0.000416	−83,888	20,828	0.015999	7,428	7,478
Rhode Island	0.020288	−5,285	689	0.054010	−3,549	392
South Carolina	0.010860	−28,489	4,734	0.014430	−45,449	3,850
South Dakota	0.015625	−1,308	673	0.010036	−12,819	972
Tennessee	0.012744	−18,120	4,952	0.006234	−59,874	4,533
Texas	0.013120	−32,602	9,846	0.004451	17,951	10,125
Utah	0.016880	−6,103	1,982	0.009898	−14,696	1,820
Vermont	0.001944	−15,681	1,579	0.053670	−11,001	718
Virginia	0.013836	6,730	4,561	0.023587	−26,835	3,063
Washington	0.005950	−19,151	5,965	0.053290	−94,821	3,905
West Virginia	−0.000448	−5,976	2,586	0.008732	−9,638	1,901
Wisconsin	0.009191	−19,263	5,304	0.006010	−93,592	9,429
Wyoming	0.017028	−1,035	1,010	0.018940	−9,791	1,193

Table D-7. a, b, and c Parameters for Calculating Approximate Standard Errors for Days or Trips for the Detail Sportsmen Sample

State	Sportsmen and anglers 16+			Hunters 16+		
	a	b	c	a	b	c
United States	-0.000144	-28,529	17,917	0.000069	9,445	5,567
Alabama	-0.002322	-8,057	10,284	0.013585	-3,849	3,113
Alaska	0.017254	-433	344	0.007475	-775	572
Arizona	0.014448	121	2,357	0.017234	-8,222	3,986
Arkansas	0.013145	-1,560	2,761	-0.000013	468	3,079
California	0.019127	8,300	4,057	0.015920	-5,272	11,342
Colorado	0.004447	-7,501	5,350	0.027855	-2,709	2,302
Connecticut	0.006748	-1,650	2,102	0.045472	660	1,069
Delaware	0.014386	-1,429	879	0.022828	-451	376
Florida	0.004190	-7,941	9,726	0.060620	-2,325	4,311
Georgia	-0.004071	-9,819	11,283	0.018543	5,055	2,474
Hawaii	0.030213	-1,267	1,390	0.107950	-226	383
Idaho	0.001369	-1,642	2,166	0.011626	-331	1,456
Illinois	0.004376	-10,396	13,001	0.008279	-563	5,853
Indiana	-0.005679	-17,955	10,407	0.011527	-9,519	3,795
Iowa	0.002951	-2,071	4,109	0.007895	-6,046	3,143
Kansas	0.007352	-604	1,497	-0.002003	-8,016	3,489
Kentucky	-0.003142	-2,893	4,370	0.007808	-3,893	3,484
Louisiana	0.013202	-16,559	6,777	0.012199	2,044	2,135
Maine	-0.011035	-3,485	4,005	0.007157	-2,867	1,806
Maryland	0.045450	-1,164	1,915	0.035718	-1,442	2,437
Massachusetts	0.004395	-3,357	4,018	0.006853	-2,991	2,303
Michigan	-0.001452	-16,536	14,076	0.004264	-10,292	5,610
Minnesota	0.008364	-7,130	5,743	0.005830	-9,272	4,802
Mississippi	-0.017627	-10,434	11,811	-0.001552	-2,439	2,916
Missouri	0.012202	-4,169	5,187	0.006883	2,284	2,840
Montana	0.004255	-1,379	1,718	0.002052	-1,580	1,417
Nebraska	0.002607	-2,690	3,064	0.005199	-1,921	1,554
Nevada	0.003045	-1,649	1,798	0.115390	-242	411
New Hampshire	0.000214	-1,570	1,633	0.009654	640	627
New Jersey	0.010017	-4,620	5,660	0.008681	11,245	1,642
New Mexico	0.017088	-1,424	1,838	0.047235	127	827
New York	0.005934	43,758	8,137	0.000654	-10,622	7,656
North Carolina	0.002948	-6,843	6,520	0.001450	-2,510	3,978
North Dakota	0.014352	-279	583	0.004591	-486	621
Ohio	0.002097	-14,149	9,795	0.005342	-10,571	6,469
Oklahoma	-0.000714	-5,313	6,427	0.037022	-8,855	4,250
Oregon	0.028740	-2,964	3,304	0.006202	-4,366	2,940
Pennsylvania	0.017015	38,935	1,385	0.000078	-4,935	7,128
Rhode Island	0.030402	-466	557	0.049018	-158	295
South Carolina	0.006928	28,696	1,559	0.002727	-2,574	2,846
South Dakota	0.005192	-725	1,179	0.003239	-2,324	1,152
Tennessee	0.007245	1,883	2,263	0.001422	-5,173	3,626
Texas	0.001997	-17,658	9,396	0.022648	-4,099	6,813
Utah	0.003485	370	1,570	0.017024	-1,801	1,444
Vermont	0.002760	-57	890	0.000718	-2,381	887
Virginia	0.001179	-18,439	10,318	0.037767	-3,002	3,410
Washington	0.000425	-7,499	9,611	0.102630	-12,596	5,122
West Virginia	-0.010583	-5,227	4,180	0.021073	-4,218	2,077
Wisconsin	0.013691	-9,186	7,120	0.006278	-12,752	5,707
Wyoming	-0.004748	-1,159	1,555	-0.002873	-917	949

Table D-8. a and b Parameters for Calculating Approximate Standard Errors of Levels of Nonconsumptive Users for the Detail Nonconsumptive User Sample

State	Primary nonresidential users		All nonconsumptive users[1]	
	a	b	a	b
United States	-0.000094	10,345	-0.000088	9,722
Alabama	-0.000691	2,398	-0.001069	2,946
Alaska	-0.002091	817	-0.002814	1,010
Arizona	-0.002184	4,125	-0.002653	4,757
Arkansas	-0.001418	2,248	-0.002136	2,922
California	-0.002838	28,828	-0.002973	30,038
Colorado	-0.001952	3,708	-0.002368	4,342
Connecticut	-0.001824	2,789	-0.002321	3,411
Delaware	-0.001447	549	-0.001863	655
Florida	-0.002349	13,284	-0.002524	14,134
Georgia	-0.001212	4,275	-0.001975	5,970
Hawaii	-0.000971	633	-0.001289	735
Idaho	-0.001659	1,156	-0.002100	1,367
Illinois	-0.001728	8,929	-0.002028	10,182
Indiana	-0.001708	5,021	-0.001959	5,607
Iowa	-0.001686	2,878	-0.002792	4,312
Kansas	-0.001952	2,592	-0.002742	3,420
Kentucky	-0.001451	3,024	-0.001980	3,807
Louisiana	-0.001014	2,775	-0.001824	3,813
Maine	-0.001892	1,517	-0.002362	1,804
Maryland	-0.001963	4,595	-0.001950	4,572
Massachusetts	-0.001912	5,006	-0.002247	5,768
Michigan	-0.002008	9,330	-0.002276	10,367
Minnesota	-0.002043	5,423	-0.002594	6,625
Mississippi	-0.001392	2,284	-0.001461	2,346
Missouri	-0.001834	5,297	-0.002590	7,047
Montana	-0.002077	1,092	-0.002716	1,346
Nebraska	-0.001555	1,654	-0.002729	2,527
Nevada	-0.001814	1,178	-0.002228	1,375
New Hampshire	-0.001682	1,109	-0.002220	1,391
New Jersey	-0.001732	5,466	-0.002117	6,472
New Mexico	-0.001757	1,581	-0.002017	1,727
New York	-0.001824	12,284	-0.002377	15,325
North Carolina	-0.001231	4,225	-0.001367	4,572
North Dakota	-0.001537	605	-0.002130	759
Ohio	-0.001857	9,338	-0.002332	11,413
Oklahoma	-0.002464	4,517	-0.002751	4,942
Oregon	-0.001941	3,217	-0.002337	3,766
Pennsylvania	-0.001747	10,161	-0.002241	12,498
Rhode Island	-0.001822	930	-0.002427	1,184
South Carolina	-0.001428	2,505	-0.002508	3,662
South Dakota	-0.001219	612	0.001646	738
Tennessee	-0.002210	5,527	-0.002570	6,262
Texas	-0.001836	12,634	-0.002091	13,972
Utah	-0.001964	1,871	-0.003083	2,619
Vermont	-0.001677	665	-0.001786	699
Virginia	-0.002110	6,539	-0.003464	9,915
Washington	-0.002340	6,783	-0.002322	6,739
West Virginia	-0.001790	1,985	-0.001623	1,873
Wisconsin	-0.001793	5,306	-0.002414	6,742
Wyoming	-0.002136	717	-0.002535	809

[1]Use these parameters for: total nonconsumptive users and primary residential users.

Table D-9. a, b, and c Parameters for Calculating Approximate Standard Errors for Expenditures and Days or Trips for Nonconsumptive Users

State	Expenditures			Days or trips		
	a	b	c	a	b	c
United States	0.001215	-282,226	45,885	0.000987	-60,563	52,811
Alabama	0.024139	-9,379	4,098	0.018332	-1,449	3,778
Alaska	0.026812	-8,153	1,170	0.014523	-805	1,206
Arizona	0.023064	-20,364	5,437	0.013842	-6,283	8,922
Arkansas	0.030419	-27,113	3,108	0.021343	-3,154	3,606
California	0.062820	-40,744	20,464	0.083140	-37,154	43,490
Colorado	0.070850	-18,657	5,204	0.056430	-6,763	7,756
Connecticut	0.019390	-11,363	4,382	0.016898	-6,496	6,367
Delaware	0.023965	-4,782	935	0.009040	-629	1,084
Florida	0.020540	-30	29,437	0.001485	-25,490	24,770
Georgia	0.013762	-16,567	9,698	0.058840	-3,549	6,485
Hawaii	0.045890	-2,820	878	0.022950	-735	1,391
Idaho	0.014826	-4,670	1,827	0.009063	-3,202	3,010
Illinois	0.031830	-69,745	17,258	0.003981	-13,077	17,614
Indiana	0.015877	15,202	9,997	0.002404	-6,885	10,423
Iowa	0.016991	-22,437	4,615	0.018967	-2,973	5,811
Kansas	0.025093	-9,399	3,851	0.002322	-3,201	4,962
Kentucky	0.016727	-47,093	7,655	0.023920	-4,865	8,041
Louisiana	0.023500	-32,823	5,830	0.059580	-4,383	5,780
Maine	0.010085	-16,556	3,017	0.001313	-2,978	3,563
Maryland	0.005947	26,331	9,024	0.047920	-7,463	8,233
Massachusetts	0.009778	-4,391	10,512	0.005279	-11,297	12,718
Michigan	0.048560	-69,873	12,523	0.009817	-14,832	19,522
Minnesota	0.022050	-40,965	10,643	0.044920	-7,952	9,931
Mississippi	0.031680	37,625	2,650	0.031717	-2,263	3,602
Missouri	0.043330	-17,567	11,392	0.013076	-24,564	14,369
Montana	0.025931	-3,917	1,783	0.005356	-2,059	2,364
Nebraska	0.024994	54,614	1,058	0.018741	-2,335	3,580
Nevada	0.033870	-16,308	2,314	0.013184	-1,504	2,185
New Hampshire	0.011799	-8,549	2,135	0.012387	-1,752	2,449
New Jersey	0.010069	-45,658	10,664	0.011673	-3,259	8,525
New Mexico	0.038710	15,720	2,553	0.058800	-1,872	2,196
New York	0.018378	-93,452	24,061	0.017948	-6,374	16,002
North Carolina	0.007832	-65,772	9,255	0.013342	-6,894	10,406
North Dakota	0.024253	434	593	0.023215	-734	1,129
Ohio	0.014133	59,639	10,783	0.009514	-29,385	3,110
Oklahoma	0.043254	-43,610	6,312	0.054340	-37,951	13,662
Oregon	0.028490	14,151	5,638	0.010153	-5,199	7,825
Pennsylvania	0.013522	-32,299	17,430	0.019134	-12,423	21,369
Rhode Island	0.033382	-203	1,218	0.009271	-1,475	1,704
South Carolina	0.025928	-9,766	3,216	0.067680	-2,369	4,161
South Dakota	0.045880	-13,835	1,422	0.015271	-3,894	2,242
Tennessee	0.036348	-10,592	5,006	0.011982	-27,873	11,873
Texas	0.036702	-277,947	23,888	0.009839	-31,816	33,326
Utah	0.034840	-2,067	2,771	0.003765	-2,307	3,918
Vermont	0.011607	-5,393	1,249	0.008395	-2,664	1,666
Virginia	0.010021	3,592	8,595	0.016696	-10,043	10,862
Washington	0.019285	59,681	7,549	0.008059	-6,772	12,897
West Virginia	0.017676	894	1,702	0.087620	-2,413	2,289
Wisconsin	0.014365	40,476	8,693	-0.001194	-15,463	13,311
Wyoming	0.014594	-9,350	1,442	0.002206	-1,753	2,011

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