

Appendix **B**

Appendix B. Comparability With Previous Surveys

The 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (FHWAR) was designed to continue the data collection of the 1955-1985 Surveys. While complete comparability between any two surveys cannot be achieved, this appendix compares the major findings of all the surveys and presents trends for the major categories of wildlife-related recreation. These trends were developed to adjust for the differences in the surveys' methodologies and definitions of categories of data collected. The differences are discussed in the following sections under the headings of the year that each survey was conducted.

Trend information is provided in two sections. The first section presents trends in hunting and fishing from 1955 to 1985. The second section presents trends in hunting, fishing, and nonconsumptive wildlife-related recreation from 1980 to 1990. The trend information for the period 1955 to 1985 is based on data from the detailed phases of the seven surveys conducted during that time period. Each had the same recall period, 12 months, for the detailed phase of its data collection. Their data are comparable after definitional differences are reconciled.

The second section presents trends from 1980 to 1990. This trend information is based on data from the screening phases rather than the detailed phases of the three surveys because there was a significant change in methodology used in the detailed phase of the 1991 Survey. The recall period in 1991 was changed from 12 to 4 months to improve the accuracy of the data collected.

Because of this change it is not possible to accurately compare data collected in the detailed phase of the 1991 Survey with that of previous surveys. Instead, trend information for 1980 to 1990 is based on data collected in the screening phases of the the last three surveys. The information is comparable because the same methodology was used. It should be noted that the screening phase information of each survey differs from the information collected in its detailed interview phase and should not be compared. The information from the screening interviews is used to show the relative level of activity from survey to survey and not to provide accurate estimates of actual participation for a particular year. Estimates based on the detailed survey interviews serve that purpose.

The principle characteristics of the 1955-1991 Surveys are summarized in table B-1. This table shows the scope and design of all the surveys.

Table B-1. Major Characteristics of Surveys: 1955 to 1991

Characteristic	1955	1960	1965	1970	1975	1980	1985	1991
Survey design:								
Screening interview mode and population of interest	Combined with detailed phase	Personal interview, 12 years old and older	Personal interview, 9 years old and older	Mail questionnaire, 9 years old and older	Telephone interview, 6 years old and older	Telephone/ personal interview, 6 years old and older	Telephone/ personal interview, 6 years old and older	Telephone/ personal interview, 6 years old and older
Detailed interview mode and population of interest	Personal interview, 12 years old and older	Personal interview, 12 years old and older. Substantial participants ¹	Personal interview, 12 years old and older. Substantial participants	Personal interview, 12 years old and older. Substantial participants ²	Mail questionnaire, 9 years old and older	Personal interview, 16 years old and older	Personal interview, 16 years old and older	Telephone/ personal interview, 16 years old and older. Respondents interviewed three times at 4-month intervals.
Sample sizes:								
Screening phase (households)	20,000	18,000	16,000	24,000	106,294	116,025	102,694	102,804
Detailed phase (individuals):								
Fishing and Hunting	9,328	10,300	6,400	8,700	20,211	30,291	28,011	23,179
Nonconsumptive	(X)	(X)	(X)	(X)	(X)	5,997	26,671	22,723
Response rates:								
Screening phase	(NA)	(NA)	(NA)	(NA)	95 percent	95 percent	93 percent	95 percent
Detailed phase:								
Fishing and Hunting	(NA)	93 percent	(NA)	(NA)	37 percent	90 percent	92 percent	95 percent
Nonconsumptive	(X)	(X)	(X)	(X)	(X)	95 percent	94 percent	95 percent
Level of reporting	National	National	National	National	State and National	State and National	State and National	State and National
Data collection agent	Private contractor	Bureau of the Census	Bureau of the Census	Bureau of the Census	Private contractor	Bureau of the Census	Bureau of the Census	Bureau of the Census

NA Not available.

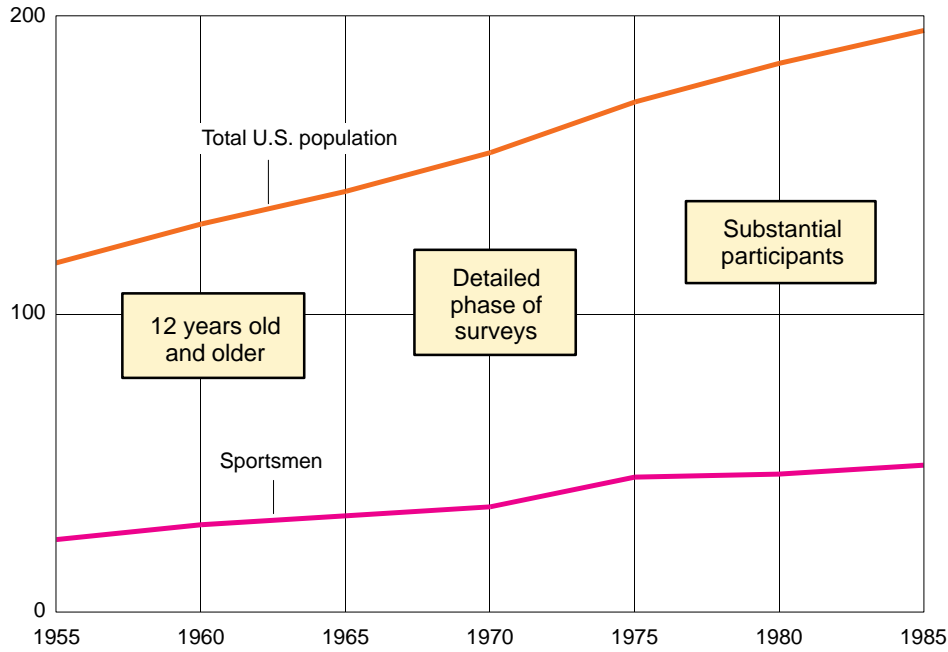
X Not applicable; nonconsumptive interviews were not conducted prior to 1980.

¹ Spent \$5.00 or more or participated 3 days or more during the year.

² Spent \$7.50 or more or participated 3 days or more during the year.

Participation of Sportsmen: 1955-1985

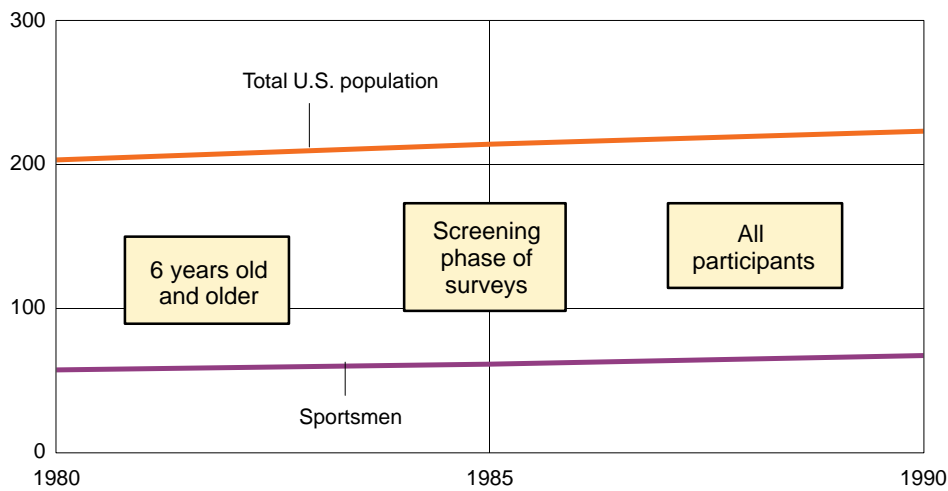
(In millions)



B-3

Participation of Sportsmen: 1980-1990

(In millions)



B-4

Section I.

Trends for 1955 to 1985

1955-1970 Surveys

The 1955-1970 National Surveys included only "substantial participants." Substantial participants were defined as those participants who participated at least 3 days and/or spent at least \$5 (the 1955-1965 Surveys) or \$7.50 (the 1970 Survey) during the surveyed year. Under most circumstances, the surveys may be compared for totals, but the effects of differences should be considered when comparing the details of the surveys. The 1960, 1965, and 1970 National Surveys differed from the 1955 National Survey in classification of expenditures as outlined below.

1. Alaska and Hawaii were not included in the 1955 Survey.
2. Expenditure categories were more detailed in 1970 than they were in earlier surveys.
3. The 1960-1970 classification of some expenditures differs from the 1955 Survey in the following respects:
 - a. "Boats and boat motors" shown under "auxiliary equipment" were included in "equipment, other" in 1955.
 - b. "Entrance and other privilege fees" shown separately were included in "trip expenditures, other" in 1955.
 - c. "Snacks and refreshments" not included with "food" expenditures in the 1960-1970 reports were under "trip expenditures, other" in 1955.

- d. Expenditures on equipment, magazines, club dues, licenses, and other similar items were classified by the one sport activity for which expenditures were chiefly made. In 1955, these expenditures were evenly divided among all the activities in which the sportsman took part.
 - e. Compared with 1955, the 1960-1970 Surveys reported fewer expenditures within the "other" category because selected items were transferred to more appropriate categories.
 - f. Expenditures on alcoholic beverages were reported separately in the 1970 Survey.
 - g. In 1970, definition of a "substantial participant" was changed from one who spent at least \$5 during the year or spent 3 days fishing or hunting to one who spent \$7.50 for the year or spent 3 days fishing or hunting.
4. The number of waterfowl hunters in the 1970 Survey is not comparable with those reported in the 1960 and 1965 Surveys. In 1960 and 1965, respondent sportsmen were not included in the waterfowl hunter total if they reported that they went waterfowl hunting but did not take the trip chiefly to hunt waterfowl. In 1970, all respondents who reported that they had hunted waterfowl during 1970, regardless of trip purpose, were included in the total. The number of hunters who did not take

trips chiefly to hunt waterfowl in 1970 was 1,054,000.

1975 Survey

In contrast to previous surveys which covered substantial participants 12 years old and older, the 1975 Survey based all the estimates on responses from individuals 9 years of age and older and did not select respondents based upon substantial participation as defined above. As a result, individuals who participated fewer than 3 days or spent less than \$7.50 on hunting or fishing were included in the estimates of participants, days of activity, and expenditures.

Categories of hunting and fishing expenditures differed from the previous four surveys in that only major categories were reported. For example, hunting equipment expenditures were not further delineated by subcategory. Similarly, no detail was provided within the category of fishing equipment expenditures. Expenses for "other" items such as daily entrance fees, magazines, club dues, and dogs were categorized as "other" in the 1975 report.

In addition to the above differences the 1975 Survey gathered data on species sought for the favorite hunting and fishing activity. These data replaced the "chiefly" category where hunting or fishing was the primary purpose of the trip or day of activity. Data omitted in the 1975 Survey that were included in previous surveys include the respondents' population density of residence, occupation, and level of education.

1980-1985 Surveys

The 1980 and 1985 Surveys were similar. Each measured participants, rather than substantial participants. Questions were incorporated into the 1980 and 1985 Survey questionnaires to facilitate the construction of categories of data for comparisons with earlier surveys. The use of "chiefly" to delimit primary purpose appeared in the 1970 and prior surveys and its use was continued in the 1980 and 1985 Surveys. The expenditure categories in 1980 and 1985 are similar to the 1970 categories with the addition of fish finders, motor homes, and camper trucks as separate categories. The definition of fishing included the use of nets or seines and spearfishing.

As in the 1970 and 1975 Surveys, the 1980 and 1985 Surveys used a two-phase process to gather information from households and individuals. In the first phase, household respondents were asked to identify each participant 6 years of age and older who resided in their household. In comparison, the 1975 and 1970 Surveys screened households for participants who were 9 years of age and older. In the second phase, the detailed interview phase, conducted in person in 1985, 1980 and 1970 and by mail in 1975, participants were eligible if they were at least 12 years old in 1970, 9 years old for the 1975 Survey, and 16 years old for the 1980 and 1985 Surveys. As a result, the population of hunters and anglers is more narrowly defined in 1980 and 1985 to include individuals 16 years old and older. However, estimates of sportsmen 6 years old and over, 9 years old and over, and 12 years old and over are avail-

able for comparison with past surveys. Detailed expenditures data were not gathered for the 6-15 year-old category in 1980 and 1985.

Trends From Tables B-2 and B-3

Tables B-2 and B-3 show major findings from the first seven national surveys for the number of participants who hunted and fished, the days they spent doing the activities, and their expenditures in 1990 dollars. Where data are available, these tables can be used to assess trends in fishing and hunting from 1955 to 1985.

For the purposes of the tables, the estimates for 1975, 1980, and 1985 were adjusted to conform as closely as possible to past definitions. Therefore, totals in these tables may be different from results in the 1985 report, the 1980 report, or the 1975 report because of the exclusion here of individuals who participated for 2 days or less or spent less than \$11 on fishing or hunting in 1975 and \$15 in 1980 and 1985. Individuals who were younger than 12 years old are also excluded.

The 1975 Survey data were further adjusted in the following ways. Those who fished for anadromous species were divided into freshwater and saltwater participants by counting all individuals who indicated anadromous fishing only in freshwater as freshwater anglers and counting similarly for saltwater anglers. An individual could be counted in both categories. Expenditures were designated as either freshwater or saltwater when the respondent indicated that the activity took place in only one kind of water. For those individuals who fished for anadromous species in both fresh-

water and saltwater, expenditures were apportioned according to the ratio of the days spent in each type of water.

The categories for small game, migratory bird, and other hunting in the 1975 Survey were redefined as small game and waterfowl. All species except ducks and geese were included in small game. Participants, days, and expenditures were determined as follows for waterfowl, and all residual migratory bird participants, days, and expenditures were added to small game. If an individual only hunted for ducks or geese in the migratory bird category, the days and expenditures were tallied as waterfowl. If an individual hunted both ducks and geese, the greater number of days was used as waterfowl hunting days. It was assumed that both ducks and geese were hunted on the same day. If both waterfowl and other migratory birds were hunted by the same individual, expenditures were divided by the ratio of the days.

The 1975 Survey also included waterfowl hunting and days under a separate category of favorite and second favorite activity. The estimate of waterfowl hunting days derived above was subtracted from respondents' answers indicating that waterfowl hunting was either their favorite or second favorite activity. The distribution of the differences was normal with 61 percent being zero. Thus, minimal bias is introduced into the estimated waterfowl hunters or the days of waterfowl hunting by the procedures used to evaluate these data.

The 1980 and 1985 data that needed adjustment were the

categories of small game, migratory bird, and other hunting. Expenditures for small game hunting were calculated as the sum of expenditures for small game, other hunting, and non-waterfowl hunters who hunted for migratory birds. Expenditures for waterfowl hunting were estimated to be that portion of the migratory bird hunting expenditures that was spent by those who went waterfowl hunting.

The 1980 detailed estimates of participants, days, and expenditures were adjusted to account for the exclusion of the 12-15 year-old age group from the detailed interview phase of the 1980 Survey. That age

group had been included in previous surveys. Screening information on the 12-15 year-old age group was available. The proportion of 12-15 year-old sportsmen in 1970 participating in the various types of fishing and hunting was used to allocate 1980 12-15 year-old sportsmen between the various activities. Days of participation were handled in an identical manner. The 1980 estimates of expenditures were increased using the proportion of total expenditures in 1970 that were accounted for by the 12-15 year-old age category. Adjustments were also made to account for the change between 1970 and 1980 in the percentage of the sportsmen between

the ages of 12 and 15. The 1970 Survey was used for making the adjustments because of the similarities between the 1970 and 1980 Survey designs.

Since the 1985 Survey closely followed the 1980 Survey design, adjustments to 1985 estimates paralleled the 1980 adjustments. Small game hunting expenditures were calculated as in 1980. Expenditures for waterfowl hunting were calculated using the percentage of expenditures for migratory bird hunting that was accounted for by waterfowl hunting in 1980. Other adjustments were the same as in 1980.

Table B-2. Anglers and Hunters, by Census Division: 1955 to 1985

(U.S. population 12 years old and older. Numbers in thousands)

Year	Population		Sportsmen (fished or hunted)		Anglers		Hunters	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total, United States								
1955.....	118,366	100	24,917	21.1	20,813	17.6	11,784	10.0
1960.....	131,226	100	30,435	23.2	25,323	19.3	14,637	11.2
1965.....	141,928	100	32,881	23.2	28,348	20.0	13,585	9.6
1970.....	155,230	100	36,277	23.4	33,158	21.4	14,336	9.2
1975.....	171,860	100	45,773	26.6	41,299	24.0	17,094	9.9
1980.....	184,691	100	46,966	25.4	41,873	22.7	16,758	9.1
1985.....	195,659	100	49,827	25.5	45,345	23.2	16,340	8.4
New England								
1955.....	7,919	100	1,224	15.4	1,002	12.7	589	7.4
1960.....	8,349	100	1,368	16.4	1,205	14.4	517	6.2
1965.....	9,256	100	1,650	17.8	1,488	16.0	583	6.3
1970.....	8,652	100	1,579	18.3	1,430	16.5	582	6.7
1975.....	9,910	100	2,004	20.2	1,861	18.8	566	5.7
1980.....	10,205	100	1,974	19.3	1,788	17.5	572	5.6
1985.....	10,554	100	2,058	19.5	1,914	18.1	552	5.2
Middle Atlantic								
1955.....	24,869	100	3,539	14.2	2,811	11.3	1,608	6.5
1960.....	26,493	100	3,432	13.0	2,569	9.7	1,723	6.5
1965.....	27,346	100	3,602	13.2	2,760	10.1	1,631	6.0
1970.....	28,244	100	4,539	16.1	4,504	14.4	1,731	6.1
1975.....	30,449	100	5,919	19.4	5,097	16.7	2,096	6.9
1980.....	30,256	100	5,181	17.1	4,332	14.3	2,001	6.6
1985.....	31,099	100	5,565	17.9	4,820	15.5	1,972	6.3
East North Central								
1955.....	25,733	100	5,489	21.3	4,583	17.8	2,538	9.9
1960.....	26,833	100	6,316	32.5	5,317	19.8	2,985	11.1
1965.....	28,124	100	6,214	22.1	5,336	19.0	2,563	9.1
1970.....	31,550	100	7,284	23.1	6,699	21.2	2,812	8.9
1975.....	32,796	100	9,049	27.6	8,181	24.9	3,392	10.3
1980.....	33,526	100	8,725	26.0	7,891	23.5	2,955	8.8
1985.....	33,747	100	8,973	26.6	8,270	24.5	2,814	8.3
West North Central								
1955.....	9,201	100	2,913	31.7	2,346	25.5	1,534	16.7
1960.....	10,149	100	3,383	33.3	2,855	28.1	1,709	16.8
1965.....	11,681	100	3,678	31.5	3,226	27.6	1,620	13.9
1970.....	12,904	100	4,000	31.0	3,579	27.7	1,783	13.8
1975.....	13,564	100	4,524	33.3	4,089	30.1	1,863	13.7
1980.....	13,826	100	4,770	34.5	4,220	30.5	1,965	14.2
1985.....	14,137	100	5,140	36.4	4,681	33.1	1,971	13.9
South Atlantic								
1955.....	14,336	100	3,223	22.5	2,805	19.6	1,449	10.1
1960.....	17,798	100	4,423	24.9	3,695	20.8	2,045	11.5
1965.....	20,593	100	5,626	27.3	5,054	24.5	1,900	9.2
1970.....	23,539	100	5,461	23.2	5,129	21.8	1,904	8.1
1975.....	27,127	100	7,110	26.2	6,479	23.9	2,494	9.2
1980.....	30,512	100	7,769	25.5	7,086	23.2	2,444	8.0
1985.....	33,636	100	8,721	25.9	8,056	24.0	2,467	7.3
East South Central								
1955.....	7,959	100	1,963	24.7	1,665	20.9	989	12.4
1960.....	9,277	100	2,778	29.9	2,207	23.8	1,510	16.3
1965.....	9,652	100	2,587	26.8	2,201	22.8	1,294	13.4
1970.....	9,862	100	2,660	27.0	2,464	25.0	1,162	11.8
1975.....	10,798	100	3,007	27.8	2,689	24.9	1,355	12.5
1980.....	11,771	100	3,614	30.7	3,173	27.0	1,567	13.3
1985.....	12,364	100	3,671	29.7	3,308	26.8	1,441	11.7

Continued

Table B-2. Anglers and Hunters, by Census Division: 1955 to 1985—Continued

(U.S. population 12 years old and older. Numbers in thousands)

Year	Population		Sportsmen (fished or hunted)		Anglers		Hunters	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
West South Central								
1955.....	10,250	100	2,560	25.0	2,237	21.8	1,165	11.4
1960.....	11,837	100	3,666	31.0	3,133	26.5	1,750	14.8
1965.....	12,724	100	3,713	29.2	3,278	25.8	1,571	12.3
1970.....	14,624	100	4,380	30.0	4,006	27.4	1,918	13.1
1975.....	16,628	100	5,781	34.8	5,267	31.7	2,563	15.4
1980.....	19,136	100	5,862	30.6	5,136	26.8	2,456	12.8
1985.....	21,184	100	6,418	30.3	5,704	26.9	2,572	12.1
Mountain								
1955.....	4,529	100	1,369	30.2	1,112	24.6	796	17.6
1960.....	5,222	100	1,646	31.5	1,372	26.3	1,120	21.4
1965.....	5,029	100	1,565	31.1	1,261	25.1	988	19.6
1970.....	5,656	100	2,044	36.1	1,769	31.3	980	17.3
1975.....	7,576	100	2,570	33.9	2,252	29.7	1,159	15.3
1980.....	9,160	100	2,903	31.7	2,500	27.3	1,268	13.8
1985.....	10,215	100	3,128	30.6	2,765	27.1	1,241	12.1
Pacific								
1955.....	13,570	100	2,637	19.4	2,252	16.6	1,116	8.2
1960.....	15,268	100	3,422	22.4	2,971	19.5	1,279	8.4
1965.....	17,523	100	4,246	24.2	3,744	21.4	1,433	8.2
1970.....	20,199	100	4,332	21.4	4,030	20.0	1,466	7.3
1975.....	23,012	100	5,811	25.2	5,386	23.4	1,607	7.0
1980.....	26,299	100	6,168	23.5	5,747	21.9	1,531	5.0
1985.....	38,725	100	6,154	21.4	5,829	20.3	1,310	4.6

Note: These estimates are based on the detailed phases of the seven National Surveys and should not be compared with the estimates from the screening phases which are used for tables B-4 and B-5.

Table B-3. Comparison of Major Findings of the National Surveys: 1955 to 1985

(U.S. population 12 years old and older. Numbers in thousands)

Sportsmen, expenditures, and days	1955	1960	1965	1970	1975	1980	1985
Total sportsmen	24,917	30,435	32,881	36,277	45,773	46,966	49,827
Anglers	20,813	25,323	28,348	33,158	41,299	41,873	45,345
Freshwater	18,420	21,677	23,962	29,363	36,599	35,782	39,122
Saltwater	4,557	6,292	8,305	9,460	13,738	11,972	12,893
Hunters	11,784	14,637	13,583	14,336	17,094	16,758	16,340
Small game	9,822	12,105	10,576	11,671	14,182	12,496	11,130
Big game	4,414	6,277	6,566	7,774	11,037	11,047	12,576
Waterfowl	1,986	1,955	1,650	2,894	4,284	3,177	3,201
Expenditures ¹	13,904,225	17,010,944	18,282,320	23,925,058	40,730,094	42,094,416	51,101,515
Anglers	9,336,002	11,882,891	12,137,086	16,706,477	28,656,715	28,521,304	34,731,608
Freshwater	6,951,447	9,117,627	8,819,330	12,580,446	21,138,064	20,321,023	23,014,603
Saltwater	2,384,556	2,765,259	3,317,773	4,126,031	7,518,651	6,807,288	8,737,535
Hunters	4,568,222	5,128,045	4,651,589	7,218,581	12,073,379	13,185,436	12,461,852
Small game	2,409,399	3,206,537	2,552,606	3,185,841	5,519,441	4,068,112	2,846,575
Big game	1,579,704	1,526,585	1,737,452	3,209,185	5,168,708	6,876,092	6,494,911
Waterfowl	579,119	394,927	361,527	823,555	1,385,230	934,186	951,728
Days	566,870	658,308	708,578	909,876	1,459,551	1,300,983	1,415,379
Fishing	397,447	465,769	522,759	706,187	1,058,075	952,420	1,064,986
Freshwater	338,826	385,167	426,922	592,494	890,576	788,392	895,027
Saltwater	58,621	80,602	95,837	113,694	167,499	164,040	171,055
Hunting	169,423	192,539	185,819	203,689	401,476	348,543	350,393
Small game	118,630	138,192	128,448	124,041	269,653	225,793	214,544
Big game	30,834	39,190	43,845	54,536	100,600	117,406	135,447
Waterfowl	19,959	15,158	13,526	25,113	31,223	26,179	25,933

Note: These estimates are based on the detailed phases of the seven National Surveys and should not be compared with the estimates from the screening phases which are used for tables B-4 and B-5.

¹ In 1990 dollars.

Trends Section II.

Trends for 1980 to 1990

This trends section covers the period from 1980 to 1990. The information is based primarily on the data collected in the screening phases of the 1980, 1985 and 1991 Surveys. These surveys used similar methodologies for screening purposes and collected comparable information. The screening phases were conducted in January 1981, January 1986, and January 1991. Respondents were asked to report wildlife-associated recreation participation for the previous 12 months. The types of activities covered were the same for all Surveys with one difference. The 1991 Survey covered only primary nonconsumptive wildlife-related recreation participation and did not include secondary nonconsumptive participation. Therefore, the trend information is only for participation in primary nonconsumptive activities. An example of a secondary nonconsumptive activity is incidentally observing wildlife while pleasure driving.

A description of the population covered, information collected, and the method of developing trend information for the period from 1980 to 1990 is presented below.

1980-1991 Surveys

The first trends section covers the survey years 1955-1985 and uses the participation definitions from the initial surveys, i.e., participants that are "substantial" and 12 years of age and older. The last three surveys have focused on participants 16 years of age and older who participated any number of days and spent any amount

of money on wildlife-related recreation. Also, the earlier surveys used different categories for the types of fishing and hunting: freshwater and saltwater fishing, big game, small game, and waterfowl hunting. In the 1980, 1985, and 1991 Surveys, the fishing categories were divided into Great Lakes, other freshwater, and saltwater fishing, and the hunting categories were divided into big game, small game, migratory bird and other animals. Rather than continue with the older participant and type of activity definitions in the trends tables, the more up-to-date definitions are used in tables B-4 through B-6 for the years 1980 through 1990.

The 1991 Survey sportsmen's questionnaire was based on the 1985 questionnaire, with most of the questions the same for the two surveys. Expenditure and day averages from the detailed phases were used in the trends computations, and the differences between the 1985 and 1991 questionnaires that bear on these calculations are outlined below.

1. The 1985 respondents were asked to estimate their days of hunting and fishing participation by sub-state region, while the 1991 respondents gave their estimates by state.
2. The 1985 respondents estimated their total annual trip-related expenditures, then divided the total among the states they visited. The 1991 respondents estimated their trimester trip-related expenditures by individual state.

3. The 1985 hunting equipment expenditure list differed from the 1991 list in that it included special hunting clothes, cases and carriers for equipment or game, and hunting knives, while the 1991 list included these categories in "other."
4. The 1985 fishing trip-related expenditure list differed from the 1991 list in that it included live bait, cut bait, and prepared baits as separate categories and the 1991 list lumped them together. The 1991 list included boat insurance while the 1985 list did not.
5. The 1985 fishing equipment expenditure list included, among other things, fly rods, other rods and fishing poles, rod making component parts, fly reels, other reels, lines (not over 130 pound test) and fly lines, lines over 130 pound test, artificial lures and baits, artificial flies and dressing for flies or lines, cast nets, minnow traps and seines and other seines or nets, minnow buckets and other portable bait containers, fishing hook disgorgers, scales and knives, depth finders and fish finders and other sonar devices with flasher display only, other depth finders with graph or meter or digital or other display, other electronic fishing devices, rod holders and rod belts, ice fishing tip-ups and tilts, other ice fishing equipment items, spear fishing spears and spear guns and spear tips, other spearfishing equipment, fish fighting chairs and outriggers and downriggers, and fishing vests and other. The 1991

fishing equipment expenditure list did not go into similar detail, asking for rods and poles and rod making components, reels, lines, artificial lures and flies and baits and dressing for flies or lines, minnow traps and seines and bait containers, depth finders and other electronic fishing devices, ice fishing equipment, spearfishing equipment, and all other. All other items on the two lists were identical.

6. The special hunting and fishing equipment expenditure lists for the two survey years also differed. The 1985 Survey asked for, among other things, inboard boat, outboard boat, outboard motor, electric trolling motor, other boat accessories, boat trailer or hitch, travel or tent trailer, pickup or camper or van, motor home, trail bike or dune buggy or 4x4 vehicle or 3-wheeler, snowmobile, ice chest, and other. The 1991 Survey questionnaire included bass boat, other type of motor boat, boat motor or boat trailer or hitch or other boat accessories, pickup or camper or van or travel or tent trailer or motor home, trail bike or dune buggy or 4x4 vehicle or 3-wheeler or snowmobile, and other including ice chest. The rest of the two lists were identical.
7. The auxiliary hunting and fishing equipment expenditure lists for the two survey years had different entries. The 1985 list included, among other things, snowshoes or skis, foul weather gear, other special fishing or hunting clothes such as jackets, rubber boots or

waders, maintenance and repair of equipment not including boats or vehicles, fishing or hunting boots, and other. The 1991 list included special fishing or hunting clothing or foul weather gear or boots or waders and all other.

Trends From Tables B-4, B-5, and B-6

The 1980 and 1985 Surveys required respondents to remember their recreation activities for the past year; the 1991 Survey went back to the respondents three times during the year to get their activity information. This change in the recall period was due to a study of the effect of the respondent recall length on survey estimates. The FHWR Survey's recall study showed that there are significant differences in survey results between annual recall surveys and shorter recall surveys. Even if everything else is held constant, such as questionnaire content and sample design, just changing the respondents' recall period results in different estimates for the same phenomenon. A straight comparison without any adjustment of estimates from surveys with different recall requirements gives misleading trends data.

The 1991 FHWR Survey's recall study also reveals that the level of recall bias varies for different types of fishing and hunting participation and expenditure. For example, annual recall respondents in the FHWR recall study gave an estimate of average annual days of saltwater fishing that was 46 percent higher than the trimester recall estimate, while the annual recall estimate of

average annual saltwater fishing trips was 30 percent higher than the trimester recall estimate. This is evidence against a single "correction factor" for all survey estimates when calculating trends data from surveys using different recall periods. Applying a correction factor to estimates from surveys with different recall requirements is not feasible.

The above demonstrates that a reliable trends analysis needs to use data compiled from surveys in which the important elements (e.g., the sample design, the questions asked, the data weighting procedure, and the recall period) vary little. For the 1980, 1985, and 1991 Surveys, the screening interviews asked an adult household respondent (except for 20 percent of the 1991 sample, in which every member of the household 16 years old and older answered for himself or herself and an adult household respondent answered for members of the household 6-15 years of age) the past year's wildlife-related recreation activity of all household members 6 years old and older. These data bases supply information that was similarly gathered and compiled. The presentation of trends data in tables B-4 through B-6 uses the screening interviews of the three surveys to arrive at estimates of recreation participation.

The strength of using the past three survey's screening interviews for the trends analysis is that they were all done in approximately the same way, making the data comparable. One significant difference, however, is that the 1980 and 1985 screening surveys cover the years 1980 and 1985, while the

1991 screening survey covers the year 1990. This is because the annual recall of the 1980 and 1985 Surveys allowed the respondents to be screened into the detailed phase after the year was over, while the 1991 trimester interviews required respondents to be screened into the detailed phase during the first part of the year 1991 before their activity took place. The data from the screening interviews are subject to similar biases such as (1) the data come from household respondents rather than the self-response of participants and (2) annual recall was used in each screening interview. These biases mean the resulting estimates are not as accurate as the estimates from the second (detailed) phase of each survey, in which the hunters, anglers, and non-consumptive participants themselves were interviewed about their activity over the surveyed year (with trimester recall, in the case of the 1991 Survey). However, the screening interview estimates are good indicators of relative levels of activity,

while not being as accurate as the estimates for that year's activity which were derived from the detailed phase of the surveys.

The hunting, fishing, nonresidential, and residential nonconsumptive total participation estimates came directly from the 1980, 1985, and 1991 screening data files. The type of hunting and fishing participation estimates were calculated by using their proportions of total hunting and fishing observed in the detailed phases of the 1980, 1985, and 1991 Surveys. The expenditure and day information from the screening files were not used in the expenditure and day sections of table B-4 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 the expenditure and day estimates were calculated by multiplying

the participation estimates by the average expenditure and day estimates from the 1980 and 1985 detailed phases and from the 1991 annual recall phase. The 1991 annual recall phase was a survey independent of the 1991 trimester recall survey. During the last interview phase of the 1991 trimester interviewing a sample of sportsmen was interviewed regarding their 1991 activity. This survey used annual recall and supplied national-level estimates, not state-level estimates as the trimester survey did. 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 all three 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 calculation.

Table B-4. Comparison of Major Findings of the National Surveys: 1980 to 1990

(Sportsmen and nonconsumptive participation estimates are for people 6 years old and older; expenditures and days are for participants 16 years old and older. Numbers in thousands)

Participants, expenditures, and days	1980	1985	1990
Total sportsmen	59,354	63,390	69,491
Anglers	54,235	58,889	65,128
Great Lakes	3,796	4,711	4,559
Other freshwater	45,557	48,878	55,359
Saltwater	15,728	17,667	16,282
Hunters	18,761	18,237	18,783
Big game	12,757	13,678	14,463
Small game	13,320	11,854	10,143
Migratory birds	5,628	5,471	3,944
Other animals	2,814	3,100	1,878
Expenditures ¹	40,809,501	48,666,616	63,273,830
Anglers	27,198,301	33,381,510	42,532,506
Great Lakes	1,008,369	1,877,233	2,249,556
Other freshwater	12,101,789	20,932,773	25,763,285
Saltwater	3,904,732	8,807,404	9,782,588
Hunters	12,628,883	10,944,749	11,737,921
Big game	4,275,583	6,231,064	5,508,717
Small game	2,553,690	2,090,146	1,785,809
Migratory birds	959,213	1,198,233	773,496
Other animals	379,688	424,339	292,987
Days	1,168,141	1,308,326	1,282,376
Anglers	848,960	979,566	975,422
Great Lakes	38,623	44,784	50,316
Other freshwater	677,464	774,320	960,014
Saltwater	147,720	153,934	154,008
Hunters	319,181	328,760	306,954
Big game	114,230	123,280	157,572
Small game	143,124	128,220	101,299
Migratory birds	40,320	39,448	25,067
Other animals	37,800	47,498	28,985
Total nonconsumptive participants	121,125	115,269	109,472
Residential	115,788	107,022	100,750
Nonresidential	22,972	34,200	37,545

Note: These estimates come from the screening phases of the three National Surveys, and are only for use as trends measures. Estimates from the screening interviews are not as accurate as estimates from the detailed interviews in measuring the surveyed year's wildlife-associated recreation activity.

¹ In 1990 dollars.

Table B-5. Anglers and Hunters, by Census Division: 1980 to 1990

(U.S. population 6 years old and older. Numbers in thousands)

Year	Total population	Sportsmen	Anglers	Hunters
Total, United States				
1980.....	205,255	59,354	54,235	18,761
1985.....	216,318	63,390	58,889	18,237
1990.....	225,494	69,491	65,128	18,783
New England				
1980.....	11,230	2,551	2,364	630
1985.....	11,528	2,660	2,518	582
1990.....	11,826	2,963	2,859	581
Middle Atlantic				
1980.....	33,362	6,579	5,699	2,188
1985.....	34,021	7,105	6,368	2,091
1990.....	34,110	7,690	6,997	2,119
East North Central				
1980.....	37,439	11,228	10,409	3,249
1985.....	37,531	11,453	10,737	3,083
1990.....	38,276	12,416	11,601	3,530
West North Central				
1980.....	15,384	6,048	5,494	2,223
1985.....	15,717	6,429	5,964	2,211
1990.....	16,115	6,641	6,191	2,181
South Atlantic				
1980.....	33,795	9,863	9,175	2,786
1985.....	36,849	10,944	10,277	2,787
1990.....	39,587	12,159	11,558	2,794
East South Central				
1980.....	13,207	4,556	4,109	1,815
1985.....	13,734	4,585	4,199	1,641
1990.....	13,974	5,234	4,859	1,788
West South Central				
1980.....	21,495	7,213	6,492	2,815
1985.....	23,817	8,063	7,352	2,981
1990.....	24,184	8,810	8,268	2,750
Mountain				
1980.....	10,273	3,566	3,160	1,392
1985.....	11,464	3,974	3,599	1,408
1990.....	12,288	4,288	3,903	1,398
Pacific				
1980.....	29,072	7,750	7,333	1,663
1985.....	31,659	8,177	7,873	1,452
1990.....	35,134	9,291	8,890	1,641

Note: These estimates come from the screening phases of the three National Surveys, and are only for use as trends measures. Estimates from the screening interviews are not as accurate as estimates from the detailed interviews in measuring the surveyed year's wildlife-associated recreation activity.

Table B-6. Nonconsumptive Participants, by Census Division: 1980 to 1990

(U.S. population 6 years old and older. Numbers in thousands)

Year	Total population	Total nonconsumptive	Residential	Nonresidential
Total, United States				
1980	205,255	121,125	115,788	22,972
1985	216,318	115,269	107,022	34,200
1990	225,494	109,472	100,750	37,545
New England				
1980	11,230	7,557	7,355	1,166
1985	11,528	6,909	6,557	1,842
1990	11,826	6,367	5,968	2,113
Middle Atlantic				
1980	33,362	19,732	19,166	3,410
1985	34,021	16,578	15,498	4,803
1990	34,110	14,831	13,820	4,784
East North Central				
1980	37,439	25,107	24,202	4,567
1985	37,531	22,769	21,245	6,853
1990	38,276	21,030	19,701	6,915
West North Central				
1980	15,384	9,787	9,334	2,025
1985	15,717	9,459	8,724	3,131
1990	16,115	9,534	8,806	3,381
South Atlantic				
1980	33,795	19,925	19,273	3,147
1985	36,849	19,146	18,179	4,592
1990	39,587	19,103	17,830	5,881
East South Central				
1980	13,207	7,628	7,417	987
1985	13,734	7,100	6,729	1,558
1990	13,974	6,904	6,451	2,053
West South Central				
1980	21,495	11,375	10,833	1,981
1985	23,817	11,386	10,612	3,081
1990	24,184	10,526	9,687	3,185
Mountain				
1980	10,273	5,640	5,062	1,715
1985	11,464	6,592	5,791	2,813
1990	12,288	6,471	5,603	3,021
Pacific				
1980	29,072	14,374	13,147	3,974
1985	31,659	15,330	13,686	5,529
1990	35,134	14,705	12,882	6,211

Note: These estimates come from the screening phases of the three National Surveys, and are only for use as trends measures. Estimates from the screening interviews are not as accurate as estimates from the detailed interviews in measuring the surveyed year's wildlife-associated recreation activity.