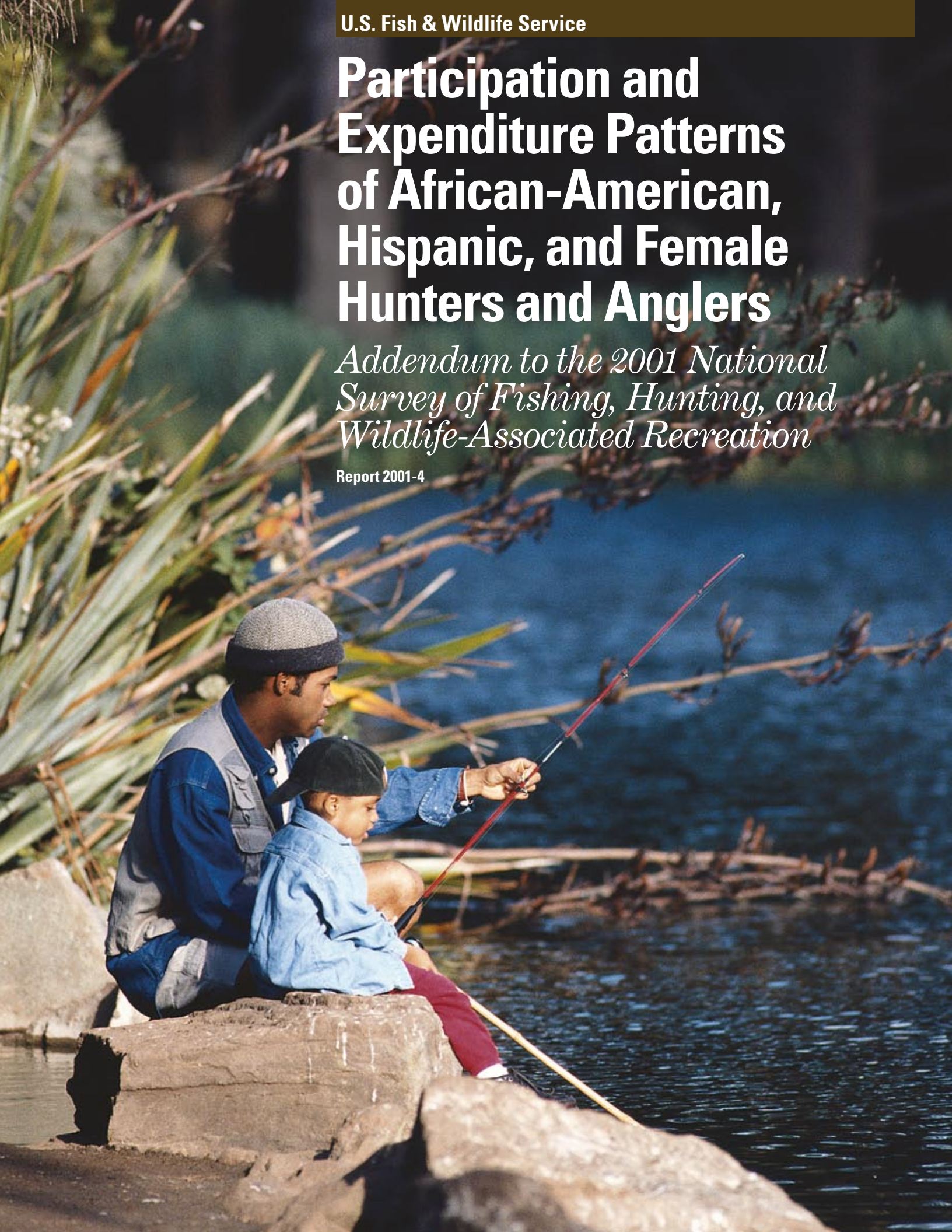


Participation and Expenditure Patterns of African-American, Hispanic, and Female Hunters and Anglers

*Addendum to the 2001 National
Survey of Fishing, Hunting, and
Wildlife-Associated Recreation*

Report 2001-4



Participation and Expenditure Patterns of African-American, Hispanic, and Female Hunters and Anglers

*Addendum to the 2001 National
Survey of Fishing, Hunting, and
Wildlife-Associated Recreation*

Report 2001-4



May 2004

Erin Henderson
U.S. Fish and Wildlife Service
Division of Economics
Arlington VA

This report is intended to complement the National and State reports from the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. The conclusions are the authors and do not represent official positions of the U.S. Fish and Wildlife Service.

Contents

Introduction	3
Hunting	4
Overview	4
Hunting Participation	4
Regional Distribution of Hunters	5
Hunting Participation Levels	5
Hunting Expenditures	6
Hunting on Private and Public Land	6
Types of Hunting and Selected Game	7
Female Hunters	8
Female's Hunting Participation	8
Female Hunters' Participation Levels (Days & Trips)	9
Female's Hunting Expenditures	12
Female Hunting on Private and Public Land	14
Hunting Trends 1991, 1996 & 2001	18
Fishing	19
Overview	19
Fishing Participation	19
Regional Distribution of Anglers	21
Fishing Avidity & Expenditures	22
Types of Fishing and Selected Species	23
Female, African American & Hispanic Anglers	25
<i>Participation Levels (Days & Trips)</i>	25
<i>Fishing Expenditures</i>	27
Fishing Trends 1991, 1996, & 2001	31
Participation Models for Hunting & Fishing Activities	32
Hunting Participation Model	33
Fishing Participation Model	34
Summary	35
Appendix A: Sample Sizes	36

Introduction

Since the U.S. Fish and Wildlife Service began tracking the demographics of hunters and anglers in 1955, participation rates of females and minorities have consistently been below the national averages for hunting and fishing activities. This trend is becoming more significant to the future of hunting and fishing due to the changing demographics of the United States.

According to U.S. Census projections, Hispanic and African-American populations are growing at a faster rate than the rest of the American population. In 2001, the Nation's Hispanic population totaled 38.7 million, a 73 percent increase since 1990. Furthermore, 1 in 8 Americans were Hispanic in 2001. In 2030, almost 1 in 5 Americans will be Hispanic. In 2001, the Nation's African-American population totaled 38.3 million, a 28 percent increase since 1990. Today 1 in 8 Americans are of African-American descent, a ratio that will continue to 2030. Females are also under-represented in hunting and fishing. Although females comprise 51 percent of the population (which is expected to remain constant through 2030), their participation in hunting and fishing is far below the national average.

This report highlights differences among select low participation groups in terms of participation rates, geographical distribution, participation levels (days and trips per year), and associated expenditures. It also reports the relative usage of private or public land hunting, types of hunting and fishing, and species sought. In addition to descriptive statistics, the report concludes with an empirical model to determine the probability of an individual's decision to hunt or fish.

The descriptive statistics of this report are divided into a hunting section and a fishing section. Each section compares all anglers to the participation rates, participation levels, expenditures, and hunting and fishing preferences for African-Americans, Hispanics, and females. At the end of the hunting section, females' participation and



Mike Hemming/USFWS

expenditures for hunting activities are further analyzed by selected demographic characteristics. Due to small sample sizes, this further analysis is not provided for African-American or Hispanic hunters. However, the larger sample sizes for fishing activities provide adequate data to analyze each subpopulation in this demographic detail in the fishing section. Appendix A shows sample sizes.

All reported data are from the “2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation” and represent participation and expenditures for the calendar year 2001 of persons age 16 years and older. The data for the total population of hunters and anglers include all subpopulations (henceforth referred to as ‘all hunters’ or ‘all anglers,’ respectively). Data for African-Americans include all persons who identified themselves as Black or African-American in the Survey. This includes all African-American participants who are male or female and those who identified themselves also as Hispanic. Likewise, the Hispanic category includes persons

of both sexes and of any race. The female category includes all races.

The 2001 survey was conducted for the U.S. Fish and Wildlife Service by the U.S. Census Bureau. The survey was conducted in two phases. First, a screening interview was conducted to identify wildlife-related recreationists. Second, multiple interviews were conducted to collect detailed information on participation and expenditures for persons 16 years of age and older. The U.S. Census Bureau collected the data primarily by telephone; respondents who could not be reached by telephone were interviewed in person. The response rate was 75 percent for the screen phase and 88 percent for the detailed sportsmen phase. Refer to the *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*¹ for more detailed information on the methods of data collection.

¹This document is available on the U.S. Fish and Wildlife Service webpage: <http://federalaid.fws.gov/surveys/surveys.html>.

Hunting

Overview

Table 1 highlights the total number of hunting participants, days and trips, and trip-related and equipment expenditures for African-American hunters, Hispanic hunters, female hunters, and the total population of hunters. Females were the largest subpopulation, and spent the most money, a combined total of \$492 million on hunting equipment and trip-related expenditures. Hispanic hunters spent more on average for hunting than the other subpopulations; and in the case of trip-related expenditures, Hispanic hunters spent more than the national average for all hunters. African-American hunters spent more days hunting and took more hunting trips per year on average than the other subpopulations.

Hunting Participation

Hunting participation rates are calculated by dividing the number of hunters in a particular subgroup by the total population in that subgroup. The subgroup population in the U.S. is determined by using the data from the screening sample.

Figure 1 reveals the U. S. hunting participation rates for persons age 16 and over for the total population, African-Americans, Hispanics, and females. Hunting participation is not consistent across subgroups. The participation rates of the African-Americans, Hispanics, and females were much lower than the total population. While about 6 percent of the total population hunt, only 2 percent of Hispanics hunt, 1 percent of African-Americans hunt, and 1 percent of females hunt.

Table 1. Hunters, Days, Trips and Expenditures: 2001

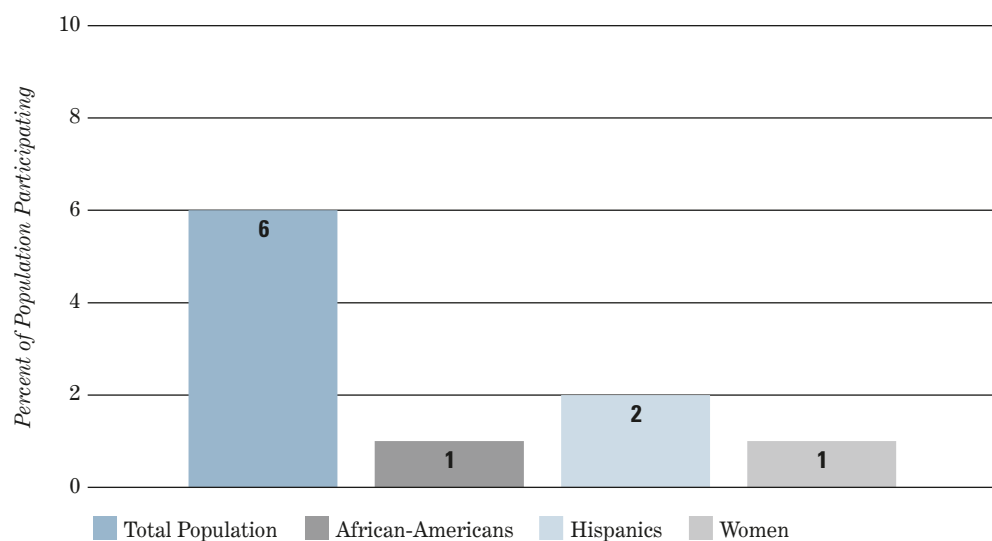
(Includes hunters 16 years of age and older. Numbers in thousands.)

	All Hunters	African-American Hunters	Hispanic Hunters	Female Hunters
Hunters	13,034	288	428	1,189
Days of Hunting	228,367	5,382	5,139	14,068
Mean Days of Hunting	18	19	12	12
Trips	200,124	4,431	3,337	11,927
Mean Hunting Trips	16	16	8	10
Total Hunting Expenditures	\$11,016,945	\$213,300	\$399,379	\$491,833
Trip Expenditures*	\$5,252,391	\$106,593	\$236,530	\$188,237
Mean Trip Expenditures	\$407	\$374	\$552	\$164
Equipment Expenditures**	\$5,764,554	\$106,707	\$162,849	\$303,596
Mean Equipment Expenditures	\$442	\$370	\$380	\$255

*Trip-related expenditures include food, drink, lodging, public and private transportation, guide fees, pack trip or package fees, public and private land use access fees, equipment rental, boating costs, and heating and cooking fuel.

**Equipment expenditures consist of rifles, shotguns, other firearms, ammunition, bows and arrows, telescopic sights, decoys, hunting dogs and associated costs. Also included are auxiliary equipment such as camping equipment, binoculars, special hunting clothing, processing and taxidermy costs. Excluded from equipment expenditures are special equipment purchases such as boats, campers, trucks, and cabins.

Figure 1. Participation Rates for Hunting

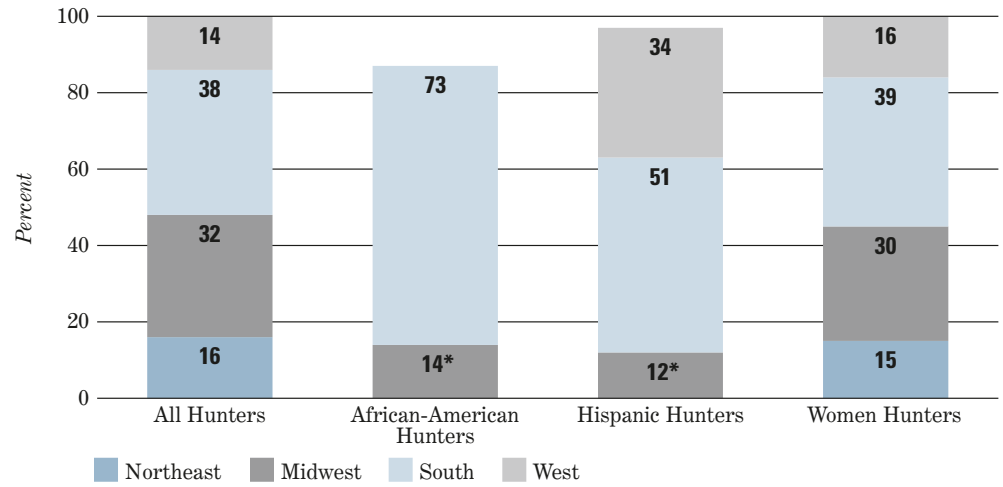


Regional Distribution Of Hunters

The regional distribution of hunters illustrates where hunting generally occurs in the U.S. With this information, we are better equipped to understand where pressure on game and hunting resources may occur.

Figure 2 shows the distribution of hunter subpopulations throughout the country. The majority of African-American hunters live in the South (73 percent). The largest regional population of Hispanic hunters and female hunters also live in the South (51 percent and 39 percent, respectively). Sample sizes for African-American hunters were too small to report data reliably for the Northeast and West regions. Samples sizes were also too small for Hispanic hunters in the Northeast region.

Figure 2. Where Do They Live? Regional Distribution of Hunters



*Estimate based on a small sample size. African-American and Hispanic hunters do not sum to 100 because some samples were too small to report.

Hunting Participation Levels

In addition to data regarding the number of people hunting, data about the frequency of hunting also presents valuable information for resource management.

Figures 3 and 4 show the mean annual hunting days and mean annual hunting trips for each population group. The national participation average for all hunters is 18 days and 15 trips (Figures 3 and 4). Of the subpopulations, African-Americans hunted nearly 50 percent more (19 days) than did Hispanics (12 days) and females (12 days). The same pattern continues for the average number of hunting trips. African-American hunters took the most hunting trips (16 trips), followed by females (10 trips) and Hispanics (8 trips).

Figure 3. Mean Days of Hunting

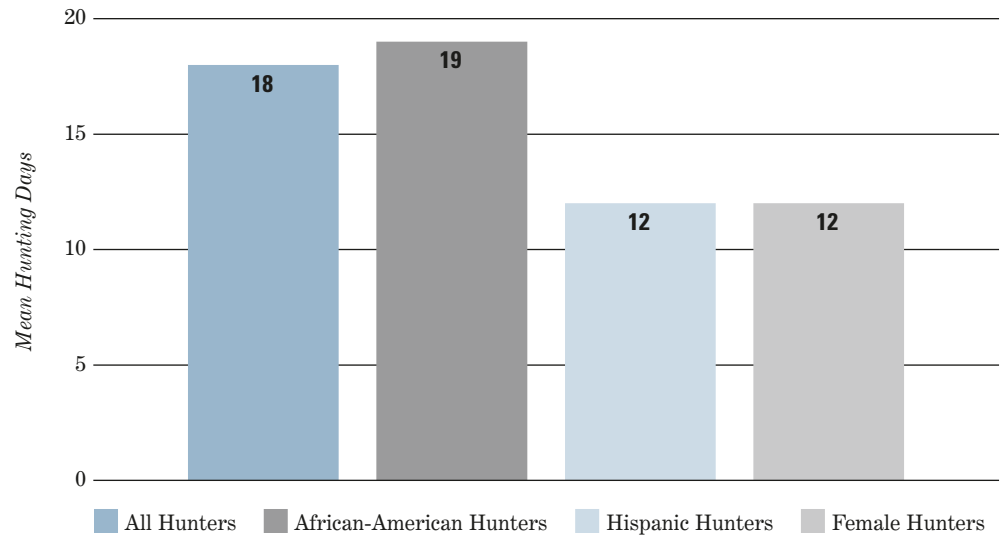
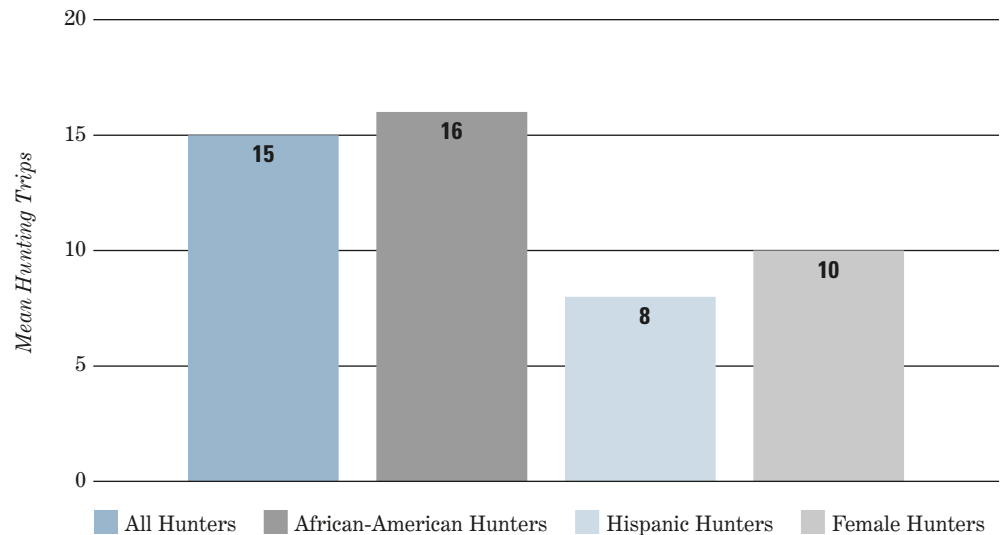


Figure 4. Mean Hunting Trips



Hunting Expenditures

Hunting expenditures are divided into two categories: trip-related expenditures² and equipment expenditures.³ Figure 5 illustrates a comparison of mean trip expenditures for hunters. Hispanics spent considerably more on average (\$552) for hunting trips than all hunters (\$403). The other subpopulations spent less on average than all hunters: African-Americans spent \$373 per year and females spent the least, \$163.

Average spending for hunting equipment is shown in Figure 6. In this case, each of the subpopulations average less than the national average for all hunters (\$442). Of the subpopulations, Hispanics again spent the most (\$380), while African-Americans spent \$370 and females spent \$255.

Hunting on Private and Public Land

The number of people hunting on private and public land reveals hunting choices and levels of resource use. Figures 7 and 8 show, respectively, the percentage of each group that hunt on private land and the percentage of each group that hunt on public land. Typically, more hunters hunt on private land than on public land although many hunt on both. At least 68 percent of each subpopulation hunt on private land. A far greater percentage of African-American hunters hunt on private land (84 percent) than on public land (32 percent). Female hunters also favor private land hunting (80 percent) versus public land hunting (28 percent). In contrast, the margin between private land (68 percent) and public land (48 percent) for Hispanic hunters is much smaller.

²Trip-related expenditures include food, drink, lodging, public and private transportation, guide fees, pack trip or package fees, public and private land use access fees, equipment rental, boating costs, and heating and cooking fuel.

³Equipment expenditures consist of firearms, ammunition, bows and arrows, telescopic sights, decoys, hunting dogs and associated costs. Also included are auxiliary equipment such as camping equipment, binoculars, special hunting clothing, processing and taxidermy costs. Excluded from equipment expenditures are special equipment purchases such as boats, campers, trucks, and cabins.

Figure 5. Mean Trip Expenditures for Hunters

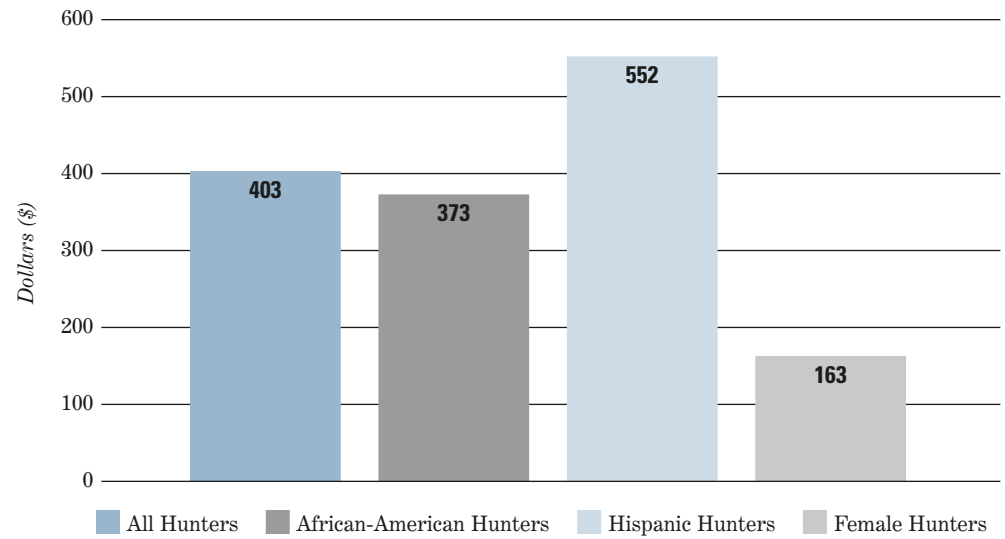


Figure 6. Mean Equipment Expenditures for Hunters

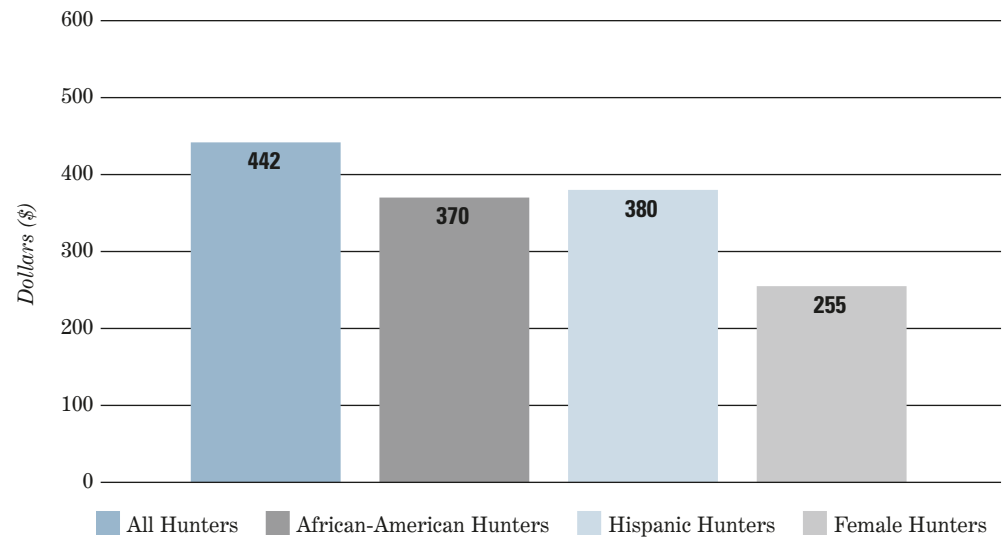
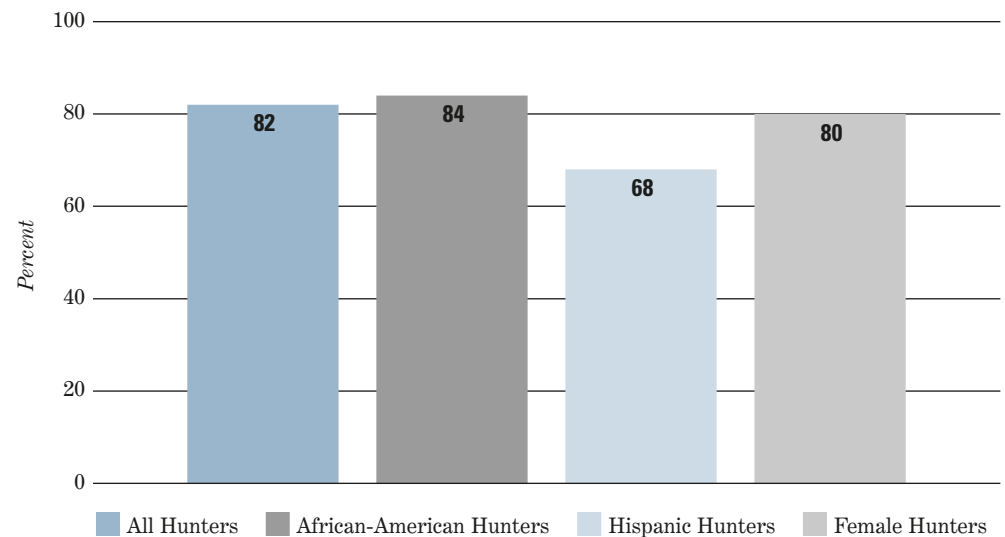


Figure 7. Hunters Hunting on Private Land



Types of Hunting and Selected Game

To understand better the needs of African-American, Hispanic, and female hunters, it is helpful to know in what kind of hunting they participate and which type of game they hunt. Figure 9 shows the percentage of hunters that participate in big game hunting, small game hunting, migratory bird hunting, and other animal hunting.⁴ Figure 10 depicts the percentage of hunters that hunt selected game. These game were selected because they were the most sought after species in 2001.

In general, female hunters follow the national trend for all hunters with 83 percent participating in big game hunting, fewer in small game hunting (27 percent), and fewer still pursuing migratory birds (12 percent) and other animals (4 percent). Similar to all hunters, deer is the most popular type of game for females (76 percent).

For Hispanic hunters, big game hunting is far more popular than other types of hunting. Seventy-five percent of Hispanic hunters hunt big game in comparison to 29 percent hunting small game, 35 percent hunting migratory birds, and 9 percent hunting other animals. Consistent with these findings, 67 percent of Hispanic hunters hunt deer and only 10 percent hunt rabbit. Estimates for hunting “other animals,” wild turkey, squirrel, and rabbit, are based on small sample sizes.

African-American hunters hunt small game (69 percent), which is considerably more than the general hunting population (42 percent). This preference for small game is reflected in their high participation in rabbit hunting (45 percent) and squirrel hunting (37 percent), which is greater than for all other groups of hunters. The sample size for wild turkey was too small to report reliable estimates.

⁴Other animals include coyotes, crows, foxes, groundhogs, prairie dogs, raccoons, and similar animals. Other animals may be classified as unprotected or non-game animals by the state in which they are hunted.

Figure 8. Hunters Hunting on Public Land

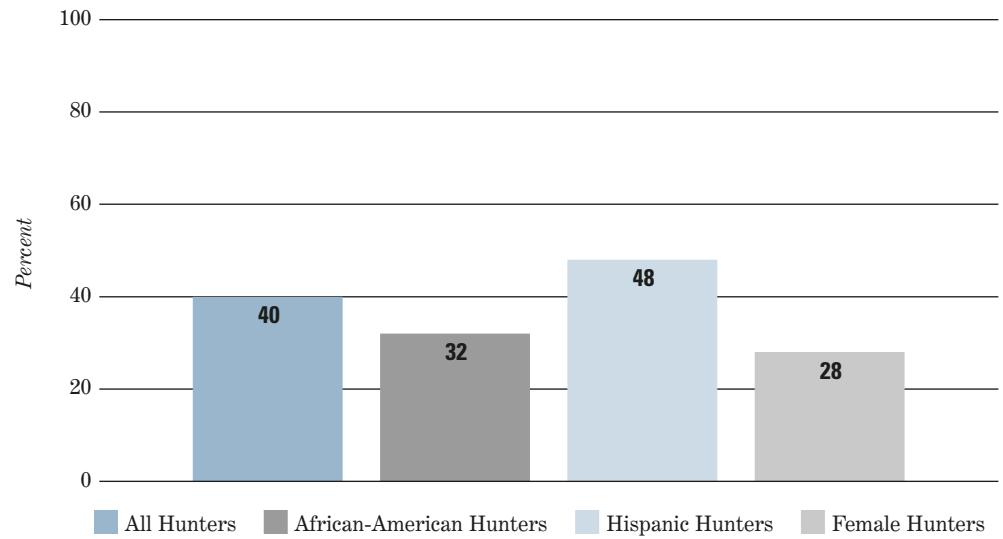
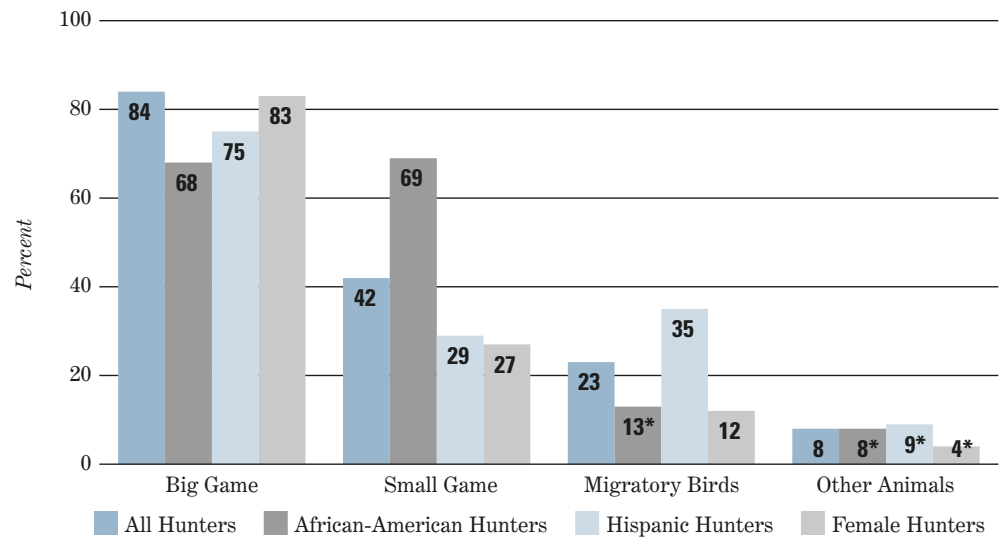
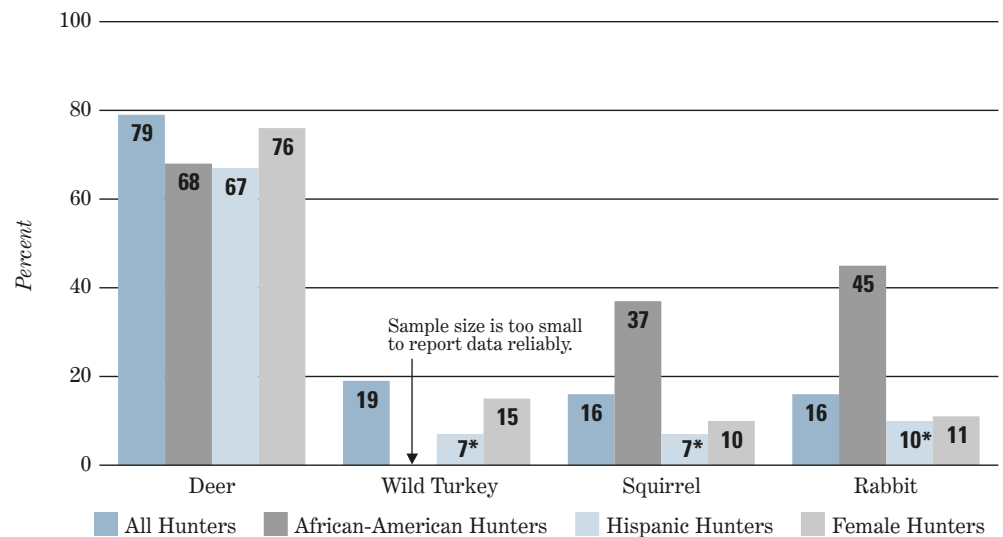


Figure 9. Percent of Hunters, by Type of Hunting



*Estimate based on a small sample size.

Figure 10. Percent of Hunters, by Selected Game



*Estimate based on a small sample size.

Female Hunters

For a more in-depth statistical analysis of hunters, data on participation, expenditures and private/public land preferences are evaluated by age, education, income and place of residence. These comparisons are made between female hunters and all hunters. Due to small sample sizes, African-American and Hispanic hunting populations are not analyzed in further detail.

Female's Hunting Participation

Only 1 percent of females 16 years of age and over in the United States participated in hunting (see Figure 1) as opposed to 6 percent for the entire population. A comparison of all hunters and female hunters by age, education, income, and place of residency follows.

Hunting participation for females is constant across all age groups, where one percent of the female population hunts in each respective age group (Figure 11). This pattern does not hold true for the general population, which has its greatest percentage of hunters in the 35 to 44 and 45 to 54 age groups (8 percent and 7 percent, respectively).

As shown in Figure 12, females of all education levels participate at the rate of 1 percent. The hunting participation rate for the total population, however, peaks at 7 percent for those hunters with a high school degree or some college. The lowest participation rate for the total population is 5 percent for those hunters without a high school degree or with at least a college degree.

Hunting participation is positively correlated with income for the total population (Figure 13). Eight-percent of the total population earning over \$30,000 annually participates in hunting activities, which is almost three times greater than the percentage of the total population earning less than \$20,000 (3 percent). For the female population, the participation rate remains constant across income levels at 1 percent.

Figure 11. Participation Rates for Hunting, by Age

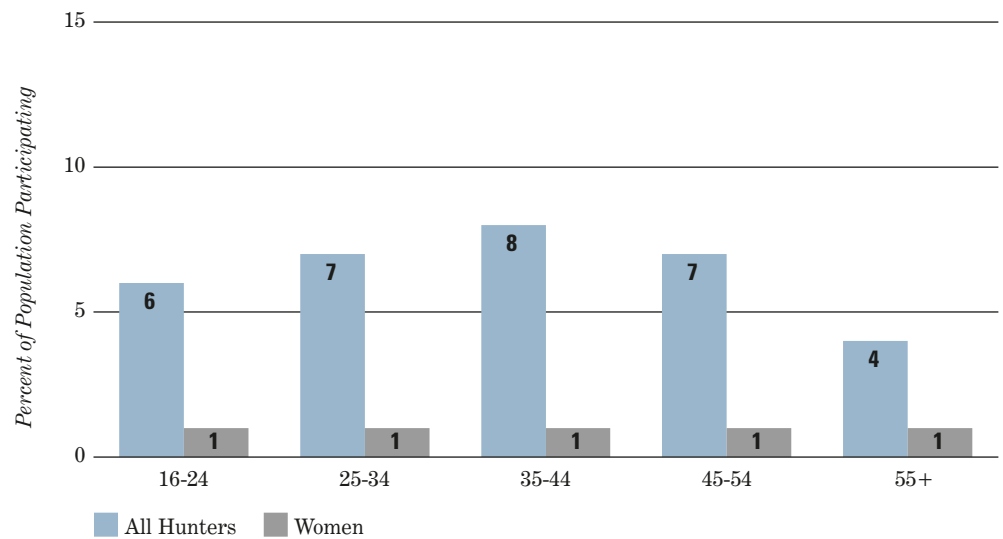


Figure 12. Participation Rates for Hunting, by Education

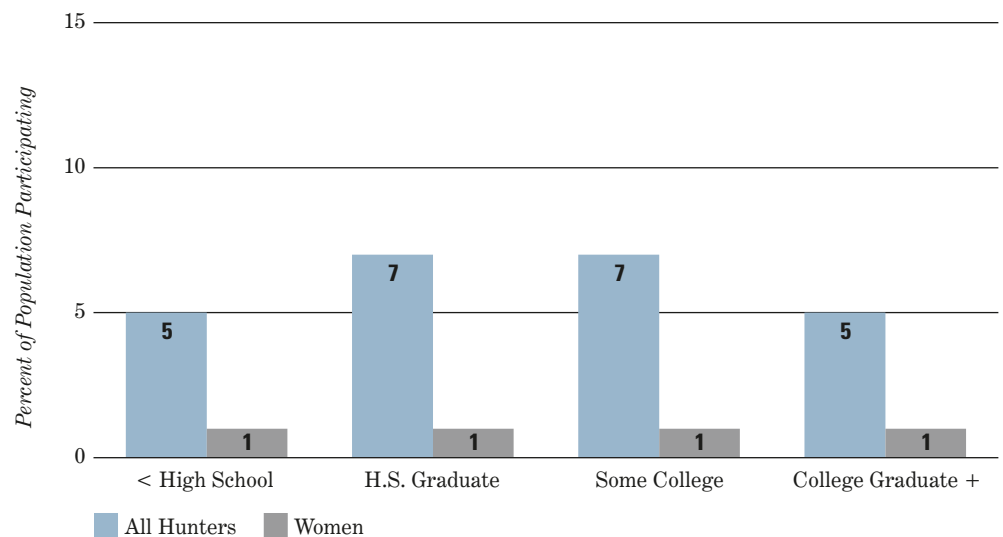
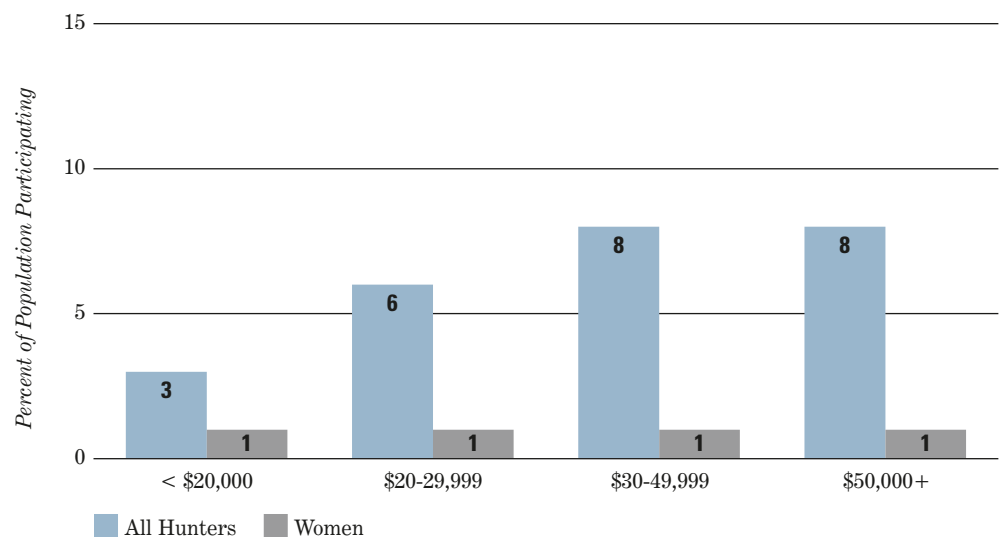


Figure 13. Participation Rates for Hunting, by Income



People residing in rural areas are over three times more likely to hunt than people living in urban areas (Figure 14). Female hunters living in rural areas are also about three times more likely to hunt than females living in urban areas.

Female Hunters' Participation Levels (Days & Trips)

Figures 15 thru 18 compare the mean days and trips for female hunters and all hunters by age, education, income, and place of residence.

Figure 15 shows that female hunters' mean hunting days are lowest (9 days) for females age 16 to 24, and highest for those age 20 to 34 (15 days) and age 45 to 54 (14 days). In contrast, the mean hunting days for all hunters decreases from 19 days for 16 to 34 year-old hunters to 16 days for hunters 55 and over.

Similar to the pattern for all hunters, females' hunting days and education are inversely related (Figure 16). Thus, the number of hunting days decreases for female hunters without a high school degree (13 days) to those female hunters who are college graduates (10 days). Income level and mean hunting days are depicted in Figure 17. With one exception, females' average hunting days by income level follow the relatively stable trend of activity as shown by the general hunting population. The exception occurs at the \$20,000 to \$29,999 income category, where the number of hunting days is nearly half of any other income category.

Figure 14. Participation Rates for Hunting, by Place of Residence

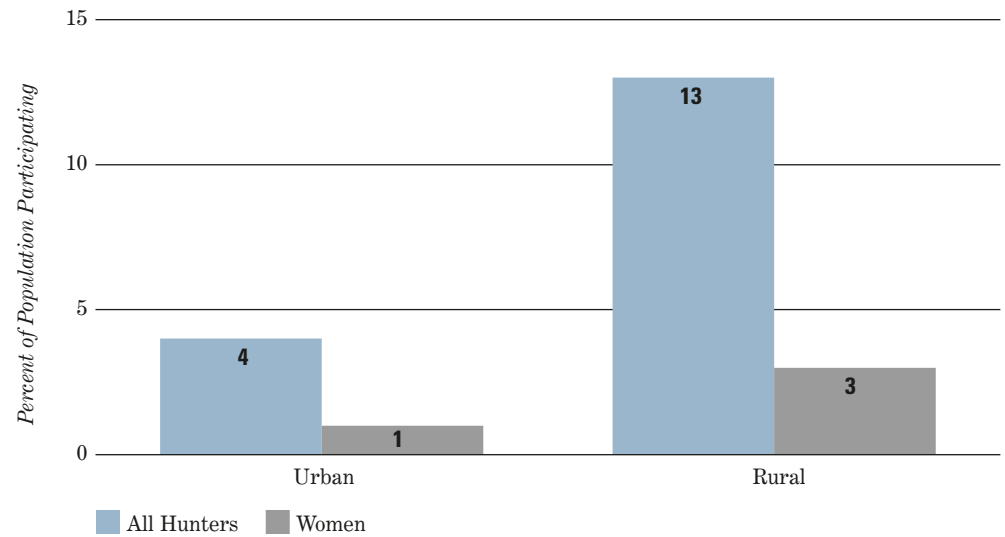


Figure 15. Mean Days of Hunting, by Age

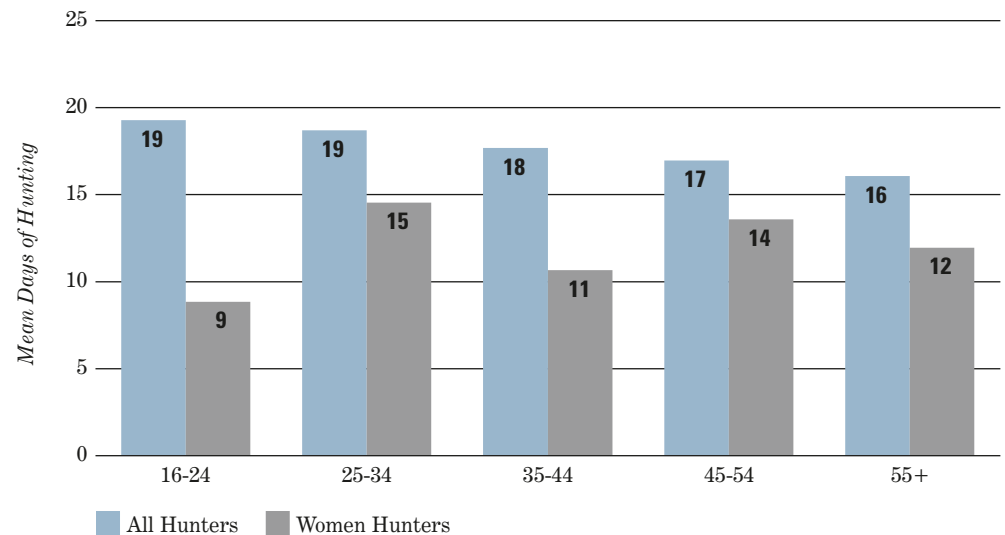


Figure 16. Mean Days of Hunting, by Education

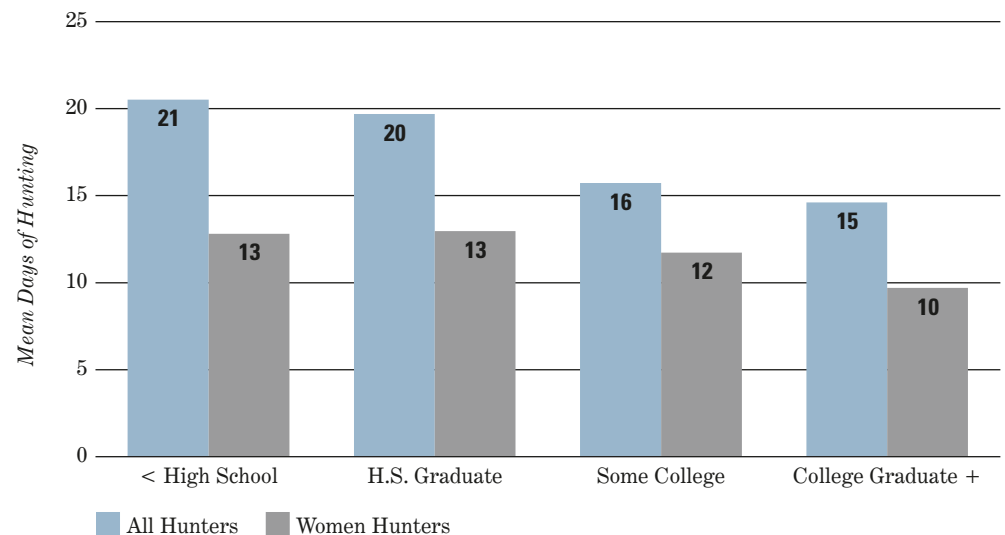


Figure 18 shows that female hunters who live in rural areas hunt almost twice as many days annually (14 days) than female hunters who live in urban areas (8 days). This is similar to the pattern for all hunters, where hunters in rural areas hunt 20 days annually while hunters in urban areas hunt 14 days annually.

Figures 19 thru 22 depict various demographic characteristics by the number of annual mean hunting trips in 2001. As shown in these figures, the pattern of mean hunting trips is similar to that of mean hunting days.

Figure 17. Mean Days of Hunting, by Income

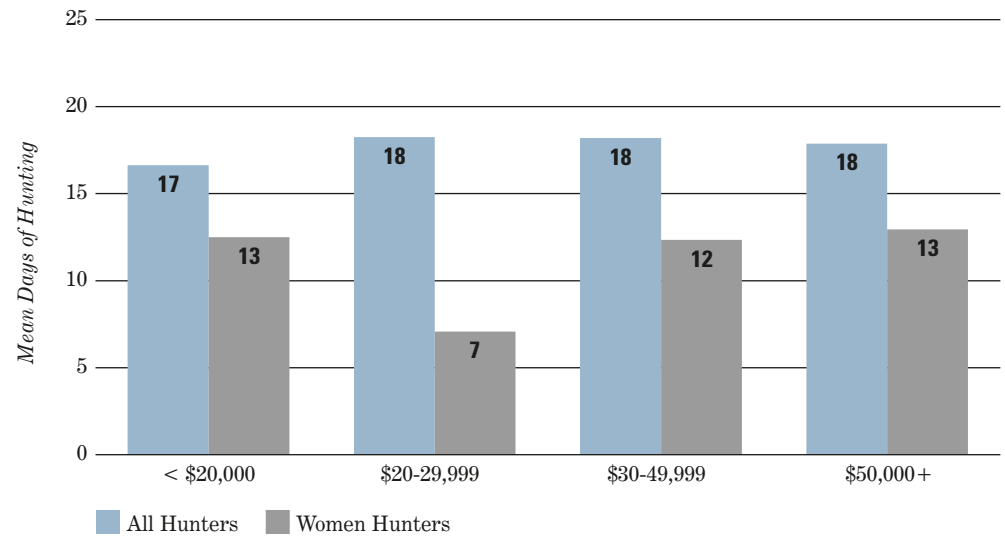


Figure 18. Mean Days of Hunting, by Place of Residence

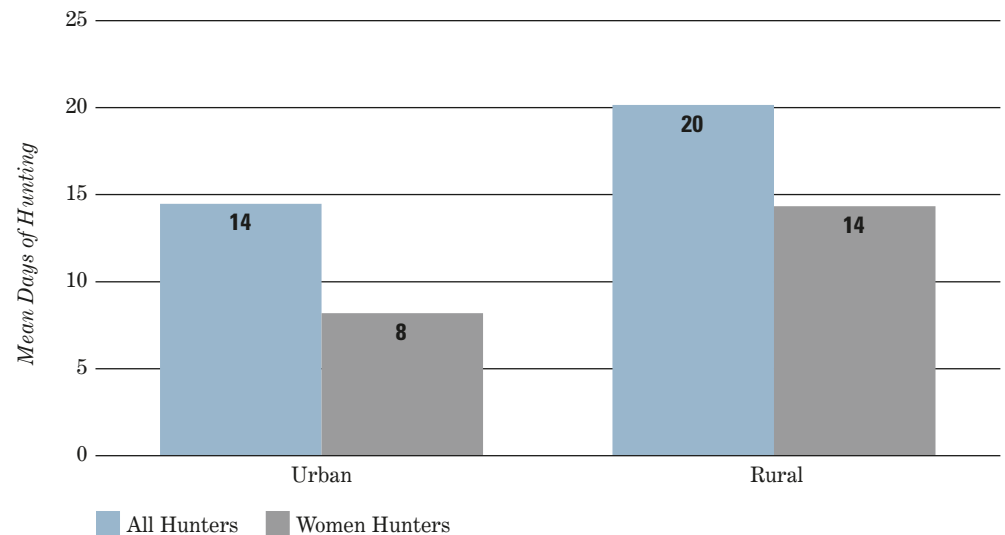


Figure 19. Mean Hunting Trips, by Age

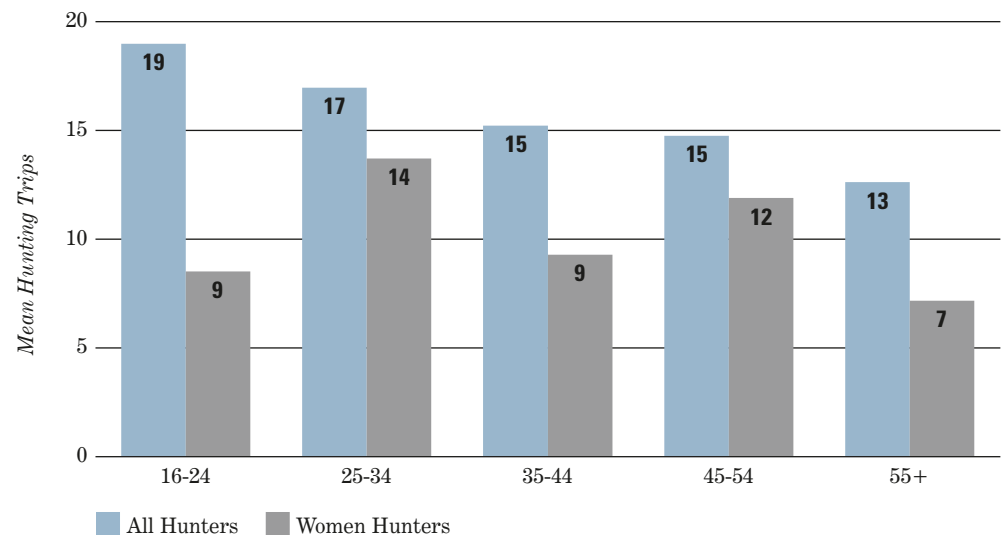


Figure 20. Mean Hunting Trips, by Education

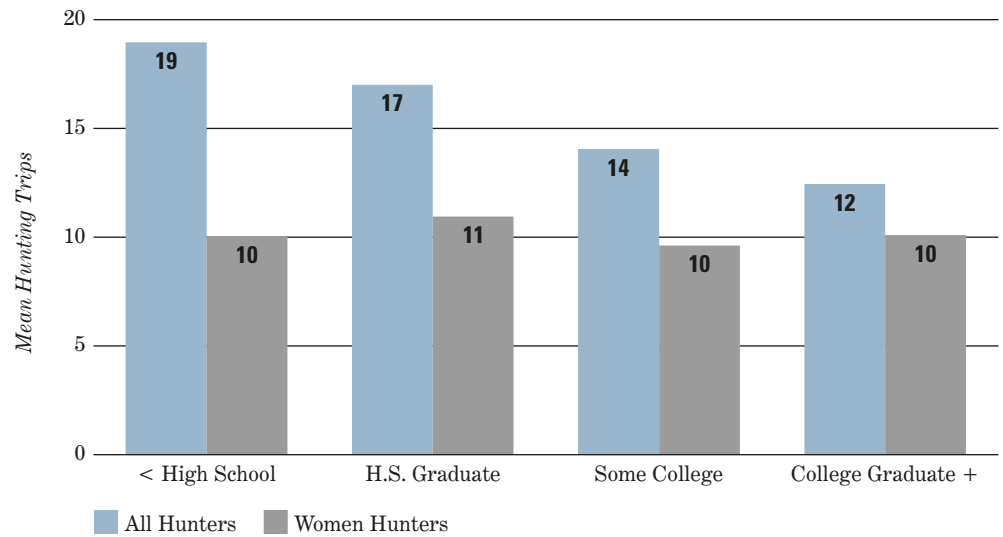


Figure 21. Mean Hunting Trips, by Income

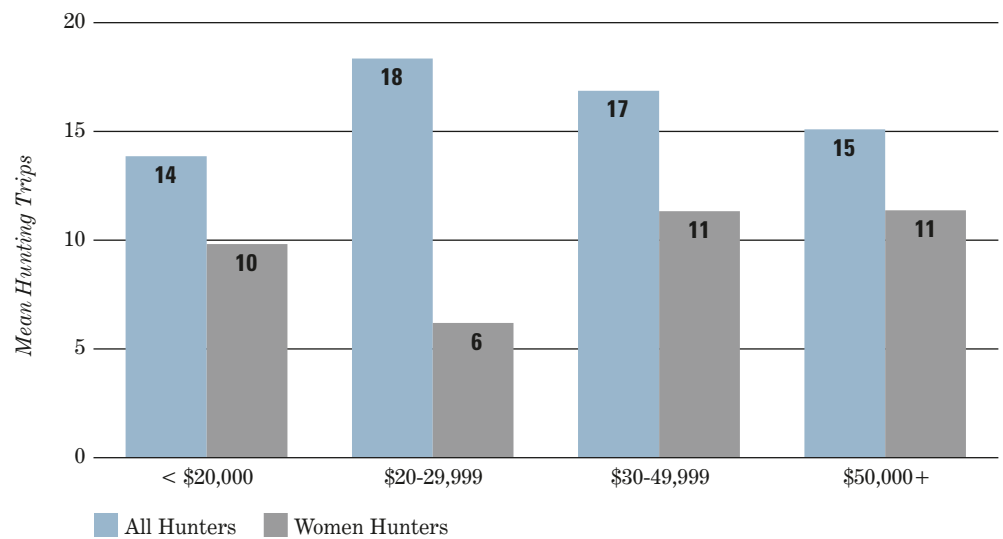
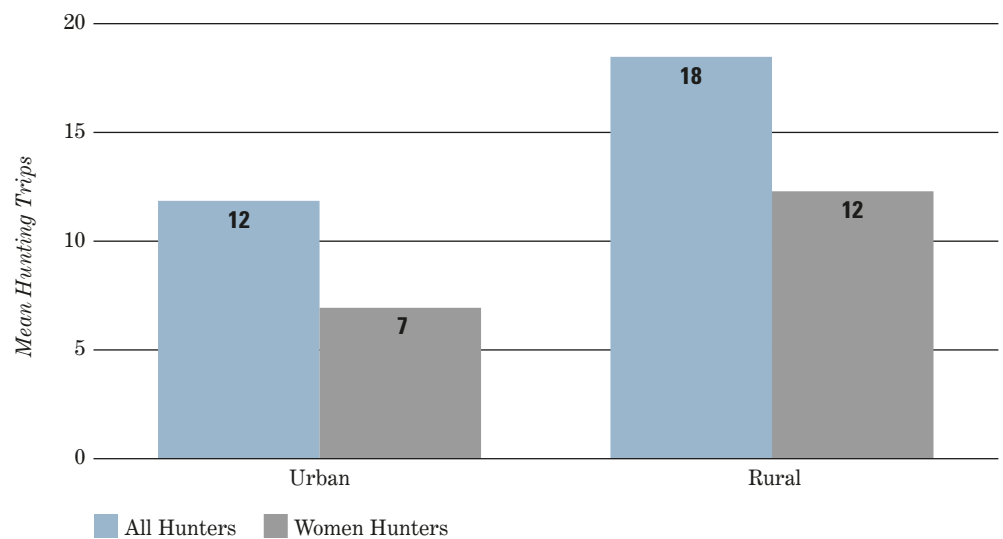


Figure 22. Mean Hunting Trips, by Place of Residence



Females' Hunting Expenditures

As seen in Figures 5 and 6, female hunters on average spent considerably less for hunting trips and equipment than all hunters spend. Despite this finding, a demographic breakdown of female hunter trip and equipment expenditures identifies spending patterns somewhat similar to that of all hunters. Figures 23 through 26 display mean trip expenditures for female hunters and all hunters.

Females' trip expenditures for hunting are sporadic across all age groups, all else constant (Figure 23). This is not consistent with the trip expenditure patterns for all hunters, which increases until reaching the age 55+ category.

Trip expenditures for all hunters are positively correlated with both education and income levels (Figures 24 and 25). Thus, as income increases, annual trip expenditures double from \$264 for those hunters with less than \$20,000 household income to \$585 for those hunters with over \$50,000 household income. In addition, as education increases, annual hunting trip expenditures increase at about the same rate from \$256 for those hunters without a high school degree to \$566 for those hunters with at least a college degree.

Females' trip expenditures do not follow the same trends for all hunters within the income and education brackets. While all hunters' trip expenditures are positively correlated with both income and education, females' trip expenditures had one education and income category ("some college" and "\$20,000-\$29,999") that did not follow the positive correlation pattern. Females' annual trip expenditures are less than half of the trip expenditures for all hunters across all category levels.

Figure 23. Mean Trip Expenditures, by Age

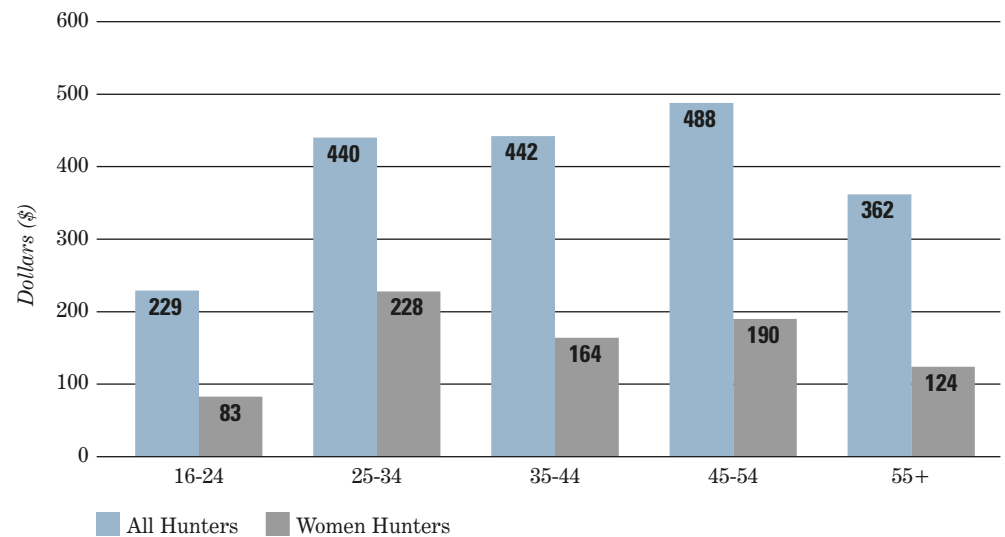


Figure 24. Mean Trip Expenditures, by Education

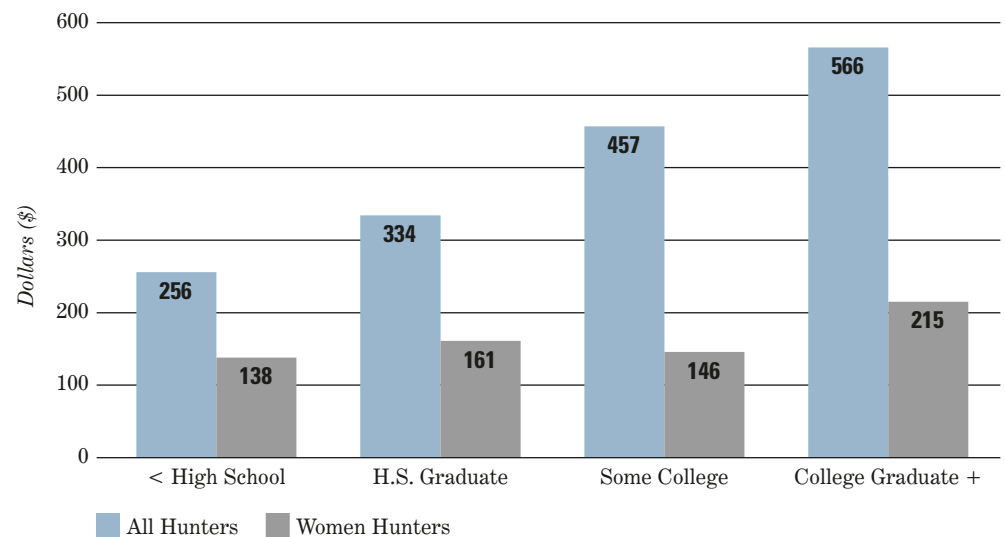
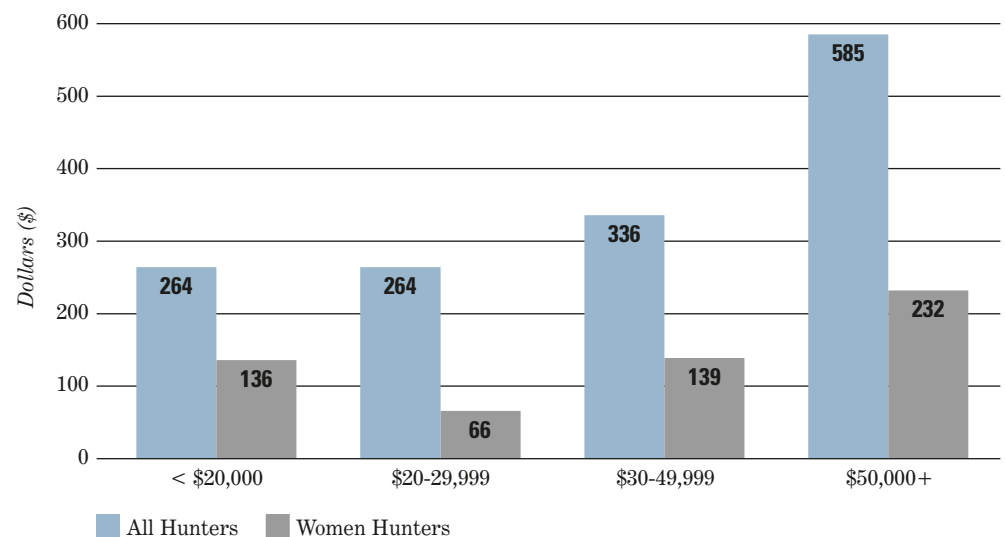


Figure 25. Mean Trip Expenditures, by Income



As depicted in Figure 26, mean trip expenditures for female hunters living in urban areas are 20 percent greater than mean trip expenditures for female hunters living in rural areas. All hunters also show this pattern. On average, hunters living in urban areas spent \$488 while hunters in rural areas spent \$340 (a 30 percent difference).

Figures 27 thru 30 compare the annual mean equipment expenditures by demographic characteristics for female hunters and all hunters. As with trip expenditures, female hunters' equipment expenditures are about half of all hunters' expenditures across nearly all categories. Furthermore, no pattern for equipment expenditures by age emerges for female hunters, as is the result for trip expenditures (Figure 27).

Figure 28 compares equipment expenditures by education. Females' equipment expenditures do not follow the same positive correlation as all hunters. Instead, females' expenditures peak for those females with a high school degree (\$341) and decrease for those female hunters with at least a college degree (\$158).

Figure 26. Mean Trip Expenditures, by Place of Residence

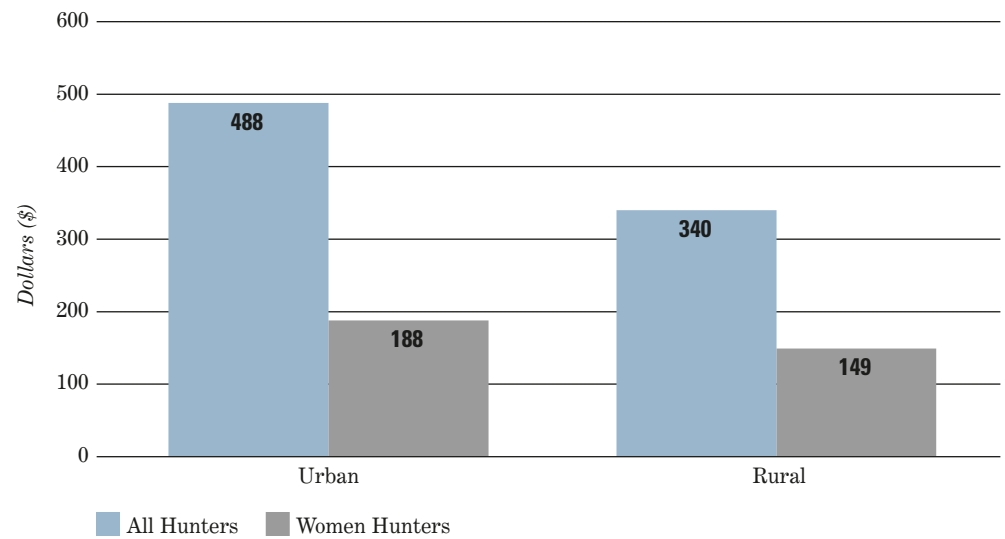


Figure 27. Mean Equipment Expenditures, by Age

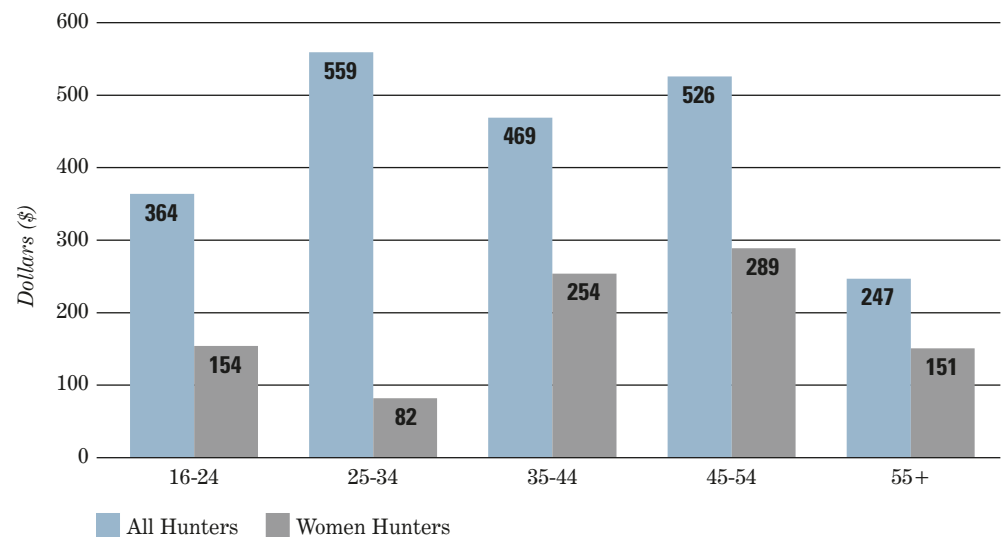


Figure 28. Mean Equipment Expenditures, by Education

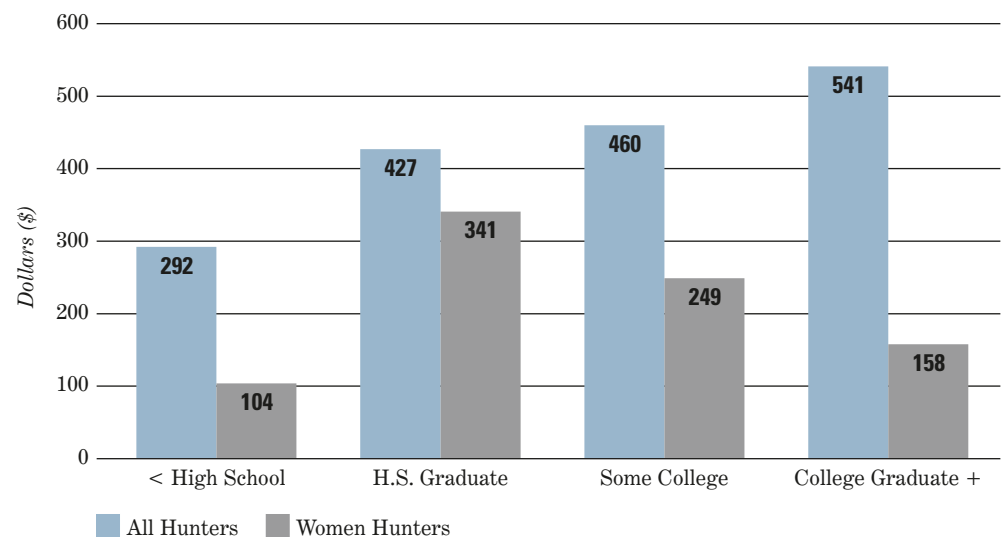


Figure 29 conveys that both female hunters' and all hunters' equipment expenditures are positively correlated with income. However, in comparison, equipment expenditures for all hunters doubled while equipment expenditures for females tripled, moving from those with less than \$20 thousand income to those with over \$50 thousand income.

Female hunters' and all hunters' equipment spending do not follow similar patterns, when categorized by place of residence (Figure 30). Female hunters living in urban areas spent \$143 on equipment in 2001 while female hunters living in rural areas spent about 30 percent more (\$194). Conversely, all hunters living in urban areas spent more (\$342) than those hunters living in rural areas (\$295).

Females Hunting on Private and Public Land

As shown earlier in Figures 7 and 8, many more female hunters hunt on private land (80 percent) than on public land (28 percent). A demographic analysis follows in Figures 31 thru 38.

Categorizing by age shows that 75 to 85 percent of female hunters of all ages hunt on private land (Figure 31). Similarly for all hunters as well, between 81 and 85 percent of all hunters in each age group hunt on private land. Figure 32 shows the percentage of hunters hunting on public land, by age. No pattern emerges for either all hunters or female hunters when participation is categorized by age. The highest percent of female hunters hunting on public land (39 percent) is in the age 55 and over category, while the highest percent of all hunters hunting on public land (41 percent) is in the 35 to 44 age category.

Figure 29. Mean Equipment Expenditures, by Income

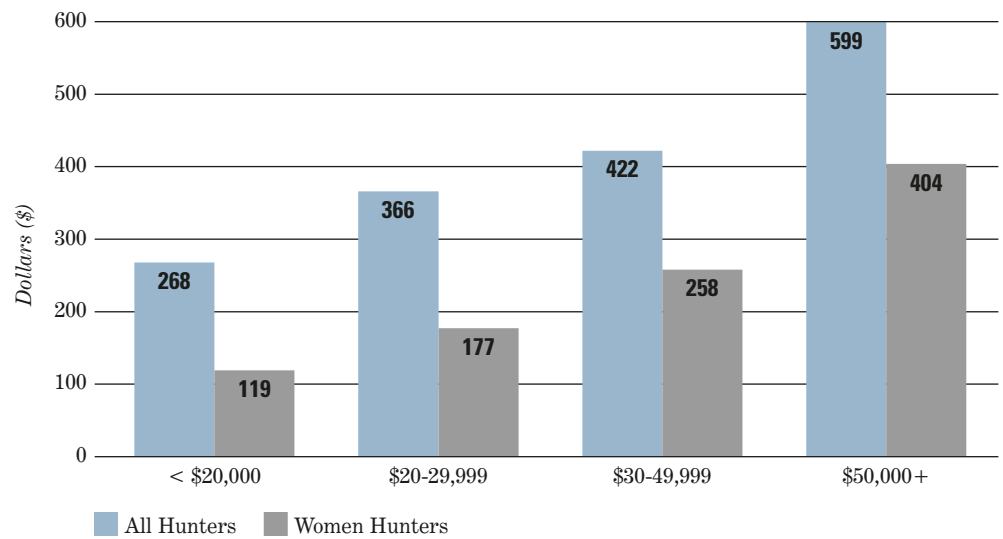


Figure 30. Mean Equipment Expenditures, by Place of Residence

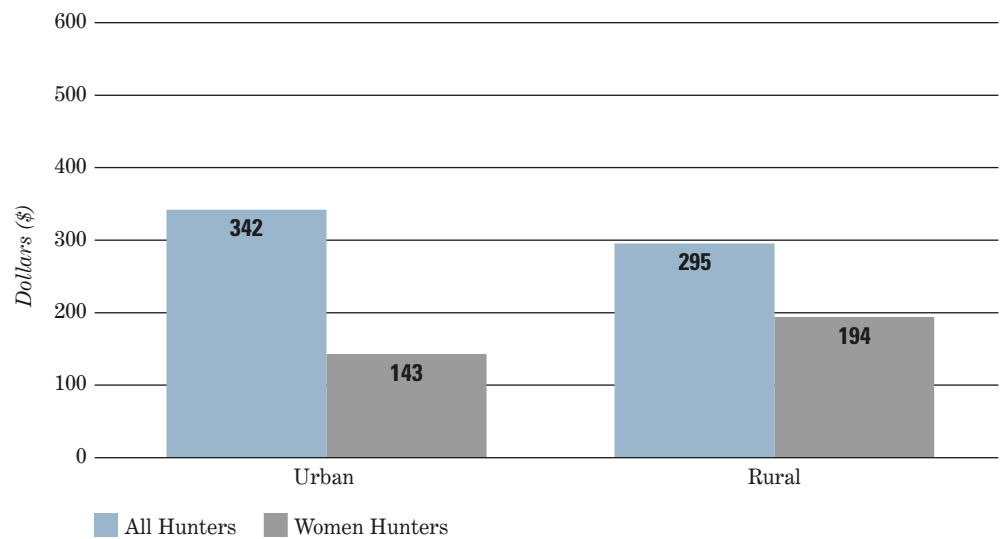


Figure 31. Hunters Hunting on Private Land, by Age

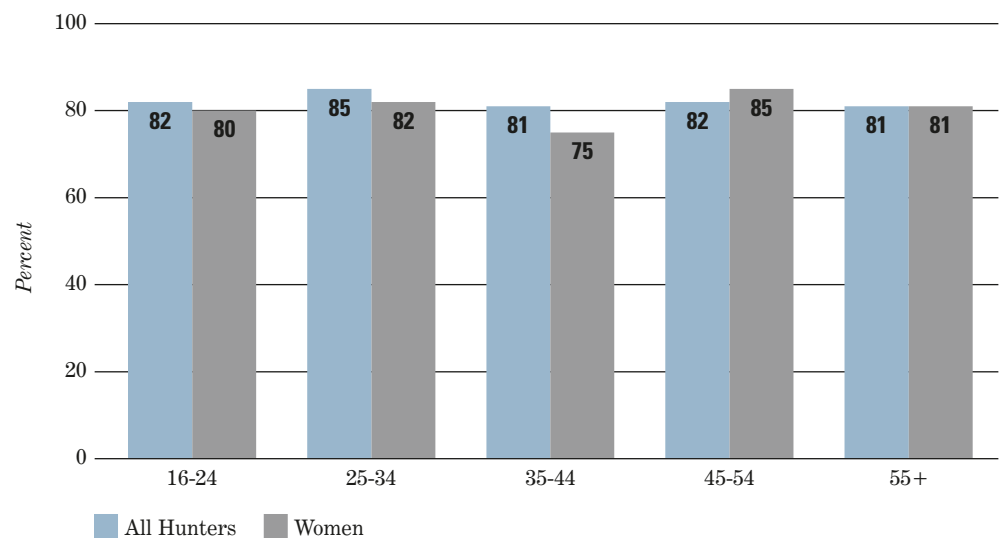


Figure 33 shows that private land hunting by education averages between 81 and 86 percent of all hunters. Hunting on private land for females averages slightly below at 77 to 83 percent. Participation patterns compared by educational achievement are more pronounced for hunters on public land (Figure 34). For both all hunters and female hunters, the participation rate and educational achievement are positively correlated. For all hunters, participation rates increased from 38 percent for those without a high school diploma to 41 percent for those with at least a college degree. Participation for female hunters also increased but at a faster rate. Twenty-three percent of female hunters without a high school degree hunt on public land while 34 percent of female hunters with at least a college degree hunt on public land.

Figure 32. Hunters Hunting on Public Land, by Age

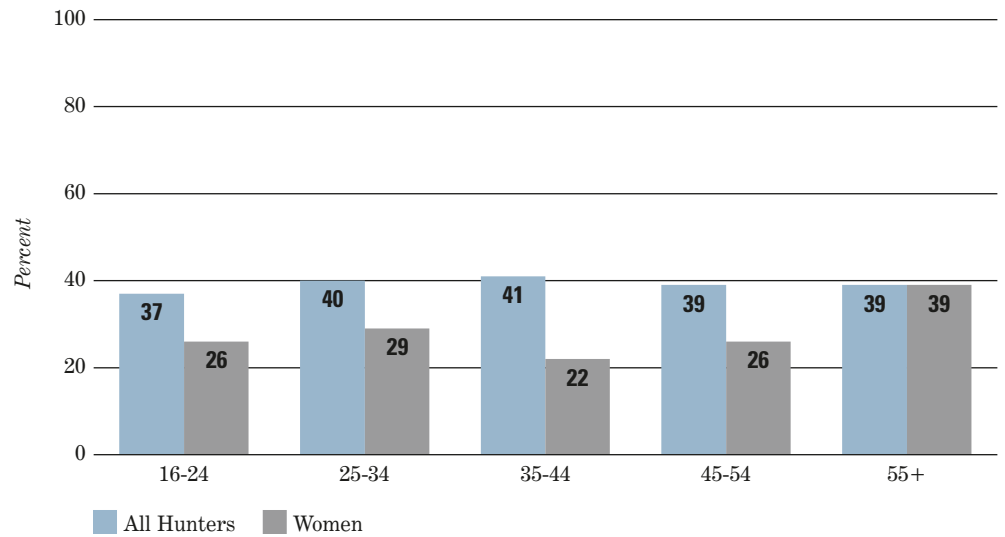


Figure 33. Hunters Hunting on Private Land, by Education

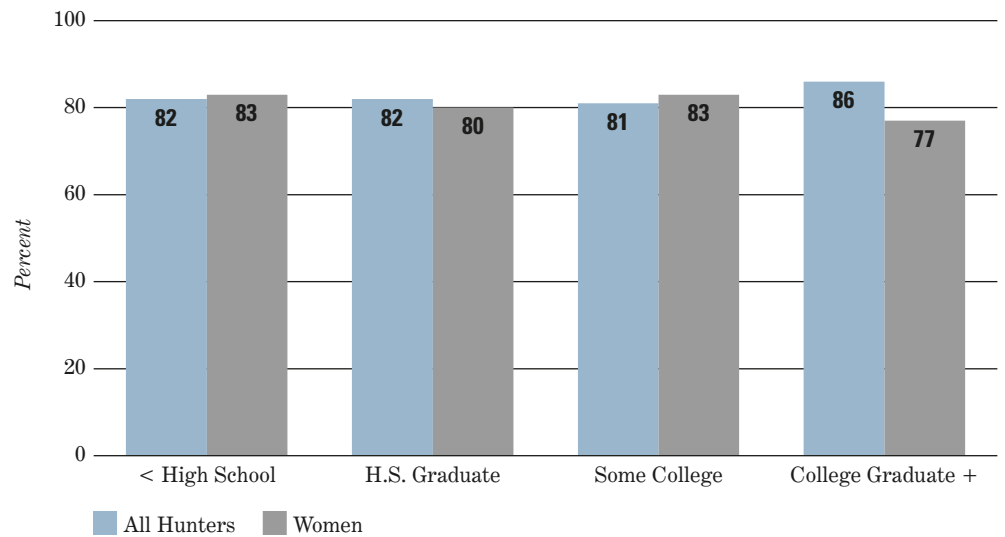
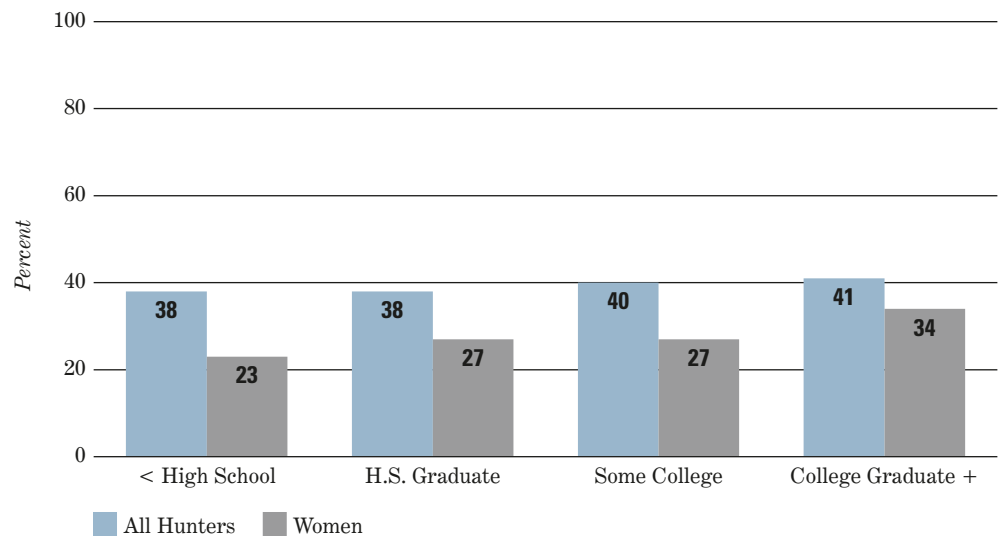


Figure 34. Hunters Hunting on Public Land, by Education



Household income has little impact on hunters' decisions to partake in hunting activities on private land (Figure 35). Participation for all hunters ranges between 77 and 85 percent while participation for female hunters varies between 77 and 84 percent. Figure 36 illustrates the positively correlated relationship between household income and the decision to hunt on public land for all hunters. No pattern emerges for female hunters.

Figure 35. Hunters Hunting on Private Land, by Income

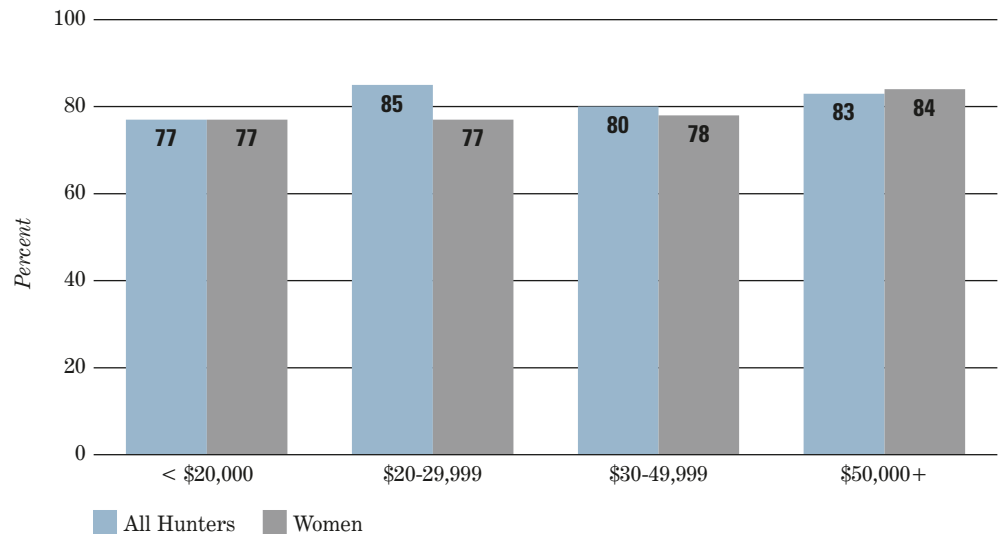
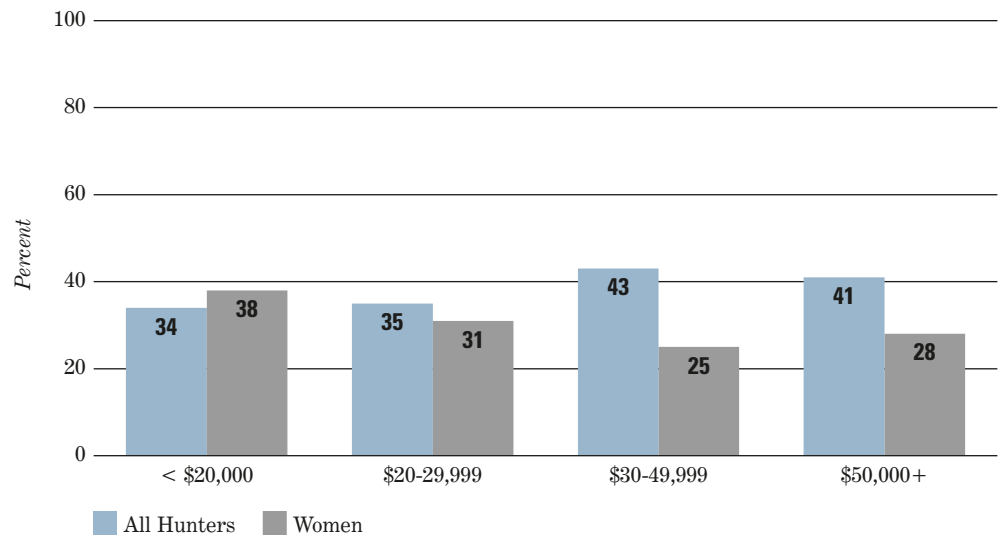


Figure 36. Hunters Hunting on Public Land, by Income



Figures 37 and 38 demonstrate that the highest percent of female hunters hunting on private land are residents of rural areas (86 percent); whereas, the highest percent of female hunters hunting on public land are residents of urban areas (33 percent). For all hunters, the largest percent hunting on private land are also rural residents (87 percent), and the largest percent hunting on public land are urban residents (44 percent).

Figure 37. Hunters Hunting on Private Land, by Place of Residence

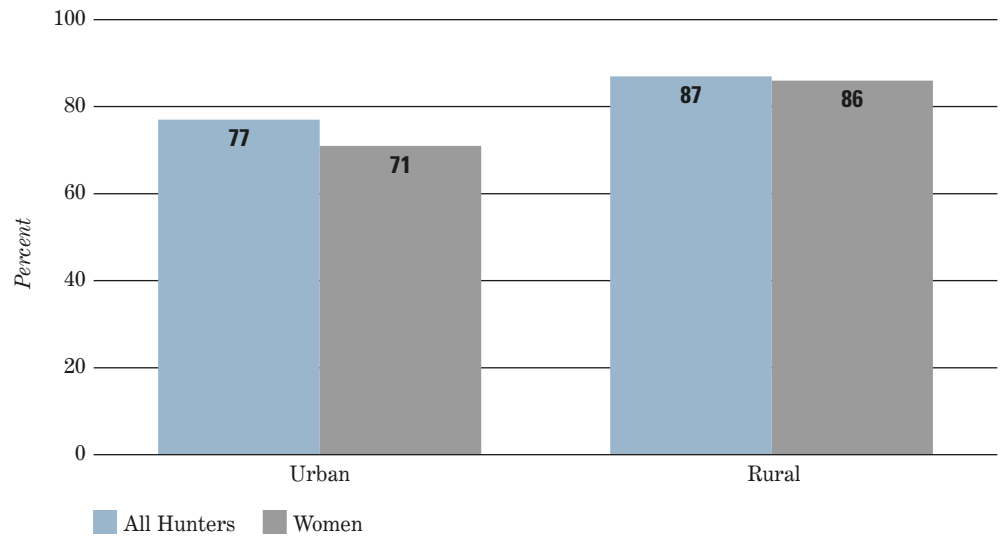
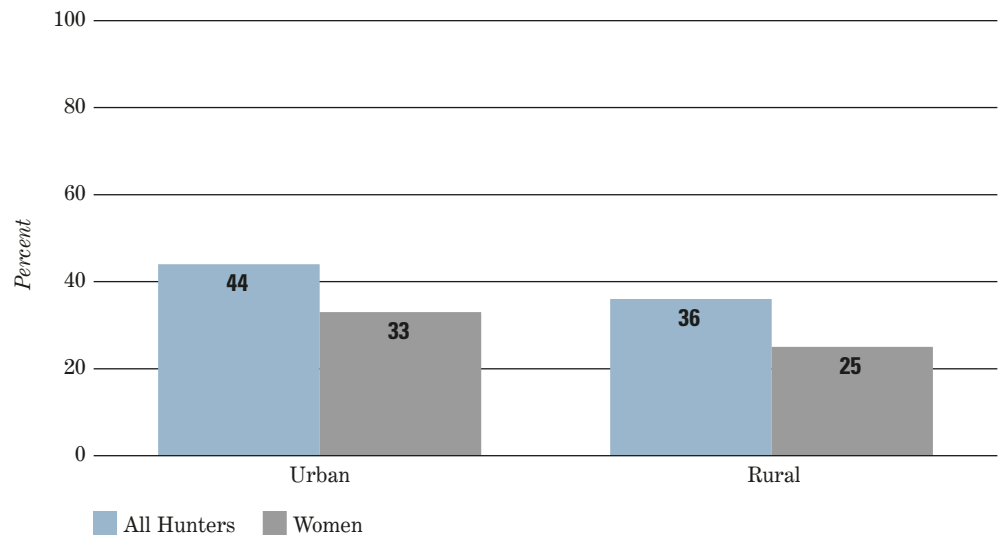


Figure 38. Hunters Hunting on Public Land, by Place of Residence



Hunting Trends 1991, 1996, & 2001

Table 2 highlights the number of hunting participants, days, and expenditures from the 1991, 1996, and 2001 Surveys and the percentage change between each year. All expenditures are depicted in 2001 dollars. Two changes are made to the 2001 expenditures to be consistent with 1991 and 1996 estimates. First, trip expenditures for 2001 are slightly different from those reported in Table 1 because heating and cooking fuel are not included. Second, the 2001 equipment expenditures are also slightly different than Table 1 because auxiliary expenditures are excluded to remain consistent with previous reports.

While remaining approximately similar between 1991 and 1996, the total number of people hunting and their hunting days between 1996 and 2001 decreased by 7 percent and 11 percent, respectively. Unlike the general hunting population, the number of hunters with Hispanic

ethnicity increased by over 50 percent between 1991 and 2001. Correspondingly, the number of hunting days by Hispanic hunters also increased substantially, by 59 percent. This increase in hunting participation outpaces the Hispanic population increase in the United States over the last decade. African-American hunters do not have a significant change in their hunting participation or the number of days hunted.

Although the total number of hunters has decreased over the past 10 years, total trip expenditures increased from \$4.48 billion to \$5.18 billion. However, total trip expenditures in 2001 declined slightly from 1996 (\$5.52 billion). Between 1991 and 2001, Hispanic hunters' trip expenditures increased dramatically by 250 percent, which again far outpaces their growth in participation. No significant trends emerged for African-American hunters or female hunters for trip expenditures.

Between 1996 and 2001, total hunting equipment expenditures declined by 27 percent, and females' hunting equipment expenditures also declined by 25 percent. Although this change represents a marked decrease, the equipment expenditures for the total hunting population and female hunters changed only marginally between 1991 and 2001. On the other hand, Hispanic hunters' equipment expenditures, which remained nearly equivalent between 1996 and 2001, increased by 69 percent from 1991 to 2001. There was no significant change for African-American hunters.

Table 2. Hunting Comparison: Participants, Days, & Expenditures in 1991, 1996, & 2001
(Numbers in thousands)

	Annual Estimates			Percentage Change*		
	1991	1996	2001	1991 to 1996	1996 to 2001	1991 to 2001
Hunters						
Total Hunters	14,006	13,975	13,034	*	-7	-7
African-American	294	303	288	*	*	*
Hispanic	274	335	428	*	+28	+56
Women	1,069	1,192	1,189	*	*	*
Days						
Total Days	235,806	256,676	228,367	*	-11	*
African-American	5,499	4,839	5,382	*	*	*
Hispanic	3,229	4,363	5,139	*	*	+59
Women	13,512	13,074	14,068	*	*	*
Hunting Expenditures**						
Total Trip Expenditures	\$4,484,853	\$5,521,508	\$5,176,031	+23	*	+15
African-American	\$86,018	\$92,222	\$105,928	*	*	*
Hispanic	\$65,806	\$209,072	\$230,371	+218	*	+250
Women	\$241,194	\$247,544	\$193,924	*	*	*
Total Equipment Expenditures	\$4,280,683	\$6,255,967	\$4,561,709	+46	-27	*
African-American	\$66,505	\$98,293	\$92,370	*	*	*
Hispanic	\$72,922	\$129,911	\$123,360	+78	*	+69
Women	\$193,732	\$255,575	\$192,185	+72	-25	*

The "*" denotes that the percentage change is not different from zero at the 90 percent confidence level. Thus, for 90 percent of all possible samples, the estimate between one survey year is not different from another survey year. Expenditures are in 2001 dollars.

**All expenditures are depicted in 2001 dollars. Two changes are made to the 2001 expenditures to be consistent with 1991 and 1996 estimates. First, trip expenditures for 2001 are slightly different from those reported in Table 1 because heating and cooking fuel are not included. Second, the 2001 equipment expenditures are also slightly different because auxiliary expenditures are excluded. These exclusions were necessary to make the estimates comparable with previous publications.

Fishing

Overview

Table 3 highlights the total number of anglers, total and mean fishing days, fishing trips, trip expenditures and equipment expenditures for African-American, Hispanic, female, and all anglers. Females are the largest subpopulation (8.9 million), and they spend the most money (\$3.2 billion on trip and equipment expenditures). However, on average, Hispanic anglers spend more than African-American or female anglers. Hispanic anglers spend 25 percent more than African-American anglers and female anglers on mean trip expenditures; and they also spend 38 percent more than African-American anglers and 47 percent more than female anglers on mean equipment expenditures. African-American anglers spend more days fishing (16 days) and take more trips (14) on average than Hispanic anglers and female anglers.

Fishing Participation

Figure 39 shows the fishing participation rates (the percent of the sub-population in the U.S. that fished in 2001) for persons age 16 and older for the total population, African-Americans, Hispanics, and females. All subpopulations participate at remarkably lower rates than the population as a whole for general fishing and freshwater fishing. For general fishing participation rates, females had the highest participation rate (8 percent) while African-Americans and Hispanics each had a participation rate of 7 percent. Females also had the highest participation rate (7 percent) for freshwater fishing. For saltwater fishing, Hispanics had the highest participation rate of 3 percent.

Table 3. Anglers Days, Trips and Expenditures: 2001

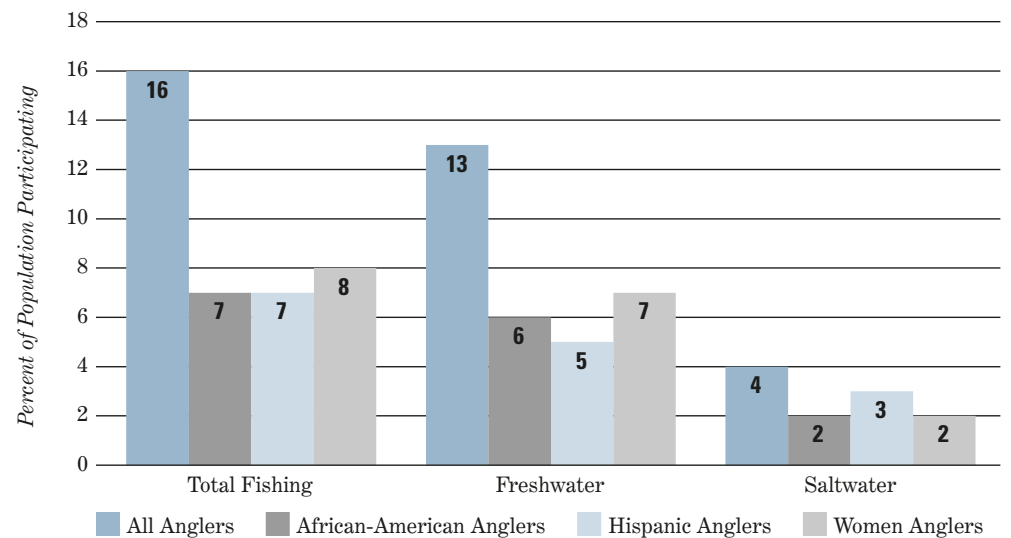
(Includes anglers 16 years of age and older. Numbers in thousands.)

	All Anglers	African-American Anglers	Hispanic Anglers	Female Anglers
Anglers	34,071	1,563	1,564	8,912
Days of Fishing	557,394	24,702	19,060	107,692
Mean Days of Fishing	16	16	12	12
Trips	436,662	19,870	15,179	78,028
Mean Fishing Trips	13	14	10	9
Total Fishing Expenditures	\$19,994,661	\$578,996	\$817,384	\$3,191,799
Trip Expenditures*	\$14,656,000	\$402,604	\$536,357	\$2,339,622
Mean Trip Expenditures	\$449	\$273	\$359	\$278
Equipment Expenditures**	\$5,338,661	\$176,392	\$281,026	\$852,177
Mean Equipment Expenditures	\$157	\$113	\$180	\$96

*Trip expenditures are composed of food, drink, lodging, public and private transportation, guide fees, pack trip or package fees, public and private land use access fees, boat fuel, launching, mooring, storage, maintenance, insurance fees, bait, ice, and equipment rental.

**Equipment expenditures are made up of rods, reels, lines, lures, tackle boxes, creels, stringers, fish nets, minnow traps, seines, bait containers, depth and fish finders, ice and spear fishing equipment. Also included are auxiliary camping equipment such as binoculars, special fishing clothing, processing and taxidermy costs. Special equipment such as boats, campers, trucks and cabins are excluded from equipment expenditures due to small sample sizes and to remain consistent with the equipment expenditure analysis for hunters in the preceding section.

Figure 39. Participation Rates for Fishing



Figures 40 thru 43 show participation by age, education, income, and place of residence. Participation rates are determined by dividing the number of anglers in each subcategory by the number of people in the U.S. in each subcategory.

For most groups, fishing participation increases with age until the 35 to 44 age category, after which, fishing participation decreases with age (Figure 40). African-Americans follow this basic pattern except their participation peaks in the 45 to 54 age category.

Figure 41 depicts the association between fishing participation rates and educational attainment. No trends emerge for fishing participation rates for African-Americans anglers. For Hispanics and females, however, participation in fishing increases with educational achievement.

Figure 42 shows that participation is positively correlated with income. That is, as household income increases, the rate of participation for each group also increases. However, for Hispanic anglers, participation slightly decreases for those earning between \$20,000 and \$29,999 annually.

Participation by place of residence is illustrated in Figure 43. For all populations, rural residents were nearly twice more likely to participate in fishing than urban residents.

Figure 40. Participation Rates for Fishing, by Age

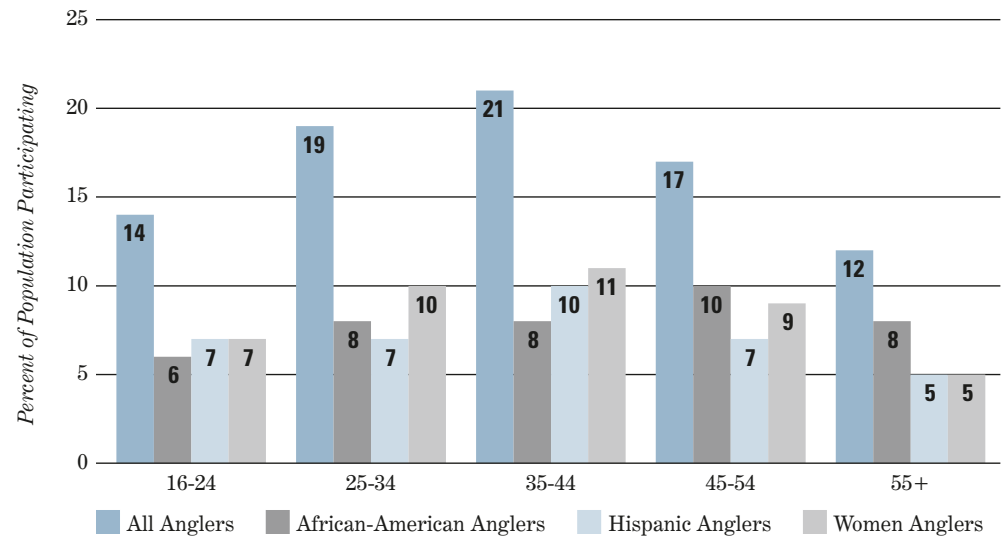


Figure 41. Participation Rates for Fishing, by Education

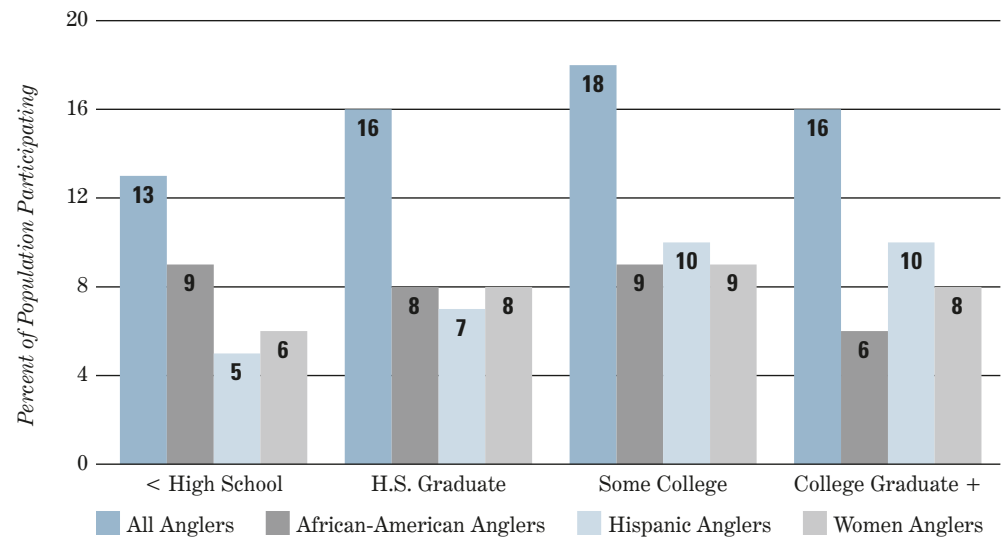
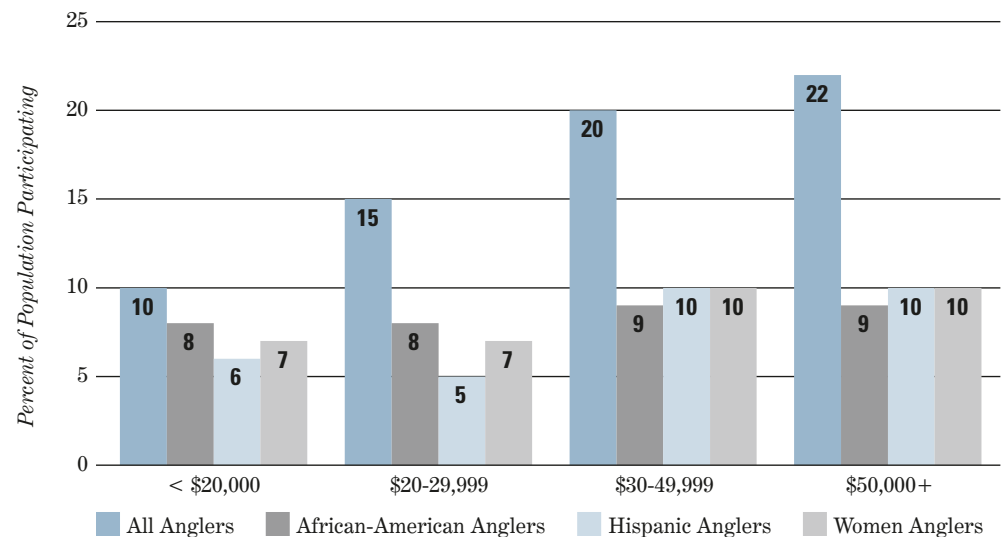


Figure 42. Participation Rates for Fishing, by Income



Regional Distribution of Anglers

Several topics reported in this study such as type of fishing and species sought are highly variable by region of the country. Figure 44 shows the percent of each angler subpopulation that resides in the Northeast, the South, the Midwest and the West. As a whole, the South has the highest percent of all anglers (39 percent). It also has the highest shares of African-American (67 percent) and female anglers (40 percent). The West has a slightly higher percent of Hispanic anglers (44 percent) than the South (41 percent). All regions have nearly the same share of female anglers as all anglers. The Northeast has the lowest share of all anglers (14 percent) and low shares for all subpopulations.

Figure 43. Participation Rates for Fishing, by Place of Residence

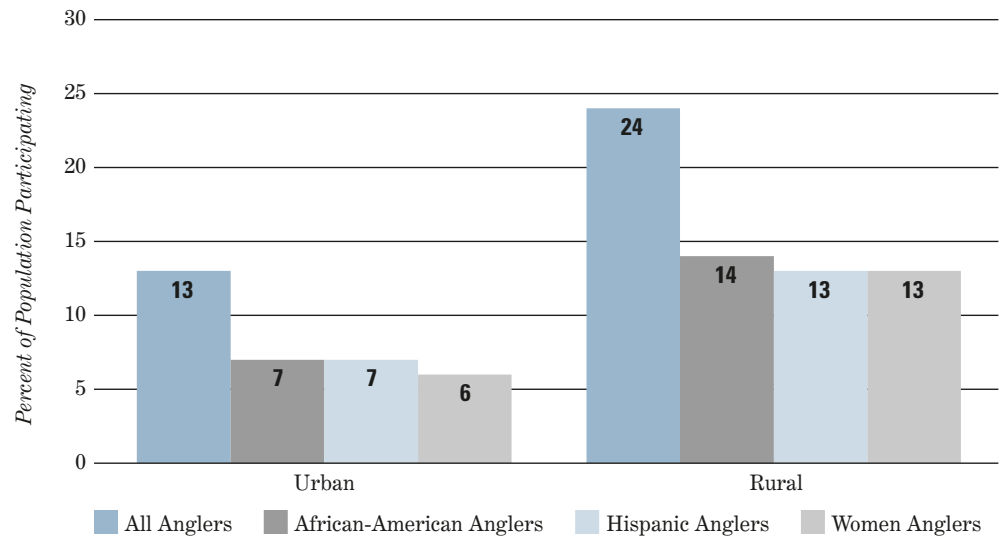
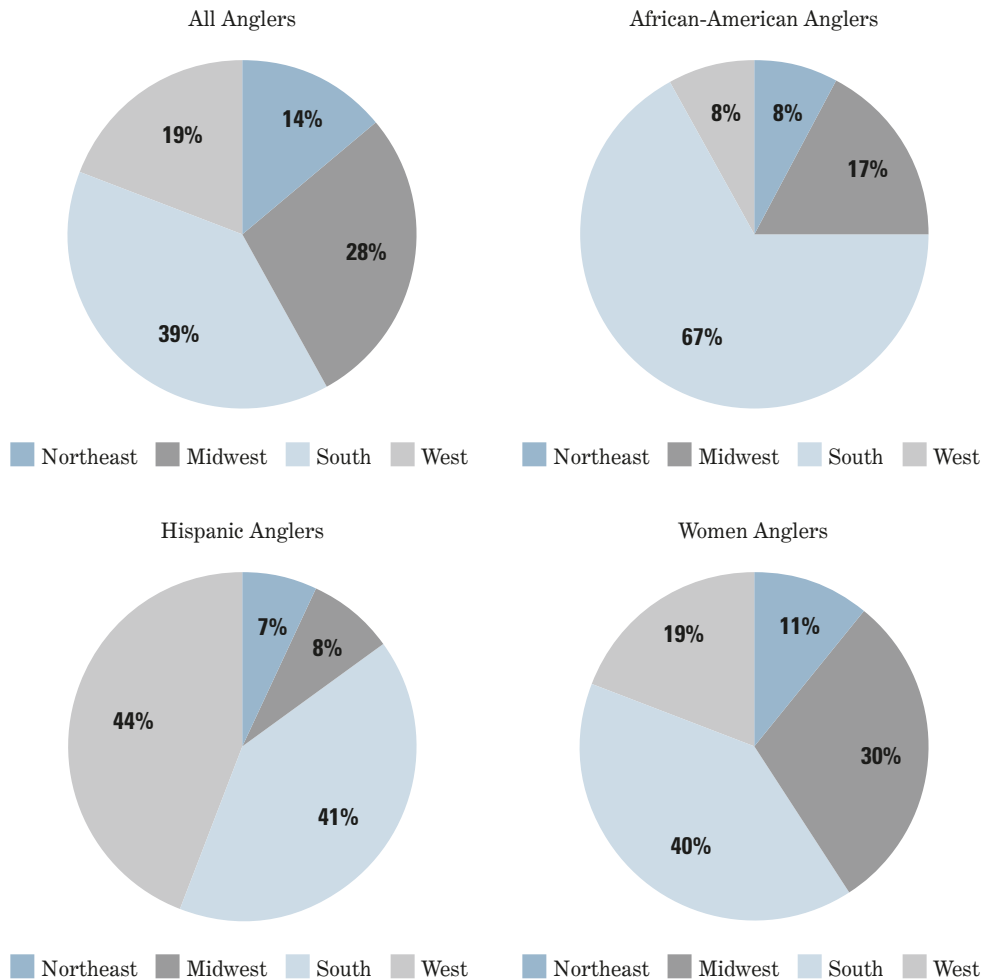


Figure 44. Where Do They Live? Regional Distribution of Anglers



Fishing Avidity & Expenditures

In terms of resource management and economic impacts, how often people fish is as important a question as how many people fish. Thus, the following information is presented on the mean number of fishing days, the mean number of fishing trips, the mean trip expenditures,⁵ and the mean equipment expenditures for anglers.⁶

Figures 45 and 46 represent mean fishing days and mean fishing trips, respectively. African-American anglers, on average, spend more days fishing (16 days) and take more trips (14 trips) per year than Hispanic anglers and female anglers. Hispanic anglers and female anglers spend the identical number of days fishing (12 days) and take about the same amount of fishing trips (10 and 9 trips, respectively). Comparing fishing days to fishing trips, very few trips are multi-day angling trips.

Figure 47 shows mean annual fishing trip expenditures, and Figure 48 shows mean equipment expenditures. Hispanic anglers spend, on average, \$359 on trip-related expenditures and \$180 on equipment. These expenditures are larger than African-American and female expenditures. Furthermore, Hispanic anglers' average equipment expenditures exceed those of all anglers by about \$20 annually.

⁵Trip expenditures are composed of food, drink, lodging, public and private transportation, guide fees, pack trip or package fees, public and private land use access fees, boat fuel, launching, mooring, storage, maintenance, insurance fees, bait, ice, and equipment rental.

⁶Equipment expenditures are made up of rods, reels, lines, lures, tackle boxes, creels, stringers, fish nets, minnow traps, seines, bait containers, depth and fish finders, ice and spear fishing equipment. Also included are auxiliary camping equipment such as binoculars, special fishing clothing, processing and taxidermy costs. Special equipment such as boats, campers, trucks and cabins are excluded from equipment expenditures due to small sample sizes and to remain consistent with the equipment expenditure analysis for hunters in the preceding section.

Figure 45. Mean Days of Fishing

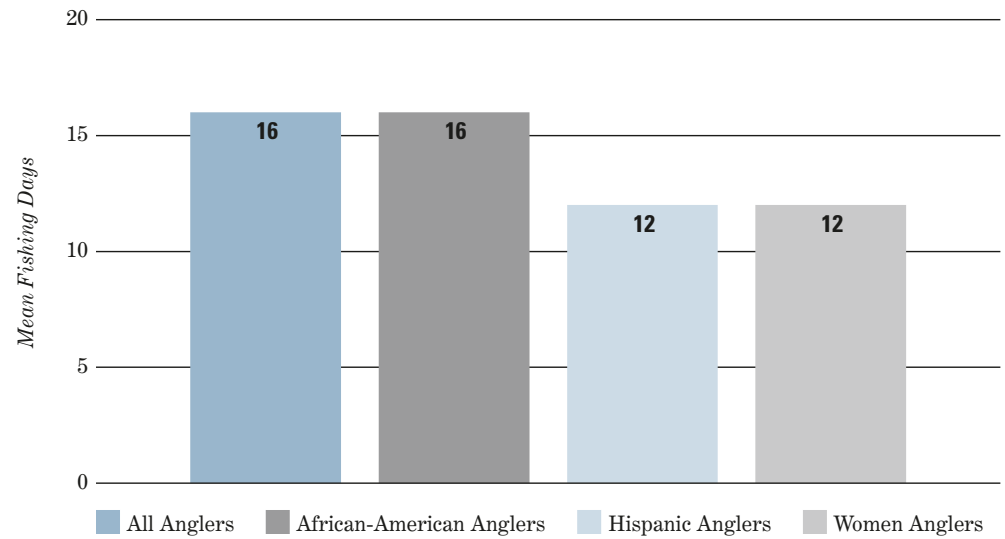


Figure 46. Mean Fishing Trips

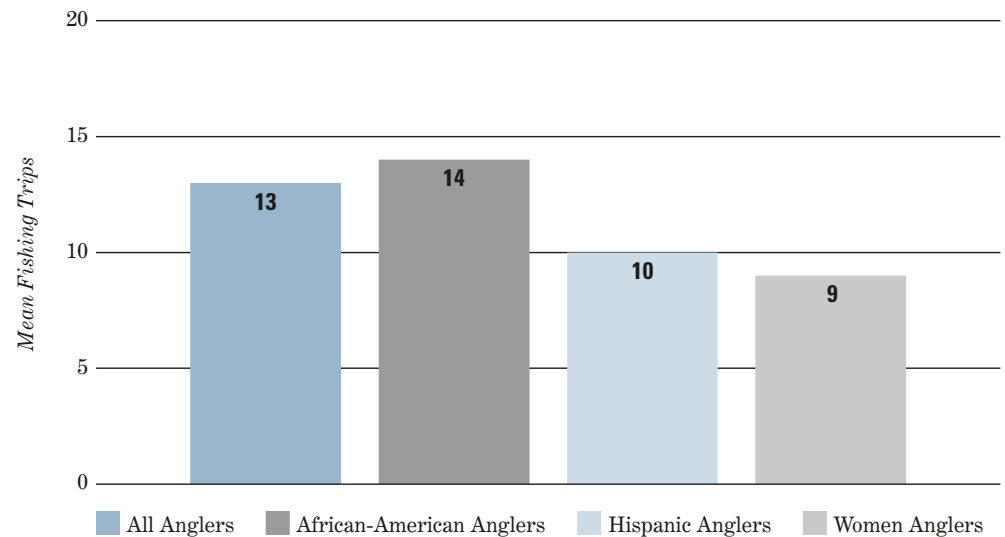
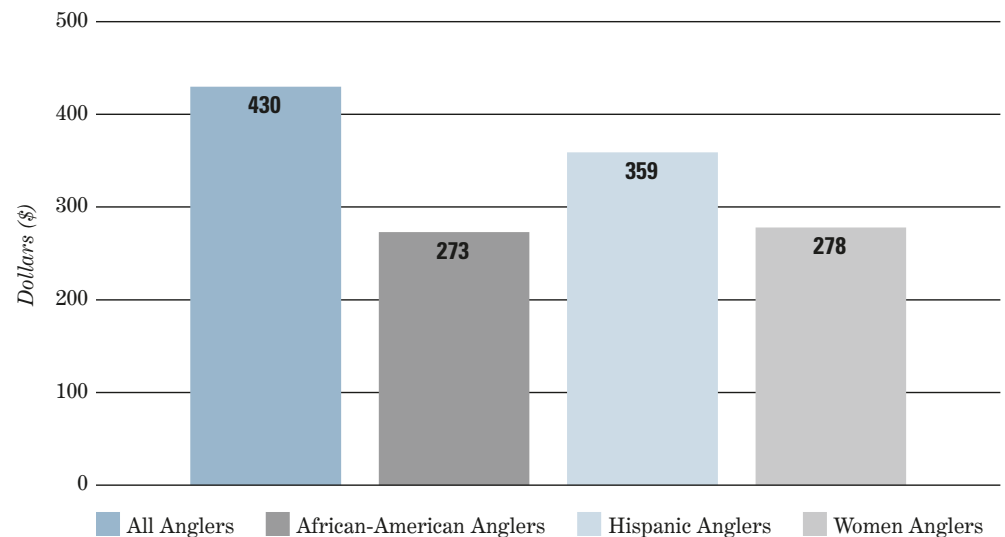


Figure 47. Mean Trip Expenditures for Anglers



African-American anglers and female anglers spend about the same amount on trip-related fishing expenses (\$273 and \$278, respectively). For fishing equipment, African-American anglers spend more (\$113) than female anglers spend (\$96).

Types of Fishing and Selected Species

Figure 49 shows the percent of each angler subpopulation that participates in Great Lakes, saltwater and other freshwater fishing (i.e., excluding Great Lakes fishing). Other freshwater fishing is the most popular type of fishing with at least 69 percent of each angler subpopulation participating. The percent of African-American anglers (76 percent) and female anglers (81 percent) that fish in other freshwater are close to the percentage for all anglers (82 percent). Other freshwater fishing is least popular with Hispanic anglers (69 percent).

Participation in saltwater fishing is lower than freshwater fishing participation. Only 27 percent of all anglers fish in saltwater. However, a relatively large percentage of Hispanic anglers (44 percent) participate in saltwater fishing. This is greater than African-American anglers (31 percent) and female anglers (24 percent).

Participation in Great Lakes fishing is low for all subpopulations of anglers. Only 5 percent of all anglers fish in the Great Lakes. The African-American angler participation rate is 8 percent while 3 percent of female anglers participate. The sample size for Hispanic anglers fishing in the Great Lakes was too small to report reliably.

Figure 48. Mean Equipment Expenditures for Anglers

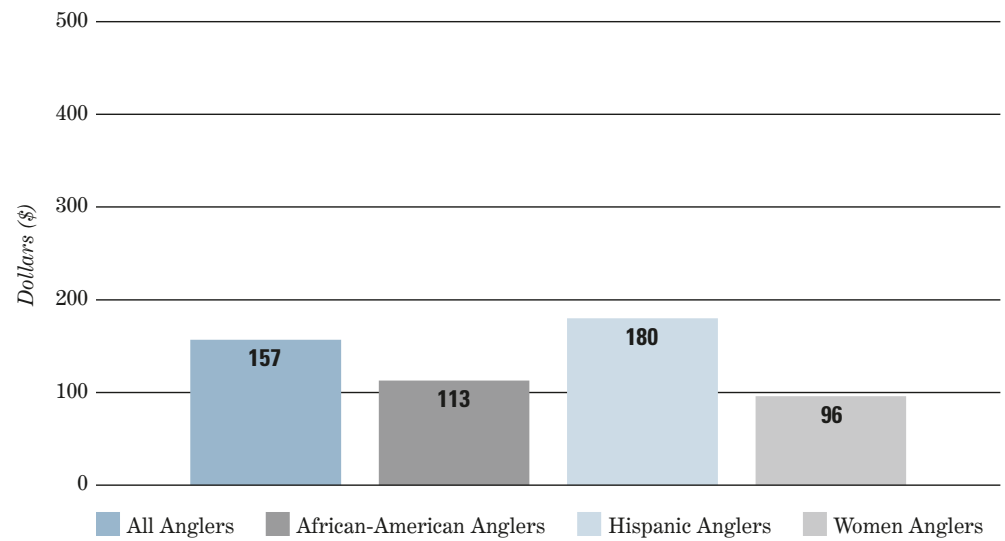
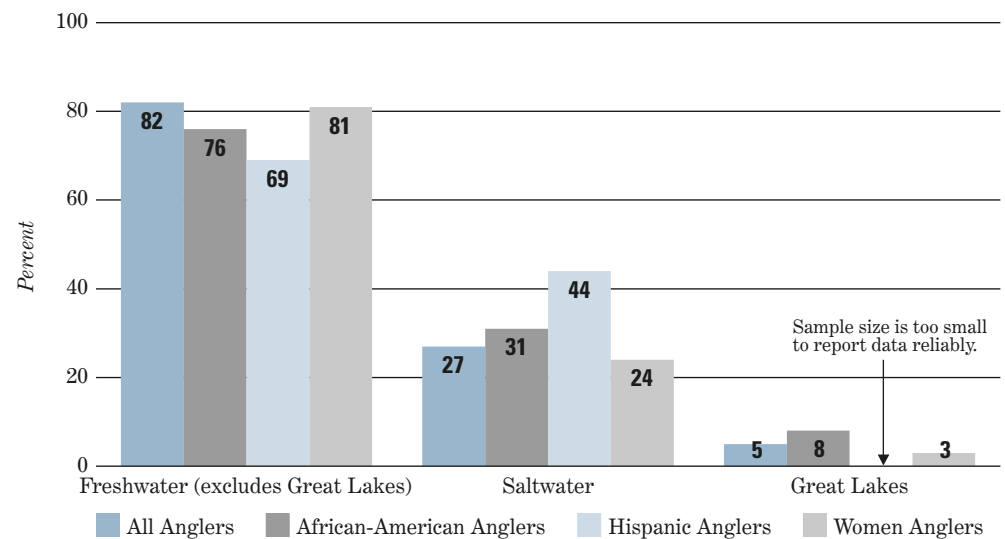


Figure 49. Percent of Anglers, by Type of Fishing



Figures 50 and 51 depict the percentage of each angler subpopulation that pursue popular freshwater and saltwater fish species. Great lakes fishing is not included. For purposes of comparison, the percentage of all freshwater anglers and the percentage of all saltwater anglers that pursued each species is presented in each figure. As depicted in Figure 49, excluding the Great Lakes, 82 percent of all anglers fish in freshwater. While participating in freshwater fishing, black bass, panfish, trout, and catfish are the species most often targeted.

For African-American freshwater anglers, catfish is the most pursued species (Figure 50). Fifty percent of African-American freshwater anglers fish for catfish, more than any other subpopulation. Many African-American freshwater anglers also fish for panfish (39 percent) and black bass (35 percent). However, only 10 percent of African-Americans fish for trout, which is far below the rates for all anglers and other angler subpopulations.

Thirty-nine percent of Hispanic freshwater anglers fished for trout, which exceeds the rate for all freshwater anglers and other freshwater angler subpopulations (Figure 50). Hispanic freshwater angling for black bass and catfish are also well-represented (32 percent each), but panfishing is not nearly as popular as it is with other groups (9 percent).

For female freshwater anglers, fishing for black bass (29 percent) and trout (24 percent) are below the participation rates for all freshwater anglers. Panfish and catfish have approximately the same participation rates for female freshwater anglers as they do for all freshwater anglers.

Figure 51 shows that the most sought after saltwater species for saltwater anglers include flatfish (25 percent) (flounder, halibut, sole), striped bass (19 percent), sea trout (16 percent) and blue fish (13 percent). In general, the subpopulations' participation rates are slightly below those for all saltwater anglers. The most pursued species by Hispanics, African-Americans, and females is flatfish (20, 20, and 22 percent, respectively). Hispanic angling and African-American angling estimates are based on small sample sizes for striped bass, sea trout, and blue fish. Small sample sizes for flatfish also exist for Hispanic anglers.

Figure 50. Percent of Freshwater Anglers (excluding Great Lakes), by Type of Freshwater Species

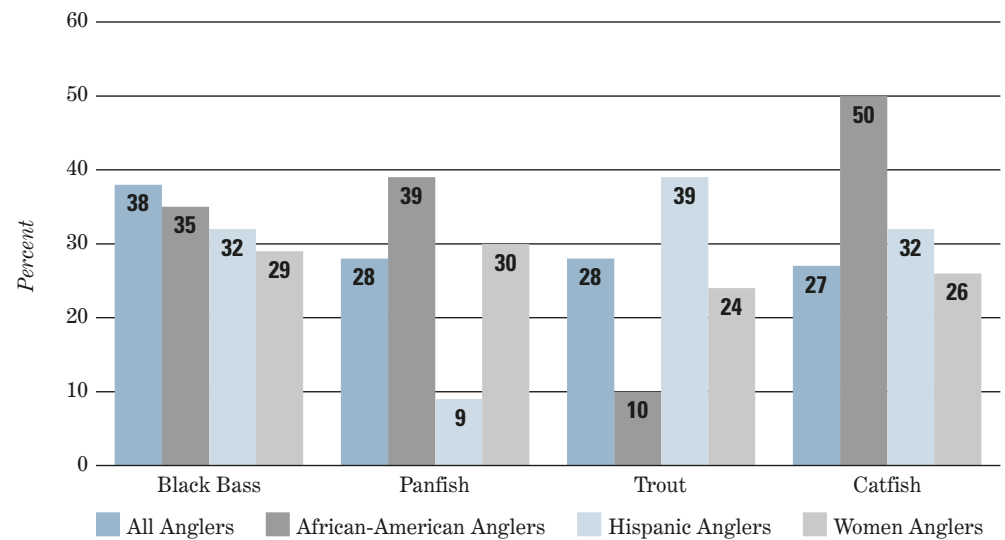
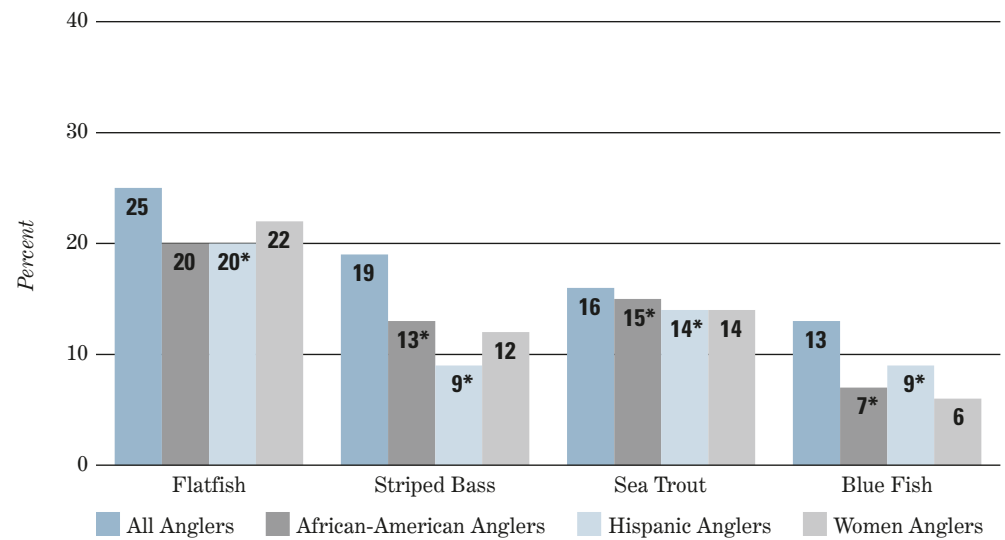


Figure 51. Percent of Saltwater Anglers, by Type of Saltwater Species



*Estimate based on a small sample size.

Female, African-American, and Hispanic Anglers

The following section examines fishing days, trips and expenditures by age, education, income and residency. This in-depth analysis is conducted for each subpopulation.

Participation Levels (Days & Trips)

Figures 52 through 55 portray the average annual number of fishing days by age, education, income, and place of residency. Differences in days and trips of two or less are not usually statistically significant at the 90 percent confidence level and therefore should not be treated as true differences.¹²

As seen in Figure 52, age and mean fishing days are compared for all anglers and each subpopulation. For each population group, anglers that spend the most days fishing tended to be age 16 to 24 or over the age of 55.

Average fishing days and education are inversely related for all anglers (Figure 53). African-American anglers depict the same inverse relationship, where fishing days decrease as educational attainment increases. Hispanic anglers and female anglers, however, do not show any clear pattern between average annual fishing days and education.

Figure 54 shows the relationship between mean fishing days and income for all anglers and for African-American anglers. Those anglers with \$20,000 to \$49,999 incomes spent more days fishing than those anglers outside of that income range. In comparison, fishing days are inversely related to income for female anglers. No pattern emerges for Hispanic anglers.

¹²This means that for 90 percent of all possible samples, differences of 2 days or less are not statistically significant.

Figure 52. Mean Days of Fishing, by Age

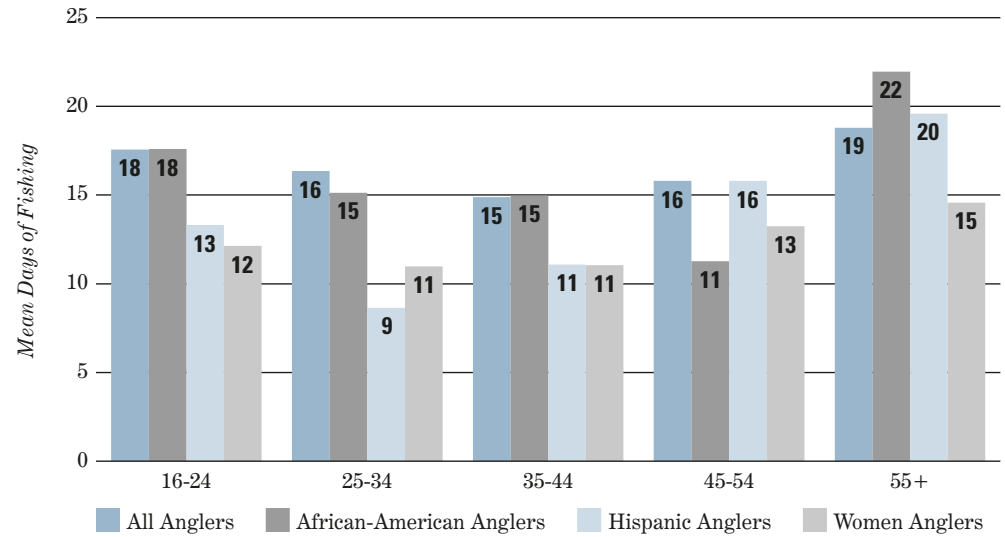


Figure 53. Mean Days of Fishing, by Education

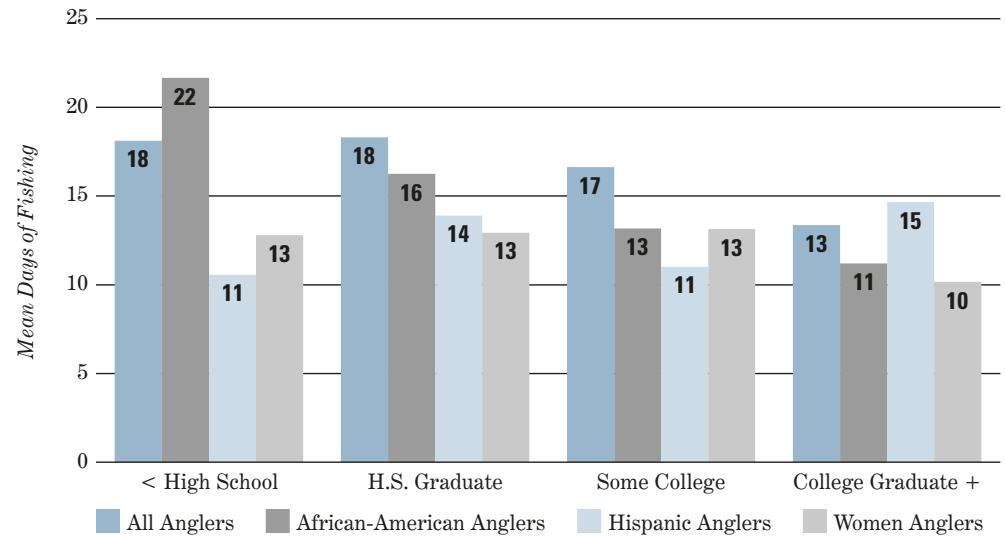
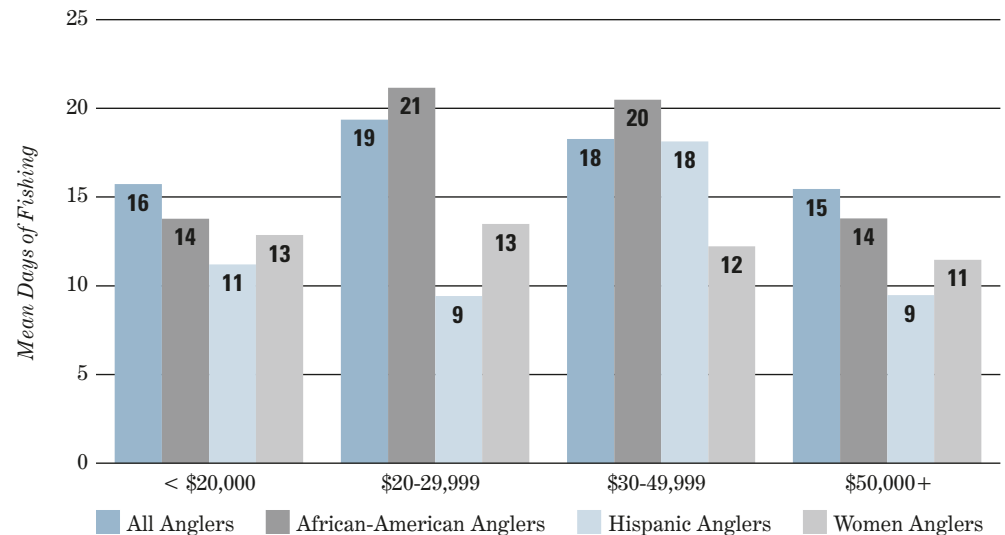


Figure 54. Mean Days of Fishing, by Income



Place of residency is a factor in how often anglers fish. Figure 55 shows that mean days are lower for urban residents.

Figures 56 thru 59 compare mean fishing trips with age, education, income, and place of residency. The pattern of mean trips is very similar to that of mean days.

Figure 55. Mean Days of Fishing, by Place of Residence

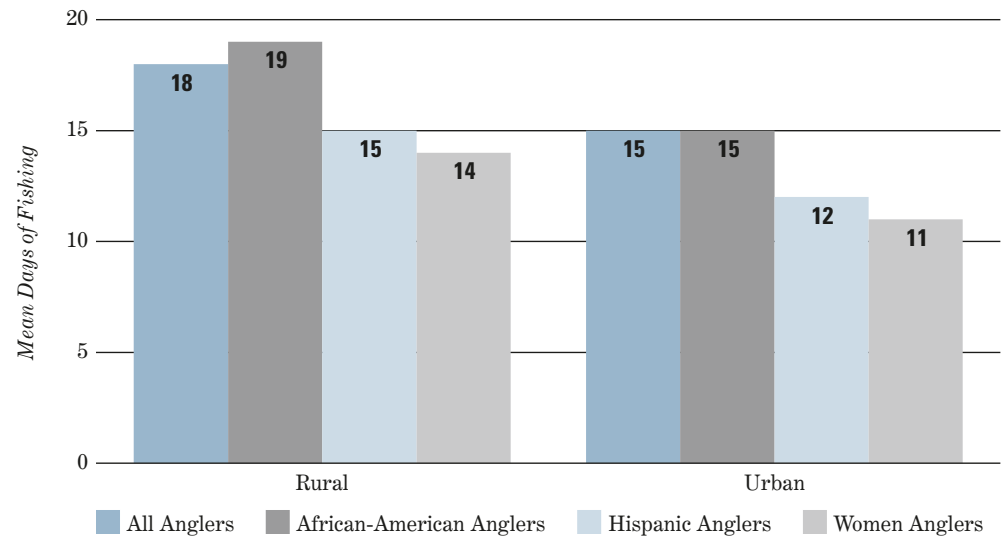


Figure 56. Mean Fishing Trips, by Age

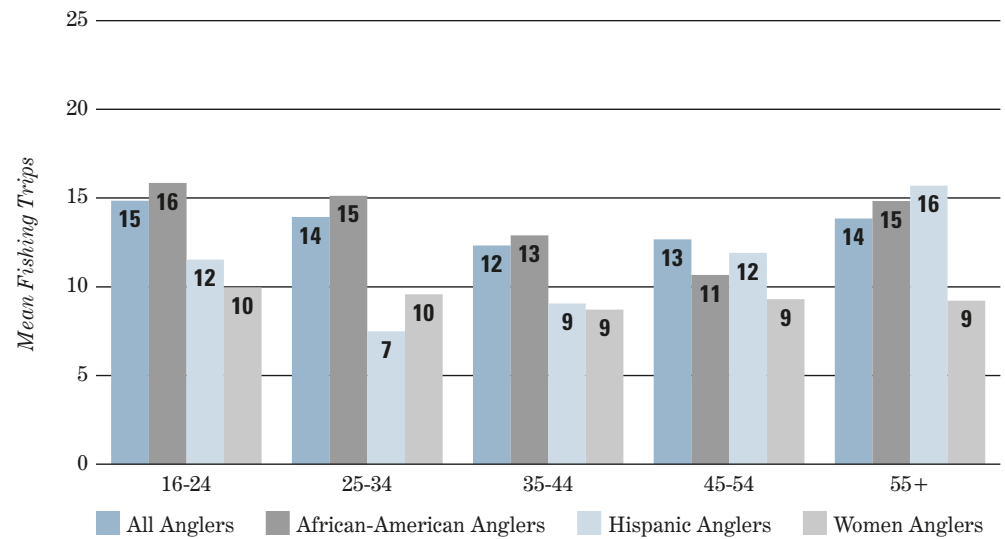
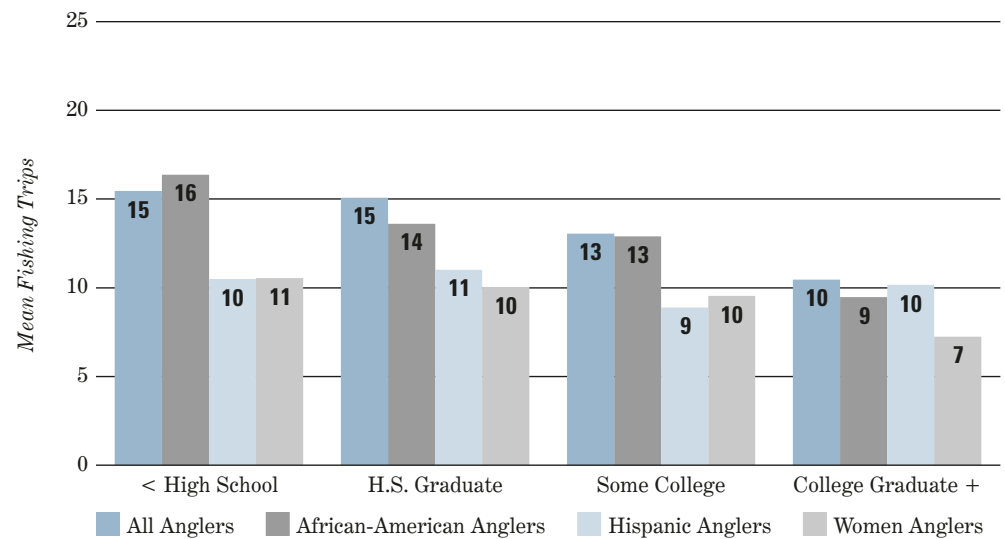


Figure 57. Mean Fishing Trips, by Education



Fishing Expenditures

As shown in Figures 47 and 48, females spent on average \$278 per year for fishing trips and \$96 per year on fishing equipment. This was substantially below the average expenditures for all anglers. Furthermore, with the exception of Hispanic anglers' equipment expenditures, all subgroups had lower mean expenditures than all anglers. In order to better understand which segments of the subpopulations are spending more and which are spending less and how this compares with anglers in general, expenditures are analyzed by particular demographic characteristics such as age, education, income, and residency. This analysis finds some differences between the spending patterns of females, African-Americans, Hispanics, and all anglers.

Figure 60 depicts the relationship between mean trip expenditures and age. Both all anglers and female anglers' trip expenditures increase with age up to the 45 to 54-age category, after which spending decreases. No apparent pattern between trip expenditures and age emerges for African-American anglers or Hispanic anglers. Across all age groups, each subpopulation spent less than all anglers, except for Hispanic anglers age 16 to 24.

Figure 58. Mean Fishing Trips, by Income

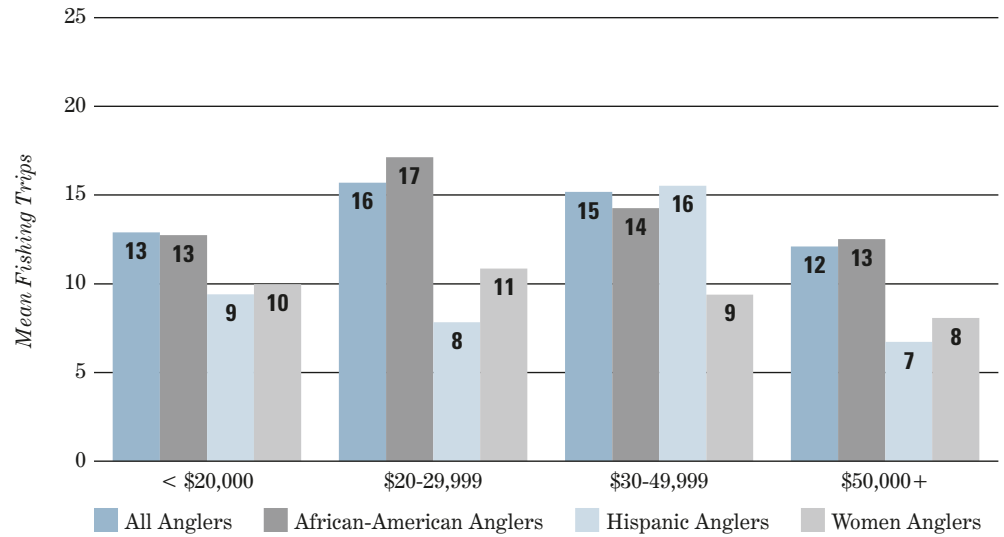


Figure 59. Mean Fishing Trips, by Place of Residence

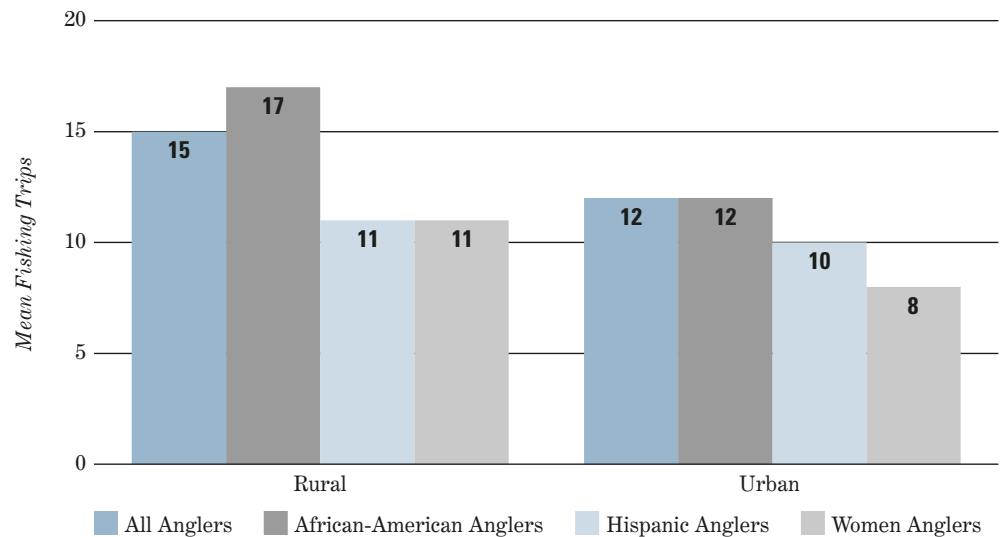
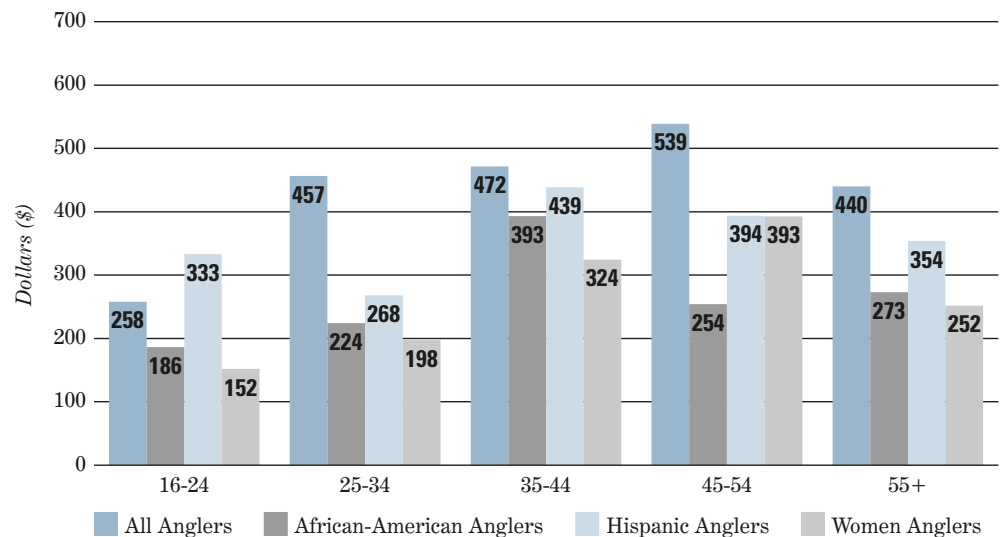


Figure 60. Mean Trip Expenditures, by Age



Mean trip expenditures increase as education increases for both all anglers and female anglers (Figure 61). Neither African-American anglers nor Hispanic anglers follow the same spending pattern. Mean trip expenditures for African-American anglers is \$205 for those without a high school degree, increases to \$376 for those anglers with some college, and decreases to \$308 for those anglers with at least a college degree. No pattern emerges for Hispanic anglers.

Figure 62 demonstrates the correlation between mean fishing trip expenditures and income. All anglers' trip expenditures are positively correlated with income, increasing from \$279 for those anglers with less than \$20,000 income to \$639 for those anglers with greater than \$50,000 income. Female anglers' trip expenditures are also positively correlated with income. Their trip expenditures are \$194 for those anglers with less than \$20,000 income and almost double to \$381 for anglers with greater than \$50,000 income. No pattern emerges for African-American or Hispanic anglers. However, all subpopulations have the greatest spending for those anglers with incomes greater than \$50,000.

Similar to all anglers, Hispanic anglers and female anglers from urban areas spend more, on average, for fishing trips than rural residents spend (Figure 63). In contrast, African-American anglers living in rural areas had higher fishing trip expenditures (\$342) than African-American anglers living in urban areas (\$252).

Figure 61. Mean Trip Expenditures, by Education

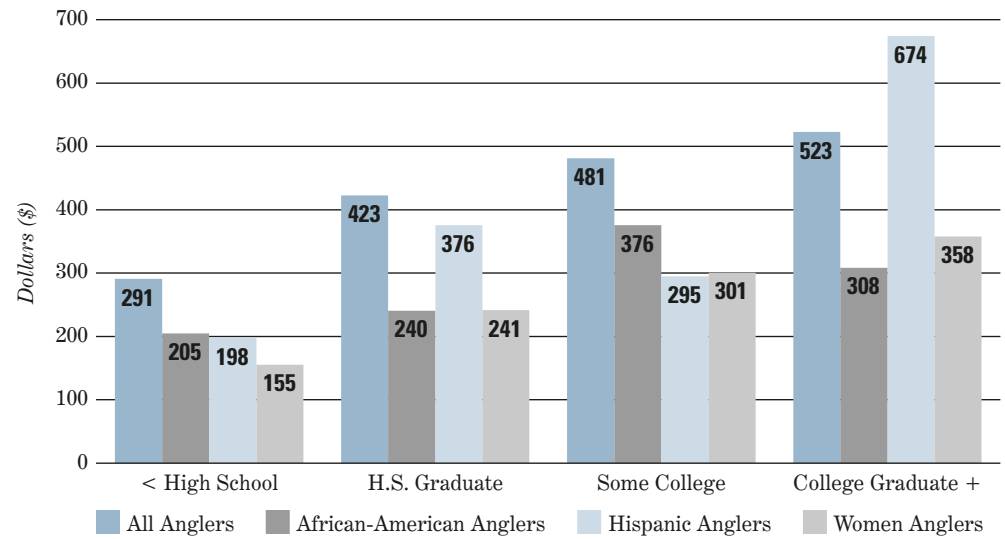


Figure 62. Mean Trip Expenditures, by Income

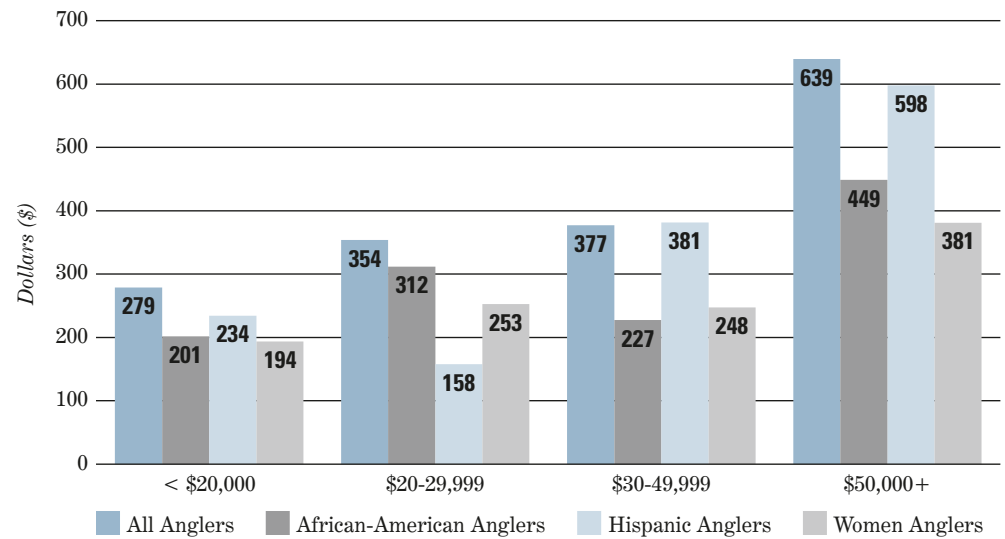
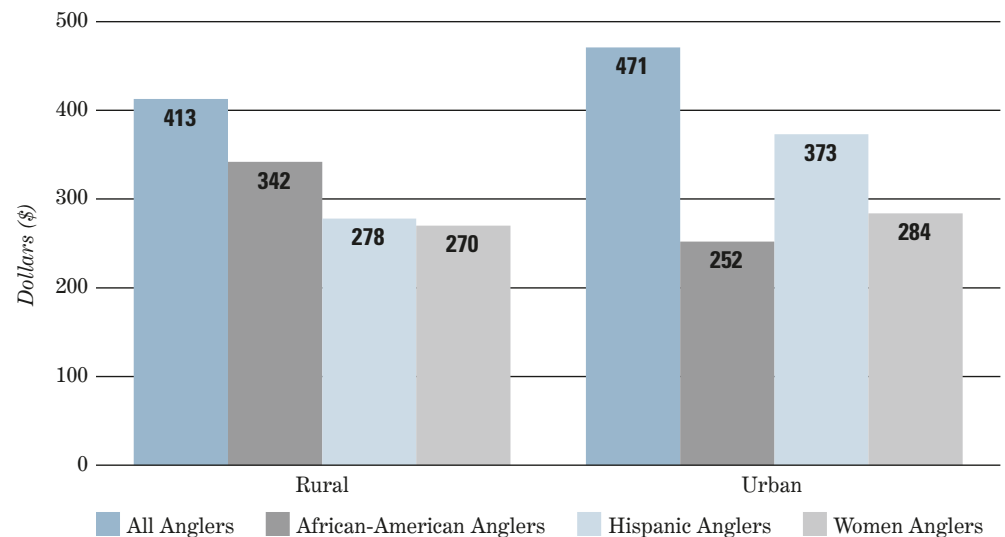


Figure 63. Mean Trip Expenditures, Place of Residence



Figures 64 thru 67 show mean equipment expenditures and their relationship to age, education, income, and residence, all else constant. Figure 64 shows the relationship between mean equipment expenditures and age. For both all anglers and African-American anglers, the highest equipment expenditures occur for those anglers age 35 to 44 and the lowest equipment expenditures occur for those anglers age 16 to 24 or over age 55. No pattern for Hispanic anglers or female anglers emerges.

For education in Figure 65, mean equipment expenditures gradually increase with increasing educational achievement for all anglers. African-American anglers follow this same pattern, with a slight spending decrease for those with at least a college degree. Neither Hispanic anglers nor female anglers show any pattern.

Figure 64. Mean Equipment Expenditures, by Age

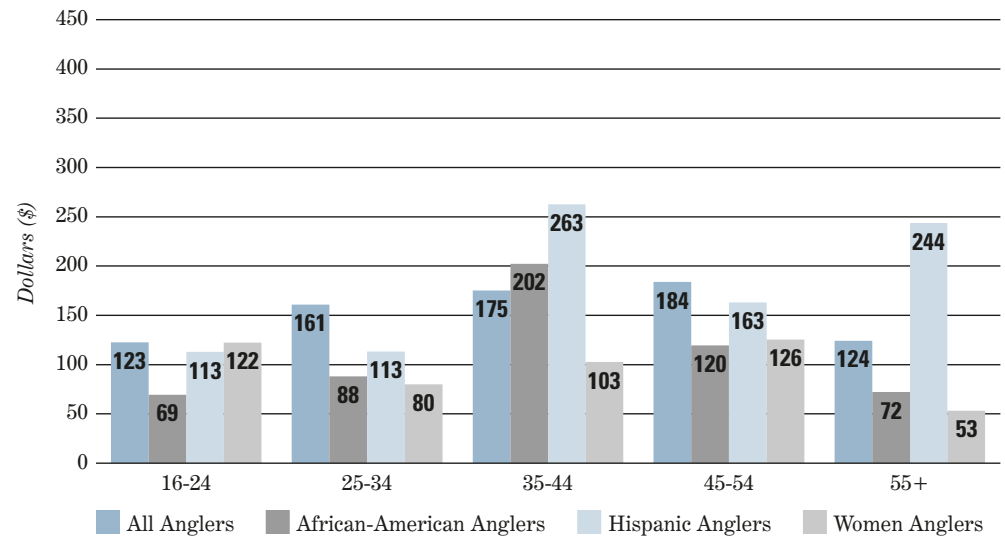
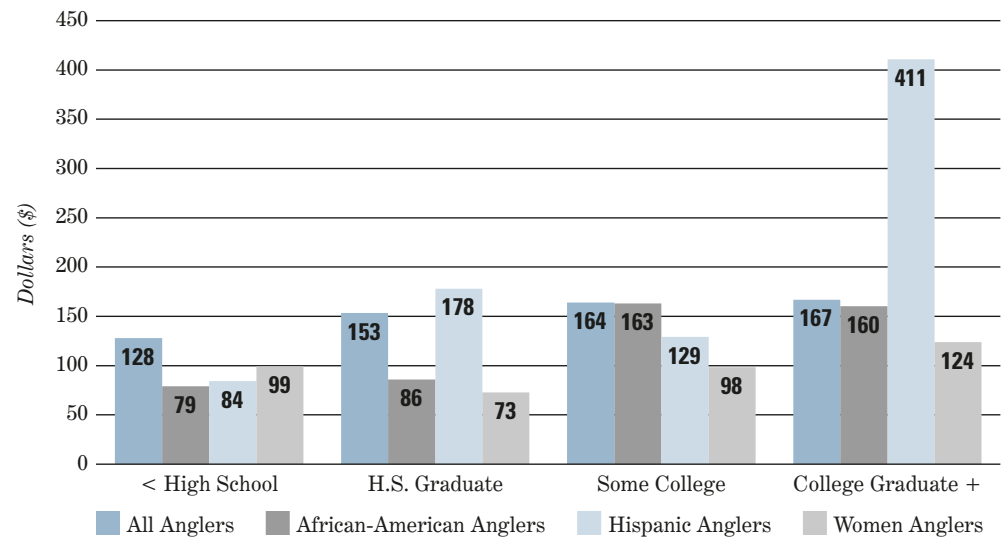


Figure 65. Mean Equipment Expenditures, by Education



Income and mean equipment expenditures are positively correlated for all anglers, African-American anglers, and Hispanic anglers (Figure 66). However, female anglers' equipment expenditures do not follow this general pattern. Equipment expenditures for female anglers remain relatively steady (\$85 to \$90) for anglers with up to \$49,999 income, and increase to \$113 annually for female anglers earning over \$50,000.

Similar to trip expenditures patterns, equipment expenditures are higher for urban residents than for rural residents (Figure 67). The exception to this pattern is the African-American angler.

Figure 66. Mean Equipment Expenditures, by Income

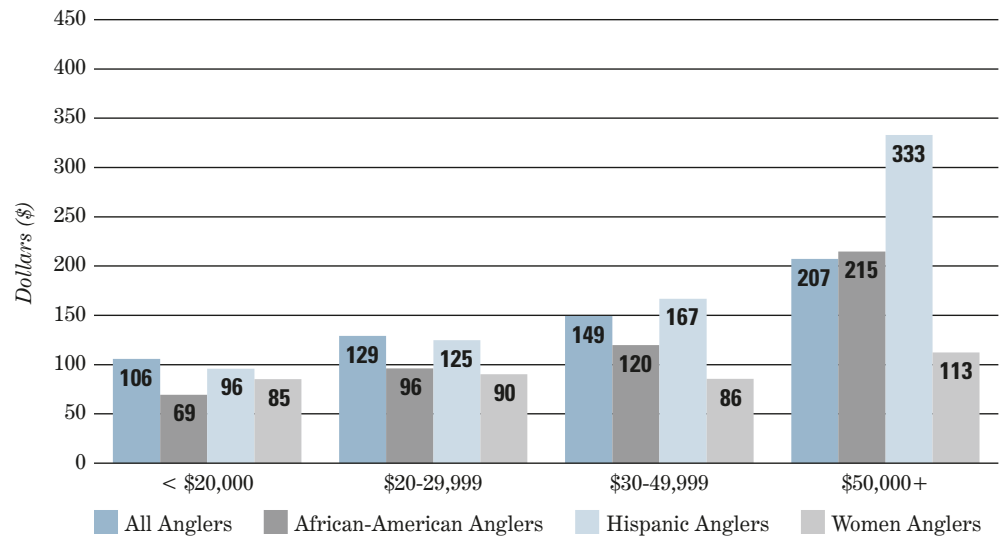
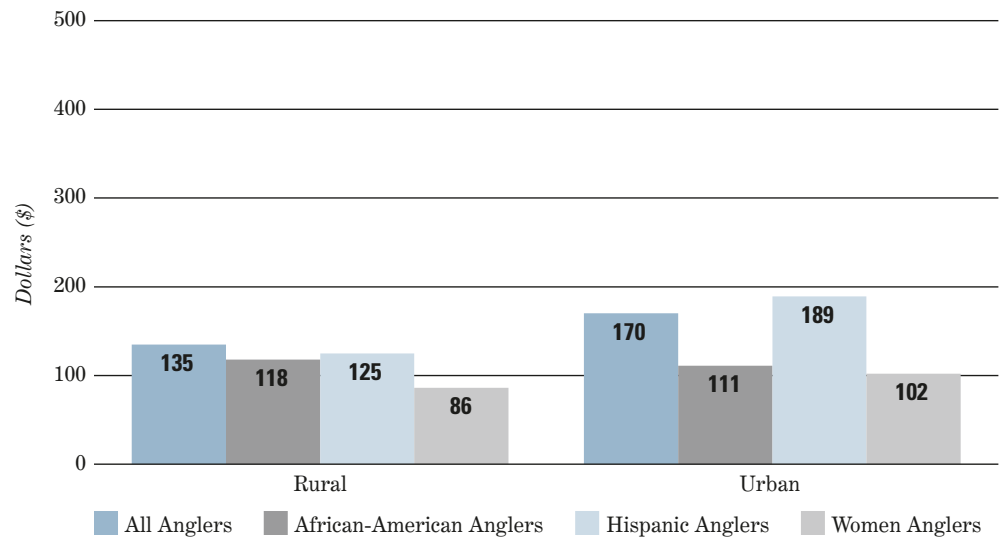


Figure 67. Mean Equipment Expenditures, by Place of Residence



Fishing Trends 1991, 1996, & 2001

Table 4 highlights the number of fishing participants, days, and expenditures from the 1991, 1996, and 2001 Surveys and the percentage change between the years. All expenditures are depicted in 2001 dollars. Two changes are made to 2001 expenditures in this table to be consistent with 1991 and 1996 estimates. First, fishing trip expenditures for 2001 are slightly different from those reported in Table 3 because they do not include heating and cooking fuel. Second, 2001 equipment expenditures are also somewhat different from Table 3 because auxiliary expenditures are not included to remain consistent with previous reports.

The number of all anglers decreased marginally (5 percent) between 1991 and 2001. The number of African-American anglers and female anglers also decreased during this period. Between 1996 and 2001, African-American angler participation decreased

from 1.80 million to 1.56 million. Female anglers decreased from 9.51 million to 8.91 million. Conversely, Hispanic anglers dramatically increased by nearly one-third.

Although the total number of anglers declined over the last decade, the fishing frequency of those anglers participating increased, with the exception of African-American anglers. Total fishing days increased by over 40 million days between 1991 and 2001. Hispanic and female fishing days increased by 33 percent and 10 percent respectively. Although fishing days for African-American anglers decreased by 38 percent between 1996 and 2001, this represents a marginal change from the number of fishing days in 1991.

Between 1996 and 2001, fishing trip expenditures for all anglers, African-American anglers, and female anglers decreased by 16 percent, 39 percent,

and 12 percent, respectively. There is no significant change for Hispanic anglers. During this same period, total fishing equipment expenditures decreased for all anglers, African-American anglers, and female anglers by 23 percent, 37 percent, and 13 percent respectively. Hispanic anglers have no significant change in equipment expenditures between 1996 and 2001. However, Hispanic anglers are the only subpopulation that had increasing trip expenditures (38 percent) and increasing equipment expenditures (49 percent) between 1991 and 2001.

Table 4. Angling Comparison: Participants, Days, & Expenditures in 1991, 1996, & 2001
(Numbers in thousands)

	Annual Estimates			Percentage Change*		
	1991	1996	2001	1991 to 1996	1996 to 2001	1991 to 2001
Anglers						
Total Anglers	35,787	35,246	34,071	*	-3	-5
African-American	1,815	1,802	1,564	*	-13	-14
Hispanic	1,218	1,185	1,564	*	+32	+28
Women	9,935	9,509	8,912	*	-6	-10
Days						
Total Days	511,328	625,893	557,394	+22	-11	+9
African-American	23,273	40,131	24,702	+72	-38	*
Hispanic	14,375	16,685	19,060	*	*	+33
Women	97,699	112,841	107,692	+16	*	+10
Fishing Expenditures**						
Total Trip Expenditures	\$15,443,868	\$17,299,985	14,578,102	+12	-16	*
African-American	\$569,120	\$659,450	401,003	*	-39	-30
Hispanic	\$385,395	\$577,791	532,569	+50	*	+38
Women	\$2,654,437	\$2,625,915	2,321,156	*	-12	-13
Total Equipment Expenditures	\$5,199,844	\$6,017,407	\$4,617,612	+16	-23	-11
African-American	\$182,371	\$260,875	\$163,347	+43	-37	*
Hispanic	\$167,547	\$206,509	\$249,084	*	*	+49
Women	\$946,316	\$757,855	\$662,179	-20	-13	-30

The “*” denotes that the percentage change is not different from zero at the 90 percent confidence level. Thus, for 90 percent of all possible samples, the estimate between one survey year is not different from another survey year. Expenditures are in 2001 dollars.

**All expenditures are depicted in 2001 dollars. Two changes are made to the 2001 expenditures to be consistent with 1991 and 1996 estimates. First, trip expenditures for 2001 are slightly different from those reported in Table 1 because heating and cooking fuel are not included. Second, the 2001 equipment expenditures are also slightly different because auxiliary expenditures are excluded. These exclusions were necessary to make the estimates comparable with previous publications.

Participation Models for Hunting & Fishing Activities

The descriptive statistics presented in the previous sections show that African-Americans, Hispanics, and females are less likely to fish and hunt than the general population in 2001. However, these descriptions are limited because conclusions cannot be made with certainty whether low participation is due to a person's race or gender, or if it is due to a combination of other social factors. For example, these groups often have lower education levels than the general population. Is low participation by minorities and females because of low education levels? Or, is participation low regardless of education? Empirical models are utilized to separate the effects of race, gender, and other socioeconomic variables on hunting and fishing participation. The implemented models remove the confounding effects of the correlation between race or gender and various socio-demographic characteristics to determine each characteristic's individual contribution to the probability of participating in hunting or fishing.¹³ Hunting and fishing are each addressed in separate empirical models.

¹³The model is a type of qualitative response model, where the dependent variable has a discrete outcome with a "yes or "no" decision. By using a logit model to estimate the probability of a particular outcome, the unboundedness problem is avoided. Equation 2 shows the model that is estimated. Equation 2 is estimated separately for hunting and fishing.

$$(1) P_i = \frac{e^{\beta_i X_i}}{1 + e^{\beta_i X_i}}$$

$$(2) \ln\left(\frac{P_i}{1 - P_i}\right) = \sum_{i=1} \beta_i X_i$$

where:

P_i = Probability that the i^{th} individual fished/hunted (i.e., "yes")

X_i = Vector of explanatory variables

β = Vector of coefficients to be estimated

The data are from the 2001 FHWAR screener survey and the 2001 FHWAR sportsmen survey. For the hunting model, the dependent variable is equal to one if the respondent hunted in 2001 or is equal to zero if the respondent did not hunt in 2001. The model hypothesizes that a person's decision whether or not to hunt is based on race, ethnicity, gender, urban residency, and other socio-demographic characteristics. The fishing

model is constructed identically, with the exception of the dependent variable determining the probability of fishing rather than hunting.

Table 5 defines the explanatory variables, which include continuous and binary variables. The frequency distribution by age suggests that middle-aged people are more likely to hunt than younger or older people are. To capture this hypothesized

Table 5. Definition of Variables for Probability Models

<i>Variable</i>	<i>Definition</i>	<i>Unit of Measurement</i>
PROBHUNT	Probability of hunting	1 = if respondent hunts 0 = otherwise
PROBFISH	Probability of fishing	1 = if respondent fishes 0 = otherwise
HISPANIC	Ethnicity of individual	1 = if respondent indicated Hispanic ethnicity 0 = otherwise
BLACK	Race of individual	1 = if respondent indicated race is Black 0 = otherwise
GENDER	Sex of individual	1 = if respondent is male 0 = if respondent is female
METRO	Urban residence	1 = if residence is in an urban area 0 = otherwise
RETIRED	Retirement status	1 = if respondent is retired 0 = otherwise
WEST	Location of respondent's residence	1 = if respondent resides in West 0 = otherwise
SOUTH	Location of respondent's residence	1 = if respondent resides in South 0 = otherwise
MID	Location of respondent's residence	1 = if respondent resides in Midwest 0 = otherwise
AGE	Age of respondent	Years \geq 16
AGE2	Age of respondent, squared	Years \geq 16
SCHOOL	Education level	Ordinal number between 1 and 18 (i.e., 1 = kindergarten; 18 = graduate or professional degree)
SCHOOL2	Education level, squared	Ordinal number between 1 and 36 (i.e., 1 = kindergarten; 36 = graduate or professional degree)
INCOME	Annual household income	Thousands of dollars

bell shaped distribution, age is represented by two variables: (1) AGE represents the age of the respondent, and (2) AGE2 is AGE squared. Education has a similar distribution. The variable SCHOOL is a continuous variable for the number of years of education completed, and SCHOOL2 is the school variable squared.

Hunting Participation Model

The hunting participation model is estimated from a sample of 73,453 households in the United States. The results are shown below in Table 6. Standard errors are in parentheses. All variables (except RETIRED) for the hunting participation model were significant at the one percent level.

As expected, the variables BLACK, HISPANIC, and GENDER show that African-Americans, Hispanics, and females are less likely to hunt compared to the those people who are not black, Hispanic, or female. The coefficient for GENDER is the largest of the three groups indicating that being a woman more heavily influences whether a person will hunt compared to being Hispanic or African-American.

As shown by the results for the INCOME variable, income has only a marginal impact on whether a person will choose to hunt. Although this result is consistent with Figure 13, we expected the INCOME coefficient to have a larger magnitude. The insignificance of the Retired variable indicates that retired people were not more or less likely to hunt than non-retired people.

A person's residence in a particular region of the U.S. affects whether a person will choose to hunt. The positive significant signs for SOUTH and MID reveal that people who live in the South or Midwest are more likely to hunt than people who live in the Northeast. Conversely, the negative significant sign for WEST implies that people living in the West are less likely to hunt than people living in the Northeast.

The age and education variables indicate that participation increased with age and education up to a point (reflected by the positive sign for AGE and SCHOOL) and then decreased (reflected by the negative sign on the squared variables: AGE2 and SCHOOL2).

In summary, the hunting participation model finds that a person who is African-American, Hispanic or female is less likely to hunt based on these classifications alone. Other factors that contribute to whether or not someone hunts are residency, age, education, and income.

Table 6. Results: Hunting Participation

Variable	Hunting Participation Model	
	Coefficient	Marginal Effect*
INTERCEPT	-6.1906 (0.0062)	—
HISPANIC	-1.1732 (0.0021)	-0.0086 (0.0005)
BLACK	-1.4733 (0.0024)	-0.0122 (0.0006)
GENDER	2.4622 (0.0012)	0.2444 (0.0010)
METRO	-1.1798 (0.0008)	-0.0479 (0.0005)
RETIRED	0.0442 (0.0017)	0.00002 (0.0001)
WEST	-0.1725 (0.0013)	-0.0004 (0.0001)
SOUTH	0.1582 (0.0011)	0.0006 (9.96*10 ⁻⁵)
MID	0.4566 (0.0011)	0.0031 (0.0002)
AGE	0.0748 (0.0001)	0.0056 (2.80*10 ⁻⁵)
AGE2	-0.00099 (1.604*10 ⁻⁶)	-0.0001 (3.77*10 ⁻⁷)
SCHOOL	0.2384 (0.0008)	0.0179 (4.81*10 ⁻⁵)
SCHOOL2	-0.0112 (0.00003)	-0.0008 (2.66*10 ⁻⁶)
INCOME	0.00209 (0.00001)	0.0002 (1.19*10 ⁻⁶)

*Note: The logit model in Equation 2 is solved using a maximum likelihood estimator (MLE), where the estimated coefficients are the impact on the log of the ratio for the decision to hunt to the decision not to hunt. To simplify the understanding of each variable's impact, marginal effects are included with the MLE results as well.

Fishing Participation Model

The model below was estimated from a sample of 73,453 households in the United States. All variables were significant at the 1 percent level. Standard errors are in parentheses.

Consistent with the results for the hunting participation model, the variables BLACK, HISPANIC, and GENDER show that African-Americans, Hispanics, and females are less likely to fish compared to the those people who are not black, Hispanic, or female. Once again, the coefficient for GENDER is the largest of the three groups indicating that being a woman more heavily influences whether a person will fish compared to being Hispanic or African-American. However, the magnitude of the GENDER coefficient is much smaller than in the hunting participation model.

The positive signs for WEST, SOUTH, and MIDWEST reveal that people who live in these regions are more likely to fish than people who live in the Northeast (the omitted variable). This variable is strongest for those living in the South or Midwest.

The positive sign for AGE and the negative sign for AGE2 demonstrates that the likelihood of fishing increases with age up to a certain point and then decreases. This result reaffirms the finding for all anglers in Figure 40.

Education behaves in the same manner as age; participation increases with education and then decreases after a certain point. This is different from the finding in Figure 41, which does not show any particular pattern for fishing participation associated with educational attainment.

The METRO variable reveals that people living in urban areas are less likely to fish than people living in rural areas. This result is consistent with Figure 43, which illustrated that 9 percent of anglers are urban residents while 22 percent of anglers are rural residents. The marginal effect of living in a urban residence has a larger impact than being African-American or Hispanic on whether or not a person decides to fish.

In summary, African-Americans, Hispanics, and females are less likely to fish regardless of their age, income, education or income levels. Retired people, residents of the South and people with higher incomes are more likely to fish. Education and age are also important predictors of whether or not someone fishes.

Table 7. Results: Fishing Participation

Variable	Fishing Participation Model	
	Coefficient	Marginal Effect
INTERCEPT	-4.7376 (0.0039)	—
HISPANIC	-0.9888 (0.0011)	-0.0057 (.0004)
BLACK	-0.8855 (0.0011)	-0.0042 (0.0004)
GENDER	1.2711 (0.0005)	0.0547 (0.0005)
METRO	-0.6054 (0.0005)	-0.0135 (0.0002)
RETIRED	0.2748 (0.0011)	0.0008 (0.0001)
WEST	0.1955 (0.0008)	0.0005 (0.0001)
SOUTH	0.4479 (0.0008)	0.0044 (0.0002)
MID	0.5449 (0.0008)	0.0041 (0.0002)
AGE	0.0753 (0.0001)	0.0051 (0.00003)
AGE2	-0.0010 (1.016*10 ⁻⁶)	-0.0001 (3.50*10 ⁻⁷)
SCHOOL	0.1839 (0.0005)	0.0125 (0.00003)
SCHOOL2	-0.0082 (0.00002)	-0.0006 (1.60*10 ⁻⁶)
INCOME	0.0042 (7.604*10 ⁻⁶)	0.0003 (1.69*10 ⁻⁶)

Summary

This report has presented detailed information on the participation and expenditure patterns of African-American, Hispanic, and female hunters and anglers. This information includes participation rates, participation levels (days and trips), expenditures, usage of public and private land, types of hunting and fishing, and species pursued. Comparisons of this information among the different populations for hunters and anglers reveal that these populations are unique in many respects. Also presented are models that predict the likelihood of participation in hunting and fishing. The models explain that regardless of socio-demographics, African-Americans, Hispanics, and females are less likely to hunt and fish than the general population.

The data can be used in several ways to improve hunting and fishing experiences of these low participation groups. One way might be to shape hunting and fishing conservation and safety programs for specific groups. Data on participation rates, participation levels, and expenditures can help pinpoint certain groups of people more likely to participate. For instance, the data show that females living in rural areas are more likely to hunt than females living in urban areas. Furthermore, females living in rural areas take more hunting trips and hunt more days, on average, than females living in urban areas. Hunting conservation and safety programs designed toward these demographics could be both well received and cost effective.



Photodisc

Hunting and fishing experiences might be improved through efficient allocation of resources. Data provided on the use of private and public land, types of hunting and fishing, and species sought combined with other data on participation might help resource managers make informed decisions. For example, the report shows that many hunters hunt predominately on private land. To avoid overcrowding and over-hunting, resource managers could examine the reasons why private land is preferred over public land for hunting and increase efforts to make public land more favorable. Information about types of hunting and fishing and species sought could be used in a similar manner.

Another use of the data is directing information toward the appropriate user groups. For instance, the report shows that a large proportion of Hispanic anglers reside and trout fish in the West. Changes in trout fishing regulations or trout fish advisories in the West could have a large impact on this group.

Wildlife professionals could target information to this group in Spanish and English and choose the best medium (e.g., newspaper, magazines, television, posters) to disseminate the information.

Expenditure information can provide the hunting and fishing industry with a better understanding of their customers. Demographic profiles of trip and equipment expenditures can be used to better serve customers and for marketing purposes. A key finding is that Hispanic anglers spend more on average on trips and equipment than many other groups. Furthermore, the number of Hispanic anglers and their spending has increased significantly over the last decade.

Above are just a few ways the report's information can be used. Wildlife professionals can use this information in any number of ways to arrive at a better understanding of groups who do not hunt or fish as much as the rest of the population.

Appendix A: Sample Sizes

Sample sizes for hunters and anglers are presented in Tables A-1, A-2, A-3, and A-4. For the statistical analysis, small sample sizes are considered to be between 10 and 29 observations. Samples sizes with less than ten were considered too small to report data reliably. These assumptions are consistent with the “2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation.”



Mike Hemming/USFWS

Table A-1. Sample Sizes for Hunters

Category	All Hunters				African-American Hunters				Hispanic Hunters				Female Hunters			
	Days	Trips	Equip. Expend.	Trip Expend.	Days	Trips	Equip. Expend.	Trip Expend.	Days	Trips	Equip. Expend.	Trip Expend.	Days	Trips	Equip. Expend.	Trip Expend.
Age																
16-24	824	822	827	822	12	12	12	12	25	25	25	25	89	88	89	86
25-34	1,043	1,041	1,052	1,043	19	19	20	20	32	32	32	32	121	120	122	122
35-44	1,472	1,469	1,485	1,471	18	18	18	18	40	40	40	40	139	137	136	141
45-54	1,261	1,258	1,267	1,255	28	28	28	28	35	35	35	35	116	115	115	117
55+	1,082	1,082	1,088	1,080	28	28	29	29	17	17	17	17	77	77	77	78
Education																
< High School	753	751	759	753	26	26	27	27	24	24	24	24	55	54	54	54
H.S. Graduate	2,190	2,187	2,204	2,187	42	42	43	43	68	68	68	68	221	218	219	224
Some College	1,513	1,510	1,523	1,504	26	26	26	26	34	34	34	34	172	171	169	172
College Graduate +	1,226	1,224	1,233	1,227	11	11	11	11	23	23	23	23	94	94	94	95
Income																
< \$20,000	1,555	1,550	1,582	1,550	40	40	42	41	41	41	41	41	172	170	170	178
\$20-29,999	611	611	614	611	24	24	24	24	12	12	12	12	72	71	71	72
\$30-49,999	1,333	1,329	1,336	1,330	20	20	20	20	45	45	45	45	117	115	115	117
\$50,000+	2,183	2,182	2,187	2,180	21	21	21	21	51	51	51	51	181	181	180	181
Region																
Midwest	1,663	1,661	1,675	1,657	10	10	10	10	16	16	16	16	145	143	142	145
Northeast	766	765	770	765	4	4	4	4	5	5	5	5	56	56	57	58
South	1,873	1,870	1,884	1,871	83	83	85	84	33	33	33	33	169	167	166	171
West	1,380	1,376	1,390	1,378	8	8	8	8	95	95	95	95	172	171	171	174

Table A-2. Sample Sizes for Hunters continued

<i>Category</i>	<i>All Hunters</i>	<i>African American Hunters</i>	<i>Hispanic Hunters</i>	<i>Female Hunters</i>
Type of Hunting				
Big Game	457	69	130	459
Small Game	2,468	77	48	155
Migratory Birds	1,281	12	39	60
Other Animals	498	11	10	25
Type of Game				
Deer	4,325	69	106	393
Wild Turkey	944	9	13	63
Squirrel	820	40	11	46
Rabbit	860	55	16	55
Region				
Midwest	1,675	10	16	145
Northeast	770	4	5	58
South	1,884	85	33	171
West	1,390	8	95	174
Type of Land				
Private Land	4,461	86	76	397
Public Land	2,887	41	106	223
Residence				
Urban	2,493	46	99	199
Rural	3,226	61	50	349

Table A-3. Sample Sizes for Anglers

Category	All Anglers				African American Anglers				Hispanic Anglers				Female Anglers			
	Days	Trips	Trip Expend.	Equip Expend.	Days	Trips	Trip Expend.	Equip Expend.	Days	Trips	Trip Expend.	Equip Expend.	Days	Trips	Trip Expend.	Equip Expend.
Age																
16-24	1,687	1,659	1,654	1,698	64	63	63	64	89	88	88	89	417	411	409	423
25-34	2,463	2,401	2,399	2,482	93	90	91	96	124	121	120	125	700	675	676	710
35-44	3,493	3,410	3,410	3,524	118	111	111	120	131	126	127	133	958	928	925	968
45-54	2,752	2,688	2,676	2,775	122	118	118	123	70	70	69	71	689	670	665	697
55+	2,788	2,713	2,712	2,817	130	124	128	136	49	46	47	49	617	598	595	626
Education																
< High School	1,610	1,580	1,580	1,621	131	129	130	133	104	100	99	104	355	351	349	359
H.S. Graduate	4,560	4,442	4,433	4,610	192	185	187	198	168	167	167	170	1,191	1,150	1,146	1,208
Some College	3,547	3,454	3,443	3,571	136	127	128	138	113	108	108	114	976	947	944	990
College Graduate +	3,466	3,395	3,395	3,494	68	65	66	70	78	76	77	79	859	834	831	867
Income																
< \$20,000	3,845	3,724	3,722	3,914	242	233	237	252	149	145	146	153	1,112	1,080	1,077	1,137
\$20-29,999	1,376	1,349	1,346	1,386	78	74	74	80	67	65	64	67	362	353	351	365
\$30-49,999	2,812	2,762	2,757	2,823	100	96	97	100	112	110	110	112	715	695	692	720
\$50,000+	5,150	5,036	5,026	5,173	107	103	103	107	135	131	131	135	1,192	1,154	1,150	1,202
Region																
Midwest	3,378	3,264	3,271	3,413	70	66	69	72	47	47	48	49	935	900	902	950
Northeast	2,035	1,963	1,955	2,058	41	36	38	46	44	42	42	45	402	380	377	409
South	4,330	4,248	4,239	4,364	375	363	363	380	106	102	102	106	1,128	1,105	1,100	1,143
West	3,440	3,396	3,386	3,461	41	41	41	41	266	260	259	267	916	897	891	922

Table A-3. Sample Sizes for Anglers continued

<i>Category</i>	<i>All Anglers</i>	<i>African American Anglers</i>	<i>Hispanic Anglers</i>	<i>Female Anglers</i>
Type of Fishing				
Freshwater (excludes Great Lakes)	11,161	425	361	2,833
Saltwater	3,412	168	165	776
Great Lakes	451	30	8	75
Type of Freshwater Species				
Black Bass	3,898	153	91	749
Panfish	2,844	174	45	753
Trout	3,748	46	173	817
Catfish	2,656	213	104	651
Type of Saltwater Species				
Flatfish	871	41	27	193
Striped Bass	779	29	19	101
Sea Trout	407	28	12	71
Blue Fish	535	16	19	69
Region				
Midwest	3,413	72	49	950
Northeast	2,058	46	45	409
South	4,364	380	106	1,143
West	3,461	41	267	922

U.S. Fish & Wildlife Service
Division of Federal Aid
Washington, DC 20240
<http://federalaid.fws.gov>

May 2004

