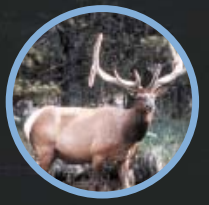
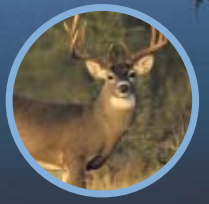
TRUSTEES

Theodore Roosevelt Conservation Alliance Presents:

The Economic Impacts of Fishing, Hunting and Wildlife Viewing on National Forest Lands





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WELCOME

You obviously care about the future of our national forest system and the American economy or you wouldn't be reading this valuable research that shows the collective size and strength of hunters and anglers.

The Theodore Roosevelt Conservation Alliance (TRCA) is dedicated to helping grassroots sporting groups and their constituents be heard where the decisions are made our national forests and grasslands. Picture the lone raindrop falling to the forest floor, pooling into a trickle that reaches the stream that adds strength to the raging river and becomes the thundering waterfall.

Our collective voices have that same power!

Our Trustees: Izaak Walton League of America, Mule Deer Foundation, Rocky Mountain Elk Foundation, Trout Unlimited, Wildlife Forever and The Wildlife Management Institute invite you to stand up and be counted. Let your voice be heard by joining us if you want to nurture, enhance and protect our fish, wildlife and habitat resources on our national forest system.

With pride, TRCA highlights the conservation legacy of American leaders, elected officials and citizen volunteers whose foresight gave us our public lands that are home to most of the country's elk, mule deer and other species.

It is that same foresight which guided the American Sportfishing Association and US Forest Service to quantify the economic impact of recreational fishing and hunting on our national forests. We want to thank them for their hard work and insights. They deserve the credit for the original project.

If you would like additional copies of this reprint free from TRCA to share with others, please call us toll-free at 1-877-770-8722 or view it on-line at www.trca.org.

Remember, you and I are forebearers to future generations of Americans who will judge us by our stewardship of these critical watersheds and public resources.

Wishing you the best afield,

Bob Munson

Bob Munson
Director

Special thanks to the critical funding of the Pew Charitable Trusts.

LIST OF FIGURES AND TABLES

ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

In this project, the economic contributions of fishing, hunting, and wildlife-viewing activities that occur on National Forest lands are quantified. Data on expenditures and participation came from the 1996 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (U.S. Department of the Interior, 1997). Input/Output models were developed to provide economic impact estimates on a statewide and regional basis. These results are intended to help managers plan resource activities and increase public awareness of fishing, hunting, and viewing use opportunities on National Forest lands.

Wildlife related recreation (fishing, wildlife viewing, and hunting) on National Forest lands provides significant benefits to state and regional economies throughout the nation. In 1996, wildlife related recreation on Forest Service lands contributed about $21 billion to the nations economy. This economic activity supported 238,800 full time equivalent (FTE) jobs, and generated $421 million in state sales and income taxes. Within the National Forest System fishing generated the largest economic impact, followed by hunting and wildlife viewing.

In 1996, fishing within the National Forest System generated $2.9 billion in retail sales, $8.5 billion in total multiplier effects, $2.2 billion in salaries and wages, and 95,720 (FTE) jobs annually. Fishing on National Forest lands also provided $128.2 million in state sales tax revenues, $33.5 million in state income tax revenues, and $241.6 million in federal income tax revenues. Nonconsumptive wildlife-related activities on National Forest lands generated $2.1 billion in retail sales, $6.3 billion in total multiplier effects, $1.6 billion in salaries and wages, 70,372 (FTE) jobs, $98.8 million in state sales tax revenues, $22.5 million in state income tax revenues, and $177.6 million in federal income tax revenues.

The results show that hunting on National Forest lands generated $2.1 billion in retail sales, $6.1 billion in total multiplier effects, $1.69 billion in salaries and wages, and 72,719 (FTE) jobs annually for the U.S. economy in 1996. Hunting also provided tax revenues by generating $105.7 million in state sales tax and $32.6 million in state income tax revenues, and $181.7 million in federal income tax revenues.

Economic impacts were calculated separately for big game, small game, and migratory bird hunting on Forest Service lands. Big game hunting was extremely popular, and in 1996 hunters spent 16.2 million days targeting big game species within the National Forest System, spending a total of $1.26 billion on their trips. These expenditures generated, $3.6 billion in total output, $996 million in salaries and wages, and supported 42,225 full time equivalent jobs annually for the U.S. economy. Big game hunting also provided tax revenues by generating $65.2 million in state sales tax and $21.1 million in state income tax revenues, and $107.9 million in federal income tax revenues.

On National Forest lands small game hunting and migratory bird hunting were less popular than big game hunting. In 1996, these activities generated $227.8 million and $243.3 million in retail sales respectively. Economic activity associated with small game hunting amounted to $663 million that supported 8,102 jobs (FTE), generated $19.6 million in state sales and income taxes, and $19 million in federal income taxes. Economic activity associated with migratory bird hunting amounted to $714 million that supported 8,801 jobs (FTE), generated $19.2 million in state sales and income taxes, and $21.0 million in federal income taxes.

From these results it is evident that outdoor recreation benefits a variety of industries, and contributes millions of dollars annually to state and federal coffers. By recognizing the huge economic contributions of fish and wildlife-related activities that take place on National Forest lands, and using these data to help manage all forest resources wisely, the local communities and the national economy will realize long term sustained benefits.

The National Forest System provides high quality wildlife recreational opportunities throughout the nation. In addition, hunting, fishing and other wildlife-related activities on National Forest lands provide the U.S. and state economies with important sources of jobs, income and other benefits.

This study did not measure economic impact to local economies in close proximity to National Forest lands. However, benefits from wildlife related recreational activities are particularly important in rural or remote areas, where other sources of income are limited. By supporting billions in retail sales, tens of thousands of jobs and billions in salaries and wages, fishing, hunting and other wildlife-related activities are of great value not only to industry and local businesses, but to every resident of every community surrounding National Forest Service lands.

Apart from providing business and job opportunities, outdoor recreation contributes other benefits to our society. The American Recreation Coalition reported that Americans who participate in outdoor recreation during childhood and adulthood have an overall higher quality of life than others (ARC, 1996). In addition to contributing recreational activities, national forests provide aesthetically pleasing surroundings prized by millions of Americans who want to live and work in a rural setting.

INTRODUCTION

Fishing, hunting and wildlife-watching are popular and traditional pastimes, which result in significant economic impacts to the nation. It was determined that 77 million adult Americans (16 years old and older) participated in these activities during 1996 (U.S. Department of Interior, 1997). This means that 38% of the adult U.S. population in 1996 took recreational trips for the primary purpose of fishing, hunting and wildlife-watching. Expenditures associated with wildlife related recreation totaled $101 billion in 1996. These figures represent participation and expenditures throughout the nation on private and public lands.

For the nation's 77 million people who, fish, hunt, and view wildlife, managing national forests for recreational use is extremely important, since the Forest Service oversees 30% of all federal lands, more private land owners are restricting access to their property, and outdoor recreation is growing by two points per year (ARC, 1996). Moreover, the tourism, recreational equipment and transportation sectors of our economy are dependent upon the provision of outdoor recreational opportunities on public lands. In this study, economic impacts from recreational fishing, hunting, and wildlife viewing are estimated for areas managed by the Forest Service. Local community impacts are not calculated in this study. Economic impacts are determined on a statewide basis and regional summaries are presented. Completion of this project accomplishes a primary task of the Forest Services Eyes on Wildlife Strategic Plan, Rise to the Future Fisheries Program Action Plan, and the Wildlife, Fish and Rare Plant Communication Strategic Plan.

Economic Concepts

The economic benefits of outdoor recreation can be estimated by two types of economic methods: economic impact analysis and economic valuation. An economic impact analysis addresses the business and financial activity resulting from users expenditures. Economic value measures the intrinsic value received by the user in the course of their outdoor activity. Technically, net economic value measures the difference between what an individual would be willing to pay and what they actually pay for a commodity or activity. This concept is also known as consumer surplus. Only economic impacts are addressed in this report.

There are three types of economic impacts: direct, indirect, and induced. A direct impact is created by the initial purchase made by the consumer. For example, when a person buys binoculars for $395 there is a direct impact to the retailer of $395. Indirect impacts are secondary effects generated from a direct impact. For example, the retail store must purchase additional binoculars; the binocular manufacturer must purchase additional glass and metals for production; glass manufacturers must buy inputs, and so on. Therefore, the original expenditure of $395 for the binoculars benefits a host of other industries. An induced impact results from the wages and salaries paid by the directly and indirectly impacted industries. The employees of these industries spend their income on various goods and services. These expenditures are known as induced impacts which, in turn, create a continual cycle of additional indirect and induced effects.

The sum of the direct, indirect and induced impacts equals the total economic impact. As the original retail purchase goes through round after round of indirect and induced effects, the economic impact of the original purchase is multiplied, benefiting many industries and individuals. Likewise, the reverse is true. If a particular item or industry is removed from the economy, the economic loss is greater than the original lost retail sale. Once the original retail purchase is made, each successive round of spending is smaller than the previous round. When the economic benefits are no longer measurable, the economic examination ends.

METHODS

The methods used to estimate days of participation and economic impacts of wildlife-associated recreational activities on National Forest lands are separated into six stages:

- Extract days of participation and tabulate recreationists expenditures;
- Calculate participation and expenditures attributable to National Forest lands;
- Develop trends in participation and expenditures between 1991 and 1996 for all wildlife related activities;
- Disaggregate the expenditures into retail, wholesale, and manufacturer portions;
- Generate economic impact estimates by applying the economic model to the adjusted expenditures;
- Calculate state sales tax, state income tax, and federal income tax revenues;
- Calculate standard errors for 1996 regional participation and expenditure estimates.

Participation

Days of participation were obtained from the U. S. Fish and Wildlife Service's 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (The National Survey). Anglers, hunters, and wildlife watchers were asked to report days of activity where the particular recreational activity was the primary purpose of their trip. In the case of hunting and wildlife viewing, the National Survey collects data specifically on participation on public lands. Initial 1996 participation estimates for all three activities on National Forest lands were submitted to Forest Service Regional offices for comment. If appropriate, recommendations made by Forest Service personnel were used to modify estimates.

Freshwater fishing days including Great Lakes fishing effort were downloaded for each state. For each state, a ratio was applied to this data in order to estimate the number of angler days on National Forest lands. Except for Alaska, this downweighting factor was the ratio of the surface area of water bodies on National Forest lands and the total surface area of all inland water bodies within the state (Appendix 1). In Alaska, most fishing takes place in the South Central and Southeast portions of the state (Howe et. al., 1996), and Forest Service lands are located in these areas in Alaska. Thus, the downweighting factor was the ratio of surface area of water bodies on National Forest lands in Alaska and surface area of inland water bodies in the entire Southeast and South Central portions of the state.

In the case of wildlife viewing, only nonresidential wildlife viewing days on public lands were downloaded. Nonresidential participation is defined as activity occurring at least 1 mile away from the respondents home. The National Survey does not specifically elicit data on public lands viewing days. Instead respondents were asked whether they viewed wildlife on private and or public lands in each state. A ratio was developed from these responses to calculate the total public wildlife viewing days:

- If the response was yes to public land and no to private land then all days in that state was assumed to be on public lands.
- If the response was yes to both public and private lands, then 50% of all days in that state was assumed to be on public lands.
- If the respondent was not sure if activity occurred on public or private land, then 50% of all days in that state was assumed to be on public lands.

The proportion of these public viewing days on Forest Service (FS) lands was estimated as the ratio of FS land acreage and total public land acreage (federal, state, and local) within the state (Appendix 2). It was assumed that wildlife viewing took place on all public lands. There was no reliable information on all public land acreage in Alaska, and since 70% of all land in Alaska is managed by federal agencies, the ratio used to downweight total public viewing days was calculated as the ratio of Forest Service acreage and total federal land acreage in Alaska (Bureau of Land Management, 1996).

Sportsmen responding to the National Survey were asked specifically to recall the number of days they spent hunting on public lands. Thus, it was possible to extract total hunting days, big game hunting days, small game hunting days, and migratory bird hunting days on public lands from the National Survey database. Again a ratio was applied to this data to estimate the level of public hunting on Forest Service lands on a statewide basis. The proportion of these public viewing days on Forest Service (FS) lands was estimated as the ratio of FS land acreage and total federal and state public land acreage within the state (Appendix 2). It was assumed that hunting would not occur on local and municipal public lands. This ratio was then adjusted by data obtained from each Forest Service regional office. Some regional offices provided hunting participation data that gave more insight into the proportion of public hunting on Forest Service lands:

1. Data from the Alaska office indicates that the total number of hunting days in South Central and South East Alaska was 499,118 in 1994, and the Forest Service days amounted to 135,208. Thus the ratio of 37.16% was used to weight the public lands hunting data (In Alaska 73% of all hunting takes place on public lands).

2. In Utah and Wyoming, independent surveys indicate that 67% of all public hunting days in the state took place on National Forest lands.

Participation data were extracted from the 1991 National Survey (U.S. Department of the Interior, 1993), and proportionally reduced to reflect participation on Forest Service lands. The same methods were used to derive participation estimates as described for the 1996 estimates. Estimation of 1991 participation and expenditure on National Forest lands was required to establish trends between 1991 and 1996. A previous study conducted for the Forest Service, The 1994 Economic Impacts of Fishing, Hunting, and Wildlife-Related Recreation on National Forest lands, utilized data from the 1991 National Survey. However, the methods used to estimate Forest Service participation and corresponding expenditures were not the same as utilized in this analysis.

Expenditures

The 1996 National Survey collects expenditure information where the primary purpose of the purchase was for hunting, inland (freshwater and Great Lakes) fishing, or non consumptive wildlife-related activities. For the purposes of this project, inland fishing, hunting and nonconsumptive wildlife-related recreation expenditure data were downloaded from the survey database separately for individual states. Also, hunting expenditures for big game, small game and migratory bird hunting were separately extracted from this data base.

For all activities, expenditures were extracted individually by expenditure item. Expenditures included trip-related (e.g. food, lodging, fuel), hunting equipment (e.g. guns, decoys, ammunition), fishing equipment (e.g. rods, reels, lures), wildlife viewing equipment (e.g. binoculars, photographic equipment), auxiliary equipment (e.g. camping equipment), special equipment (e.g. boats), and other purchases made for the specific recreational activity. A complete description of these expenditure categories for fishing, hunting, and wildlife viewing is contained in Appendix 3.

Fishing and hunting expenditures that would not be incurred for fishing or hunting on public lands were deleted as follows: private land use or access fees; cabins; and land leasing and ownership. Then for each state, expenditure estimates were divided by the total number of days spent fishing and hunting respectively. This provided a measure of daily expenditures made for hunting and fishing on public lands. Similarly, average daily expenditures were calculated for big game, small game, and migratory bird hunting.

For non consumptive wildlife-related use, certain expenditures were not included as they are typically for wildlife-related activities around the home or on private land. These include: bird houses; bird feeders; commercial bird seed; plantings; private land use or access fees; cabins; and land leasing and ownership. Again, for each state, wildlife viewing expenditure estimates were divided by the total number of days spent wildlife watching. This provided a measure of daily expenditures made for wildlife viewing on public lands.

The Survey does not have a separate category for fishing, hunting and wildlife-related use expenditures made on National Forest lands. For each recreational activity in each state, direct expenditures per day for all expenditure items were multiplied by estimated days of participation on Forest Service lands, to derive total expenditures on Forest Service lands. Retail sales for the region would then be the sum of state expenditures in that region.

Expenditure data were extracted from the 1991 National Survey, and the same methods, as described above for calculating the 1996 estimates, were used to determine 1991 expenditures made for hunting, fishing, and wildlife viewing on National Forest lands. Also, 1991 expenditure estimates were adjusted for inflation to represent 1996 dollars.

Margins

Retail sales (recreationist expenditures) were separated into manufacturing, wholesale and retail sub-categories because economic impact analyses treats each segment as separate industries. The amount of each retail sale attributed to each segment is known as a margin. A margin is the percentage, or mark-up, of a sale attributable to either the retail, wholesale or manufacturing sector. For example, 70 percent of the final retail dollar value of a shotgun sale may be attributed to the manufacturer, 5 percent to the wholesaler and 25 percent to the retailer. This means that the manufacturing industry has earned 70 percent of the final retail price, the wholesaler accrued 5 percent of the sale, and the retailer received 25 percent. Since there are no wholesale or manufacturing activities in the service sector, services are not subjected to the above process.

Retail and wholesale margins (the percentage markup made over costs by retailers or wholesalers) were calculated using gross margin and sales data from the U.S. Census Bureau publications The Annual Retail Trade Survey: 1986 to 1996 and The Annual Benchmark Report for Wholesale Trade: January 1987 to February 1997 for 1996 retail and wholesale sectors. Gross margins were divided by the corresponding sales figures to calculate the margins for the retailers and wholesalers in question. These margins were then used to calculate the percentage of an expenditure which can be attributed to retailers and wholesalers for a given product. The formulae used were:

Retailer portion = R / (1+R)

Wholesaler portion = W / [(1+R) * (1+W)]

where W = wholesale margin and R = retail margin.

Manufacturing portions were then calculated by subtracting retail and wholesale portions from 100 percent. Market portions were calculated for industry sectors as classified by Standard Industrial Classification codes.

Economic Impact Modeling

To estimate the economic impacts the data were analyzed with an economic model: the RIMS-II Regional Input-Output model. The RIMS-II model was developed by U.S. Dept. of Commerce, Bureau of Economic Analysis for primary use by the federal government. Input-output models describe how sales in one industry impact other industries. For example, once a sportsman makes a purchase, the retailer buys more merchandise from wholesalers, who buy more from manufacturers, who, in turn, purchase new inputs and supplies. In addition, the wages and salaries paid by these businesses stimulate more benefits. Simply, the first purchase creates numerous rounds of purchasing. Input-output analysis tracks how the various rounds of purchasing benefits other industries and generates economic benefits.

The relationships between industries are explained through multipliers. For example, an income multiplier of 0.09 for industry X would indicate that for every dollar received by the industry under study, nine cents would be paid to the employees of industry X. The RIMS-II model provides multipliers for all major industries. The multipliers include direct, indirect and induced effects. The RIMS-II model includes output, earnings and employment multipliers. The output multiplier measures the total economic effects created by the original retail sale. The earnings multiplier measures the total salaries and wages generated by the original retail sale. The employment multiplier estimates the number of jobs supported by the original retail sale.

To apply the RIMS-II model, recreationist expenditures are each matched to the appropriate output, earnings and employment multipliers. For example, dollars attributed to gasoline refining are multiplied separately by the earnings, output and employment multipliers specific to gasoline refinement. The resulting estimates describe the salaries and wages, total economic effects, and jobs supported by the refining industry as a result of fuel purchases made by recreationists. This same process is repeated for all reported expenditures. After all expenditures and multipliers have been applied together, the retail, wholesale and manufacturing results for each category are summed together. Total economic output represents the direct, indirect, and induced impacts.

Tax Revenues

State sales tax revenues were calculated by multiplying expenditures on goods and services by the respective state sales tax rates and fuel expenditures by fuel tax rates from 1996. Tables providing sales and fuel tax information were obtained from the Commerce Clearing Houses State Tax Guide. Prevailing gasoline prices were obtained from the Census Bureau. Due to the widely differing fees, wholesaler/manufacturer and use taxes were not included in this study.

Income tax figures could not be calculated simply from earnings because of the progressive nature of most state income tax systems. Instead, income tax revenues were estimated by calculating earnings per job for each state. The taxes paid on this average level of earnings were determined using income tax tables from the Commerce Clearing House. The average earnings per job were reduced by the applicable standard deductions and exemptions to approximate the taxable portion of earnings subject to income taxes. The taxes per job were then multiplied by the total number of jobs to provide an estimated total income tax figure.

Similarly, federal income tax revenues were calculated by dividing the total income generated by recreationists expenditures by the total number of jobs supported by recreationists expenditures. The result was the average income per job. From this, a standard deduction (per 1996 tax return forms, 1040-EZ) was subtracted. The applicable tax rate was then applied according to the 1996 IRS tax schedule for single filers to determine the average tax paid per job. Finally, the average tax paid per job was multiplied by the total number of jobs to determine the total federal income tax revenue generated by recreationists in 1996. Efforts were not made specifically to account for deductions such as itemized expenses (house/mortgage interest, etc.) due to the widely divergent nature of these deductions.

Standard Errors

Standard errors were calculated for participation and expenditure estimates in order to determine if these estimates were significant. Standard errors are indicators of the precision of participation and expenditure estimates. Also, multiplying standard errors by 1.96 will yield 95% confidence intervals.

The formula used to calculate standard errors is described in Appendix 4. Parameters for calculating fishing, hunting, and wildlife viewing standard errors are contained in Appendices 5, 6, and 7.

For each activity, economic impact estimates for individual expenditure items were summed and state level estimates are presented in Appendix 8 to Appendix 12. Regional estimates for expenditures, output, wages, full time equivalent (FTE) jobs, and taxes were calculated as the sum of respective estimates for individual states within the region. Standard errors for regional estimates were calculated as the square root of the sum of the variances for individual state estimates within the region. Table 2 to Table 11 provides these regional summaries for fishing, wildlife viewing, and hunting. Table 1 contains the national summary of participation and economic impacts of all wildlife related recreation activities within the National Forest System.

RESULTS

Wildlife related recreation (fishing, wildlife viewing, and hunting) on National Forest lands provides significant benefits to state and regional economies throughout the nation. In 1996, wildlife related recreation on Forest Service lands contributed nearly $21 billion to the nations economy. This economic activity supported 238,800 full time equivalent jobs, and generated $421 million in state sales and income taxes (Table 1). Within the National Forest System, fishing generated the largest economic impact, followed by hunting and wildlife viewing.

The discussion on results begins by focusing on the economic contributions of fishing on National Forest lands, then the economic benefits of wildlife viewing is presented, followed by the economic contributions of hunting on National Forest lands. These results reflect participation and economic data for 1996. Economic impacts are calculated at the state and regional level. These estimates do not reflect the economic impact of wildlife related recreation in local communities close to National Forest locations. Regional summaries are presented in this section and state wide estimates are contained in the Appendix section. In addition, trends in participation and retail sales between 1991 and 1996 are discussed.

One of the most important trends observed nationwide on both public and private lands was an increase in avidity among hunters and anglers nationwide between 1991 and 1996 (U.S. Department of the Interior, 1997). However, there was a significant decline in the number of wildlife watching participants and days of participation in 1996 compared to 1991 (U.S. Department of the Interior, 1997). From 1991 to 1996 the U.S. economy recovered from a mild recession and average real disposable personal income increased. This resulted in increased spending by American consumers on leisure activities and recreational equipment.

Economic Impacts of Fishing on National Forest Lands

A total of $2.9 billion was spent by U.S. anglers for fishing activities on Forest Service lands during 1996 (Table 2). Over 40% was trip related expenditures such as food and lodging, and the rest for equipment purchased primarily for fishing and other purchases specifically related to inland fishing (Figure 1). A full description of these expenditure categories is contained in Appendix 3.

The total economic effect from 1996 National Forest fishing is estimated at $8.5 billion. Total household income generated from fishing is estimated at $2.2 billion. Fishing activities on National Forest lands supported 95,718 full time equivalent jobs. State sales tax revenue is estimated at $128.2 million, state income tax and federal income tax revenues are estimated at $33.5 million and $241.6 million, respectively (Table 2).

Between 1991 and 1996 there was an increase of 26% in days of participation and a 58% increase in expenditures made for fishing within the National Forest System (Table 3). An increase in participation was observed in all regions during this time period, except for region 1 where participation declined by 4.4% (Table 3). Expenditures increased for all regions during this five year span. This is due to both an increase in days fished and an increase in average daily expenditures.

Economic Impacts of Wildlife Viewing on National Forest Lands

A total of $2.1 billion was spent by non consumptive wildlife recreationists on National Forest lands during 1996 (Table 4), and more than 50% was spent on trip related items (Figure 1). The total economic effect from this retail spending was $6.3 billion. Total household income generated from wildlife viewing on National Forest lands in 1996 is estimated at $1.6 billion. These activities also supported 70,372 full time equivalent jobs. State sales tax revenue generated from 1996 wildlife viewing expenditures is estimated at $98.8 million. Non consumptive recreation within the National Forest System also generated $22.5 million in state income taxes and $177.6 million in federal income tax revenue (Table 4).

In contrast to fishing trends, non-consumptive wildlife related recreation within the National Forest System declined during the period 1991 to 1996. This declining trend was also observed nationwide on both private and public lands (U.S. Department of the Interior, 1997).Within the National Forest System, days of participation declined by 16% and expenditures declined by 12% between 1991 and 1996. This decline was observed in all regions except regions 2, 3, and 10 (Table 5).

Economic Impacts of Hunting on National Forest Lands

A total of $2.1 billion was spent by participants hunting on National Forest lands during 1996 (Table 6). Unlike fishing and wildlife viewing a smaller portion of these expenditures were for trip related items (Figure 1). The total economic effect from all types of hunting on National Forest lands is estimated at $6.1 billion. These activities also supported 72,719 full time equivalent jobs and $1.7 billion in total household income. State sales tax revenue generated from all expenditures for hunting on National Forest lands is estimated at $105.7 million. Total state and federal income tax revenues generated by hunting are estimated at $32.6 million and $181.7 million, respectively (Table 6).

Similar to the fishing trends, hunting days and expenditures increased during the period 1991 to 1996. Between 1991 and 1996, days of participation increased by 25% within the National Forest System, and expenditures increased by 89%. An increase in participation was observed in all regions during this time period, except for region 1 where participation declined by 10.6%. Expenditures increased for all regions during this five year span (Table 7). Economic impact analysis was carried out separately for big game, small game, and migratory bird hunting within the National Forest System.

TABLE 1

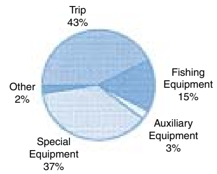
Summary of Economic Impact of Fishing, Hunting, and Wildlife Viewing on National Forest Lands, 1996

Activity	Total Days of Participation	st. error	Retail Sales	st. error	Exp. per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Freshwater Fishing	46,807,170	2,065,858	2,904,560,516	126,091,974	62	8,506,141,870	2,244,542,277	95,718	128,172,974	33,464,968	241,592,006
Wildlife Viewing	53,013,590	3,219,521	2,135,445,263	137,814,336	40	6,255,957,247	1,650,197,841	70,372	98,849,546	22,529,055	177,610,472
Hunting	27,396,750	1,461,405	2,111,357,487	261,388,362	76	6,124,546,161	1,687,931,536	72,719	105,692,946	32,647,200	181,743,359
All Wildlife Dependent Recreation	127,617,555	6,842	7,151,393,264	53,894	56	20,889,645,385	5,582,670,853	238,809	332,715,468	88,641,231	600,954,836
Big Game Hunting	16,295,895		1,292,057,417		78	3,634,287,029	995,466,597	42,225	65,106,222	21,130,881	147,875,995
Small Game Hunting	7,060,045		227,612,940		35	663,737,177	179,917,871	5,102	16,446,934	1,114,052	19,027,346
Migratory bird Hunting	2,918,551		245,349,721		83	714,348,209	107,597,450	8,691	15,733,395	3,647,225	20,960,379

Figure 1: Breakdown of Expenditures for Fishing, Hunting, and Wildlife Viewing on National Forest Lands, 1996

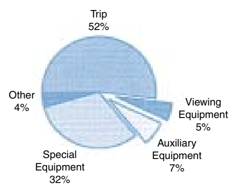
Fishing Expenditures

Trip	1,236,358,254
Fishing Equipment	444,047,246
Auxiliary Equipment	74,875,136
Special Equipment	1,070,418,385
Other	72,268,495
TOTAL	2,904,560,516



Wildlife Viewing Expenditures

Trip	1,107,956,823
Viewing Equipment	109,867,290
Auxiliary Equipment	146,841,797
Special Equipment	675,851,862
Other	95,098,539
TOTAL	2,135,445,291



Hunting Expenditures

Trip	556,334,578
Hunting Equipment	772,725,72[illegible]
Auxiliary Equipment	115,031,813
Special Equipment	159,266,324
Other	508,029,051
TOTAL	2,1[illegible],387,487

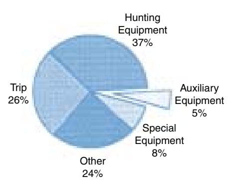


TABLE 2

Economic Impacts of Freshwater Fishing on National Forest Lands by Region, 1996

Region	F.S. Freshwater Fishing Days	st. error	Retail Sales	st. error	Exp. per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1	2,491,918	195,238	212,627,235	21,098,661	$85	351,278,472	105,613,593	6,327	2,900,921	1,151,332	9,485,951
Region 2	4,853,715	320,877	359,620,285	47,390,654	$74	691,153,851	153,575,004	7,865	12,239,689	634,657	17,319,957
Region 3	1,443,716	659,591	253,067,324	38,706,517	$75	461,455,145	124,461,065	6,454	12,651,366	2,356,810	12,129,551
Region 4	3,914,634	215,612	261,705,426	20,939,718	$59	415,722,045	112,716,334	6,077	12,388,757	3,474,717	10,751,925
Region 5	6,788,557	1,265,153	551,057,347	100,155,379	$81	1,163,398,554	305,625,360	12,000	33,063,443	4,795,953	34,054,257
Region 6	4,989,194	615,550	233,250,634	31,605,505	$47	443,157,815	117,085,962	5,763	4,214,275	4,450,405	12,475,326
Region 8	5,764,720	339,830	270,545,071	17,602,061	$47	541,895,455	145,806,093	7,124	12,575,527	4,027,806	14,526,925
Region 9	12,956,404	1,217,526	605,493,636	50,658,784	$55	1,322,764,588	301,177,026	7,396	35,137,370	12,939,250	37,071,174
Region 10	1,554,226	200,454	126,299,717	31,088,420	$60	231,130,457	60,232,193	2,872	no tax	no tax	6,106,645
Total Forest Service	46,807,170	2,065,858	2,904,560,516	136,991,974	$62	8,509,141,876	2,244,542,277	95,718	128,173,974	33,464,968	241,592,006

TABLE 3

Trends in Freshwater Fishing Participation and Expenditures on National Forest Lands Between 1991 and 1996

Region	Freshwater Fishing Days 1991	Freshwater Fishing Days 1996	Freshwater Fishing Retail Sales 1991	Freshwater Fishing Retail Sales 1996
Region 1	2,636,000	2,491,898	$142,168,984	$212,621,235
Region 2	4,567,000	4,837,319	$254,514,983	$359,620,285
Region 3	2,789,000	1,443,216	$222,413,951	$233,367,826
Region 4	2,691,000	3,014,638	$162,174,174	$231,795,426
Region 5	4,382,000	6,785,557	$236,438,876	$551,05[illegible]
Region 6	3,251,000	4,089,194	$228,811,561	$233,[illegible]
Region 8	3,534,000	5,764,721	$180,144,454	$270,823,671
Region 9	6,379,000	12,996,463	$297,963,066	$665,991,436
Region 10	957,000	1,584,328	$105,266,810	$126,299,717
Total Forest Service	37,129,800	46,807,370	$1,829,506,168	$2,904,560,516

Big Game Hunting

Big game hunting was the most popular type of hunting on National Forest lands. In 1996 U.S. hunters spent a total of $1.26 billion on big game hunting trips within the National Forest System (Table 8). This represents about 60% of expenditures for all types of hunting on National Forest lands.

The sum of the direct, indirect, and induced effects attributed to 1996 big game hunting on National Forest lands is estimated at $3.6 billion. Big game hunting also supported 42,225 full time equivalent jobs. These are jobs that are directly associated with hunting in addition to jobs in industries that indirectly support hunting. State sales tax revenue generated from big game hunting is estimated at $65.2 million. Total state income tax revenue generated by 1996 big game hunting was $21.2 million and total federal income tax revenue generated was $107.9 million (Table 8).

Small Game Hunting

A total of $227.8 million was spent for small game hunting activities on National Forest lands during 1996 (Table 9). The total economic effect from 1996 small game hunting on National Forest lands is estimated at $663.3 million. Total household income generated from small game hunting on National Forest lands is estimated at $179.9 million. Small game hunting also supported 8,102 full-time equivalent jobs. These are jobs that are directly associated with hunting in addition to jobs in industries that indirectly support hunting (Table 9). For regions 5 and 10 sample sizes were too small to allow calculation of individual regional estimates. Instead these regions were combined, and aggregate estimates are presented (Table 9).

Migratory Bird Hunting

A total of $243.3 million was spent for migratory bird hunting activities on National Forest lands during 1996, which cycled through the economy resulting in a total economic effect of $714.3 million (Table 10). Total household income generated from migratory bird hunting on National Forest lands is estimated at $197.6 million, which supported 8,801 full time equivalent jobs. State sales and income tax revenues, and federal income tax revenue are presented in Table 6. Only small sample sizes were available for regions 5, 6, and 10, and thus individual regional estimates could not be calculated. Instead these regions were combined, and aggregate estimates are presented (Table 10).

Trends in hunting days and expenditures between 1991 and 1996 for big game, small game, and migratory bird hunting are presented in Table 11. During this five year period, the largest increases in days of hunting and expenditures was for migratory bird hunting on Forest Service lands. This is consistent with the findings from the National Surveys that showed migratory bird hunting on all public lands increased from 5.6 million days in 1991 to 7.8 million days in 1996 (U.S. Department of the Interior, 1997, and U.S. Department of the Interior, 1993).

Other Revenue

Hunting and fishing on National Forest lands provide other sources of government revenues beside taxes. Most recreationists are required to buy a state hunting or fishing

license and often one or more specialized state/federal permits and/or national forest stamps. The revenues raised from these license/permit sales are used to support wildlife and habitat conservation and management efforts.

In addition to licenses and permits sales, states obtain funds for wildlife management under the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act) and the Sportfish Restoration Act (Wallop-Breaux). The funds receive income from excise taxes on equipment commonly used by sportsmen on National Forests. The funds are exclusively dedicated for wildlife and fish enhancement projects, and education. These additional revenue sources were not included in the analysis.

TABLE 4

Economic Impacts of Wildlife Viewing on National Forest Lands by Region, 1996

Region	F.S. Wildlife Viewing Days	st. error	Retail Sales	st. error	Exp. per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1	1,498,266	214,595	63,454,574	12,861,516	$42	116,445,549	31,109,262	1,975	556,575	356,981	2,980,154
Region 2	6,347,694	937,522	225,405,171	42,925,425	$36	465,580,464	130,949,527	7,399	7,053,450	516,292	13,597,723
Region 3	2,690,541	1,024,054	200,423,952	42,396,416	$74	369,613,865	97,624,146	4,772	10,021,198	1,614,413	8,716,764
Region 4	1,160,039	158,595	65,633,750	10,688,290	$57	121,518,154	34,470,582	1,924	1,471,501	1,190,045	3,497,625
Region 5	7,070,999	1,561,305	227,132,432	54,225,295	$32	567,091,539	141,624,545	9,611	13,627,946	2,156,504	16,099,518
Region 6	5,488,427	764,114	312,017,618	81,396,875	$57	592,564,754	151,744,643	6,920	14,217,681	2,334,240	15,804,107
Region 8	13,584,102	1,226,128	594,754,937	55,914,509	$44	1,090,262,552	377,534,031	16,442	29,143,513	7,521,694	33,072,394
Region 9	14,801,421	1,556,786	406,767,800	47,511,305	$27	526,144,641	215,962,017	11,364	19,428,653	6,809,090	23,187,319
Region 10	372,113	69,544	79,855,045	7,506,333	$197	66,754,019	20,542,052	1,041	no tax	no tax	3,212,312
Total Forest Service	53,013,603	3,238,571	2,135,445,261	137,814,536	$40	6,255,957,347	1,650,195,043	70,572	98,849,546	22,589,059	177,619,472

TABLE 5

Trends in Wildlife Viewing Participation and Expenditures on National Forest Lands Between 1991 and 1996

Region	Wildlife Viewing Days 1991	Wildlife Viewing Days 1996	Wildlife Viewing - Retail Sales 1991	Wildlife Viewing - Retail Sales 1996
Region 1	2,249,175	1,498,266	$63,741,607	$63,454,574
Region 2	4,957,776	6,347,694	$160,661,351	$225,405,172
Region 3	1,099,265	2,690,541	$126,175,210	$200,423,952
Region 4	1,058,603	1,160,039	$45,795,440	$65,633,750
Region 5	15,527,904	7,070,996	$644,099,048	$227,132,432
Region 6	6,519,602	5,488,427	$361,125,743	$312,017,618
Region 8	11,875,085	13,584,102	$695,301,670	$594,754,937
Region 9	16,362,577	14,801,421	$465,159,299	$406,767,800
Region 10	250,748	372,113	$12,202,252	$79,855,045
Total Forest Service	63,391,632	53,013,603	$3,426,333,854	$2,135,445,261

TABLE 6

Economic Impacts of Hunting on National Forest Lands by Region, 1996

Region	F.S. Hunting Days	st. error	Retail Sales	st. error	Exp. per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1	1,302,801	118,711	104,261,533	11,417,219	$80	184,406,925	51,652,917	3,595	3,302,565	1,558,925	4,708,675
Region 2	2,698,528	529,827	311,676,909	84,329,585	$115	631,902,659	179,537,280	9,595	13,521,244	4,770,475	17,545,791
Region 3	606,823	151,037	84,585,568	21,308,617	$139	158,640,471	46,526,690	2,315	4,570,576	1,050,756	4,565,725
Region 4	1,758,151	270,035	145,093,907	32,136,310	$83	274,044,014	78,442,106	4,305	9,173,137	2,950,911	7,477,691
Region 5	1,242,445	669,738	151,760,479	59,351,564	$105	392,853,976	115,970,089	4,881	11,925,205	1,351,225	12,599,526
Region 6	2,818,155	559,555	250,165,960	55,126,142	$89	471,491,705	126,755,505	5,886	7,497,677	6,001,814	17,229,369
Region 8	7,037,741	639,302	469,550,636	45,985,464	$64	935,084,655	262,815,559	13,228	25,755,064	7,752,218	26,306,730
Region 9	9,305,347	730,296	501,459,346	61,087,754	$54	990,751,398	352,428,672	14,027	29,783,459	9,200,939	26,582,567
Region 10	326,742	55,211	59,930,148	14,288,910	$183	93,478,098	32,052,593	1,126	no tax	no tax	2,070,991
Total Forest	27,796,783	1,461,405	2,111,387,487	281,138,207	$76	6,124,546,161	1,687,931,536	72,714	105,692,948	32,647,209	101,743,599

TABLE 7

Trends in Hunting Participation and Expenditures on National Forest Lands Between 1991 and 1996

Region	Total Hunting Days 1991	Total Hunting Days 1996	Total Hunting Retail Sales 1991	Total Hunting Retail Sales 1996
Region 1	1,457,409	1,302,801	59,940,219	$104,261,533
Region 2	1,491,752	2,698,528	56,170,255	$311,676,909
Region 3	663,992	606,823	65,241,702	$84,585,568
Region 4	1,344,192	1,758,151	77,398,679	$145,093,907
Region 5	951,274	1,242,445	87,170,757	$151,760,479
Region 6	2,694,347	2,818,155	115,145,461	$250,165,960
Region 8	5,909,015	7,037,741	240,245,009	$469,550,636
Region 9	7,668,354	9,305,347	270,974,472	$501,459,346
Region 10	559,261	326,742	59,698,359	$59,930,148
Total Forest Service	22,308,497	27,796,783	1,115,119,244	2,111,387,487

TABLE 8
Economic Impacts of Big Game Hunting on National Forest Lands by Region, 1996

Region	U.S. Big Game Hunting	Retail Sales	Exp. per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1	895,398	[illegible]	$72	[illegible]	[illegible]	2,346	[illegible]	927,618	2,573,869
Region 2	1,996,312	[illegible]	$199	[illegible]	[illegible]	9,170	[illegible]	5,618,211	18,368,379
Region 3	247,887	[illegible]	$154	[illegible]	[illegible]	1,105	[illegible]	484,470	2,951,589
Region 4	1,059,529	[illegible]	$76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4,071,170
Region 5	887,938	[illegible]	$64	[illegible]	[illegible]	[illegible]	[illegible]	368,991	[illegible]
Region 6	[illegible]	[illegible]	$93	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9,135,421
Region 8	4,608,765	[illegible]	$66	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 9	5,032,053	[illegible]	$48	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 10	326,000	15,204,428	$81	28,749,562	6,956,351	119	211,634		750,734
Total Forest Service	16,308,895	$1,259,057,447	$78	$3,834,287,024	$995,766,397	42,225	$65,806,822	$21,170,861	$97,378,995

CONCLUSION

The National Forest System provides high quality wildlife recreational opportunities throughout the nation. In addition, hunting, fishing and other wildlife-related activities on National Forest lands provide the U.S. and state economies with important sources of jobs, income and other benefits.

This study did not measure economic impact to local economies in close proximity to National Forest lands. However, benefits from wildlife related recreational activities are particularly important in rural or remote areas, where other sources of income are limited. By supporting billions in retail sales, tens of thousands of jobs and billions in salaries and wages, fishing, hunting and other wildlife-related activities are of great value not only to industry and local businesses, but to every resident of every community surrounding National Forest Service lands.

Apart from providing business and job opportunities, outdoor recreation contributes other benefits to our society. The American Recreation Coalition reported that Americans who participate in outdoor recreation during childhood and adulthood have an overall higher quality of life than others (ARC, 1996). In addition to contributing recreational activities, national forests provide aesthetically pleasing surroundings prized by millions of Americans who want to live and work in a rural setting.

TABLE 9

Economic Impacts of Small Game Hunting on National Forest Lands by Region, 1996

Region	F.S. Small Game Hunting Days	Retail Sales	Exp. per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1	292,499	6,234,698	$21	11,439,919	2,986,530	155	520,200	83,626	266,342
Region 2	550,444	40,081,480	$73	82,639,096	23,006,526	1,515	1,961,925	462,997	2,158,976
Region 3	196,796	8,060,848	$41	15,529,258	4,502,972	228	556,181	99,994	451,249
Region 4	467,461	19,079,159	[illegible]	36,725,956	9,663,075	570	1,216,211	254,324	659,255
Region 6	576,550	15,706,715	$27	29,075,597	8,336,935	401	1,214,698	173,854	841,405
Region 8	1,778,296	41,604,617	$23	57,726,327	25,752,590	1,329	3,352,772	623,951	2,257,203
Region 9	2,694,125	72,409,559	$27	147,215,325	40,230,583	2,171	6,335,619	1,150,272	3,955,428
Regions 5 and 10*	495,082	22,985,742	$46	45,077,447	13,140,321	565	310,377	176,005	1,412,634
Total Forest Service	**7,863,045**	**227,812,946**	**$33**	**663,252,177**	**179,917,871**	**8,302**	**16,449,934**	**3,114,053**	**19,027,346**

* It was not possible to calculate separate estimates for Region 5 and 10 as less than 30 observations of small game hunting on public lands were available for these regions

TABLE 10

Economic Impacts of Migratory Bird Hunting on National Forest Lands by Region, 1996

Region	F.S. Migratory Bird Hunting Days	Retail Sales	Exp. per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Ta	Federal Income Tax
Region 1	113,663	5,855,457	$78	16,076,693	4,369,505	265	404,577	120,157	294,678
Region 2	136,762	15,678,254	$115	31,294,950	8,770,332	490	696,258	205,894	534,572
Region 3	94,357	11,290,892	$120	20,953,872	5,979,150	313	611,014	175,577	529,500
Region 4	209,507	16,748,705	$82	32,458,415	9,076,950	535	1,010,920	357,067	596,271
Region 8	699,106	50,794,032	$72	101,534,448	29,251,329	1,518	2,923,550	564,669	2,263,001
Region 9	3,110,277	96,452,753	$31	194,206,625	54,417,200	2,754	7,014,875	1,809,254	5,456,598
Regions 5, 6, and 10	495,339	43,440,726	$85	87,679,282	24,529,311	1,162	2,742,583	270,692	2,551,628
Total Forest Service	**3,918,551**	**240,289,721**	**$85**	**414,548,269**	**197,582,454**	**8,801**	**15,733,595**	**3,447,335**	**20,994,350**

* It was not possible to calculate separate estimates for Region 5, 6 and 10 as less than 30 observations of migratory bird hunting on public lands were available for these regions. Also, small sample sizes did

TABLE 11

A Comparison of Participation and Expenditures for Big Game, Small Game, and Migratory Bird Hunting on National Forest Lands Between 1991 and 1996

Region	Big Game Hunting Days 1991	Big Game Hunting Days 1996	Big Game Retail Sales 1991	Big Game Retail Sales 1996	Small Game Hunting Days 1991	Small Game Hunting Days 1996	Small Game Retail Sales 1991	Small Game Retail Sales 1996	Migratory Bird Hunting Days 1991	Migratory Bird Hunting Days 1996	Migratory Bird Retail Sales 1991	Migratory Bird Retail Sales 1996
Region 1	[illegible]	866,358	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Region 10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total Forest Service	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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APPENDICES

Appendix 1. Ratios Used to Calculate Freshwater Fishing Estimates on Forest Service Lands

Region/State	Surface Area of Lakes and Streams on National Forest Lands (Sq. miles)*	Surface Area of all Inland Water Bodies (Sq. miles)	Ratio
Alabama	25	968	2.6%
Alaska**	1,012	2,300	44.0%
Arizona	182	364	49.9%
Arkansas	54	1,107	4.9%
California	625	2,874	21.4%
Colorado	128.3	371	34.6%
Florida	205	4,683	4.4%
Georgia	48	1,011	4.7%
Idaho	488	823	59.3%
Illinois	42	2,325	1.8%
Indiana	11	550	2.0%
Kansas	1	459	0.2%
Kentucky	23	679	3.3%
Louisiana	63	4,153	1.5%
Maine	10	2,263	0.4%
Michigan	1,209	39,806	18.1%
Minnesota	811	7,326	11.1%
Mississippi	17	781	1.5%
Missouri	48	811	5.9%
Montana	952	1,490	63.9%
Nebraska	3	481	0.6%
Nevada	220	761	28.9%
New Hampshire	24	314	7.6%
New Mexico	91	234	38.9%
New York	1	1,888	0.1%
North Carolina	244	3,954	6.2%
North Dakota	43	1,710	2.5%
Ohio	93	3,875	2.3%
Oklahoma	9	1,224	0.7%
Oregon	397	1,050	37.8%
Pennsylvania	43	1,239	3.5%
South Carolina	19	1,008	1.9%
South Dakota	300	1,225	24.5%
Tennessee	30	926	3.3%
Texas	52	4,950	1.0%
Utah	1,050	2,736	38.4%
Vermont	40	366	10.9%
Virginia	78	1,000	7.8%
Washington	373	1,845	20.9%
West Virginia	15	145	10.7%
Wisconsin	710	11,188	6.3%
Wyoming	379	714	53.1%

* Made the assumption that the average width of streams on National Forest Lands was 0.005 miles.

** Used surface area of inland waters at Southeastern and South Central Alaska.

Appendix 2: Ratios Used to Calculate Hunting and Wildlife Viewing Estimates on F.S. Lands

Region/State	Forest Service Lands (acres/100)	Federal (acres/100)	State Public (acres/100)	County + Parish (acres/100)	Ratio of FS to all Public Lands for hunting*	Ratio of FS to all Public Lands for Wild. View.**
Alabama	6,640	9,214	3,450	2,124	52.50%	43.56%
Alaska	220,047				77.20%	9.06%
Arizona	112,517	302,795	94,024	2,595	25.08%	27.52%
Arkansas	25,769	32,073	5,713	357	69.30%	65.65%
California	206,277	164,924	21,412	3,500	43.15%	41.53%
Colorado	145,081	239,229	29,421	908	53.96%	53.84%
Florida	11,472	37,914	24,150	1,942	18.43%	17.51%
Georgia	5,049	20,865	7,423	1,584	30.15%	26.29%
Idaho	204,008	312,950	25,771	153	57.03%	56.95%
Illinois	2,778	5,205	4,827	3,211	27.68%	20.95%
Indiana	1,956	4,875	5,110	1,455	19.58%	17.05%
Kansas	1,082	6,057	2,725	1,460	12.32%	10.55%
Kentucky	6,951	12,009	2,405	1,068	44.97%	42.06%
Louisiana	6,041	12,037	11,177	1,954	25.37%	23.45%
Maine	539	1,035	8,674	320	5.15%	4.98%
Michigan	28,570	31,655	45,044	4,128	37.25%	35.35%
Minnesota	28,375	31,827	59,451	25,540	30.42%	25.48%
Mississippi	11,582	17,299	5,466	3,844	50.90%	43.54%
Missouri	14,942	20,171	9,332	1,406	50.65%	48.34%
Montana	165,770	271,217	46,717	3,016	52.75%	52.26%
Nebraska	3,521	7,385	13,945	1,751	16.51%	15.25%
Nevada	62,753	602,896	1,326	391	10.88%	20.60%
New Hampshire	7,247	7,474	1,971	108	76.73%	75.87%
New Mexico	91,033	244,435	86,930	174	28.29%	26.77%
New York	161	2,306	58,745	2,350	0.29%	0.27%
North Carolina	12,435	24,477	8,345	734	37.59%	37.01%
North Dakota	11,058	15,509	9,577	4,851	38.02%	32.55%
Ohio	2,272	1,754	5,275	3,116	25.12%	18.71%
Oklahoma	2,459	12,029	11,365	845	14.59%	14.05%
Oregon	156,564	322,909	13,591	2,257	46.47%	46.16%
Pennsylvania	5,133	6,820	36,955	1,255	11.73%	11.39%
South Carolina	6,124	11,362	7,989	1,095	31.22%	29.65%
South Dakota	20,131	39,009	11,777	1,055	40.25%	47.17%
Tennessee	6,341	13,792	6,459	1,852	31.31%	28.67%
Texas	6,755	32,026	39,010	7,758	9.51%	8.57%
Utah	81,127	355,815	32,521	345	67.00%	20.57%
Vermont	3,564	3,680	1,912	-	65.22%	65.22%
Virginia	16,570	22,591	3,508	707	60.44%	58.95%
Washington	91,721	124,739	31,963	1,555	58.54%	57.97%
West Virginia	10,326	12,700	3,031	260	68.72%	67.55%
Wisconsin	15,217	18,390	13,910	37,559	47.24%	23.46%
Wyoming	92,477	300,299	34,292	157	67.00%	27.62%

* Forest Service acreage divided by the sum of (federal acreage, state public acreage)
Estimates for Alaska, Utah and Wyoming were obtained from other sources.

** Forest Service acreage divided by the sum of (federal, state public, and local municipal acreage)

Appendix 3: Description of Expenditure Categories for Wildlife Recreation

Fishing Expenditures

Trip:	Food, Lodging, Transportation, Fuel, Guide Fees, Package Fees, Public Land Use or Access Fees, Boat Costs, Equipment Rental, Bait, Ice.
Fishing Equipment:	Rods, Reels, Poles and Rod Making Components, Lines and Leaders, Artificial Lures, Files, Hooks, Sinkers, Tackle Boxes, Electronic Fishing Devices, Ice Fishing Equipment, Other Fishing Equipment.
Auxiliary Equipment:	Camping Equipment, Binoculars, Field Glasses, Telescopes, etc., Special Fishing Clothing, Foul Weather Gear, Boots, Waders, etc.
Special Equipment:	Boats, Trailer/Hitch or Other Boat Accessories, Off Road Vehicles and Other Special Equipment.
Other:	Fishing License Fees, Other Fees, Processing and Taxidermy Costs, Books and Magazines Dues or Contributions to Organizations, Other Purchases.

Wildlife Viewing Expenditures

Trip:	Food, Lodging, Transportation, Fuel, Guide Fees, Package Fees, Public Land Use or Access Fees, Boat Costs, Equipment Rental.
Viewing Equipment:	Binoculars, Field Glasses, Telescopes, etc., Photographic Equipment, Special Clothing, and Other Wildlife Watching Equipment.
Auxiliary Equipment:	Camping Equipment, and Other Auxiliary Equipment.
Special Equipment:	Off Road Vehicle, Travel or Tent Trailer, Camper, Van, Pickup, Motor Home, Other.
Other:	Books and Magazines, Dues or Contributions to Organizations.

Hunting Expenditures

Trip:	Food, Lodging, Transportation, Fuel, Guide Fees, Package Fees, Public Land Use or Access Fees, Boat Costs, Equipment Rental.
Hunting Equipment:	Guns and Rifles, Archery Equipment, Telescopic Sights, Decoys and Game Calls, Ammunition, Hand Loading Equipment, Hunting Dogs, Other.
Auxiliary Equipment:	Camping Equipment, Binoculars, Field Glasses, Telescopes, etc., Special Clothing, Foul Weather Gear, Boots, Waders, etc.
Speical Equipment:	Boats, Trailer/Hitch or Other Boat Accessories, Off Road Vehicles and Other Special Equipment.
Other:	License Fees, Other Fees, Processing and Taxidermy Costs, Books and Magazines Dues or Contributions to Organizations, Other Purchases.

Appendix 4: Method for Calculating Standard Errors

Standard Errors

The formula below was used to calculate the standard error of days of participation and expenditures estimates on national Forest lands:

$$S_x = \sqrt{ax^2 + bx + \frac{cx^2}{y}}$$

Here:
x is the size of the estimate which could be participation or expenditures depending on the calculation;

y is the base of the estimate (the number of participants);

a, b, and c are the parameters associated with the particular characteristic (U.S. Department of Interior, 1997). A separate set of parameters is required for estimation of standard errors for participation and expenditures.

Parameters for calculating fishing, hunting , and wildlife viewing standard errors are contained in Appendices 3, 4, and 5

Appendix 5: Parameters Used to Calculate Variances for Fishing Days and Expenditures

State	Parameters for Days			Parameters for Expenditures		
	a	b	c	a	b	c
Alabama	-0.011070	-11.882	13.572	0.022140	-31.579	7.652
Alaska	0.030200	-490	902	0.022245	-15.072	1,467
Arizona	0.055570	4.295	1.456	0.025451	1,413	4,134
Arkansas	0.013766	2.954	3.940	0.046100	-35,777	5,033
California	0.029946	-4.196	10.727	0.020212	-130.816	28.097
Colorado	0.005428	2.711	5.282	0.027113	51.215	5.499
Florida	0.013367	-74.334	31.357	0.018422	-54,519	21,567
Georgia	-0.002050	-20.900	25.606	0.017194	33,491	10,236
Idaho	0.004423	18.648	8.978	0.015456	19.925	9.802
Illinois	0.001866	-31.925	21.335	0.023597	-118.927	16,341
Indiana	-0.005906	-10.395	13.612	0.008054	-37,770	7,805
Kansas	0.072000	-1.100	2.576	0.002115	5.986	2,597
Kentucky	0.003450	-4.425	6.292	0.032294	-35,485	6,480
Louisiana	0.027440	-17.750	15.168	0.012738	-6,321	10,247
Maine	0.003850	-6.593	3.250	0.051020	-11.191	2,066
Michigan	0.013477	54.347	20.932	0.017766	-94.395	17,923
Minnesota	0.067180	-14.167	13.857	0.015251	-2.990	10,826
Mississippi	0.002499	-3.770	5.305	0.015820	-34.650	7.071
Missouri	-0.013381	-20.614	23.468	0.031520	-38.417	8.625
Montana	0.007359	-729	1.403	0.012955	-4.035	1.384
Nebraska	0.001529	2.946	1.650	0.019900	3.439	1.802
Nevada	0.008312	-1.069	1.657	0.006387	-11.673	2.757
New Hampshire	0.021018	-748	1,292	0.060070	-13.219	1.758
New Mexico	0.058130	-319	1.665	0.029329	-4.702	1.937
New York	0.006621	-76.595	25.019	0.013940	128.454	20.807
North Carolina	0.026993	7,929	12.144	0.039150	-174.985	18.106
North Dakota	0.000737	-1,735	1,770	0.021379	-777	752
Ohio	-0.006811	-17,533	22.133	0.018212	78.116	14.481
Oklahoma	0.004213	22.701	22,462	0.043336	-88,549	10,547
Oregon	-0.003614	-13,057	17,352	0.008565	-51,773	11,911
Pennsylvania	-0.004771	-29.038	23.722	0.009523	138,047	20,372
South Carolina	0.018055	-1,772	3,337	0.032553	-45,611	5,362
South Dakota	-0.017421	-2.325	3.861	0.008600	-27.856	3.057
Tennessee	-0.010925	-15.875	20.791	0.022255	24,179	8,024
Texas	0.054330	20,030	29,511	0.037808	-300,879	38,595
Utah	-0.010685	-7,389	6,713	0.009579	-16.645	3.479
Vermont	-0.011265	-3.527	2.815	0.007530	20.673	2.991
Virginia	0.035180	125.224	9.203	0.007276	-173,725	15,135
Washington	0.035450	61,558	6,373	0.033116	-39.564	8.578
West Virginia	0.014577	-1.405	2.885	0.016591	29.540	4.806
Wisconsin	-0.002227	13.226	11.392	0.011615	-32,159	11,367
Wyoming	0.032576	-753	1,220	0.022142	-1,139	914
USA	-0.000467	-324.198	68.529	0.030150	-197,573	34,364

Appendix 6: Parameters Used to Calculate Variances for Hunting Days and Expenditures

State	Parameters for Days			Parameters for Expenditures		
	a	b	c	a	b	c
Alabama	0.058950	1,149	4,361	0.041030	-34,071	6,795
Alaska	0.011783	-2,797	1,533	0.043010	-17,754	1,016
Arizona	0.082450	-2,136	2,510	0.079800	209,994	5,746
Arkansas	0.134810	7,550	5,216	0.128750	-273,947	4,961
California	0.175460	-13,157	11,832	0.121120	-136,516	11,476
Colorado	0.073060	-15,717	7,068	0.128930	19,131	3,212
Florida	0.059830	11,392	12,144	0.051760	-276,536	15,698
Georgia	0.038507	-4,615	8,955	0.077200	-264,814	8,067
Idaho	0.012561	-6,336	3,657	0.028210	102,915	3,821
Illinois	0.010252	-13,269	10,590	0.027065	-235,387	13,766
Indiana	0.040000	5,762	4,345	0.044360	-113,075	5,115
Kansas	0.075350	-3,738	3,795	0.094000	-144,269	3,970
Kentucky	0.005257	-9,012	6,791	0.001890	211,392	9,351
Louisiana	-0.008098	11,412	9,109	0.077410	-178,553	8,417
Maine	0.055710	-6,057	2,589	0.115060	-62,158	5,145
Michigan	0.024393	-8,049	15,439	0.021450	-388,383	27,458
Minnesota	0.003578	-3,337	10,044	0.045130	-194,991	11,309
Mississippi	-0.006274	-3,463	4,651	0.001990	70,252	7,995
Missouri	0.022759	2,068	7,131	0.023035	-171,746	14,407
Montana	0.002099	-3,770	2,756	0.009135	1,629	2,229
Nebraska	0.057340	-617	1,463	0.015060	21,110	2,673
Nevada	0.032699	-1,206	1,228	0.073300	-57,000	1,773
New Hampshire	0.011513	764	1,264	0.070440	-73,168	1,638
New Mexico	-0.008373	507	1,516	0.055030	-40,824	1,474
New York	0.005049	-13,967	10,989	0.028680	107,377	14,764
North Carolina	0.026400	5,922	10,982	0.045760	1,355	8,152
North Dakota	0.039289	-488	975	0.024171	-23,902	1,149
Ohio	0.005266	-4,317	9,261	0.011040	-260,018	17,181
Oklahoma	0.022440	12,432	10,113	0.098030	-41,671	8,498
Oregon	0.047340	-8,303	6,034	0.054460	225,614	6,961
Pennsylvania	0.005890	-13,459	11,579	0.053880	-155,577	10,311
South Carolina	0.012010	7,443	5,606	0.013070	165,472	6,240
South Dakota	0.006947	264	1,570	0.014269	574	1,458
Tennessee	0.043030	-14,555	7,158	0.047520	469,535	13,955
Texas	0.093980	-7,271	15,821	0.019380	-347,415	29,092
Utah	0.061040	-5,144	3,385	0.112610	-242,080	3,939
Vermont	-0.002375	-453	1,235	0.012590	35,217	1,730
Virginia	0.072510	288	5,400	0.069520	-203,860	6,212
Washington	0.053870	-15,132	10,364	0.105190	41,284	6,080
West Virginia	0.020992	1,412	3,116	0.012360	-42,917	4,494
Wisconsin	0.044300	-29,411	12,437	0.013420	125,738	10,357
Wyoming	0.003673	-1,046	1,592	0.070790	-37,872	1,042
USA	0.000284	64,121	73,374	0.000277	-478,142	93,707

Appendix 7: Parameters Used to Calculate Variances for Wildlife Viewing Days and Expendi

State	Parameters for Days			Parameters for Expenditures		
	a	b	c	a	b	c
Alabama	0.011352	3,090	6,929	0.035881	18,572	3,305
Alaska	0.033700	-480	902	0.033200	-485	802
Arizona	0.232510	-7,261	4,855	0.095800	-24,154	3,065
Arkansas	0.120550	6,939	4,442	0.039340	-17,737	7,682
California	0.052850	-492,479	107,634	0.035321	1,067,637	50,195
Colorado	0.017830	20,910	22,425	0.049110	551,049	39,425
Florida	0.017290	-54,794	47,009	0.031930	-252,097	42,131
Georgia	0.031240	-23,045	14,502	0.013984	-70,051	15,016
Idaho	0.052940	-2,501	4,459	0.074730	41,520	4,112
Illinois	0.027020	58,510	15,204	0.032920	-139,223	32,872
Indiana	0.122298	615	4,197	0.009581	-40,800	16,403
Kansas	0.046990	-3,363	5,621	0.049730	28,458	2,692
Kentucky	0.190170	34,100	7,178	0.057270	-92,495	7,465
Louisiana	0.057300	-3,617	5,930	0.015589	-55,977	11,140
Maine	0.051630	15,634	175	0.014378	32,355	3,273
Michigan	0.029460	37,292	38,827	0.081770	-186,154	77,084
Minnesota	0.117360	-726	8,805	0.027860	-590,903	26,760
Mississippi	0.147200	-4,425	3,214	0.097820	25,306	3,929
Missouri	0.126950	93,740	29,824	0.051350	-337,535	14,174
Montana	0.025541	-6,366	4,142	0.060400	-10,180	3,150
Nebraska	0.038910	7,544	6,580	0.022050	40,731	6,267
Nevada	0.059320	6,503	3,079	0.088910	-19,563	2,740
New Hampshire	0.020010	-11,117	17,071	0.073310	-15,254	5,644
New Mexico	0.215380	559	3,098	0.071300	19,200	2,055
New York	0.002550	33,900	37,945	0.057020	264,233	15,441
North Carolina	0.045300	-20,978	13,008	0.020769	75,748	15,550
North Dakota	0.020354	-1,274	1,794	0.002330	-1,760	1,453
Ohio	0.041150	22,185	16,194	0.032960	-395,966	40,707
Oklahoma	0.204560	-13,045	9,632	0.099700	20,480	5,997
Oregon	0.020200	30,908	16,514	0.055410	-43,805	8,458
Pennsylvania	0.033850	-55,757	50,757	0.097590	295,002	21,756
South Carolina	0.073840	-26,541	9,633	0.040030	19,526	4,583
South Dakota	0.144230	-15,927	2,618	0.093560	16,285	974
Tennessee	0.045640	19,995	16,505	0.106740	-192,356	13,204
Texas	0.207350	6,535	15,119	0.130150	-261,300	31,449
Utah	-0.003508	-3,355	7,127	0.051580	-4,065	5,598
Vermont	0.035450	10,059	2,020	0.005280	-1,430	1,518
Virginia	0.054950	-13,451	16,263	0.063670	4,565	14,345
Washington	-0.004180	17,720	27,976	0.100400	15,783	22,301
West Virginia	0.037490	-9,680	4,534	0.031240	12,231	3,875
Wisconsin	0.159790	-15,203	11,080	0.197560	350,579	-1,524
Wyoming	0.020135	-13,601	2,557	0.056740	-26,047	2,290
USA	0.004371	-26,991	38,946	0.002097	54,854	59,984

APPENDIX 8

Economic Impacts of Freshwater Fishing on National Forest Lands by State, 1996

Region/State	Forest Service Freshwater Fishing Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1									
Idaho - Northern	780,544	55,899,434	$71	94,667,981	25,960,641	1,491	2,794,972	1,082,316	2,339,774
Montana	1,671,760	154,609,812	$92	284,838,398	78,579,855	4,779	no tax	136,392	7,076,072
North Dakota	33,991	2,116,990	$63	3,771,893	961,896	57	105,949	12,314	58,190
Region 2									
Colorado	2,547,152	216,119,392	$96	448,190,160	121,915,872	6,021	6,452,579	612,951	12,259,014
Kansas	4,522	110,492	$22	659,445	173,268	19	15,214	4,156	15,792
Nebraska	27,561	1,527,005	$56	2,113,276	672,184	37	56,380	17,991	64,305
South Dakota	571,407	50,165,615	$75	85,924,516	22,371,098	1,319	2,014,625	no tax	2,052,678
Wyoming	1,281,524	91,497,281	$71	153,957,999	38,372,012	2,458	3,659,891	no tax	3,327,507
Region 3									
Arizona	2,341,215	177,612,989	$76	328,454,335	91,840,825	4,990	8,880,645	1,956,887	9,208,222
New Mexico	1,132,007	75,454,915	$66	132,968,814	31,022,242	1,844	3,772,721	399,976	2,911,078
Region 4									
Idaho - Southern	1,855,567	85,748,612	$46	141,831,705	38,907,754	2,344	4,187,431	1,601,521	3,475,495
Nevada	571,985	60,900,779	$105	96,075,835	26,580,170	1,220	3,952,246	no tax	2,387,397
Utah	1,506,680	87,151,035	$55	172,211,506	47,250,394	2,573	4,248,720	1,974,196	4,519,044
Region 5									
California	6,788,257	551,054,087	$81	1,150,295,554	309,625,760	12,990	33,065,442	4,509,932	34,854,257
Region 6									
Oregon	3,692,382	195,521,641	$53	315,005,786	83,035,273	4,103	no tax	4,480,405	8,517,355
Washington	2,290,632	64,834,994	$28	125,122,027	34,908,055	1,660	4,214,275	no tax	3,341,020

APPENDIX 8 (CONTINUED)

Economic Impacts of Freshwater Fishing on National Forest Lands by State, 1996

Region/State	Forest Service Freshwater Fishing Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 8									
Alabama	371,163	17,467,232	$47	34,735,371	9,335,453	470	695,689	331,215	897,745
Arkansas	455,045	14,705,700	$31	28,567,589	7,561,020	445	661,737	252,557	696,382
Florida	505,887	33,405,595	$41	61,795,059	17,132,296	822	2,004,336 no tax		1,771,590
Georgia	665,214	48,215,855	$79	98,541,616	26,627,409	1,296	1,928,634	1,169,444	2,774,584
Kentucky	319,748	17,106,104	$54	34,672,747	8,849,360	465	1,026,360	418,303	869,870
Louisiana	281,408	8,191,212	$29	15,270,128	3,997,168	219	324,288	78,695	387,540
Mississippi	170,185	3,555,850	$20	7,193,861	1,857,775	102	248,909	33,071	69,998
North Carolina	978,045	38,512,721	$39	77,041,917	20,567,518	1,000	1,540,540	762,594	1,908,035
Oklahoma	106,903	3,525,653	$33	7,301,124	1,876,410	101	158,651	35,003	175,576
South Carolina	211,539	7,746,020	$37	14,916,644	4,067,758	213	387,301	159,509	383,012
Tennessee	370,711	15,387,684	$42	32,156,207	8,638,858	413	920,222 no tax		855,027
Texas	391,354	16,887,954	$43	35,899,022	10,316,966	517	1,055,497 no tax		1,084,176
Virginia	725,451	46,209,155	$64	91,405,789	24,995,742	1,154	1,617,320	852,931	2,377,220
Region 9									
Illinois	369,245	24,036,536	$70	64,559,430	17,459,425	718	1,735,408	501,300	1,912,921
Indiana	323,110	15,232,523	$47	32,801,480	8,721,209	415	761,641	279,341	886,075
Maine	17,036	730,383	$41	1,320,257	338,108	20	44,405	8,325	31,221
Michigan	5,157,531	259,394,950	$50	497,542,644	137,398,105	6,287	15,567,699	5,345,651	14,305,545
Minnesota	2,959,067	171,070,606	$57	349,126,916	97,262,624	4,758	11,119,576	3,854,598	9,654,100
Missouri	602,975	36,643,410	$44	90,529,690	21,227,902	1,111	1,632,684	672,006	2,076,979
New Hampshire	240,119	13,740,394	$57	24,358,936	6,806,711	335	no tax	no tax	743,895
New York	12,305	402,553	$33	725,031	191,380	8	16,102	5,655	21,519
Ohio	415,017	19,294,027	$46	43,251,606	11,347,257	516	961,701	249,832	1,181,204
Pennsylvania	731,790	21,274,861	$29	44,554,609	12,183,249	564	1,276,492	338,557	1,258,999
Vermont	213,437	11,262,034	$53	19,399,959	5,470,361	301	450,371	110,709	522,597
West Virginia	559,914	20,772,397	$35	31,501,967	7,453,310	461	1,246,341	212,531	655,130
Wisconsin	1,087,217	66,152,971	$61	132,882,470	35,572,896	1,801	3,300,399	1,257,447	3,520,757
Region 10 - Alaska	1,584,778	136,299,717	$86	231,190,657	60,232,392	2,632	no tax	no tax	6,760,345

APPENDIX 9

Economic Impacts of Wildlife Viewing on National Forest Lands by State, 1996

Region/State	Forest Service Wildlife Viewing Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1									
Idaho - Northern	350,481	15,998,095	$42	27,243,637	7,292,952	420	200,305	252,514	653,972
Montana	1,036,431	45,227,078	$44	85,966,194	22,994,627	1,502	no tax	42,981	2,224,147
North Dakota	81,353	1,729,401	$21	3,233,118	821,653	53	86,470	1,485	82,009
Region 2									
Colorado	4,386,568	140,065,375	$31	309,858,074	98,207,707	4,537	4,201,961	461,911	9,238,217
Kansas	198,376	1,412,455	$7	3,077,795	825,095	47	96,189	20,268	70,474
Nebraska	190,946	2,098,524	$13	4,575,456	1,276,054	71	105,926	33,913	124,799
South Dakota	719,757	35,373,626	$49	65,530,152	18,145,079	1,209	1,454,995	no tax	1,879,795
Wyoming	652,154	46,125,203	$71	81,559,147	22,547,017	1,515	1,845,408	no tax	2,078,447
Region 3									
Arizona	1,952,141	117,915,985	$59	223,989,768	61,142,905	2,766	5,895,914	1,170,156	5,546,766
New Mexico	708,400	82,505,567	$116	146,074,099	36,480,441	2,506	4,125,278	435,227	3,197,975
Region 4									
Idaho - Southern	570,058	23,965,360	$42	40,816,456	10,926,156	630	1,198,412	423,263	979,707
Nevada	112,932	14,885,900	$132	24,574,224	6,392,539	294	967,553	no tax	671,425
Utah	477,070	26,779,462	$56	56,961,505	16,251,968	1,003	1,305,499	766,767	1,756,696
Region 5									
California	7,070,949	223,132,477	$32	507,091,439	141,624,645	5,911	13,627,946	2,156,504	16,999,318
Region 6									
Oregon	2,216,845	91,284,835	$42	158,647,506	44,527,591	2,128	no tax	2,320,240	4,426,725
Washington	3,209,542	218,302,780	$67	415,917,228	108,217,252	4,792	14,217,031	no tax	11,573,342

APPENDIX 9 (CONTINUED)

Economic Impacts of Wildlife Viewing on National Forest Lands by State, 1996

Region/State	Forest Service Wildlife Viewing Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 8									
Alabama	907,438	41,054,926	$45	82,860,797	22,161,163	1,121	1,642,197	790,984	2,131,139
Arkansas	1,943,496	192,075,391	$97	262,826,913	69,176,401	3,490	5,553,389	1,823,362	5,497,715
Florida	2,038,373	132,094,073	$63	248,023,011	70,024,183	3,395	7,925,643	no tax	3,518,723
Georgia	895,333	29,088,992	$32	60,113,493	18,494,118	912	1,160,558	887,774	2,094,567
Kentucky	892,720	27,297,799	$31	58,769,258	14,195,678	730	1,637,866	656,540	1,364,904
Louisiana	230,799	5,946,535	$26	11,325,444	3,063,245	171	235,455	64,297	310,717
Mississippi	268,010	16,257,471	$61	32,720,729	8,565,710	463	1,144,675	156,791	405,775
North Carolina	2,340,073	45,720,859	$19	85,031,895	23,583,917	1,361	1,745,934	1,038,065	2,598,769
Oklahoma	430,869	4,257,759	$10	5,995,755	2,492,765	146	192,747	54,626	242,065
South Carolina	525,555	29,032,015	$55	54,428,029	14,711,940	816	1,451,601	419,079	1,465,890
Tennessee	956,905	45,141,303	$47	92,077,774	25,865,017	1,355	2,705,478	no tax	2,540,776
Texas	451,795	9,596,507	$21	20,429,070	5,491,426	205	599,354	no tax	550,309
Virginia	2,256,983	81,151,290	$36	159,662,366	44,120,314	3,208	2,859,592	1,605,274	4,945,300
Region 9									
Illinois	1,248,795	13,253,055	$11	20,797,059	6,293,627	350	928,556	349,916	957,691
Indiana	563,716	6,031,058	$11	12,405,752	3,345,034	181	201,567	122,060	387,241
Maine	84,601	4,212,572	$50	8,142,551	2,179,576	51	282,754	67,169	253,100
Michigan	2,400,414	113,134,874	$47	234,255,759	59,256,199	2,602	6,992,092	2,216,937	5,922,837
Minnesota	769,249	13,113,929	$17	27,621,997	7,768,049	397	552,455	331,792	805,549
Missouri	2,682,305	78,170,421	$29	166,237,825	44,257,721	2,155	3,302,700	1,421,555	4,406,543
New Hampshire	1,064,318	34,037,124	$31	61,026,075	17,344,063	970	no tax	no tax	3,148,978
New York	22,951	899,103	$39	1,725,653	454,726	26	35,064	12,050	45,862
Ohio	1,346,900	13,221,652	$10	28,147,121	7,536,999	393	661,583	182,625	899,401
Pennsylvania	960,176	27,349,000	$29	55,385,150	16,615,952	769	1,654,080	461,097	1,715,272
Vermont	875,721	27,027,521	$31	48,647,423	13,952,400	645	1,051,095	366,683	1,400,733
West Virginia	506,093	25,667,705	$53	44,767,368	12,292,509	795	1,340,067	307,227	1,155,625
Wisconsin	1,306,663	47,120,403	$36	93,291,908	25,402,583	1,550	2,556,015	1,065,693	3,009,560
Region 10 - Alaska	372,115	39,855,045	$107	67,754,009	20,583,081	1,041	no tax	no tax	2,212,322

APPENDIX 10

Economic Impacts of Hunting on National Forest Lands by State, 1996

Region/State	Forest Service Hunting Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1									
Idaho - Northern	605,687	37,046,060	$61	65,045,445	18,144,129	1,045	2,668,195	701,351	1,695,017
Montana	570,548	58,819,411	$103	106,929,557	29,015,955	1,819	no tax	807,455	2,655,528
North Dakota	126,566	8,398,062	$66	15,021,585	3,922,790	234	554,415	56,138	358,131
Region 2									
Colorado	1,794,229	226,470,291	$126	480,307,789	135,911,875	6,955	10,766,551	4,015,353	13,540,958
Kansas	65,962	3,497,650	$53	7,235,746	1,957,554	107	219,326	49,561	188,902
Nebraska	53,942	5,180,526	$96	9,153,212	2,464,435	139	476,879	65,575	232,990
South Dakota	323,202	22,757,028	$70	40,679,539	11,590,514	724	1,141,014	no tax	1,053,903
Wyoming	461,205	53,781,533	$117	94,418,404	26,013,287	1,664	1,667,071	no tax	2,370,038
Region 3									
Arizona	470,210	62,513,290	$133	121,220,135	36,721,275	1,792	3,446,775	764,359	3,354,856
New Mexico	136,021	21,072,268	$154	37,420,335	9,798,815	566	1,051,795	280,547	971,872
Region 4									
Idaho - Southern	907,441	55,502,466	$61	94,454,834	27,155,572	1,565	3,997,464	1,050,795	2,509,477
Nevada	51,790	9,849,147	$190	15,961,837	4,656,921	216	686,788	no tax	490,724
Utah	795,919	80,642,306	$101	154,225,043	46,572,670	2,587	4,512,880	1,930,175	4,411,989
Region 5									
California	1,742,445	183,780,459	$105	392,832,970	115,970,089	4,881	11,925,203	1,753,227	12,592,926
Region 6									
Oregon	1,289,372	150,464,043	$117	284,118,602	73,617,453	3,527	no tax	4,003,814	7,560,294
Washington	1,528,462	99,704,915	$65	187,575,101	53,120,352	2,503	3,497,677	no tax	5,099,075

APPENDIX 10 (CONTINUED)

Economic Impacts of Hunting on National Forest Lands by State, 1996

Region/State	Forest Service Hunting Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 8									
Alabama	740,971	64,463,535	$87	131,127,869	36,619,752	1,759	3,959,964	1,357,921	3,656,234
Arkansas	1,507,219	64,447,527	$43	124,591,692	35,544,380	1,920	3,787,496	1,206,634	3,445,002
Florida	87,027	5,229,357	$60	9,849,785	3,144,620	150	317,758	no tax	324,199
Georgia	366,184	43,774,733	$119	90,191,949	25,178,218	1,100	1,777,978	1,125,775	2,096,214
Kentucky	301,613	16,649,578	$55	34,009,356	9,506,502	515	1,058,015	549,680	919,055
Louisiana	419,038	23,547,653	$56	42,877,161	12,067,822	657	1,229,559	240,698	1,184,030
Mississippi	719,709	39,465,672	$41	75,686,713	20,297,586	1,145	3,092,145	558,565	1,918,725
North Carolina	949,019	43,521,406	$46	84,260,258	23,566,602	1,129	2,441,806	970,145	2,425,063
Oklahoma	206,514	16,065,302	$57	34,159,571	9,210,715	405	801,283	210,468	895,248
South Carolina	438,615	30,669,051	$47	58,558,061	12,690,682	637	1,190,057	311,738	1,113,918
Tennessee	628,692	44,691,395	$71	95,443,857	26,345,474	1,267	3,012,766	no tax	2,700,536
Texas	138,265	8,941,846	$65	20,268,916	5,203,514	281	625,077	no tax	582,726
Virginia	832,454	78,475,019	$94	154,045,705	43,967,450	2,164	3,557,875	1,258,560	4,469,278
Region 9									
Illinois	256,041	17,390,321	$68	39,775,657	11,459,667	495	1,152,710	328,936	1,232,159
Indiana	294,650	12,350,373	$42	25,157,245	7,361,403	364	542,783	244,506	731,372
Maine	55,809	4,261,448	$76	7,222,401	2,050,509	112	297,505	12,896	191,233
Michigan	2,477,115	130,155,892	$54	247,071,934	70,014,982	3,255	5,629,557	2,727,835	7,197,461
Minnesota	981,515	65,710,217	$67	121,997,718	36,750,643	1,892	4,674,553	1,492,716	3,744,295
Missouri	759,815	56,000,155	$74	119,753,851	32,957,271	1,753	2,949,264	575,886	3,235,424
New Hampshire	385,447	17,444,845	$45	31,464,900	9,605,667	476	no tax	no tax	971,012
New York	8,307	507,570	$61	952,574	249,049	10	21,343	7,285	37,716
Ohio	736,678	37,591,555	$50	82,857,330	23,249,158	1,116	2,151,545	191,752	2,357,152
Pennsylvania	568,535	30,052,604	$53	67,580,779	18,343,552	815	1,521,532	513,759	1,951,045
Vermont	316,575	20,601,743	$65	36,480,154	10,754,456	555	906,899	266,029	1,064,114
West Virginia	642,986	23,116,094	$36	39,419,650	10,835,782	615	1,609,694	322,574	1,050,272
Wisconsin	1,754,131	85,959,025	$49	167,109,986	48,855,019	2,655	5,266,454	1,843,287	4,715,015
Region 10 - Alaska	326,342	59,014,148	$153	92,478,038	22,052,503	1,126	no tax	no tax	2,076,951

APPENDIX 11

Economic Impacts of Big Game Hunting on National Forest Lands by State, 1996

Region/State	Forest Service Big Game Hunting Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1									
Idaho - Northern	385,487	22,309,934	$58	37,341,543	6,536,942	561	1,370,215	421,468	1,005,965
Montana	497,347	35,844,632	$55	70,064,809	20,405,115	1,360	1,319,870	481,985	1,725,075
North Dakota	46,161	3,280,781	$71	5,639,452	1,605,610	47	212,071	20,110	145,831
Region 2									
Colorado	1,427,247	277,570,914	$194	581,574,135	164,690,705	8,047	11,651,560	5,599,234	16,797,671
South Dakota	128,609	6,655,284	$52	11,270,596	3,372,762	192	387,369	0	287,139
Wyoming	400,067	29,774,697	$73	51,755,399	13,474,595	833	1,497,854	0	1,206,070
Region 3									
Arizona	170,068	26,550,054	$156	49,791,064	15,107,030	756	1,525,160	320,279	1,527,447
New Mexico	77,315	11,590,601	$150	21,011,961	5,778,774	349	630,674	164,231	524,143
Region 4									
Idaho - Southern	579,635	33,514,667	$58	56,544,424	15,750,462	575	2,052,108	606,149	1,508,035
Utah	442,961	44,745,183	$101	91,241,197	25,613,232	1,410	2,807,315	1,066,972	2,456,362
Region 5									
California	807,598	51,960,490	$64	11_,069,318	31,391,177	1,279	4,182,755	258,991	3,117,740
Region 6									
Oregon	969,912	128,189,925	$132	235,455,506	64,125,805	2,776	2,065,131	5,346,295	6,291,809
Washington	936,707	48,615,247	$52	91,753,676	26,719,314	1,182	4,748,152	0	2,516,553

APPENDIX 11 (CONTINUED)

Economic Impacts of Big Game Hunting on National Forest Lands by State, 1996

Region/State	Forest Service Big Game Hunting Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 8									
Arkansas	656,055	30,959,660	$47	56,270,208	16,758,117	565	1,760,313	559,020	1,588,347
Mississippi	315,181	17,180,749	$55	35,954,309	9,047,752	500	1,125,910	240,854	865,737
Tennessee	400,549	20,847,830	$52	60,530,158	15,378,677	539	2,064,051	0	1,932,270
Virginia	827,362	63,705,155	$77	124,175,707	34,294,914	1,022	2,900,515	1,095,368	3,550,806
Region 9									
Maine	32,415	2,379,669	$73	4,022,261	1,134,028	60	175,611	63,090	121,336
Michigan	1,465,317	52,998,950	$36	95,749,909	28,595,550	1,509	3,800,094	1,110,930	2,925,177
Minnesota	565,255	34,850,477	$96	69,117,920	19,217,864	893	2,547,914	802,225	2,005,563
New Hampshire	229,615	5,036,601	$35	14,582,346	4,435,864	220	146,395	0	444,561
New York	5,497	298,440	$51	501,055	135,717	5	12,168	4,119	15,512
Pennsylvania	410,597	19,190,354	$47	35,262,710	11,151,252	505	494,531	312,291	1,175,406
Vermont	161,245	9,190,529	$57	16,701,845	4,797,179	251	454,675	118,042	472,169
West Virginia	619,965	28,736,365	$46	46,259,979	13,423,134	730	2,071,208	403,955	1,287,727
Wisconsin	750,688	42,011,112	$56	81,490,464	23,715,171	1,229	2,799,206	904,729	2,309,001
Region 10									
Alaska	226,090	18,294,426	$81	28,749,542	6,958,251	319	211,874	0	750,308

*Estimates are calculated for states where there were more than 30 observations of big game hunting on public lands

APPENDIX 12

Economic Impacts of Small Game Hunting on National Forest Lands by State, 1996

Region/State	Forest Service Small Game Hunting Days	Retail Sales	Expenditures per person per day	Economic Output	Personal Income	FTE Jobs	State Sales Tax	State Income Tax	Federal Income Tax
Region 1									
Montana	121,645	3,071,498	$25	5,835,220	1,525,653	98	222,130	29,770	132,735
North Dakota	44,291	1,053,306	$24	2,035,258	507,093	32	65,067	6,305	45,055
Region 2									
Nebraska	39,099	750,200	$25	1,379,029	356,360	21	70,495	9,039	32,916
South Dakota	149,406	9,029,723	$57	17,108,045	4,903,337	313	442,535	0	424,295
Region 3									
Arizona	165,526	7,497,895	$44	15,026,751	3,932,465	105	409,551	83,545	395,755
Region 4									
Nevada	21,022	1,261,709	$60	2,002,845	569,990	27	115,300	0	58,900
Utah	256,430	15,071,431	$55	20,368,0[illegible]	7,661,095	460	788,392	299,967	697,359
Region 8									
Mississippi	209,190	5,502,781	$25	10,742,285	2,712,256	160	347,600	69,191	249,275
Region 9									
Minnesota	368,960	16,075,418	$44	32,577,016	8,459,027	442	1,216,072	135,076	839,191
Pennsylvania	144,514	1,826,110	$13	3,864,139	1,075,117	46	56,732	30,160	116,285
Wisconsin	459,154	9,250,542	$20	[illegible]	5,141,455	292	2,055,096	191,512	492,022

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