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The Center for



Rural Pennsylvania
A Legislative Agency of the Pennsylvania General Assembly

Economic Values and Impacts
of Sport Fishing, Hunting and
Trapping Activities
in Pennsylvania

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The Center for Rural Pennsylvania is a bipartisan, bicameral legislative agency that serves as a resource for rural policy research within the Pennsylvania General Assembly. It was created in 1987 under Act 16, the Rural Revitalization Act, to promote and sustain the vitality of Pennsylvania's rural and small communities. To preserve and enhance the rural environment that makes the Commonwealth a unique place to live, work, or visit, the Center awards grants for applied research and model projects; maintains and disseminates information on rural trends and conditions; develops publications to share research and project results; and sponsors local, state and national forums on rural issues.

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Hunters, anglers and furtakers have long been drawn to Pennsylvania's rural areas to enjoy their abundant natural resources. Rural areas have also come to recognize the importance of these participants' hunting, fishing and trapping activities to the rural economy.

But what economic impacts do these activities actually have on rural areas? And is the Commonwealth and its rural communities taking full advantage of the economic opportunities that these activities offer?

As a research agency mandated to gather and analyze information on rural conditions and trends, the Center for Rural Pennsylvania sponsored a grant project to answer these and other questions about the economic benefits of hunting, fishing and trapping.

From 1995 to 1997, Dr. E.L. Dick Shafer, professor of Environmental Management at the Pennsylvania State University, and a team of researchers studied the economic impacts and values of hunting, fishing and trapping activities on the Commonwealth. (See Appendix A)

The grant project was to provide a snapshot of how much money these activities bring to the state; how much money people are spending to enjoy these activities; and how these sporting activities affect employment in rural areas.

The grant project also set out to measure the economic value of these activities by determining whether participants actually spent as much as they are willing to spend to participate in their sport; to determine what the long-term economic benefits of these activities may be; and to develop an economic base-line measure that would support these activities.

The results of the project will help policy makers craft better programs and policies that relate to hunting, fishing and trapping. More specifically, the results could help link these activities to rural economic development strategies, including tourism, and help policy makers and resource managers make sure that the availability of both wildlife and public lands match the demand for these resources.

From the study, the researchers found that hunters, anglers and furtakers created a \$9.6 billion impact from participating in these activities.

Results showed that another economic benefit associated with these activities was employment, which totaled more than 88,000 jobs.

The researchers also found that hunters, anglers and furtakers placed a high value on their sport. In most cases, the value they placed on their activities was much higher than what they actually paid to participate. For example, annual revenues from the sale of hunting and fishing licenses were quite small when compared to the amount of money that hunters and anglers spent on hunting and fishing trips. In 1996, the sale of 1.1 million hunting licenses generated revenues of \$16.7 million, which was 1.3 percent of the overall \$1.33 billion that hunters spent on hunting trips. Also in 1996, the sale of almost 976,000 fishing licenses totaled \$19.9 million, which was just 1.5 percent of the \$1.26 billion anglers spent on fishing trips.

The study also found that the economic values that sporting enthusiasts placed on wildlife-watching activities away from home was \$860 million, while the total expenditures of these enthusiasts to participate in wildlife watching away from home was \$290 million.

Most respondents to the study also indicated that communities, families, and individuals benefit socially and physically from the existence and maintenance of wildlife resources.

To measure the economic benefits of these sporting activities, the researchers had to determine what impact these activities had on the Commonwealth and the value of these activities to the participants.

What is economic “impact”?

Economic impact is how much participants actually spend on equipment, goods, and licenses, and how these purchases affect the economy. Purchases can have direct, indirect and induced impacts on the economy. For example, sporting enthusiasts who buy equipment make a direct impact on the retailers that sell equipment. Through their purchases, the enthusiasts also have an indirect impact on the industries that supply equipment and services to those retailers. These direct and indirect impacts also lead to induced impacts, which result when employees of the retailers and other industries receive wages and in turn spend their money on other goods and services. (See Appendix B for more on economic impact)

How economic impact was measured

IMPLAN, or the IMpact Analysis for PLANing method, was used to measure the economic impacts of hunting, fishing and trapping. IMPLAN is a computerized database and modeling system that helps to construct regional economic accounts and input-output tables. Input-output analyses assess the change in the overall economy that results from a corresponding change in some activity, such as hunting, fishing or trapping.

Using IMPLAN, the researchers measured the direct, indirect and induced economic impacts in seven economic categories including total economic effect, or output; personal income; employment; employee compensation; proprietary in-

come; other property-type income; and indirect business taxes. (See Appendix B for more on the IMPLAN method)

What is economic “value”?

Economic value, on the other hand, can be described as the maximum amount that a participant would be willing to pay to participate in the activity less any direct expenses that the participant pays to participate. Since activities such as hunting, sport fishing and trapping have other related expenses that participants may not actually pay for, including the use of public lands or resources or the time spent on the activity, economic value represents a real savings, or “good deal,” for the participants. (See Appendix C for more on economic value)

How economic value was measured

The Travel Cost Method (TCM) was used to estimate the economic values of hunting, sport fishing and trapping. Preferred by many economists, the TCM is based on the observed market behavior of a sample of people in response to direct out-of-pocket expenses, and time and cost for travel. The TCM, which in this study was based on the annual trip expenditures of sporting participants who used the resources, was used to calculate an economic demand curve on participation in specific activities. The areas under the demand curves were used to determine indirect measures of consumer surplus benefits. (See Appendix C for more on the TCM)

How data was gathered

To gather data for the study, the researchers sent mail questionnaires to Pennsylvania hunters, anglers and furtakers in the 67 counties of the state. The names and addresses of 15,299 hunters, 15,102 anglers, and 2,842 furtakers were sampled from the total number of 1994 licenses on file at the Pennsylvania Game Commission and the state Fish and Boat Commission. Large sample sizes were used to increase the likelihood that sportsmen and women would receive a questionnaire shortly after their most recent trip, which was a requirement of the TCM.

Three separate questionnaires were designed to measure trip and equipment expenditure patterns of the three activities. Hunters and anglers received their surveys periodically throughout a 12-month period in 1995-96, while furtakers received their questionnaire at the end of the 1996 furtaking season. The total number of usable responses for the surveys was 2,621 for hunters, 987 for anglers and 677 for furtakers.

In the mail questionnaires, the respondents were also asked to describe any other wildlife-associated recreation activities in which they participated. These activities may have included making their residences attractive to wildlife so that the participants could observe or photograph wildlife, or taking trips away from their residences to observe or photograph wildlife.

Other Research

In 1997, the U.S. Department of the Interior released the results of its 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. The purpose of the national study was to gather information on the number of anglers, hunters and wildlife-watching participants nationwide; how often these recreationists participate in their activities; and how much they spend on their activities.

The purpose of the Center for Rural Pennsylvania's study was to estimate the economic benefits of hunting, sport fishing and trapping for two types of economic measures within the Commonwealth.

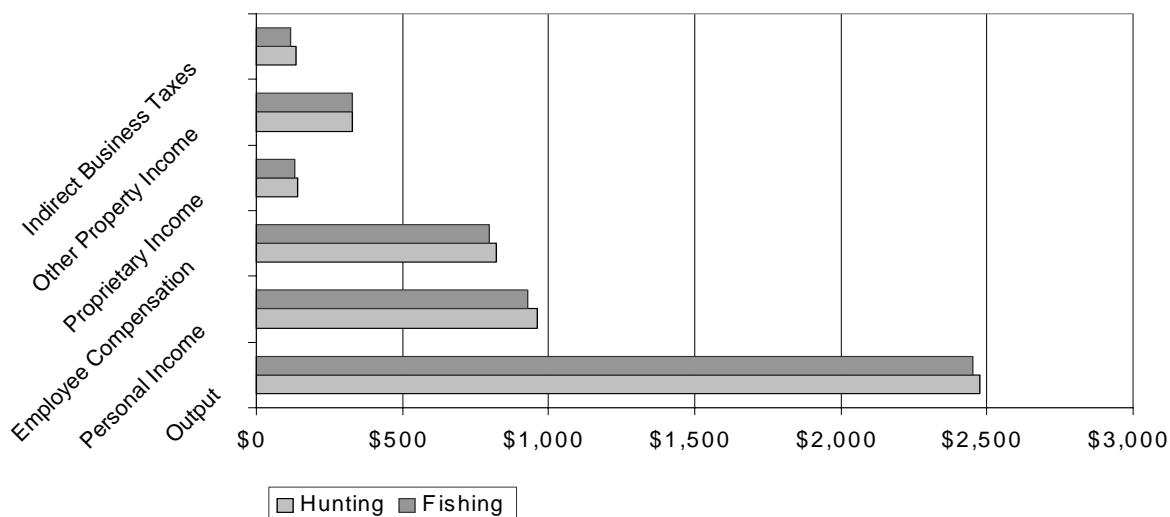
The Center wants to point out that the national study and the Center's study used different survey methods and that comparing the two studies would not be appropriate.

Economic Impacts

The economic impacts of the three activities in dollars were about \$4.8 billion for hunting, \$4.7 billion for sport fishing and \$19 million for furtaking, or a total of more than \$9.6 billion.

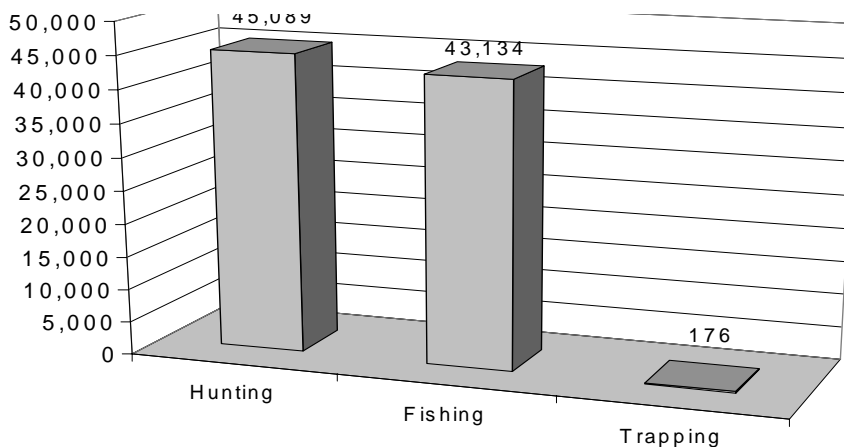
Hunting and sport fishing had very similar total dollar values for six of the seven economic categories as shown in the table below. (See Appendix B for definitions of categories)

Total Economic Impacts Of Hunting And Sport Fishing For Six Economic Categories (1996 Dollars)



In the job category, hunting and sport fishing also had very similar impacts. The total number of jobs associated with hunting was 45,089, fishing was 43,134, and furtaking was 176.

Number Of Jobs Associated With Hunting, Fishing And Trapping

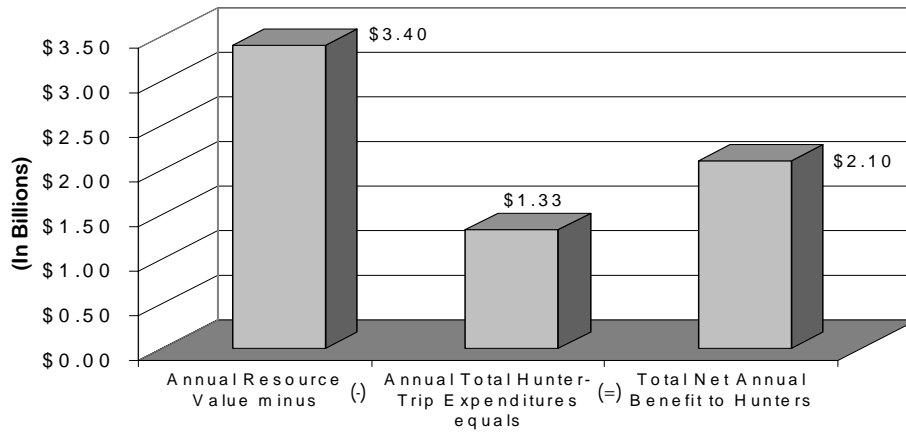


Economic Value

The total economic value of hunting, fishing and trapping was \$7.1 billion, or \$3.4 billion for hunting, \$3.7 billion for sport fishing and \$3.6 million for furtaking.

The total annual value of \$3.4 billion for hunting was about two-and-one-half times the \$1.33 billion in out-of-pocket travel expenses hunters spent to use the Commonwealth's hunting resources during a 12-month period.

Total Net Annual Benefit To Hunters

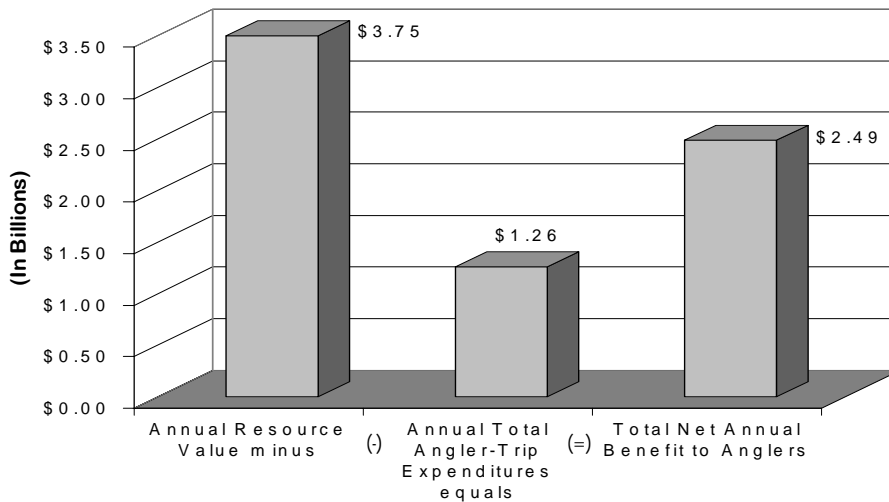


The total net annual benefit is 1.5 times greater than hunter-trip expenditures.

Total trip expenditures shown above are based on average expenditures per trip multiplied by total number of trips (as required by TCM).

The total annual value of \$3.7 billion for sport fishing was almost three times the \$1.26 billion in travel costs anglers spent to use fishing resources during the same 12-month period.

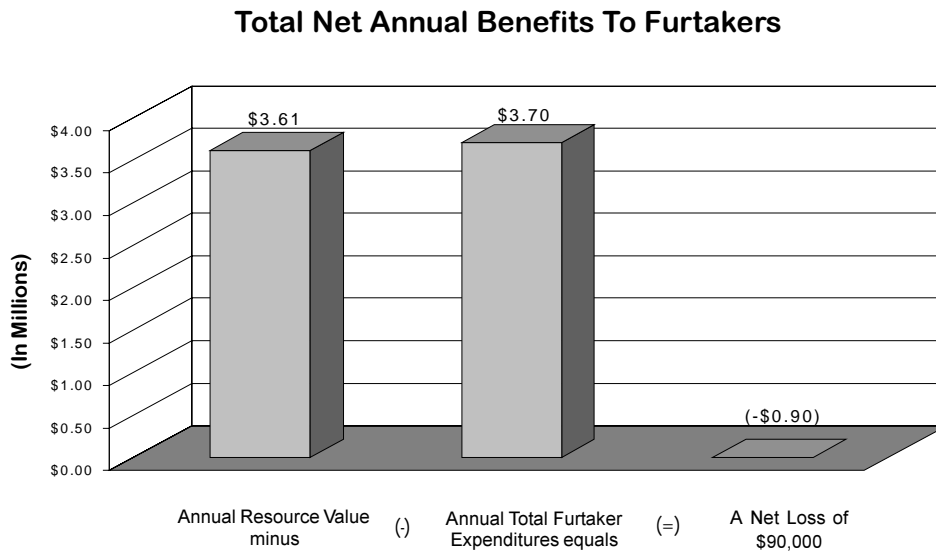
Total Net Annual Benefit To Anglers



The total is almost 2 times greater than angler-trip expenditures.

Total trip expenditures shown above are based on average expenditures per trip multiplied by total number of trips (as required by TCM).

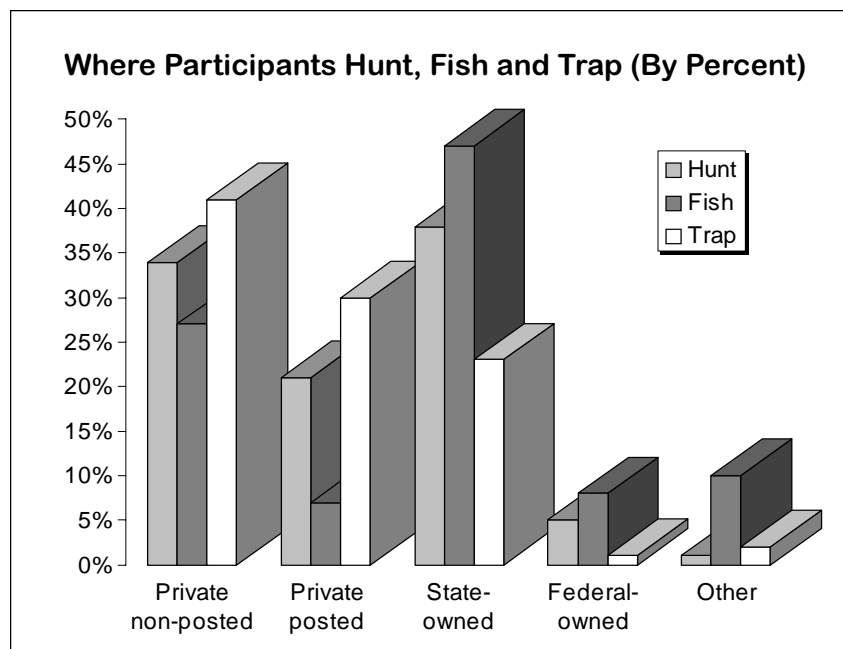
The total value of \$3.6 million for furtaking was slightly less than the \$3.70 million that furtakers spent for travel costs.



According to the research, anglers, on average, took about twice as many trips as hunters, or 13.4 compared to 7.6 million trips. Hunters, on the other hand, spent an average of about twice as much per trip as anglers, or \$174 compared to \$94 per trip. Furtaker expenditures were computed on an annual basis instead of a per trap-line-trip basis.

Where Participants Engage In Their Sports

State-owned land was used more often for hunting and fishing trips than private, posted or non-posted lands or federal land, while private, non-posted land was more often used for furtaking activities. Anywhere from about 25 to 50 percent of hunter, angler and furtaker trips involved state-owned lands, while about 25 to 40 percent of trips involved private, non-posted land and about 10 to 30 percent involved posted land.



Wildlife watching at home

Survey participants were also asked how much they spent to attract wildlife to or observe wildlife at their homes. Sporting enthusiasts' households spent a total of \$93 million to observe and attract wildlife to their homes. The total expenditures for hunter households was somewhat higher (\$49.7 million) than for angler households (\$41.6 million); furtaker households' total expenditures were \$1.7 million.

Wildlife-watching activities away from home

In the mail questionnaire, survey participants were also asked about other, non-residential, or away-from-home, wildlife-associated activities in which they participated. The total economic value of these wildlife-associated recreation activities was slightly more than \$860 million; \$320 million for hunters; \$540 million for

anglers; and \$1.57 million for furtakers.

The total value of non-residential wildlife viewing for hunter households was three times the amount those households spent to watch wildlife.

The total annual value of non-residential wildlife viewing resources for angler households was also three times the amount those households spent to watch wildlife.

However, the total annual value of non-residential wildlife viewing resources for furtaker households was only 1.3 times the amount of their related expenditures.

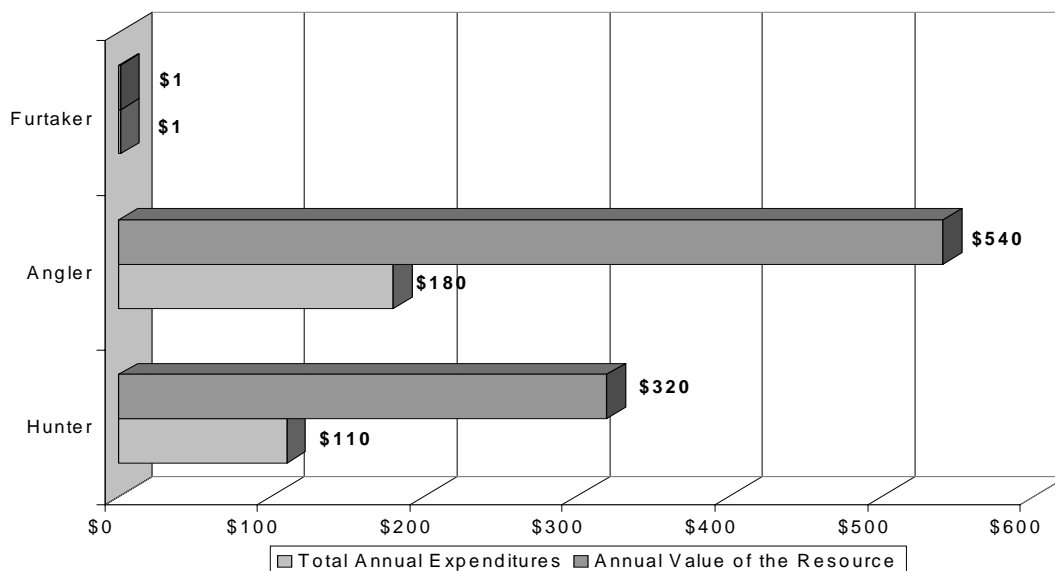
Hunter and angler households incurred almost the same average expenditure per trip, or \$33 versus \$32, but angler households took almost twice as many trips as hunter households.

Open Comments

The last question in the survey allowed for additional comments about wildlife recreation.

The participants often commented on the psychological value of wildlife and fish. Many

Economic Values Of Wildlife Viewing Resources



respondents wrote of how they valued the opportunity to spend time in a natural environment observing or photographing wild animals, catching trout, or stalking big game. Other respondents discussed how they valued knowing that species exist within a functioning ecosystem, even though the respondents may have seldom used the resource.

Many individuals mentioned the physical benefits related to the sporting or recreational activity. For example, the respondents felt that many of the recreational activities required a great deal of physical exertion, which contributed to the respondents' overall health. Also, some respondents perceived their activities as a "competition" between humans and animals, which forced the respondents to master certain physical skills in order to observe, photograph, or harvest wild animals or fish.

Overall, participants in this study believed that engaging in wildlife and fish recreation activities improved their physical health through exercise, change of pace, and stress reduction.

Respondents also commented on the social values of wildlife-associated recreation, which included the strengthening of relationships among people, social cohesion and interaction. Social values included building personal character and developing social bonding among family and friends while participating in wildlife-and fish-related outdoor activities. Despite some variations, the participants' explanations of various social values all contained the basic premise that family, community, and the state, or society in general, benefit from the presence of wildlife and fish.

HUNTER PROFILES

Activities

- Hunters from all 67 counties in the Commonwealth responded to the survey.
- 95 percent of all hunters took one or more hunting trips during the 1995-96 hunting season.
- A hunting trip was defined as one hunter spending part or all of one or more consecutive days hunting one or more types of game (close to or far from home) in Pennsylvania before returning to the location where the trip began.
- Total hunting trips for the sample was 17,654, which translates to an estimated total 7.61 million hunting trips for the total hunting population.
- The median number of trips per hunter was five.
- Almost 25 percent of all hunters took one to five trips, another 30 percent took three to six trips, and another 25 percent of hunting trips varied between seven to 20-plus trips.
- The median number of days per trip was three.
- 15 percent of all hunting trips were one day or less; another 26 percent were for two to three days; 26 percent were four to seven days and 15 percent were eight-plus days.
- About 40 percent of all hunting trips occurred in December, 35 percent in November, and 4 percent in October.
- About 34 percent of all hunting trips involved private, non-posted land. 21 percent of all hunting trips involved posted land. The largest percentage of hunting trips (38 percent) were to state forest, game, or park lands.

- About 36 percent of surveyed hunters had an antlerless deer permit; 26 percent had archery licenses; 17 percent had one or more bonus deer licenses; 15 percent had bear licenses; and 8 percent had muzzle-loader permits.

- 53 percent of surveyed hunters were also anglers; 2 percent were anglers and furtakers.

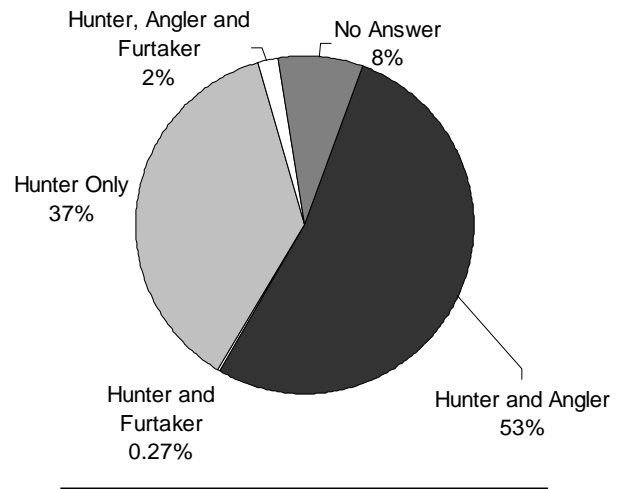
Rural land ownership

- 45 percent of hunters owned rural land.
 - About 18 percent of hunters who owned rural land were also anglers.
 - Slightly more than 16 percent of rural land owned by hunters was one to 20 acres.
 - About 19 percent of all hunters who owned rural land allowed anyone to use their land for hunting, fishing, trapping, or recreation.

Non-residential wildlife watching activities

- About 45 percent of all hunters took one or more trips during a 12-month period to watch wildlife.
 - Hunters took a total of 3.39 million trips to watch wildlife.
 - The median number of trips per hunter was four.
 - About 15 percent of those trips were for one day or less. Other trips varied from two to 11-plus days.
 - The median number of days per trip was two.
 - Wildlife viewing trips took place mainly during September through November.
 - Large mammals were the wildlife sought about 30 percent of the time.

Hunter Survey Participants Involved In Combination Of Activities



- Birds were the major attraction 50 percent of the time for trips to fields, forests, mountains, and waterfowl habitats.

ANGLER PROFILES

Activities

- Anglers from 64 counties in the Commonwealth responded to the survey.
 - 87 percent of anglers took one or more angler trips during the 1995-96 fishing season.
 - An angler trip was defined as one angler traveling to and spending part or all of one or more consecutive days fishing one or more water bodies in Pennsylvania before returning to the location where the trip began (usually the angler's residence).
 - Total angler trips for the sample was 12,185, which translated to an estimated total of 13.4 million angler trips for 12 months.
 - The median number of trips per angler was six.
 - Almost two thirds of all angler trips occurred in April, May and June.
 - 37 percent of all angler trips were one day or less; another 26 percent were for two to three days.

- The median number of days per trip was two.
- About 27 percent of all angler trips were to private, nonposted land. About 24 percent of trips were to state parkland, 13 percent to state game land, and 10 percent to state forest land. Federal land accounted for another 8 percent.
- 53 percent of surveyed anglers were also hunters; 2 percent were hunters and furtakers.

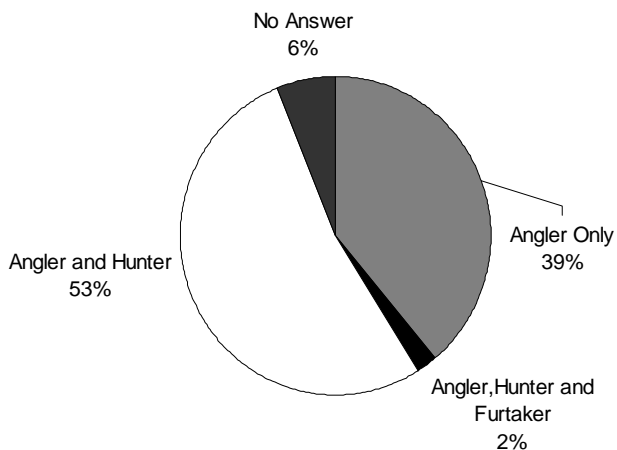
Rural land ownership

- 20 percent of anglers owned rural land.
- Many anglers who owned rural land were also hunters.
- Slightly more than 11 percent of rural land owned by anglers was 20 acres or less.
- About 21 percent of all anglers who owned rural land allowed people that they may or may not have known, to use their land for hunting, fishing, trapping, or recreation.

Non-residential wildlife-watching activities

- About a third of all anglers took one or more trips during a 12-month period to watch wildlife.
- Anglers took a total of 5.64 million trips to watch wildlife.

Angler Survey Participants Involved In Combination Of Activities



- The median number of trips was four.
- About 15 percent of those trips were for one day or less. Other trips varied from two to 11-plus days.
- The median number of days per trip was two.
- Wildlife viewing trips took place mainly during the spring and fall.
- Large mammals were the wildlife sought 20 percent of the time.
- Birds were the major attraction 53 percent of the time for trips to fields, forests, mountains, and waterfowl habitats.

FURTKAKER PROFILES

Activities

- Furtakers from 66 counties responded to the survey.
- The percent of furtakers is fairly evenly distributed throughout the Game Commission's six furbearer management areas.
- 52 percent of all licensed furtakers did not trap.
- 62 percent of trapping activity occurred in November and December.
- Almost 75 percent of all trapping activity took place on private lands; 29 percent of which were posted, 41 percent of which were not.
- 40 percent of trap lines were a few hundred yards to 2.5 miles in length; another 21 percent ranged between 2.6 and 7.5 miles.
- 50 percent of trap lines were within a mile from furtakers' residences.
- One person operated most trap lines.
- The most heavily trapped furbearer was muskrat, followed by raccoon and fox, which were harvested in about equal numbers.

- The average dollar value per pelt ranged from \$23.80 for coyote to \$2.03 for skunk.
- Only 20 percent of all furtakers realized a profit from their trapping activities.
- 71 percent of surveyed furtakers were also hunters and anglers.

Rural land ownership

- 41 percent of all licensed furtakers owned rural land, but only about 50 percent of those landowners engaged in trapping activities.
- 21.6 percent of all licensed furtakers did not trap, did not own rural land, and were both a hunter and angler.
- Almost 50 percent of all rural land owned by furtakers ranged between one to 19 acres.
- About 19 percent of furtakers who own rural land allow public access.

Non-residential wildlife-watching activities

- 55 percent of licensed furtakers took one or more trips to watch wildlife in the previous 12 months.
- Most wildlife viewing activities occurred in the fall and in February.
- Two-thirds of all wildlife viewing trips were for one to two days.
- Large mammals topped the list of most favorite type of wildlife to watch on trips.

Conclusion

Through this study, the researchers helped to estimate what the economic benefits of hunting, fishing and trapping are to the Commonwealth; how sportsmen and women feel about maintaining the natural resources that support their sporting activities; and how the Commonwealth might continue to address the task of resource management.

Information from this study helped to emphasize the economic impact that hunting, fishing and furtaking have in providing jobs and other financial and social benefits. For example, the \$9.6 billion that hunters, anglers and furtakers spent to participate in their activities was more than half of what the Commonwealth spent on its total state budget in 1997.

The study also helped to reemphasize the need for coordination and cooperation among private, state and federal agencies and programs. Effective management and preservation of wildlife and fish resources will continue to be critical components in the future.

Policy makers and natural resource managers face many challenges in meeting the demands for wildlife-associated recreation activities. With the help of credible economic, social, and public opinion data, as well as biological considerations, policy makers can make effective management decisions.

The data gathered from this study may provide policy makers with data that can help influence their decisions about the state's natural resources.

Following are issues that should be considered.

- Costs associated with hunting and fishing are considerably less than the value participants place on these activities. Policy makers may want to review the disparity between the costs associated with and the benefits gained from these activities. *(Editor's note: In December 1998, Gov. Tom Ridge signed legislation to increase hunting license fees beginning July 1999.)*

- Improving the future of wildlife and fish resources in the state will become an increasingly difficult task. As the Commonwealth witnesses the intensified use of its lands, its agencies are experiencing declines in funding for wildlife and fish management. Unless these circumstances change, wildlife and fish management agencies will be faced with the challenging job of solving more complex land use problems with less funds and personnel.

- Over the years, an aging population may affect the participation rate for these activities. To maintain or increase participation in hunting, fishing and trapping, the Commonwealth may want to consider developing new ways to increase interest among youth.

- Hunting and fishing are important economic activities, as is wildlife watching. The Commonwealth may want to consider incorporating these activities into its tourist promotion package to maintain or increase their economic potential.

- Wildlife and sporting resource management agencies need to better coordinate their services and increase cooperation between and within their agencies to better manage land that is increasingly being used by a wider variety of outdoor enthusiasts.

- The availability of public land is important to hunters and anglers since most use public lands to participate in sporting activities. The Commonwealth should recognize these uses and the impacts they have on rural communities and review state programs for establishing public lands.

- Since hunters and anglers also use private land for these activities, the Commonwealth may want to consider offering private landowner incentive programs that encourage landowners to maintain habitat areas. Programs could range from wildlife habitat management assistance to preferred tax treatment for landowners that preserve wildlife habitat and allow hunters and anglers on their property.

- An ongoing process of data collection and analysis would help to determine the long-term needs of participants and the future health and maintenance of the state's natural resources.

While the economic data gathered in this study can provide solid insight into the economic values and impacts of sporting activities to the state, it cannot stand alone to justify or formulate policy. Instead, the economic data gathered in this study must be used with biological, public opinion and cultural data to produce sound, well-informed policies that will benefit a variety of groups and the Commonwealth in the years to come.

A

Research Team

The multi-disciplinary team members that conducted this project are listed below.

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B

Economic Impact and the IMPLAN Method

Economic impact

Wildlife-associated recreation has been a traditional leisure time activity that produces economic benefits for many individuals and businesses in the Commonwealth. The hunting, sport fishing, and furtaking "industry" is comprised of small and large businesses, but is not often thought of as an industry in the traditional sense. Unlike steel or textile industries, which are identified by large factories and transportation systems, the wildlife-associated recreation industry is comprised of widely scattered manufacturers, wholesalers, and retailers that, when considered together, form a network industry. This industry usually occurs in regions that are rural and often economically "dispersed," and it is in these areas that the economic contribution of wildlife-related recreation is especially valuable relative to other regions where a diversity of job opportunities may exist.

There are three types of economic impacts from wildlife-associated recreation activities: direct, indirect, and induced.

- **Direct Impacts:** A direct impact is the initial purchase made by a sportsman or woman. For example, when a sportsman buys a piece of equipment for \$450, there is a direct impact for the retailer, and the economy, of \$450.

- **Indirect Impacts:** Indirect impacts are the secondary effects resulting from the purchase of that equipment. Indirect impacts imply that a business's sales benefits not only that business, but also the many industries that sell supplies and services to that business.

- **Induced Impacts:** An induced impact results from the wages and salaries paid by the directly and indirectly impacted industries. The employees of these industries, in turn, spend their income. These expenditures are termed induced impacts. They, in turn, create a continual cycle of indirect and induced effects.

IMPLAN Method

IMPLAN (IMpact Analysis for PLANing) was used to measure the economic impacts, in 1996 dollars, of expenditures for travel and equipment associated with hunting, sport fishing, and furtaking. IMPLAN was originally developed by the USDA Forest Service in cooperation with the Federal Emergency Management Agency and the USDI Bureau of Land Management to assist the Forest Service in land and resource management planning. IMPLAN is especially useful in depicting the economic impacts of outdoor recreation activities such as hunting, sport fishing, and furtaking in an overall economy.

IMPLAN is a computerized database and modeling system for constructing regional economic accounts and regional input-output tables. Input-output analyses assess the change in the overall economy that results from a corresponding change in some activity, such as hunting, fishing, or furtaking activities. The model relies on

two sets of data. The first is a 528-sector input-output transaction table based on the U.S. Department of Commerce's Bureau of Economic Analysis's National Input-Output Table. This table describes the use and production of commodities by 528 manufacturing, commercial, and government sectors in the U.S. economy. The second set is the county-level data to be used for developing a regional input-output structure that describes total output, employment, and the components of final demand and value added for the sectors within the region. Final demand, or sales, is the dollar value placed on the ultimate consumption of commodities, such as goods and services. Value-added represents the portion of total sales directed to employee compensation, proprietary income, property income, and indirect business taxes.

In this study of the economic contributions of hunting, sport fishing, and furtaking, the region of interest is the entire state — not individual counties or cluster of counties within the state.

The survey procedures used to obtain the data were not designed to evaluate the economic impacts of any of the above three recreation activities within a county or cluster of counties because of survey respondents' inability to assign each of 18 expenditure items to a given county or counties in which expenditures were made over a 12-month period, or even for a given trip.

Economic impacts (direct, indirect, and induced) are reported in this study for each of seven economic categories: total economic effect (output), personal income,

employment, employee compensation, proprietary income, other property type income, and indirect business taxes.

- **Total Economic Effect (Output):** Industry output is a single number in dollars of each industry associated with each of the three consumptive wildlife-recreation associated activities. The dollars represent the value of the industry's total production.

- **Personal Income:** Personal income resulting from each of the three wildlife-recreation consumptive activities.

- **Employment:** Total number of jobs related to each of the three activities; and includes both full-time and part-time workers.

- **Employee Compensation:** Describes the total payroll costs (including benefits) of each of the hunting-, sport fishing-, or furtaking-related industries. It includes the wages and salaries of workers who are paid by employers, as well as benefits such as health and life insurance, retirement payments, and non-cash compensation.

- **Proprietary Income:** Income that consists of payments received by self-employed individuals as income. Any income a person receives for payment of self-employed work as reported on a federal income tax form is counted here. This includes income received by private business owners, doctors, and lawyers.

- **Other Property Type Income:** This category consists of payments from rents, royalties, and dividends. Payments to individuals in the form of rents received on property, royalties from contracts and dividends paid by corporations are included here, as well as corporate profits earned by corporations.

C

Economic Value and the Travel Cost Method

Economic value

When a readily available market exists for a commercial product, such as gasoline, supply/demand theory can be applied in a very straightforward way. Wildlife-associated recreation activities, however, do not present such an observable market, so special non-market valuation techniques must be applied to capture the economic values of the resources involved.

For example, the product of hunting, fishing and trapping is not just the amount of time spent on the activity, but the entire experience throughout the trip or trips. Since publicly provided hunting, sport fishing or trappings resources are not generally priced and paid for by the direct beneficiaries of the opportunities, the sporting participants are reaping a consumer's surplus value that reflects the benefits they gain from being able to "buy" their recreational experience at a lower price than the actual market value.

However difficult it may be to quantify consumer's surplus, studies show that it is a concept relevant for many social decisions, such as deciding that the state should incur the heavy expenses of providing and managing wildlife-associated recreation resources.

Travel Cost Method

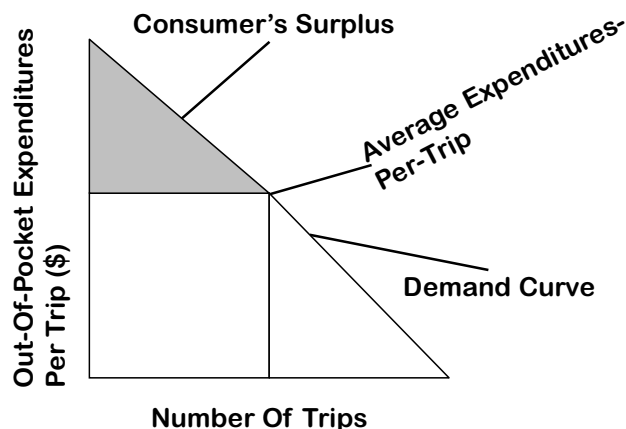
The Travel Cost Method (TCM) was used in this study to estimate the economic consumptive values of sport fishing, hunting and furtaking; and the non-consumptive value of wildlife viewing for angler, hunter and furtaker households.

The TCM is the preferred method to assess the

value of consumer's surplus because it uses actual out-of-pocket travel expenditures of a sample of sportsmen and women to estimate a demand curve for angler or hunter trips, and then derive a second-stage demand curve for the total number of annual trips.

For example, the consumer's surplus in a TCM demand curve is represented by the area below the demand curve and above the average out-of-pocket expenditures per trip.

The graphic below helps illustrate this concept.



For the purpose of this study, a hunter or angler trip was defined as any Pennsylvania resident-licensed hunter or angler who spent all of one or more consecutive days hunting or fishing for one or more types of game or fish in the state before returning to the location where the trip began.

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