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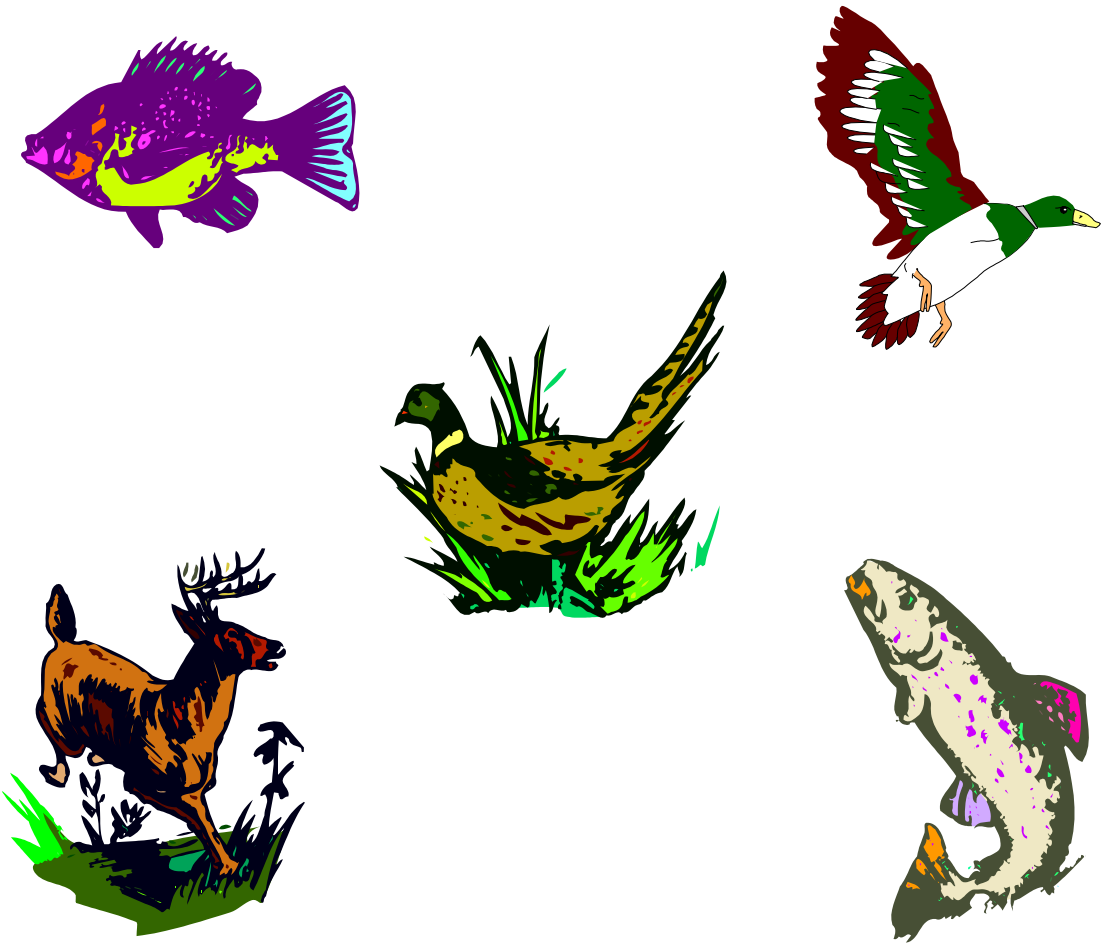
Resident and Nonresident Hunter and Angler Expenditures, Characteristics, and Economic Effects, North Dakota, 2001-2002



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Abstract

The purpose of this study was to estimate the economic effects of hunting and fishing activities during the 2001-2002 season on the North Dakota economy, and to compare current information to previous studies to identify trends in hunting and angling activities. A mail survey of 29,034 resident hunters and anglers and 7,199 nonresident hunters and anglers was conducted to solicit information on 21 hunting and fishing activities during the 2001-2002 season.

Total spending by hunters and anglers in North Dakota during the 2001-2002 season was estimated at $468.5 million, excluding purchases of licenses. Resident hunter and angler expenditures were estimated at $402.7 million, and nonresident hunter and angler expenditures were estimated at $65.9 million. Hunting expenditures were estimated at $166.4 million, and fishing expenditures were estimated at $302.1 million. Total spending in rural areas was estimated at $213.4 million by residents and $48.4 million by nonresidents.

Total direct expenditures ($468.5 million) from hunting and fishing in North Dakota generated nearly $544.9 million in secondary economic effects. Gross business volume (direct and secondary effects) of hunting and fishing in North Dakota was estimated at $1 billion. Hunting and fishing activities were estimated to generate $30.5 million in general state tax collections and support 13,100 full-time equivalent jobs throughout the state.

As a result of increased average per person spending in most hunting and fishing activities and increased number of participants in most activities, total spending in North Dakota increased by $106 million or 29 percent from 1996-97 to 2001-02. Total spending by resident hunters and anglers increased by $73 million or 22 percent, while nonresident spending increased by $33 million or 101 percent over the period. Hunter expenditures increased by $31 million or 23 percent, while angler expenditures increased by $75 million or 33 percent over the period. Gross business volume from all hunting and fishing activities increased by $233.9 million (30 percent) over the period.

The economic importance of hunting and fishing in North Dakota has continued to increase throughout the 1990s, and continues to be an important source of economic activity in the state. However, policy decisions affecting wildlife management should not be based solely on economic information, and must balance the ever increasing demand for wildlife-related recreation with the supply of wildlife-related resources to ensure the continued economic benefits that abundant hunting and fishing opportunities provide to the state.

Key Words: hunting, fishing, expenditures, economic effects, North Dakota

Highlights

Information on the characteristics and expenditures of hunters and anglers in North Dakota has been used to identify trends and economic effects associated with hunting and fishing in the state since the mid 1970s. The purpose of this study was to estimate the economic effects of hunting and fishing activities during the 2001-2002 season.

The ND Game and Fish Department conducted a mail survey of licensed hunters and anglers in the state in 2001. A total of 29,034 resident hunters and anglers and 7,199 nonresident hunters and anglers were randomly sampled to solicit information on their characteristics and expenditures. Hunting and fishing activities were divided into 21 different categories based on license type (i.e., resident, nonresident, gratis), game type (e.g., antelope, deer, small game), and, when applicable, by weapon type (i.e., archery and firearm).

Resident and nonresident hunters and anglers participated about the same number of days and traveled the same distances as they did in the late 1980s and mid 1990s. Resident hunters and anglers continue to spend more time hunting and fishing in the state than nonresidents. Gross household incomes of nonresidents remain higher than residents. The majority of resident and nonresident hunters and anglers continue to be male, are in their early- to mid-40s, and hunt on private land. Gross household incomes have increased substantially for both resident and nonresident hunters and anglers, and the percentage of resident hunters and anglers living in urban communities has increased.

Average spending per participant varied substantially among the survey groups. Average season spending by gratis turkey, antelope, and deer hunters ranged from $128 to $222. Per person spending for firearm antelope and deer hunters ranged from $431 to $491. Archery antelope and deer hunters spent from $634 to $1,170 per season. Big game and furbearer hunters averaged $929 and $570 in season expenditures, respectively. Resident upland game, resident waterfowl, and nonresident small game hunters had season expenditures of $723, $810, and $768, respectively.

The average resident angler (i.e., open water and ice fishing) spent $2,597 per year, compared to nonresident anglers who spent $884 per year. Participants in darkhouse spearing averaged $451 per season in total expenditures.

Total spending by hunters and anglers in North Dakota during the 2001-2002 season was estimated at $468.5 million, excluding purchases of licenses. Resident hunter and angler expenditures were estimated at $402.7 million and nonresident hunter and angler expenditures were estimated at $65.9 million. Expenditures from hunting were estimated at $166.4 million and expenditures from fishing were estimated at $302.1 million.

Small game hunting accounted for 50 percent ($66.6 million) of all resident hunter expenditures. Deer and furbearer hunting accounted for 36 percent ($47.8 million) and 11 percent ($14.7 million) of all resident hunter expenditures, respectively. Antelope, big game,

and turkey hunting collectively accounted for about 3 percent of all resident hunter expenditures. Nonresident expenditures for waterfowl and upland game hunting were estimated at $20.9 million and $10.8 million, respectively, and accounted for 93 percent of all nonresident hunter expenditures. Deer and archery antelope hunting represented 7 percent of nonresident hunting expenditures.

Resident open water fishing expenditures were estimated at $238.3 million, representing over 88 percent of total resident angler spending. Expenditures for open water and ice fishing by nonresidents were estimated at $23.2 million and $8.7 million, respectively.

Total direct expenditures ($468.5 million) from hunting and fishing in North Dakota generated $544.9 million in secondary economic effects. Gross business volume (direct and secondary effects) of hunting and fishing in North Dakota was estimated at $1 billion. Hunting and fishing activities generated $30.5 million in general state tax collections and supported 13,100 full-time equivalent jobs throughout the state.

Total spending in rural areas (i.e., towns less than 2,500 in population) was estimated at $213.4 million by residents and $48.4 million by nonresidents. Resident and nonresident hunters collectively spent about $102.6 million in rural areas, compared to $159.2 million by fishing participants.

Total spending by residents and nonresidents were comparable for similar activities; however, nonresidents generally spent fewer days hunting in the state, and as a result, daily expenditures were slightly higher for nonresidents than residents. Average daily expenditures for nonresidents were higher for lodging, meals, and other day-to-day expenses, while residents had higher average daily expenses for gear-related items (equipment, clothing, weapons) and other services (i.e., meat processing, repairs, veterinarian care, taxidermy).

Total spending in North Dakota increased by $106 million or 29 percent from 1996-97 to 2001-02. Resident hunter and angler spending increased by $73 million or 22 percent, while nonresident spending increased by $33 million or 101 percent over the period. Hunter expenditures increased by $31 million or 23 percent, while angler expenditures increased by $75 million or 33 percent over the period. Gross business volume from all hunting and fishing activities increased by $233.9 million (30 percent) over the period.

While information on the economic effects of hunter and angler expenditures can be important in making decisions regarding wildlife management; economic information alone can not address all of the issues currently facing policymakers in the state. Hunting and fishing continues to be an economically important industry in North Dakota largely due to increased hunter and angler participation. The growth in popularity of hunting and fishing has created new challenges for wildlife management officials and state policymakers. In the quest to capture economic activity from hunting and fishing activities, care should be exercised that the demand for wildlife-based recreation be matched with the biological and public limits of wildlife-based resources.

Resident and Nonresident Hunter and Angler Expenditures, Characteristics, and Economic Effects, North Dakota, 2001-2002

Dean A. Bangsund and F. Larry Leistritz*

Introduction

A number of issues are currently confronting sportsmen, policymakers, businesses, wildlife groups, wildlife biologists, and land owners regarding wildlife management in North Dakota. Many of the issues pertain to balancing the demand for wildlife-related recreation arising from diverse interest groups. The demand for wildlife-related recreation must be balanced with the supply of wildlife-related resources. Policies which affect either the demand or supply of wildlife-related resources will impact those diverse interests within the state.

This study is a continuation of a series of studies which have periodically assessed various aspects of hunting and angling activities in North Dakota. Information on the characteristics, expenditures, and economic effects of hunters and anglers in North Dakota can provide insights on the impacts and trends associated with hunting and fishing in the state. While policy decisions affecting wildlife management should not be based solely on socio-economic information, this information can be useful in 1) understanding current hunter and angler characteristics in the state, 2) identifying trends in hunter and angler activities, and 3) evaluating the economic effects of alternative hunter/angler-management policies.

The first study sponsored by the ND Game and Fish Department to assess socio-economic information on hunters and anglers in North Dakota was conducted in 1976 and only gathered information on nonresident hunters and anglers (Leitch and Scott 1978). Since 1978, six additional studies have been conducted at approximately five-year intervals to assess socio-economic characteristics of both resident and nonresident hunters and anglers. Studies in 1981 and 1982 collected information on resident hunters and anglers (Kerestes and Leitch 1983, Leitch and Kerestes 1982). Another study was conducted in 1983 to collect information on nonresident hunters and anglers (Anderson and Leitch 1984). Baltezore et al. (1987) collected information on resident hunters and anglers in 1986. Both resident and nonresident hunters and anglers were surveyed in 1991 (Baltezore and Leitch 1992). Lewis et al. (1998) again surveyed both resident and nonresident hunters and anglers in North Dakota in 1996.

The purpose of this study was to estimate the characteristics, expenditures, and economic effects of hunters and anglers in North Dakota during the 2001-2002 season. Current information was compared to previous studies to identify trends in hunting and angling activities.

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Methods

Resident and nonresident hunters and anglers were surveyed to estimate current expenditures and characteristics. Input-output analysis was used to estimate the economic contribution of hunters and anglers to the state's economy. Information from previous studies was compared to current data to illustrate and identify trends in hunter expenditures, characteristics, and economic effects.

Survey Design

The ND Game and Fish Department conducted a mail survey of hunters and anglers in North Dakota to solicit information on hunting and fishing expenditures during the 2001-2002 season. A random sample of licensed hunters and anglers,[1] divided into 21 different categories, were mailed questionnaires shortly after the closing dates for each respective season (Table 1). The survey groups were divided by license type (i.e., resident, nonresident, gratis), game type (i.e., antelope, big game, deer, furbearers, turkey, upland, waterfowl, and fish), and, when applicable, by weapon type (i.e., archery and firearm). The survey groups represented most of the hunting and angling activities in North Dakota during the 2001-2002 season (Table 2).

Sampling techniques were largely based on procedures used by Kerestes and Leitch (1983). Sample rates associated with the expenditure survey were consistent with rates used in past expenditure studies, and were adjusted by the ND Game and Fish Department to be consistent with annual participation and harvest surveys. The ND Game and Fish Department conducts annual surveys to estimate hunter and angler participation, and to estimate game harvest. Since the expenditure survey was conducted jointly with the participation and harvest survey[2] for some survey groups, a primary consideration of the ND Game and Fish Department was to maintain sampling integrity and response rates associated with previous expenditure studies and with current, ongoing departmental surveys of hunters and anglers.

The number and type of hunting and fishing activities surveyed in 2001 were similar to previous studies. Two categories of hunting were excluded from this study that were included in previous studies. Spring turkey hunters (i.e., regular and gratis) were not surveyed as the spring turkey hunting season was completed prior to administrative approval to conduct this study. Although spending levels of spring turkey hunters and fall turkey hunters differ, expenditures

[1]The list of license holders for some sample groups was relatively straightforward as current (2001) license holders were obtained through license or lottery application records (e.g., firearm antelope, firearm deer, special big game, and turkey licenses are only distributed through the ND Game and Fish Department's Bismarck office). However, several other, more general hunting licenses (e.g., small game, sportsman, furbearer, fishing) are available from venders distributed throughout the state. Names and addresses of individuals obtaining general licenses from retail venders are not provided by venders in time to compile a mailing list for surveying purposes in the year the license was purchased. As such, the survey sample for hunting and fishing activities in 2001 that did not require a specific tag or a lottery license was drawn from those purchasing a license in 2000.

[2]With some survey groups, a participation/harvest questionnaire and an expenditure questionnaire were mailed to all individuals in the sample.

from spring turkey hunters in past years represented a minor portion of all hunting expenditures in the state (Lewis et al. 1998). Similarly, muzzleloader deer hunters were not surveyed in 2001, but their total spending also represented a minor portion of all hunting expenditures in previous studies (Lewis et al. 1998). Two other changes in this study included adding darkhouse spearing[3] and separating resident anglers into three categories (open water, ice, season-long) instead of the two previous categories (open water, ice).

Expenditure questionnaires were specific to each sample (see Appendix A for a representative questionnaire). The type of information requested and the questionnaire format were relatively unchanged from previous studies to allow for comparison with past data. Changes from the 1996 questionnaire included standardizing demographic and characteristic information on participants for all survey groups, and expanding the list of durable good purchases (e.g., underwater cameras, spearing equipment).

Administration of the survey varied slightly by hunting and fishing groups. The ND Game and Fish Department directly collected questionnaires from some hunting and fishing groups. Questionnaires from other survey groups were collected and electronically scanned by a third party. In addition, some survey groups had the option of faxing the mail questionnaire and/or completing the questionnaire on the Internet. Thus, depending upon the survey group, survey responses were either collected directly by ND Game and Fish Department, or via the Internet, mail, and/or fax to a third party.

The ND Game and Fish Department validated the accuracy of electronic scanning and Internet sampling and verified that the multiple collection methods resulted in data that was consistent with previous studies. Also, the ND Game and Fish Department used several statistical methods (e.g., listing of any expenditure entries exceeding 99.9 percent of all entries in any particular expense category) to examine for data outliers. Expenditures were also evaluated by considering days participated, miles traveled, and/or other qualifying data to eliminate outliers that could not be considered defendable or reasonable. Examples of what might be considered an unreasonable level of spending would be $5000 for ammunition for one day of hunting or $2000 for food expense for two days of hunting.

Sample rates for the survey groups ranged from 72 individuals for nonresident archery antelope to 6,191 individuals for resident fall turkey (Table 2). Response rates[4] for resident survey groups varied from 34 percent for open water fishing to 84 percent for special big game. Nonresident response rates varied from 41 percent for season-long fishing to 74 percent for archery antelope (Table 2). Overall response rate for the survey was 51 percent.

[3]Darkhouse spearing was authorized for the first time in North Dakota in 2001.

[4]Response rate was calculated as useable questionnaires returned divided by mailed questionnaires less undeliverable addresses [returns/(mailed-undeliverables)].

Table 1. North Dakota Hunter and Angler Survey Sample Groups and Mailings, 2001-2002

Activity	First Mailing Date	Second Mailing Date
Resident		
Antelope		
Archery	December 17, 2001	none
Firearm	October 20, 2001	none
Gratis	October 20, 2001	none
Deer		
Archery	January 4, 2002	none
Firearm	November 23, 2001	none
Gratis	November 23, 2001	none
Special Big Game	Aug. 17 through Dec. 17, 2001	3-4 weeks after initial mailing
Furbearer	April 29, 2002	none
Small Game		
Upland	January 4, 2002	February 6, 2002
Waterfowl	January 4, 2002	February 6, 2002
Fall Turkey (regular and gratis)	January 7, 2002	none
Fishing		
Open Water	April 3, 2002	none
Ice	April 3, 2002	none
Season-long	April 3, 2002	none
Darkhouse Spearing	March 6, 2002	none
Nonresident		
Antelope Archery	December 17, 2001	none
Deer		
Archery	January 4, 2002	none
Firearm	November 23, 2001	none
Small Game	January 4, 2002	February 6, 2002
Fishing	April 3, 2002	none

Table 2. Sample Size, Undelivered Mailings, Returned Questionnaires, and Response Rates by Survey Group, North Dakota, 2001-2002

Survey Group	Sample Size	Undelivered Questionnaires	Returned Questionnaires	Response Rate (%)
Resident				
Antelope				
Archery	771	30	362	49
Firearm	821	18	564	70
Gratis	334	2	126	38
Deer				
Archery	2,638	5	1,178	45
Firearm	1,600	53	745	48
Gratis	700	8	360	52
Special Big Game[a]	385	0	322	84
Furbearer	3,672	367	1503	45
Small Game				
Upland Game	1,528	79	860	59
Waterfowl	1,520	87	812	57
Fall Turkey				
Regular	6,191	37	3,262	53
Gratis	384	2	205	54
Fishing				
Open Water	2,411	395	691	34
Ice	2,411	395	787	39
Season-long	2,413	395	834	41
Darkhouse Spearing	1,255	36	752	62
Nonresident				
Antelope Archery	72	0	53	74
Deer				
Archery	745	3	399	54
Firearm	895	47	545	64
Small Game	2,989	105	2,016	70
Fishing	2,498	408	858	41
Total, all groups	36,233	2,472	17,234	51

[a] Includes elk, moose, and bighorn sheep.

Expenditures

Estimating the amount and type of recreational expenditures associated with hunting and fishing activities in North Dakota was one of the primary goals of the study. Questionnaires for each survey group (e.g., archery deer, ice fishing) were designed to solicit information on expenditures specific to that activity. For example, fishing participants were not asked questions about ammunition or firearm purchases. Questionnaires specifically requested only information on purchases made 1) within North Dakota and 2) for the activity and season specified on the questionnaire. The questionnaires were structured to sort expenditures into durable goods or fixed expenses and nondurable goods or variable expenses (Table 3).

Durable Goods/Fixed Expenses

Durable goods usually represent items that can be used over several seasons or can be used numerous times over extended periods before replacing. A few examples of durable goods for hunting and fishing include optics, weapons, fishing rods, clothing, boats, knives, decoys, ice augers, and so on. Purchases of durable goods are often classified as fixed expenses, since the cost of the item is not dependent upon activity levels (the cost of a knife is the same if an individual hunts 2 days or 20 days). Most durable goods will eventually wear out, become obsolete, break, or otherwise become nonuseful in the long term (e.g., over 20 years). However, rather than trying to estimate the annualized expense[5] for durable goods, the full purchase cost of all durable goods (except vehicles) was allocated to the hunting/fishing category for the study.

The treatment of fixed expenses in this study is consistent with past studies and is based on the premise that not all hunters and anglers incur all of their fixed expenses in any given year. For example, in any given year, only some anglers will purchase a new boat and only some firearm deer hunters will purchase a new rifle. Thus, when fixed expenses for each survey group are averaged and multiplied by all individuals participating in the survey category, an approximate overall level of annual purchases for durable goods can be estimated. Durable good purchases were credited to the activity for which those items/goods were initially purchased. However, in reality, the purchase of some durable goods for a specific activity does not preclude the possible use of those items for other types of recreational activities. For example, binoculars purchased for an antelope hunt could also be used for other hunting activities or other non-hunting uses. Given the scope of this study, and the need to maintain consistency with previous studies, no attempt was made to determine the percentage use of durable goods (except vehicle purchases) for only the activity surveyed.

[5]Annualizing expenses is a technique to spread out fixed expenditures over the life of an item or good. In the case of hunting and fishing, the difficulty in annualizing fixed expenditures prevents treating durable good purchases on annual use or anticipated useful life basis.

Table 3. Expenditure Categories for Survey Groups, North Dakota, 2001-2002

Category	Description
Variable Expenditures	
Access	Expenses paid to gain access to land or to launch boats
Ammunition	Expenses for cartridges, shot shells, and reloading components
Bait	Purchases of bait (live, frozen, or otherwise) used for fishing
Equipment Fuel	Expenses for fuel for boats, ice house heaters, and/or other equipment
Film	Purchases of film and film developing
Food	Purchases of food and beverages
Guide	Expenses for guide services (hunting and/or fishing)
Lodging	Expenses paid for overnight stays while hunting or fishing
Meat	Expenses for meat processing, packing, and/or fish cleaning
Rentals	Expenses for rental of boat, motor, fish house, and/or other equipment
Repairs	Expenses for repair of hunting or fishing equipment
Taxidermy	Fees or material costs for mounting fish, birds, or animals
Transportation	Expenses for gas, oil, air fare, or other transportation costs
Veterinarian	Fees for veterinarian care of animals used while hunting
Other	Any other variable expenses not included in the above categories
Fixed Expenditures	
Auger	Purchases of ice augers, saws, and/or chisels used for ice fishing
Binoculars	Purchases of binoculars, scopes, range finders, and/or other optics
Boat	Purchases of boats, motors, and boat trailers for hunting/fishing
Calls	Purchases of predator calls
Camera	Purchases of underwater cameras for fishing
Camping	Purchases of camping equipment used while hunting/fishing
Clothing	Purchases of clothing used primarily for hunting/fishing
Decoy	Purchases of decoys for hunting and spearing
Dogs	Purchases of hunting dogs
Finders	Purchases of electronic depth or fish finders
Ice House	Purchases of ice fishing houses, shelters, and/or heaters
Rods	Purchases of fishing rods
Skinning Equipment	Purchases of stretchers, knives, and/or other tools for use on hides/fur
Spears	Purchases of ice fishing spears
Tackle	Purchases of fishing tackle
Traps	Purchases of traps, snares, and/or trapping supplies (lures, scents)
Vehicles	Purchases of vehicles, campers, ATVs primarily for hunting/fishing
Weapons	Purchases of rifles, shotguns, bows, arrows, accessories
Other	Any other durable goods not included in the above categories

Nondurable Goods/Variable Expenses

Nondurable goods generally represent items/services consumed or used in direct proportion to activity levels. A few examples of nondurable goods for hunting and fishing include bait, ammunition, gas, food, guide services, and so on. Purchases of nondurable goods are often classified as variable expenses, since expenses for those items are dependent upon activity levels (gas purchases should be proportional to the number of miles traveled). Most nondurable goods are consumed or used completely within a short period. Unlike some durable good purchases which may not necessarily parallel activity levels (i.e., they could potentially be used for other recreational activities and are not likely consumed in one use), nondurable goods/services closely match hunting/fishing activity levels and are usually directly attributable to only one activity. For example, lodging expenses incurred while pheasant hunting should not be transferable to darkhouse spearing activities.

Estimation of Average Expenditures

The method for determining average season variable expenses used in this study was identical to the method used by Lewis et al. (1998).[6] Average season (total) variable expenditures, in each survey group, were estimated by summing the average of the individual expenditure categories (e.g., gas, food, lodging). Alternatively, the average expenses for gas, food, lodging, etc., were summed to estimate average season variable expenses in each survey group. However, the calculation of average vehicle, average season fixed, and average season total expenditures in this study differed from the methods used in the Lewis study.

The Lewis study included the average value of vehicle purchases in average fixed season expenses for each survey group. This method produced two problems. First, the full value of the vehicle was attributed to the hunting/fishing activity--this likely overstates the true amount of vehicle expense attributable to hunting/fishing activities. Second, vehicle expenses were estimated separately for each hunting and fishing survey group--this resulted in substantial differences in vehicle expenses among groups, as the average value was greatly influenced by relatively small sample sizes (i.e., observations) in each group. As a result, the Lewis study estimated some hunting and fishing survey groups had very high average vehicle expenses (e.g., the Lewis study implied that every resident archery antelope hunter spent on average over $1,200 for vehicle purchases in 1996), while other groups had very low average vehicle expenses (e.g., gratis turkey and deer hunters were estimated to have $0 in vehicle purchases). To address these concerns, vehicle expenses were handled differently in this study than in the Lewis study.

Determining an appropriate amount of vehicle expense to include in the expenditure estimates for the various survey groups is difficult. The same data problems associated with too few observations for vehicle purchases in each survey group in the Lewis study were also present in this study. To correct for too few observations, the survey groups were condensed into five categories for purposes of estimating vehicle expenses. The five categories included

[6]Referred to hereafter as the Lewis study.

gratis hunters, resident hunters, resident anglers, nonresident hunters, and nonresident anglers. However, condensing the 21 survey groups into 5 categories did not address the issue of applying an appropriate amount of vehicle expense to hunting and fishing activities.

Arguably, most individuals use vehicles for much more than just hunting and fishing. After hunting or fishing seasons are over, individuals continue to use their vehicles for a host of transportation and/or recreation needs. Even in the case of all terrain vehicles (ATVs), whose primary use might be associated with hunting or ice fishing, ATVs are often used throughout the year. In light of the multiple-use nature of vehicles, applying the full purchase cost of a vehicle to a single, short-term (i.e., few days to several weeks) activity is not appropriate. Further, individual purchase decisions are generally not solely based on participation in hunting or fishing activities.[7] It is unlikely someone would rush to buy a new vehicle because they drew a deer tag, or because they had a pheasant hunt scheduled later in the year. Since vehicles (e.g., pickups, sport utilities, ATVs) represent durable goods that are likely to be used extensively outside of hunting and fishing activities, a weighting procedure was developed to allocate a percentage of all vehicle purchases in each of the five groups using days participated by individuals (see Appendix B for a complete discussion of how allocated vehicle expense was estimated).

As a result of the methods used to estimate vehicle expenses, average season fixed expenses differed from those estimated in the Lewis study. The average vehicle expenses in the five categories were allocated to the remaining 21 survey groups (see Appendix B for discussion of how vehicle expenses were allocated to each survey group). Purchases of all other durable goods were averaged using the same methods employed on variable expenses. Average season fixed expenses represented the sum of allocated vehicle expense and average expenses for all other durable goods.

The Lewis study treated total season expenses as the sum of only those observations that had both variable and fixed expenses. However, as was the case in this study, not all respondents 1) purchased both nondurable (variable) and durable (fixed) goods for the activity surveyed or 2) reported both types of purchases. As a result, the number of observations with both variable and fixed expenses was substantially less than the number of observations that had either variable or fixed expenses. In addition, the average for only those observations with variable and fixed expenses did not match the sum of each group's average variable and average fixed expenses. The method used in the Lewis study overestimated spending (i.e., the average total expense was higher than the sum of average variable and fixed expenses) in 15 of the 19 activity categories examined in 1996. To correct this problem, average variable season and average fixed season expenses were estimated separately for each survey group, and then combined to represent average total season expenditures. This method utilized all expenditure observations in the data set to arrive at an estimate for total season expenditures.

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[7]Many individuals purchase vehicles which will suit their needs while hunting or fishing (e.g., four wheel drive, cargo space, passenger room, towing capacity), but buying decisions are influenced by a host of factors not associated with hunting/fishing (e.g., age, condition, reliability of existing vehicle, personal finances, personal preferences and desires, etc.). Granted, some individuals do purchase vehicles exclusively for hunting/fishing pursuits, but these situations were considered few, and were not addressed in this study.

Average daily variable and fixed expenses were estimated by dividing individuals' total variable and total fixed expenses by the number of days participated, and then averaging individuals' average daily variable and average daily fixed expenses for each survey group. Average daily total expenditures were the sum of average daily variable and average daily fixed expenses.

Economic Impacts

Economic effects of a project, program, policy, or activity can be categorized into direct and secondary impacts. Direct impacts are those changes in economic output, employment, or income that represent the initial or first effects of a project, program, or event. Secondary impacts (sometimes categorized as indirect and induced effects) result from subsequent rounds of spending and respending within the economy. This process of spending and respending is sometimes termed the multiplier process, and the resultant secondary effects are sometimes referred to as multiplier effects (Leistritz and Murdock 1981).

Traditionally, economic measures of industry impacts or project-type impacts are based on revenues that represent "new wealth" to an economy and the subsequent rounds of spending and respending associated with those "new revenues." New wealth generally comes from the sale of materials, goods, or services to entities outside of an economy (Leistritz 1998). An *economic contribution* analysis measures all revenues associated with an industry or activity, even if not all of the economic activity represents new wealth to an economy. Alternatively, an *economic impact* analysis is usually based on the economic activity created only from new wealth. Both approaches measure total economic activity using direct and secondary effects.

Hunting and angling activities in the state generate revenues for recreational businesses and individuals (e.g., landowners through access fees). For the businesses and individuals affected by hunter and angler expenditures, the source (i.e., in-state, out-of-state) of those revenues is not likely important. For example, a bait store selling fishing supplies makes the same level of earnings regardless if the sale is made to a resident or nonresident angler. However, at an aggregate level, the source of spending has implications for measuring the amount of "new wealth" created within an economy. Generally, out-of-state sources (i.e., nonresidents) of spending are considered "new wealth" to the state economy. However, measuring the amount of "new wealth" to the state economy from in-state sources (i.e., resident spending) is difficult. Some of the money spent by residents on hunting and fishing in North Dakota would be spent in the state regardless if hunting and fishing opportunities did not exist. Alternatively, some of the money spent on hunting and fishing in North Dakota would leave the state in the absence of those hunting and fishing opportunities. Resident expenditures would be considered "new money" when in-state opportunities reduce the amount of expenditures that would otherwise leave the state. The availability of hunting and angling opportunities within the state keeps resident expenditures from "leaking" to other states.

In the North Dakota economy, the amount of new wealth created by hunter and angler expenditures is difficult to measure. New wealth considerations become even more complicated

when an economy becomes smaller, such as a single or multi-county area. In small, rural economies new wealth (i.e., increase in primary sector revenues) can come from both in-state and out-of-state sources, even if the spending from in-state sources does not represent new wealth to the state. Thus, even though not all resident hunter and angler spending represents new wealth to the state economy, that spending can have different implications for rural economies (see Appendix C for a more thorough discussion of new wealth considerations in rural areas). The difficulties in applying multiple new wealth criteria to various categories of hunter and angler spending based on state versus rural economies, the information requirements to develop those criteria, and that recreational spending in rural economies is important regardless of the source (i.e., resident, nonresident) are the primary reasons why economic contribution analyses have been used for measuring the economic size of hunting and fishing activities in the state. This study will use an economic contribution approach, which is consistent with the methods used in previous studies.[8]

Direct Effects

Direct effects (also termed in this report as total direct expenditures) were the sum of all resident and nonresident hunting and fishing expenditures. Average expenditures, for each survey group, were multiplied by the total number of participants in each activity during the 2001-2002 season. Thus, average expenditures, determined from survey data, were used with data on hunter and angler participation to arrive at total direct effects or total direct expenditures.

Secondary Effects

The secondary effects of hunter and angler expenditures in North Dakota were estimated using the North Dakota Input-Output Model and represent additional economic activity generated from the respending of hunter/angler expenditures. Input-output (I-O) analysis is a mathematical tool that traces linkages among sectors of an economy and calculates the total business activity resulting from a direct impact in a basic sector (Coon et al. 1985). An economic sector is a group of similar economic units (e.g., *Communications and Public Utilities* sector would include activities associated with communication, electricity, gas, and other utility activities). The North Dakota I-O Model has 17 economic sectors, is closed with respect to households (households are included in the model), and was developed from primary (survey) data from firms and households in North Dakota.

Total direct expenditures by hunters and anglers for durable and nondurable goods were allocated to three sectors of the North Dakota I-O Model (Table 4). The sectors of North Dakota's economy that capture hunter expenditures were *Retail Trade*, *Business and Personal Services*, and *Households*. Secondary effects were combined with direct effects to estimate the gross business volume of hunting and angling activities in the state.

[8]The term "economic impact" has often been used loosely in past studies to describe the overall economic effect of hunter and angler expenditures in the state. The analyses performed in past studies measured all economic activity associated with hunter and angler expenditures and represent economic contribution analyses.

Table 4. Treatment of Hunter and Angler Expenditures within the North Dakota Input-Output Model

Economic Sectors	Expenditure Categories
Retail Trade	ammunition, bait, equipment fuel, film, food, transportation, ice auger, optics, boats, calls, cameras, camping equipment, clothing, decoys, 2/3 of dog purchases, fish finders, ice houses, rods, skinning equipment, spears, fishing tackle, traps, vehicles, and weapons
Business and Personal Services	guide services, lodging, meat processing, rental equipment, repairs, taxidermy, veterinarian, and 1/3 of dog purchases
Households	access fees

State-level Tax Collections

Tax collections are another important measure of the economic effect of an industry, activity, or event on an economy. State-level tax collections resulting from direct and secondary economic activity associated with hunting and fishing in the state were estimated for sales and use taxes, personal income taxes, and corporate income taxes. Total economic activity (direct and secondary effects) in the *Retail Trade* sector were used to estimate revenue from sales and use taxes. Economic activity in the *Households* sector was used to estimate personal income tax collections. Similarly, corporate income tax revenue was estimated from the economic activity in all business sectors (excluding the *Households*, *Government*, and *Agriculture* sectors).

Expenditures in Rural Areas

The Lewis study defined North Dakota communities with a population of 2,500 or less as rural and estimated the amount of spending that occurs in those communities. This study also asked participants to estimate the percentage of their total seasonal spending that occurs in rural communities. Rural spending was not estimated for each expense item (e.g., gas, clothing, lodging, food), but rather was estimated as average season expenditures per rural and urban individual in the various survey groups. Average season expenditures in rural areas for rural and urban participants were then multiplied by the number of active rural and urban participants in each survey group to estimate total expenditures made by hunters and anglers in rural areas of North Dakota.

Additional Expenditures

The Lewis study asked nonresident hunters and anglers to estimate additional spending made while in the state hunting or fishing that was not directly related to their hunting or fishing activity. Examples of additional spending could include purchases of retail items (e.g., clothing, appliances, furniture, gifts) or other recreation (e.g., charitable gaming). As a result of

modifying vehicle purchases to more closely reflect the proportion of vehicle expense associated with hunting and fishing, the difference between purchase price and estimated vehicle expense was included in the additional expense category for residents and nonresidents (see Appendix B). Additional expenditures were not included in the economic contribution analysis, since those purchases can not be credited to hunting or fishing activities (i.e., those purchases may have occurred if the individual was in the state for another reason).

Hunter and Angler Characteristics

Age, residence, and income characteristics were solicited from survey participants. Information on days participated, miles traveled, ownership of land hunted, and value per day of hunting/fishing were also collected from survey participants. Hunter and angler characteristics of participants in the 2001-2002 season were compared to respondent characteristics in previous studies.

Residents

The typical resident hunter was 42 years old, hunted 6 days per year in North Dakota, lived in a community over 2,500 population, and had a gross income around $50,000. The typical resident angler was 47 years old, fished 18 days per year in the state, lived in an urban community, and had a gross income around $50,000. Characteristics for all hunting and fishing groups are included in the following sections.

Age

The majority of hunters and anglers surveyed were between 19 and 45 years of age (Table 5). Generally, gratis hunters were older than those without gratis licenses. Also, archery hunters tended to be younger than firearm hunters. Little difference was found in the average age or age distribution of upland and waterfowl hunters. Archery deer hunters were on average the youngest (36 years old) and fall turkey gratis hunters were the oldest (average age 52 years).

Fishing activities had the lowest percentage of participants 18 years of age or younger of all the survey groups.[9] Also, the percentage of fishing participants was generally more evenly distributed between 19 to 45 and 46 to 65 year-age categories than the distributions found in the hunting groups. When averaged across all survey groups, over 85 percent of participants in resident hunting and fishing activities ranged from 19 to 65 years of age (Table 5).

[9]Data from survey respondents may not represent the true age distribution of hunting and fishing activities due to licensing requirements and sampling methods. Residents and nonresidents younger than 16 years of age were not surveyed and do not need a license to fish and hunt small game in North Dakota. Also, licensing requirements for resident youth differ for firearm versus archery hunting (e.g., deer, antelope, and big game). Similar licensing requirements and exemptions exist for nonresident youth.

Table 5. Average Age and Distribution of Resident Hunters and Anglers by Age Categories, North Dakota, 2001-2002

Activity	Average Age[a]	18 Years or Less	19 to 45 Years	46 to 65 Years	Over 65 Years
		---------- % ----------			
Antelope					
Archery	37	7	68	25	0
Firearm	42	6	55	35	5
Gratis	46	10	30	52	9
Deer					
Archery	36	13	61	25	1
Firearm	40	9	54	31	6
Gratis	51	3	31	45	21
Special Big Game	44	6	47	38	8
Furbearer	44	2	49	42	6
Small Game					
Upland	45	4	44	45	6
Waterfowl	46	3	45	43	9
Fall Turkey					
Regular	42	14	43	36	8
Gratis	52	6	27	46	21
Fishing					
Open Water	48	2	46	36	17
Ice	49	2	40	43	16
Season-long	48	2	43	44	12
Darkhouse Spearing	43	7	51	36	7

Note: Percentages may not total due to rounding.
[a] May not reflect true average age due to licensing requirements for youth and sampling methods which did not include participants under 16 years of age.

Residence

Population trends in North Dakota indicate an increasing percentage of the state's population lives in urban communities (U.S. Bureau of the Census 2001). For example, in 1990 the four largest North Dakota metro areas (i.e., Fargo-West Fargo, Grand Forks, Bismarck-Mandan, Minot) had 37 percent of the state's population. In 2000, those same cities had 41 percent of the state's population. From 1990 to 2000, population in the four largest metro areas increased by 12 percent, compared to an increase of 0.5 percent statewide (U.S. Bureau of the Census 2001). As a result, if hunter participation is not affected by rural versus urban residence, the number of hunters living in urban communities would be expected to increase.

The percentage of hunters and anglers in rural and urban communities was determined from survey respondents. The questionnaire asked respondents to choose among five categories describing the size of the community they resided in.

Overall, 55 percent of resident hunters responding to the survey lived in communities 2,500 or greater in population. Similarly, 56 percent of resident anglers responding to the survey lived in communities 2,500 or greater in population.

Archery antelope hunters had the highest percentage of urban participants at 71 percent (Table 6). Gratis hunters had highest percentage of rural participants, which ranged from 78 percent for gratis turkey hunters to 90 percent for gratis deer hunters. However, because gratis licenses are issued to landowners, gratis survey groups would be expected to have a high percentage of rural hunters. Special big game and furbearer hunters were the only other survey groups with less than 50 percent urban hunters (special allotments of elk and moose licenses are made available to landowners each year). All other resident hunting categories had over 50 percent of survey respondents indicating they lived in communities over 2,500 population (Table 6).

Of all the fishing survey groups, open water fishing had the highest percentage of urban participants (65 percent). In contrast, 59 percent of ice fishing participants lived in rural areas (Table 6). When participants were sampled for both open water and winter fishing (i.e., season-long fishing), the majority of survey respondents lived in urban areas (64 percent). The majority of participants in darkhouse spearing lived in rural areas (54 percent), but participants were essentially distributed evenly among all the residence categories (Table 6).

Some differences were noted between the residence of hunters and anglers in 2001-2002 and the residence of participants in the Lewis study. A higher percentage of archery antelope hunters in 2001-2002 lived in urban areas than in 1996-1997 (71 percent to 58 percent). Firearm deer and special big game hunters showed slight increases in the number of urban participants in 2001-2002. Upland and waterfowl hunters increased from about 54 percent urban in 1996-1997 to about 65 percent urban in 2001-2002. The percentage of rural participants in gratis deer and archery deer hunting increased slightly in 2001-2002. More open water fishing participants were urban in 2001-2002 than in 1996-1997 (65 percent to 48 percent). In contrast, the percentage of ice fishing participants who lived in rural areas increased from 1996-1997 to 2001-2002 (50 percent to 59 percent). Although not uniform across all survey groups, overall a greater percentage of participants were from urban areas in 2001-2002 than in 1996-1997.

Table 6. Residence of Survey Respondents, Resident Hunters and Anglers, by Activity, North Dakota, 2001-2002

Activity	Urban			Rural			
	City over 50,000	City 2,500 to 50,000	Total Urban	Community under 2,500	Farm or Ranch	Rural Nonfarm	Total Rural
	%						
Antelope							
Archery	28	43	71	16	6	7	29
Firearm	27	31	58	20	12	10	42
Gratis	4	8	12	15	72	1	88
Deer							
Archery	21	30	51	23	14	11	49
Firearm	23	28	51	23	16	10	49
Gratis	3	7	10	12	76	2	90
Special Big Game	18	27	45	21	26	9	55
Furbearer	24	25	49	23	18	9	51
Small Game							
Upland	40	26	66	13	12	9	34
Waterfowl	40	25	65	15	13	8	35
Fall Turkey							
Regular	27	33	60	21	10	8	40
Gratis	17	5	22	7	67	4	78
Fishing							
Open Water	44	21	65	18	8	9	35
Ice	11	30	41	30	21	9	59
Season-long	24	40	64	16	12	9	36
Darkhouse Spearing	21	26	47	22	20	11	53

Note: Percentages may not total due to rounding.

Income

Gratis hunting generally had the highest percentage (59 percent) of participants with gross annual household incomes over $50,000, which likely reflects a high percentage of individuals with farm or ranch revenues. Between 40 to 50 percent of participants in all other hunting categories had gross incomes over $50,000 (Table 7). In contrast, all hunting categories, excluding gratis, had less than 10 percent of participants with gross incomes under $10,000. About one-third of participants in all hunting categories had gross incomes between $25,000 to $50,000. Nearly 50 percent of participants in open water and season-long fishing had gross household incomes over $50,000. Participants in darkhouse spearing and ice fishing had slightly lower incomes than the other fishing groups, about 44 percent of participant incomes were over $50,000 (Table 7). Similar to hunting participants, about one-third of fishing participants had gross incomes between $25,000 to $50,000.

When participant incomes in 2001-2002 were compared to participant incomes in 1996-1997, the average income had increased substantially (not accounting for inflation). For example, among the three categories of antelope hunting, the number of participants with incomes of $50,000 or more increased 15 percent. In the deer hunting categories, the increase in participants with incomes over $50,000 was 13 percent. The percentage of upland and waterfowl participants with incomes of $50,000 or more was about 37 percent in 1996-1997, compared to about 55 percent of participants in 2001-2002. No comparisons were made to changes in angler incomes, since their incomes were not reported in the Lewis study.

Ownership of Land Hunted

Resident hunters primarily hunt on private land, except archery antelope hunters, who hunted over 50 percent of the time on public land (Table 8). Excluding gratis hunters, who are required to hunt on their own land, upland game hunters spent the most time on private land (81 percent). Firearm deer hunters spent 80 percent of their time hunting on private land. All other groups, excluding gratis hunters, spent between 65 to 80 percent of their time hunting on private land (Table 8). Hunters in 2001-2002 spent similar amounts of time hunting public and private land when compared to hunters in 1996-1997.

Days Participated

The average resident hunter spent 6 days hunting in the state. Archery deer hunters spent, on average, the most days hunting (averaged 13 days). Upland and waterfowl hunters spent 9 and 8 days hunting, respectively (Table 9). Antelope gratis and firearm hunters averaged only 2 days hunting, the fewest of all hunting categories. Anglers in season-long fishing averaged 24 days of participation in 2001-2002. Anglers only participating in open water fishing averaged 18 days per year, while those only participating in ice fishing averaged 13 days per year (Table 9).

Table 7. Gross Household Income, Resident Hunters and Anglers, by Activity, North Dakota, 2001-2002

Activity	Over $150,000	$125,000-$150,000	$100,000-$124,999	$75,000-$99,999	$50,000-$74,999	$25,000-$49,999	$10,000-$24,999	Under $10,000
	%							
Antelope								
Archery	3	1	4	17	24	37	10	4
Firearm	2	2	4	15	26	38	9	3
Gratis	17	3	6	11	22	15	17	10
Deer								
Archery	5	2	4	13	24	37	11	4
Firearm	3	1	3	12	25	36	14	6
Gratis	8	2	7	8	22	29	19	4
Special Big Game	5	2	3	12	30	31	12	5
Furbearer	3	2	5	14	26	34	10	5
Small Game								
Upland	6	2	7	15	23	35	10	3
Waterfowl	9	3	5	15	25	31	9	3
Fall Turkey								
Regular	3	2	5	15	27	33	9	7
Gratis	13	2	7	12	20	30	14	2
Fishing								
Open Water	4	1	5	13	26	35	12	4
Ice	5	0	3	8	27	34	18	5
Season-long	2	2	5	12	28	33	15	4
Darkhouse Spearing	4	1	5	10	24	39	12	4

Note: Percentages may not total due to rounding.

Table 8. Resident Hunting by Land Ownership, by Activity, North Dakota, 2001-2002

Activity	Land Ownership			
	Federal	State	Private	Unknown
	---------- % of time spent hunting ----------			
Antelope				
Archery	38	13	42	6
Firearm	19	10	65	5
Gratis	0	0	99	0
Deer				
Archery	11	11	77	2
Firearm	7	9	80	3
Gratis	0	1	99	0
Special Big Game	16	18	61	5
Furbearer	6	6	78	10
Small Game				
Upland	6	11	81	3
Waterfowl	8	11	78	3
Fall Turkey				
Regular	7	8	78	6
Gratis	1	0	93	5

Note: Percentages may not total due to rounding.

Over the past 20 years (1981 to 2001), the average number of days participated has remained relatively stable for most hunting and fishing activities (Table 9). Subtle changes in the number of days participated have occurred in some categories, for example, archery deer hunters spent more days hunting in 1996 than in the other survey years. Furbearer hunters spent more time hunting in 1981 than in the other survey years, and anglers spent more days participating in open water fishing the early 1980s and in 2001, than in the late 1980s. However, in other categories, such as upland game, waterfowl, firearm deer, special big game, firearm antelope, and ice fishing, the average number of days spent hunting/fishing by participants has remained unchanged.

Table 9. Average Days Spent Hunting and Fishing, by Residents, by Activity, North Dakota, 1981, 1982, 1986, 1990, 1996, and 2001

Activity	1981	1982	1986	1990	1996	2001
	---------- days ----------					
Antelope						
Archery	na	4	7	8	6	5
Firearm	na	2	2	2[a]	2	2
Gratis	na	na	na	–	2	2
Deer						
Archery	13	14	13	14	16	13
Firearm	4	4	5	4[a]	4	4
Gratis	na	na	na	–	3	4
Special Big Game	4	5	4	5	5	5
Furbearer	17	12	12	12	13	11
Small Game						
Upland	6	5	9	13	8	9
Waterfowl	7	6	8	11	8	8
Fall Turkey						
Regular	2	2	2	2[a]	2	3
Gratis	na	na	na	--	2	4
Fishing						
Open Water	22	18	13	13	17	18
Ice	na	na	12	11	10	13
Season-long	na	na	na	na	na	24
Darkhouse Spearing	na	na	na	na	na	8

na=not available

[a] Includes gratis hunters.

Miles Traveled

Excluding gratis hunters, fall turkey and firearm deer hunters traveled the least, 324 miles and 356 miles, respectively. In contrast, special big game hunters averaged over 1,000 miles traveled in 2001 (Table 10). The average upland game and waterfowl hunter averaged around 800 miles traveled in 2001, which was nearly identical to the number of miles traveled in 1996. Likewise, archery deer hunters traveled, on average, 678 miles in 2001, which was nearly identical to the number of miles traveled in the 1990s. The average miles traveled by furbearer hunters decreased from nearly 700 miles in 1996 to about 530 miles in 2001. Average miles traveled by participants in ice fishing and open water fishing increased in 2001 from 1996, but miles traveled for ice fishing were similar to earlier studies (Table 10).

Table 10. Average Miles Traveled by Residents, North Dakota, by Hunting and Fishing Activity, 1981, 1982, 1986, 1990, 1996, and 2001

Activity	1981	1982	1986	1990	1996	2001
	---------- miles ----------					
Antelope						
Archery	na	467	688	777	737	824
Firearm	na	513	366	418[a]	637	691
Gratis	na	na	na	--	91	83
Deer						
Archery	437	164	465	654	674	678
Firearm	270	205	338	335[a]	375	356
Gratis	na	na	na	--	112	122
Special Big Game	397	567	583	1,131	970	1,081
Furbearer	796	612	636	625	694	530
Small Game						
Upland	415	na	521	869	878	870
Waterfowl	476	na	480	904	779	778
Fall Turkey						
Regular	249	207	232	340[a]	277	324
Gratis	na	na	na	–	128	101
Fishing						
Open Water	na	103	649	860	815	974
Ice	na	na	651	672	495	648
Season-long	na	na	na	na	na	1,013
Darkhouse Spearing	na	na	na	na	na	453

na=not available

[a] Includes gratis hunters.

Value of a Day of Hunting and Fishing

Survey respondents were asked to place a monetary value on a single day spent either hunting or fishing. These values do not imply spending levels or have any effect on hunter/angler impacts within the economy, but rather indicate a measure of the importance for the participant of time spent hunting or fishing in the state.

Special big game hunters placed a higher value on a day of hunting than participants in other hunting categories (Table 11). Archery antelope and firearm antelope hunters had the second and third highest values per day of hunting, respectively. Archery deer hunters placed the lowest value per day of hunting. Excluding the top three hunting categories, the average

value of a day of hunting in the remaining hunting categories ranged from $46 to $68. Resident anglers valued a day of darkhouse spearing at $45 and a day of ice fishing at $72. When adjusted for inflation, the general trend in the value per day of hunting has been decreasing. Archery deer, firearm deer, special big game, waterfowl, upland game, and fall turkey participants placed a lower value on a day of hunting than in earlier studies (Table 11). Trends in the value per day of fishing are mixed--open water fishing values are down from earlier studies, while ice fishing values are greater than earlier studies.

Table 11. Average Value of a Day Spent Hunting or Fishing, North Dakota, by Residents, by Activity, 1981, 1982, 1986, 1990, 1996, and 2001

Activity	1981	1982	1986	1990	1996	2001
	---------- 2001 dollars ----------					
Antelope						
Archery	na	na	84	73	78	87
Firearm	na	na	na	124[a]	108	113
Gratis	na	na	na	--	72	59
Deer						
Archery	867	na	72	69	52	46
Firearm	210	na	89	78[a]	59	68
Gratis	na	na	na	--	41	52
Special Big Game	1,476	590	438	163	167	165
Furbearer	207	167	76	74	46	51
Small Game						
Upland	78	na	123	56	69	64
Waterfowl	78	na	112	76	59	57
Fall Turkey						
Regular	201	na	322	65[a]	64	56
Gratis	na	na	na	--	38	56
Fishing						
Open Water	89	na	562	55	138	60
Ice	na	na	56	50	37	72
Season-long	na	na	na	na	na	60
Darkhouse Spearing	na	na	na	na	na	44

na=not available

[a] Includes gratis hunters.

Gender

Most resident hunters are male. Archery antelope hunting had the fewest women participants with 1 percent, while deer gratis hunting had the highest level of women participants with 26 percent (Table 12). Anglers, as a group, had higher relative levels of women participation than hunters. Female anglers averaged about 30 percent of all participants in open water and ice fishing (Table 12).

Table 12. Gender of Resident Hunters and Anglers, North Dakota, 2001-2002

Activity	Male	Female
	------- %	-------
Antelope		
Archery	99	1
Firearm	94	6
Gratis	82	18
Deer		
Archery	98	2
Firearm	89	11
Gratis	74	26
Special Big Game	87	13
Furbearer	96	4
Small Game		
Upland	95	5
Waterfowl	96	4
Fall Turkey		
Regular	92	8
Gratis	91	9
Fishing		
Open Water	72	28
Ice	69	31
Season-long	76	24
Darkhouse Spearing	93	7

Nonresidents

The typical nonresident hunter was 44 years old, hunted nearly 5 days per year in North Dakota, lived in a community with a population of 2,500 or more, and had a gross household income around $70,000. The typical nonresident angler was 49 years old, fished 6 days per year in the state, lived in an urban community, and had a gross household income around $75,000. Characteristics for all hunting and fishing groups are included in the following sections.

Age

The majority of nonresident hunters and anglers were between the ages of 19 to 45 (Table 13). Archery antelope hunters had the highest percentage of participants in the 19 to 45 age category (65 percent). Nonresident anglers were on average older than nonresident hunters, with nearly half of all participants between 46 and 65 years of age (Table 13).

Table 13. Average Age and Distribution of Nonresident Hunters and Anglers by Age Categories, North Dakota, 2001-2002

Activity	Average Age[a]	18 Years or Less	19 to 45 Years	46 to 65 Years	Over 65 Years
		%			
Antelope Archery	40	2	65	33	0
Deer					
Archery	44	2	54	41	3
Firearm	45	4	48	42	6
Small Game	44	3	54	38	5
Fishing	49	1	40	47	12

[a] May not reflect true average age due to licensing requirements for youth and sampling methods which did not include participants under 16 years of age.

Residence

Nonresident firearm deer hunters had the highest percentage of urban participants (74 percent), while archery deer hunters had the lowest percentage of urban participants (49 percent) (Table 14). All other hunting/angling groups had a majority of participants living in urban areas (Table 14).

Income

Seventy percent of nonresident hunters and anglers, except archery antelope hunters, had incomes of $50,000 or greater (Table 15). Over 50 percent of nonresident small game hunters had incomes over $75,000. Less than 10 percent of all nonresident hunters and anglers had incomes under $25,000 (Table 15).

Table 14. Residence of Survey Respondents, Nonresident Hunters and Anglers, by Activity, North Dakota, 2001-2002

Activity	Urban			Rural			
	City over 50,000	City 2,500 to 50,000	Total Urban	Community under 2,500	Farm or Ranch	Rural Nonfarm	Total Rural
	%						
Antelope Archery	19	35	54	12	13	21	46
Deer							
Archery	20	29	49	17	12	22	51
Firearm	42	33	74	11	5	10	26
Small Game	32	36	68	11	5	15	32
Fishing	31	34	65	16	7	12	35

Note: Percentages may not total due to rounding.

Table 15. Gross Household Income, Nonresident Hunters and Anglers, by Activity, North Dakota, 2001-2002

Activity	Over $150,000	$125,000-$150,000	$100,000-$124,999	$75,000-$99,999	$50,000-$74,999	$25,000-$49,999	$10,000-$24,999	Under $10,000
	%							
Antelope Archery	6	8	2	14	33	35	2	0
Deer								
Archery	11	3	8	18	30	26	4	0
Firearm	9	6	12	19	26	22	4	2
Small Game	14	5	11	21	22	20	4	1
Fishing	8	5	7	21	30	24	5	2

Note: Percentages may not total due to rounding.

Ownership of Land Hunted

Nonresident archery antelope hunters spent about half their time hunting on private land. By contrast, nearly 85 percent of nonresident firearm deer hunting was conducted on private land (Table 16). About one-quarter of archery deer hunting occurred on public lands.

Archery antelope hunters spent considerably more time hunting on public land in 2001 than in 1996 (Table 16). Little change has occurred in the amount of time nonresident deer and small game hunters spend hunting on the various land types over the past two decades.

Table 16. Nonresident Hunting by Land Ownership, by Activity, North Dakota, 1976, 1983, 1990, 1996, and 2001

Activity	1976	1983	1990	1996	2001
	---------- % of time spent hunting ----------				
Antelope Archery					
Federal	14	na	40	12	34
State	21	na	10	17	12
Private	61	na	47	71	51
Unknown	4	na	3	1	2
Deer Archery					
Federal	18	19	25	21	14
State	25	19	14	7	10
Private	56	59	60	71	76
Unknown	1	3	1	1	1
Deer Firearm					
Federal	11	12	8	6	4
State	9	7	9	7	8
Private	78	78	81	84	85
Unknown	2	3	2	3	2
Small Game					
Federal	12	12	10	10	9
State	12	9	11	13	18
Private	72	75	76	75	71
Unknown	4	4	3	3	2

na=not available
Note: Percentages may not total due to rounding.

Days Participated

Nonresident archery deer hunters spent more time hunting (8 days) in the state than participants in any other nonresident hunting or angling group (Table 17). Nonresident firearm deer hunters spent the least amount of time hunting (3 days) in the state of all the nonresident groups.

Between 1976 and 2001, the amount of time spent hunting has decreased slightly for archery antelope hunters (Table 17). However, the amount of time spent hunting by archery deer, firearm deer, and small game hunters has remained unchanged. The amount of time spent fishing by nonresident anglers has fluctuated from 6 to 9 days from 1983 to 2001.

Table 17. Average Days Spent Hunting and Fishing, by Nonresidents, by Activity, North Dakota, 1976, 1983, 1990, 1996, and 2001

Activity	1976	1983	1990	1996	2001
	---------- days ----------				
Antelope Archery	9	na	7	6	6
Deer					
Archery	7	8	8	7	8
Firearm	4	4	4	3	3
Small Game	5	4	5	6	6
Fishing	na	8	6	9	6

na=not available

Miles Traveled

Archery hunters traveled, on average, more miles than other nonresident hunting and fishing participants (Table 18). Firearm deer hunters averaged the fewest miles traveled (about 1,000).

Comparing the number of miles traveled over time is difficult because past studies only requested the one-way mileage from the respondent's home to where they hunted or fished. In more recent studies, total mileage was requested, which included miles traveled while hunting within the state. With only two surveys collecting information on total mileage, an increase in the number of miles traveled by archery deer hunters was the only evident trend.

Table 18. Average Miles Traveled by Nonresidents, by Activity, North Dakota, 1976, 1983, 1990, 1996, and 2001

Activity	1976[a]	1983[a]	1990	1996[b]	2001[b]
	---------- miles ----------				
Antelope Archery	535	na	1,529[b]	1,897	1,706
Deer					
Archery	373	502	1,169[b]	1,357	1,627
Firearm	588	639	567[a]	993	1,001
Small Game	482	701	610[a]	1,369	1,251
Fishing	na	696	489[a]	1,047	1,031

na=not available

[a] One-way distance from respondents' home to where they hunted.

[b] Miles traveled for all trips rather than just the one-way distance from the respondents' homes to where they hunted/fished.

Value of a Day of Hunting and Fishing

Nonresidents were asked to place a monetary value on a day of hunting/fishing. The figure does not necessarily represent the amount of money spent, but instead provides a measure of the worth of a day hunting or fishing. Nonresident archery deer hunters placed the highest value on a day ($135) of hunting (Table 19). Archery antelope hunters placed the lowest value on a day ($80) of hunting. From 1983 to 1990, values placed on a day of hunting and fishing by nonresidents generally decreased. However, from 1990 to 2001, values placed on a day of hunting increased for archery and firearm deer hunters (Table 19). The value per day of hunting was similar from 1990 through 2001 for archery antelope and fishing participants.

Table 19. Average Value of a Day Spent Hunting or Fishing, by Nonresidents, by Activity, North Dakota, 1983, 1990, 1996, and 2001

Activity	1983	1990	1996	2001
	---------- 2001 dollars ----------			
Antelope Archery	na	97	72	80
Deer				
Archery	169	81	114	135
Firearm	201	109	114	119
Small Game	170	95	103	109
Fishing	164	67	94	89

na=not available

Gender

Most nonresident hunters are male. Archery antelope hunting had the highest level of women participants with 10 percent, while archery deer and small game hunting had the lowest level of women participants with 1 percent (Table 20). Fishing had higher levels of women participation than hunting. Nine percent of all fishing participants were women (Table 20).

Table 20. Gender of Nonresident Hunters and Anglers, North Dakota, 2001-2002

Activity	Male	Female
	---- % ----	
Archery Antelope	90	10
Deer		
Archery	99	1
Firearm	97	3
Small Game	99	1
Fishing	91	9

Hunter and Angler Expenditures in the 2001-2002 Season

Average expenditures for hunting and fishing participants in North Dakota were estimated for several activities (see Appendix D for detailed average spending per participant). Average season total expenditures were used with estimates of the number of active participants to project total direct spending by hunters and anglers during the 2001-2002 season. Total direct expenditures were applied to the North Dakota Input-Output Model to estimate secondary economic effects, gross business volume, secondary employment, and state tax collections.

Season Expenditures

Among all of the activities examined, gratis hunters had the lowest average total season expenditures (Table 21). Fall turkey gratis, antelope gratis, and deer gratis hunters had on average about $128, $189, and $222, respectively, in total season expenditures. Average total season expenditures for resident firearm antelope, resident firearm deer, and nonresident firearm deer hunters were similar ($463, $431, and $491, respectively). Archery hunters averaged more per-season expenditures than firearm hunters. Resident archery antelope, resident archery deer, nonresident archery antelope, and nonresident archery deer spent on average $895, $634, $696, and $1,170 per season, respectively (Table 21). Of all resident hunting activities, big game hunters had the most total season expenditures ($929).

Average season expenditures for small game hunting were similar for both residents and nonresidents. Resident upland game and waterfowl hunters had total season expenditures of $723 and $810, respectively. Nonresident small game hunters, which included spending for both upland and waterfowl hunting activities, averaged about $768 per season. Given limitations with survey methods and licensing data, a single estimate of average total season spending for resident small game hunters could not be estimated.[10]

The average resident angler participating in open water fishing spent about $2,040 per season (Table 21). Average total season expenditures for ice fishing were $619 per participant. The average resident angler (i.e., open water and ice fishing) spent $2,597 per year. Residents participating in darkhouse spearing had $451 in average season expenditures. Nonresident anglers spent on average $884 per year for open water and ice fishing activities (Table 21).

[10]See Appendix E for a detailed discussion of the difference between resident and nonresident small game hunter expenditures.

Table 21. Average Season Expenditures, by Activity, North Dakota, 2001

Residence/Activity	Average Season Expenditures		
	Variable	Fixed	Total
	---------- $ ----------		
Resident			
Antelope			
Archery	265.46	629.61	895.07
Firearm	266.53	196.13	462.66
Gratis	72.60	116.51	189.11
Deer			
Archery	272.22	361.87	634.09
Firearm	219.50	211.26	430.76
Gratis	137.87	84.54	222.41
Muzzleloader[a]	123.27	186.02	309.29
Special Big Game	659.87	268.99	928.86
Furbearer	197.51	372.82	570.33
Small Game			
Upland	326.66	395.90	722.56
Waterfowl	374.50	435.23	809.73
Turkey			
Fall Regular	108.01	132.93	240.94
Fall Gratis	61.89	65.63	127.52
Spring Regular[a]	95.29	149.82	245.11
Spring Gratis[a]	56.44	105.38	161.82
Fishing			
Open Water	688.21	1,351.34	2,039.55
Ice	274.10	344.91	619.01
Season-long	760.95	1,835.74	2,596.69
Darkhouse Spearing	172.49	278.34	450.83
Nonresident			
Antelope Archery	594.81	101.28	696.09
Deer			
Archery	987.64	181.98	1,169.62
Firearm	401.03	90.33	491.36
Small Game	640.77	127.22	767.99
Fishing	570.59	313.04	883.63

[a] Spending represents 1996 expenditures adjusted for inflation. Groups were not surveyed in 2001.

Average total season expenditures for resident and nonresident hunters and anglers are similar in magnitude, but differ in the types of spending. Generally, total spending levels for deer and antelope hunters were similar for both residents and nonresidents. Also, total season spending for upland game and waterfowl hunting for residents and small game hunting for nonresidents were similar. However, when comparing the difference between variable (nondurable) and fixed (durable) expenditures between residents and nonresidents, the two groups' spending is different. Averaged across all of the hunting categories, nonresidents spent about 80 percent of their total season expenditures on nondurable goods or variable expenses. In comparison, residents spent about 45 percent of their total spending on nondurable goods. Generally, within North Dakota, nonresidents spent more in 2001 per person on lodging, meals, and other day-to-day expenses, while residents spent more per person on equipment-related items (e.g., clothing, weapons, decoys) and other services (e.g., meat processing, veterinarian care, repairs, taxidermy) (Appendix F).

Daily Expenditures

Average daily expenditures represent total spending over a season divided by the number of days of participation. Average daily expenditures are helpful when comparing spending among activities. Because of variations in season lengths, harvest opportunities, and typical activities required for some types of hunting/fishing, total expenditures are not always an appropriate comparison. For example, firearm deer hunters have a relatively short season (16½ days) and are generally limited to one or two animals per season while upland game hunters may hunt for several months and can harvest birds throughout the season.[11]

Generally, deer, antelope, and big game hunters had the highest average daily expenditures (Table 22). Resident big game hunters had the highest daily expenditures, averaging $311 in 2001, followed by resident firearm and archery antelope hunters with average daily expenditures of $272 and $237, respectively. Nonresident archery and firearm deer hunters spent on average $191 and $180 per day, respectively, during the 2001-2002 season compared to $149 per day for resident firearm deer hunters. Nonresident small game hunters spent about $155 per day. Resident upland and waterfowl hunters spent about $112 and $140 per day, respectively, during the 2001-2002 season. Gratis turkey, antelope, and deer hunters had average daily expenditures of $49, $100, and $101, respectively (Table 22). Not including gratis hunters, resident archery deer and fall turkey hunters had the lowest average daily expenditures of all hunting activities ($88 and $108, respectively).

[11]Upland game hunters can harvest birds throughout the season providing they do not exceed daily and possession limits. Personal consumption of game birds during the season can allow hunters to take numerous daily limits over the course of an entire season.

Table 22. Average Daily Expenditures, by Activity, North Dakota, 2001

Residence/Activity	Average Days Participated	Average Daily Expenditures		
		Variable	Fixed	Total
		---------- $ ----------		
Resident				
Antelope				
Archery	5	67.10	169.54	236.64
Firearm	2	157.87	114.51	272.38
Gratis	2	42.25	57.97	100.22
Deer				
Archery	13	36.24	52.19	88.43
Firearm	4	72.12	76.60	148.72
Gratis	4	60.28	40.84	101.12
Special Big Game	5	222.61	88.01	310.62
Furbearer	11	40.02	85.19	125.21
Small Game				
Upland	9	49.18	63.02	112.20
Waterfowl	8	56.27	83.91	140.18
Fall Turkey				
Regular	3	47.26	60.33	107.59
Gratis	4	17.83	31.66	49.49
Fishing				
Open Water	18	44.57	98.44	143.01
Ice	13	27.59	49.45	77.04
Season-long	24	43.23	134.75	177.98
Darkhouse Spearing	8	35.87	80.26	116.13
Nonresident				
Antelope Archery	6	112.68	19.21	131.89
Deer				
Archery	8	167.06	23.79	190.85
Firearm	3	147.17	32.44	179.61
Small Game	6	131.72	23.43	155.15
Fishing	6	136.47	42.20	178.67

Average daily expenditures for season-long fishing were nearly identical for residents and nonresidents (Table 22). Average daily expenditures for resident season-long fishing was $178, compared to $179 for nonresidents. Resident ice fishing anglers had the lowest average daily expenditures ($77) of all fishing categories. Resident anglers partaking in open water fishing had average daily expenditures of $143 (Table 22). Average daily expenditures for residents participating in darkhouse spearing was $116.

Total season expenditures for residents and nonresidents were comparable for similar activities; however, nonresidents generally spent fewer days hunting in the state than residents. As a result, daily expenditures were slightly higher for nonresidents than residents. Average daily expenditures for nonresidents were higher for lodging, meals, and other day-to-day expenses, while residents had higher average daily expenditures for equipment-related items (e.g., clothing, weapons, decoys) and other services (e.g., meat processing, veterinarian care, repairs, taxidermy).

Participation Rates

The number of licenses sold was provided by the ND Game and Fish Department (2002a). However, not all individuals who purchase a license actually hunt or fish during the season. The number of active participants was based on using data from the participation and expenditure surveys (see the section on **Survey Design** on page 2) to estimate the percentage of individuals that indicated they had participated in the activity for which they were licensed. Participation was based on several criteria. Affirmative response to questions on the participation survey regarding if they purchased a license, if they actively participated in the activity, if they harvested any animal(s), where they hunted/fished, or if they provided information from the expenditure or participation questionnaire on days participated and/or listed expenses incurred during the season were all used to determine participation rates.

Participation rates were estimated for all survey categories (Table 23). Participation rates vary among the various hunting and fishing categories for several reasons. Typically, licenses which are difficult to obtain (e.g., the odds of drawing a lottery big game license are low) have higher participation rates. Resident big game, firearm antelope, firearm deer, and archery deer hunting had participation rates over 90 percent. Similarly, spring turkey and resident archery antelope hunting had participation rates over 88 percent (Table 23). Across all categories, participation rates for nonresident hunters and anglers were generally 90 percent or higher (Table 23). Participation rate for resident open water fishing was 86 percent. The participation rate for resident ice fishing was 37 percent, the lowest of all survey categories (Table 23).

Table 23. License Sales, Active Participants, and Participation Rates, Hunters and Anglers, North Dakota, 2001-2002

Activity	License Sales	Participation Rate	Active Participants[a]
		----- percent-----	
Resident			
Antelope			
Archery	922	88.2	813
Firearm	821	95.9	787
Gratis	334	77.0	257
Deer			
Archery	11,903	94.5	11,247
Firearm	95,368	92.9	88,583
Gratis	11,137	81.4	9,064
Muzzleloader[b]	1,717	92.4	1,586
Special Big Game	386	97.2	375
Furbearer	50,389	51.0	25,708
Small Game			
Upland	66,954	78.8	52,749
Waterfowl	66,954	52.6	35,215
Turkey			
Fall Regular	6,191	79.6	4,931
Fall Gratis	448	71.2	319
Spring Regular[b]	2,672	88.9	2,376
Spring Gratis[b]	304	71.0	216
Fishing			
Open Water	136,262	85.7	116,828
Ice	136,262	37.4	50,948
Season-long	136,262	89.2	121,612
Darkhouse Spearing[c]	1,287	72.3	930
Nonresidents			
Antelope Archery	90	96.2	87
Deer			
Archery	1,325	95.1	1,260
Firearm	1,510	92.7	1,399
Small Game	41,702	99.1	41,329
Fishing	40,353	89.5	36,099

[a] Based on the percentage of survey respondents indicating participation in each activity during the 2001-02 season, and does not include participants under 16 years of age.

[b] Information was obtained from harvest surveys conducted by the ND Game and Fish Department even though those hunting activities were not included in the expenditure survey.

[c] A separate license is not required for darkhouse spearing; however, participants must comply with state fishing license requirements and register their name and address with the ND Game and Fish Department.

Some hunting categories, such as furbearer, will have lower participation rates, due to licensing structures. For example, a resident sportsman license enables the license holder to fish and hunt furbearer, upland game, and waterfowl; however, not all individuals purchasing that license intend to pursue game in all of the categories for which the license allows. Also, nonresident participation rates are high because no single license enables the holder to pursue all hunting or fishing activities in North Dakota. Nonresident hunters must purchase a specific license for each hunting activity. Those purchasing a specific license are more likely to participate in that activity, resulting in higher participation rates than if the licenses were more general. Also, participation rates can be influenced by other factors, such as personal conflicts, adverse weather, family emergencies, and changes in individual preferences that may occur prior to hunting/fishing.

Season-long fishing (residents) had the most participants of all hunting and fishing activities in North Dakota in 2001-2002 with about 121,600 individuals (Table 23). When the four categories of resident deer hunting were combined, those activities collectively had 110,480 active participants[12]--the second highest category. Resident small game hunting, which is comprised of upland game and waterfowl hunting, was the third highest activity with nearly 88,000 participants.[12] Nonresident small game hunting was the fourth highest activity with about 41,300 participants, followed by nonresident fishing with 36,100 active participants (Table 23). Individuals can participate in more than one hunting and fishing activity; however, it is impossible given current records to estimate the number of individuals participating in any hunting and fishing activity in the state (i.e., it is impossible to only count the individual, for example, who hunted deer, upland game, and turkeys as one active participant).

Projected Total Direct Expenditures

The amount of total expenditures incurred in North Dakota by hunters and anglers is a function of the number of active participants and average total season expenditures per participant. Total participants in each hunting and fishing activity were multiplied by the average season total expenditures to arrive at an estimate of total hunter and angler expenditures.

Spring turkey, spring turkey gratis, and muzzleloader deer hunters were not surveyed in this study. To include spending from those hunting activities, direct expenditures from the Lewis Study were adjusted to reflect 2001 dollars using the Consumer Price Index (CPI) (U.S. Department of Labor 2002). The number of active participants in those activities were estimated using harvest surveys (ND Game and Fish Department 2002b).

Total direct expenditures by hunters and anglers in North Dakota during the 2001-2002 season were estimated at $478.7 million (Table 24). Excluding purchases of licenses, total direct expenditures were $468.5 million. Resident hunter and angler expenditures were $402.7 million and represented 86 percent of the total (Table 24). Nonresident hunter and angler expenditures were $65.9 million and represented 14 percent of the total. Resident and nonresident hunter

[12]Active participants may not equal number of individuals. Total participants can include individuals who participate in more than one activity.

expenditures were estimated at $166.4 million (36 percent of all expenditures). Resident and nonresident angler expenditures were $302.1 million and accounted for 64 percent of the total (Table 24).

Table 24. Total Direct Expenditures, Resident and Nonresident Hunters and Anglers, North Dakota, 2001-2002

	Resident		Nonresident		Total	
Activity	Total	Percent	Total	Percent	Total	Percent
	- 000s $ -		- 000s $ -		- 000s $ -	
Hunting	132,421.3	32.9	33,962.4	51.6	166,383.7	35.5
Percent of hunting	79.6		20.4			
Fishing	270,234.0	67.1	31,897.7	48.4	302,131.8	64.5
Percent of fishing	89.4		10.6			
Total hunting/fishing	402,655.4		65,860.1		468,515.5	100
Percent of total	85.9		14.1			
License Sales	5,035.3		5,137.9		10,173.2	
Grand Total	407,690.6		70,998.0		478,688.7	
Percent	85.2		14.8			

Small game (i.e., upland and waterfowl) hunting accounted for 50 percent ($66.6 million) of all resident hunter expenditures (Table 25). Following small game, deer and furbearer hunting accounted for 36 percent ($47.8 million) and 11 percent ($14.7 million) of all resident hunter expenditures, respectively (Table 25). Antelope, big game, and turkey hunting collectively accounted for about 3 percent of all resident hunter expenditures.

Nonresident expenditures related to waterfowl hunting were estimated at $20.9 million or about 62 percent of all nonresident hunter expenditures (Table 25). Upland game hunting accounted for 32 percent ($10.8 million) of nonresident hunter expenditures. Collectively, upland game and waterfowl hunting accounted for 93 percent ($31.7 million) of all nonresident hunter expenditures (Table 25). Deer and archery antelope hunting collectively accounted for 7 percent of all nonresident hunter expenditures.

Resident open water fishing expenditures were estimated at $238.3 million, representing over 88 percent of total resident angler expenditures (Table 25). Collectively, ice fishing and darkhouse spearing expenditures represented about 12 percent of all resident angler spending. Expenditures for open water fishing by nonresidents were estimated at $23.2 million, and represented 73 percent of all nonresident angler spending. Nonresident ice fishing expenditures represented 27 percent ($8.7 million) of all nonresident angler spending (Table 25).

Expenditures for open water fishing generated the most spending with $261.5 million or 56 percent of all resident and nonresident hunting and angling expenditures (Table 25). Resident and nonresident small game (upland and waterfowl) hunting was the second largest expenditure group with $98.4 million or 21 percent of all spending. Deer hunting activities accounted for 11 percent of all expenditures (Table 25).

Total hunter and angler spending was estimated by type of expenditure (see Appendix F for a complete description). Boat, motor, and trailer purchases were the largest single expense category for all hunting and fishing activities ($112.2 million). Transportation expenses were the second largest expenditure category ($65.2 million). Other expenditure categories with substantial spending included food ($50.2 million), weapons ($25.5 million), lodging ($24.8 million), camping-related equipment/gear ($23.9 million), share of vehicle purchases attributable to hunting/fishing ($21.7 million), and clothing ($21 million) (Appendix F). Total variable and fixed expenses for all hunting and angling activities were estimated at $204.4 million and $264.1 million, respectively (Appendix F).

Table 25. Total Direct Expenditures (excluding license purchases), by Hunting and Fishing Activity, Residents and Nonresidents, North Dakota, 2001-2002

	Resident		Nonresident		Total	
Activity	Total	Percent	Total	Percent	Total	Percent
	- 000s $ -		- 000s $ -		- 000s $ -	
Hunting						
Antelope	1,140.4	0.9	60.6	0.2	1,201.0	0.3
Archery	727.7		60.6		788.3	
Firearm[a]	412.7		na		412.7	
Deer	47,795.3	36.1	2,161.1	6.4	49,956.4	10.7
Archery	7,131.4		1,473.7		8,605.2	
Firearm[a]	40,663.9		687.4		41,351.3	
Big Game	348.3	0.3	na		348.3	0.1
Turkey[b]	1,846.2	1.4	na		1,846.2	0.4
Furbearer	14,662.1	11.1	na		14,662.1	3.1
Small Game[c]	66,629.0	50.3	31,740.7	93.4	98,369.8	21.0
Upland	38,114.9		10,833.1		48,948.0	
Waterfowl	28,514.2		20,907.6		49,421.8	
Total	132,421.3	100.0	33,962.4	100.0	166,383.7	35.5
Fishing						
Open Water[d]	238,276.9	88.2	23,192.8	72.7	261,469.7	55.8
Ice[d]	31,537.9	11.6	8,704.9	27.3	40,242.7	8.6
Darkhouse Spearing	419.3	0.2	na		419.3	0.1
Total	270,234.0	100.0	31,897.7	100.0	302,131.8	64.5
Total Hunting/Fishing	402,655.4		65,860.1		468,515.5	

Note: Percentages and totals may not add due to rounding. na = not applicable.

[a] Includes gratis and muzzleloader hunter expenditures.

[b] Includes fall regular, fall gratis, spring regular, and spring gratis hunter expenditures.

[c] Resident upland game and waterfowl hunters were surveyed separately. Nonresident upland game and waterfowl hunters were surveyed as one group. The split in spending between nonresident upland game and waterfowl hunting was based on a survey question requesting the percentage of total expenses attributable to each game type (see Appendix E).

[d] Resident open water fishing, ice fishing, and darkhouse spearing activities were surveyed separately. Nonresident anglers were surveyed as one group. The split in spending between nonresident open water and ice fishing was based on a survey question requesting the percentage of total expenses attributable to each type of fishing.

Total Economic Effects

The North Dakota Input-Output Model was used to develop estimates of secondary economic effects (i.e., multiplier effects), gross business volume (i.e., sum of direct and secondary effects in all economic sectors), secondary employment, and state-level tax revenues. Total direct expenditures from all hunting and fishing activities were allocated to the appropriate sectors of the North Dakota Input-Output Model (see Table 4).

Total direct expenditures ($468.5 million) from all hunting and fishing activities in North Dakota for the 2001-2002 season generated nearly $544.9 million in secondary economic effects. The total economic contribution (direct and secondary effects) of hunting and fishing in North Dakota was estimated at $1 billion (Table 26).

Resident and nonresident hunters spent $166.4 million on hunting activities in the state in 2001, which generated an additional $199 million in secondary economic effects in the state economy. Hunting activities generated $77.2 million in economy-wide personal income and $189.3 million in statewide retail trade. Hunting activities in 2001 generated $365.4 million in gross business volume (Table 26).

Resident and nonresident anglers spent $302.1 million on fishing activities in the state in 2001, which generated an additional $346 million in secondary economic effects in the state economy. Fishing activities generated $131 million in economy-wide personal income and $362 million in statewide retail trade. Fishing activities in 2001 generated $648 million in gross business volume (Table 26).

Resident hunters and anglers spent about $402.7 million in the state in 2001. Direct expenditures from resident hunters and anglers generated an additional $461.1 million in secondary economic effects within the state economy. Economy-wide personal income and statewide retail trade activity resulting from resident hunter and angler spending in the state was estimated at $174.9 million and $483 million, respectively. The gross business volume resulting from resident hunters and anglers was estimated at nearly $864 million (Table 26).

Nonresident hunters and anglers spent about $65.9 million in the state in 2001. Direct expenditures from nonresident hunters and anglers generated an additional $84 million in secondary economic effects within the state economy. Economy-wide personal income and statewide retail trade activity resulting from nonresident hunter and angler spending in the state was estimated at $33 million and $69 million, respectively. The gross business volume resulting from nonresident hunters and anglers was estimated at nearly $150 million (Table 26).

Direct expenditures and secondary economic effects from resident hunters, resident anglers, and nonresident hunters and anglers in 2001-02 generated about $8.6 million, $18 million, and $4 million in state-level tax collections, respectively (Table 26). Total state-level sales and use, personal income tax, and corporate income tax collections from hunting and fishing activities in the state in 2001-02 were $25.5 million, $2.7 million, and $2.3 million, respectively. Total state-level tax collections were estimated at $30.5 million (Table 26).

Table 26. Total Economic Contribution of Resident and Nonresident Hunting and Fishing Activities in North Dakota, 2001-2002

Activity	Resident	Nonresident	Total[a]
	---------- 000s $ ----------		
Hunting			
Direct Expenditures	132,422	33,962	166,383
Secondary Effects	154,435	44,548	198,983
Gross Business Volume	286,857	78,510	365,367
Personal Income	58,966	18,193	77,159
Retail Trade	155,262	34,055	189,317
Secondary Employment[b]	3,761	1,342	5,103
State tax collections[c]	8,598	1,985	10,583
Fishing			
Direct Expenditures	270,235	31,898	302,132
Secondary Effects	306,653	39,264	345,917
Gross Business Volume	576,888	71,162	648,050
Personal Income	115,899	15,221	131,120
Retail Trade	327,768	34,680	362,448
Secondary Employment[b]	6,920	1,094	8,014
State tax collections[c]	17,980	1,962	19,942
Total Hunting and Fishing			
Direct Expenditures	402,657	65,860	468,517
Secondary Effects	461,088	83,812	544,900
Gross Business Volume	863,745	149,672	1,013,417
Personal Income	174,865	33,414	208,279
Retail Trade	483,030	68,735	551,765
Secondary Employment[b]	10,681	2,436	13,117
State tax collections[c]	26,578	3,947	30,525

[a] Totals may not add due to rounding.
[b] Secondary employment was measured as full-time equivalent jobs.
[c] State tax collections included sales and use, personal income, and corporate income taxes.

Additional Nonresident Expenditures

Nonresident hunters and anglers were asked to list additional spending that occurred in North Dakota while on their hunting or fishing trip that was not related to their hunting or fishing activity. In addition to the spending listed on the questionnaire, the difference between the price paid for vehicles and the allocated vehicle expense was added to this category (see page 9).

Nonresident archery antelope hunters spent, on average, $676 during the 2001 season on items not related to hunting while in North Dakota (Table 27). Archery deer hunters spent an additional $525 on items not related to hunting in the 2001 season. Nonresident anglers spent $452 on average for items not related to fishing while in North Dakota. Firearm deer and small game hunters spent the least per person on non hunting-related items while in North Dakota. Nonresident hunters and anglers spent a total of $26.4 million while in the state hunting and fishing for items not related to their hunting or fishing activity (Table 27).

Table 27. Average Additional Expenditures per Nonresident Hunter and Angler, and Total Additional Expenditures for All Participants, North Dakota, 2001-2002

Activity	Average Additional Expenditures Per Hunter/Angler[a]	Additional Expenditures For All Hunters/Anglers
	---------- $ ----------	
Archery Antelope	676	59,000
Deer		
Archery	525	662,000
Firearm	217	304,000
Small Game	219	9,051,000
Fishing	452	16,317,000
Total	na	26,393,000

[a] Spending that occurred while in North Dakota hunting and/or fishing, but for items unrelated to hunting or angling.

Expenditures in Rural Areas

Hunters and anglers were asked to indicate the percentage of expenditures made in rural areas in an attempt to better understand the distribution of hunter and angler spending within the state. The percentage of expenditures made in rural areas was applied to average season expenditures for both rural and urban, and resident and nonresident hunters and anglers to determine total rural spending in 2001-2002.

Rural Participants

The percentage of season expenditures incurred in rural areas by rural resident hunters ranged from 69 percent to 89 percent (Table 28). Rural gratis hunters (antelope, deer, turkey) generally had the highest percentage of seasonal spending in rural areas (over 83 percent), while rural resident archery deer hunters had the lowest percentage of their season spending in rural areas (69 percent). Rural resident hunters, averaged across all hunting groups, spent about 79 percent of their total season expenditures in rural areas.

Rural resident anglers participating in open water fishing had the highest average total season spending in rural areas of all rural participants ($1,474). Rural nonresident archery deer hunters had the second highest average total season spending in rural areas ($883), followed by rural resident big game hunters and rural resident archery antelope hunters with $778 and $644, respectively. Rural nonresident small game hunters spent $625 in rural areas of the state for both upland game and waterfowl hunting. Rural resident upland game and rural resident waterfowl hunters spent $512 and $590, respectively, in rural areas of the state. However, rural nonresident small game spending in rural areas cannot be directly compared to the rural spending estimates generated for either rural resident upland game or waterfowl hunters (see Appendix E for explanation). Rural nonresident and rural resident firearm deer hunters spent similar amounts in rural areas of the state, $367 and $346, respectively. Rural gratis hunters spent the lowest total amount per season in rural areas ($110 for fall turkey to $185 for firearm deer) (Table 28).

Total season expenditures in rural areas were highest for rural resident anglers participating in open water fishing ($60.3 million). The next highest groups were rural resident deer hunters, anglers participating in ice fishing, and upland hunters with $15 million, $14.3 million, and $9.2 million in total expenditures in rural areas, respectively (Table 28). Rural nonresident small game hunters and rural nonresident anglers had the highest total season expenditures of all rural nonresident groups with $8.3 million and $7.4 million, respectively. As a group, fall turkey gratis hunters spent the least in rural areas ($28,000). Total rural expenditures by resident and nonresident rural hunters and anglers were estimated at $133.5 million (Table 28).

Table 28. Hunter and Angler Expenditures in Rural Areas by Rural Participants, North Dakota, 2001-2002

Activity	Average Season Spending[a]	Breakout of Rural Participants for Each Activity[b]		Average Rural Spending per Season per Person		Total Season Expenditures in Rural Areas
Resident	--- $ ---	- % -	- total -	- % -	-- $ --	-- $ --
Antelope						
Archery	895.07	29	236	72.0	644.04	152,000
Firearm	462.66	42	331	79.1	365.96	121,000
Gratis	189.11	88	226	89.2	168.64	38,000
Deer						
Archery	634.09	48	5,399	68.7	435.89	2,353,000
Firearm	430.76	49	43,406	80.3	345.99	15,018,000
Gratis	222.41	90	8,158	83.0	184.62	1,506,000
Muzzleloader	309.29	56	888	74.0	228.74	203,000
Special Big Game	928.86	55	206	83.7	777.92	160,000
Furbearer	570.33	51	13,111	81.6	465.24	6,100,000
Small Game						
Upland	722.56	34	17,935	70.8	511.52	9,174,000
Waterfowl	809.73	35	12,325	72.8	589.79	7,269,000
Fall Turkey						
Regular	240.94	40	1,972	78.0	187.91	371,000
Gratis	127.52	78	249	86.6	110.48	28,000
Fishing						
Open Water	2,039.55	35	40,890	72.3	1,474.25	60,282,000
Ice	619.01	59	30,059	76.6	474.17	14,253,000
Darkhouse Spearing	450.83	54	502	71.1	320.49	161,000
Nonresident						
Antelope Archery	696.09	46	40	63.8	444.04	18,000
Deer						
Archery	1,169.62	51	643	75.5	882.93	568,000
Firearm	491.36	25	350	74.7	367.08	128,000
Small Game	767.99	32	13,225	81.4	624.94	8,265,000
Fishing	883.63	35	12,635	66.1	584.08	7,380,000
Total, all groups	na	42	201,898	76.3[c]	na	133,548,000

[a] Average season expenditures for all participants (rural and urban).
[b] Percentage of all participants that were rural and the number of active participants that were rural.
[c] Simple average and does not reflect weighting by dollar volume or number of participants.

Urban Participants

The percentage of season expenditures incurred in rural areas by urban resident hunters ranged from 35 percent to 84 percent (Table 29). Urban gratis hunters (antelope, deer, turkey) generally spent the highest percentage of their season expenditures in rural areas, while urban resident anglers spent the lowest percentage of their season expenditures in rural areas. Urban resident hunters, averaged across all hunting groups, spent about 53 percent of their total season expenditures in rural areas.

Urban nonresident archery deer hunters had the highest average total season spending in rural areas of all urban participants ($877) (Table 29). The next highest groups were urban resident anglers participating in open water fishing and nonresident small game hunters with $774 and $619, respectively. Four other groups, urban nonresident anglers, urban resident special big hunters, urban nonresident archery antelope hunters, and urban resident archery antelope hunters, all spent on average over $500 per person in rural areas. Urban resident upland game and waterfowl hunters spent $303 and $333, respectively, in rural areas. Urban gratis hunters spent the lowest total amount per season in rural areas ($73 for fall turkey to $159 for antelope) (Table 29).

Total season expenditures in rural areas were highest for urban resident anglers participating in open water fishing ($58.8 million). The next highest groups were urban nonresident small game hunters, urban nonresident anglers, resident urban upland hunters, and urban resident firearm deer hunters with $17.4 million, $13.8 million, $10.5 million, and $8.5 million in total expenditures in rural areas, respectively (Table 29). As a group, fall turkey gratis and antelope gratis hunters had the least total spending in rural areas ($5,000 each). Total rural expenditures by resident and nonresident urban hunters and anglers were estimated at $128.3 million (Table 29).

Table 29. Hunter and Angler Expenditures in Rural Areas by Urban Participants, North Dakota, 2001-2002

Activity	Average Season Spending[a]	Breakout of Urban Participants for Each Activity[b]		Average Rural Spending per Season per Person		Total Season Expenditures in Rural Areas
Resident	--- $ ---	- % -	- total -	- % -	-- $ --	-- $ --
Antelope						
Archery	895.07	71	577	57.7	516.16	298,000
Firearm	462.66	58	456	64.8	299.63	137,000
Gratis	189.11	12	31	84.3	159.39	5,000
Deer						
Archery	634.09	52	5,848	42.8	271.40	1,587,000
Firearm	430.76	51	45,177	43.4	187.12	8,454,000
Gratis	222.41	10	906	51.2	113.95	103,000
Muzzleloader	309.29	44	698	35.5	109.69	77,000
Special Big Game	928.86	45	169	59.3	550.80	93,000
Furbearer	570.33	49	12,597	50.3	287.10	3,617,000
Small Game						
Upland	722.56	66	34,814	41.9	302.52	10,532,000
Waterfowl	809.73	65	22,890	41.1	332.97	7,622,000
Fall Turkey						
Regular	240.94	60	2,959	45.1	108.73	322,000
Gratis	127.52	22	70	57.1	72.87	5,000
Fishing						
Open Water	2,039.55	65	75,938	38.0	774.03	58,778,000
Ice	619.01	41	20,889	35.0	216.37	4,520,000
Darkhouse Spearing	450.83	46	428	36.9	166.33	71,000
Nonresident						
Antelope Archery	696.09	54	47	75.8	527.52	25,000
Deer						
Archery	1,169.62	49	617	75.0	876.79	541,000
Firearm	491.36	75	1,049	65.5	321.90	338,000
Small Game	767.99	68	28,104	80.6	618.76	17,390,000
Fishing	883.63	65	23,464	66.5	587.87	13,794,000
Total, all groups	na	57.8	277,030	54.7[c]	na	128,309,000

[a] Average season expenditures for all participants (rural and urban).
[b] Percentage of all participants that were urban and the number of active participants that were urban.
[c] Simple average and does not reflect weighting by dollar volume or number of participants.

All Participants

Rural resident hunters, across all hunting groups, spent about $42.5 million in rural areas of North Dakota during the 2001-2002 season (Table 30). Urban resident hunters spent about $32.9 million in rural areas. Rural and urban resident hunters combined spent about $75.3 million in rural areas of the state in 2001. Rural expenditures by rural hunters represented 56 percent of all resident hunter expenditures in rural areas. Rural and urban hunter expenditures in rural areas represented 29 percent of all rural hunting and fishing expenditures in the state in 2001.

Rural resident anglers spent about $74.7 million in rural areas of North Dakota during the 2001-2002 season (Table 30). Urban resident anglers spent about $63.4 million in rural areas. Rural and urban resident anglers combined spent about $138.1 million in rural areas of the state in 2001. Rural expenditures by rural anglers represented 54 percent of all resident angler expenditures in rural areas. Rural and urban angler expenditures in rural areas represented 53 percent of all rural hunting and fishing expenditures in the state in 2001.

Rural resident hunters and anglers spent about $117.2 million in rural areas of North Dakota in 2001. Urban resident hunters and anglers spent $96.2 million in rural areas of the state in 2001 (Table 30). Rural and urban resident hunters and anglers spent $213.4 million in rural areas in 2001, representing 81 percent of all rural expenditures (Table 30).

Nonresident hunters spent $27.3 million in rural areas of the state during the 2001-2002 season. Nonresident anglers spent $21.2 million in rural areas of the state in 2001. Rural and urban nonresident hunters and anglers spent $48.4 million in rural areas in 2001, representing 19 percent of all rural expenditures (Table 30).

Total rural expenditures for all groups, resident and nonresident, were estimated at $261.9 million in North Dakota during the 2001-2002 season. Rural expenditures represented 56 percent of all expenditures made by resident and nonresident hunters and anglers in the state in 2001 (Table 30).

Table 30. Hunter and Angler Expenditures in Rural Areas, All Participants, North Dakota, 2001-2002

Group	Rural Spending			Share of All Rural Spending
	Rural Participants	Urban Participants	All Participants	
	---------- $ ----------			-- % --
Resident Hunters[a]	42,493,000	32,852,000	75,345,000	28.8
group percent	56.4	43.6		
Resident Anglers	74,696,000	63,369,000	138,065,000	52.7
group percent	54.1	45.9		
Total Resident	117,189,000	96,221,000	213,410,000	81.5
group percent	54.9	45.1		
Nonresident Hunters	8,979,000	18,294,000	27,273,000	10.4
group percent	32.9	67.1		
Nonresident Anglers	7,380,000	13,794,000	21,174,000	8.1
group percent	34.9	65.1		
Total Nonresident	16,359,000	32,088,000	48,447,000	18.5
group percent	33.8	66.2		
Total, all groups	133,548,000	128,309,000	261,857,000	100.0
group percent	51.0	49.0		

[a] Includes deer muzzleloader, but excludes spring turkey regular and gratis hunting groups.

Comparison of Spending in 1996 and 2001

Average season expenditures, total expenditures by hunting and fishing survey groups, and statewide economic effects from hunter and angler expenditures in 2001 were compared to those in 1996. Data from Lewis et al. (1998) was used to generate expenditure estimates for hunting and fishing survey groups using the same methods employed in this study. Thus, estimates of hunter and angler expenditures in 1996, developed for comparison in this study, will differ from those published by Lewis et al. (1998). Expenditures made in 1996 were adjusted to reflect 2001 dollar equivalents using the CPI (U.S. Department of Labor 2002).

Total direct expenditures, which represent the sum of all hunter and angler spending, are a function of the number of hunters and anglers and average season spending. Changes in either component will affect total direct expenditures. When comparing total direct expenditures between periods, changes in both participation levels and average season spending must be examined.

Season Expenditures

Compared to spending in the 1996-97 season, after adjusting for inflation, average season expenditures for resident antelope hunters increased in the 2001-02 season (Table 31). Antelope gratis hunters increased their average season expenditures by 69 percent, while archery antelope and firearm antelope hunters increased their average season expenditures by 40 percent and 31 percent, respectively.

Resident archery deer and firearm deer hunters also both increased their average season spending from 1996-97 to 2001-02 (Table 31). Firearm deer hunters increased their average spending by 24 percent, while gratis deer hunters had a modest 2 percent decrease in average season spending over the period. Resident furbearer hunters also had a modest 2 percent decrease in average season spending.

Resident upland and waterfowl hunters spent on average 7 percent more in 2001-02 than in 1996-97 (Table 31). Fall turkey hunters had substantial increases in average season spending between the 1996-97 and 2001-02 periods. Fall turkey gratis hunters had the largest percentage increase (125 percent) in average spending of all resident hunting groups.

Nonresident firearm deer and archery antelope hunters posted modest declines in average season spending of 1 percent and 3 percent, respectively (Table 31). However, nonresident archery deer hunters increased their average season spending in the 2001-02 season by nearly $380 or 48 percent more than average spending in the 1996-97 season. Nonresident anglers spent less on average (10 percent) during the 2001-02 season than in the 1996-97 season. Nonresident small game hunters in 2001-02 increased their average spending by 7 percent over 1996-97 season spending levels.

Table 31. Comparison of Average Variable, Fixed, and Total Season Expenditures, by Activity, North Dakota, 1996-1997 and 2001-2002

Category	1996-1997 Season Expenditures[a]			2001-2002 Season Expenditures			Change in Total
	Variable	Fixed	Total	Variable	Fixed	Total	
Resident	---------- 2001 $ ----------						
Antelope							
Archery	254.66	385.35	640.01	265.46	629.61	895.07	40%
Firearm	240.15	112.60	352.75	266.53	196.13	462.66	31%
Gratis	50.97	60.62	111.59	72.60	116.51	189.11	69%
Deer[b]							
Archery	302.96	297.51	600.47	272.22	361.87	634.09	6%
Firearm	217.64	129.12	347.76	219.50	211.26	430.76	24%
Gratis	140.11	87.26	227.37	137.87	84.54	222.41	-2%
Special Big Game	729.88	167.31	897.19	659.87	268.99	928.86	4%
Furbearer	240.43	343.00	583.43	197.51	372.82	570.33	-2%
Small Game							
Upland	448.64	224.97	673.61	326.66	395.90	722.56	7%
Waterfowl	392.05	364.20	756.25	374.50	435.23	809.73	7%
Fall Turkey[b]							
Regular	94.96	75.93	170.89	108.01	132.93	240.94	41%
Gratis	36.28	20.41	56.69	61.89	65.63	127.52	125%
Fishing							
Open Water	586.82	1,265.60	1,852.42	688.21	1,351.34	2,039.55	10%
Ice	232.70	325.89	558.59	274.10	344.91	619.01	11%
Darkhouse Spearing	na	na	na	172.49	278.34	450.83	na
Nonresident							
Antelope Archery	568.82	146.39	715.21	594.81	101.28	696.09	-3%
Deer							
Archery	689.15	98.62	787.77	987.64	181.98	1,169.62	48%
Firearm	421.42	76.95	498.37	401.03	90.33	491.36	-1%
Small Game	646.49	74.61	721.10	640.77	127.22	767.99	7%
Fishing	515.77	470.22	985.99	570.59	313.04	883.63	-10%

na=not available

[a] Adjusted for inflation to reflect 2001 dollars using the CPI (U.S. Department of Labor 2002).

[b] Muzzleloader, spring turkey regular, and spring turkey gratis categories were not surveyed in 2001. As a result, estimated season expenditures were assumed to be equal to the 1996 expenditures after adjusting for inflation, and were not included for comparison between 1996 and 2001.

Overall, 14 of the 19 hunting and fishing groups examined increased average season expenditures from 1996-97 to 2001-02 seasons (Table 31). Five groups spent less on average per participant during the 2001-02 season than in the 1996-97 season. Archery hunters, as a group, with the exception of nonresident antelope hunters, had increases in average season spending over the period. Small game hunters, both resident and nonresident, had increases in average spending over the period. Resident anglers increased their average season spending over the period; however, nonresident anglers decreased their average season spending.

Hunter and Angler Participation

In general, antelope hunting was the only category with fewer licenses sold in 2001-02 than in 1996-97 (Table 32). License sales declined by 21 percent for resident archery antelope hunters, 49 percent for firearm antelope hunters, and 53 percent for gratis antelope hunters. All other license types and survey groups had increased license sales from 1996-97 to 2001-02.

The number of active participants generally paralleled changes in license sales (Table 32). A substantial decline in the number of antelope licenses available led to a 42 percent decrease in the number of resident antelope hunters from 1996-97 to 2001-02. The number of special big game hunters increased by 50 percent, expanding from 250 hunters in 1996-97 to 375 hunters in 2001-02. Sales of all types of resident deer licenses increased from 1996-97 to 2001-02 (Table 32). As a result, the number of resident deer hunters in 2001-02 was over 6 percent more than in 1996-97.

While the total number of licenses sold that would allow individuals to pursue furbearers increased by 25 percent from 1996-97 to 2001-02, the number of individuals actively hunting furbearers in the state decreased by 10 percent. Similarly, while the sales of licenses that would allow residents to hunt upland game and waterfowl in the state increased over the period, the number of resident waterfowl hunters decreased 9 percent from 1996-97 to 2001-02. However, the number of resident upland game hunters increased by 3 percent (Table 32).

Resident turkey license sales and the number of turkey hunters both doubled from 1996-97 to 2001-02. The number of resident anglers participating in open water fishing increased by 14 percent from 1996-97 to 2001-02, while the number of resident anglers participating in ice fishing increased 43 percent over the period (Table 32).

All categories of nonresident hunting and angling had increases in license sales and number of active participants (Table 32). Nonresident antelope hunters increased by 4 individuals from 1996-97 to 2001-02. The number of nonresident deer hunters increased by 68 percent from 1996-97 to 2001-02. However, the biggest increase in nonresident hunters was in the area of upland game and waterfowl hunting. Nonresident small game hunters increased by 110 percent over the period, going from about 19,700 individuals to over 41,300 individuals. The number of nonresident anglers also increased substantially (103 percent) over the period, going from about 17,750 individuals in 1996-97 to nearly 36,100 individuals in 2001-02 (Table 32).

Table 32. Comparison of License Sales and Active Participants, by Activity, North Dakota, 1996-1997 and 2001-2002

	1996-1997 Season		2001-2002 Season		Percentage Change 1996-97 to 2001-02	
Activity	Licenses	Participants	Licenses	Participants	Licenses	Participants
Resident						
Antelope						
Archery	1,169	1,076	922	813	-21	-24
Firearm	1,607	1,534	821	787	-49	-49
Gratis	713	575	334	257	-53	-55
Deer						
Archery	11,172	10,575	11,903	11,247	7	6
Firearm	86,226	84,855	95,368	88,583	11	4
Gratis	8,931	7,655	11,137	9,064	25	18
Muzzleloader	700	648	1,717	1,586	145	145
Special Big Game	256	250	386	375	51	50
Furbearer	40,340	28,469	50,389	25,708	25	-10
Small Game						
Upland	60,714	51,021	66,954	52,749	10	3
Waterfowl	60,714	38,627	66,954	35,215	10	-9
Wild Turkey						
Fall Regular	3,007	2,463	6,191	4,931	106	100
Fall Gratis	234	150	448	319	91	113
Spring Regular	1,335	1,197	2,672	2,376	100	98
Spring Gratis	110	78	304	216	176	177
Fishing						
Open Water	116,114	102,375	136,262	116,828	17	14
Ice	116,114	35,625	136,262	50,948	17	43
Darkhouse Spearing	na	na	1,287	930	na	na
Nonresident						
Antelope Archery	83	83	90	87	8	5
Deer						
Archery	694	674	1,325	1,260	91	87
Firearm	932	908	1,510	1,399	62	54
Small Game	19,848	19,707	41,702	41,329	110	110
Fishing	18,123	17,757	40,353	36,099	123	103

na=not available

Total Direct Expenditures

As a result of increased average per person season spending in most hunting and fishing survey groups and increased number of hunters and anglers in most groups, total direct expenditures in North Dakota increased by $106 million or 29 percent from 1996-97 to 2001-02 (Table 33). Expenditures for nondurable goods increased by 28 percent and purchases of durable goods increased by 31 percent. The greatest increase in spending between 1996-97 and 2001-02 came from durable good purchases, which increased by nearly $62 million and represented 58 percent of the increase in total spending by all hunters and anglers.

Total direct expenditures by resident hunters and anglers in 2001-02 increased by $73 million or 22 percent from 1996-97. Total direct expenditures by nonresident hunters and anglers in 2001-02 increased by $33 million or 101 percent from 1996-97 (Table 33). Expenditures for hunting (resident and nonresident) increased by $31 million or 23 percent from 1996-97 to 2001-02. Expenditures for fishing (resident and nonresident) increased by $75 million or 33 percent over the period (Table 33).

Expenditures by resident hunters increased by $12.3 million or 10 percent, while expenditures by nonresident hunters increased by $18.7 million or 123 percent (Table 33). Expenditures by nonresident anglers increased by $14.4 million or 82 percent, while expenditures by resident anglers increased by $60.7 million or 29 percent (Table 33).

Table 33. Comparison of Total Direct Expenditures, by Residence and Activity, North Dakota, 1996-1997 and 2001-2002

	Total Direct Expenditures		Change from 1996-97 to 2001-02	
Category	1996-1997	2001-2002	Dollars	Percent
All Activities	---------- 000s 2001 $ ----------			
Variable Expenses	160,074	204,393	44,319	27.7
Fixed Expenses	202,389	264,123	61,734	30.5
Total	362,463	468,515	106,052	29.3
All Activities				
Residents	329,701	402,655	72,954	22.1
Nonresidents	32,762	65,860	33,098	101.0
All Hunting	135,412	166,384	30,972	22.9
Residents	120,159	132,421	12,262	10.2
Nonresidents	15,254	33,962	18,708	122.6
All Fishing	227,050	302,132	75,082	33.1
Residents	209,542	270,234	60,692	29.0
Nonresidents	17,508	31,898	14,390	82.2

Note: Totals may not add due to rounding.

The relative contribution of various hunting and fishing categories to total expenditures from all hunting and fishing activities was examined for the 1996-97 and 2001-02 seasons (Table 34). In 1996-97, spending by hunters comprised 37 percent of all direct expenditures, compared to 36 percent of all direct expenditures in 2001-02. Spending by resident hunters comprised 33 percent all direct expenditures in 1996-97 compared to 28 percent of all expenditures in 2001-02. The share of total direct expenditures by nonresident hunters went from 4 percent in 1996-97 to 7 percent in 2001-02.

In 1996-97, spending by resident and nonresident anglers comprised 63 percent of all direct expenditures, compared to 64 percent of all direct expenditures in 2001-02. Spending by resident anglers comprised 58 percent all direct expenditures in 1996-97 and in 2001-02. The share of total direct expenditures by nonresident anglers went from 5 percent in 1996-97 to 7 percent in 2001-02 (Table 34).

Total spending by resident hunters and anglers represented 91 percent of all hunter and angler direct expenditures in 1996-97. In 2001-02, resident spending represented 86 percent of all expenditures. Nonresident spending went from comprising 9 percent of total expenditures in 1996-97 to 14 percent of the total in 2001-02 (Table 34).

Table 34. Resident and Nonresident Expenditures as a Percentage of Total Direct Expenditures and Percentage of Activity, North Dakota, 1996-1997 and 2001-2002

	Percentage of All Direct Expenditures	
Category	1996-1997	2001-2002
Hunting	37.4	35.5
Resident	33.2	28.3
Nonresident	4.2	7.2
Fishing	62.6	64.5
Residents	57.8	57.7
Nonresidents	4.8	6.8
All Resident Expenditures	91.0	85.9
All Nonresident Expenditures	9.0	14.1
	Percentage of Category by Residence	
	1996-1997	2001-2002
Hunting		
Residents	88.7	79.6
Nonresidents	11.3	20.4
Fishing		
Residents	92.3	89.4
Nonresidents	7.7	10.6

Changes in total direct expenditures for the various hunter and angler survey groups ranged from an increase of 379 percent for fall gratis turkey hunters to a decrease of nearly 33 percent for resident firearm antelope hunters from 1996-97 to 2001-02 (Table 35). Only four survey groups had less total spending in 2001-02 than in 1996-97. Corresponding closely with decreased number of participants, total direct expenditures from resident firearm antelope, gratis antelope, furbearer, and waterfowl hunters decreased by 33 percent, 24 percent, 12 percent, and 2 percent, respectively.

Total direct expenditures by resident deer hunters increased by 12 percent for archery hunters to 145 percent for muzzleloader hunters from 1996-97 to 2001-02 (Table 35). Resident deer hunters spent over $10 million more in 2001-02 than in 1996-97. Total direct expenditures by special big hunters increased by 55 percent over the period, which paralleled the increase in active participants (which increased 50 percent).

Total spending by resident waterfowl hunters decreased 2 percent from 1996-97 to 2001-02; however, total direct expenditures by upland game hunters increased by nearly 11 percent (Table 35). Total spending for resident small game hunters (upland and waterfowl) increased by 5 percent.

Total direct expenditures by all resident turkey hunters increased by 151 percent from 1996-97 to 2001-02. Fall gratis turkey hunters had the greatest increase (379 percent) in total spending of any hunting or fishing category.

Resident anglers participating in open water fishing spent $48.6 million more in 2001-02 than in 1996-97, which was the largest monetary increase of any hunting or angling survey group. Total direct expenditures for resident ice fishing activities increased by nearly 59 percent or $11.6 million from 1996-97 to 2001-02.

Corresponding with a small increase in hunter participation, total spending by nonresident archery antelope hunters increased by 2 percent over the period. However, spending in other categories of nonresident activities increased substantially (Table 35). Total direct expenditures by nonresident archery deer hunters increased by $0.9 million or 178 percent from 1996-97 to 2001-02 and nonresident firearm deer hunter expenditures increased 52 percent. Nonresident angler expenditures, which included open water and ice fishing, increased by $14.4 million or 82 percent over the period. Similarly, nonresident small game hunter expenditures, which includes upland game and waterfowl hunting, increased by $17.5 million or 123 percent over the period (Table 35).

Table 35. Comparison of Total Direct Hunter and Angler Expenditures, by Hunting and Fishing Activity, North Dakota, 1996-1997 and 2001-2002

	Total Direct Expenditures		Change from 1996-97 to 2001-02		Percentage of Total Direct Expenditures	
Activity	1996-1997	2001-2002	Dollars	Percent	1996-97	2001-02
Resident	---------- 000s 2001 $ ----------					
Antelope						
Archery	688.7	727.7	39.0	5.7	0.19	0.16
Firearm	541.1	364.1	(177.0)	-32.7	0.15	0.08
Gratis	64.2	48.6	(15.6)	-24.3	0.02	0.01
Deer						
Archery	6,350.0	7,131.4	781.4	12.3	1.75	1.52
Firearm	29,424.5	38,157.5	8,733.0	29.7	8.12	8.14
Gratis	1,740.6	2,015.8	275.2	15.8	0.48	0.43
Muzzleloader[a]	200.4	490.5	290.1	144.8	0.06	0.10
Special Big Game	224.3	348.3	124.0	55.3	0.06	0.07
Furbearer	16,609.9	14,662.1	(1,947.8)	-11.7	4.58	3.13
Small Game						
Waterfowl	29,211.6	28,514.2	(697.4)	-2.4	8.06	6.09
Upland	34,368.4	38,114.9	3,746.5	10.9	9.48	8.14
Wild Turkey						
Fall Turkey	420.9	1,188.2	767.3	182.3	0.12	0.25
Fall (Gratis)	8.5	40.7	32.2	378.8	0.00	0.01
Spring Turkey[a]	293.4	582.4	289.0	98.5	0.08	0.12
Spring Gratis[a]	12.6	35.0	22.4	177.8	0.00	0.01
Fishing						
Open Water	189,642.3	238,276.9	48,634.6	25.6	52.32	50.86
Ice	19,899.9	31,537.9	11,638.0	58.5	5.49	6.73
Darkhouse Spearing	na	419.3	na	na	na	0.09
Nonresident						
Antelope Archery	59.4	60.6	1.2	2.0	0.02	0.01
Deer						
Archery	531.0	1,473.7	942.7	177.6	0.15	0.31
Firearm	452.5	687.4	234.9	51.9	0.12	0.15
Small Game	14,210.7	31,740.7	17,530.0	123.4	3.92	6.77
Fishing	17,508.3	31,897.7	14,389.4	82.2	4.83	6.81

na=not available

[a] These groups were not surveyed in 2001. Average season expenditures in 2001 were set to the 1996 average expenditures after adjusting for inflation. The change in total direct expenditures depicted in the table for these groups between 1996 and 2001 is due only to a change in hunter participation.

Total Economic Effects

The North Dakota Input-Output Model was used to develop estimates of secondary economic effects (i.e., multiplier effects), gross business volume (i.e., sum of direct and secondary effects in all economic sectors), secondary employment, and state-level tax collections. Total direct expenditures from all hunting and fishing activities were allocated to various sectors of the North Dakota Input-Output Model (see Table 4).

Generally, the percentage change in secondary and total economic effects between the 1996-1997 and 2001-2002 seasons paralleled the percentage change in total direct expenditures in those seasons (Table 36). Total direct expenditures increased about 29 percent from 1996-97 to 2001-02. Secondary and total economic effects increased by 31 percent and 30 percent, respectively.

Total direct expenditures from all hunting and fishing activities in North Dakota for the 2001-2002 season generated about $545 million in secondary economic effects. By comparison, hunting and fishing activities generated $417 million in secondary economic effects in the 1996-1997 season. Secondary or multiplier effects throughout the North Dakota economy increased $128 million from 1996-97 to 2001-02 (Table 36).

The total economic effect (i.e., direct and secondary effects in all sectors) of resident and nonresident hunter and angler expenditures in North Dakota in 2001-02 was estimated to be about $1 billion. By comparison, the total economic effect from the same activities in 1996-97 were estimated at $780 million. Hunting and fishing activities produced an increase of $234 million in total business activity within the state over the period (Table 36).

The gross business volume (i.e., direct and secondary effects) resulting from hunting activities in the state from 1996-97 to 2001-02 increased 23 percent or by $69 million (Table 36). The gross business volume from fishing activities over the period increased 34 percent or by $164 million. About 70 percent of the total change in gross business volume due to hunter and angler expenditures over the period was due to fishing activities (Table 36).

Other key economic measures, such as statewide retail trade activity, economy-wide personal income, and secondary employment, also changed proportionally to the increase in total direct expenditures (Table 36). Retail trade activity in the state, resulting from hunting and fishing activities, increased by $119 million from 1996-97 to 2001-02. Economy-wide personal income (i.e., wages, salaries, retained earnings from business owners) increased $50 million or 31 percent over the period. Secondary employment, which measures employment created by the volume of economic activity associated with hunting and fishing activities, but does not include those directly employed in hunting and fishing industries, increased from about 10,100 full-time equivalent (FTE) jobs in 1996-97 to about 13,100 FTE jobs in 2001-02 (Table 36). Collections of state taxes increased by $6.2 million over the period.

Table 36. Comparison of Total Economic Contribution of Resident and Nonresident Hunting and Fishing Activities in North Dakota, 1996-1997 and 2001-2002

Activity	1996-1997 Season[a]	2001-2002 Season	Change 1996-2001	
Hunting	---------- 000s $ ----------			- % -
Direct Expenditures	135,412	166,383	30,971	22.9
Secondary Effects	160,502	198,983	38,481	24.0
Gross Business Volume	295,914	365,367	69,453	23.5
Personal Income	61,561	77,159	15,598	25.3
Retail Trade	155,356	189,317	33,961	21.9
Secondary Employment[b]	4,194	5,103	909	21.7
State tax collections[c]	8,842	10,583	1,741	19.7
Fishing				
Direct Expenditures	227,050	302,132	75,082	33.1
Secondary Effects	256,511	345,917	89,406	34.9
Gross Business Volume	483,561	648,050	164,489	34.0
Personal Income	96,951	131,120	34,169	35.2
Retail Trade	277,047	362,448	85,401	30.8
Secondary Employment[b]	5,925	8,014	2,089	35.3
State tax collections[c]	15,471	19,942	4,471	28.9
Total Hunting and Fishing				
Direct Expenditures	362,462	468,517	106,055	29.3
Secondary Effects	417,013	544,900	127,887	30.7
Gross Business Volume	779,475	1,013,417	233,942	30.0
Personal Income	158,512	208,279	49,767	31.4
Retail Trade	432,403	551,765	119,362	27.6
Secondary Employment[b]	10,119	13,117	2,998	29.6
State tax collections[c]	24,313	30,525	6,212	25.6

[a] Adjusted for inflation to reflect 2001 dollars using the CPI (U.S. Department of Labor 2002).
[b] Secondary employment was measured as full-time equivalent jobs.
[c] State tax collections include sales and use, personal income, and corporate income taxes.

Summary

This study is a continuation of a series of studies which have periodically assessed the socio-economic aspects of hunting and angling in North Dakota. The purpose of this study was to estimate the characteristics, expenditures, and economic effects of hunters and anglers in North Dakota during the 2001-2002 season and compare current information to previous studies to identify trends in hunting and angling activities.

The ND Game and Fish Department conducted a mail survey of 29,034 resident hunters and anglers and 7,199 nonresident hunters and anglers to solicit information on their expenditures during the 2001-2002 season. Hunting and fishing activities were divided into 21 different categories, based on license type (i.e., resident, nonresident, gratis), game type (i.e., antelope, big game, deer, furbearers, turkey, upland, waterfowl, and fish), and, when applicable, by weapon type (i.e., archery and firearm). Across all hunting and fishing categories, 17,234 individuals responded to the survey and 2,472 mailings were undeliverable, resulting in an overall response rate of 51 percent.

Each survey group was mailed a questionnaire requesting information on purchases made within North Dakota in 2001 for a specific hunting or fishing activity. Additional information on residence, age, income, and other characteristics also was solicited. Expenses were categorized into variable or nondurable goods/services and fixed or durable goods. Average variable, fixed, and total (variable and fixed) expenditures per hunter and angler were estimated for each survey group.

Average expenditures by hunting and fishing participants were multiplied by the number of active participants to project total direct spending by hunters and anglers during the 2001-2002 season. Total direct expenditures were applied to the North Dakota Input-Output Model to generate estimates of secondary economic effects, gross business volume, secondary employment, and state tax collections.

The following sections provide highlights of the characteristics of hunting and fishing participants, average expenditures, total economic effects of hunting and fishing activities, and comparisons of key economic measures between 1996 and 2001.

Hunter and Angler Characteristics

- ✔ The typical resident hunter was 42 years old, lived in an community over 2,500 population, hunted 6 days per season in the state, and had a gross household income around $50,000.

- ✔ The typical resident angler was 47 years old, fished 18 days per year in the state, lived in an urban community, and had a gross household income around $50,000.

- ✔ The typical nonresident hunter was 44 years old, hunted 5 days per season in the state, lived in a community over 2,500 population, and had a gross household income around $70,000.

- ✔ The typical nonresident angler was 49 years old, fished 6 days per year in the state, lived in an urban community, and had a gross household income around $75,000.

Average Season Expenditures

Average individual spending for hunting and fishing participants was estimated for the 2001-2002 season. Average individual spending varied substantially across the survey groups. Gratis hunters, as a group, had the lowest total season expenditures and resident anglers had the highest season spending.

- ✔ The lowest average season spending ($128) was for fall gratis turkey hunters.

- ✔ The highest average season spending ($2,597) was for resident season-long anglers.

- ✔ Average season expenditures by resident and nonresident small game hunters were similar: resident upland game hunters averaged $723 per season, resident waterfowl hunters averaged $810 per season, and nonresident small game hunters (which included expenses for both upland and waterfowl hunting) averaged $768 per season.

- ✔ Average season expenditures by resident and nonresident firearm deer hunters were similar with $431 and $491 per season, respectively.

- ✔ Average season expenditures by resident and nonresident archery deer hunters were $634 and $1,170 per season, respectively. Nonresident archery deer hunters had the highest average per person spending of all hunting groups.

- ✔ Average season expenditures by resident and nonresident archery antelope hunters were $895 and $696 per season, respectively.

- ✔ Resident season-long anglers spent considerably more than their nonresident counterparts: $2,597 versus $884 per season, respectively.

- ✔ Special big game hunters had the highest average spending of all resident hunting groups: $929 per season.

Average Daily Expenditures

Average daily expenditures represent average total spending divided by the number of days of participation. Due to differences in season lengths, harvest opportunities, and typical

activities required for some types of hunting/fishing, average daily expenditures can be useful in providing a comparative measure of spending among activities.

- ✔ The lowest average daily spending ($49) was for fall gratis turkey hunters.

- ✔ The highest average daily spending ($311) was for resident big game hunters.

- ✔ Average daily expenditures by resident and nonresident small game hunters were similar: resident upland game hunters averaged $112 per day, resident waterfowl hunters averaged $140 per day, and nonresident small game hunters (which included spending for both upland and waterfowl hunting) averaged $155 per day.

- ✔ Average daily expenditures by resident and nonresident archery deer hunters were $88 and $191 per day, respectively. Nonresident archery deer hunters had the highest average daily spending of all nonresident hunting and fishing groups.

- ✔ Average daily expenditures by resident and nonresident firearm deer hunters were similar with $149 and $180, respectively.

- ✔ Average daily expenditures for resident and nonresident season-long anglers were nearly identical: $178 versus $179, respectively.

- ✔ Fifteen of the 21 survey groups had average daily expenditures between $100 and $200. Three groups averaged less than $100 per day and three groups averaged over $200 per day.

Total Direct Expenditures

The amount of total expenditures incurred in North Dakota by hunters and anglers is a function of the number of participants and average spending per participant. Total participants in each hunting and fishing activity were multiplied by the average season expenditures to arrive at an estimate of total hunter and angler expenditures.

- ✔ Resident hunters spent $132 million in North Dakota in 2001-2002.
  - ✓ Small game hunters spent $67 million and accounted for 50 percent of all resident hunter expenditures.
  - ✓ Deer hunters spent $48 million and accounted for 36 percent of all resident hunter expenditures.
  - ✓ Furbearer hunters spent $15 million and accounted for 11 percent of all resident hunter expenditures.
  - ✓ Turkey, antelope, and big game hunters accounted for 3 percent of all resident hunter expenditures.

- ✔ Resident anglers spent $270 million in North Dakota in 2001-2002.
  - ✓ Open water fishing accounted for 88 percent of all resident angler spending.
  - ✓ Ice fishing accounted for nearly 12 percent of all resident angler spending.

- ✔ Nonresident hunters spent $34 million in North Dakota in 2001-2002.
  - ✓ Small game hunters spent $32 million ($11 million was spent hunting upland game and $21 million was spent hunting waterfowl) and accounted for 93 percent of all nonresident hunter expenditures in 2001-2002.

- ✔ Nonresident anglers spent $32 million in North Dakota in 2001-2002.
  - ✓ Open water fishing accounted for 73 percent of all nonresident angler spending.
  - ✓ Ice fishing accounted for 27 percent of all nonresident angler spending.

- ✔ Total resident hunter and angler spending was estimated at $403 million in North Dakota in 2001-2002.

- ✔ Total nonresident hunter and angler spending was estimated at $66 million in North Dakota in 2001-2002.

- ✔ All hunter and angler spending was estimated at nearly $469 million (excluding license purchases) in North Dakota in 2001-2002.

- ✔ Total license purchases by resident and nonresident hunters and anglers was $10.2 million, with resident and nonresident license purchases accounting for 49 percent and 51 percent of the total, respectively.

Total Economic Effects

Total direct expenditures from hunting and fishing were used in the North Dakota Input-Output Model to develop estimates of secondary economic effects (i.e., multiplier effects), gross business volume (i.e., sum of direct and secondary effects in all economic sectors), secondary employment, and state-level tax revenues. These key economic measures are used to highlight the economic importance of hunting and fishing to the state economy.

- ✔ Expenditures by resident hunters generated:
  - ✓ $154 million in secondary economic effects
  - ✓ $287 million in gross business volume
  - ✓ about 3,800 full-time equivalent jobs
  - ✓ nearly $8.6 million in state tax collections
- ✔ Expenditures by resident anglers generated:
  - ✓ $307 million in secondary economic effects
  - ✓ $577 million in gross business volume
  - ✓ about 6,900 full-time equivalent jobs
  - ✓ nearly $18 million in state tax collections

- ✔ Expenditures by nonresident hunters generated:
  - ✓ $45 million in secondary economic effects
  - ✓ $79 million in gross business volume
  - ✓ about 1,300 full-time equivalent jobs
  - ✓ nearly $2 million in state tax collections

- ✔ Expenditures by nonresident anglers generated:
  - ✓ $39 million in secondary economic effects
  - ✓ $71 million in gross business volume
  - ✓ about 1,100 full-time equivalent jobs
  - ✓ nearly $2 million in state tax collections

- ✔ Expenditures associated with all hunting activities generated:
  - ✓ $199 million in secondary economic effects
  - ✓ $365 million in gross business volume
  - ✓ about 5,100 full-time equivalent jobs
  - ✓ about $10.5 million in state tax collections

- ✔ Expenditures associated with all fishing activities generated:
  - ✓ $346 million in secondary economic effects
  - ✓ $648 million in gross business volume
  - ✓ about 8,000 full-time equivalent jobs
  - ✓ about $19.9 million in state tax collections

- ✔ The total economic effects of all hunting and fishing activities in the state in 2001-2002 were estimated at:
  - ✓ $467 million in direct expenditures
  - ✓ $545 million in secondary economic effects
  - ✓ $1 billion in gross business volume
  - ✓ 13,100 full-time equivalent jobs
  - ✓ $30.5 million in state tax collections

Spending in Rural Areas

Hunters and anglers were asked to indicate the percentage of expenditures made in rural areas in an attempt to better understand the distribution of hunter and angler spending within the state. The percentage of expenditures made in rural areas was applied to average season expenditures for both rural and urban resident and nonresident hunters and anglers to determine total rural spending in 2001-2002.

- ✔ Resident hunters spent $75.3 million in rural areas of North Dakota.

- ✔ Resident anglers spent $138.1 million in rural areas of the state.

- ✔ Nonresident hunters spent $27.3 million in rural areas of the state.

- ✔ Nonresident anglers spent $21.2 million in rural areas of the state.

- ✔ Total expenditures by hunters and anglers in rural areas in 2001-2002 were estimated at $261.9 million or about 56 percent all direct expenditures made in the state.

Comparison of Spending in 1996 and 2001

Average season expenditures, total expenditures by hunting and fishing survey groups, and statewide economic effects from hunter and angler expenditures in 2001 were compared to those in 1996. Expenditures made in 1996 were adjusted to reflect 2001 dollar equivalents using the Consumer Price Index. Changes in total direct expenditures and the number of hunters and anglers from 1996 to 2001 also were examined.

- ✔ License sales increased for all survey groups, except resident antelope hunting.

- ✔ The number of participants increased in all but five hunting and fishing categories from 1996 to 2001.
  - ✓ Resident turkey hunter numbers doubled.
  - ✓ Resident big game hunter numbers increased 50 percent.
  - ✓ Resident deer hunter numbers increased 6 percent.
  - ✓ Resident small game hunter numbers decreased 2 percent.
  - ✓ Resident angler numbers increased 22 percent.
  - ✓ Nonresident deer hunter numbers increased 68 percent.
  - ✓ Nonresident small game hunter numbers increased 110 percent.
  - ✓ Nonresident angler numbers increased 103 percent.

- ✔ Average spending per participant increased in all but five survey groups from 1996 to 2001.
  - ✓ Average season spending increased for resident antelope, turkey, archery deer, firearm deer, special big game, and small game hunters. Spending decreased for resident furbearer and gratis deer hunters.
  - ✓ Average season spending increased for nonresident archery deer and small game hunters. Spending decreased for nonresident firearm deer and archery antelope hunters.
  - ✓ Average season spending increased for resident anglers, but decreased for nonresident anglers.

- ✔ Total direct expenditures from hunting activities increased by $31 million or by 23 percent from 1996 to 2001.
  - ✓ Total expenditures by resident hunters increased by $12.3 million (10 percent).
  - ✓ Total spending by nonresident hunters increased by $18.7 million (123 percent).

- ✔ Total direct expenditures from fishing activities increased by $75 million or by 33 percent from 1996 to 2001.
  - ✓ Total expenditures by resident anglers increased by $60.7 million (29 percent).
  - ✓ Total spending by nonresident anglers increased by $14.4 million (82 percent).

- ✔ Total direct expenditures from all hunting and fishing activities increased by $106 million or by 29 percent from 1996 to 2001.
  - ✓ Total expenditures by residents increased by $73 million (22 percent).
  - ✓ Total spending by nonresidents increased by $33 million (101 percent).

- ✔ Gross business volume (direct and secondary effects) in North Dakota from all hunting and fishing activities increased by $234 million or by 30 percent from 1996 to 2001.

Conclusions

The increase in popularity of hunting and fishing in the state during the 1990s has created new challenges for wildlife management officials and policymakers. Populations of most wildlife species increased during the 1990s, contributing to an increase in hunter and angler participation. Socio-economic information on hunters and anglers in the state has been periodically assessed since the late 1970s. This study represents a continuation of those efforts, and provides insights into hunter and angler characteristics and the economic effects of hunting and fishing on the state and rural economies.

Despite substantial increases in hunter and angler activity in North Dakota during the 1990s, some aspects of hunter and angler participation remain unchanged. Resident and nonresident hunters and anglers are participating about the same number of days and traveling the same distances as they did in the late 1980s and mid 1990s. Resident hunters and anglers continue to spend more time hunting and fishing in the state than nonresidents. Gross household incomes of nonresidents remain higher than residents. The majority of resident and nonresident hunters and anglers continue to be male, are in their early- to mid-40s, and hunt on private land. Recent changes in characteristics of hunters and anglers included a substantial increase in gross household incomes for both resident and nonresident participants and an increase in the percentage of resident hunters and anglers living in urban communities.

Expenses for durable and nondurable goods used while hunting and fishing in North Dakota varied substantially among the activities surveyed. Generally, among the hunting categories, gratis hunters had the lowest per person spending and archery and big game hunters had the highest per person spending during the 2001-2002 season. However, resident anglers had the highest season expenditures of all activities surveyed. Due to the differences in season lengths and the inherent nature of some hunting and angling activities, spending levels will vary considerably between activities. Perhaps of greater importance than relative spending levels among the various hunting/fishing activities is the long-term trend in hunter and angler spending. Average per person spending in most hunting and angling activities, after adjusting for inflation,

increased from 1996 to 2001. In the five categories that had lower per person season expenditures, total spending in those groups represented a small portion (7 percent) of all expenditures. Thus, average per person spending increased in the hunting and fishing categories that contribute the most to the state economy.

Comparisons between resident and nonresident per person season spending yielded several similarities and differences. The biggest disparity in per person spending occurred in season-long fishing where residents spent 194 percent more than nonresidents. However, nonresident archery deer hunters spent 84 percent more than residents, but resident archery antelope hunters spent 29 percent more than nonresidents. Little difference in per person spending existed for resident and nonresident small game and firearm deer hunters. Average daily spending also varied substantially among the various hunting and fishing activities. Generally, average spending per day was higher for nonresidents; however, nonresidents typically hunt fewer days than residents. Despite a substantial difference in total per person spending between resident and nonresident anglers, spending per day between the two groups was nearly identical. As a rule of thumb, season spending levels per participant appear to be more influenced by the type of activity, than by the residence of the participant.

While some differences exist between resident and nonresident spending for similar activities, those differences have less effect on the state economy than the number of participants. On the margin, adding or subtracting an equal number of resident or nonresident participants in the same hunting/fishing activity has similar economic consequences to the state economy. However, those economic effects may not be evenly distributed throughout the state. The average nonresident hunter/angler tends to spend more in rural areas than urban resident hunters/anglers, while rural resident hunters/anglers tend to spend more in rural areas than nonresident hunters/anglers. Additional differences in spending between residents and nonresidents were evident in the type of expenditures. Nonresident hunters/anglers spend a greater proportion of their seasonal expenditures on nondurable good purchases, while residents spent a greater proportion of their seasonal expenditures on durable good purchases. Nonresidents have a slightly greater per person impact on some service providers, such as lodging, guides, and food, while residents have a greater influence on other services, such as taxidermy, repairs, meat processing, and veterinarian care.

The relative share of spending in the various hunting and fishing activities compared to total spending remained mostly unchanged from 1996 to 2001. In 2001, hunting continued to represent slightly more than one-third of all expenditures, and fishing continued to represent nearly two-thirds of all expenditures. Expenditures for the categories with the most participation, such as small game, deer, and fishing all maintained about the same percentage of total expenditures in 2001 as they did in 1996. For example, expenditures from small game and deer hunters represented about 21 percent and 11 percent, respectively, of all hunting and fishing expenditures in 1996 and in 2001. Thus, no single hunting or fishing category substantially changed its relative importance when compared to other activities from 1996 to 2001.

Two themes were evident when evaluating the change in total spending from 1996 through 2001. First, total expenditures, measured in percentage and monetary terms, for fishing increased more than total spending for hunting. Second, expenditures by nonresident hunters and anglers increased, in percentage terms, substantially more than spending by residents. However, in monetary terms, the combined increase in spending by resident hunters and anglers was over double that of nonresidents.

The number of individuals hunting and fishing in North Dakota has increased substantially in the last decade, due largely to increases in wildlife populations within the state. The increase in hunter and angler participation has substantially increased the economic importance of hunting and fishing to the state economy. While information on the economic effects of hunter and angler expenditures can be important in making decisions regarding wildlife management; economic information alone can not address all of the issues currently facing policymakers in the state. Hunting and fishing has grown into an economically important industry to North Dakota largely due to abundant wildlife populations. In the quest to capture economic activity from hunting and fishing activities, care should be exercised that hunting and fishing activities be managed such that the state can continue to benefit from growing wildlife populations and abundant hunting/fishing opportunities.

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APPENDIX A

Representative Expenditure Questionnaire

2001-2002 FURBEARER HARVEST SURVEY

North Dakota Game and Fish Department
Wildlife Division SFN 6463

DIRECTIONS: Please answer each of the questions as completely and accurately as you can. Give us your best estimate if you can't remember precisely. Information is compiled for summaries and averages and used for management purposes only. Please include information about your furbearer activities for the preceding twelve months.

1. **Did you purchase a North Dakota furbearer stamp or sportsman's license for the 2001-2002 season?**

   ☐ NO, If no, please stop here and return this questionnaire.

   ☐ YES

2. **Which of the following furbearers did you hunt, trap or snare during the past twelve months? (Please check all appropriate blanks.)**

	Fox	Coyote	Bobcat	Raccoon	Badger	Skunks	Beaver	Weasel	Muskrat	Mink
HUNT	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
TRAP	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
SNARE	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

3. **Please complete the following table for your activity the past twelve months.**

	NUMBER OF DAYS			COUNTY	NUMBER HARVESTED			NUMBER	NUMBER HARVESTED
	HUNTED	TRAPPED	SNARED	OF MOST ACTIVITY	HUNTED	TRAPPED	SNARED	SOLD	WITH MANGE
Fox									
Coyote									
Bobcat									
Raccoon									
Badger									
Skunks									
Beaver									
Weasel									
Muskrat									
Mink									

4. **Did you hunt fox or coyotes during the 2001-2002 night season?**

   ☐ YES ☐ NO

   a. How many of each species did you harvest at night? Red Fox_____ Coyotes_____

   b. How many of each species did you shoot at but not retrieve? Red Fox_____ Coyotes_____

- Please Complete Reverse Side -

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2001-2002 FURBEARER PARTICIPANT QUESTIONNAIRE (hunt, trap or snare)

North Dakota Game and Fish Department
Wildlife Division

The North Dakota Game and Fish Department would like to determine the economic activity generated by sportsmen and women in North Dakota. To do this we are asking a select group of hunters to fill out this survey and return it in the postage paid, self addressed envelope provided. Your best guesses are better than ours! Your cooperation is strictly voluntary. The information provided will be kept confidential and used to develop overall statistics only. Thank you for your cooperation!

PLEASE USE DARK INK

NOTICE
PLEASE return this survey within 15 days.

1. What is your age? _____ What is your gender? ___ Male ___ Female

2. Would you associate your primary residence with.....? (Check one)
___ City over 50,000 population
___ City between 2,500 and 50,000 pop.
___ Community under 2,500 population
___ Farm or ranch
___ Rural non-farm

3. What is your approximate annual household income? (before taxes and deductions)
___ $150,000 or more
___ $125,000-$149,999
___ $100,000-$124,999
___ $75,000-$99,999
___ $50,000-$74,999
___ $25,000-$49,999
___ $10,000-$24,999
___ Under $10,000

4. Indicate the percentage of furbearer activity you did on each land ownership type.
_____ Federal % _____ State % _____ Private % _____ Unknown % Total = 100%

5. Please provide your best estimate on the money you spent while pursuing furbearers in North Dakota in 2001-2002. Include your share of group expenses.

Food and beverages..... $ _____.00
Transportation..... $ _____.00
(gas, oil, vehicle repairs)
Miles traveled..... _____ miles
(for all trips)
Lodging..... $ _____.00
(Hotel, motel, campground fees)
Ammunition..... $ _____.00
Film..... $ _____.00
Taxidermy..... $ _____.00
Land access fees..... $ _____.00
Guiding fees..... $ _____.00
Other..... $ _____.00
(please specify)
_____

6. Please provide the cost of any of the following items you purchased in North Dakota in 2001-2002 for the ***2001-2002 Furbearer*** season.

Traps, Snares, supplies..... $ _____.00
(lures, scents, etc.)
Firearms..... $ _____.00
(rifles, muzzleloaders, handguns, etc.)
Binoculars, spotting or rifle.scope. $ _____.00
Skinning equipment..... $ _____.00
(stretchers, knives)
Predator calls..... $ _____.00
Clothing..... $ _____.00
(Used primarily for hunting, trapping, etc.)
Pickup, motorhome, ... $ _____.00
or other vehicle (ATV, snowmobile)
Camping equipment..... $ _____.00
Other equipment..... $ _____.00
(please specify)
_____

7. What percentage of your total expenditures listed in questions 5 and 6 above was spent in rural areas of North Dakota?
(communities under 2,500 in population) _____%

8. If you could put a dollar value on a typical day of pursuing furbearers in North Dakota, what would that dollar amount be? $ _____.00

9. If you pursued more than one type of furbearer, please allocate your expenses:
Fox..... _____%
Coyote..... _____%
Raccoon, Badger, Skunk, Bobcat. _____%
Beaver, Mink, Muskrat..... _____%
(Total=100%)

THANK YOU! If you have any suggestions or comments on how the North Dakota Game and Fish Department could improve furbearer hunting, trapping or furbearer management in the state, please enclose them on a separate sheet of paper.

2001 SMALL GAME AND WATERFOWL SURVEY
NORTH DAKOTA GAME AND FISH DEPARTMENT

100 N. BISMARCK EXPRESSWAY
BISMARCK, ND 58501-5095

Wildlife Division, SFN 6458 *(R8/99)*

NOTICE
PLEASE return this questionnaire within 5 days.

YOU MAY COMPLETE YOUR SURVEY AT
www.esurvey.cc/ndsmallgamehunter

PLEASE USE DARK INK

PLEASE answer ALL questions and return PROMPTLY. We would appreciate having you return this questionnaire even though you did NOT hunt or hunted unsuccessfully. Estimate the number of days hunted and game bagged if you do not recall the exact number. Report only game taken by you. Please record your answers in the appropriate boxes below. Thank you for your cooperation!

DID YOU BUY A SMALL GAME STAMP OR SPORTSMANS LICENSE..... ☐ YES ☐ NO

DID YOU BUY A FEDERAL DUCK STAMP?..... ☐ YES ☐ NO

DID YOU HUNT SMALL GAME? (Small game includes: Partridges, grouse, pheasants, tree squirrels, & cottontail rabbits) ☐ YES ☐ NO

DID YOU HUNT WOODCOCK?..... ☐ YES ☐ NO

HOW MANY DAYS DID YOU HUNT SMALL GAME?.....

DID YOU HUNT DUCKS OR GEESE?..... ☐ YES ☐ NO

HOW MANY DAYS DID YOU HUNT DUCKS OR GEESE?..

DID YOU HUNT SANDHILL CRANES?..... ☐ YES ☐ NO

DID YOU HUNT MOURNING DOVES?..... ☐ YES ☐ NO

DID YOU HUNT CROWS?..... ☐ YES ☐ NO

GENERAL HARVEST INFORMATION

(If you did not hunt a species, LEAVE BOXES BLANK.)

	NUMBER OF DAYS HUNTED	COUNTY HUNTED MOST (USE CHART)	NUMBER HARVESTED
HUNGARIAN PARTRIDGE			
SHARP-TAILED GROUSE			
SAGE GROUSE			
RUFFED GROUSE			
RING-NECKED PHEASANT			
WOODCOCK			
TREE SQUIRRELS			
COTTONTAIL RABBITS			
DUCKS			
GEESE			
SAND-HILL CRANES			
COOTS			
MOURNING DOVES			
CROWS			

DUCK HARVEST

	NUMBER BAGGED		NUMBER BAGGED
MALLARD		BLUE-WINGED TEAL	
GADWALL		GREEN-WINGED TEAL	
PINTAIL		REDHEAD	
WIDGEON		SCAUP	
SHOVELER		CANVASBACK	
WOOD DUCK		OTHERS	

GOOSE HARVEST

	NUMBER BAGGED
CANADA (LARGE & SMALL)	
SNOW	
BLUE	
WHITE-FRONTED (SPECKLEBELLY)	
OTHERS	

DO NOT INCLUDE harvest from SPRING or EARLY CANADA goose seasons. REGULAR SEASON ONLY

County Chart
Use the following county codes to complete this survey

Adams	01
Barnes	02
Benson	03
Billings	04
Bottineau	05
Bowman	06
Burke	07
Burleigh	08
Cass	09
Cavalier	10
Dickey	11
Divide	12
Dunn	13
Eddy	14
Emmons	15
Foster	16
Golden Valley	17
Grand Forks	18
Grant	19
Griggs	20
Hettinger	21
Kidder	22
LaMoure	23
Logan	24
McHenry	25
McIntosh	26
McKenzie	27
McLean	28
Mercer	29
Morton	30
Mountrail	31
Nelson	32
Oliver	33
Pembina	34
Pierce	35
Ramsey	36
Ransom	37
Renville	38
Richland	39
Rolette	40
Sargent	41
Sheridan	42
Sioux	43
Slope	44
Stark	45
Steele	46
Stutsman	47
Towner	48
Traill	49
Walsh	50
Ward	51
Wells	52
Williams	53
Unknown	99

44889

THANK YOU! Your participation helps preserve North Dakota wildlife resources

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2001 SMALL GAME HUNTER QUESTIONNAIRE
North Dakota Game and Fish Department
Wildlife Division

NOTICE
PLEASE return this survey within 5 days.

YOU MAY COMPLETE YOUR SURVEY AT
www.esurvey.cc/ndsmallgamehunter

The North Dakota Game and Fish Department would like to determine the economic activity generated by sportsmen and women *SMALL GAME* hunting in North Dakota. To do this we are asking a select group of hunters to fill out this survey and return it in the postage paid, self addressed envelope provided. Your best guesses are better than ours! Your cooperation is strictly voluntary. The information provided will be kept confidential and used to develop overall statistics only. Thank you for your cooperation!

PLEASE USE DARK INK

SMALL GAME IS BOTH UPLAND AND WATERFOWL

SORT CODE - PLEASE DO NOT WRITE IN THIS SPACE

1. What is your age? ☐☐ What is your gender? ☐ Male ☐ Female

2. Would you associate your primary residence with.....? (Check one)

☐ City over 50,000 population ☐ Community under 2,500 population ☐ Rural non-farm
☐ City between 2,500 and 50,000 pop. ☐ Farm or ranch

3. What is your approximate annual household income? (before taxes and deductions)

☐ $150,000 or more ☐ $75,000-$99,999 ☐ $10,000-$24,999
☐ $125,000-$149,999 ☐ $50,000-$74,999 ☐ Under $10,000
☐ $100,000-$124,999 ☐ $25,000-$49,999

4. Indicate the percentage of small game hunting you did on each land ownership type.

Federal ☐☐☐% State ☐☐☐% Private ☐☐☐% Unknown ☐☐☐% Total = 100%

5. Please provide your best estimate on the money you spent <u>while small game hunting in North Dakota</u> in 2001. Include your share of group expenses.

Food and beverages	$ .00	Film	$ .00	Veterinarian (Dog care)	$ .00
Transportation (gas, oil, vehicle repairs)	$ .00	Taxidermy	$ .00	Repairs to equipment	$ .00
Miles traveled (for all trips)	miles	Land access fees	$ .00	Other *(please specify)*	$ .00
Lodging (Hotel, motel, campground fees)	$ .00	Guiding fees	$ .00		
Ammunition	$ .00	Meat processing	$ .00		

6. Please provide the cost of any of the following items you purchased <u>in North Dakota</u> in 2001 for the ***2001 Small Game*** season.

Weapons (Shotguns, etc.)	$ .00	Decoys	$ .00	Duck boats, canoes, motors, etc.	$ .00
Dogs	$ .00	Clothing-boots-waders (Used primarily for hunting)	$ .00	Camping equipment	$ .00
Binoculars or spotting scope	$ .00	Pickup, motorhome or other vehicle	$ .00	Other equipment *(please specify)*	$ .00

7. What percentage of your total expenditures listed in questions 5 and 6 above was spent in <u>rural areas</u> of North Dakota? (communities under 2,500 in population) ☐☐☐%

IMPORTANT
9. Please allocate your ***SMALL GAME*** hunting expenses: **Total = 100%**

Upland ☐☐☐% Waterfowl ☐☐☐%

8. If you could put a dollar value on a typical day of small game hunting in North Dakota, what would that dollar amount be? $ .00

10. How much money did you spend in North Dakota during the 2001 small game season **in addition** to that listed in Ques 5 and 6? $ .00

THANK YOU! If you have any suggestions or comments on how the North Dakota Game and Fish Department could improve small game hunting or small game management in the state, please enclose them on a separate sheet of paper.

Draft

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APPENDIX B

Procedure for Estimating Vehicle Expenses

Ownership costs attributable to a hunting and/or fishing activity for a vehicle not used exclusively for hunting and/or fishing are difficult to estimate. The ownership cost attributable to hunting and fishing for a vehicle used exclusively for that pursuit would be relatively straightforward. However, it is unlikely that most vehicles (e.g., pickup, sport utility, all terrain vehicle) are used only for hunting and fishing activities. As such, attributing the full ownership cost of a vehicle (i.e., multi-use asset) to a single use (i.e., hunting or fishing) grossly overstates ownership costs associated with hunting and fishing activities.

The questionnaire mailed to hunters and anglers asked for the cost of vehicle(s) purchased during the season for which the vehicle(s) was used. However, the questionnaire did not ask any additional information regarding the purchase, such as, if the vehicle was used exclusively for hunting/fishing or if the vehicle was used for other hunting or fishing activities not addressed by the questionnaire. For example, an individual who was mailed an upland game questionnaire and indicated a vehicle purchase could have also used the vehicle for waterfowl, turkey, deer, and antelope hunting, and the vehicle could also have been used for both summer and winter fishing. Given the shortcomings of the information provided by the questionnaire, a procedure to allocate a portion of vehicle purchases to specific hunting and fishing activities was developed.

Relatively few individuals purchase a vehicle each year compared to the number of individuals purchasing other hunting and fishing related gear. To avoid the problem of having too few observations (i.e., survey respondents that indicated a vehicle purchase), vehicle purchases were averaged over large groups. The groups included all resident hunters, resident anglers, resident gratis hunters, nonresident hunters, and nonresident anglers. The average vehicle expense in each of those groups was then assigned to the individual hunting or fishing categories in that group. For example, for resident hunters, the estimated average amount of vehicle purchases attributable to hunting was allocated to individual hunting categories, such as turkey, upland, waterfowl, deer, big game, antelope, and furbearer groups.

The process of determining an appropriate expense for vehicle purchases required having information on the number of days participated. Observations that included vehicle purchases were not used if the observation did not also report the number of days participated. All vehicle purchases of $1 to less than $250 were also excluded from the analysis since those amounts were not deemed sufficient to represent an actual vehicle purchase. It was perceived that individuals applying small amounts of expense for vehicle purchases on the questionnaire were not reporting actual vehicle purchases but were instead reporting an expense charge for use of their current vehicle. The questionnaire specifically asked only for the purchase price of vehicle(s) bought in North Dakota during the 2001-2002 season for use in hunting and/or fishing activities.

After removing observations with small dollar amounts for vehicle purchases ($1 to $249) and those observations without information on participation days, the total purchase value (i.e., sum of all vehicle purchases) in each group was determined (Appendix Table B1). Total purchase value was then divided by the number of observations that contained a vehicle purchase of $250 or more to estimate average purchase value. Average purchase cost for resident hunters,

resident anglers, gratis hunters, nonresident hunters, and nonresident anglers was $15,845, $11,780, $27,200, $16,786 and $13,796, respectively (Appendix Table B1).

Average purchase price per group was then divided by the total number of observations in each group with either $0 or $250 or more of vehicle purchases to arrive at an estimate of average purchase value per group respondent. Average vehicle purchase value per respondent for resident hunters, resident anglers, gratis hunters, nonresident hunters, and nonresident anglers was $834, $827, $615, $161, and $253, respectively (Appendix Table B1).

The total number of days of participation for each group was summed for the observations that had $0 or $250 or more of vehicle purchases. Total days of participation for the groups were 28,206, 28,041, 791, 7,133, and 2,847 for resident hunters, resident anglers, gratis hunters, nonresident hunters, and nonresident anglers, respectively. Days per year (365) was multiplied by the number of respondents with $0 or $250 or more of vehicle purchases to arrive at the total respondent-days per year. Total days of participation was divided by the total respondent-days per year to determine the average percentage of time per year that the vehicles were used for hunting and fishing. The percentage was then doubled, to account for potential multiple hunting/fishing uses, and because hunting/fishing use may be more demanding than other normal uses. The percentage was then multiplied by the average vehicle purchase value per respondent to arrive at an allocated vehicle expense per person for the five groups. Average vehicle purchase costs attributable to resident hunters, resident anglers, gratis hunters, nonresident hunters, and nonresident anglers were $31.28, $83.38, $12.07, $4.89, and $8.90, respectively (Appendix Table B1).

Appendix Table B1. Vehicle Expense Estimates for Resident Hunters, Resident Anglers, Gratis Hunters, Nonresident Hunters, and Nonresident Anglers, North Dakota, 2001-2002

Resident Groups			Nonresident Groups				
Gratis	Hunting	Fishing	Hunting	Fishing	Id	Formula	Explanation
697	8,879	2,603	2,860	721	a	count	Total survey respondents in each group
5	217	107	19	15	b	count	Survey respondents with positive vehicle expense[a]
221	4,122	1,524	1,286	443	c	count	Survey respondents that answered vehicle purchase portion of questionnaire[b]
$136,000	$3,438,378	$1,260,410	$318,937	$206,937	d	sum of "b"	Total value of vehicle purchases[b]
2.3%	5.3%	7.0%	1.2%	0.9%	e	b / c	Percentage of total survey respondents that made a vehicle purchase
$27,200	$15,845	$11,780	$16,786	$13,796	f	d / b	Average purchase value
$615	$834	$827	$161	$253	g	d / c	Average spent on vehicle purchases
791	28,206	28,041	7,133	2,847	h	sum of "c"	Total days participated in hunting/fishing activities
80,665	1,504,530	556,260	469,390	161,695	i	c * 365	Total person-year days of participation
1.0%	1.9%	5.0%	1.5%	1.8%	j	h / i	Percentage of total yearly vehicle ownership time that vehicle was used for hunting and fishing
$12.07	**$31.28**	**$83.38**	**$4.89**	**$8.90**	k	2 * j * g	Allocated vehicle expense per hunter and angler in each respective group

[a] Observations with $1 to less than $250 were excluded. Observations with vehicle expense of $250 or more were excluded if days of participation were missing.

[b] Survey respondents must also have included days of participation to have been included in the total.

APPENDIX C

New Wealth in Rural Areas

Outdoor recreation expenditures in rural areas can be assessed using an economic base approach. Economic base describes the industries, sectors, or common economic activities that bring "new" money into an area. Economic base data represent sales of goods and services produced within an area to entities outside the area (Leistritz 1998). The area in question can be any reasonable geographical unit--county, multi-county region, state, multi-state area, etc. Also, goods and services considered "sales to final demand" vary by area definition.

Economic base activities represent only a portion of all economic activity in an area. Other industries (sometimes called derivative or residentiary) are derived from the presence of basic (primary sector) industries (Hertsgaard et al. 1984). The spending and respending of economic base or primary sector dollars creates spillover (multiplier) effects, which in turn support other sectors of the economy. Outdoor recreation expenditures would be considered part of the tourism sector. At the state level, the tourism sector includes expenditures by out-of-state visitors for retail items (e.g., souvenirs, meals, clothing, gas, convenience items) and sales of business and personal services (e.g., tours, motel/hotel accommodations, campgrounds, guide fees). In North Dakota, the role outdoor recreation expenditures play in contributing to the economic base of the state is largely determined by whether expenditures are made from resident or nonresident recreationists. However, when an economy becomes smaller, such as a multi-county area, new wealth (i.e., increase in primary sector revenues) can come from both in-state and out-of-state sources.

Generally, all expenditures made by nonresident hunters would be considered new wealth, both to the local and state economy. Expenditures made by resident hunters can also be considered new wealth to a rural economy if the hunters do not live in the immediate region where the expenditures occur. In this case, resident expenditures would represent new wealth to the rural economy, but not necessarily to the state economy. For example, spending by a resident hunter, who lives in eastern North Dakota, but hunts in western North Dakota, would represent new wealth for the western region, but not new wealth for the state. The retention of hunting expenditures that would, in the absence of in-state hunting opportunities, otherwise leave the state would also be considered new wealth to the state. For example, if a resident hunter normally pursued upland game in another state but instead choose to pursue similar opportunities in North Dakota, those expenditures would be considered new wealth to the local and state economy. Similarly, if residents decide to pursue hunting activities rather than spend their discretionary income pursuing other recreation activities outside of the state, those expenditures would be considered new wealth to both the local and state economy. For example, if a hunter decides to pursue upland game in the state instead of traveling to Minnesota for a football game, then those expenditures incurred while upland game hunting would be considered new wealth. Alternatively, if a resident decides to go hunting rather than participating in another recreational activity within the state, those expenditures would be considered a shift in discretionary spending and would not represent new wealth to the state. While a shift in discretionary spending would not represent new wealth for the state, the expenditures could represent new wealth to a local/rural economy. For example, rather than attending a music concert in a major trade center, an individual instead decides to hunt upland game within the state. A number of factors must be considered when determining how much of the recreational expenditures captured in the state and

in local economies can be considered new wealth versus a shift in discretionary spending. In most cases, the rules governing the use of hunter expenditures discussed above would also apply to expenditures from other outdoor recreational activities (e.g., fishing, birdwatching).

Even though not all of the economic activity reported in this study represents new wealth to the North Dakota economy, especially in the case of resident hunter and angler spending, in-state opportunities for hunting and fishing can be credited with capturing/retaining much of the economic activity described in this report. In the absence of hunting and fishing opportunities existing within the state, residents would likely seek similar, and in some cases, alternative opportunities for recreation from out-of-state sources and the reduction in economic activity that would ensue would be considered an economic loss (leakage) to the state. Considering that North Dakota residents spent about $403 million on hunting and fishing activities in the state in 2001-02, if even a small percentage of those individuals decided to spend the discretionary income currently used for hunting and fishing in other states (i.e., either for hunting/fishing or in pursuit of other recreation), the economic loss to the state could be substantial. Economic leakage (loss of current spending) would especially impact rural economies, as a substantial percentage of spending from both rural and urban resident hunters and anglers occurs in rural areas of the state.

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APPENDIX D

Expenditure Listings for Hunting and Fishing Survey Groups

Measuring the amount and type of recreational expenditures associated with hunting and fishing activities within North Dakota was one of the primary goals of the study. Questionnaires for each survey group (e.g., archery deer, ice fishing) were designed to solicit information on expenditures specific to that activity. For example, open water fishing participants were not asked questions about ammunition or firearm purchases. Each group's questionnaire was specific in requesting only information on purchases made 1) within North Dakota and 2) for the activity and season specified on the questionnaire.

Durable goods usually represent items that can be used over several seasons or can be used numerous times over extended periods before replacement items are required. A few examples of durable goods for hunting and fishing include optics, weapons, fishing rods, clothing, boats, knives, decoys, ice augers, and so on. Purchases of durable goods are often classified as fixed expenses, since the cost of the item is not dependent upon activity levels (the cost of a knife is the same if the individual hunts 2 days or 20 days).

Nondurable goods generally represent items/services consumed or used in direct proportion to activity levels. A few examples of nondurable goods for hunting and fishing include bait, ammunition, gas, food, guide services, and so on. Purchases of nondurable goods are often classified as variable expenses, since the cost of the item is dependent upon activity levels (gas purchases should be proportional to the number of miles traveled).

Average season (total) variable expenditures, in each survey group, were determined by summing the average of the individual expenditure categories for each variable expense. Alternatively, expenses for gas, food, lodging, etc., were summed and divided by the number of observations to estimate average expense for each expenditure item. Those average expenses were then summed to arrive at average season variable expenses. (Observations in the data set also included zeros for no spending. Those observations were included in the averages). The method for determining average season variable expenses used in this study was identical to the method used by Lewis et al. (1998). However, the calculation of average vehicle, average season fixed, and average season total expenditures in this study differed from the methods used in past studies (see Estimation of Average Expenditures section on page 8).

Average daily variable and fixed expenses were estimated by dividing individuals' total variable and total fixed expenses by the number of days participated, and then averaging individuals' average daily variable and average daily fixed expenses for each survey group. Average daily total expenditures were the sum of average daily variable and average daily fixed expenses. Average daily spending estimates in the following tables will not equal seasonal expenses (variable, fixed, and total) divided by average days participated for the group due to differences in the number of observations within the data set that had both expenditure information and information on days participated. Average days participated was estimated for the entire survey group, and may not be the same as the average days participated for only those observations with variable, fixed, or variable and fixed expenditures.

Table D1. Resident Archery Antelope Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	0.41
Film	4.55
Food and Beverage	70.77
Guide	0.00
Lodging	29.92
Meat Processing	6.44
Taxidermy	14.00
Transportation	123.48
Other	15.89
Total Season Variable	265.46
Daily Season Variable	67.10
Fixed Expenses	
Binoculars/Optics	101.85
Camping Equipment	107.99
Clothing	114.80
Vehicle	31.28
Weapons	245.02
Other	28.67
Total Season Fixed	629.61
Daily Season Fixed	169.54
Total Season Expenses	895.07
Daily Season Total	236.64
Share of expenses spent in rural areas	61.6%
Average expenses in rural areas	551.39
Average days participated	4.83

Table D2. Resident Firearm Antelope Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	0.15
Ammunition	14.57
Film	3.89
Food and Beverage	56.03
Guide	0.09
Lodging	40.15
Meat Processing	33.15
Taxidermy	34.13
Transportation	82.53
Other	1.84
Total Season Variable	266.53
Daily Season Variable	157.87
Fixed Expenses	
Binoculars/Optics	50.78
Camping Equipment	9.86
Clothing	32.04
Vehicle	31.28
Weapons	67.71
Other	4.46
Total Season Fixed	196.13
Daily Season Fixed	114.51
Total Season Expenses	462.66
Daily Season Total	272.38
Share of expenses spent in rural areas	71.0%
Average expenses in rural areas	328.33
Average days participated	2.00

Table D3. Resident Gratis Antelope Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	0.00
Ammunition	6.47
Film	0.90
Food and Beverage	9.32
Guide	0.00
Lodging	1.37
Meat Processing	17.79
Taxidermy	14.25
Transportation	21.99
Other	0.51
Total Season Variable	72.60
Daily Season Variable	42.25
Fixed Expenses	
Binoculars/Optics	24.50
Camping Equipment	3.31
Clothing	10.08
Vehicle	12.07
Weapons	63.61
Other	2.94
Total Season Fixed	116.51
Daily Season Fixed	57.97
Total Season Expenses	189.11
Daily Season Total	100.22
Share of expenses spent in rural areas	87.2%
Average expenses in rural areas	164.93
Average days participated	2.53

Table D4. Resident Special Big Game Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	9.28
Ammunition	26.81
Film	9.72
Food and Beverage	120.61
Guide	11.81
Lodging	95.88
Meat Processing	96.07
Taxidermy	95.53
Transportation	183.19
Other	10.97
Total Season Variable	659.87
Daily Season Variable	222.61
Fixed Expenses	
Binoculars/Optics	68.37
Camping Equipment	15.23
Clothing	43.24
Vehicle	31.28
Weapons	89.11
Other	21.76
Total Season Fixed	268.99
Daily Season Fixed	88.01
Total Season Expenses	928.86
Daily Season Total	310.62
Share of expenses spent in rural areas	72.7%
Average expenses in rural areas	675.24
Average days participated	5.56

Table D5. Resident Archery Deer Hunter Expenditures, 2001-2002

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	3.39
Film	5.39
Food and Beverage	57.50
Guide	0.01
Lodging	8.86
Meat Processing	28.84
Taxidermy	25.09
Transportation	132.21
Other	10.93
Total Season Variable	272.22
Daily Season Variable	36.24
Fixed Expenses	
Binoculars/Optics	55.81
Camping Equipment	20.49
Clothing	94.30
Vehicle	31.28
Weapons	128.53
Other	31.46
Total Season Fixed	361.87
Daily Season Fixed	52.19
Total Season Expenses	634.09
Daily Season Total	88.43
Share of expenses spent in rural areas	55.5%
Average expenses in rural areas	351.82
Average days participated	13.09

Table D6. Resident Firearm Deer Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	0.81
Ammunition	18.89
Film	2.24
Food and Beverage	42.03
Guide	0.00
Lodging	6.92
Meat Processing	62.71
Taxidermy	13.81
Transportation	67.42
Other	4.67
Total Season Variable	219.50
Daily Season Variable	72.12
Fixed Expenses	
Binoculars/Optics	41.19
Camping Equipment	10.01
Clothing	40.50
Vehicle	31.28
Weapons	81.92
Other	6.36
Total Season Fixed	211.26
Daily Season Fixed	76.60
Total Season Expenses	430.76
Daily Season Total	148.72
Share of expenses spent in rural areas	61.3%
Average expenses in rural areas	264.13
Average days participated	4.42

Table D7. Resident Gratis Deer Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	0.00
Ammunition	11.51
Film	1.26
Food and Beverage	24.75
Guide	0.00
Lodging	3.14
Meat Processing	52.24
Taxidermy	13.43
Transportation	30.18
Other	1.36
Total Season Variable	137.87
Daily Season Variable	60.28
Fixed Expenses	
Binoculars/Optics	17.05
Camping Equipment	0.00
Clothing	20.95
Vehicle	12.07
Weapons	31.99
Other	2.48
Total Season Fixed	84.54
Daily Season Fixed	40.84
Total Season Expenses	222.41
Daily Season Total	101.12
Share of expenses spent in rural areas	79.2%
Average expenses in rural areas	176.07
Average days participated	3.63

Table D8. Resident Furbearer Expenditures, 2001-2002

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	1.94
Ammunition	26.61
Film	2.04
Food and Beverage	44.06
Guide	0.00
Lodging	8.72
Taxidermy	10.28
Transportation	102.50
Other	1.36
Total Season Variable	197.51
Daily Season Variable	40.02
Fixed Expenses	
Binoculars/Optics	86.47
Predator Calls	15.45
Camping Equipment	12.28
Clothing	59.42
Skinning Equipment	4.58
Vehicle	31.28
Traps	7.46
Weapons	151.99
Other	3.89
Total Season Fixed	372.82
Daily Season Fixed	85.19
Total Season Expenses	570.33
Daily Season Total	125.21
Share of expenses spent in rural areas	66.7%
Average expenses in rural areas	380.48
Average days participated	11.23
Percent expenses for coyote	50.4
Percent expenses for fox	31.1
Percent expenses for land fur	9.3
Percent expenses for water fur	9.2

Table D9. Resident Open Water Fishing Expenditures, 2001

Expenditure Category	Average per Angler
Variable Expenses	--- $ ---
Access Fees	5.76
Bait	45.07
Fuel (boat)	79.52
Film	8.75
Food and Beverage	186.08
Guide	2.50
Lodging	73.30
Meat Processing	3.85
Rental (equipment)	5.05
Repairs	65.15
Taxidermy	2.84
Transportation	206.74
Other	3.60
Total Season Variable	688.21
Daily Season Variable	44.57
Fixed Expenses	
Boat, Motor, Trailer	883.33
Underwater Cameras	6.05
Camping Equipment	136.24
Clothing	26.27
Fish/Depth Finders	47.02
Fishing Rods	80.72
Tackle	78.30
Vehicle	83.38
Other	10.03
Total Season Fixed	1,351.34
Daily Season Fixed	98.44
Total Season Expenses	2,039.55
Daily Season Total	143.01
Share of expenses spent in rural areas	49.8%
Average expenses in rural areas	1,015.15
Average days participated	18.39
Percent fished Devils Lake	18.7
Percent fished midsized reservoirs	12.7
Percent fished Missouri River system	37.6
Percent fished other rivers and streams	9.3
Percent fished small lakes/reservoirs	21.7

Table D10. Resident Ice Fishing Expenditures, 2001-2002

Expenditure Category	Average per Angler
Variable Expenses	--- $ ---
Access Fees	0.46
Bait	22.15
Fuel (heater)	28.74
Film	2.49
Food and Beverage	68.19
Guide	0.00
Lodging	13.38
Meat Processing	2.55
Rental (equipment)	0.11
Repairs	10.73
Taxidermy	4.41
Transportation	117.96
Other	2.93
Total Season Variable	274.10
Daily Season Variable	27.59
Fixed Expenses	
Ice Augers	41.86
Underwater Cameras	26.47
Clothing	24.78
Fish/Depth Finders	36.57
Fish Houses/Heaters	59.74
Fishing Rods	36.73
Tackle	31.19
Vehicle	83.38
Other	4.19
Total Season Fixed	344.91
Daily Season Fixed	49.45
Total Season Expenses	619.01
Daily Season Total	77.04
Share of expenses spent in rural areas	60.1%
Average expenses in rural areas	372.17
Average days participated	13.24
Percent fished Devils Lake	23.3
Percent fished midsized reservoirs	15.8
Percent fished Missouri River system	10.4
Percent fished other rivers and streams	4.4
Percent fished small lakes/reservoirs	46.1

Table D11. Resident Season-long Fishing Expenditures, 2001-2002

Expenditure Category	Average per Angler
Variable Expenses	--- $ ---
Access Fees	7.16
Bait	53.02
Fuel (boat, heater)	107.10
Film	8.60
Food and Beverage	188.99
Guide	1.43
Lodging	51.13
Meat Processing	6.22
Rental (equipment)	14.88
Repairs	77.41
Taxidermy	6.12
Transportation	234.11
Other	4.78
Total Season Variable	760.95
Daily Season Variable	43.23
Fixed Expenses	
Boat, Motor, Trailer	1,259.06
Ice Augers	25.17
Underwater Cameras	9.47
Camping Equipment	158.97
Clothing	33.41
Fish/Depth Finders	44.63
Ice House, Heaters	48.69
Fishing Rods	81.70
Tackle	80.84
Vehicle	83.38
Other	10.42
Total Season Fixed	1,835.74
Daily Season Fixed	134.75
Total Season Expenses	2,596.69
Daily Season Total	177.98
Share of expenses spent in rural areas	53.8%
Average expenses in rural areas	1,395.62
Average days participated	24.86
Percent assigned to ice fishing	23.5
Percent assigned to open water fishing	76.5

Table D12. Resident Darkhouse Spearing Expenditures, 2001-2002

Expenditure Category	Average per Person
Variable Expenses	--- $ ---
Access Fees	0.22
Bait	5.02
Fuel (heater)	17.10
Film	1.54
Food and Beverage	34.71
Guide	0.50
Lodging	3.86
Meat Processing	1.87
Rental (equipment)	27.77
Repairs	7.98
Taxidermy	1.62
Transportation	61.24
Other	9.06
Total Season Variable	172.49
Daily Season Variable	35.87
Fixed Expenses	
Ice Augers, Saws, Chisels	59.14
Clothing	9.01
Fish/Depth Finders/Underwater	19.25
Ice House, Heaters	46.82
Spears	30.38
Tackle, Decoys	20.36
Vehicle	83.38
Other	10.00
Total Season Fixed	278.34
Daily Season Fixed	80.26
Total Season Expenses	450.83
Daily Season Total	116.13
Share of expenses spent in rural areas	55.3%
Average expenses in rural areas	249.52
Average days participated	7.63

Table D13. Resident Fall Turkey Hunter Expenditures, 2001-2002

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	0.42
Ammunition	8.56
Film	1.94
Food and Beverage	28.60
Guide	0.06
Lodging	15.08
Meat Processing	0.52
Taxidermy	2.02
Transportation	50.17
Other	0.64
Total Season Variable	108.01
Daily Season Variable	47.26
Fixed Expenses	
Binoculars/Optics	17.76
Camping Equipment	11.14
Clothing	25.34
Vehicle	31.28
Weapons	41.96
Other	5.45
Total Season Fixed	132.93
Daily Season Fixed	60.33
Total Season Expenses	240.94
Daily Season Total	107.59
Share of expenses spent in rural areas	58.2%
Average expenses in rural areas	140.27
Average days participated	2.99

Table D14. Resident Gratis Fall Turkey Hunter Expenditures, 2001-2002

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	0.00
Ammunition	5.20
Film	0.70
Food and Beverage	19.76
Guide	0.00
Lodging	3.36
Meat Processing	0.35
Taxidermy	1.01
Transportation	31.11
Other	0.40
Total Season Variable	61.89
Daily Season Variable	17.83
Fixed Expenses	
Binoculars/Optics	17.37
Camping Equipment	0.00
Clothing	20.61
Vehicle	12.07
Weapons	14.04
Other	1.54
Total Season Fixed	65.63
Daily Season Fixed	31.66
Total Season Expenses	127.52
Daily Season Total	49.49
Share of expenses spent in rural areas	76.4%
Average expenses in rural areas	97.46
Average days participated	4.13

Table D15. Resident Upland Game Hunter Expenditures, 2001-2002

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	5.09
Ammunition	50.12
Film	3.87
Food and Beverage	73.04
Guide	1.92
Lodging	20.41
Meat Processing	10.59
Taxidermy	9.04
Transportation	134.82
Veterinarian/Dog Care	13.90
Other	3.86
Total Season Variable	326.66
Daily Season Variable	49.18
Fixed Expenses	
Binoculars/Optics	39.01
Camping Equipment	89.13
Clothing	82.59
Hunting Dog	18.76
Vehicle	31.28
Weapons	120.71
Other	14.42
Total Season Fixed	395.90
Daily Season Fixed	63.02
Total Season Expenses	722.56
Daily Season Total	112.20
Share of expenses spent in rural areas	50.9%
Average expenses in rural areas	367.98
Average days participated	8.64
Percent expenses for pheasant	76.7
Percent expenses for grouse	14.7
Percent expenses for other upland game	8.6

Table D16. Resident Waterfowl Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	1.31
Ammunition	68.36
Film	4.26
Food and Beverage	70.28
Guide	1.18
Lodging	14.85
Meat Processing	11.15
Repairs	20.18
Taxidermy	16.20
Transportation	149.98
Veterinarian/Dog Care	14.18
Other	2.57
Total Season Variable	374.50
Daily Season Variable	56.27
Fixed Expenses	
Binoculars/Optics	43.28
Camping Equipment	23.56
Clothing	88.11
Decoys	55.44
Duck Boat/Canoe/Motors	25.80
Hunting Dogs	29.15
Vehicle	31.28
Weapons	129.18
Other	9.43
Total Season Fixed	435.23
Daily Season Fixed	83.91
Total Season Expenses	809.73
Daily Season Total	140.18
Share of expenses spent in rural areas	51.7%
Average expenses in rural areas	418.31
Average days participated	8.51
Percent expenses for geese	52.8
Percent expenses for ducks	45.1
Percent expenses for other migratory	2.1

Table D17. Nonresident Archery Antelope Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	73.47
Film	13.33
Food and Beverage	123.16
Guide	36.73
Lodging	79.96
Meat Processing	5.61
Taxidermy	29.59
Transportation	215.41
Other	17.55
Total Season Variable	594.81
Daily Season Variable	112.68
Fixed Expenses	
Binoculars/Optics	33.70
Camping Equipment	10.30
Clothing	46.74
Vehicle	4.89
Weapons	2.17
Other	3.48
Total Season Fixed	101.28
Daily Season Fixed	19.21
Total Season Expenses	696.09
Daily Season Total	131.89
Share of expenses spent in rural areas	70.4%
Average expenses in rural areas	489.75
Average days participated	6.41

Table D18. Nonresident Archery Deer Hunter Expenditures, 2001-2002

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	172.46
Film	13.14
Food and Beverage	149.36
Guide	224.16
Lodging	121.69
Meat Processing	13.89
Taxidermy	17.38
Transportation	187.49
Other	88.07
Total Season Variable	987.64
Daily Season Variable	167.06
Fixed Expenses	
Binoculars/Optics	34.99
Camping Equipment	14.21
Clothing	66.43
Vehicle	4.89
Weapons	26.92
Other	34.54
Total Season Fixed	181.98
Daily Season Fixed	23.79
Total Season Expenses	1,169.62
Daily Season Total	190.85
Share of expenses spent in rural areas	75.2%
Average expenses in rural areas	880.00
Average days participated	8.01

Table D19. Nonresident Firearm Deer Hunter Expenditures, 2001

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	7.42
Ammunition	17.62
Film	5.07
Food and Beverage	120.08
Guide	0.98
Lodging	50.26
Meat Processing	44.20
Taxidermy	11.82
Transportation	123.47
Other	20.11
Total Season Variable	401.03
Daily Season Variable	147.17
Fixed Expenses	
Binoculars/Optics	13.46
Camping Equipment	3.36
Clothing	35.43
Vehicle	4.89
Weapons	18.42
Other	14.77
Total Season Fixed	90.33
Daily Season Fixed	32.44
Total Season Expenses	491.36
Daily Season Total	179.61
Share of expenses spent in rural areas	68.1%
Average expenses in rural areas	334.71
Average days participated	3.46

Table D20. Nonresident Angler Expenditures, 2001-2002

Expenditure Category	Average per Angler
Variable Expenses	--- $ ---
Access Fees	2.68
Bait	26.76
Fuel (boat, heater)	42.54
Film	4.64
Food and Beverage	153.03
Guide	24.18
Lodging	150.89
Meat Processing	2.04
Rental (equipment)	3.63
Repairs	13.51
Taxidermy	4.44
Transportation	133.73
Other	8.52
Total Season Variable	570.59
Daily Season Variable	136.47
Fixed Expenses	
Boat, Motor, Trailer	214.42
Ice Augers	2.59
Underwater Cameras	2.08
Camping Equipment	8.85
Clothing	17.42
Fish/Depth Finders	8.52
Ice House, Heaters	3.19
Fishing Rods	15.47
Tackle	28.14
Vehicle	8.90
Other	3.46
Total Season Fixed	313.04
Daily Season Fixed	42.20
Total Season Expenses	883.63
Daily Season Total	178.67
Share of expenses spent in rural areas	66.4%
Average expenses in rural areas	587.09
Average days participated	5.96
Percent assigned to ice fishing	27.3
Percent assigned to open water fishing	72.7

Table D21. Nonresident Small Game Hunter Expenditures, 2001-2002

Expenditure Category	Average per Hunter
Variable Expenses	--- $ ---
Access Fees	19.67
Ammunition	48.18
Film	5.30
Food and Beverage	159.66
Guide	37.76
Lodging	171.56
Meat Processing	3.36
Repairs	11.13
Taxidermy	9.04
Transportation	150.53
Veterinarian/Dog Care	5.73
Other	18.85
Total Season Variable	640.77
Daily Season Variable	131.72
Fixed Expenses	
Binoculars/Optics	3.39
Camping Equipment	10.98
Clothing	41.05
Decoys	18.47
Duck Boat/Canoe/Motors	7.97
Hunting Dogs	1.75
Vehicle	4.89
Weapons	20.82
Other	17.90
Total Season Fixed	127.22
Daily Season Fixed	23.43
Total Season Expenses	767.99
Daily Season Total	155.15
Share of expenses spent in rural areas	80.8%
Average expenses in rural areas	620.74
Average days participated	5.54
Percent assigned to upland game	34.1
Percent assigned to waterfowl	65.9

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APPENDIX E

Clarification of Average Spending by Nonresident Small Game Hunters

Small game hunting in North Dakota is comprised of upland game, waterfowl, and other migratory birds (e.g., doves). Both resident and nonresident small game license holders were surveyed to obtain information on upland game and waterfowl hunting, although the two groups were surveyed differently. In past studies and in this study, two samples of resident small game license holders were compiled. One survey sample was sent a questionnaire specifically asking about upland hunting activities and expenditures, while the other survey sample was sent a questionnaire specifically asking about waterfowl hunting activities and expenditures. For purposes of estimating total direct expenditures, average upland game hunting expenses were applied to the estimated number of resident upland game hunters and average waterfowl hunting expenses were applied to the estimated number of waterfowl hunters. This method of sampling and expenditure analysis provides a reasonable estimate of total spending by resident small game hunters. However, since many resident small game hunters pursue both game types, this method can not provide an overall average per person spending estimate that can be applied to all resident small game hunting participants.

By comparison, nonresident small game hunters were surveyed as one group (i.e., only one survey sample) and asked to report all expenses pertaining to upland game and waterfowl hunting. As a result, some nonresident small game hunters would report expenses associated only with upland game hunting, providing they did not hunt waterfowl. Similarly, some nonresident small game hunters would report expenses associated only with waterfowl hunting, providing they did not hunt upland game. However, as is the case with resident small game hunters, many nonresident small game hunters pursue both upland game and waterfowl while hunting in North Dakota. For individuals that hunted both game types, the expenses reported would reflect spending for both upland game and waterfowl hunting. Similar spending estimates for resident small game hunters was not collected (i.e., they were only asked to report expenses for only one of the two possible hunting activities). To clarify, the average spending per nonresident small game hunter of $768 reported in the main document reflects a composite average of spending for not only those who only hunted upland game or only hunted waterfowl, but also spending from those who hunted both game types. Thus, average per person spending estimates for nonresident small game hunters cannot be directly compared to the two separate averages developed for resident small game hunters.

As discussed above, the data collected in this study can not be used to estimate an overall average spending per resident small game hunter. However, the questionnaire sent to nonresident small game hunters did contain an additional question asking for the approximate percentage of all expenses that could be attributed to upland game hunting and the percentage attributable to waterfowl hunting. Information from that question was used to develop estimates of average total season spending for nonresident small game hunters who only hunted upland game or waterfowl, and a separate estimate for those who hunted both upland game and waterfowl. However, not all survey respondents answered the question pertaining to the split in expenses between the two hunting activities, and as a result, the number of observations used to estimate the following spending estimates was less than the number of observations used in the report to develop total direct expenditures.

Of the nonresident small game hunters who answered the question on the split in expenses between upland game and waterfowl hunting, 20 percent indicated they incurred 100 percent of their expenses upland game hunting, 39 percent indicated a split in spending between upland game and waterfowl, and 41 percent indicated they incurred 100 percent of their expenses hunting waterfowl. If the survey respondents understood and answered the question correctly, then those percentages could be interpreted to reflect the ratio of nonresident small game hunters who hunted only upland game, only waterfowl, and both. By comparison, information on the number of resident small game participants who hunt both upland game and waterfowl was not available.

Average total season expenditures were estimated for the three groups of nonresident small game hunters. The average total season spending for nonresident small game survey respondents who only hunted upland game was estimated at $743. The average total season spending for those hunting only waterfowl was estimated at $688. The average total spending for those hunting both upland game and waterfowl was estimated at $873. Average total season spending for those nonresident small game hunters who did not answer the upland/waterfowl percentage of expenses question was $695. By comparison, average total season expenditures for resident small game hunters pursuing upland game was $723. Average total season expenditures for resident waterfowl hunters was $810. However, an estimate of average resident small game hunter spending for those individuals pursuing both game types can not be estimated (i.e., no spending estimate was available to compare to the $873 for nonresident small game hunters pursing both game types).

The amount of spending in rural areas by nonresident small game hunters only pursuing upland game or waterfowl was estimated only to compare to the amount of resident upland game and waterfowl hunter expenditures in rural areas. Separate estimates of rural spending were not generated for rural versus urban nonresidents as was presented in the main document, and the estimates of rural spending illustrated here were not used to estimate total direct expenditures in rural areas. Nonresident small game hunters only hunting upland game averaged $592 in rural areas, compared to $512 for rural resident upland game hunters and $303 for urban resident upland game hunters. Nonresident small game hunters only hunting waterfowl averaged $547 in rural areas, compared to $590 for rural resident waterfowl hunters and $333 for urban resident waterfowl hunters.

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APPENDIX F

Total Spending by Expenditure Type for Hunting and Fishing Groups

Appendix Table F1. Spending by Expenditure Type, Resident and Nonresident Hunting, North Dakota, 2001-2002

Category	Resident	Nonresident	Total Hunting
	---------- 000s $ ----------		
Variable Expenditures	**60,929**	**28,342**	**89,271**
Access	483	1,047	1,530
Ammunition	7,621	2,016	9,637
Bait	0	0	0
Equipment Fuel	0	0	0
Film and Processing	704	244	948
Food	12,445	6,966	19,411
Guide Services	148	1,848	1,996
Lodging	2,747	7,321	10,068
Meat Processing	7,404	219	7,623
Rentals	0	0	0
Repairs	710	460	1,170
Taxidermy	3,055	415	3,470
Transportation	23,470	6,649	30,119
Veterinarian	1,232	237	1,469
Other	910	920	1,830
Fixed Expenditures	**71,490**	**5,622**	**77,112**
Auger	0	0	0
Binoculars/optics	10,569	206	10,775
Boat (hunting)	908	330	1,238
Calls (electronic predator)	397	0	397
Camera (underwater)	0	0	0
Camping Equipment	7,148	477	7,625
Clothing	14,235	1,834	16,069
Decoy	1,952	763	2,715
Dogs	2,016	72	2,088
Fish/Depth Finders	0	0	0
Ice House	0	0	0
Rods	0	0	0
Skinning Equipment	118	0	118
Spears	0	0	0
Tackle	0	0	0
Traps	192	0	192
Vehicles	7,091	216	7,307
Weapons	24,595	920	25,515
Other	2,269	804	3,073

Appendix Table F2. Spending by Expenditure Type, Resident and Nonresident Fishing, North Dakota, 2001-2002

Category	Resident	Nonresident	Total Fishing
	---------- 000s $ ----------		
Variable Expenditures	**94,527**	**20,600**	**115,127**
Access	697	97	794
Ammunition	0	0	0
Bait	6,398	966	7,364
Equipment Fuel	10,771	1,536	12,307
Film and processing	1,150	168	1,318
Food	25,245	5,524	30,769
Guide Services	293	873	1,166
Lodging	9,249	5,447	14,696
Meat Processing	582	74	656
Rentals	621	131	752
Repairs	8,165	488	8,653
Taxidermy	558	160	718
Transportation	30,220	4,828	35,048
Veterinarian	0	0	0
Other	578	308	886
Fixed Expenditures	**175,709**	**11,299**	**187,008**
Auger	2,188	93	2,281
Binoculars/optics	0	0	0
Boat, Motor, Trailer	103,198	7,741	110,939
Calls (electronic predator)	0	0	0
Camera (underwater)	2,056	75	2,131
Camping Equipment	15,917	319	16,236
Clothing	4,340	629	4,969
Decoys	0	0	0
Dogs	0	0	0
Fish/Depth Finders	7,375	307	7,682
Ice House	3,087	115	3,202
Rods/reels	11,302	558	11,860
Skinning Equipment	0	0	0
Spears	28	0	28
Tackle	10,756	1,016	11,772
Traps	0	0	0
Vehicles	14,067	321	14,388
Weapons	0	0	0
Other	1,395	125	1,520

Appendix Table F3. Spending by Expenditure Type, Resident and Nonresident, All Activities, North Dakota, 2001-2002

Category	Resident	Nonresident	All Activities
	---------- 000s $ ----------		
Variable Expenditures	**155,456**	**48,942**	**204,398**
Access	1,180	1,144	2,324
Ammunition	7,621	2,016	9,637
Bait	6,398	966	7,364
Equipment Fuel	10,771	1,536	12,307
Film and processing	1,854	412	2,266
Food	37,690	12,490	50,180
Guide Services	441	2,721	3,162
Lodging	11,996	12,768	24,764
Meat Processing	7,986	293	8,279
Rentals	621	131	752
Repairs	8,875	948	9,823
Taxidermy	3,613	575	4,188
Transportation	53,690	11,477	65,167
Veterinarian	1,232	237	1,469
Other	1,488	1,228	2,716
Fixed Expenditures	**247,199**	**16,921**	**264,120**
Auger	2,188	93	2,281
Binoculars/optics	10,569	206	10,775
Boat, Motor, Trailer	104,106	8,071	112,177
Calls (electronic predator)	397	0	397
Camera (underwater)	2,056	75	2,131
Camping Equipment	23,065	796	23,861
Clothing	18,575	2,463	21,038
Decoys	1,952	763	2,715
Dogs	2,016	72	2,088
Fish/Depth Finders	7,375	307	7,682
Ice House	3,087	115	3,202
Rods/reels	11,302	558	11,860
Skinning Equipment	118	0	118
Spears	28	0	28
Tackle	10,756	1,016	11,772
Traps	192	0	192
Vehicles	21,158	537	21,695
Weapons	24,595	920	25,515
Other	3,664	929	4,593