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Expenditures and Economic Impact of Resident and Nonresident Hunters and Anglers in North Dakota, 1990-91 Season

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Table of Contents

	<u>Page</u>
List of Tables	ii
List of Figures	iii
List of Appendix Tables	iv
Highlights	v
Introduction	1
Resident and Nonresident Expenditures	1
Purpose	1
Procedures	2
Survey	2
Sample Groups	2
Sample Sizes	3
Mailings	3
Response Rates	3
Expenditures	3
Economic Impacts	8
Direct Impact	8
Indirect Impacts	8
Ruralized Expenditures	9
Results	11
Resident and Nonresident Hunter/Angler Expenditures	11
Daily and Season Expenditures	11
Projected Total Expenditures	11
Historical Expenditures	15
Additional Nonresident Expenditures	16
Economic Impact of Resident and Nonresident Hunters/Anglers	18
Resident and Nonresident Ruralized Expenditures	18
Summary	20
Conclusions	24
References	28
Appendix A - Resident Archery Pronghorn Antelope	29
Appendix B - Nonresident Archery Pronghorn Antelope	30
Appendix C - Resident Firearms Pronghorn Antelope	31
Appendix D - Gratis Firearms Pronghorn Antelope	32
Appendix E - Resident Archery Deer	33
Appendix F - Nonresident Archery Deer	34
Appendix G - Resident Firearms Deer	35
Appendix H - Gratis Firearms Deer	36
Appendix I - Nonresident Firearms Deer	37
Appendix J - Resident Muzzleloader Deer	38
Appendix K - Special Big Game	39
Appendix L - Resident Waterfowl	40
Appendix M - Resident Upland Game	41
Appendix N - Nonresident Small Game	42
Appendix O - Resident Wild Turkey	43
Appendix P - Gratis Wild Turkey	44
Appendix Q - Resident Spring Wild Turkey	45
Appendix R - Resident Furbearer	46
Appendix S - Resident Summer Fishing	47
Appendix T - Resident Ice Fishing	48
Appendix U - Nonresident Fishing	49

<u>No.</u>	<u>List of Tables</u>	<u>Page</u>
1	SAMPLE GROUPS, SAMPLE SIZES, AND MAILINGS, NORTH DAKOTA HUNTER AND ANGLER SURVEY, 1990-91	4
2	SUMMARY OF SURVEY RESPONSES BY ACTIVITY, NORTH DAKOTA RESIDENT AND NONRESIDENT HUNTERS AND ANGLERS, 1990-91	6
3	VARIABLE AND FIXED GOOD EXPENDITURE CATEGORIES	7
4	AVERAGE SEASON AND DAILY EXPENDITURES, BY ACTIVITY, RESIDENT AND NONRESIDENT HUNTER/ANGLER SURVEY, 1990-1991	12
5	LICENSE SALES, ACTIVE PARTICIPANTS, AND PARTICIPATION RATES, NORTH DAKOTA HUNTERS AND ANGLERS, 1990	13
6	TOTAL DIRECT RESIDENT AND NONRESIDENT EXPENDITURES IN NORTH DAKOTA, BY ACTIVITY, 1990	14
7	RESIDENT AND NONRESIDENT TOTAL DIRECT EXPENDITURES (EXCLUDING LICENSE FEES) AND PERCENTAGE CHANGE, VARIOUS SURVEY YEARS, IN 1990 DOLLARS	15
8	AVERAGE SEASON AND DAILY EXPENDITURES, BY ACTIVITY, RESIDENT HUNTERS AND ANGLERS, 1982, 1986, AND 1990 IN 1990 DOLLARS	16
9	AVERAGE SEASON EXPENDITURES, BY ACTIVITY, NONRESIDENT HUNTERS AND ANGLERS, 1976, 1983, AND 1990, IN 1990 DOLLARS	17
10	AVERAGE ADDITIONAL DAYS, AVERAGE ADDITIONAL DAILY EXPENDITURES, AVERAGE ADDITIONAL EXPENDITURES PER HUNTER/ANGLER, AND ADDITIONAL TOTAL DIRECT EXPENDITURES FOR ALL NONRESIDENT HUNTERS/ANGLERS IN NORTH DAKOTA, BY ACTIVITY, 1990 . .	17
11	AG PROCESSING AND MISCELLANEOUS MANUFACTURING SALES, RETAIL TRADE SALES, PERSONAL INCOME, TOTAL BUSINESS ACTIVITY, AND EMPLOYMENT GENERATED BY RESIDENT AND NONRESIDENT HUNTER/ANGLER EXPENDITURES IN NORTH DAKOTA, 1990	18
12	RESIDENT URBAN, RURAL, AND ALL HUNTER/ANGLER EXPENDITURES IN RURAL AREAS, BY ACTIVITY, 1990	19
13	NONRESIDENT HUNTER/ANGLER EXPENDITURES IN RURAL AREAS, BY ACTIVITY, 1990	20
14	RESIDENT AND NONRESIDENT EXPENDITURES IN RURAL AND URBAN AREAS OF NORTH DAKOTA, BY ACTIVITY, 1990	21

List of Figures

<u>No.</u>		<u>Page</u>
1	Flow of Resident and Nonresident Hunter/Angler Expenditures . . .	9
2	Flow of Urban and Rural Resident and Nonresident Hunter/Angler Expenditures	10
3	Dollar Flow of Resident and Nonresident Hunter/Angler Expenditures, 1990-91 Season, North Dakota	22
4	Dollar Flow of Urban and Rural Resident and Nonresident Hunter/Angler Expenditures, 1990-91 Season, North Dakota	23
5	North Dakota Population, 1980-1990	24
6	Percentage of North Dakota Population Who Are Anglers/Hunters, 1980-1990	25
7	North Dakota Nonresident Fishing/Hunting License Sales, 1980-1990	26
8	North Dakota Resident Fishing/Hunting License Sales, 1980-1990	26

List of Appendix Tables

<u>No.</u>		<u>Page</u>
A1	RESIDENT ARCHERY PRONGHORN ANTELOPE HUNTER EXPENDITURES, 1990 . . .	29
B1	NONRESIDENT ARCHERY PRONGHORN ANTELOPE HUNTER EXPENDITURES, 1990 .	30
C1	RESIDENT FIREARMS PRONGHORN ANTELOPE HUNTER EXPENDITURES, 1990 . .	31
D1	GRATIS FIREARMS PRONGHORN ANTELOPE HUNTER EXPENDITURES, 1990 . . .	32
E1	RESIDENT ARCHERY DEER HUNTER EXPENDITURES, 1990	33
F1	NONRESIDENT ARCHERY DEER HUNTER EXPENDITURES, 1990	34
G1	RESIDENT FIREARMS DEER HUNTER EXPENDITURES, 1990	35
H1	GRATIS FIREARMS DEER HUNTER EXPENDITURES, 1990	36
I1	NONRESIDENT FIREARMS DEER HUNTER EXPENDITURES, 1990	37
J1	RESIDENT MUZZLELOADER DEER HUNTER EXPENDITURES, 1990	38
K1	SPECIAL BIG GAME HUNTER EXPENDITURES, 1990	39
L1	RESIDENT WATERFOWL HUNTER EXPENDITURES, 1990	40
M1	RESIDENT UPLAND GAME HUNTER EXPENDITURES, 1990	41
N1	NONRESIDENT SMALL GAME HUNTER EXPENDITURES, 1990	42
O1	RESIDENT WILD TURKEY (EARLY, LATE, WINTER) HUNTER EXPENDITURES, 1990	43
P1	GRATIS WILD TURKEY HUNTER EXPENDITURES, 1990	44
Q1	RESIDENT SPRING WILD TURKEY HUNTER EXPENDITURES, 1991	45
R1	RESIDENT FURBEARER HUNTER/TRAPPER EXPENDITURES, 1990	46
S1	RESIDENT SUMMER ANGLER EXPENDITURES, 1990	47
T1	RESIDENT ICE ANGLER EXPENDITURES, 1990	48
U1	NONRESIDENT ANGLER EXPENDITURES, 1990	49

Highlights

The purpose of this study was to estimate expenditures and economic impacts of resident and nonresident hunters and anglers during the 1990-91 season in North Dakota. Resident open water anglers had the highest average season expenditure (\$2,363), and special big game hunters had the highest average daily expenditure (\$430) among resident hunting/fishing activities. Nonresident anglers had the highest average season expenditure (\$668), and small game hunters spent the most per day (\$123) among nonresident hunting/fishing activities.

Resident and nonresident hunters'/anglers' projected total direct expenditures (excluding the cost of licenses) in 1990 in North Dakota were \$397 million. Ninety-six percent of the total was attributable to resident hunting/fishing activities. Nearly 65 percent of total resident and nonresident expenditures was from fishing in the state.

Resident and nonresident expenditures generated \$1,319 million of total business activity in 1990 in North Dakota. Expenditures induced \$200 million in ag processing and miscellaneous manufacturing sales, \$170 million in retail trade sales and \$267 million in personal income. Resident and nonresident expenditures supported 19,000 jobs across the state.

Over 65 percent or \$10 million of nonresident expenditures was spent in rural areas. Nearly 34 percent or \$67 million of urban resident expenditures was spent in rural areas. Over 35 percent of the expenditures in rural areas was new money to those areas.

Expenditures and Economic Impact
of Resident and Nonresident Hunters and Anglers
in North Dakota, 1990-91 Season

James F. Baltezare and Jay A. Leitch*

Introduction

The recreation and tourism sector was the fifth largest industry on average from 1985 to 1989 in North Dakota (Leistritz and Coon 1990). Recreation and tourism expenditures accounted for 4 percent of the state's economic base during this time period. A portion of these expenditures is associated with hunting and fishing activities available in the state. Resident and nonresident hunters and anglers spend millions of dollars on goods and services, preparing for and participating in their respective hunting and fishing activities. Hunter/angler expenditures are a vital source of economic activity for both urban and rural areas of North Dakota.

Resident and Nonresident Expenditures

Nonresident hunters' and anglers' expenditures represent "new money" to North Dakota. New money is needed to ensure continued economic growth within the state. Nonresident expenditures create economic activity across the state but are of primary importance to rural communities, helping them to diversify their economic bases and strengthen their economies.

Generally, resident expenditures are not considered "new money" to the state but may be to local communities. The availability of hunting and angling activities ensures that the majority of money, which resident hunters and anglers spend, stays in the state and is not "leaked" to neighboring states with similar activities. Resident spending is considered new money to the extent that in-state recreational activities reduce resident spending out of state.

Purpose

The purpose of this study was to estimate expenditures and economic impacts of resident and nonresident hunters and anglers for the 1990-91 season in North Dakota. Specifically the study

- estimated resident and nonresident hunters' and anglers' season and daily variable, fixed, and total expenditures,
- estimated direct and indirect economic activity, resulting from resident and nonresident hunter and angler expenditures, and
- estimated the extent of resident and nonresident ruralization of hunter and angler expenditures.

Direct economic activity is the total dollar value of resident and nonresident hunting and fishing expenditures. Indirect economic activity is the secondary effect from "responding" initial expenditures. Total business activity, personal income, and employment are measures of indirect economic activity. The level of direct and indirect economic activity generated from hunting and angling expenditures shows the portion of state economic activity attributable to the hunting/angling industry. Such information is useful for estimating the contribution of wildlife-related recreation to the state's economic activity.

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Rural areas of North Dakota supply the natural resource inputs necessary for hunting and fishing activities. Habitat, fishing waters, and fish and wildlife are part of the state's rural environment. Urban resident and nonresident hunters/anglers must travel to rural areas of the state to participate in wildlife resource-related activities. This process requires residents and nonresidents to spend money in both rural and urban areas.

Expenditures are "ruralized" when urban residents and nonresidents purchase goods and services in rural areas of the state. Ruralized expenditures are an increasingly important economic consideration for rural areas as the state becomes more urban. The level of ruralized expenditures provides information to assess the usefulness of hunting/angling as an economic development tool for rural North Dakota.

Nonresident expenditure data were collected in 1976 (Leitch and Scott 1978) and 1983 (Anderson and Leitch 1984). Resident expenditure data were collected in 1981 (Leitch and Kerestes 1982), 1982 (Kerestes and Leitch 1983), and 1986 (Baltezare et al. 1987). Survey data collected in 1990-91 were added to the time series data set and compared with past survey data to identify changes in resident and nonresident expenditures and economic impacts (Baltezare and Leitch 1992).

Procedures

Various methods were used to administer surveys, estimate expenditures, and measure economic impacts. The following discussions identify specific methods used and steps taken to implement procedures for this study. Procedures outlined in past hunter/angler studies were followed whenever possible and applicable for comparisons.

Survey

Primary survey data were collected, using questionnaires mailed to licensed hunters and anglers. The North Dakota Game and Fish Department (NDGFD), Bismarck, provided a random set of drawn names with addresses for all survey sample groups. License types included resident, nonresident, and gratis. Landowners are eligible for gratis hunting licenses for some species if they own or lease a minimum of a quarter section of land and agree to hunt only on their own land.

Sample Groups

Sample groups represented hunting and angling opportunities available in North Dakota during 1990-91 for resident (including gratis) and nonresident hunters and anglers. The survey excluded nonresident furbearer licensees. Names and addresses of 1990 or 1991 license holders were available for special big game,¹ resident (including gratis where applicable) firearms pronghorn antelope, turkey, firearms deer, muzzleloader deer, and all nonresident sample groups. Names and addresses from the 1989 license year were used for resident summer fishing, archery pronghorn antelope and deer, waterfowl and upland game, and furbearer.² Names and addresses for the resident ice fishing sample were based on respondents to the summer resident fishing survey who indicated they ice fished occasionally or frequently. Gratis hunters were

¹Special big game includes elk, moose, and bighorn sheep.

²Vendors throughout the state sell these licenses with no limit on the number sold. The time required to collect license information from vendors prohibits using current year license buyers for these surveys.

surveyed separately from resident hunters based on recommendations of past studies, which found significant differences in expenditure patterns between gratis and resident hunters (Baltezare et al. 1987).

Sample Sizes

Resident sample sizes were based on sample size projections reported in Baltezare et al. 1987. [See Kerestes and Leitch (1983a) for a detailed discussion of procedures used to determine appropriate sample sizes.] Sample sizes were adjusted upward, based on expected response rates, according to the number of survey mailings. The estimated sample size or the total population (all hunters/anglers who purchased a specific license type), whichever was less, was the actual sample size for each sample group.

Sample sizes for resident archery pronghorn antelope and deer, waterfowl, upland game, furbearer, open water fishing, and ice fishing (those activities where samples were based on license sales from the previous year) were increased 25 percent to adjust for potential turnover in individuals who purchase licenses from one year to the next. Nonresident sample sizes were based on a desired respondent sample size of 250 and adjusted upward for expected nonresponses. The fall turkey sample was divided proportionally among early (40 percent), late (48 percent), and winter (12 percent) seasons, based on percentage of license sales for each season.

Mailings

Survey administration was divided between NDGFD and North Dakota State University (NDSU), Fargo, personnel for various sample groups. NDGFD personnel administered surveys for sample groups with only one questionnaire mailing³ (Table 1). Expenditure questionnaires were included with the annual NDGFD post-season harvest surveys. NDSU personnel administered surveys for sample groups with two questionnaire mailings. Second mailings were mailed three to four weeks after the first mailing.

Response Rates

Resident response rates ranged from a high of 89 percent for special big game hunters to a low of 27 percent for wild turkey gratis hunters (Table 2). Generally, response rates for gratis activities were lower than for resident activities. Nonresident response rates ranged from 58 percent for small game hunters to 87 percent for firearms deer hunters.

Expenditures

Hunters and anglers make variable and fixed expenditures (Table 3). Variable expenditures represent purchases of goods and services that are consumed or used over a short time or that are used only once. Variable expenditures are directly related to the level of the activity. Fixed expenditures represent purchases of goods that last longer and may be used more than once. Fixed expenditures are not related to activity levels in the near term.

³Sample sizes for these sample groups were based on first mailing response rates reported in Baltezare et al. 1987.

TABLE 1. SAMPLE GROUPS, SAMPLE SIZES, AND MAILINGS, NORTH DAKOTA HUNTER AND ANGLER SURVEY, 1990-91

Sample Group	First Mailing Date ^a	Second Mailing Date	Sample License Year	Sample Size
Archery Elk	Oct 16, 1990	Nov 6, 1990	1990	1 ^b
Archery Moose	Oct 16, 1990	Nov 6, 1990	1990	3 ^b
Open Water Fishing Resident	Oct 16, 1990	Nov 6, 1990	1988-89	1,887 ^b
Firearms Pronghorn Antelope Resident	Oct 22, 1990	N/A	1990	415 ^c
Gratis	Oct 22, 1990	N/A	1990	430 ^c
Bighorn Sheep	Oct 29, 1990	Nov 19, 1990	1990	8 ^b
Archery Pronghorn Antelope Resident	Oct 29, 1990	Nov 19, 1990	1989	545 ^b
Early Turkey Resident	Nov 12, 1990	N/A	1990	180 ^c
Waterfowl Resident	Nov 26, 1990	Dec 17, 1990	1989	904 ^b
Firearms Elk	Nov 26, 1990	Dec 17, 1990	1990	34 ^b
Firearms Deer Resident	Nov 26, 1990	Dec 17, 1990	1990	439 ^b
Gratis	Nov 26, 1990	Dec 17, 1990	1990	433 ^b
Nonresident	Nov 26, 1990	Dec 17, 1990	1990	325 ^b
Muzzleloader Deer Resident	Dec 10, 1990	N/A	1990	625 ^c
Late Turkey Resident	Dec 10, 1990	N/A	1990	220 ^c
Firearms Moose	Dec 17, 1990	Jan 7, 1991	1990	107 ^b
Turkey Resident Winter	Dec 31, 1990	N/A	1990	60 ^c
Gratis	Dec 31, 1990	N/A	1990	350 ^c
Archery Deer Resident	Dec 31, 1990	N/A	1989	1,700 ^c
Small Game Nonresident	Jan 7, 1991	N/A	1990 ^d	625 ^c
Upland Game Resident	Jan 7, 1991	Jan 28, 1991	1989	897 ^b
Small Game Nonresident	Mar 18, 1991	N/A	1990 ^e	625 ^c

(continued)

TABLE 1. (continued)

Sample Group	First Mailing Date ^a	Second Mailing Date	Sample License Year	Sample Size
Archery Deer Nonresident	Mar 18, 1991	Apr 8, 1991	1990	320 ^b
Archery Pronghorn Antelope Nonresident	Mar 18, 1991	Apr 8, 1991	1990	64 ^b
Ice Fishing ^f Resident	Mar 18, 1991	Apr 8, 1991	1988-89	341
Fishing Nonresident	Mar 18, 1991	Apr 8, 1991	1989-90	1,272 ^b
Furbearer Resident	Apr 1, 1991	N/A	1989	1,640 ^c
Spring Turkey Resident	May 13, 1991	N/A	1991	420 ^c

^aUp to two mailings were sent to obtain the desired number of usable returns.

^bQuestionnaires were sent by NDSU; mailing labels were provided by NDGFD.

^cQuestionnaires were included in a NDGFD survey.

^dSurvey of hunters who applied directly to NDGFD for a license.

^eSurvey of hunters who purchased a license from vendors across the state.

^fBased on summer fishing survey respondents, indicating they ice fished occasionally or frequently.

TABLE 2. SUMMARY OF SURVEY RESPONSES BY ACTIVITY, NORTH DAKOTA RESIDENT AND NONRESIDENT HUNTERS AND ANGLERS, 1990-91

Activity	First Mailing	Second Mailing	Refusal or Undelivered	Returned	Response Rate ^a
	----- number of questionnaires -----				- percent -
<u>RESIDENT</u>					
Antelope					
Archery	545	344	52	326	66.1
Firearms	415	---	--	269	64.8
Gratis	430	---	--	170	39.5
Deer					
Archery	1,700	---	--	748	44.0
Firearms	439	288	8	261	60.6
Gratis	433	343	5	220	51.4
Muzzleloader	625	---	--	483	77.3
Special Big Game ^b	153	56	--	136	88.9
Small Game					
Waterfowl	904	565	68	578	69.1
Upland	897	605	69	515	62.2
Wild Turkey					
Early	180	---	--	115	63.9
Late	220	---	--	129	58.6
Winter	60	---	--	40	66.7
Gratis	350	---	--	94	26.9
Spring	420	---	--	254	60.5
Furbearer	1,640	---	--	503	30.7
Fishing					
Open Water	1,887	1,176	265	912	56.2
Ice	341	182	--	247	72.4
<u>NONRESIDENT</u>					
Antelope					
Archery	64	42	0	45	70.3
Deer					
Archery	320	182	16	219	72.0
Firearms	325	151	13	271	86.9
Small Game ^c	1,250	---	--	728	58.2
Fishing	1,272	875	153	662	59.2

^aResponse rate equals number of questionnaires returned divided by number of first mailing questionnaires less refusal or undelivered.

^bIncludes elk, moose, and bighorn sheep.

^cIncludes both hunters who applied directly to NDGFD and those who purchased licenses from vendors across the state.

TABLE 3. VARIABLE AND FIXED GOOD EXPENDITURE CATEGORIES

Category	Description
Variable Expenditures	
Access	Fees paid to gain access to land or to launch boats
Ammunition	Cartridges, shotshells
Bait	Cost of live bait
Film	Film and film developing
Food	Food and beverages
Lodging	Hotel, motel, etc.
Meat	Meat processing, packing, fish cleaning
Operating	Boat gas and oil, repairs and maintenance of equipment
Rentals	Boat, motor, fish house, or equipment rental
Taxidermy	Professional fees or materials for mounting fish, birds, or animals
Transportation	
Private	Gas, oil, repairs for vehicles on hunting/fishing trips
Commercial	Fares, vehicle rentals, charters
Veterinarian	Dog health care
Other	Anything used for hunting/fishing not included in above categories
Fixed Expenditures	
Arrows	Arrows
ATV	All terrain vehicles, snowmobiles, motorbikes
Binoculars	Binoculars, spotting scope, etc.
Boat	Boats, motors, and trailers
Camping	Tents, stoves, camping equipment used while hunting/fishing
Clothing	Special clothing used primarily for hunting/fishing
Depth finder	Depth or fish finders
Dogs	Hunting dogs
Duck boat/decoys	Duck boats, decoys, etc.
Fishing equipment	Rods, reels, tackle boxes, tackle, etc. hunting/fishing equipment not included in above categories
Skinning Equipment	Stretchers, knives, etc.
Traps	Traps, snares, trapping supplies (lures, scents), etc.
Vehicles	Pickups, motorhomes, or other vehicles bought primarily for hunting/fishing
Winter Fishing Equipment	Fish houses, heaters, ice augers, etc.
Weapons	Rifles, shotguns, bows, and accessories
Other	Game/predator calls, snowshoes, game bags, waders, and other accessories used for hunting/fishing

Expenditure data were summarized for individual expenditure categories and variable, fixed, and total season and daily expenditures for each activity (Appendices A through U). Average season variable and fixed expenditures were determined by summing individual expenditure categories for each expenditure type. Average total season expenditures were estimated by adding variable and fixed expenditures for those hunters and anglers with both variable and fixed expenditures. Daily expenditures were estimated by dividing season variable, fixed, and total expenditures by the number of days spent hunting/angling.

Economic Impacts

Economic impacts were separated into direct and indirect, which were further divided into resident and nonresident impacts to assess the economic contributions of each group. Resident and nonresident season expenditures were aggregated to estimate the overall direct and indirect economic impacts of hunter/angler expenditures on the North Dakota economy. The economic impacts of ruralized resident and nonresident hunter/angler expenditures were also estimated.

Direct Impact

The direct impact was the total dollar value of resident and nonresident hunter/angler expenditures in North Dakota. Average season expenditures multiplied by the number of active hunters/anglers represented the aggregate expenditure for a particular activity. The number of active hunters/anglers was based on the percentage of survey respondents actually participating in each hunting/fishing activity. License sales multiplied by the percentage of survey respondents participating equaled the number of active hunters/anglers. The total direct economic impact was estimated by summing the total season expenditures for each hunting/angling activity.

Indirect Impacts

Indirect impacts were the added economic activity generated from responding direct hunter/angler expenditures. The North Dakota 18-Sector Input-Output Model⁴ was used to estimate indirect impacts (Coon et al. 1990). Changes in total business activity, retail trade sales, and employment represented the indirect impacts, which were identified for resident, nonresident, and all hunters/anglers in North Dakota.

⁴The original 17-sector model was recently modified to include a recreation and tourism sector. The modification permits total direct resident and nonresident hunter and angler expenditures to be entered into the recreation and tourism sector of the model. Past estimates of indirect impacts have separated direct expenditures into those occurring in the retail trade and business and personal service sectors before introduction into the input-output model.

Ruralized Expenditures

Total hunting/angling expenditures represent both resident and non-resident expenditures (Figure 1). Nonresident expenditures include expenditures specifically related to hunting/angling activities and other additional expenditures--goods and services purchased in North Dakota not directly related to hunting/angling activities (i.e., clothing, appliances, or gambling). Estimates of other additional expenditures were based on nonresident responses to a survey question asking how much money they spent in North Dakota in addition to hunting/angling expenditures. **These additional expenditures were not included in estimates of direct or indirect impacts.** Nonresident hunting/angling expenditures occur in both urban and rural areas of the state.

Resident expenditures occur in either rural or urban areas of North Dakota. Money is transferred between urban and rural areas to the extent urban (rural) residents purchase hunting/angling-related goods and services in rural (urban) areas. Residents living in a city with a population equal to or greater than 2,500 are considered urban and reside in urban areas. Those living in a city with a population less than 2,500, on a farm or ranch, or in a rural but nonfarm area are considered rural, and reside in rural areas. These definitions are consistent with those of the Bureau of the Census.

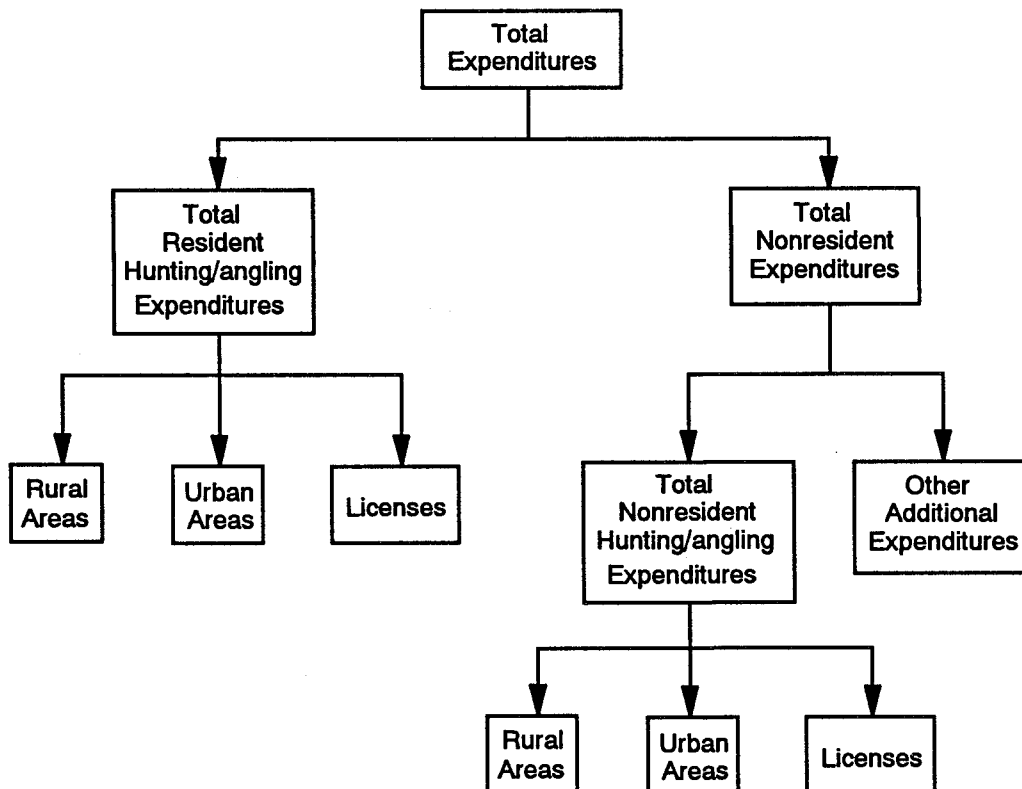


Figure 1. Flow of Resident and Nonresident Hunter/Angler Expenditures

Urban resident expenditures in rural areas as a result of hunting and angling were defined as "ruralization" of hunter/angler expenditures (Figure 2). Nonresident expenditures to purchase hunting and angling goods and services in rural areas also were considered "ruralization" of hunter/angler expenditures. The total amount of "ruralization" was the sum of urban resident and nonresident expenditures in rural areas of North Dakota.

Resident and nonresident respondents were asked to indicate the percentage of their season expenditure spent in rural areas (communities under 2,500 in population). The average percentage of rural spending multiplied by each group's average season expenditure was the amount of expenditure per resident and nonresident in rural areas. The number of active sportsmen multiplied by sportsmen expenditures in rural areas for each activity equaled the total expenditure for all sportsmen in rural areas. Expenditures in rural areas were estimated for urban, rural, and all resident and nonresident hunters/anglers.

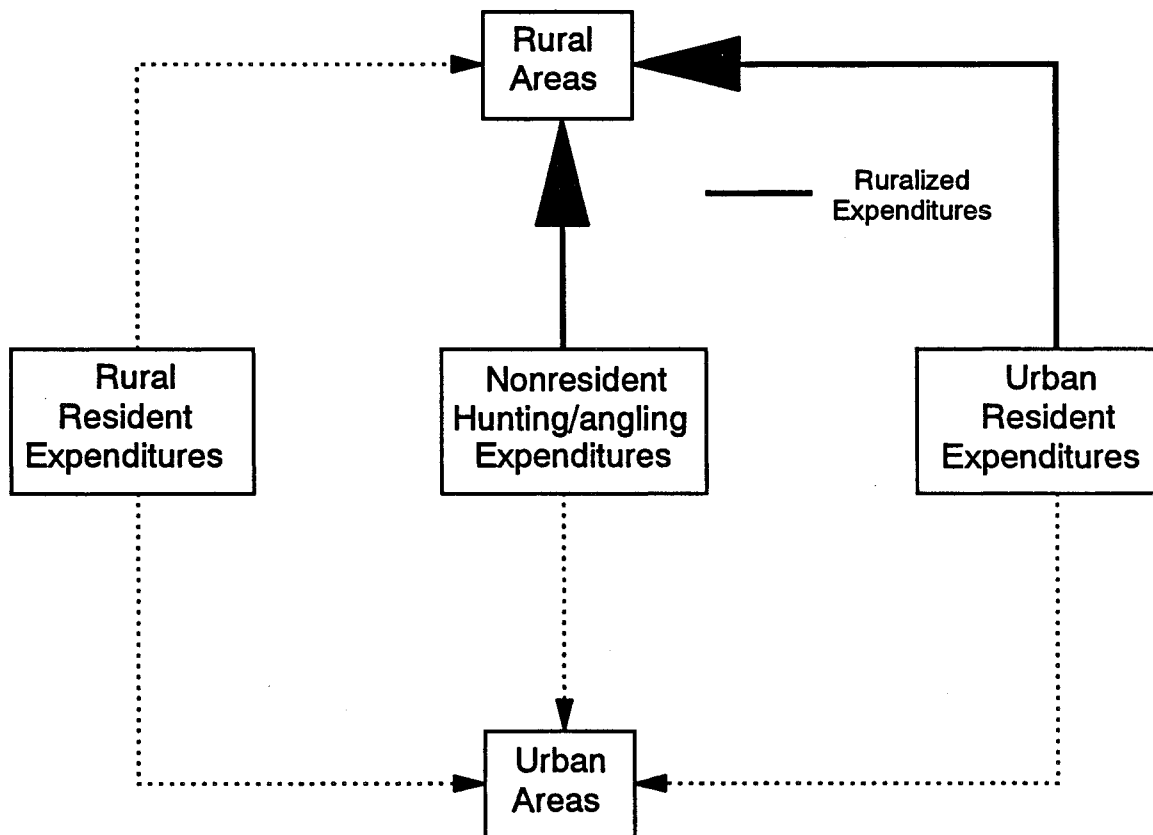


Figure 2. Flow of Urban and Rural Resident and Nonresident Hunter/Angler Expenditures

Results

Results were organized into three basic areas--expenditures, economic impacts, and ruralized expenditures. Summary statistics are presented according to license type (i.e., pronghorn antelope, deer) within each of these areas. Further distinctions were made between resident and nonresident hunters/anglers. Responses were aggregated to estimate overall statistics for all resident and nonresident hunters/anglers where applicable.

Resident and Nonresident Hunter/Angler Expenditures

Resident and nonresident hunter/angler expenditures were organized into the following areas:

- estimated daily and season expenditures,
- projected total expenditures,
- reported historical expenditures, and
- estimated additional nonresident expenditures.

Average daily and season total expenditures and projected total expenditures were estimated for each resident and nonresident activity. Resident and nonresident projected total expenditures in 1990 were compared to projected total expenditures from previous survey years to identify changes in expenditure patterns over time. Nonresident expenditures, in addition to direct hunting/angling expenditures, also were estimated.

Daily and Season Expenditures

Resident average daily expenditures ranged from \$26 for gratis wild turkey hunters to \$430 for special big game hunters (Table 4). (Itemized season expenditures and total variable and fixed season and daily expenditures for residents and nonresidents are provided in the appendix corresponding to the activity.) Average season expenditures varied from \$63 for gratis wild turkey hunters to \$2,363 for summer anglers.

Nonresident archery pronghorn antelope hunter expenditures were the lowest per day (\$54) and for the season (\$368). Nonresident small game hunter expenditures were the highest per day (\$123). Nonresident angler expenditures were the highest among activities for the season (\$668).

Projected Total Expenditures

The number of licenses sold (Table 5) times the participation rate (Table 5) times season total expenditures (Table 4) provides a projection of total expenditures for each activity. Summing total expenditures among individual activities and adding the cost of licenses provides an estimate of the total direct economic impact hunter/angler expenditures have on the North Dakota economy. Total expenditures were estimated for residents and nonresidents and for aggregate hunting/fishing activities.

Total direct resident and nonresident hunter/angler expenditures in 1990 in North Dakota were \$400 million (Table 6). Total expenditures, excluding the cost of licenses, were \$397 million. Nearly 65 percent of total direct expenditures was attributable to fishing activities. Over 15 percent of total expenditures was attributable to small game hunting. Resident expenditures were 96 percent (\$382 million) of total direct expenditures.

TABLE 4. AVERAGE SEASON AND DAILY EXPENDITURES, BY ACTIVITY,
RESIDENT AND NONRESIDENT HUNTER/ANGLER SURVEY, 1990-1991

Activity	Expenditure			
	Season		Daily	
	Mean	C.I. ^a	Mean	C.I. ^a
----- dollars -----				
<u>RESIDENTS</u>				
Pronghorn Antelope				
Archery	1,096	± 172	156	± 74
Firearms				
Resident	560	± 239	325	± 125
Gratis	278	± 284	121	± 99
Special Big Game	1,458	± 544	430	± 110
Deer				
Archery	706	± 148	83	± 33
Firearms				
Resident	600	± 215	173	± 83
Gratis	138	± 24	42	± 7
Muzzleloader	501	± 195	174	± 74
Furbearer	1,042	± 328	208	± 132
Small Game				
Waterfowl	1,120	± 353	97	± 24
Upland	710	± 149	63	± 9
Wild Turkey				
Combined ^b	156	± 26	84	± 14
Spring	267	± 202	182	± 190
Gratis	63	± 25	26	± 10
Fishing				
Open Water	2,363	± 529	213	± 49
Ice	872	± 492	129	± 96
<u>NONRESIDENTS</u>				
Pronghorn Antelope				
Archery	368	± 55	54	± 8
Deer				
Archery	567	± 260	78	± 17
Firearms	466	± 133	118	± 33
Small Game	562	± 95	123	± 22
Fishing	668	± 206	117	± 27

^aIndicates a 90 percent confidence interval ($\alpha = 0.05$).^bIncludes early, late, and winter seasons.

TABLE 5. LICENSE SALES, ACTIVE PARTICIPANTS, AND PARTICIPATION RATES,
NORTH DAKOTA HUNTERS AND ANGLERS, 1990

Activity	License Sales	Active Participants ^a	Participation Rate -- percent --
<u>RESIDENTS</u>			
Pronghorn Antelope			
Archery ^b	1,215	1,141	93.9
Firearms ^c			
Resident	1,883	1,837	97.6
Gratis	817	718	87.9
Special Big Game ^c	153	153	100.0
Deer ^c			
Archery	10,460	10,104	96.6
Firearms			
Resident	55,601	53,673	96.5
Gratis	10,238	9,095	88.8
Muzzleloader	700	672	96.0
Furbearer ^c	27,998	22,857	81.6
Small Game ^c	59,537 ^d		
Waterfowl	--	27,529	46.2
Upland	--	52,109	87.5
Wild Turkey ^c			
Combined ^d	4,387	3,600	82.1
Spring	1,490	1,319	88.5
Gratis	348	245	70.4
Fishing ^c			
Open Water	113,093	94,772	83.8
Ice	---	25,316 ^e	---
<u>NONRESIDENTS</u>			
Pronghorn Antelope			
Archery ^b	64	64	100.0
Deer			
Archery ^b	404	393	97.3
Firearms ^c	635	613	96.5
Small Game ^c	7,765 (5,522) ^g	6,065	78.1
Fishing ^b	16,906	16,500	97.6

^aNumber of active participants based on the percentage of survey respondents actually participating in each activity during the 1990 season.

^bParticipation rate based on NDSU survey.

^cParticipation rate based on NDGFD survey.

^dSmall game license required to hunt both upland and/or waterfowl.

^eIncludes early, late, and winter seasons.

^fEstimate provided by NDGFD.

^gNumber in parenthesis is for those who were licensed to and did hunt waterfowl.

TABLE 6. TOTAL DIRECT RESIDENT AND NONRESIDENT EXPENDITURES IN NORTH DAKOTA, BY ACTIVITY, 1990

Activity	Resident		Nonresident		Total	
	Expenditure	Percentage	Expenditure	Percentage	Expenditure	Percentage
	- dollars -		- dollars -		- dollars -	
Pronghorn Antelope ^a	2,478,330 ^b	0.6	23,560	0.2	2,501,890	0.6
Deer ^a	40,897,474 ^c	10.7	508,110	3.4	41,405,584	10.4
Special Big Game	223,074	0.1	0	0.0	223,074	0.1
Small Game ^d	67,801,348	17.7	3,408,530	22.8	71,209,878	17.9
Wild Turkey	927,142 ^e	0.2	0	0.0	927,142	0.2
Furbearer	<u>23,813,565</u>	<u>6.2</u>	<u>0</u>	<u>0.0</u>	<u>23,813,565</u>	<u>6.0</u>
Total Hunting	136,140,933	35.6	3,940,200	26.4	140,081,133	35.3
Hunting Percentage	97.2		2.8		100.0	
Total Fishing	<u>246,030,395</u>	<u>64.4</u>	<u>11,017,875</u>	<u>73.6</u>	<u>257,048,270</u>	<u>64.7</u>
Fishing Percentage	95.7		4.3		100.0	
Total Hunting and Fishing	382,171,328	100.0	14,958,075	100.0	397,129,404	<u>100.0</u>
Percentage	96.2		3.8		100.0	
Cost of Licenses	<u>2,697,829</u>		<u>735,407</u>		<u>3,433,236</u>	
Grand Total	384,869,157		15,693,482		400,562,640	

^aArchery and firearms combined.^bAverage includes gratis hunters.^cIncludes gratis and muzzleloader hunters.^dIncludes upland game and waterfowl hunters.^eIncludes gratis and spring season hunters.

Historical Expenditures

Resident expenditures increased considerably from 1982 to 1986 before leveling off in 1990 (Table 7). Resident expenditures have increased from \$125 million in 1982 to \$382 million in 1990. Nonresident expenditures increased 194 percent from 1976 to 1983 and declined 3 percent from 1986 to 1990. Nonresident expenditures increased from \$5 million in 1976 to \$15 million in 1990.

TABLE 7. RESIDENT AND NONRESIDENT TOTAL DIRECT EXPENDITURES (EXCLUDING LICENSE FEES) AND PERCENTAGE CHANGE, VARIOUS SURVEY YEARS, IN 1990 DOLLARS

Survey Year	Residents		Nonresidents	
	Total	Percent Change ^a	Total	Percent Change ^a
	- 1990 dollars ^b -		- 1990 dollars ^b -	
1976	na	na	5,262,500	na
1982	125,462,142	na	na	na
1983	na	na	15,465,360	194
1986	356,845,592	184	na	na
1990	382,171,328	7	14,958,075	(3)

^aRepresents the percentage change from the previous survey year.

^bAdjusted to 1990 dollars, using the Gross National Product Implicit Price Deflator.

Resident average season expenditures (adjusted for inflation) were higher in 1986 than in 1982 for all hunting/angling activities, except for furbearers (Table 8). Season expenditures were generally lower in 1990 than in 1986 for resident hunting/angling activities. Respondents had higher expenditures in most expenditure categories. However, for some activities, lower season expenditures for vehicles more than offset increases in other expenditure categories, except for small game waterfowl, gratis wild turkey, furbearer, and open water and ice fishing.

Resident average daily expenditures were generally lower in 1990 than in 1986 (Table 8). Exceptions were gratis wild turkey hunters and resident open water and ice anglers.

Nonresident average season expenditures were lower for archery and firearms deer hunters and higher for small game hunters in 1983 than for 1976 (Table 9). Season expenditures were higher for archery deer and small game hunters and anglers in 1990 than in 1986.

TABLE 8. AVERAGE SEASON AND DAILY EXPENDITURES, BY ACTIVITY, RESIDENT HUNTERS AND ANGLERS, 1982, 1986, AND 1990, IN 1990 DOLLARS

Activity	Season			Daily		
	1982	1986	1990	1982	1986	1990
----- 1990 dollars* -----						
Pronghorn Antelope						
Archery	682	1,338	1,096	217	286	156
Firearms	542	720	560	359	569	325
Gratis	na	641	278	na	591	121
Deer						
Archery	272	862	706	29	81	83
Firearms	359	685	600	125	242	173
Gratis	na	na	138	na	na	42
Muzzleloader	na	na	501	na	na	174
Special Big Game	1,061	1,735	1,458	455	975	430
Small Game						
Waterfowl	234	689	1,120	39	100	97
Upland	206	973	710	38	207	63
Wild Turkey						
Combined	70	542	156	38	407	84
Gratis	na	38	63	na	18	26
Spring	na	na	267	na	na	182
Furbearer	748	745	1,042	na	na	208
Fishing						
Open Water	825	1,463	2,363	63	146	213
Ice	na	315	872	na	38	129

*Adjusted to 1990 dollars, using the Gross National Product Implicit Price Deflator.

Additional Nonresident Expenditures

The average nonresident hunter spent \$13 to \$17 per day, or \$89 to \$124 in total, in the state for nonhunting-related goods and services during the season (Table 10). Most nonresident hunters spent an average of two days in North Dakota in addition to the days spent hunting. The average nonresident angler spent \$26 per day (\$269 in total) for nonangling-related goods and services and stayed seven additional days in the state.

Collectively, nonresident hunters/anglers contributed \$5.1 million to the state's economy in addition to direct hunter/angler expenditures. Nearly 90 percent of additional expenditures was attributable to nonresident anglers, and over 10 percent was attributable to small game hunters.

TABLE 9. AVERAGE SEASON EXPENDITURES, BY ACTIVITY,
NONRESIDENT HUNTERS AND ANGLERS, 1976, 1983, AND
1990, IN 1990 DOLLARS

Activity	Season		
	1976	1983	1990
----- 1990 dollars* -----			
Pronghorn Antelope			
Archery	na	na	368
Deer			
Archery	515	249	567
Firearms	515	480	466
Small Game	498	533	562
Fishing	na	564	668

*Adjusted to 1990 dollars, using the Gross National
Product Implicit Price Deflator.

TABLE 10. AVERAGE ADDITIONAL DAYS, AVERAGE ADDITIONAL DAILY EXPENDITURES,
AVERAGE ADDITIONAL EXPENDITURES PER HUNTER/ANGLER, AND ADDITIONAL TOTAL
DIRECT EXPENDITURES FOR ALL NONRESIDENT HUNTERS/ANGLERS IN NORTH DAKOTA, BY
ACTIVITY, 1990

Activity	Average Additional Trip Days ^a	Average Additional Daily Expenditures ^b	Average Additional Expenditures Per Hunter/Angler	Additional Total Direct Expenditures For All Hunters/Anglers
----- dollars -----				
Archery Antelope	3	14	121.17	7,755
Archery Deer	2	15	123.47	48,534
Firearms Deer	2	17	103.00	63,139
Small Game	2	13	89.00	539,785
Fishing	7	26	268.84	<u>4,435,860</u>
Total				5,095,073

^aTotal days spent in North Dakota during the hunting/fishing seasons less days
spent hunting/fishing.

^bTotal additional expenditures divided by total days spent in North Dakota
during the hunting/fishing seasons.

Economic Impact of Resident and
Nonresident Hunters/Anglers

Resident and nonresident hunters/anglers accounted for \$1,319 million in total business activity in 1990 in North Dakota⁵ (Table 11). Hunting/angling expenditures generated \$200 million in ag processing and miscellaneous manufacturing sales, \$170 million in retail trade sales, and \$267 million in personal income. Participation in hunting/angling activities supported 19,000 jobs across North Dakota.

TABLE 11. AG PROCESSING AND MISCELLANEOUS MANUFACTURING SALES, RETAIL TRADE, SALES, PERSONAL INCOME, TOTAL BUSINESS ACTIVITY, AND EMPLOYMENT GENERATED BY RESIDENT AND NONRESIDENT HUNTER/ANGLER EXPENDITURES IN NORTH DAKOTA, 1990

Group	Ag Processing & Misc. Manu- facturing Sales	Retail Trade Sales	Personal Income	Total Business Activity	Secondary Employment
	----- thousand dollars -----				-- jobs --
Residents	192,729	163,875	257,316	1,268,754	18,706
Nonresidents	<u>7,543</u>	<u>6,414</u>	<u>10,071</u>	<u>50,288</u>	<u>781</u>
Total	200,272	170,289	267,387	1,319,042	19,487

Resident and Nonresident
Ruralized Expenditures

Over 50 percent of residents' season expenditures for all hunting/angling was "ruralized" (spent in rural communities with populations less than 2,500) (Table 12). Archery pronghorn antelope hunters spent 52 percent of their hunting season expenditures in rural areas compared to 78 percent for special big game hunters. Over half of direct resident hunter/angler expenditures was spent in rural North Dakota.⁶

Urban residents' percentage of rural spending ranged from 21 percent for ice anglers to 64 percent for special big game hunters. Over \$67 million of urban resident expenditures was ruralized. Over 30 percent of ruralized hunter and angler expenditures was the direct result of urban residents' expenditures.

Rural residents spent between 58 percent (gratis wild turkey hunters) and 86 percent (special big game hunters) of total season expenditures in rural North Dakota. Rural residents spent about \$136 million in rural areas, accounting for nearly 70 percent of all resident expenditures in rural areas.

⁵Hunting/angling expenditures were applied to the recreation and tourism sector, and the cost of licenses was applied to the government sector of the North Dakota Input-Output Model.

⁶This was estimated by dividing total hunting/fishing expenditures in rural areas (\$202,981,285) by total direct resident expenditures (\$382,171,328).

TABLE 12. RESIDENT URBAN, RURAL, AND ALL HUNTER/ANGLER EXPENDITURES IN RURAL AREAS, BY ACTIVITY, 1990

Activity	All Residents			Urban Residents ^a			Rural Residents ^b		
	Percentage Rural Spending	Seasonal Amount per Sportsmen	Amount all Sportsmen	Percentage Rural Spending	Seasonal Amount per Sportsmen	Amount all Sportsmen	Percentage Rural Spending	Seasonal Amount per Sportsmen	Amount all Sportsmen
		----- dollars -----			----- dollars -----			----- dollars -----	
HUNTING									
Archery Antelope	52	578	659,285	39	435	322,465	78	843	336,820
Firearms Antelope									
Resident	68	382	702,101	50	280	182,973	78	439	519,128
Gratis	82	227	163,176	0	0	0	82	227	163,176
Total	72 ^c	339 ^c	865,277	36	201	182,973	79	379	682,305
Archery Deer	56	335	3,380,297	30	254	903,895	70	378	2,476,402
Firearms Deer									
Resident	71	344	18,448,254	48	414	6,352,814	81	316	12,095,440
Gratis	84	116	1,055,398	0	0	0	84	116	1,055,398
Total	73 ^c	311 ^c	19,503,652	41	354	6,352,814	81	287	13,150,838
Muzzleloader Deer	63	178	119,644	29	253	50,045	77	147	69,598
Special Big Game	78	1,197	183,127	64	516	28,264	86	1,577	154,863
Small Game									
Waterfowl	66	624	17,183,600	43	579	5,996,286	80	651	11,187,314
Upland Game	66	404	21,060,673	42	366	6,327,793	78	423	14,732,880
Wild Turkey									
Resident	66	90	324,369	43	69	99,770	82	104	224,599
Gratis	58	36	8,895	0	0	0	58	36	8,895
Total	66 ^c	87 ^c	333,264	40	65	99,770	81	100	233,494
Spring	65	202	266,438	32	69	25,838	79	255	240,600
Furbearer	67	550	12,581,116	45	668	4,335,448	76	504	8,245,668
Total Hunting			76,135,175			24,625,589			51,510,783
Hunting Percentage			100			32			68
FISHING									
Open water	62	1,198	113,571,630	37	1,135	40,647,851	77	1,237	72,923,779
Ice	57	524	13,274,480	21	185	1,849,987	80	747	11,424,493
Total Fishing			126,846,110			42,497,838			84,348,272
Fishing Percentage			100			34			66
HUNTING AND FISHING COMBINED									
Total			202,981,285			67,123,427			135,859,055
Percentage			100			33			67

^aNorth Dakota residents living in a city with a population greater than 2,500.^bNorth Dakota residents living in a city with a population less than or equal to 2,500, on a farm or ranch, or in a rural but nonfarm area.^cValues are a weighted average based on the number of participants.

The percentage of nonresident expenditures in rural areas ranged from 62 percent for anglers to 78 percent for archery pronghorn antelope hunters (Table 13). The season amount per sportsman varied from \$287 to \$427 for archery pronghorn antelope and archery deer hunters, respectively. Nonresidents spent over \$9.6 million or 65 percent of total nonresident direct expenditures in rural areas of North Dakota in 1990.

TABLE 13. NONRESIDENT HUNTER/ANGLER EXPENDITURES IN RURAL AREAS, BY ACTIVITY, 1990

Activity	Percentage Rural Spending	Seasonal Amount per Sportsman	Amount all Sportsmen
		- dollars -	- dollars -
Archery Pronghorn			
Antelope	78	287	18,389
Archery Deer	75	427	168,006
Firearms Deer	71	332	203,253
Small Game	70	394	2,392,106
Fishing	62	417	<u>6,875,154</u>
Total in Rural Areas			<u>9,656,908</u>

Collectively, nearly 55 percent of all resident and nonresident hunter and angler expenditures was spent in rural areas of North Dakota (Table 14). Residents made over 50 percent of expenditures in rural areas. Most of these expenditures were attributable to rural residents. Only 3 percent of total hunter/angler expenditures in rural areas was attributable to nonresidents. Over half of total hunting (56 percent) and angling (52 percent) expenditures was in rural areas of North Dakota.

Summary

A fourth survey of hunter and angler expenditures in North Dakota was made to estimate their economic impact. Resident open water anglers had the highest average season expenditure (\$2,363) compared to other resident hunting/angling activities. Resident special big game hunters had the highest average daily expenditure (\$430). Gratis wild turkey hunters had the lowest average season (\$63) and daily (\$26) expenditures.

Nonresident anglers had the highest average season expenditure (\$668) compared to other nonresident hunting/angling activities. Nonresident small game hunters spent the most per day (\$123). Nonresident archery pronghorn antelope hunters spent the least per day (\$54) and had the lowest season expenditure (\$368).

Resident and nonresident hunter/angler projected total direct expenditures (excluding the cost of licenses and other additional nonresident expenditures) in North Dakota were over \$397 million in 1990. Ninety-six percent of total direct expenditures was attributable to resident hunting/fishing activities. Nearly 65 percent of total resident and nonresident expenditures was from fishing in the state.

TABLE 14. RESIDENT AND NONRESIDENT EXPENDITURES IN RURAL AND URBAN AREAS OF NORTH DAKOTA, BY ACTIVITY, 1990

Activity	In Rural Areas					In Urban Areas					Total Expenditures
	All	Total Residents	Urban Residents	Rural Residents	Nonresidents	All	Total Residents	Urban Residents	Rural Residents	Nonresidents	
	----- dollars -----										
Antelope	1,542,951	1,524,562	505,437	1,019,124	18,389	958,939	953,768	678,218	275,550	5,171	2,501,890
Deer	23,374,851	23,003,592	7,306,754	15,696,839	371,259	18,030,733	17,893,882	12,311,934	5,581,948	136,851	41,405,584
Special Big Game	183,127	183,127	28,264	154,863	0	39,947	39,947	15,311	24,636	0	223,074
Small Game	40,636,379	38,244,272	12,324,078	25,920,194	2,392,106	30,573,499	29,557,075	20,818,402	8,738,674	1,016,424	71,209,878
Wild Turkey	599,702	599,702	125,608	474,094	0	327,440	327,440	199,191	128,249	0	927,142
Furbearer	12,581,116	12,581,116	4,335,448	8,245,668	0	11,232,449	11,232,449	7,522,885	3,709,563	0	23,813,565
Total Hunting	78,918,126	76,136,372	24,625,589	51,510,783	2,781,754	61,163,007	60,004,561	41,545,940	18,458,620	1,158,446	140,081,134
Hunting Percentage	56	54	18	37	2	44	43	30	13	1	
Fishing	133,721,264	126,846,110	42,497,838	84,348,272	6,875,154	123,327,007	119,184,286	90,173,754	29,010,532	4,142,721	257,048,270
Fishing Percentage	52	49	17	33	3	48	46	35	11	2	
Grand Total	212,639,390	202,982,482	67,123,427	135,859,055	9,656,908	184,490,014	179,188,847	131,719,694	47,469,153	5,301,167	397,129,404
Percentage	54	51	17	34	3	46	45	33	12	1	

Total direct resident expenditures (excluding the cost of licenses) have increased from \$125 million in 1982 to nearly \$382 million in 1990. Nonresident expenditures have increased from \$5 million in 1976 to \$15 million in 1990.

Resident and nonresident expenditures generated \$1,319 million of total business activity in North Dakota in 1990. Expenditures induced \$200 million in ag processing and miscellaneous manufacturing sales, \$170 million in retail trade sales, and \$267 million in personal income. Resident and nonresident expenditures supported 19,000 jobs across the state.

Total resident and nonresident hunting/angling expenditures (including other additional nonresident expenditures and cost of licenses) were \$406 million in 1990 (Figure 3). Most (\$385 million or 95 percent) was attributable to residents. Approximately \$203 million and \$9.7 million of resident and nonresident expenditures, respectively, or 52 percent of total expenditures was in rural areas.

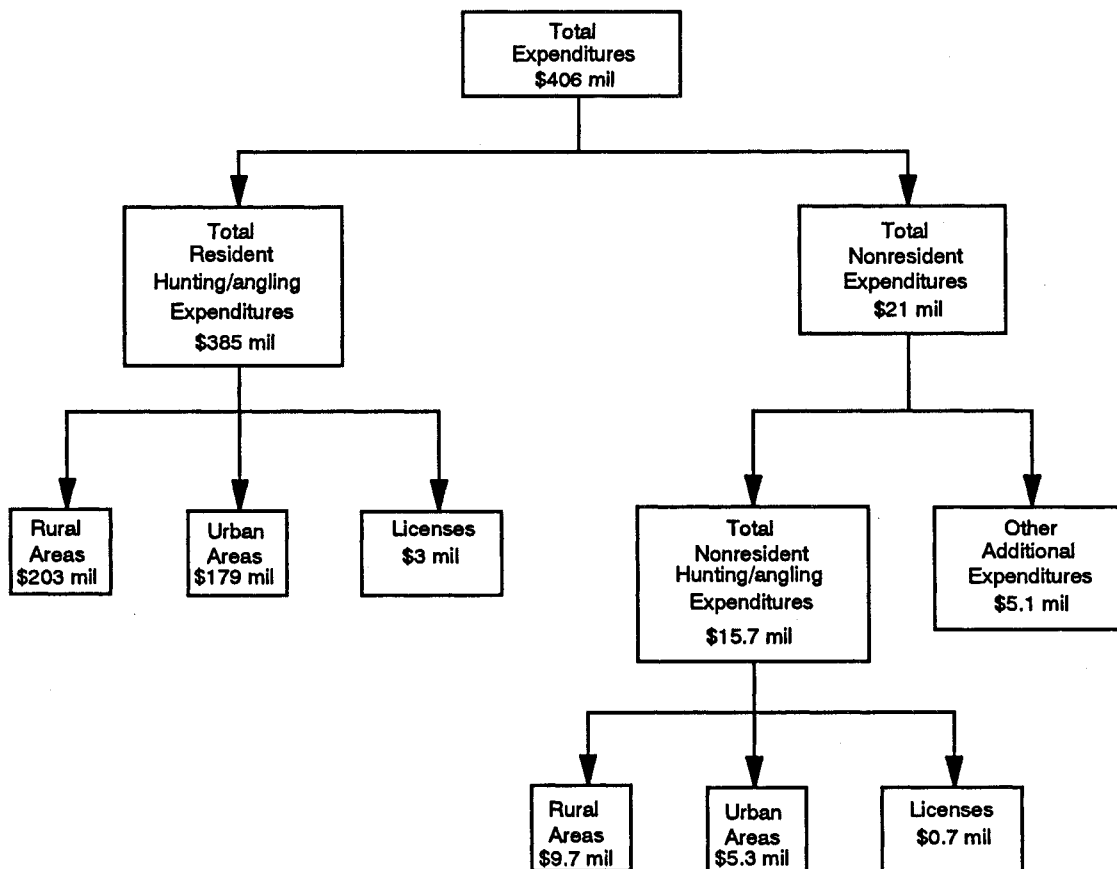


Figure 3. Dollar Flow of Resident and Nonresident Hunter/Angler Expenditures, 1990-91 Season, North Dakota

Rural residents accounted for most (\$136 million or 64 percent) of the expenditures in rural areas (Figure 4). Over 30 percent (\$67 million) and 5 percent (\$10 million) of expenditures in rural areas were attributable to urban residents and nonresidents, respectively.

Sixty percent (\$10 million) of nonresident expenditures was ruralized (Figure 4). Nearly 34 percent (\$67 million) of urban resident expenditures was ruralized. Over 35 percent of the expenditures in rural areas was attributable to ruralized resident and nonresident hunting/fishing expenditures.

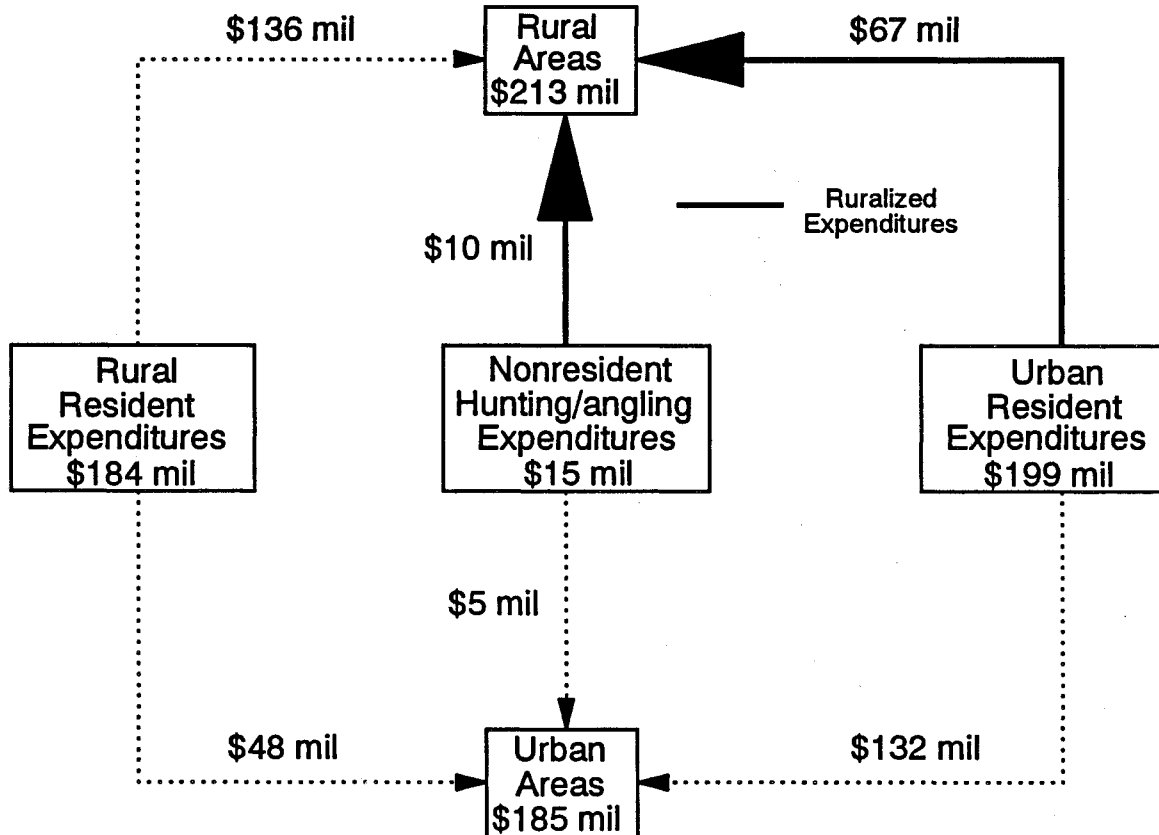
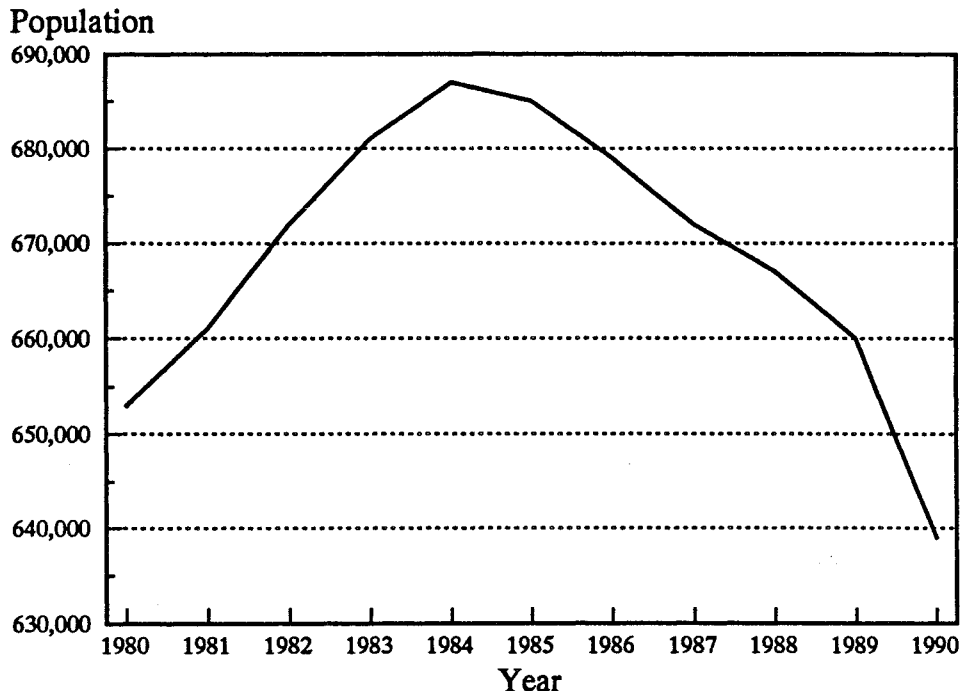


Figure 4. Dollar Flow of Urban and Rural Resident and Nonresident Hunter/Angler Expenditures, 1990-91 Season, North Dakota

Conclusions

Resident and nonresident hunters and anglers are an important part of North Dakota's economy. Resident and nonresident expenditures represented 5 percent of the state's economic base and provided 6 percent of the state's employment in the 1990-91 season. Hunting/fishing opportunities continue to furnish one mechanism to diversify and strengthen the state's economic base. However, the future extent and impact of resident and nonresident hunting/fishing expenditures on the North Dakota economy are uncertain.

North Dakota's population declined from over 685,000 to under 640,000, or by about 7 percent, from 1984 to 1990 (Figure 5). A declining population implies fewer total resident hunters/anglers unless the percentage of the population hunting/fishing increases. The percentage of the North Dakota population angling has declined from 23 percent to 18 percent (22 percent) from 1980 to 1990 (Figure 6). The percentage of hunters has declined from 13.6 percent to 12.8 percent (6 percent) over the same period.⁷ Reductions in the North Dakota population and the percentage of the population hunting/fishing both lead to fewer total resident hunters/anglers in the state.



SOURCE: U.S. Department of Commerce, Bureau of Census

Figure 5. North Dakota Population, 1980-1990

⁷The percentage of the population who were anglers was determined by dividing annual total resident fishing licenses sold (fishing and husband/wife license types) by the estimated North Dakota population for each year. The percentage of hunters was determined by dividing annual general game license sales by the estimated North Dakota population for each year. All North Dakota residents, regardless of age, must purchase a general game license to hunt unless they only hunt furbearer (hunt, trap, or snare) or they (including immediate family members) hunt only small game on their own land.

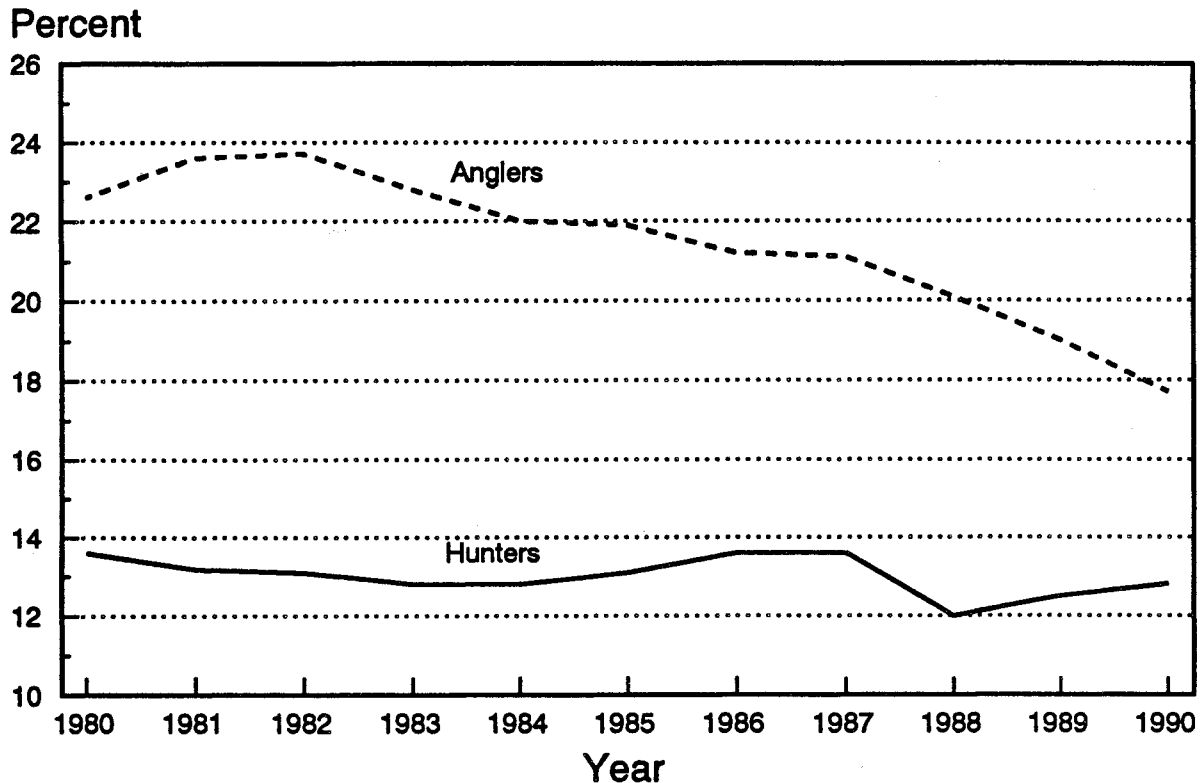


Figure 6. Percentage of North Dakota Population Who Are Anglers/Hunters, 1980-1990

Fewer resident hunters/anglers implies a reduction in state economic activity unless expenditures per hunter/angler increase. Average individual season expenditures of anglers, in particular, and hunters, in general, increased from 1986 to 1990. The 7 percent increase in aggregate direct expenditures from 1986 to 1990 suggests increased expenditures per hunter/angler more than offset the decline in the number of hunting/fishing participants. Unless expenditures per hunter/angler continue to increase and/or the number of hunters/anglers in the state grows, the economic activity generated by resident hunters/anglers will decline. A decline in economic activity seems almost certain, considering state trends in population and in absolute hunter/angler numbers.

Nonresident hunting and fishing license sales remained relatively stable from 1980 to 1990 in North Dakota (Figure 7). Resident fishing license sales declined 29 percent from 1982 to 1990 while resident hunting license sales declined 8 percent from 1980 to 1990 (Figure 8). Stable nonresident hunting/fishing license sales combined with falling resident hunting/fishing license sales suggest capacity for additional hunters/anglers within North Dakota.⁸

⁸This statement assumes the decline in resident hunting/fishing license sales is not the result of NDGFD reducing the number of available licenses.

License Sales

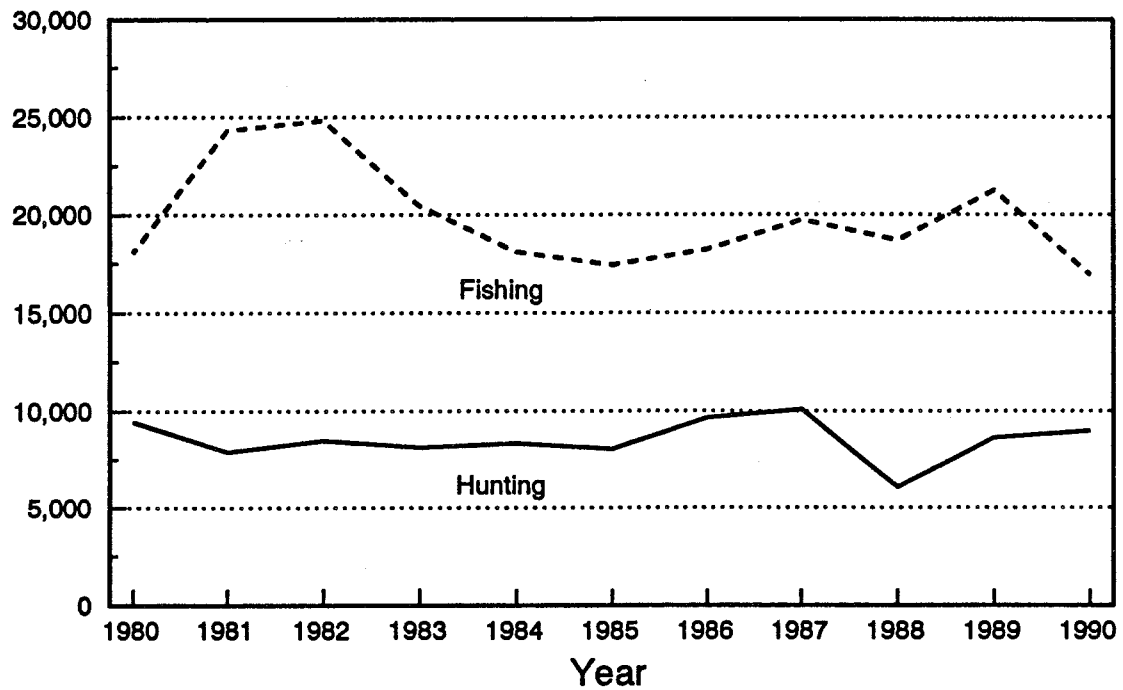


Figure 7. North Dakota Nonresident Fishing/Hunting License Sales, 1980-1990

License Sales

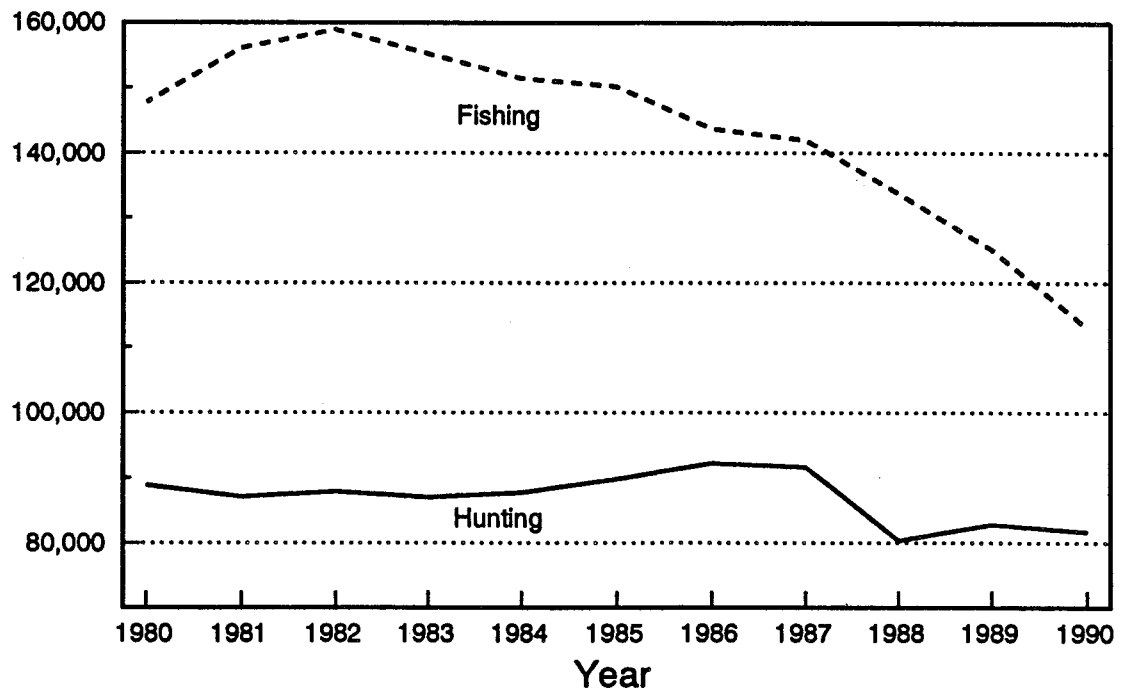


Figure 8. North Dakota Resident Fishing/Hunting License Sales, 1980-1990

The continuing declines in resident population and percentage of the population hunting/fishing imply residents may not be able to absorb what appears to be excess hunting/fishing capacity. Expanding opportunities in North Dakota for nonresident hunters/anglers could reduce excess hunting/fishing capacity, increase hunting/fishing expenditures, and boost economic activity within the state. Rural residents would benefit the most from expanding nonresident hunting/fishing participation since the majority of nonresidents' hunting/fishing expenditures in North Dakota is made in rural areas.

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Appendix A
Resident Archery Pronghorn Antelope

APPENDIX TABLE A1. RESIDENT ARCHERY PRONGHORN ANTELOPE
HUNTER EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
- dollars -		
Variable:		
Access	0.02	
Film	7.17	
Food	62.21	
Lodging	9.32	
Meat	4.84	
Other	7.51	
Taxidermy	15.04	
Transportation	<u>128.17</u>	
Season	233.90 ± 25.19 ^b	(n=198, sd=216.16)
Daily	40.94 ± 5.29	(n=193, sd= 44.84)
Fixed:		
Binoculars	37.84	
Camping	67.44	
Clothing	35.25	
Other	5.99	
Vehicle	612.21	
Weapons	<u>101.51</u>	
Season	856.66 ± 447.24	(n=182, sd=216.16)
Daily	<u>115.19 ± 89.06</u>	(n=177, sd=587.39)
Total Fixed and Variable:		
Season	1,096.27 ± 171.82	(n=181, sd=3,791.13)
Daily	156.42 ± 73.64	(n=176, sd= 595.67)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix B
Nonresident Archery Pronghorn Antelope

APPENDIX TABLE B1. NONRESIDENT ARCHERY PRONGHORN ANTELOPE
HUNTER EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
<hr/> - dollars - <hr/>		
Variable:		
Access	0.00	
Film	27.62	
Food	123.52	
Lodging	39.40	
Meat	4.86	
Other	10.88	
Taxidermy	16.86	
Transportation		
Commercial	0.00	
Private	<u>104.07</u>	
Season	327.21 ± 45.52 ^b	(n=42, sd=179.89)
Daily	52.67 ± 9.02	(n=42, sd= 35.63)
Fixed:		
Binoculars	2.19	
Camping	8.19	
Clothing	12.16	
Other	5.31	
Vehicle	0.00	
Weapons	<u>6.84</u>	
Season	34.69 ± 12.73	(n=32, sd=43.92)
Daily	<u>4.87 ± 1.70</u>	n=32, sd= 5.86)
Total Fixed and Variable:		
Season	368.13 ± 54.52	(n=32, sd=188.06)
Daily	53.96 ± 7.89	(n=32, sd= 27.22)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix C
Resident Firearms Pronghorn Antelope

APPENDIX TABLE C1. RESIDENT FIREARMS PRONGHORN ANTELOPE
HUNTER EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
<hr/>		
	- dollars -	
Variable:		
Access	0.17	
Ammunition	11.27	
Film	4.94	
Food	34.83	
Lodging	19.23	
Meat	16.32	
Other	1.56	
Taxidermy	46.02	
Transportation	<u>58.99</u>	
Season	193.14 ± 13.86 ^b	(n=260, sd=136.30)
Daily	116.58 ± 10.25	(n=258, sd=100.39)
Fixed:		
Binoculars	35.73	
Camping	4.13	
Clothing	13.56	
Other	2.53	
Vehicle	264.18	
Weapons	<u>43.91</u>	
Season	360.68 ± 236.42	(n=191, sd=1,992.27)
Daily	<u>205.18 ± 122.52</u>	(n=190, sd=1,029.81)
Total Fixed and Variable:		
Season	559.61 ± 239.29	(n=191, sd=2,016.48)
Daily	324.99 ± 124.93	(n=190, sd=1,050.00)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix D
Gratis Firearms Pronghorn Antelope

APPENDIX TABLE D1. GRATIS FIREARMS PRONGHORN ANTELOPE
HUNTER EXPENDITURES, 1990

Expenditure Category*	Mean Expenditure	
	- dollars -	
Variable:		
Access	0.00	
Ammunition	6.24	
Film	0.67	
Food	6.60	
Lodging	0.88	
Meat	14.62	
Other	1.41	
Taxidermy	11.24	
Transportation	<u>18.87</u>	
Season	60.29 ± 9.74 ^b	(n=153, sd=73.49)
Daily	34.97 ± 6.73	(n=149, sd=50.10)
Fixed:		
Binoculars	12.20	
Camping	2.50	
Clothing	5.88	
Other	0.68	
Vehicle	177.06	
Weapons	<u>21.19</u>	
Season	219.45 ± 282.12	(n=100, sd=1,720.25)
Daily	<u>87.06 ± 98.83</u>	(n= 96, sd= 590.42)
Total Fixed and Variable:		
Season	277.83 ± 283.62	(n=100, sd=1,729.42)
Daily	121.17 ± 99.44	(n= 96, sd= 594.07)

*For further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix E
Resident Archery Deer

APPENDIX TABLE E1. RESIDENT ARCHERY DEER HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
<hr/>		
	- dollars -	
Variable:		
Access	1.59	
Film	3.69	
Food	48.13	
Lodging	5.79	
Meat	12.97	
Other	5.41	
Taxidermy	9.72	
Transportation	<u>107.31</u>	
Season	194.05 ± 14.97 ^b	(n=560, sd=215.97)
Daily	21.83 ± 3.35	(n=544, sd= 47.73)
Fixed:		
Binoculars	17.02	
Camping	22.60	
Clothing	41.78	
Other	10.26	
Vehicle	328.76	
Weapons	<u>75.57</u>	
Season	494.31 ± 143.45	(n=514, sd=1,983.01)
Daily	<u>59.90 ± 32.02</u>	(n=497, sd= 435.30)
Total Fixed and Variable:		
Season	705.52 ± 147.87	(n=505, sd=2,026.23)
Daily	82.78 ± 32.96	(n=489, sd= 444.39)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix F
Nonresident Archery Deer

APPENDIX TABLE F1. NONRESIDENT ARCHERY DEER HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
- dollars -		
Variable:		
Access	32.42	
Film	10.38	
Food	107.95	
Lodging	58.71	
Meat	10.37	
Other	4.83	
Taxidermy	9.64	
Transportation		
Commercial	9.25	
Private	<u>122.07</u>	
Season	363.20 ± 31.63 ^b	(n=211, sd=280.12)
Daily	60.29 ± 8.00	(n=211, sd= 70.81)
Fixed:		
Binoculars	1.90	
Camping	5.39	
Clothing	16.41	
Other	4.71	
Vehicle	152.81	
Weapons	<u>23.82</u>	
Season	203.96 ± 253.06	(n=172, sd=2,023.65)
Daily	<u>16.08 ± 13.01</u>	(n=172, sd= 104.01)
Total Fixed and Variable:		
Season	566.52 ± 260.29	(n=172, sd=2,081.50)
Daily	77.64 ± 16.92	(n=172, sd= 135.31)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix G
Resident Firearms Deer

APPENDIX TABLE G1. RESIDENT FIREARMS DEER HUNTER
EXPENDITURES, 1990

Expenditure Category*	Mean Expenditure	
	- dollars -	
Variable:		
Access	0.22	
Ammunition	18.78	
Film	3.02	
Food	39.57	
Lodging	7.33	
Meat	41.79	
Other	2.38	
Taxidermy	5.81	
Transportation	<u>68.19</u>	
Season	187.09 ± 16.83 ^b	(n=255, sd=163.83)
Daily	50.90 ± 4.71	(n=253, sd= 45.72)
Fixed:		
Binoculars	25.23	
Camping	2.13	
Clothing	21.85	
Other	2.80	
Vehicle	281.58	
Weapons	<u>72.86</u>	
Season	406.44 ± 213.54	(n=222, sd=1,940.35)
Daily	<u>119.58 ± 82.84</u>	(n=220, sd= 749.25)
Total Fixed and Variable:		
Season	599.50 ± 214.95	(n=222, sd=1,952.89)
Daily	173.15 ± 82.96	(n=220, sd= 750.33)

*For further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix H
Gratis Firearms Deer

APPENDIX TABLE H1. GRATIS FIREARMS DEER HUNTER
EXPENDITURES, 1990

Expenditure Category*	Mean Expenditure	
- dollars -		
Variable:		
Access	0.00	
Ammunition	10.90	
Film	0.59	
Food	15.26	
Lodging	0.33	
Meat	34.31	
Other	0.97	
Taxidermy	4.64	
Transportation	<u>26.30</u>	
Season	94.19 ± 12.41 ^b	(n=182, sd=102.05)
Daily	30.89 ± 4.25	(n=180, sd= 34.75)
Fixed:		
Binoculars	5.42	
Camping	0.14	
Clothing	9.75	
Other	0.89	
Vehicle	0.00	
Weapons	<u>20.78</u>	
Season	36.99 ± 14.34	(n=144, sd=104.94)
Daily	<u>8.45 ± 2.89</u>	(n=143, sd= 21.07)
Total Fixed and Variable:		
Season	137.49 ± 23.71	(n=144, sd=173.51)
Daily	41.61 ± 6.69	(n=143, sd= 48.81)

*For further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix I
Nonresident Firearms Deer

APPENDIX TABLE I1. NONRESIDENT FIREARMS DEER HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
<hr/>		
	- dollars -	
Variable:		
Access	1.83	
Ammunition	12.96	
Film	3.35	
Food	90.70	
Lodging	29.70	
Meat	23.90	
Other	6.85	
Taxidermy	8.59	
Transportation		
Commercial	33.51	
Private	<u>98.71</u>	
Season	309.78 ± 26.16 ^b	(n=263, sd=258.68)
Daily	85.50 ± 7.46	(n=262, sd= 73.59)
Fixed:		
Binoculars	6.96	
Camping	2.23	
Clothing	16.60	
Other	3.07	
Vehicle	80.23	
Weapons	<u>13.91</u>	
Season	123.01 ± 128.50	(n=192, sd=1,085.73)
Daily	<u>29.64 ± 32.27</u>	(n=191, sd= 271.97)
Total Fixed and Variable:		
Season	465.69 ± 133.09	(n=192, sd=1,124.49)
Daily	117.81 ± 33.24	(n=191, sd= 280.13)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix J
Resident Muzzleloader Deer

APPENDIX TABLE J1. RESIDENT MUZZLELOADER DEER HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
<hr/> - dollars -		
Variable:		
Access	1.21	
Ammunition	10.68	
Film	0.86	
Food	18.87	
Lodging	1.57	
Meat	11.44	
Other	1.11	
Taxidermy	1.44	
Transportation	<u>40.17</u>	
Season	86.89 ± 6.07 ^b	(n=458, sd=79.23)
Daily	27.23 ± 2.52	(n=457, sd=32.89)
Fixed:		
Binoculars	20.33	
Camping	1.37	
Clothing	26.16	
Other	5.00	
Vehicle	289.83	
Weapons	<u>68.61</u>	
Season	410.30 ± 193.15	(n=347, sd=2,193.88)
Daily	<u>145.36 ± 73.04</u>	(n=347, sd= 829.62)
Total Fixed and Variable:		
Season	501.23 ± 194.58	(n=346, sd=2,206.96)
Daily	173.91 ± 73.79	(n=346, sd= 836.93)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix K
Special Big Game

APPENDIX TABLE K1. SPECIAL BIG GAME HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
	- dollars -	
Variable:		
Access	13.96	
Ammunition	18.06	
Film	14.23	
Food	106.90	
Lodging	76.90	
Meat	82.72	
Other	16.84	
Taxidermy	88.84	
Transportation	<u>166.20</u>	
Season	582.54 ± 49.40 ^b	(n=134, sd=348.66)
Daily	202.00 ± 30.34	(n=134, sd=214.16)
Fixed:		
Binoculars	29.30	
Camping	5.75	
Clothing	41.17	
Other	49.28	
Vehicle	651.20	
Weapons	<u>70.55</u>	
Season	847.25 ± 533.93	(n=100, sd=3,255.68)
Daily	<u>199.17 ± 100.15</u>	(n=100, sd= 610.66)
Total Fixed and Variable:		
Season	1,462.06 ± 544.22	(n=100, sd=3,318.39)
Daily	429.86 ± 109.50	(n=100, sd= 667.69)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix L
Resident Waterfowl

APPENDIX TABLE L1. RESIDENT WATERFOWL HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
<hr/>		
	- dollars -	
Variable:		
Access	1.55	
Ammunition	61.86	
Film	5.87	
Food	69.04	
Lodging	24.09	
Meat	8.24	
Other	5.85	
Repairs	13.26	
Taxidermy	10.19	
Transportation	132.44	
Veterinarian	<u>9.32</u>	
Season	340.31 ± 46.73 ^b	(n=210, sd=412.88)
Daily	35.04 ± 3.97	(n=202, sd= 34.36)
Fixed:		
Boat	0.01	
Binoculars	21.08	
Camping	10.96	
Clothing	59.36	
Decoys	22.17	
Dogs	8.90	
Other	1.99	
Vehicle	538.19	
Weapons	<u>93.71</u>	
Season	756.40 ± 326.50	(n=182, sd=2,685.78)
Daily	<u>61.44 ± 23.17</u>	(n=178, sd= 188.51)
Total Fixed and Variable:		
Season	1,119.74 ± 353.21	(n=180, sd=2,889.50)
Daily	97.38 ± 24.34	(n=176, sd= 196.90)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix M
Resident Upland Game

APPENDIX TABLE M1. RESIDENT UPLAND GAME HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
	- dollars -	
Variable:		
Access	0.56	
Ammunition	47.42	
Film	3.40	
Food	75.51	
Lodging	15.81	
Meat	12.67	
Other	6.15	
Taxidermy	7.96	
Transportation	152.76	
Veterinarian	<u>15.30</u>	
Season	337.50 ± 34.13 ^b	(n=341, sd=384.30)
Daily	34.03 ± 2.70	(n=331, sd= 29.92)
Fixed:		
Binoculars	14.67	
Camping	10.08	
Clothing	50.23	
Dogs	6.43	
Other	4.91	
Vehicle	196.25	
Weapons	<u>68.78</u>	
Season	350.14 ± 136.01	(n=301, sd=1,438.82)
Daily	<u>28.03 ± 7.75</u>	(n=292, sd= 80.76)
Total Fixed and Variable:		
Season	709.59 ± 149.05	(n=300, sd=1,574.17)
Daily	62.77 ± 8.63	(n=291, sd= 89.81)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix N
Nonresident Small Game

APPENDIX TABLE N1. NONRESIDENT SMALL GAME HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
	- dollars -	
Variable:		
Access	5.39	
Ammunition	27.66	
Film	4.46	
Food	119.05	
Lodging	73.00	
Meat	1.46	
Other	14.23	
Repairs	4.86	
Taxidermy	4.76	
Transportation		
Commercial	46.36	
Private	107.62	
Veterinarian	<u>2.16</u>	
Season	409.77 ± 23.84 ^b	(n=677, sd=382.95)
Daily	93.36 ± 8.10	(n=638, sd=124.73)
Fixed:		
Boat	0.01	
Binoculars	1.30	
Camping	2.16	
Clothing	21.07	
Decoys	6.66	
Dogs	3.21	
Other	3.37	
Vehicle	54.82	
Weapons	<u>16.12</u>	
Season	106.89 ± 87.51	(n=422, sd=1,096.11)
Daily	<u>23.34 ± 18.46</u>	(n=403, sd= 225.94)
Total Fixed and Variable:		
Season	561.78 ± 94.90	(n=422, sd=1,188.75)
Daily	122.96 ± 22.37	(n=403, sd= 273.86)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix O
Resident Wild Turkey

APPENDIX TABLE O1. RESIDENT WILD TURKEY (EARLY, LATE,
WINTER) HUNTER EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
<hr/>		
	- dollars -	
Variable:		
Access	0.73	
Ammunition	6.27	
Film	1.43	
Food	28.30	
Lodging	10.54	
Meat	0.36	
Other	1.30	
Taxidermy	0.48	
Transportation	<u>43.71</u>	
Season	92.50 ± 10.68 ^b	(n=241, sd=101.08)
Daily	50.49 ± 5.60	(n=237, sd= 52.59)
Fixed:		
Binoculars	8.80	
Camping	10.22	
Clothing	15.63	
Other	1.56	
Vehicle	1.46	
Weapons	<u>21.98</u>	
Season	59.11 ± 20.21	(n=160, sd=155.85)
Daily	<u>34.73 ± 12.25</u>	(n=159, sd= 94.20)
Total Fixed and Variable:		
Season	155.51 ± 26.21	(n=159, sd=201.50)
Daily	83.73 ± 14.33	(n=158, sd=109.81)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix P
Gratis Wild Turkey

APPENDIX TABLE P1. GRATIS WILD TURKEY HUNTER
EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
- dollars -		
Variable:		
Ammunition	3.90	
Film	0.34	
Food	8.22	
Lodging	0.40	
Meat	0.00	
Other	0.00	
Taxidermy	0.00	
Transportation	<u>18.65</u>	
Season	31.14 ± 10.53 ^b	(n=63, sd=50.97)
Daily	12.47 ± 3.63	(n=61, sd=17.29)
Fixed:		
Binoculars	13.32	
Camping	0.00	
Clothing	7.10	
Other	0.00	
Vehicle	2.44	
Weapons	<u>0.00</u>	
Season	24.02 ± 16.33	(n=42, sd=64.54)
Daily	<u>10.80 ± 9.65</u>	(n=40, sd=26.32)
Total Fixed and Variable:		
Season	62.79 ± 25.34	(n=42, sd=100.15)
Daily	26.10 ± 10.10	(n=40, sd= 38.94)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix Q
Resident Spring Wild Turkey

APPENDIX TABLE Q1. RESIDENT SPRING WILD TURKEY HUNTER
EXPENDITURES, 1991

Expenditure Category*	Mean Expenditure	
- dollars -		
Variable:		
Ammunition	4.54	
Film	1.70	
Food	15.80	
Lodging	3.95	
Meat	0.24	
Other	0.67	
Taxidermy	6.38	
Transportation	<u>33.62</u>	
Season	66.60 ± 7.89 ^b	(n=226, sd=72.30)
Daily	32.88 ± 4.43	(n=223, sd=40.32)
Fixed:		
Binoculars	13.87	
Camping	0.80	
Clothing	7.11	
Other	3.12	
Vehicle	157.96	
Weapons	<u>14.31</u>	
Season	193.73 ± 198.90	(n=160, sd=1,534.07)
Daily	<u>144.67 ± 187.32</u>	(n=159, sd=1,440.26)
Total Fixed and Variable:		
Season	266.81 ± 202.09	(n=158, sd=1,548.95)
Daily	182.05 ± 189.95	(n=157, sd=1,451.27)

*For further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix R
Resident Furbearer

APPENDIX TABLE R1. RESIDENT FURBEARER HUNTER/TRAPPER
EXPENDITURES, 1990

Expenditure Category*	Mean Expenditure	
	- dollars -	
Variable:		
Access	0.17	
Ammunition	26.56	
Film	2.21	
Food	39.85	
Lodging	6.30	
Other	17.14	
Taxidermy	6.43	
Transportation	112.08	
Season	209.98 ± 33.78 ^b	(n=292, sd=351.94)
Daily	25.62 ± 4.90	(n=266, sd= 48.73)
Fixed:		
A.T.V.	26.77	
Binoculars	42.15	
Calls	6.77	
Camping	10.04	
Clothing	31.74	
Other	16.47	
Skinning Equip.	5.14	
Traps	5.74	
Vehicle	564.83	
Weapons	<u>111.69</u>	
Season	813.77 ± 319.21	(n=239, sd=3,009.03)
Daily	<u>180.75 ± 129.48</u>	(n=220, sd=1,171.08)
Total Fixed and Variable:		
Season	1,041.85 ± 327.78	(n=238, sd=3,083.41)
Daily	208.08 ± 131.90	(n=220, sd=1,192.93)

*For further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix S
Resident Summer Fishing

APPENDIX TABLE S1. RESIDENT SUMMER ANGLER EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
- dollars -		
Variable:		
Access	3.13	
Bait	34.59	
Boat Gas	54.57	
Boat Rental	1.90	
Film	6.35	
Food	126.05	
Lodging	37.05	
Meat	1.67	
Other	5.03	
Repairs	56.57	
Taxidermy	10.43	
Transportation	<u>159.98</u>	
Season	490.43 ± 67.98 ^b	(n=469, sd=897.67)
Daily	45.35 ± 6.96	(n=445, sd= 89.50)
Fixed:		
Boat	570.68	
Camping	144.87	
Clothing	13.89	
Depth Finder	29.79	
Other	15.81	
Rods	44.85	
Tackle	46.87	
Vehicle	<u>943.87</u>	
Season	1,804.03 ± 478.62	(n=424, sd=6,009.37)
Daily	<u>164.22 ± 46.17</u>	(n=402, sd= 564.49)
Total Fixed and Variable:		
Season	2,362.57 ± 529.17	(n=416, sd=6,581.05)
Daily	212.86 ± 49.17	(n=395, sd= 595.84)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix T
Resident Ice Fishing

APPENDIX TABLE T1. RESIDENT ICE ANGLER EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
	- dollars -	
Variable:		
Bait	16.31	
Film	0.63	
Food	53.19	
Heating gas	8.98	
House rent	0.62	
Lodging	2.47	
Meat	0.80	
Other	0.30	
Repairs	8.93	
Taxidermy	3.40	
Transportation	<u>82.86</u>	
Season	177.57 ± 30.95 ^b	(n=103, sd= 191.51)
Daily	20.29 ± 3.64	(n= 95, sd= 22.01)
Fixed:		
Auger	19.72	
Clothing	16.46	
Fish Finder	15.96	
Fish house	15.62	
Other	0.09	
Rods	16.24	
Tackle	14.73	
Vehicle	<u>593.18</u>	
Season	677.92 ± 488.28	(n=90, sd=2,824.50)
Daily	<u>107.54 ± 96.07</u>	(n=82, sd= 530.47)
Total Fixed and Variable:		
Season	872.37 ± 492.39	(n=90, sd=2,848.33)
Daily	128.61 ± 96.10	(n=82, sd= 530.64)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.

Appendix U
Nonresident Fishing

APPENDIX TABLE U1. NONRESIDENT ANGLER EXPENDITURES, 1990

Expenditure Category ^a	Mean Expenditure	
	- dollars -	
Variable:		
Access	2.18	
Bait	20.46	
Boat/fish house gas	16.23	
Boat/fish house rental	13.63	
Film	3.60	
Food	104.99	
Lodging	52.25	
Meat	1.65	
Other	11.69	
Repairs	5.70	
Taxidermy	4.80	
Transportation		
Private	91.50	
Commercial	16.65	
Season	332.37 ± 34.37 ^b	(n=271, sd=344.98)
Daily	81.48 ± 11.73	(n=251, sd=113.28)
Fixed:		
Auger	7.62	
Boat	197.88	
Camping	6.74	
Clothing	7.83	
Depth Finder	13.91	
Fish house	0.54	
Other	10.44	
Rods	12.84	
Tackle	24.80	
Vehicle	13.59	
Season	293.11 ± 191.97	(n=189, sd=1,609.26)
Daily	33.67 ± 20.60	(n=175, sd= 166.17)
Total Fixed and Variable:		
Season	667.75 ± 206.32	(n=188, sd=1,724.96)
Daily	116.53 ± 26.65	(n=174, sd= 214.33)

^aFor further explanation of categories, see Table 3.

^bIndicates a 90 percent confidence interval.