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# **Nonresident Hunters In North Dakota**

## **Characteristics Expenditures Harvest**

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## FOREWORD

This study was initiated when a need for data on nonresident hunter expenditures and activities was identified in a departmental research effort considering alternative uses of wetlands. Also, nonresident hunting license sales are an important source of revenue for the North Dakota State Game and Fish Department. In 1976, 7.5 percent of the hunters in the state were nonresidents, but nonresident license sales accounted for 27 percent of all state hunting license revenue. The data in this report fill a void that existed in estimating the economic significance of all hunting in North Dakota since a similar study dealing with resident hunters was conducted in the department in 1973.

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## Highlights

Nonresident hunting license sales are an important source of revenue for the North Dakota State Game and Fish Department--accounting for 27 percent of all state hunting license revenue in 1976. In that year, over 9,000 licenses were sold to hunters from 47 states and three foreign countries. About 80 percent of those purchasing nonresident licenses purchased waterfowl permits and over 800 bought big game licenses.

A survey of nonresidents who hunted in North Dakota in 1976 was conducted to obtain information on their expenditures in the state, some selected socioeconomic characteristics, and hunting success. Nonresident hunters came here to hunt for three main reasons: 1) they had hunted here before, 2) they had friends or relatives in the state, and 3) they were former residents. Over half of the hunters lived in cities with over 5,000 population. They spent approximately 75 percent of their time hunting on private land. Fifteen percent of the waterfowl hunters sampled had leased land in 1976, while 7.6 percent leased in 1975, and 7.8 percent leased in 1974.

Those who hunted waterfowl hunted an average of 5.3 days and spent \$311. Upland game hunters averaged about 5 days hunting and spent \$241; while firearms deer hunters spent an average of 4 days hunting and their total expenditures averaged \$280 per hunter. Archery hunters had the longest average stay in the state, 7 days, and they spent \$275.

The estimated total expenditure (excluding license purchases) by all nonresident hunters in 1976 was \$2.5 million which resulted in a total of \$6.3 million in gross business volume in the state's economy. The business volume generated by nonresident hunters resulted in the direct or indirect employment of 178 people. In addition, the employment of 50 people was due to the expenditure of \$391,000 for nonresident licenses.

NONRESIDENT HUNTERS IN NORTH DAKOTA:  
CHARACTERISTICS, EXPENDITURES,  
AND HARVEST

by

Jay A. Leitch and Donald F. Scott\*

This study was initiated when a need for data on nonresident hunter expenditures was identified in an analysis of alternative uses of wetlands.<sup>1</sup> Also, nonresident hunting license sales are an important source of revenue for the North Dakota State Game and Fish Department. In 1976, 7.5 percent of the hunters in the state were nonresidents, but nonresident license sales accounted for 27 percent of all state hunting license revenue. Knowledge of nonresident hunter activities is important in the planning process of the State Game and Fish Department.

Sorenson reported on expenditures and activities of North Dakota's resident hunters in 1973. Harmoning updated and expanded Sorenson's earlier effort. This report fills the void that existed in estimating the economic significance of hunting in North Dakota.

Hunter expenditures can assist landowners and legislators in making decisions on wildlife management or serve as a data base for more sophisticated economic analyses (Clawson and Knetsch). However, there are some limitations when using expenditures reported by hunters. First, accuracy is dependent on how well the respondent understands the survey form and his recollection of his expenditures. Second, only gross expenditures were reported, which greatly exceed their value to the community or the state. For example, of each dollar spent at a gas station, most of it may leave the area or state to purchase gasoline, oil, parts, or accessories. Only the portion that is the business owner's return after paying for inputs purchased outside the area will directly affect the region. Finally, the data were collected for one year, 1976, and this may or may not be representative of spending patterns in other years.

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<sup>1</sup>Economic Activity and Water Management in the Devils Lake Basin, forthcoming Agricultural Economics Report.

### Nonresident Hunting Regulations

Nonresident hunters are subject to somewhat different regulations than resident hunters. The number of nonresident permits is limited to 1 percent of resident permits. Big game hunters, nonresident and resident alike, must participate in the firearms deer license lottery. Nonresidents can purchase their archery permits (deer or antelope) by mail or after arriving. There is no limit on the number of archery permits issued.

Nonresident upland game and waterfowl hunters are subject to more restrictive regulations than are residents. There is a maximum season bag limit for small game, including waterfowl. The limits are: sharptail grouse--12; ruffed grouse--4; Hungarian partridge--10; pheasants--6; ducks--20; and geese--8.

Nonresident waterfowl hunters must choose ten consecutive days to hunt at the time they buy their license. They must select one of five zones to hunt in, with a sixth zone open to all hunters. A maximum number of permits can be issued within each zone.

Current regulations for nonresident upland game and waterfowl hunters became effective with the fall 1975 hunting season. They were enacted to reduce hunter congestion in prime waterfowl areas, such as Devils Lake, and to better manage the influx of nonresident hunters. An effort to make some regulations less strict failed in the 1977 legislative session.

The long-run effect of present regulations on nonresident license sales is still unknown because there have only been three hunting seasons (1975, 1976, and 1977) since their enactment. The 1976 season was abnormal in terms of nonresident waterfowl permits sold due to partial closure of Minnesota's season. This probably caused many of that state's hunters to hunt in North Dakota. Sales of nonresident licenses vary from year to year depending on several factors, including closed seasons in other states, good success ratios in previous years in North Dakota, or the influence of gasoline prices.

The number of nonresident licenses sold between 1967 and 1976 is given in Table 1. There was a general upward trend in nonresident small game licenses from 1967 until 1974. The sharp drop in 1975 license sales may have been caused by the nonresident regulations. The increase in 1976 sales may have been a result of Minnesota's shortened seasons that year.

TABLE 1. NUMBER OF NONRESIDENT HUNTING LICENSES SOLD IN NORTH DAKOTA, BY TYPE, 1967-1976

Year	Small Game	Waterfowl	Firearms Deer	Archery Deer	Archery Antelope
-----number sold-----					
1976	8,828	8,530 <sup>a</sup>	486	330	38
1975	6,278	6,043 <sup>a</sup>	366	231	25
1974	10,151	b	561	201	25
1973	8,593	b	582	140	26
1972	9,425	b	551	125	14
1971	8,638	b	600	111	10
1970	6,299	b	316	74	3
1969	4,491	b	132	41	7
1968	5,240	b	117	62	16
1967	5,050	b	183	52	10

<sup>a</sup>A small game license is a prerequisite.

<sup>b</sup>Not required.

SOURCE: Kruckenberg, Larry, "Factbook," State Game and Fish Department, Bismarck, North Dakota, annual.

### The 1976 Nonresident Hunter Population

Over 9,000 licenses were sold to hunters from 47 states and three foreign countries in 1976 (Appendix A) (Figures 1, 2, and 3). About 80 percent of those hunters purchased nonresident waterfowl permits and over 800 bought big game licenses. Appendix A presents the license combinations purchased by survey respondents.

### Survey Procedure

Questionnaires<sup>2</sup> were mailed with return envelopes to all nonresident big game hunters and a sample of nonresident small game hunters (Table 2). The small game hunter sample consisted of 50 percent of the nonresident hunters

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<sup>2</sup>The survey questionnaire was designed and printed on both sides of an 8½ by 14 inch sheet of paper, to keep it from appearing lengthly and thereby affecting the response rate. A cover letter explained the purpose of the survey and encouraged response. A map of North Dakota counties was printed on the reverse of the cover letter as an aid in completing the questionnaire. All types of license holders were sent identical questionnaires. A pretest was conducted with 60 nonresident hunters to identify and correct problems with the questionnaire.



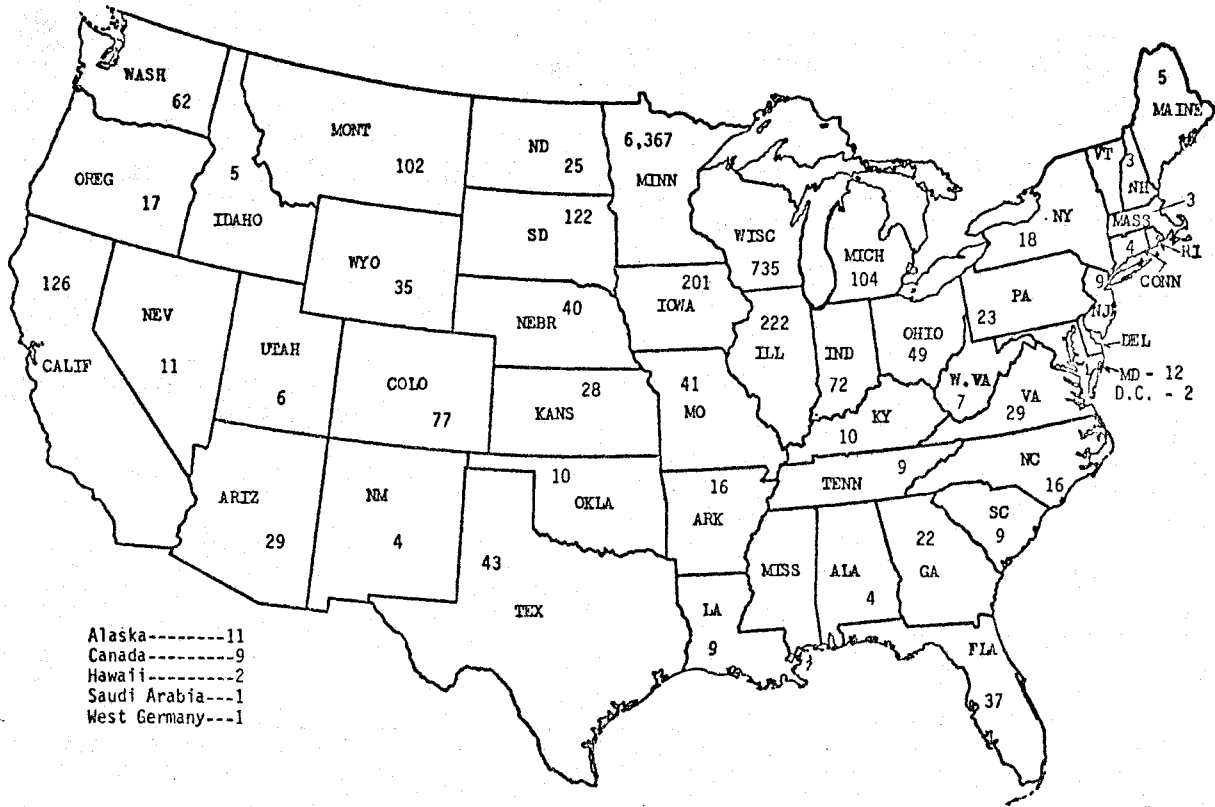


Figure 1. Number of North Dakota Nonresident Small Game Licenses Sold, By State, 1976

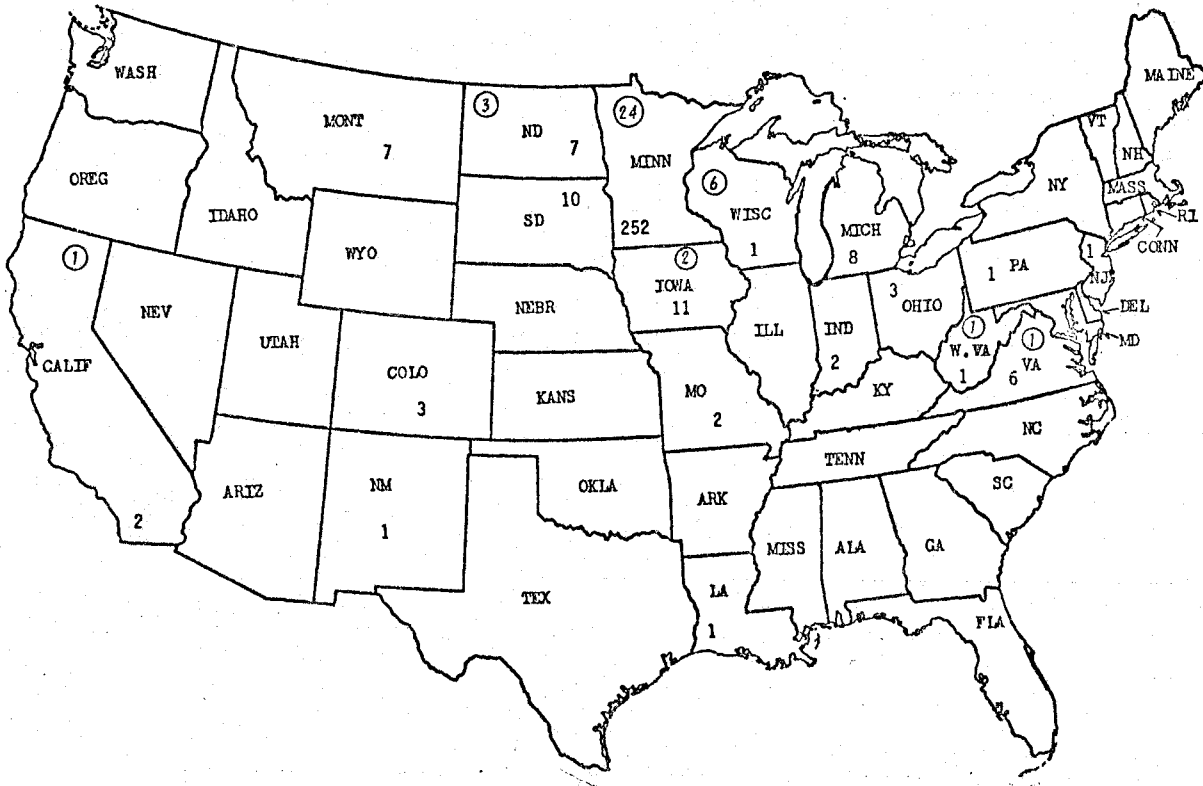


Figure 2. Number of North Dakota Nonresident Deer and Antelope Archery Licenses Sold, By State, 1976 (Number Circled Represents Antelope Licenses)



Hunters not responding to the first mailing within three weeks were sent a follow-up letter and questionnaire. The response rate for the first mailing was 35 percent. The second mailing increased the overall response rate to 57 percent.

Some returned questionnaires were not included in the analysis because they were not complete, but the completed portions were used when possible. The questionnaire was demanding in some sections, requiring respondents to recall expenditures several months before.

Some questionnaires were rejected because hunters purchased licenses but did not hunt, and so indicated on the questionnaire. Two percent of the returned questionnaires were from those who had not hunted. They had purchased their nonresident license early and could not come to North Dakota because of circumstances arising after they had purchased their license. Others held waterfowl permits for ten day periods in which the season was closed or restricted due to fire hazard.

Other reasons for rejecting returned questionnaires were that respondents included information for more than one hunter, misinterpreted directions, gave obviously erroneous responses, or returned the questionnaire too late to be included in the analysis.

### Response Bias

Response bias must be considered when dealing with mail surveys. The concern is whether those who respond to the first mailing and those who respond after a reminder and time lapse come from the same statistical population. For example, one might suspect that successful hunters would be more likely to respond than unsuccessful ones, or that expenditures of hunters responding to the first mailing would be different than those responding after a reminder.

Wroblewski (1970) argued that ". . . nonrespondents in a mail survey present a serious problem because they tend to be different from the people who do respond." He found that the average success rates of deer hunters surveyed in Minnesota went down from the first to the second mailing, and from the second to the third mailing. Gordon, et al. (1973), concluded that responses to expenditure questions posed to Idaho fishermen did not significantly differ between the first and second mailing. On the other

hand, Brown, et al. (1964), found a considerable difference between responses to expenditure questions posed to Oregon fishermen between the first and second mailing, but little difference between the second and third mailing.

Response bias between respondents to the first and second mailings was checked for three variables in this study--variable expenditures, days hunted, and success rates (Table 3). Tests for differences between the two sample means showed no significant difference in success rates of waterfowl hunters between mailings. A significant difference at the 0.1 level (but not at the 0.05 level) was identified between mean variable expenditures of waterfowl hunters responding to the first and second mailing, but the two groups were treated as coming from the same population because the absolute difference in the means was small.

TABLE 3. STATISTICS FOR TESTS OF SIGNIFICANT DIFFERENCES BETWEEN SAMPLE MEANS OF VARIABLE EXPENDITURES, DAYS HUNTED, AND BAG, FIRST AND SECOND MAILING

License Type	Variable	df	"t" Value	Percentage Difference In Mean Between First and Second Mailing
Waterfowl	Variable expend.	1,756	1.72	- 7.2
	Days hunted	1,648	1.88	- 4.5
	Ducks bagged	1,513	0.85	- 2.5
	Geese bagged	1,269	0.90	- 2.8
Firearms	Variable expend.	243	65.30	- 5.1
	Days hunted	137	0.01	+ 2.2
	Deer bagged	204	2.83	- 28.9
Archery	Variable expend.	129	0.38	- 5.8
	Days hunted	122	0.45	+ 8.2
	Deer bagged	117	0.49	- 4.8

Mean variable expenditures of firearms deer hunters for the two mailings had a high "t" statistic, but the absolute difference in the two means was only 5.1 percent. All "t" values for archery deer hunters were low as were the absolute differences in the means.

Response bias was not considered to significantly affect the accuracy of analysis when responses from the two mailings were combined. This

assumption was based on the following arguments. First, in all but one instance there was no significant difference between sample means at the 0.05 level of significance. Second, the absolute difference in sample means was small in all but one case examined. Third, a relatively large sample was drawn. And fourth, the reason for differences in sample means in some variables may be due more to the time lapse between the first and second mailing than to actual differences in those variables.

### Expenditures

Nonresident hunters purchase two general categories of goods: durable and nondurable. Nondurable goods are those that are used up over a relatively short time period or that can only be used one time. Examples of nondurable goods or services are ammunition, gasoline, food, and lodging. Expenditures for nondurable goods are generally termed "variable expenditures" since the amount spent varies with time spent in the state.

Durable goods are those that last for a relatively long time and are not used up with one use. Examples of durable goods are firearms, decoys, camping equipment, and vehicles. Money spent for durable goods does not vary in the short run and, therefore, is not so closely related to time spent in the state. It is reasonable to expect that nonresidents buy durable goods in their home area. It is mainly unanticipated purchases of durable goods that occur in North Dakota. For example, a nonresident would normally bring his firearm from home, and only through unusual circumstances (such as a part that could not be quickly repaired) would he be expected to buy a new firearm in the state. Unplanned purchases of durable goods in North Dakota still have an impact on the state's economy. The nature of these expenditures, however, may lead to considerable variability on a per capita basis from year to year.

Respondents were asked to estimate how much they spent for a predetermined list of nondurable goods and services during their hunting visit(s) in 1976 (Table 4). They were also asked to estimate their expenses for durable goods given two conditions. The first condition was to list the total cost of all durable goods related to hunting that they purchased in North Dakota in 1976. The second condition was for them to estimate what part of their total expenditure in each durable goods category was specifically for hunting in North Dakota.

TABLE 4. DURABLE (FIXED) AND NONDURABLE (VARIABLE) GOODS EXPENDITURE CATEGORIES

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Variable Expenditures

Ammunition  
Other hunting equipment (game bags, waders, etc.)  
Private transportation (gas, oil, repairs)--if you traveled with someone or had other travelers with you, include only your portion of total transportation expenses  
Commercial transportation (fares, vehicle rentals, charter)  
Lodging (motel, cabin, seasonal rental)  
Food and drink  
Boat and equipment rentals (not including vehicles)  
Fees (access, camping, memberships, park sticker)  
Services (packers, guides, horses, etc.)  
Shipping, locker, and/or meat processing costs  
Taxidermy work  
Miscellaneous (film, etc.)

Fixed Expenditures

Special clothing for hunting  
Family vehicle  
Recreational vehicle (4-wheel drive, pickup, etc., other than above)  
Cabin, land, and/or water area  
Camping trailer or pickup camper  
Camping equipment (tent, sleeping bag)  
Boating equipment (boat, canoe, motor)  
Hunting weapons  
Durable equipment (cameras, binoculars)  
Dogs  
Miscellaneous

---

This portion of the questionnaire seemed to present some problems with interpretation. Therefore, the data for durable goods presented in this report are the total amount spent in North Dakota. Through sampling one year's hunters one can expect to get a reasonable estimate of expenditures made over time for durable goods by all hunters.

Characteristics of Nonresident Hunters

A description of selected socioeconomic characteristics of 1976 nonresident hunters is presented to provide a perspective for the analysis of expenditure information to be presented later.

### Age

Average age of nonresident hunters in 1976 was 39.6 years (Table 5). The youngest hunter was 12 years old and the oldest was 82 years old. Archery deer and antelope hunters were significantly younger than other hunters.

TABLE 5. AVERAGE AGE OF NONRESIDENT HUNTERS IN NORTH DAKOTA, 1976

License Type	Average Age	Youngest	Oldest
		- - - - - years - - - - -	
Waterfowl	40.5	12	82
Upland game	42.3	22	68
Firearms deer	39.0	14	79
Archery deer and antelope	<u>30.8</u>	<u>14</u>	<u>69</u>
All hunters	39.6	12	82

### Distance Traveled

Distance traveled by outdoor recreationists is a key variable used in a number of analytical procedures to evaluate the value of outdoor recreation resources (Clawson and Knetsch, 1966; Hotelling, 1949). Distance traveled in this report is the straight line distance from the county hunted in North Dakota to the respondents' home county.<sup>3</sup>

Firearms deer hunters traveled the greatest average distance to hunt in 1976 (Table 6). They traveled an average of 588 miles one way to get to North Dakota. Archery deer hunters traveled the least average distance, 373 miles, to hunt in 1976.

### Reasons for Hunting in North Dakota

Nonresident hunters were asked what factors affected their decision to hunt in North Dakota in 1976. The most frequent responses were that they 1) had friends or relatives in the state, 2) had hunted here before, or 3) had lived here before (Table 7).

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<sup>3</sup>In many instances a nonresident hunted in more than one county. The county in which the most time was spent was used for computing distance.

TABLE 6. AVERAGE ONE-WAY DISTANCE TRAVELED BY NONRESIDENT HUNTERS TO GET TO THE NORTH DAKOTA SITE, 1976

License Type	One-Way Distance - - - miles - - -
Waterfowl	480
Upland game	536
Firearms deer	588
Archery deer	373
Archery antelope	535

TABLE 7. REASON NONRESIDENT HUNTERS CAME TO NORTH DAKOTA, BY LICENSE TYPE, 1976

Reason <sup>a</sup>	License Type			
	Water-fowl	Firearms Deer	Archery Deer and Antelope	Upland Game
	- - - percent - - -			
Hunted in N.D. before	26	14	13	17
Friends or relatives in N.D.	25	33	16	38
Lived in N.D. before	12	15	4	10
Heard about good hunting in N.D.	8	6	7	7
Friendly N.D. landowners	7	5	5	2
Uncrowded hunting conditions	4	3	3	0
Minnesota's seasons were restricted	4	2	6	1
Knew of a place to hunt	3	1	1.5	1
N.D. landowner	1	1	0	0
N.D.'s natural environment	2	9	6	5
N.D.'s hunting regulations	2	6	21	4
Could not hunt elsewhere	b	2	b	0
Close to home state	1	1	13	2
Something different	2	1	3	8
Had business in N.D.	b	1	1.5	5
TOTALS	100	100	100.0	100

<sup>a</sup>Hunters were asked to respond to an open-ended question. Their responses were categorized into the above general reasons.

<sup>b</sup>Less than 0.5 percent.



One-fifth of the archery deer and antelope hunters came because of North Dakota's long archery season.

The question asking respondents why they came was open ended--that is, a choice of answers was not provided for them. Another question specifically asked if they had hunted here before and if they intended to hunt here again. Two-thirds of all nonresident hunters indicated they had hunted in North Dakota before and approximately 91 percent indicated they intended to again.

### Occupation

Occupation dictates, to some degree, what leisure time activities individuals can pursue. Some occupational groups have above average salaries, while others have more free time with flexible schedules. The largest single occupation group of nonresident hunters was the managerial or executive group (Table 8). This group may have both higher salaries and more flexibility to allow them to come to North Dakota to hunt. Other groups, such as educators or students, may have work or school conflicts which keep them from participating in recreational activities far from their home state.

TABLE 8. OCCUPATIONS OF NONRESIDENT HUNTERS IN NORTH DAKOTA, BY LICENSE TYPE, 1976

Occupation	License Type			
	Water-fowl	Upland Game	Firearms Deer	Archery Deer and Antelope
	----- percent -----			
Farming	3.2	2.7	5.1	8.1
Professional	13.1	17.3	14.3	9.5
Sales	15.9	6.1	2.0	20.0
Labor	4.7	2.7	4.1	6.1
Government	5.1	2.7	9.7	3.4
Managerial/executive	22.9	25.3	20.4	18.9
Craftsmen	15.5	16.0	26.0	37.2
Education	3.9	5.3	2.6	7.4
Student	6.0	2.7	5.1	5.4
Unemployed or retired	9.7	6.7	6.6	2.0
TOTALS	100.0	100.0	100.0	100.0

### Type of Home Area

The majority of nonresident hunters in 1976 were from cities with over 5,000 population (Table 9). However, there was almost as many archers from rural areas as there were from larger cities.

TABLE 9. TYPE OF HOME AREA OF NONRESIDENT HUNTERS IN NORTH DAKOTA, BY LICENSE TYPE, 1976

License Type	Type of Home Area		
	City With Over 5,000 Population	Town With Less Than 5,000 Population	Rural Area
	----- percent -----		
Waterfowl	64.6	12.9	22.5
Upland game	75.0	10.5	14.5
Firearms deer	55.6	18.9	25.5
Archery deer and antelope	<u>42.6</u>	<u>18.7</u>	<u>38.7</u>
All licenses	62.5	13.9	23.6

### Ownership of Land Hunted On

Nonresident hunters spent about three-fourths of their time hunting on private land in 1976. Archery license holders spent the least amount of time on private land (56 percent) while waterfowl hunters (80 percent) and firearms deer hunters (78 percent) spent the most time on private land. Nonresident waterfowl hunters reported spending about one-fourth of their time hunting on private land that was adjacent to a game refuge.

### Nonresident Hunter Success and Expenditures

The type of game pursued--small game or big game--provided the basis for analyzing nonresident hunter activities and expenditures. The primary interest of small game hunters was either upland game or waterfowl. Big game hunters were either firearms deer hunters or hunted deer or antelope with bow and arrow.

Hunter success is measured by the amount of game bagged. Most hunters do not base hunting success entirely on the number of birds or other game bagged, but harvest numbers are useful information to those charged with managing the state's wildlife resources.

## Small Game Hunting

There are two types of nonresident small game hunters in North Dakota: those who hunt just upland game and those who also (or only) hunt waterfowl. A small game license is a prerequisite for a waterfowl permit and so it is not possible to separate those waterfowl hunters who only hunt waterfowl from those who hunt both waterfowl and upland game. Here it was assumed that nonresidents who had waterfowl permits were primarily interested in waterfowl and only incidentally hunted upland game.

### Upland Game Hunting

Sharptail grouse are the predominant upland game species pursued. Although the state does have pheasants, Hungarian partridge, ruffed grouse, squirrels, and sage grouse, the sharptail is by far the most abundant.

Nonresident upland game hunters bagged an average of 6.7 sharptails each in an average of 4.94 days of hunting in 1976. Season bags of other upland species were: ruffed grouse, 0.3; sage grouse, 0.1; pheasant, 0.4; and Hungarian partridge, 1.0.

There appeared to be little, if any, relationship between the ownership of land hunted on and the success of nonresident upland game hunters.<sup>4</sup> In other words, hunters on private land had no better luck or no worse luck than did hunters on government land.

The most popular counties for hunting upland game in 1976 were McKenzie (15 percent of nonresident hunters), Dunn (9 percent), Bowman (7.5 percent), Burleigh (7.5 percent), Golden Valley (7.5 percent), Slope (7.5 percent), and Stark (7.5 percent) (Figure 4).

### Upland Game Hunter Expenditures

Average total expenditures by nonresident upland game hunters in 1976 was \$240.73 per hunter (Table 10). Variable expenditures were \$180.71, fixed expenditures were \$24.65, and license fees were \$35.50. The average nonresident hunter spent 4.94 days hunting upland game in 1976, resulting in an average daily variable expenditure of \$36.58. His fixed expenditures were not affected by the number of days hunted.

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<sup>4</sup>The correlation coefficient between the amount of time spent hunting on private land and the number of sharptail grouse bagged was 0.16 (significant at the 0.23 level). The correlation with public land was 0.04 (significant at the 0.79 level).

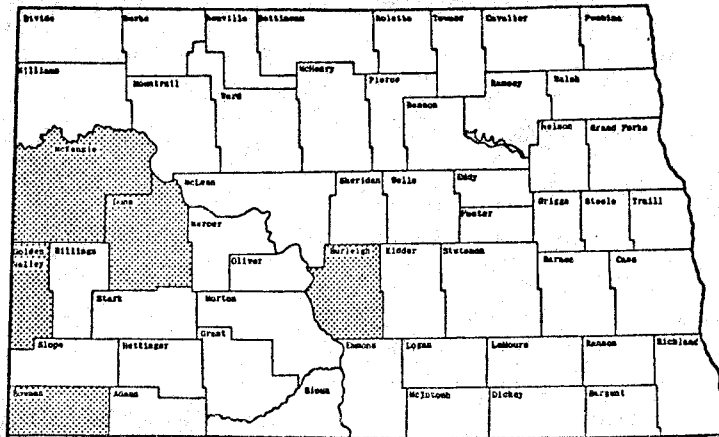


Figure 4. The Five Counties Most Frequently Hunted in by Nonresident Upland Game Hunters, 1976

Most variable expenditures of upland game hunters came from food and drink, 30.9 percent; private transportation, 29.0 percent; and lodging, 21.6 percent. There is a positive relationship between these expenditures and time spent hunting; as time increases, so does money spent.

#### Waterfowl Hunting

The number of nonresident waterfowl hunters and the distances they travel to hunt is evidence of the quality of waterfowl hunting found in the state. North Dakota is in the prairie pothole region and is the breeding place of many species of waterfowl. The state is also in the central flyway; and with its lakes, numerous potholes, and grain fields, it is attractive to migrating waterfowl. More nonresidents come here to hunt waterfowl than any other game species (Table 1, p. 3).

Nonresident waterfowl hunters bagged an average of 3.1 geese and 9.2 ducks each during their average stay of 5.3 days. This is slightly higher than the 1976 average resident waterfowl harvest, while the number of days hunted is about two-thirds that of residents.<sup>5</sup> Nonresident hunters may be more intense in their pursuit of waterfowl, since they have traveled long distances and spent a lot of money. Also, they may hunt more in the prime waterfowl areas in the state while resident hunters may be more dispersed.

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<sup>5</sup> Unpublished data from North Dakota State Game and Fish Department, Bismarck.

TABLE 10. EXPENDITURES BY NONRESIDENT UPLAND GAME HUNTERS IN NORTH DAKOTA, 1976

Good or Service	Expenditure	Percent of Total
<u>Variable Expenditures</u>		
Ammunition	\$ 10.27	5.7
Private transportation	52.65	29.0
Commercial transportation	8.82	4.9
Lodging	38.95	21.6
Food and drink	55.76	30.9
Boat and equipment rentals	0.34	0.2
Fees	0.95	0.5
Services	1.22	0.7
Shipping, locker, etc.	1.22	0.7
Taxidermy work	1.01	0.6
Miscellaneous	<u>9.52</u>	<u>5.2</u>
TOTALS	\$180.71	100.0
Average days hunted	4.94	
Average daily expenditure	\$36.58	
<u>Fixed Expenditures<sup>a</sup></u>		
Special clothing for hunting	\$ 3.45	14.0
Family vehicle	0.68	2.8
Recreational vehicle	0.00	0.0
Cabin, land, and/or water area	0.00	0.0
Camping trailer or pickup camper	0.00	0.0
Camping equipment	0.00	0.0
Boating equipment	0.00	0.0
Firearms	6.35	25.8
Other equipment	2.59	10.5
Dogs	<u>11.58</u>	<u>46.9</u>
TOTALS	\$24.65	100.0
<u>Total Expenditures</u>		
Variable	\$180.71	75.01
Fixed	24.65	10.24
License	<u>35.50</u>	<u>14.75</u>
TOTALS	\$240.86	100.00

<sup>a</sup>Vehicle or large item purchases made in North Dakota by residents of adjacent states whose home county is next to North Dakota were not included.

There appeared to be no significant relationship between waterfowl shot and ownership of land hunted on.<sup>6</sup>

Ramsey County was the most popular county for nonresident waterfowl hunters with 18 percent of the nonresident waterfowl hunters. The four counties next most frequently hunted in were: Bottineau (12.5 percent), Towner (7.2 percent), Benson (7.0 percent), and Rolette (5.3 percent) (Figure 5). Non-resident hunters responding to the survey had not hunted in four counties: Bowman, Morton, Sioux, and Traill.

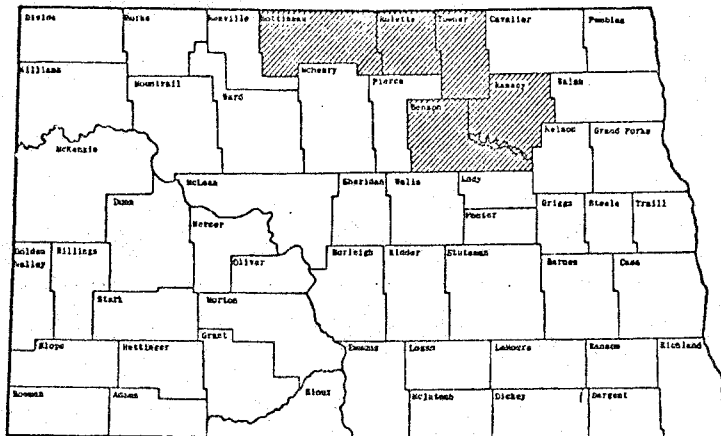


Figure 5. The Five Counties Most Frequently Hunted in by Nonresident Waterfowl Hunters, 1976

#### Waterfowl Hunter Expenditures

Nonresident waterfowl hunters spent an average of \$310.74 each during the 1976 hunting season (Table 11). The largest portion was for variable expenditures--64 percent or \$197.55. One-fourth of average total expenditures went to purchase durable goods, and 13 percent was spent for licenses.

Private transportation, lodging, and food and drink accounted for over 70 percent of expenditures for nondurable goods or services. Variable expenditures averaged \$37.27 per day, with the average hunter spending 5.3 days hunting waterfowl in North Dakota in 1976.

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<sup>6</sup>The correlation coefficient between the amount of time spent hunting on private land and the number of ducks bagged was -0.12 (significant at the 0.01 level), and for geese bagged it was 0.11 (significant at the 0.01 level). The correlation with public land was 0.01 for ducks and -0.11 for geese (significant at the 0.91 and 0.31 levels, respectively).

TABLE 11. EXPENDITURES BY NONRESIDENT WATERFOWL HUNTERS IN NORTH DAKOTA, 1976

Good or Service	Expenditure	Percent of Total
<u>Variable Expenditures</u>		
Ammunition	\$ 15.96	8.08
Private transportation	42.03	21.28
Commercial transportation	6.05	3.06
Lodging	39.37	19.93
Food and drink	61.02	30.89
Boat and equipment rentals	0.27	0.14
Fees	1.86	0.94
Services	5.01	2.54
Shipping, locker, etc.	4.43	2.24
Taxidermy work	0.86	0.44
Miscellaneous	<u>20.69</u>	<u>10.47</u>
TOTALS	\$197.55	100.00
Average days hunted	5.30	
Average daily expenditure	\$37.27	
-----		
<u>Fixed Expenditures<sup>a</sup></u>		
Special clothing for hunting	\$ 8.35	11.49
Family vehicle	12.19	16.77
Recreational vehicle	13.51	18.58
Cabin, land, and/or water area	10.54	14.50
Camping trailer or pickup camper	5.59	7.69
Camping equipment	1.03	1.42
Boating equipment	0.48	0.66
Firearms	10.32	14.20
Other equipment	7.85	11.80
Dogs	<u>2.83</u>	<u>3.89</u>
TOTALS	\$72.69	100.00
-----		
<u>Total Expenditures</u>		
Variable	\$197.55	63.57
Fixed	72.69	23.39
License	<u>40.50</u>	<u>13.04</u>
TOTALS	\$310.74	100.00

<sup>a</sup>Vehicle or large item purchases made in North Dakota by residents of adjacent states whose home county is next to North Dakota were not included.

## Leasing Waterfowl Hunting Rights

Leasing waterfowl hunting rights is becoming more popular each year. This assures the hunter of having a place to hunt--something that is becoming harder to find each succeeding year with more and more hunters afield. Also, the landowner has an opportunity for some additional income by leasing hunting rights.

Information on leasing hunting rights is difficult to collect from hunters. The lease may be held by several hunters who each hunt a different number of days during the season. The payment may be in the form of gifts or services and not money. Also, the lease may be for a wetland, a field, a goose pit, or the entire farm. The following discussion is presented given these limitations.

Eighteen percent of nonresident hunters paid for the right to hunt waterfowl on private land in one or more of the past three years. Fifteen percent had leased land in 1976, while 7.6 percent leased in 1975, and 7.8 percent leased in 1974.

Nonresident waterfowl hunters who leased hunting rights in 1976 paid an average of \$26 each for those rights. Hunters generally leased hunting rights as a group, with an average group size of 4.2 hunters. Therefore, the average amount paid for a lease by a group of hunters was \$110.

Over 90 percent of those indicating they had leased paid \$250 or less per group for the lease. The average payment for those groups who paid \$250 or less was \$65, or \$14 per man (4.7 hunters). The average payment for those groups who paid over \$250 was \$534, or \$98 per man (5.5 hunters). The highest payment reported was \$1,200 by eight hunters for 2,300 acres in Dickey County.

The length of hunting lease varied from one day to the entire season, with a week, one-half of a week, and the season being the most common arrangements (Table 12).

The smallest area leased was ten acres, and the largest was 9,000 acres. However, several hunters reported leasing goose pits or duck passes without mention of the acreage. Groups of hunters who paid \$250 or less for their lease in 1976 reported leasing an average of 136 acres. Those who paid more than \$250 per group had lease arrangements covering an average of 524 acres.



TABLE 12. PERIOD COVERED BY NONRESIDENT HUNTER LEASE AGREEMENTS FOR WATERFOWL HUNTING RIGHTS ON PRIVATE LAND IN NORTH DAKOTA, 1976

Time Covered by Lease	Percent of Leases
One day	7.9
One-half week	31.1
Week	34.8
Two weeks	1.9
Three weeks	0.5
Month	0.5
Season	20.5
No response	2.8
TOTAL	100.0

Over half of the leases for waterfowl hunting rights by nonresidents in 1976 occurred in Dickey, Ramsey, Sargent, and Towner counties (Table 13). Fifty percent of the hunting leases over \$250 were in Dickey County, while only 12 percent of those paying \$250 or less for leases were in Dickey County. Most leasing occurred in counties either in the Devils Lake-Rolla area in northeast central North Dakota or in the Oakes area in southeast central North Dakota.

TABLE 13. NONRESIDENT WATERFOWL HUNTING LEASE AGREEMENTS BY COUNTY, 1976

County	Nonresident Lease Agreements	Leases for \$250 or Less Per Group	Leases for Over \$250 Per Group
	-----percent-----		
Dickey	16	12	50
Ramsey	17	16	17
Sargent	8	8	11
Towner	11	11	a
Bottineau	7	7	a
Cavalier	7	7	a
Rolette	6	6	a
All others	<u>28</u>	<u>33</u>	<u>22</u>
TOTALS	100	100	100

<sup>a</sup>Less than 0.5 percent.

## Big Game Hunting

Nonresidents who hunt big game are only allowed to hunt deer and antelope. They may hunt deer with either firearms or bow and arrow. However, they may hunt antelope with bow and arrow only.

### Firearms Deer Hunting

Two types of deer--whitetail and mule deer--can be hunted with firearms by nonresidents. Whitetail are found throughout the state, while mule deer are found in the western half.

Overall, 62 percent of the nonresident firearms deer hunters bagged deer in 1976. Forty-two percent of the hunters reported bagging whitetail deer and 20 percent were successful with mule deer.

The most popular counties for nonresident deer hunters were: McKenzie (18.0 percent), Bowman (7.1 percent), Slope (5.9 percent), Billings (5.4 percent), and McLean (5.0 percent) (Figure 6). Nonresident firearms deer hunters reported hunting in all but seven North Dakota counties.

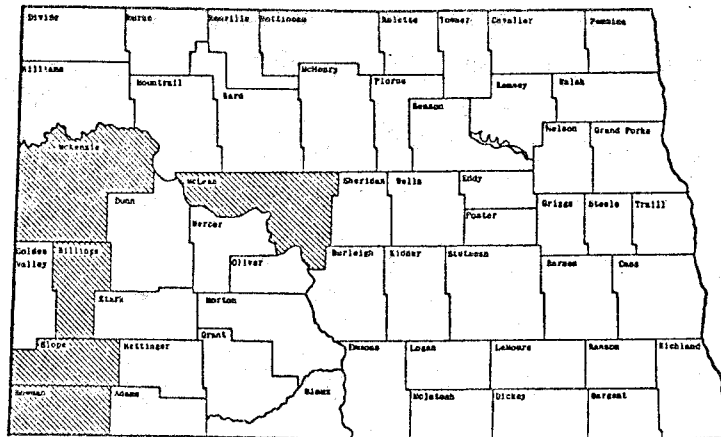


Figure 6. The Five Counties Most Frequently Hunted in by Nonresident Firearms Deer Hunters, 1976

### Firearms Deer Hunter Expenditures

Nonresident firearms deer hunters spent an average of \$296.71 each during the 1976 season (Table 14). Variable expenditures made up 43 percent of the total; fixed expenditures, 40 percent; and license fee, 17 percent of the total spent in the state.

TABLE 14. EXPENDITURES BY NONRESIDENT FIREARMS DEER HUNTERS IN NORTH DAKOTA, 1976

Good or Service	Expenditure	Percent of Total
<u>Variable Expenditures</u>		
Ammunition	\$ 4.31	3.40
Private transportation	36.71	28.98
Commercial transportation	1.31	1.03
Lodging	15.28	12.06
Food and drink	41.87	33.07
Boat and equipment rentals	0.56	0.44
Fees	0.34	0.27
Services	0.94	0.74
Shipping, locker, etc.	7.09	5.60
Taxidermy work	0.96	0.79
Miscellaneous	17.29	13.65
TOTALS	\$126.66	100.00
Average days hunted	3.99	
Average daily expenditure	\$ 31.74	
<u>Fixed Expenditures<sup>a</sup></u>		
Special clothing for hunting	\$ 6.80	5.69
Family vehicle	33.21	27.78
Recreational vehicle	46.18	38.63
Cabin, land, and/or water area	8.01	6.70
Camping trailer or pickup camper	6.58	5.50
Camping equipment	2.91	2.43
Boating equipment	0.00	0.00
Firearms	7.17	6.00
Other equipment	8.69	7.27
Dogs	0.00	0.00
TOTALS	\$119.55	100.00
<u>Total Expenditures</u>		
Variable	\$126.66	42.69
Fixed	119.55	40.29
License	51.50	17.02
TOTALS	\$279.71	100.00

<sup>a</sup>Vehicle or large item purchases made in North Dakota by residents of adjacent states whose home county is next to North Dakota were not included.

Private transportation, food and drink, miscellaneous, and lodging accounted for 88 percent of the total variable expenditures. The highest average amount spent for durable goods was for recreation vehicles (\$46.18) and family vehicles (\$33.21).<sup>7</sup>

### Archery Deer and Antelope Hunting

Nonresident hunters who purchased an archery antelope license or an archery deer license are treated as one group in this section for three reasons. First, many hunters bought both antelope and deer archery licenses. Second, analysis of antelope hunter responses and deer hunter responses separately indicated little difference in characteristics between the two, with the exception that antelope hunters spent an average of 2.25 more days hunting. And, third, the number of antelope archery hunters sampled was small by itself.

### Archery Hunter Success Rates

Twenty-three antelope hunters bagged four antelope for a success rate of 17.4 percent. Deer hunters using bow and arrow fared better by bagging 32 whitetail deer and six mule deer for 150 hunters, resulting in an overall success rate of 25.33 percent.

Archers who bought antelope and deer licenses hunted primarily in the western part of the state. The two most popular counties were McLean, where 24 percent hunted, and McKenzie, where 14 percent hunted (Figure 7). Archers who had only deer licenses favored McKenzie County (12.7 percent), Billings County (7.3 percent), Cass County (6.7 percent), and McLean County (6.0 percent).

Archers had the lowest average daily variable expenditures of any of the hunter types. They spent an average of \$121.87 for nondurable goods and services during their 7.4 day stay for a daily average variable expenditure of \$16.47 (Table 15). Food and drink, private transportation, miscellaneous, and lodging accounted for 93 percent of nonresident archery hunters' variable expenditures. Their total expenditure was not the lowest,

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<sup>7</sup> Caution is required in using the expenditure data for durable goods since they are not as predictable as purchases of nondurable goods and services and license expenditures.

TABLE 15. EXPENDITURES BY NONRESIDENT ARCHERY DEER AND ANTELOPE HUNTERS IN NORTH DAKOTA, 1976<sup>a</sup>

Good or Service	Expenditure	Percent of Total
<u>Variable Expenditures</u>		
Ammunition	\$ 4.20	3.45
Private transportation	46.52	38.16
Commercial transportation	0.08	0.07
Lodging	10.39	8.53
Food and drink	35.92	29.47
Boat and equipment rentals	0.25	0.21
Fees	0.53	0.43
Services	0.61	0.50
Shipping, locker, etc.	1.35	1.11
Taxidermy work	0.90	0.74
Miscellaneous	<u>21.12</u>	<u>17.33</u>
TOTALS	\$121.87	100.00
Average days hunted	7.4	
Average daily expenditure	\$16.47	
-----		
<u>Fixed Expenditures<sup>b</sup></u>		
Special clothing for hunting	\$ 12.18	9.75
Family vehicle	38.20	30.58
Recreational Vehicle	0.00	0.00
Cabin, land, and/or water area	0.00	0.00
Camping trailer or pickup camper	0.37	0.30
Camping equipment	5.97	4.78
Boating equipment	6.15	4.92
Firearms	49.77	39.84
Other equipment	12.29	9.83
Dogs	<u>0.00</u>	<u>0.00</u>
TOTALS	\$124.93	100.00
-----		
<u>Total Expenditures</u>		
Variable	\$121.87	44.35
Fixed	124.93	45.46
License <sup>c</sup>	<u>28.00</u>	<u>10.19</u>
TOTALS	\$274.80	100.00

<sup>a</sup>Due to the small number of nonresident archery antelope hunters they are included with nonresident archery deer hunters. Their expenditures were similar, although those who hunted antelope spent approximately 2.25 more days in North Dakota.

<sup>b</sup>Vehicle or large item purchases made in North Dakota by residents of adjacent states whose home county is next to North Dakota were not included.

<sup>c</sup>Represents the mix of archery deer and archery antelope license purchases.

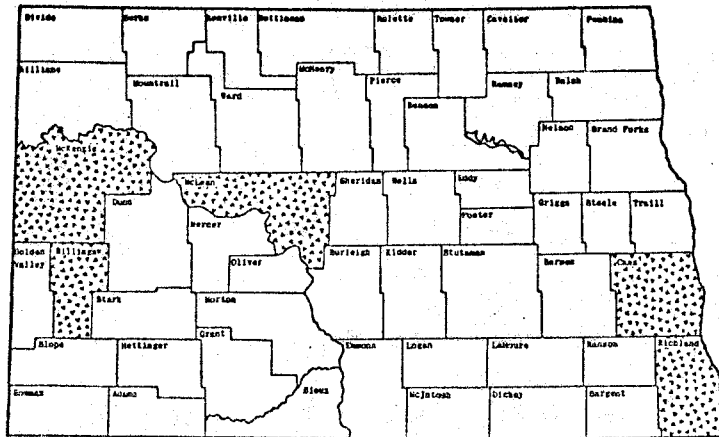


Figure 7. The Five Counties Most Frequently Hunted in by Nonresident Archers, 1976

however, since they stayed longer than other hunters. They spent \$274.80 on all items including license fees while hunting in North Dakota in 1976.

#### Impact of Nonresident Hunters on North Dakota's Economy

Recreation is an industry just as agriculture, coal mining, and manufacturing are industries. Nonresident hunting is a part of the recreation industry in North Dakota. The product the nonresident hunter consumes is a package of goods and services including food, lodging, gasoline, environmental amenities, and hunting experiences along with some other intangibles. One way to analyze the impact of the hunting industry is to examine the hunters' expenditures while consuming this package of goods and services.

#### Total 1976 Nonresident Hunter Expenditures

Total expenditures by nonresident hunters in 1976 were estimated to be \$2,525,200 excluding license fees (Table 16). Waterfowl hunters accounted for 89 percent of the total, most of which occurred in State Regions 2 and 3 (Figure 8). Most expenditures by strictly upland game hunters were in State Regions 7 and 8, the state's sharptail grouse hunting area.

#### Input-Output Analysis of Economic Activity

The significance of nonresident hunters to the state's economy can be measured in terms of the gross business volume (sales), personal income, and employment generated by nonresident hunter expenditures. Input-output analysis is an analytical technique that can be used to estimate gross business volume

TABLE 16. EXPENDITURES<sup>a</sup> MADE BY NONRESIDENT HUNTERS IN NORTH DAKOTA, BY LICENSE TYPE AND BY STATE REGION, 1976

State Planning Region	License Type				Totals
	Waterfowl	Small Game	Firearms Deer	Archery Deer and Antelope	
----- dollars -----					
1	64,200	4,400	13,600	9,400	91,600
2	575,200	3,700	13,900	4,600	597,400
3	858,300	none	4,400	2,400	865,100
4	137,500	3,700	5,500	8,800	155,500
5	185,200	4,400	10,200	27,100	226,900
6	279,900	none	18,400	8,300	306,600
7	119,400	18,700	27,300	13,200	178,600
8	37,100	30,400	23,900	12,100	103,500
State Totals	2,256,800	65,300	117,200	85,900	2,525,200

<sup>a</sup>Excluding license fee.

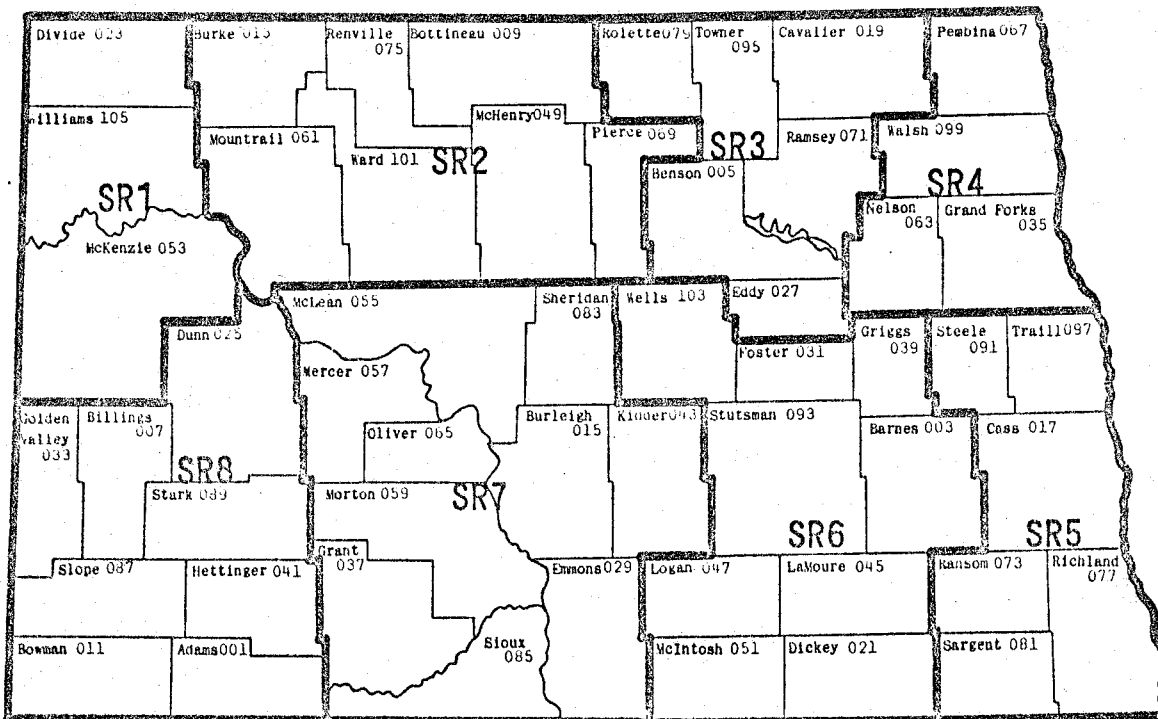


Figure 8. North Dakota State Planning Regions

and personal income resulting from increases in economic activity. Senechal (1971) and others have constructed and tested input-output models of the North Dakota economy. Employment can be estimated using the ratio of gross business volume to employment, since the number of employees in selected sectors is related to the sales volume in a sector.<sup>8</sup> Some activities, such as the service sectors, have low gross business volume per worker ratios while others, such as trade sectors, have high ratios since much of their business volume occurs through trade in goods purchased for resale.

Input-output analysis is a technique for describing the linkages that exist between sectors in an economy. Three types of tables are involved in input-output analysis. They are 1) a transactions table, 2) a technical input-output coefficients table, and 3) an interdependence coefficients (multipliers) table.

The transactions table shows the payments of each sector to and from each other sector. The columns indicate expenditures to the rows, and the rows indicate receipts from the columns.

The technical input-output coefficients table is derived from the transactions table. This table is the transactions table expressed as decimal fractions of column totals.

The interdependence coefficients (multipliers) table is derived from the technical input-output coefficients table. It shows the total input requirements that must be obtained from the row sector per dollar of output for final demand<sup>9</sup> by the column sector. The column totals of this table are the total output requirements of all row sectors in the economy per dollar of output for final demand by the column sector. For example, to provide a restaurant meal requires certain inputs, such as food, dishes, napkins, and equipment, which must be purchased from firms in other sectors of the economy. In order for firms to supply those inputs, they in turn must also purchase inputs as part of their operation. Input-output analysis traces these linkages and can be used to estimate the effect of such expenditures on a region's gross business volume. The interdependence coefficients (multipliers) table is presented in Appendix B.

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<sup>8</sup>A sector is a group of firms that perform similar but not necessarily the same functions. For example, firms engaged in retail trade, such as groceries and hardware items, comprise the retail trade sector.

<sup>9</sup>Final demand is defined as sales that result in a flow of funds into the local economy from outside the region. These sales consist of exports of crops and livestock, exports of mines and manufactured products, expenditures by tourists (hunters), and federal government outlays in the area.



### Gross Business Volume

The estimated gross business volumes generated in 1976 in each sector of the state's economy as a result of expenditures made by nonresident hunters are indicated in Table 17, along with employment in each sector attributable to nonresident hunter activity.<sup>10</sup> Row 12 of Table 17 represents the household sector, which is the personal income generated by nonresident expenditures.

The gross business volume generated by the expenditures of nonresident hunters in North Dakota in 1976 was \$6,320,400 (Table 17). One-third of the expenditures made by nonresident hunters in North Dakota in 1976 was spent in the retail trade sector. The other two-thirds were spent in the business and personal services sector.

The interdependence coefficients column in Table 17 shows that for each dollar spent by nonresident hunters, about six cents worth of business was generated in the agriculture--livestock sector; about two cents worth of business was generated in the agriculture--crops sector; 72 cents worth of business was generated in the retail trade sector; and so on for the other sectors. In total, for every dollar spent by nonresident hunters, about \$2.51 worth of business occurred in the state.

### Personal Income

Personal income is part of the gross business volume generated by the expenditures of nonresident hunters. The interdependence coefficient of .61 for households (Table 17) means that for every dollar spent by nonresident hunters, there was about 61 cents of personal income realized in the state. Personal income generated in North Dakota in 1976 as a result of nonresident hunter expenditures was \$1,552,000 (Table 17, row 12).

### Employment

The gross business volume in the state due to the money spent by nonresident hunters is also an indicator of employment in sectors of the economy that are either the direct or indirect recipients of the money. Because of interdependencies in the economy, even though nonresident hunters did not spend any money directly in the construction sector (Table 17, row 4) \$110,000

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<sup>10</sup>Gross business volumes generated by sector in each State Planning Region are presented in Appendix C.

TABLE 17. GROSS BUSINESS VOLUME AND EMPLOYMENT BY SECTOR AND PERSONAL INCOME<sup>a</sup> GENERATED BY NONRESIDENT HUNTER EXPENDITURES<sup>b</sup> IN NORTH DAKOTA, 1976

Economic Sector	Interdependence Coefficient	Gross Business Volume	Employment <sup>c</sup>
1. Agriculture, livestock	.06	\$ 142,700	2.3
2. Agriculture, crops	.02	58,800	1.0
3. Sand and gravel mining	d	d	--
4. Construction	.04	110,000	2.9
5. Transportation	.01	25,300	0.7
6. Communication and utilities	.09	227,800	6.3
7. Wholesale and ag. processing	.03	75,500	1.6
8. Retail	.72	1,820,700	20.9
9. Finance, insurance, and real estate	.09	236,100	6.5
10. Business and personal service	.71	1,793,200	107.3
11. Professional and social service	.04	109,600	6.6
12. Households	.61	1,552,000	--
13. Government	.07	168,700	21.9
14. Energy	d	d	--
TOTALS	2.49	\$6,320,400	177.8

<sup>a</sup>Row 12, Households, represents personal income.

<sup>b</sup>Nonresident hunter expenditures were \$2,525,200. One-third of nonresident hunter expenditures occurred in the retail sector and two-thirds in the business and personal service sector. The interdependence coefficients represent those proportions from the appropriate columns in Appendix B.

<sup>c</sup>Employment in each sector was estimated using gross business volume to employment ratios.

<sup>d</sup>Not significant.

worth of business volume occurred in that sector. The number of employees in the construction sector resulting from that business volume is 2.9.<sup>11</sup> In other words, the expenditures of nonresident hunters in 1976 were indirectly responsible for employing three people in the construction sector.

The business and personal service sector received the largest portion of nonresident hunter expenditures and employed 107 people as a result of those expenditures. Nonresident hunters spent enough money in 1976 to support the employment of 178 persons in all sectors of North Dakota's economy.

The estimated gross business volume, personal income, and employment generated in 1976 in each of the state's eight planning regions as a result of expenditures made by nonresident hunters are presented in Table 18. State Regions 2 and 3, the important waterfowl hunting areas, stand out in the amount of economic and employment activity generated by nonresident hunters.

TABLE 18. GROSS BUSINESS VOLUME, PERSONAL INCOME, AND EMPLOYMENT GENERATED BY NONRESIDENT HUNTER EXPENDITURES IN EACH STATE PLANNING REGION, 1976

State Planning Region	Gross Business Volume	Personal Income <sup>a</sup>	Employment <sup>b</sup>
	-----dollars-----		
1	230,000	56,000	6
2	1,497,000	367,000	43
3	2,167,000	532,000	47
4	389,000	95,000	14
5	569,000	139,000	29
6	768,000	188,000	21
7	448,000	110,000	11
8	259,000	64,000	7
TOTALS	6,327,000	1,551,000	178

<sup>a</sup>Personal income is a part of gross business volume. See Table 17 for the sectors that make up gross business volume.

<sup>b</sup>Employment to gross business volume ratios used were from unpublished data of the Department of Agricultural Economics, North Dakota State University.

<sup>11</sup>Unpublished data, Department of Agricultural Economics, North Dakota State University, Fargo.

License Expenditures

Nonresident hunters spent \$391,197 in the government sector to buy licenses in 1976 (Table 19). Nonresident license sales revenue represented approximately 15 percent of the revenue received from all sources by the State Game and Fish Department in 1976. This revenue was enough to account for the employment of 50 people throughout the state in all sectors of the economy.

TABLE 19. NONRESIDENT HUNTING LICENSES SOLD AND REVENUE RECEIVED BY THE NORTH DAKOTA STATE GAME AND FISH DEPARTMENT, 1976

License Type	Cost	Number Sold	Revenue
Small game	\$35.00	8,855	\$309,925
Waterfowl	5.00	8,530	42,650
Archery deer	25.00	330	8,250
Archery antelope	25.00	38	950
Firearms deer	50.00	486	24,300
Firearms deer permit	1.00	486	486
General game	.50	9,272	4,636
TOTAL			\$391,197

SOURCE: North Dakota State Game and Fish Department, Bismarck.

Summary

A mail survey of nonresidents who purchased 1976 hunting licenses was conducted. A sample of 2,246 individuals from a population of just over 9,000 resulted in a response rate of 57 percent.<sup>12</sup> The sample consisted of four hunter types: upland game hunters, waterfowl hunters, firearms deer hunters, and archery deer and antelope hunters. The largest group was waterfowl hunters, while the smallest was upland game hunters.

Nonresident hunters came to North Dakota to hunt in 1976 for three reasons: 1) because they had hunted here before; 2) because they had friends or relatives in the state; or 3) because they were former North Dakota residents. Archers came for the same three reasons but were also attracted by the favorable archery regulations and by the fact that it was close to their home.

<sup>12</sup>Surveys were sent to approximately 4,000 nonresident hunters.

There are three types of nonresident hunter expenditures: variable (nondurable goods and services), fixed (durable goods), and license fees. Variable expenditures were generally higher than fixed expenditures. This occurred because nonresidents usually bought durable goods in their home area.

Upland game hunters spent an average of \$241 during their five day visit (Table 20). They spent \$181 on nondurable goods and services, \$25 on durable goods, and \$35.50 on nonresident licenses.

TABLE 20. AVERAGE INDIVIDUAL EXPENDITURES BY NONRESIDENT HUNTERS IN NORTH DAKOTA, 1976

Item	Upland Game Hunters	Waterfowl Hunters	Firearms Deer Hunters	Archery Deer and Antelope Hunters
License fee	\$ 35.50	\$ 40.50	\$ 51.50	\$ 28.00 <sup>a</sup>
Variable expenditure	180.71	197.55	126.66	121.87
Fixed expenditure	<u>24.65</u>	<u>72.69</u>	<u>119.55</u>	<u>124.93</u>
TOTALS	\$240.86	\$310.74	\$297.71	\$274.80

<sup>a</sup>Nonresident archery deer and antelope licenses cost \$25 each; however, some hunters bought both which is reflected in this higher expenditure.

Waterfowl hunters spent the largest amount of the four nonresident hunter types--\$311. They spent an average of \$198 on nondurable goods and services, \$73 on durable goods, and \$40.50 on licenses during their five and one-third day stay in North Dakota in 1976.

Firearms deer hunters spent the least amount of time hunting in 1976--four days. They spent an average of \$298--\$127 on nondurable goods and services, \$120 on durable goods, and \$51.50 on licenses.

Nonresident archery deer and antelope hunters spent the most time of any of the four hunter types in North Dakota in 1976. They were in the state an average of seven and one-half days and spent \$275 during that time. They spent \$122 for nondurable goods and services, \$125 for durable goods, and \$28.00 for licenses.

The estimated total expenditure by all nonresident hunters in North Dakota in 1976 is \$2,525,200. Due to the interactions of the economy-- spending and respending--these direct expenditures resulted in \$6,320,400 in gross business volume in the state's economy.

A portion of the gross business volume generated by nonresident hunter expenditures represents personal income to North Dakotans. That portion was \$1,552,000 in 1976.

The business volume generated by nonresident hunters resulted in the direct or indirect employment of 178 people in 1976. In addition, the employment of 50 people was due to the expenditure of \$391,197 for nonresident licenses.

#### Use of Expenditure Data

The expenditures of nonresident hunters can be used to estimate the economic impact of nonresident hunting activity. They do not represent the value of the recreation experience to the hunter, however. Nor do they represent the value of the fish and game resource to the state. The recreation experience is made up of a package of goods and services, a part of which is the game species pursued. Other elements include exercise, enjoyment of the outdoors, and companionship, for which no market exists. Expenditure data and other characteristics of nonresident hunters can be useful in conducting more sophisticated statistical analyses of the value of the recreation activity to the individual, but by themselves do not represent that value.

#### Recommendations for Further Study

This study reports on the activities and expenditures of nonresident hunters for the 1976 hunting season in North Dakota.. Since the data are for just one year, they may or may not be representative of the expenditures of nonresident hunters over time. Therefore, surveys of nonresident hunter activity should be conducted on a continuing basis. They would not need to be at the same scale as this study, but should include enough responses to be statistically valid. Similar data on resident hunters have been collected in the past, and that data should also be updated through periodic surveys.

Spending patterns of recreationists change over time due to inflation, recreational pursuits, and prices. They could possibly increase faster

than the rate of inflation. Depending on the price of certain items, such as gasoline or licenses, the proportion spent in each sector of the economy could vary from year to year.

Many factors outside the state also have an impact on the number of hunters who come to hunt in North Dakota. These could be the seasons set by other states, success rates, the availability of licenses in other states, the availability of gasoline, and federal regulations concerning wildlife resources. For these reasons, the expenditure patterns and hunting activities of both resident and nonresident hunters should be surveyed periodically to maintain an accurate assessment of their impact on the state's economy.

Literature Cited

- Brown, William G., Ajmer Singh, and Emery N. Castle, An Economic Evaluation of the Oregon Salmon and Steelhead Sport Fishery, Agricultural Experiment Station Technical Bulletin 78, Oregon State University, Corvallis, September, 1964.
- Clawson, Marion, and Jack L. Knetsch, Economics of Outdoor Recreation, John Hopkins University for Resources for the Future, Baltimore, Maryland, 1966.
- Gordon, D., An Economic Analysis of Idaho Sport Fisheries, University of Idaho Cooperative Fishery Unit, Moscow, February, 1970.
- Harmoning, Arlen, "A Price Tag for Wildlife," North Dakota Outdoors, 40(1): 4-8, July, 1977.
- Senechal, Donald M., Analysis of the Validity of North Dakota Input-Output Models, M.S. Thesis, North Dakota State University, Fargo, 1971.
- Sorenson, Lee A., Alternative Uses of Wetlands, M.S. Thesis, North Dakota State University, March, 1975.
- Wroblewski, Leonard, "Some Notes on Sampling Surveys," Minnesota Department of Conservation, Division of Game and Fish, Section of Technical Services, Special Publication No. 86, September, 1970.





APPENDICIES



APPENDIX A



APPENDIX A  
NONRESIDENT HUNTING LICENSE INFORMATION

APPENDIX TABLE A1. LICENSE COMBINATIONS HELD BY SURVEY RESPONDENTS

Licenses Held	Number of Respondents
Small game	79
Firearms deer	200
Archery deer	117
Archery antelope	8
Small game, waterfowl	1,760
Small game, waterfowl, archery deer	13
Small game, waterfowl, archery deer, archery antelope	1
Small game, waterfowl, archery deer, firearms deer	2
Small game, waterfowl, firearms deer	39
Small game, firearms deer	8
Small game, archery deer	5
Archery deer, archery antelope	14
<b>TOTAL</b>	<b>2,246</b>

APPENDIX TABLE A2. HOME STATE OF NONRESIDENT HUNTERS IN NORTH DAKOTA, 1976

State	Big Game			Small Game	State	Big Game			Small Game
	Deer	Antelope	Firearms Deer			Deer	Antelope	Firearms Deer	
Alabama	0	0	0	4	Nevada	0	0	1	11
Alaska	1	0	0	11	New Hampshire	0	0	0	3
Arizona	0	0	1	29	New Jersey	1	0	1	9
Arkansas	0	0	0	16	New Mexico	1	0	0	4
California	0	1	13	126	New York	0	0	0	18
Colorado	3	0	5	77	North Carolina	0	0	0	16
Connecticut	0	0	1	4	North Dakota <sup>a</sup>	7	3	14	25
Delaware	0	0	1	0	Ohio	3	0	10	49
District of Columbia	0	0	0	2	Oklahoma	0	0	2	10
Florida	0	0	1	37	Oregon	0	0	0	17
Georgia	0	0	0	22	Pennsylvania	1	0	1	23
Hawaii	0	0	0	2	Rhode Island	0	0	0	0
Idaho	0	0	0	5	South Carolina	0	0	0	9
Illinois	0	0	21	222	South Dakota	10	0	14	122
Indiana	2	0	5	96	Tennessee	0	0	0	9
Iowa	11	2	13	201	Texas	0	0	2	43
Kansas	0	0	14	28	Utah	0	0	0	6
Kentucky	0	0	0	10	Vermont	0	0	0	0
Louisiana	1	0	0	9	Virginia	6	1	1	29
Maine	0	0	0	5	Washington	0	0	6	62
Maryland	0	0	0	12	West Virginia	1	1	1	7
Massachusetts	0	0	0	3	Wisconsin	1	6	23	735
Michigan	8	0	14	104	Wyoming	0	0	0	35
Minnesota	252	24	270	6,367					
Mississippi	0	0	0	0	Canada	3	0	19	9
Missouri	2	0	6	41	Saudi Arabia	0	0	0	1
Montana	7	0	1	102	West Germany	0	0	0	1
Nebraska	0	0	0	40	<b>TOTALS</b>	<b>321</b>	<b>38</b>	<b>461</b>	<b>8,828</b>

<sup>a</sup>Some persons had not lived in North Dakota long enough to be eligible to purchase resident licenses, while others were only temporary residents of North Dakota.



APPENDIX B





APPENDIX B  
INTERDEPENDENCE COEFFICIENTS

APPENDIX TABLE B1. INTERDEPENDENCE COEFFICIENTS<sup>a</sup> FOR THE RETAIL, BUSINESS AND PERSONAL SERVICE, AND NONRESIDENT HUNTER ECONOMIC SECTORS, NORTH DAKOTA

Sector	Retail	Business & Personal Service	Nonresident Hunter <sup>b</sup>
1. Agriculture, livestock	0.09	0.04	0.06
2. Agriculture, crops	0.03	0.02	0.02
3. Sand and gravel mining	c	c	c
4. Construction	0.03	0.05	0.04
5. Transportation	0.01	0.01	0.01
6. Communication and utilities	0.05	0.11	0.90
7. Wholesale and ag processing	0.05	0.02	0.03
8. Retail	1.27	0.45	0.72
9. Finance, insurance, and real estate	0.06	0.11	0.09
10. Business and personal service	0.02	1.05	0.71
11. Professional and social service	0.03	0.05	0.04
12. Households	0.40	0.72	0.61
13. Government	0.40	0.08	0.07
14. Energy	c	c	c
Gross Receipts Multiplier	2.09	2.71	2.51

<sup>a</sup>Hertsgaard, Thor A., et al., Developing Economic Impact Projection Models for the Fort Union Coal Region, Final Report of Phase I Environmental Protection Agency Contract No. 68-01-3507, Department of Agricultural Economics, North Dakota State University, Fargo, June, 1977.

<sup>b</sup>The nonresident hunter sector is a mixture of the retail and the business and personal service sectors. Survey data indicated one-third of the expenditures of nonresident hunters were made in the retail sector, while the other two-thirds were made in the business and personal service sector. The coefficients presented in this column represent that expenditure pattern.

<sup>c</sup>Less than 0.005.



APPENDIX C



APPENDIX TABLE C1. GROSS BUSINESS VOLUME AND EMPLOYMENT BY SECTOR AND PERSONAL INCOME GENERATED BY NONRESIDENT HUNTER EXPENDITURES IN STATE REGIONS 1-8, 1976

Economic Sector	State Region 1		State Region 2		State Region 3		State Region 4		State Region 5		State Region 6		State Region 7		State Region 8	
	Gross Business Volume	Employment <sup>c</sup>	Gross Business Volume	Employment <sup>c</sup>	Gross Business Volume	Employment <sup>c</sup>	Gross Business Volume	Employment <sup>c</sup>	Gross Business Volume	Employment <sup>c</sup>	Gross Business Volume	Employment <sup>c</sup>	Gross Business Volume	Employment <sup>c</sup>	Gross Business Volume	Employment <sup>c</sup>
1. Agriculture, livestock	\$ 5,179	.099	\$ 33,751	.645	\$ 48,878	.803	\$ 8,763	.112	\$ 12,822	.187	\$ 17,319	.287	\$ 10,094	.104	\$ 5,849	.106
2. Agriculture, crops	2,136	.041	13,918	.266	20,157	.331	3,614	.046	5,288	.077	7,142	.118	4,163	.043	2,412	.044
3. Sand and gravel mining	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d
4. Construction	3,978	.085	25,925	.620	37,546	.904	6,732	.147	9,849	.522	13,304	.331	7,754	.218	4,493	.089
5. Transportation	917	.022	5,974	.151	8,651	.171	1,551	.047	2,269	.140	3,065	.082	1,787	.049	1,035	.027
6. Communication and utilities	8,268	.195	53,882	1.359	78,032	1.542	13,990	.424	20,470	1.268	27,649	.737	16,114	.534	9,337	.242
7. Wholesale and ag processing	2,741	.061	17,861	.392	25,867	.416	4,638	.116	6,785	.309	9,165	.189	5,342	.077	3,095	.054
8. Retail	66,092	.795	430,694	4.995	623,740	5.273	111,830	1.642	163,622	3.822	221,010	2.302	128,809	1.182	74,636	.915
9. Finance, insurance, and real estate	8,571	.202	55,853	1.409	80,887	1.609	14,502	.440	21,219	1.314	28,661	.764	16,704	.462	9,679	.251
10. Business and personal service	65,093	3.737	424,182	24.023	614,310	28.602	110,139	8.042	161,148	17.518	217,669	13.532	126,861	7.248	73,508	4.608
11. Professional and social service	3,978	.228	25,925	1.468	37,546	1.748	6,732	.492	9,849	1.071	13,304	.827	7,754	.443	4,493	.282
12. Households	56,320	--	367,016	--	531,520	--	95,296	--	139,430	--	188,334	--	109,764	--	63,601	--
13. Government	6,123	.578	39,903	7.726	57,789	5.126	10,361	2.430	15,159	2.417	20,476	1.972	11,934	1.076	6,915	.533
14. Energy	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d
TOTALS	\$229,862	6.043	\$1,496,616	43.054	\$2,167,431	46.525	\$388,598	13.938	\$568,568	28.645	\$767,988	21.141	\$447,597	11.436	\$259,354	1.151

<sup>a</sup>Row 12, Households, represents personal income.

<sup>b</sup>Nonresident hunter expenditures in State Region I were \$91,667.

<sup>c</sup>Employment in each sector was estimated using gross business volume to employment ratios.

<sup>d</sup>Not significant.



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