WATERFOWL HUNTING IN NORTH DAKOTA

A survey of Minnesota residents
who hunt waterfowl in North Dakota

Final Report

A cooperative study conducted by:

Minnesota Cooperative Fish and Wildlife Research Unit
Minnesota Department of Natural Resources

WATERFOWL HUNTING IN NORTH DAKOTA

A survey of Minnesota residents who hunt waterfowl in North Dakota

Prepared by:

Susan A. Schroeder
Research Fellow
Minnesota Cooperative Fish and Wildlife Research Unit
Department of Fisheries, Wildlife, and Conservation Biology
University of Minnesota

David C. Fulton
USGS-Assistant Unit Leader
Minnesota Cooperative Fish and Wildlife Research Unit
Department of Fisheries, Wildlife, and Conservation Biology
University of Minnesota

Jeffrey S. Lawrence
Group Leader
Wetland Wildlife Population and Research Group
Minnesota Department of Natural Resources
Division of Wildlife

Steven D. Cordts
Waterfowl Staff Specialist
Wetland Wildlife Population and Research Group
Minnesota Department of Natural Resources
Division of Wildlife

Acknowledgements

This study was a cooperative effort supported by the Minnesota Department of Natural Resources, Division of Wildlife (DNR) and the U.S. Geological Survey through the Minnesota Cooperative Fish and Wildlife Research Unit at the University of Minnesota. We especially wish to thank Dave Schad, Ed Boggess, Mike DonCarlos and Jack Wingate from the Minnesota Department of Natural Resources for their support of the project. We also wish to thank Rick Nordby for his assistance in working with the electronic licensing system. Finally, we thank the many waterfowl hunters who took the time to complete the survey and helped to further our understanding of this important clientele.

Suggested Citation

Schroeder, S. A., Fulton D. C., Lawrence, J. S., and Cordts, S. D. (2007). *Waterfowl hunting in North Dakota: A survey of Minnesota residents who hunt waterfowl in North Dakota.* University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology.

Contact Information

1) Susan A. Schroeder, Research Fellow
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
200 Hodson Hall, 1980 Folwell Avenue
St. Paul, MN 55108
(612)624-3479 (phone)
(612)625-5299 (fax)
sas@umn.edu

2) David C. Fulton, USGS Assistant Unit Leader
Minnesota Cooperative Fish and Wildlife Research Unit
University of Minnesota
142 Hodson Hall, 1980 Folwell Avenue
St. Paul, MN 55108
(612)625-5256 (phone)
(612)625-5299 (fax)
dcfulton@umn.edu

3) Jeffrey S. Lawrence, Group Leader
Wetland Wildlife Population and Research Group
Minnesota Department of Natural Resources
102 23rd St. NE
Bemidji, MN 56601
jeff.lawrence@dnr.state.mn.us

4) Steven D. Cordts, Waterfowl Staff Specialist
Wetland Wildlife Population and Research Group
Minnesota Department of Natural Resources
102 23rd St. NE
Bemidji, MN 56601
steve.cordts@dnr.state.mn.us

Executive Summary

This study of Minnesota residents who purchased North Dakota waterfowl-hunting licenses for the 2005 season was conducted to assess waterfowl hunters':

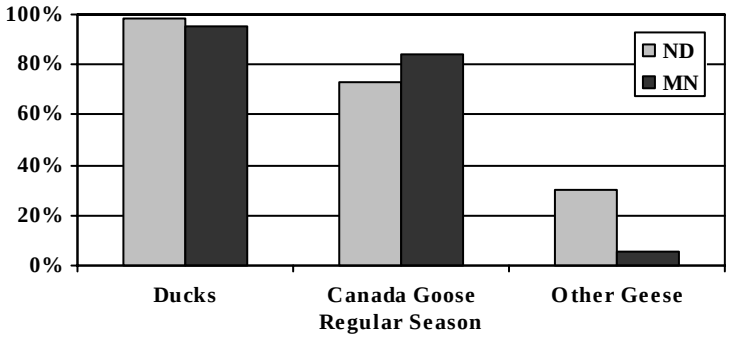
- North Dakota and Minnesota waterfowl-hunting participation and activities;
- satisfaction, attitudes, and knowledge of waterfowl management in North Dakota and Minnesota; and
- motivations for, involvement with, and constraints related to the activity of waterfowl hunting.

The survey was distributed to 800 Minnesota residents who purchased a North Dakota waterfowl hunting license; 547 completed surveys were used for this analysis. An additional 48 shortened surveys were received to gauge nonresponse bias. After adjusting for undeliverable surveys, reluctant and invalid respondents, the response rate was 69% excluding, and 76% including, reluctant responders.

Experiences

On average, respondents had been waterfowl hunting for 30 years total and for 9 years in North Dakota. Nearly all of the respondents had hunted for waterfowl in North Dakota during the 2005 season, and about two-thirds of the respondents had hunted for waterfowl in Minnesota during 2005. Almost all of the respondents who hunted in each state reported targeting ducks with a slightly smaller proportion targeting geese (Figure S-1).

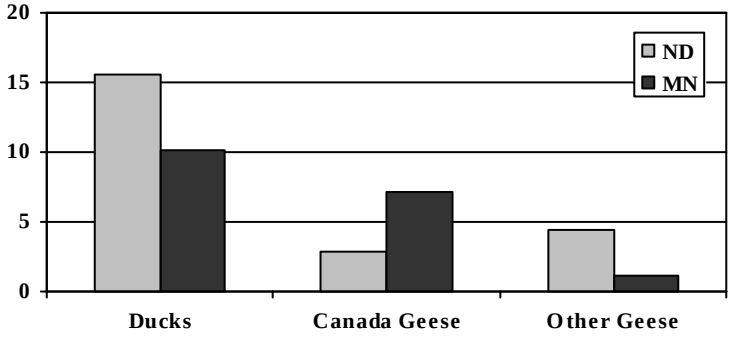
Figure S-1: Percentage of respondents who hunted in each state who participated in specific hunts



Hunters reported bagging significantly more ducks and "other" geese in North Dakota than in Minnesota. However, they reported bagging more Canada Geese while hunting in Minnesota than in North Dakota (Figure S-2).

Respondents hunted an average of 2.8 days on weekends and holidays and 3.7 days during the week in North Dakota. On average, respondents who hunted in Minnesota hunted 6.6 weekdays and holidays and 5.6 weekdays in that state. Nearly one-third of respondents hunted the opening day in North Dakota, while over 50% of respondents who hunted in Minnesota hunted on that state's opening day.

Figure S-2: Number of birds bagged in 2005



Respondents traveled an average of 337 miles one-way to hunt in North Dakota compared to 63 miles to hunt in Minnesota.

Respondents who hunted in the different states differed in whom they went hunting with during the 2005 season (Figure S-3).

Satisfaction

Respondents were significantly more satisfied with hunting in North Dakota than in Minnesota (Figure S-4). On average, respondents were satisfied with all aspects of duck and goose hunting in North Dakota. They were dissatisfied with most aspects of duck hunting in Minnesota, and they were neutral to slightly satisfied with goose hunting in Minnesota. Over 90% of hunters reported being satisfied with their general waterfowl-hunting experience in North Dakota, compared to only 39% for Minnesota. There was a significant positive relationship between the number of ducks bagged and satisfaction with duck-hunting harvest in North Dakota and Minnesota.

Hunters were also asked if their overall level of satisfaction with duck hunting and goose hunting in each state had decreased or increased in the past three hunting seasons, and since they had begun hunting ducks and geese. Over 80% of respondents said that their satisfaction with Minnesota duck hunting had decreased since they began hunting, with over 50% saying that it had greatly decreased (Figure S-5). Slightly over one-third of respondents indicated that their satisfaction with goose hunting in Minnesota had declined since they began hunting, but over 40% said that it had increased (Figure S-6).

Over 90% of respondents said they were likely to hunt ducks in North Dakota in the next 5 years, compared to 79% in Minnesota.

Figure S-3: Proportion of days hunting with...

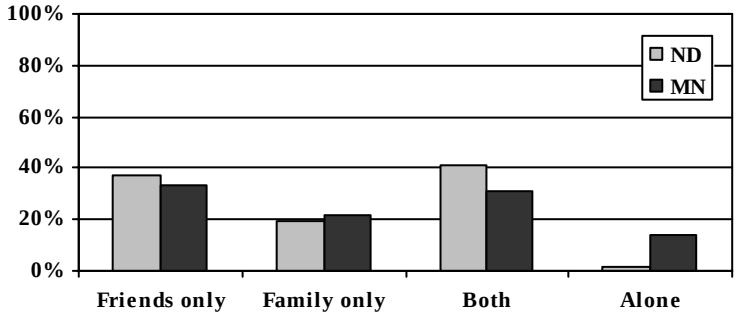


Figure S-4: Satisfaction With Duck Hunting in 2002

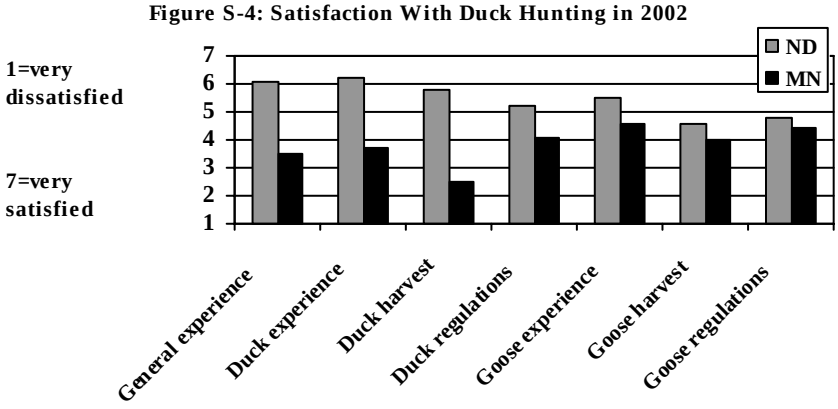


Figure S-5: Change in satisfaction with duck hunting since starting to hunt waterfowl

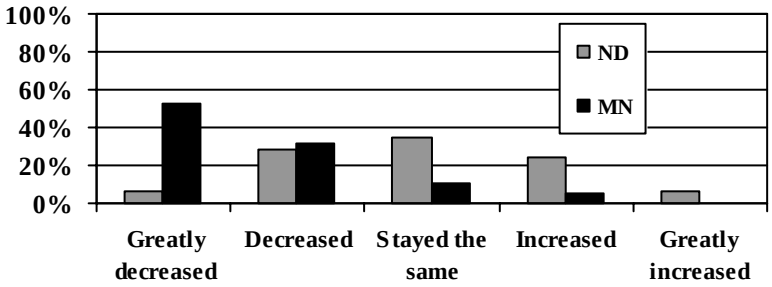
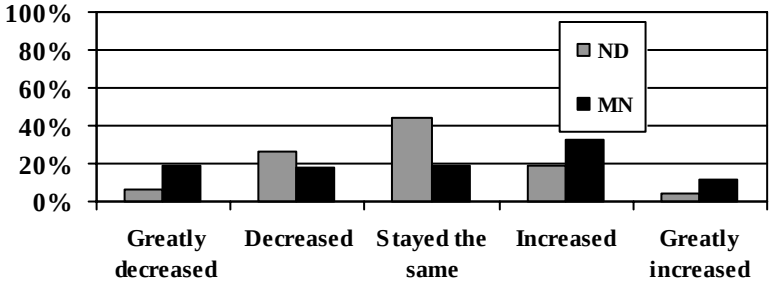
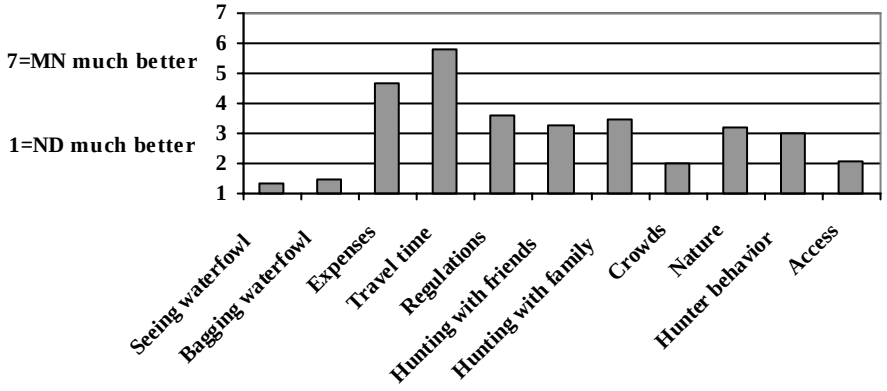


Figure S-6: Change in satisfaction with goose hunting since starting to hunt waterfowl



For most aspects of waterfowl hunting, North Dakota was seen as preferable to Minnesota (Figure S-7). Minnesota, however, was seen as preferable in terms of expenses and travel time.

S-7: Relative preference for hunting in North Dakota vs. Minnesota

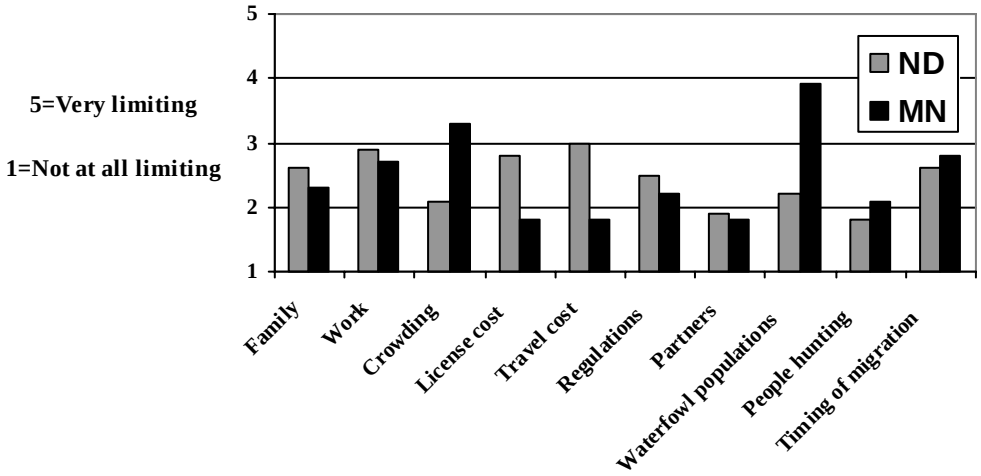


Constraints

Survey recipients were asked to report how easy or difficult it was for them to go hunting and to rate how much various factors constrained their hunting activity. Respondents indicated that it was relatively easy for them to go hunting in either North Dakota or Minnesota. It was just slightly easier for respondents to go waterfowl hunting in Minnesota than North Dakota.

Respondents rated 17 factors that might constrain their participation in hunting in North Dakota and Minnesota. There were significant differences between the states for 10 of the items (Figure S-8). Respondents reported that low waterfowl populations and crowding at hunting areas limited their hunting in Minnesota.

S-8: Constraints to waterfowl hunting in North Dakota and Minnesota

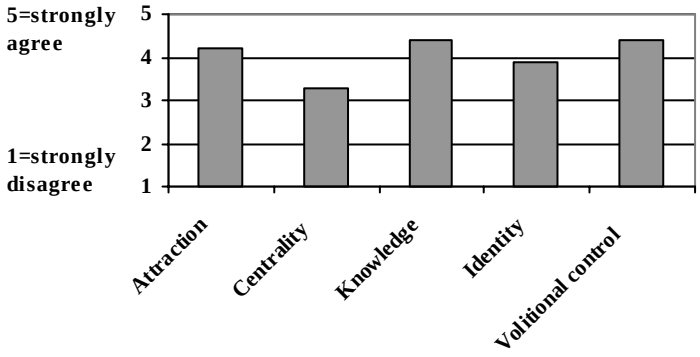


Motivations and Involvement

Waterfowl hunter involvement has been measured based on the number of days spent in the field during a season (Humburg 2002). On average, respondents to this survey hunted for waterfowl in North Dakota and Minnesota on 13.4 days during 2005. Out-of-state residents are limited to 14 days of hunting in North Dakota. Respondents to this survey include individuals who hunted for waterfowl in both North Dakota and Minnesota and those who hunted only in North Dakota. Respondents who hunted in both states appear to be substantially more involved; they hunted waterfowl an average of 17.4 days during 2005, compared to only 6.0 days for those who only hunted in North Dakota. For comparison, respondents to the 2005 Minnesota waterfowl hunter survey who hunted in both Minnesota and North Dakota hunted an average of 16.8 days in the two states combined. The Minnesota residents who hunt in both Minnesota and North Dakota appear to be more avid hunters than those who skip hunting in their home state and only hunt in North Dakota.

Respondents were asked a number of questions addressing their motivations for and involvement with waterfowl hunting. We asked survey recipients how important waterfowl hunting was to them. Most respondents (62%) indicated that it was "one of my most important recreational activities." Similar proportions of respondents indicated that waterfowl hunting was "my most important recreational activity" (16%) or "no more important than my other recreational activities" (20%). Respondents were also asked how much they spent on waterfowl hunting each year. The majority of respondents (62%) indicated that the spent $251 to $1,000, while 28% spent between $1,001 and $5,000.

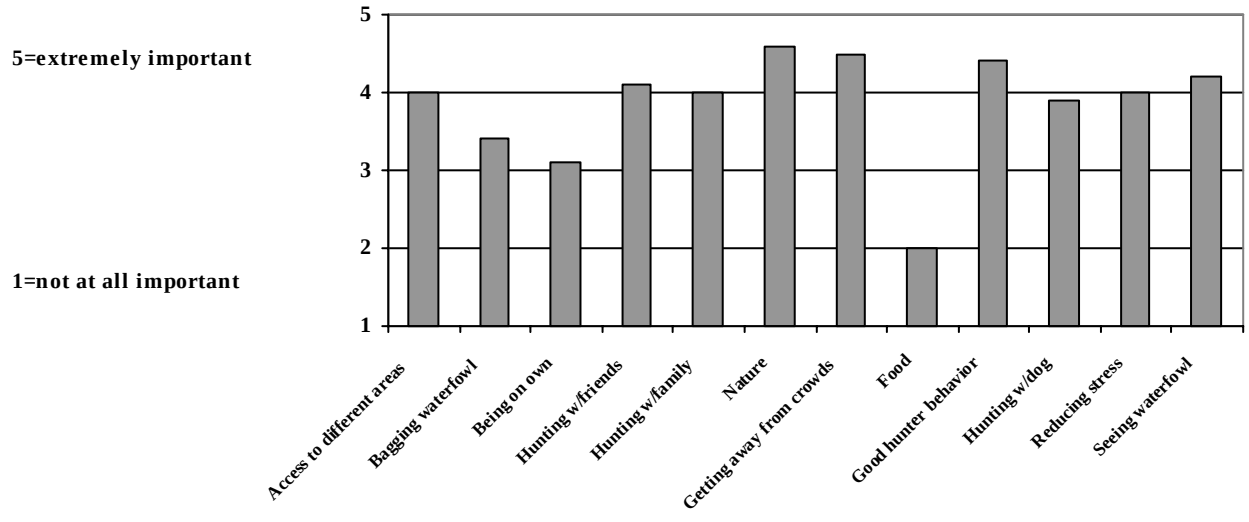
S-9: Involvement in waterfowl hunting



Survey participants were asked to respond to 21 items addressing their involvement in waterfowl hunting. A factor analysis found 5 underlying factors: attraction, centrality, knowledge, identity, and volitional control (Figure S-9). Respondents most strongly agreed with items related to attraction (e.g. waterfowl hunting is important to me), knowledge (e.g. I am knowledgeable about waterfowl hunting), and volitional control (e.g. the decision to go waterfowl hunting is primarily my own). They agreed less strongly with items related to centrality (e.g. waterfowl hunting has a central role in my life) and identity (e.g. when I am waterfowl hunting I can really be myself).

Survey recipients reported how important various experiences were to their waterfowl-hunting satisfaction. Respondents rated (a) enjoying nature and the outdoors, (b) getting away from crowds of people, and (c) good behavior among other waterfowl hunters as the most important experiences (Figure S-10).

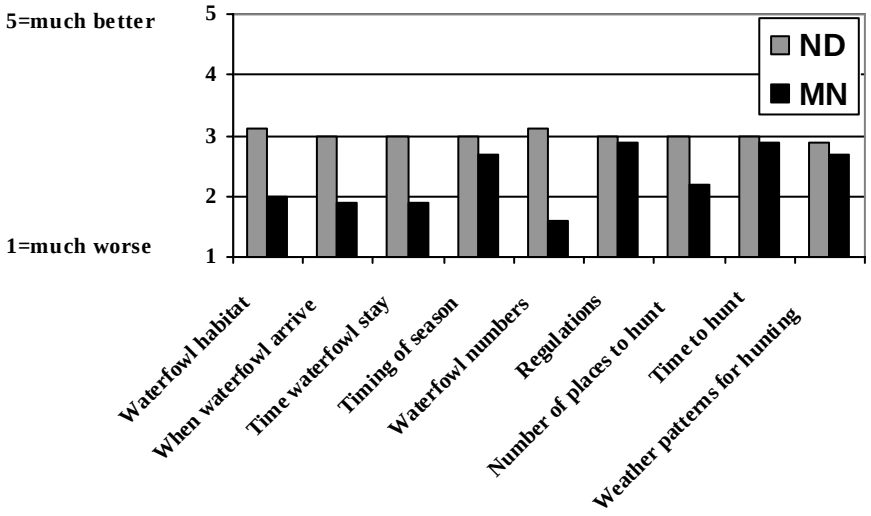
S-10: Motivations for waterfowl hunting



Quality of hunting in Minnesota and North Dakota

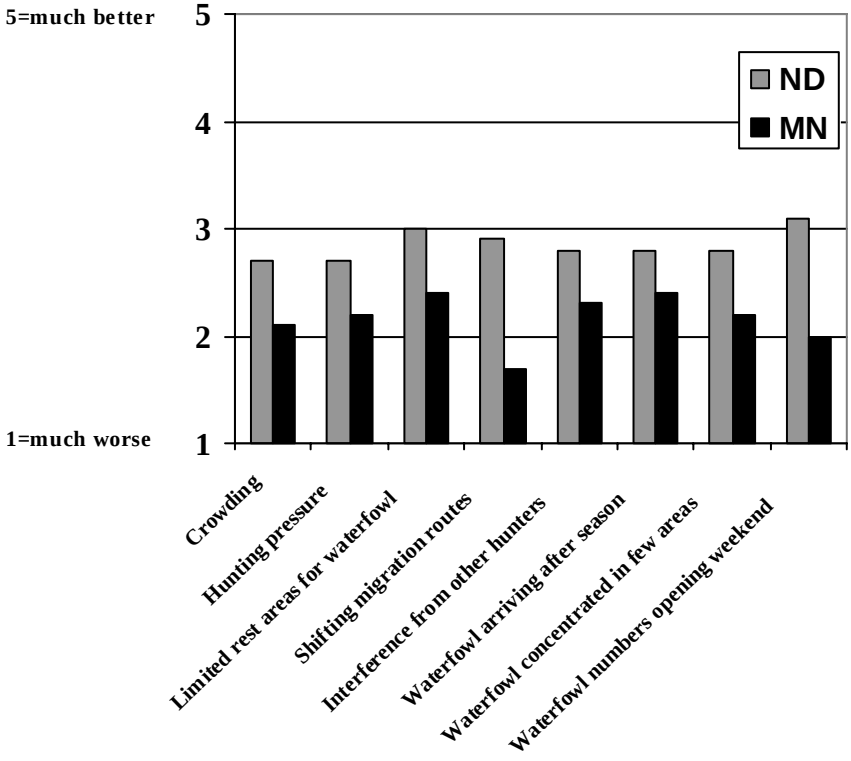
Respondents were asked about changes in the quality of hunting in North Dakota and Minnesota over the past 5 years. Responses were on a scale of 1 (much worse) to 5 (much better) (Figure S-11). Respondents indicated that Minnesota had seen declines in the quality of: waterfowl habitat, when waterfowl arrive, the length of time waterfowl stay, waterfowl numbers, and the number of places to hunt. North Dakota quality was seen as neither better nor worse.

S-11: Quality of hunting in North Dakota and Minnesota



Respondents were asked about changes in problems associated with hunting waterfowl in North Dakota and Minnesota. Hunters felt that the listed problems had gotten worse in Minnesota compared to North Dakota (Figure S-12).

S-12: Changes in problems associated with hunting in North Dakota and Minnesota



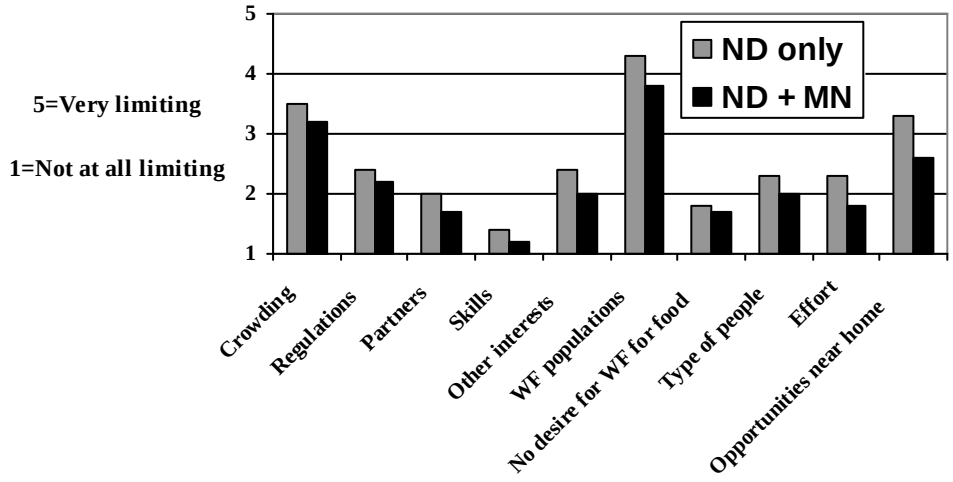
Hunting in North Dakota Only Versus Hunting in Both Minnesota and North Dakota

Respondents who hunted in both Minnesota and North Dakota were younger ($\bar{x}$ = 43) than those who only hunted in North Dakota ($\bar{x}$ = 50). Respondents who hunted in both states were more avid hunters, and reported more memberships in hunting and conservation organizations like Ducks Unlimited (62% vs. 47%).

In terms of their hunting experiences in North Dakota, respondents who hunted only in North Dakota (versus those who hunted in both states) were more likely to have hunted on the opening day for Minnesota hunters in North Dakota, which coincided with the opening day for waterfowl hunting in Minnesota. Respondents who hunted in both states bagged more ducks per hunting day on average in North Dakota than those who only hunted in North Dakota. Compared to respondents who hunted in both

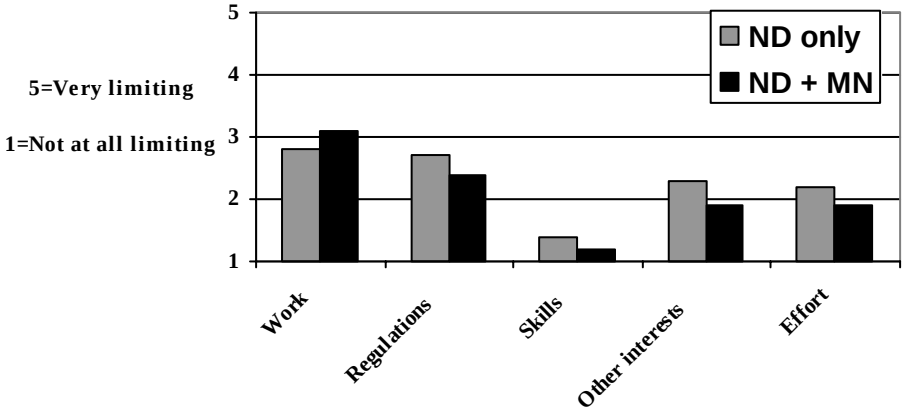
states, respondents who hunted only in North Dakota were more likely to report having visited family or hunted for other game while waterfowl hunting in the state. There was little difference between hunters who hunted in both states and those who only hunted in North Dakota in satisfaction with North Dakota hunting.

S-13: Constraints to waterfowl hunting in Minnesota, by states hunted



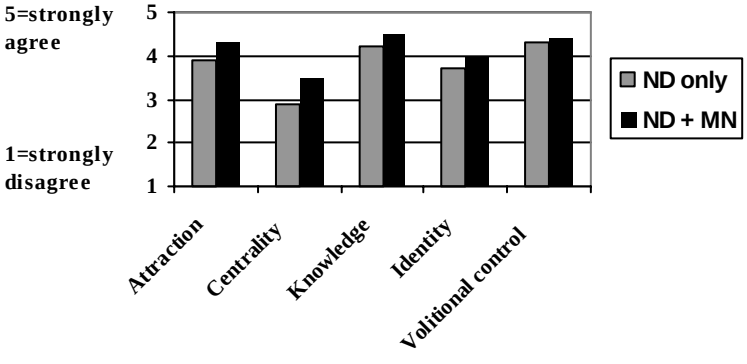
Compared to respondents who only hunted in North Dakota, respondents who hunted in both states rated many constraints to their waterfowl hunting participation lower. This finding was true for limitations to hunting in Minnesota (Figure S-13) and North Dakota (Figure S-14).

S-14: Constraints to waterfowl hunting in North Dakota, by states hunted



Respondents who hunted in both states reported higher levels of involvement in waterfowl hunting, compared to respondents who only hunted in North Dakota. Over one-fifth of respondents who hunted in both states indicated that "waterfowl hunting is my most important recreational activity," compared to only 7% of respondents who only hunted in North Dakota. Similarly, respondents who hunted in both states reported spending more money annually on waterfowl hunting. Likewise, respondents who hunted in both states rated items underlying five dimensions of waterfowl-hunting involvement higher (Figure S-15).

S-15: Involvement in waterfowl hunting, by states hunted



Respondents who only hunted in North Dakota felt that the quality of Minnesota hunting had declined more than respondents who hunted in both states.

Conclusions and Implications

Two-thirds of these hunters who live in Minnesota and hunt for waterfowl in North Dakota still hunt for waterfowl in Minnesota. On average, hunters who hunt in both states hunt more days in their home state of Minnesota than in North Dakota. However, about one-third of the Minnesota residents who purchased North Dakota waterfowl-hunting licenses do not hunt in Minnesota, and the large majority of them (86%) did hunt there in the past. These hunters who no longer hunt for waterfowl in Minnesota are somewhat older and less avid than the hunters who hunt in both states. Minnesota residents who hunt for waterfowl in North Dakota rate the quality of hunting substantially better in North Dakota than in Minnesota. They also report greater satisfaction with the hunting in North Dakota than in Minnesota.

Table of Contents

Acknowledgements ii
Suggested Citation ii
Contact Information ii
Executive Summary iii
Table of Contents x
List of Tables xii
Introduction 1
Objectives 1
Methods 2
Sampling 2
Data Collection 2
Survey Instrument 2
Data Entry and Analysis 2
Survey Response Rate 3
Section 1: 2005 North Dakota Waterfowl Season 4
Findings: 4
Waterfowl Seasons Hunted in North Dakota in 2005 4
Harvest 4
Average Number of Days Hunting Weekends and Weekdays 4
Hunting Opening Weekend 4
Hunting on Public and Private Land 5
Distance Traveled to Hunt Waterfowl in North Dakota 5
Hunting With a Paid Guide 5
Hunting Parties 5
Other Activities During the 2005 North Dakota Waterfowl Season 5
Section 2: Satisfaction with the 2005 North Dakota Waterfowl Season 11
Findings: 11
Satisfaction with the Waterfowl Hunting Experience, Harvest, and Regulations in North Dakota 11
Changes in Satisfaction Levels with North Dakota Waterfowl Hunting 11
Satisfaction with the Number of Ducks and Geese Seen While Hunting in North Dakota 12
Likelihood of Hunting Ducks and Geese in North Dakota in the Future 12
Section 3: 2005 Minnesota Waterfowl Season 18
Findings: 18
Waterfowl Seasons Hunted in Minnesota in 2005 18
Harvest 18
Average Number of Days Hunting Weekends and Weekdays 18
Hunting Opening Weekend 18
Areas Hunted 18
Who Respondents Hunted With 19
Section 4: Satisfaction with Minnesota Waterfowl Hunting 22
Findings: 22
Satisfaction with the General Waterfowl Hunting Experience in Minnesota 22
Satisfaction with Duck Hunting in Minnesota 22
Satisfaction with Goose Hunting 23
Comparison of Duck Hunting and Goose Hunting 23
Changes in Satisfaction Levels 23
Satisfaction With Number of Ducks and Geese Seen in the Field 23
Likelihood of Hunting Waterfowl in Minnesota in the Next Five Years 23
Section 5: Comparing North Dakota and Minnesota Waterfowl Hunting 27
Findings: 27
Hunting Participation in North Dakota and Minnesota 27

Satisfaction with Hunting in North Dakota and Minnesota 28
Preferences for Hunting in North Dakota and Minnesota 28
Section 6: Constraints to Waterfowl Hunting 38
Findings: 38
Ease of going Hunting in North Dakota and Minnesota 38
Limitations to Hunting in North Dakota and Minnesota 38
Section 7: Motivations for and Involvement in Waterfowl Hunting 47
Findings: 47
Motivations 47
Importance of and Financial Investment in Waterfowl Hunting 47
Involvement/Commitment to Waterfowl Hunting 47
Importance of Bagging Waterfowl 48
Section 8: Quality of Minnesota and North Dakota Waterfowl Hunting 56
Findings: 56
Opinions about Changes in Hunting Quality in North Dakota and Minnesota 56
Changes in Problems Associated With Hunting in North Dakota and Minnesota 56
Section 9: Characteristics of Respondents 63
Findings: 63
Hunter Age 63
Years Living in Minnesota 63
Years Waterfowl Hunting 63
Days Hunting Waterfowl 64
Membership in Conservation and Hunting Organizations 64
Late Respondents 64
Appendix A: Survey Instrument 70
Appendix B: Nonresponse Survey Instrument 83

List of Tables

Table 1-1: Hunters participating in different waterfowl hunts in North Dakota in 2005 6
Table 1-2: Hunters participating in duck hunting in North Dakota in 2005, by states hunted 6
Table 1-3: Hunters hunting Canada Geese in North Dakota in 2005, by states hunted 6
Table 1-4: Hunters hunting for other geese in North Dakota in 2005, by states hunted 6
Table 1-5: Average number of days hunting waterfowl in North Dakota on weekends and weekdays 7
Table 1-6: Average number of days hunting waterfowl in North Dakota, by states hunted 7
Table 1-7: Participation in hunting on the first day (October 1, 2005) that nonresidents were permitted to hunt waterfowl during the 2005 North Dakota waterfowl season by state(s) hunted 7
Table 1-8: Hunting on public versus private land during the 2005 North Dakota waterfowl season by state(s) hunted 7
Table 1-9: One-way distance traveled to the area most frequently hunted in North Dakota during the 2005 season by state(s) hunted 8
Table 1-10: Hunting with a paid hunting guide during the 2005 North Dakota waterfowl season 8
Table 1-11: Hunting for geese and ducks with a paid hunting guide during the 2005 North Dakota waterfowl season by state(s) hunted 8
Table 1-12: Percent and number of days hunting with friends, family, alone during the 2005 North Dakota waterfowl season 8
Table 1-13: Percent and number of days hunting with … during the 2005 North Dakota waterfowl season by state(s) hunted 9
Table 1-14: Other activities while hunting during the 2005 North Dakota waterfowl season 9
Table 1-15: Other activities during the 2005 North Dakota waterfowl season by state(s) hunted 10
Table 2-1: Satisfaction with most recent North Dakota waterfowl-hunting season. 13
Table 2-2: Comparison of duck-hunting and goose-hunting satisfaction for 2005 North Dakota season 13
Table 2-3: Satisfaction with general waterfowl hunting experience and duck and goose hunting experience, harvest, and regulations during most recent North Dakota waterfowl-hunting season, by states hunted. 14
Table 2-4 Overall change in duck-hunting and goose-hunting satisfaction in North Dakota over the past three seasons 15
Table 2-5: Overall change in duck and goose hunting satisfaction in North Dakota over the past three seasons, by states hunted 15
Table 2-6: Overall change in duck-hunting and goose-hunting satisfaction in North Dakota since they began hunting 15
Table 2-7: Overall change in duck and goose hunting satisfaction in North Dakota since they began hunting, by states hunted 16
Table 2-8: Satisfaction with number of ducks and geese seen in the field during the 2005 North Dakota waterfowl hunting season 16
Table 2-9: Satisfaction with number of ducks or geese seen in the field during the 2005 North Dakota waterfowl hunting season, by states hunted 16
Table 2-10: Likelihood of hunting ducks and geese in North Dakota at some time during the next 5 years. 17
Table 2-11: Likelihood of hunting ducks and geese in North Dakota at some time during the next 5 years, by states hunted. 17
Table 3-1: Hunters participating in different waterfowl hunts in Minnesota in 2005 20
Table 3-2: Average number of days hunting waterfowl in Minnesota on weekends and weekdays 20
Table 3-3: Participation in hunting on opening weekend (October 1-2, 2005) of the 2005 Minnesota waterfowl season 20
Table 3-4: Average number and percent of days hunting in Minnesota regions 20
Table 3-5: Hunting on public versus private land during the 2005 Minnesota waterfowl season 21

Table 3-6: One-way distance traveled to the area most frequently hunted in Minnesota during the 2005 season 21
Table 3-7: Number of days hunting with friends, family, alone during the 2005 Minnesota waterfowl season 21
Table 4-1: Satisfaction with most recent Minnesota waterfowl-hunting season. 24
Table 4-2: Comparison (paired sample t-test) of duck-hunting and goose-hunting satisfaction for most-recent Minnesota waterfowl-hunting season 24
Table 4-3: Overall change in duck-hunting and goose-hunting satisfaction in Minnesota over the past three seasons 25
Table 4-4: Overall change in duck-hunting and goose-hunting satisfaction in Minnesota since they began hunting 25
Table 4-5: Satisfaction with number of ducks and geese seen in the field during the 2005 Minnesota waterfowl hunting season 25
Table 4-6: Likelihood of hunting in Minnesota at some time during the next 5 years 26
Table 5-1: Proportion of 2005 North Dakota Nonresident Waterfowl License purchasers from Minnesota who hunted waterfowl in Minnesota and North Dakota in 2005, 2004, 2003, 2002, 2001, 2000 30
Table 5-2: Respondents participating in different waterfowl hunts in Minnesota and North Dakota in 2005 30
Table 5-3: Number of birds bagged by hunters participating in different waterfowl hunts in Minnesota and North Dakota in 2005 30
Table 5-4: Average number of weekdays and weekend days/holidays hunting waterfowl in Minnesota and North Dakota 30
Table 5-5: Participation in hunting on opening weekends (October 1-2, 2005) of the 2005 Minnesota and North Dakota waterfowl season 31
Table 5-6: Hunting on public versus private land during the 2005 Minnesota and North Dakota waterfowl seasons 31
Table 5-7: One-way distance traveled to the area most frequently hunted in Minnesota during the 2005 season 31
Table 5-8: Number of days hunting with friends, family, alone during the 2005 waterfowl season 31
Table 5-9: Percentage of hunting days spent hunting with friends, family, alone during the 2005 waterfowl season 32
Table 5-10: Satisfaction with the general waterfowl hunting experience during most recent Minnesota and North Dakota waterfowl-hunting seasons. 32
Table 5-11: Satisfaction with the duck hunting experience during most recent Minnesota and North Dakota waterfowl-hunting seasons. 32
Table 5-12: Satisfaction with the duck hunting harvest during most recent Minnesota and North Dakota waterfowl-hunting seasons. 33
Table 5-13: Satisfaction with the duck hunting regulations during most recent Minnesota and North Dakota waterfowl-hunting seasons. 33
Table 5-14: Satisfaction with the goose hunting experience during most recent Minnesota and North Dakota waterfowl-hunting seasons. 33
Table 5-15: Satisfaction with the goose hunting harvest during most recent Minnesota and North Dakota waterfowl-hunting seasons. 34
Table 5-16: Satisfaction with the goose hunting regulations during most recent Minnesota and North Dakota waterfowl-hunting seasons. 34
Table 5-17: Overall change in duck-hunting satisfaction in Minnesota and North Dakota over the past three seasons 34
Table 5-18: Overall change in goose-hunting satisfaction in Minnesota and North Dakota over the past three seasons 35

Table 5-19: Overall change in duck-hunting satisfaction in Minnesota and North Dakota since began hunting 35
Table 5-20: Overall change in goose-hunting satisfaction in Minnesota and North Dakota since began hunting 35
Table 5-21: Satisfaction with number of ducks seen in the field during the 2005 Minnesota and North Dakota waterfowl hunting seasons 36
Table 5-22: Satisfaction with number of geese seen in the field during the 2005 Minnesota and North Dakota waterfowl hunting seasons 36
Table 5-23: Likelihood of hunting for ducks in Minnesota and North Dakota at some time during the next 5 years 36
Table 5-24: Likelihood of hunting for geese in Minnesota and North Dakota at some time during the next 5 years 37
Table 5-25: When you consider the following aspects of your hunting experiences during the 2005 season, is Minnesota or North Dakota preferable for… 37
Table 6-1: If I want to, I can easily go waterfowl hunting in… 40
Table 6-2: If I want to, I can easily go waterfowl hunting in …, by states hunted 40
Table 6-3: Constraints to waterfowl hunting in Minnesota and North Dakota 41
Table 6-3: Constraints to waterfowl hunting in Minnesota and North Dakota (continued) 42
Table 6-4: Constraints to waterfowl hunting in Minnesota, by states hunted 43
Table 6-4: Constraints to waterfowl hunting in Minnesota, by states hunted (continued) 44
Table 6-5: Constraints to waterfowl hunting in North Dakota, by states hunted 45
Table 6-5: Constraints to waterfowl hunting in North Dakota, by states hunted (continued) 46
Table 7-1: Motivations for waterfowl hunting: Importance of… 49
Table 7-2: Motivations for waterfowl hunting: Importance of… by state(s) hunted. 49
Table 7-2: Motivations for waterfowl hunting: Importance of… by state(s) hunted (continued). 50
Table 7-3: Importance of waterfowl hunting by state(s) hunted 50
Table 7-4: Amount spent on waterfowl hunting each year by state(s) hunted 51
Table 7-5: Involvement with and commitment to waterfowl hunting 52
Table 7-6: Involvement with and commitment to waterfowl hunting by state(s) hunted 53
Table 7-6: Involvement with and commitment to waterfowl hunting by state(s) hunted 54
Table 7-7: Minimum number of ducks and geese needed to harvest in a day to feel satisfied 55
Table 7-8: Minimum number of waterfowl needed to harvest in a day to feel satisfied by state(s) hunted 55
Table 7-9: Minimum number of ducks and geese needed to harvest in a season to feel satisfied 55
Table 7-10: Minimum number of ducks needed to harvest in a season to feel satisfied by state(s) hunted 55
Table 8-1: Changes in hunting quality by state 57
Table 8-2: Changes in Minnesota hunting quality by state(s) hunted. 58
Table 8-3: Changes in North Dakota in hunting quality by state(s) hunted. 59
Table 8-4: Problems in last 5 years by state. 60
Table 8-5: Problems in Minnesota in last 5 years by state(s) hunted. 61
Table 8-6: Problems in North Dakota in last 5 years by state(s) hunted. 62
Table 9-1: Age 65
Table 9-2: Years and Proportion of Life in Minnesota 65
Table 9-3: Years Hunting Waterfowl 65
Table 9-4: Years Hunting Waterfowl in North Dakota 65
Table 9-5: Ever Hunted Waterfowl in Minnesota 66
Table 9-6: Years of the previous 6, hunting waterfowl in Minnesota and North Dakota. 66
Table 9-7: Years of the previous 6, hunting waterfowl in Minnesota 66
Table 9-8: Years of the previous 6, hunting waterfowl in North Dakota 66
Table 9-9: Trends in hunting in Minnesota and North Dakota during the previous 6 years. 67

Table 9-10: Total number of days hunting during 2005. 67
Table 9-11: Membership in hunting and conservation organizations 67
Table 9-12: Reluctant respondents versus early respondents: North Dakota waterfowl hunting during the previous 6 years. 67
Table 9-13: Reluctant respondents versus early respondents: Minnesota waterfowl hunting during the previous 6 years. 68

Introduction

Minnesota usually has the largest number of waterfowl hunters in the United States, although state duck stamp sales have declined in recent years. The Department is concerned about recruitment and retention of hunters and has recently established a program to address these issues (http://www.dnr.state.mn.us/harr/index.html). In order to better understand this important clientele, the Minnesota Cooperative Fish and Wildlife Research Unit, in cooperation with Minnesota DNR, completed waterfowl hunter surveys following the 2000 (Fulton et al., 2002) and 2002 (Schroeder et al., 2003) hunting seasons. An additional survey was conducted following the 2005 season (Schroeder et al., 2007).

This study was conducted to provide information on Minnesota residents who hunt waterfowl in North Dakota. A large number of Minnesota residents travel to other states to hunt many species, including waterfowl. In 2002, 1 in 5 (18.6%) Minnesota waterfowl hunters reported hunting waterfowl in another state or province (Schroeder et al., 2003). North Dakota was the primary destination for out-of-state hunters and 1 in 10 (11.5%) hunted waterfowl in North Dakota. We were interested in characteristics of waterfowl hunters who chose to hunt out-of-state, thus, surveying individuals hunting in North Dakota was a logical choice.

North Dakota limits hunting days for nonresident waterfowl hunters to 14 days. The days can be split into 2 7-day periods. Thus, a hunter can hunt up to 4 weekend days and 10 weekdays. Minnesota residents hunting within the state in 2005 could hunt up to 60 days for the duck season, and up to 100 days for Canada geese, depending on the goose zone.

This study of Minnesota residents who hunted waterfowl in North Dakota during the 2005 season was conducted to supplement the data gathered by the 2005 survey of Minnesota waterfowl hunters. It is intended to allow the Minnesota Department of Natural Resources to better understand issues related to Minnesota waterfowl hunter retention and recruitment.

Objectives

The specific objectives of this study were to:

1. Describe hunters' backgrounds.
2. Describe hunter effort in North Dakota and Minnesota in 2005 including: species and seasons hunted; number of days hunted; and effort during weekdays, weekends, and opening weekends.
3. Describe hunting satisfaction with waterfowl (duck and goose) hunting in North Dakota and Minnesota in 2005.
4. Describe the relative experiences of hunting in North Dakota versus Minnesota.
5. Describe the waterfowl-hunting involvement/commitment and motivations of Minnesota residents who hunt waterfowl in North Dakota.
6. Describe changes in problems associated with hunting in North Dakota and Minnesota.
7. Describe changes in the quality waterfowl-hunting in North Dakota and Minnesota.
8. Describe constraints to participation in waterfowl hunting in North Dakota and Minnesota.
9. Determine the general characteristics of Minnesota residents who hunt waterfowl in North Dakota.

The questions used to address each objective are provided in the survey instrument (Appendix A) and discussed in more detail in the subsequent sections.

Methods

Sampling

The population of interest in this study included all Minnesota residents who purchased a North Dakota waterfowl stamp during 2005 (n = 12,401). The sampling frame used to draw the study sample was the North Dakota Game and Fish Department's licensing system. A random sample of Minnesota residents who purchased a North Dakota waterfowl stamp in 2005 was drawn. An initial random sample of 800 individuals was drawn to achieve a target sample size of n = 400 completed surveys.

Data Collection

Data were collected using a mail-back survey (Appendix A) following a process outlined by Dillman (2000) to enhance response rates. We constructed a relatively straightforward questionnaire, created personalized cover letters, and made multiple contacts with the targeted respondents. Potential study respondents were contacted four times between May and September 2006. In the initial contact, a cover letter, survey questionnaire, and business-reply envelope were mailed to all potential study participants. The personalized cover letter explained the purpose of the study and made a personal appeal for respondents to complete and return the survey questionnaire. Approximately 3 weeks later, a second letter with another copy of the survey and business-reply envelope was sent to all study participants who had not responded to the first mailing. Three weeks after the second mailing a third mailing that included a personalized cover letter and replacement questionnaire with business-reply envelope was sent to all individuals with valid addresses who had not yet replied. Finally, in order to assess nonresponse bias, a 1-page survey (Appendix B) was sent to individuals who had not responded to the earlier mailings.

Survey Instrument

The data collection instrument was a 12-page self-administered survey with 11 pages of questions (Appendix A). The questionnaire addressed the following topics:

Part 1: Waterfowl hunting background;
Part 2: Hunting experiences during the 2005 North Dakota waterfowl-hunting season;
Part 3: Waterfowl-hunting experiences in Minnesota;
Part 4: Hunting in North Dakota versus Minnesota;
Part 5: Involvement in waterfowl hunting;
Part 6: Motivations for waterfowl hunting;
Part 7: Constraints to waterfowl hunting;
Part 8: Background information.

Data Entry and Analysis

Data were professionally keypunched and the data were analyzed on a PC using the Statistical Program for the Social Sciences (SPSS for Windows 12.0). We computed basic descriptive statistics and frequencies for the statewide results. Respondents who hunted for waterfowl in both North Dakota and Minnesota were compared with those who only hunted for waterfowl in North Dakota using, chi-square analysis, t-tests, and cross-tabulations. In addition to chi-square analysis, we present Cramer's V which is

a statistic measuring the strength of association or dependency between two categorical variables. Cramer's V ranges from 0 to 1, with values closer to 1 having the strongest association.

Survey Response Rate

Of the 800 questionnaires mailed, 11 were undeliverable, sent to a deceased person, or otherwise invalid. Of the remaining 789 surveys, a total of 547 were returned, resulting in an overall response rate of 69%. An additional 48 individuals returned a shortened survey (Appendix B) used to gauge nonresponse for an adjusted response rate of 76%.

Reluctant responders who completed the shortened survey had been waterfowl hunting significantly fewer years (22.5 years) than other respondents (30.1 years) ($t = 10.735$, $p < 0.001$). Reluctant responders had also been hunting for waterfowl in North Dakota for significantly fewer years on average (6.9 years) than others (8.5 years) ($t = 3.539$, $p < 0.001$). A significantly lower proportion of reluctant respondents hunted in North Dakota (93.8% versus 98.9%) ($t = 10.992$, $p < 0.001$) and Minnesota (55.3% versus 63.3%) ($t = 3.805$, $p < 0.001$) during the 2005 season. Weights were calculated to correct for differences in waterfowl hunting participation and applied to the data. However, there were no statistically significant differences observed between the weighted and unweighted data. For this reason, data were not weighted in any of the results reported here.

Section 1: 2005 North Dakota Waterfowl Season

Findings:

Results for waterfowl hunting activity in North Dakota during 2005 are reviewed below. Only individuals who actually hunted waterfowl in North Dakota in 2005 are included in this analysis.

Waterfowl Seasons Hunted in North Dakota in 2005

Respondents were first asked to report if they had actually hunted waterfowl in North Dakota in 2005. Nearly all, 98.9%, of the survey respondents indicated that they had hunted waterfowl in North Dakota in 2005. Respondents who had hunted in North Dakota in 2005 were next asked if they had hunted for ducks, Canada Geese, and/or other geese during the 2005 season. Nearly all respondents, 98.7%, indicated they had hunted ducks, while 72.9% had hunted Canada Geese and 30.5% had hunted other geese (Table 1-1). There was no significant difference in hunt participation between respondents who hunted waterfowl only in North Dakota and those who hunted in both North Dakota and Minnesota (Tables 1-2 to 1-4).

Harvest

For each season in which they hunted, respondents were asked to report the number of ducks or geese they personally bagged. The average number of ducks harvested by respondents during the season was 15.6. Hunters reported bagging an average of 2.8 Canada Geese and 4.5 other geese/swans (Table 1-1). Respondents who hunted in both North Dakota and Minnesota bagged an average of 17.2 ducks in North Dakota compared to 12.8 for those who only hunted in North Dakota ($t = 2.889$, $p < 0.01$) (Table 1-2). On average, respondents who hunted in both states bagged a higher number of ducks per day ($\bar{x} = 3.0$) than respondents who only hunted in North Dakota ($\bar{x} = 2.3$) ($t = 3.213$, $p < 0.01$) (Table 1-2).

Average Number of Days Hunting Weekends and Weekdays

Next, respondents were asked to report the number of days they hunted for waterfowl in North Dakota on weekends or holidays and weekdays. On average, hunters spent fewer days hunting on weekends and holidays (2.8 days) than during the week (3.7 days) (Table 1-5), but hunted 70% of weekend days they could hunt (maximum = 4) and 37% of potential week days (maximum = 10). There was no significant difference in days hunting between respondents who hunted waterfowl only in North Dakota and those who hunted in both North Dakota and Minnesota (Table 1-6).

Hunting Opening Weekend

Nearly one-third of respondents (28.8%) hunted the first day that nonresidents were permitted to hunt waterfowl during the 2005 North Dakota waterfowl season (Table 1-7). This day coincided with the opening day of the Minnesota waterfowl season. A greater proportion of respondents who hunted only in North Dakota (40.9%) hunted on the state's opening day compared to respondents who hunted in both Minnesota and North Dakota (21.3%) ($\chi^2 = 22.814$, $p < 0.001$, Cramer's $V = 0.211$).

Section 1: 2005 North Dakota Waterfowl Season

Hunting on Public and Private Land

A majority of respondents (57.0%) indicated that they hunted for waterfowl in North Dakota "mostly on privately owned areas" (Table 1-8). About one-fourth of respondents (25.1%) indicated that they hunted on "public and private about the same" and nearly one-fifth (17.9%) indicated that they hunted "mostly on public access areas." There was no significant difference in the land hunted between respondents who hunted waterfowl only in North Dakota and those who hunted in both North Dakota and Minnesota.

Distance Traveled to Hunt Waterfowl in North Dakota

Respondents were asked approximately how far from their current residence that they had traveled (one-way) to the area that they waterfowl hunted most often in North Dakota during the 2005 season. On average, respondents traveled 337 miles (Table 1-9). Responses ranged from 12 miles to 780 miles. There was no significant difference in miles traveled between respondents who hunted waterfowl only in North Dakota and those who hunted in both North Dakota and Minnesota.

Hunting With a Paid Guide

Nearly all respondents indicated that they never hunted with a paid guide for ducks (98.3%) or geese (98.4%) during the 2005 North Dakota waterfowl-hunting season (Table 1-10). There was no significant difference in use of guides between respondents who hunted waterfowl only in North Dakota and those who hunted in both North Dakota and Minnesota (Table 1-11).

Hunting Parties

Respondents were asked to estimate the number of days during the 2005 North Dakota waterfowl season that they hunted with (a) only friends, (b) only family member(s), (c) with a group including friends and family, and (d) alone. On average, respondents hunted 2.3 days with friends, 1.2 days with family members, 2.7 days with groups including both family and friends, and 0.2 days alone (Table 1-12). There was no substantive difference in days spent with different hunting parties between respondents who hunted waterfowl only in North Dakota and those who hunted in both North Dakota and Minnesota (Table 1-13).

Other Activities During the 2005 North Dakota Waterfowl Season

We asked respondents if they had participated in a list of other activities when they went to North Dakota to hunt waterfowl during the 2005 season. Nearly one-third of respondents indicated that they had visited friends who live in North Dakota (30.3%) or hunted for game other than waterfowl (28.9%) (Table 1-14). About one in ten (10.4%) had visited family who live in North Dakota. Less than 10% went sight-seeing (9.4%) or did other activities (7.3%). A greater proportion of respondents who hunted only in North Dakota (15.8%), compared to respondents who hunted in both states (7.3%), reported visiting with family living in North Dakota while hunting for waterfowl in the state ($\chi^2 = 9.243$, $p < 0.01$, Cramer's $V = 0.135$) (Table 1-21). Similarly, a greater proportion of respondents who hunted only in North Dakota (34.2%), compared to respondents who hunted in both states (25.9%), reported hunting for other types of game while hunting for waterfowl in the state ($\chi^2 = 4.016$, $p < 0.05$, Cramer's $V = 0.089$) (Table 1-23). There was no significant difference in visiting friends who live in North Dakota or in going sightseeing between respondents who hunted waterfowl only in North Dakota and those who hunted in both North Dakota and Minnesota (Tables 1-15).

Section 1: 2005 North Dakota Waterfowl Season

Table 1-1: Hunters participating in different waterfowl hunts in North Dakota in 2005

	n	% of hunters[1] indicating they hunted in North Dakota in 2005	Number bagged in North Dakota
Ducks	522	98.7	15.6
Canada Geese	491	72.9	2.8
Other	430	30.5	4.5

[1] % for species reflects only % of respondents that actually hunted waterfowl in North Dakota during 2005

Table 1-2: Hunters participating in duck hunting in North Dakota in 2005, by states hunted

States hunted	% of hunters[1] indicating they hunted in North Dakota in 2005	Number bagged (ND)	Ducks bagged per day (ND)
ND only	97.9	12.8	2.3
ND and MN	99.1	17.2	3.0
	χ^2 = 1.178 n.s.	t = 2.889**	t = 3.213**

[1] % for species reflects only % of respondents that actually hunted waterfowl in North Dakota during 2005
*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-3: Hunters hunting Canada Geese in North Dakota in 2005, by states hunted

States hunted	% of hunters[1] indicating they hunted in North Dakota in 2005	Number bagged (ND)
ND only	71.3	2.6
ND and MN	73.7	2.9
	χ^2 = 0.322 n.s.	t = 0.639 n.s.

[1] % for species reflects only % of respondents that actually hunted waterfowl in North Dakota during 2005
*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-4: Hunters hunting for other geese in North Dakota in 2005, by states hunted

States hunted	n	% of hunters[1] indicating they hunted in North Dakota in 2005	Number bagged (ND)
ND only	152	32.9	3.5
ND and MN	278	29.1	5.1
		χ^2 = 0.655 n.s.	t = 1.251 n.s.

[1] % for species reflects only % of respondents that actually hunted waterfowl in North Dakota during 2005
*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-5: Average number of days hunting waterfowl in North Dakota on weekends and weekdays

	n	Number of days hunted during 2005 waterfowl season	
		Mean	Std. Dev.
Total days[1]	523	6.0	3.0
Weekends/Holidays	492	2.8	1.3
Weekdays (Monday-Friday)	485	3.7	2.3

[1] Total days was not asked directly on the survey; it was calculated from weekends/holidays and weekdays.

Table 1-6: Average number of days hunting waterfowl in North Dakota, by states hunted

States hunted	n	Number of days hunted during 2005 waterfowl season	
		Mean	Std. Dev.
Total Days			
ND only	162	6.0	3.2
ND and MN	291	6.0	2.9
		t = 0.140 n.s.	
Weekend Days and Holidays			
ND only	183	2.8	1.5
ND and MN	308	2.8	1.3
		t = 0.500 n.s.	
Weekdays			
ND only	174	3.8	2.5
ND and MN	310	3.6	2.2
		t = 0.583 n.s.	

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-7: Participation in hunting on the first day (October 1, 2005) that nonresidents were permitted to hunt waterfowl during the 2005 North Dakota waterfowl season by state(s) hunted

	n	% hunting opening weekend in North Dakota
All respondents	514	28.8
ND only	193	40.9
ND and MN	320	21.3
		χ^2 = 22.814***, Cramer's V = 0.211

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-8: Hunting on public versus private land during the 2005 North Dakota waterfowl season by state(s) hunted

	n	% of hunters[1] indicating they hunted in North Dakota in 2005…		
		Mostly on privately owned areas	Mostly on public access areas	Public and private about the same
All respondents	521	57.0	17.9	25.1
ND only	195	56.4	17.9	25.6
ND and MN	325	57.5	17.5	24.9
		χ^2 = 0.064 n.s.		

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-9: One-way distance traveled to the area most frequently hunted in North Dakota during the 2005 season by state(s) hunted

	N	Average one-way miles	Std. Dev.	Range	
				Low	High
All respondents	507	336.8	123.6	12	780
ND only	190	340.5	123.8	12	780
ND and MN	316	335.0	123.6	20	750
		F = 0.233 n.s.			

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-10: Hunting with a paid hunting guide during the 2005 North Dakota waterfowl season

	n	% of hunters[1] indicating they _____ hunted with a guide in North Dakota in 2005…		
		Never	Sometimes	Always
Goose hunting	512	98.4	0.8	0.8
Duck hunting	517	98.3	1.2	0.6
		χ^2 = 1.221 n.s.		

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-11: Hunting for geese and ducks with a paid hunting guide during the 2005 North Dakota waterfowl season by state(s) hunted

States hunted	n	% of hunters[1] indicating they goose hunted with a guide in North Dakota in 2005…		
		Never	Sometimes	Always
Goose Hunting				
ND only	189	98.9	0.5	0.5
ND and MN	322	98.1	0.9	0.9
		χ^2 = 0.501 n.s.		
Duck Hunting				
ND only	191	99.0	0.5	0.5
ND and MN	325	97.8	1.5	0.6
		χ^2 = 1.098 n.s.		

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-12: Percent and number of days hunting with friends, family, alone during the 2005 North Dakota waterfowl season

	n	%	Mean[1]	SD	Range	
					Low	High
With only friends	506	37.5	2.3	3.4	0	14
With only family members		19.4	1.2	2.5	0	14
With a group including friends and family		41.2	2.7	3.5	0	20[2]
Alone		1.8	0.2	1.0	0	14

[1] F = 70.666 (p < 0.001).

[2] Note: North Dakota limits nonresident waterfowl hunters to 14 hunting days; 20 day response is more than the legal maximum

Table 1-13: Percent and number of days hunting with … during the 2005 North Dakota waterfowl season by state(s) hunted

States hunted	n	%	Mean
Only Friends			
ND only	189	37.2	2.3
ND and MN	317	37.7	2.3
		t = 0.129 n.s.	t = 0.085 n.s.
Only Family			
ND only	189	23.1	1.5
ND and MN	317	17.2	1.0
		t = 1.722 n.s.	t = 1.797 n.s.
Friends and Family			
ND only	189	36.2	2.2
ND and MN	317	44.2	2.9
		t = 1.846 n.s.	t = 2.277*
Alone			
ND only	189	3.5	0.3
ND and MN	317	1.0	0.1
		t = 2.757**, η = 0.122	t = 2.938**

*p < 0.05, **p < 0.01, ***p < 0.001

Table 1-14: Other activities while hunting during the 2005 North Dakota waterfowl season

	n	% of hunters[1]
Visited family who live in North Dakota	508	10.4
Visited friends who live in North Dakota	508	30.3
Hunted for game other than waterfowl	508	28.9
Went sight-seeing	508	9.4
Other	507	7.3

Table 1-15: Other activities during the 2005 North Dakota waterfowl season by state(s) hunted

States hunted	n	% visited family
Visited family who live in North Dakota		
ND only	190	15.8
ND and MN	317	7.3
		χ^2 = 9.243**, Cramer's V = 0.135
Visited friends who live in North Dakota		
ND only	190	33.7
ND and MN	317	28.4
		χ^2 = 1.574 n.s.
Hunted for other game in North Dakota		
ND only	190	34.2
ND and MN	317	25.9
		χ^2 = 4.016*, Cramer's V = 0.089
Went sight-seeing in North Dakota		
ND only	190	9.5
ND and MN	317	9.5
		χ^2 = 0.000 n.s.

*p < 0.05, **p < 0.01, ***p < 0.001

Section 2: Satisfaction with the 2005 North Dakota Waterfowl Season

Findings:

Study participants were asked to rate their satisfaction with their general waterfowl-hunting experience on a 7-point scale where 1 = very dissatisfied, 2 = moderately dissatisfied, 3 = slightly dissatisfied, 4 = neither, 5 = slightly satisfied, 6 = moderately satisfied, and 7 = very satisfied. They were also asked to rate hunting experiences, harvest, and hunting regulations for ducks and geese separately using the same response scale.

Satisfaction with the Waterfowl Hunting Experience, Harvest, and Regulations in North Dakota

Over 90% of respondents reported being satisfied with their general North Dakota waterfowl-hunting experience (Table 2-1). The overall mean score for general satisfaction was 6.1 on the 7-point satisfaction scale. Respondents reported a higher average level of satisfaction with the duck-hunting experience ($\bar{x}$ = 6.3) than with the goose-hunting experience ($\bar{x}$ = 5.5) ($t = 11.853$, $p < 0.001$) (Table 2-2). They were also more satisfied with the duck harvest ($\bar{x}$ = 5.8) compared to the goose harvest ($\bar{x}$ = 4.6) ($t = 13.588$, $p < 0.001$), and duck regulations ($\bar{x}$ = 5.3) compared to goose regulations ($\bar{x}$ = 4.7) ($t = 7.074$, $p < 0.001$). There were no significant differences in satisfaction between respondents who had hunted in only North Dakota and those who had hunted in both North Dakota and Minnesota (Table 2-3).

There was a positive relationship between the number of ducks bagged in North Dakota and (a) satisfaction with the general waterfowl-hunting experience ($r = 0.141$, $p < 0.01$), (b) satisfaction with the duck-hunting experience ($r = 0.125$, $p < 0.01$), (c) satisfaction with the duck harvest ($r = 0.190$, $p < 0.001$), and (d) satisfaction with the duck-hunting regulations ($r = 0.098$, $p < 0.05$) in North Dakota. Similarly, there was a positive relationship between the number of Canada Geese bagged in North Dakota and satisfaction with (a) the goose-hunting experience ($r = 0.293$, $p < 0.001$), (b) goose harvest ($r = 0.409$, $p < 0.001$), and (c) goose-hunting regulations ($r = 0.177$, $p < 0.01$) in North Dakota. The number of years hunting waterfowl in North Dakota was negatively correlated with: (a) general waterfowl-hunting satisfaction ($r = -0.119$, $p < 0.05$), (b) duck-hunting satisfaction ($r = -0.105$, $p < 0.05$), (c) duck harvest ($r = -0.074$, $p < 0.05$), and (d) duck regulations ($r = -0.138$, $p < 0.01$) in North Dakota. There was a negative relationship between age and satisfaction with North Dakota duck regulations ($r = -0.120$, $p < 0.01$).

Changes in Satisfaction Levels with North Dakota Waterfowl Hunting

Hunters were asked if their overall level of satisfaction for duck hunting and goose hunting had decreased or increased in the past three North Dakota waterfowl hunting seasons and since they had begun hunting ducks and geese in the state. Responses were recorded on a 5-point scale on which 1 = greatly decreased, 2 = decreased, 3 = stayed the same, 4 = increased, and 5 = greatly increased.

Section 2: Satisfaction with the 2005 Waterfowl Hunt

The largest proportions of respondents indicated that their satisfaction with duck hunting (44.5%) and goose hunting (54.6%) in North Dakota had stayed the same during the past 3 seasons (Table 2-4). Results were similar for respondents' reported changes in satisfaction since beginning hunting in North Dakota (Table 2-6). There were no significant differences in changes in satisfaction with North Dakota waterfowl hunting between respondents who had hunted in only North Dakota and those who had hunted in both North Dakota and Minnesota (Tables 2-5, 2-7).

Satisfaction with the Number of Ducks and Geese Seen While Hunting in North Dakota

Respondents were asked how satisfied they were with the number of ducks and geese they had seen during their most recent North Dakota waterfowl-hunting season. Responses were on the 7-point satisfaction scale used earlier where 1 = very dissatisfied, 2 = moderately dissatisfied, 3 = slightly dissatisfied, 4 = neither, 5 = slightly satisfied, 6 = moderately satisfied, and 7 = very satisfied. On average, respondents were slightly satisfied with the number of ducks ($\bar{x}$ = 5.4) and geese ($\bar{x}$ = 5.0) seen (Table 2-8). Nearly two-thirds of the respondents said that they were somewhat (27.7%) or very (37.0%) satisfied with the number of ducks seen. About half of the respondents indicated that they were somewhat (23.7%) or very (26.5%) satisfied with the number of geese seen. On average, respondents who hunted in both North Dakota and Minnesota reported higher satisfaction with the number of ducks they saw in the field ($\bar{x}$ = 5.5) while in North Dakota than respondents who hunted only in North Dakota ($\bar{x}$ = 5.2) ($t = 2.037$, $p < 0.05$, $\eta = 0.090$) (Table 2-9). Respondents who hunted in both states were less likely to feel neutral about the number of geese they saw in the field in North Dakota, but there was no significant difference in the mean score (Table 2-9).

Likelihood of Hunting Ducks and Geese in North Dakota in the Future

Respondents were asked how likely it was that they will hunt ducks and geese in North Dakota at some time during the next 5 years. Responses were on a 7-point scale from 1 = very unlikely to 7 = very likely. On average, respondents reported that they would be somewhat to very likely to hunt ducks in the next 5 years ($\bar{x}$ = 6.5) (Table 2-10). The average likelihood of hunting geese in the next 5 years was somewhat likely ($\bar{x}$ = 6.1). Over three-fourths of respondents (79.0%) indicated that it was very likely that they would hunt ducks in North Dakota in the next 5 years. This compares to 69.1% for hunting geese in North Dakota in the next 5 years. There were no significant differences in the likelihood of hunting in North Dakota in the next 5 years between respondents who had hunted in only North Dakota and those who had hunted in both North Dakota and Minnesota (Tables 2-11).

Section 2: Satisfaction with the 2005 Waterfowl Hunt

Table 2-1: Satisfaction with most recent North Dakota waterfowl-hunting season.

	n	% of hunters indicating that level of satisfaction:							Mean[1]
		Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	
General waterfowl hunting experience	499	1.6	2.2	3.6	1.6	7.0	33.9	50.1	6.1
Duck hunting experience	515	1.6	1.4	3.1	2.3	6.6	28.9	56.1	6.2[2]
Duck hunting harvest	510	3.1	3.5	5.3	5.1	10.6	28.2	44.1	5.8[2]
Duck hunting regulations	512	5.5	6.8	7.8	8.8	11.3	29.3	30.5	5.2[2]
Goose hunting experience	388	1.5	4.1	7.5	12.1	16.0	26.3	32.5	5.5[3]
Goose hunting harvest	386	6.5	9.1	12.2	18.4	16.3	18.4	19.2	4.6[3]
Goose hunting regulations	386	6.5	10.6	9.6	16.1	12.2	21.0	24.1	4.8[3]

[1] Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.

[2] $F = 98.277$ ($p < 0.001$) for one-way ANOVA comparing means among three types of duck-hunting satisfaction.

[3] $F = 46.485$ ($p < 0.001$) for one-way ANOVA comparing means among three types of goose-hunting satisfaction.

Table 2-2: Comparison of duck-hunting and goose-hunting satisfaction for 2005 North Dakota season

Satisfaction with…	N	Mean[1]
Duck-hunting experience	382	6.2
Goose-hunting experience		5.5
$t = 11.853$, $p < 0.001$[2]		
Duck-hunting harvest	378	5.8
Goose-hunting harvest		4.6
$t = 13.588$, $p < 0.001$		
Duck-hunting regulations	379	5.3
Goose-hunting regulations		4.7
$t = 7.074$, $p < 0.001$		

[1] Means are based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.

[2] Paired sample t-test

Table 2-3: Satisfaction with general waterfowl hunting experience and duck and goose hunting experience, harvest, and regulations during most recent North Dakota waterfowl-hunting season, by states hunted.

Variable or States hunted	n	% of hunters indicating that level of satisfaction: Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Mean[1]
General waterfowl hunting experience									
ND only	183	1.6	2.2	4.4	1.6	7.7	32.2	50.3	6.1
ND and MN	315	1.6	2.2	3.2	1.6	6.7	34.9	49.8	6.1
		χ^2 = 0.872 n.s.							n.s.
Duck hunting experience									
ND only	192	1.6	1.6	4.2	2.1	6.8	29.7	54.2	6.2
ND and MN	322	1.6	1.2	2.5	2.5	6.5	28.6	57.1	6.3
		χ^2 = 1.520 n.s.							n.s.
Duck hunting harvest									
ND only	190	4.2	3.2	5.3	4.7	12.1	27.9	42.6	5.7
ND and MN	319	2.5	3.8	5.3	5.3	9.7	28.5	44.8	5.8
		χ^2 = 2.091 n.s.							n.s.
Duck hunting regulations									
ND only	191	6.8	7.9	8.9	9.4	11.0	28.8	27.2	5.1
ND and MN	320	4.7	6.3	7.2	8.4	11.3	29.7	32.5	5.3
		χ^2 = 3.139 n.s.							n.s.
Goose hunting experience									
ND only	139	0.7	4.3	5.8	14.4	15.8	23.0	36.0	5.5
ND and MN	248	2.0	4.0	8.1	10.9	16.1	28.2	30.6	5.4
		χ^2 = 4.236 n.s.							n.s.
Goose hunting harvest									
ND only	138	3.6	9.4	8.7	19.6	21.0	15.9	21.7	4.8
ND and MN	247	8.1	8.9	13.8	17.8	13.8	19.8	17.8	4.5
		χ^2 = 9.088 n.s.							n.s.
Goose hunting regulations									
ND only	139	4.3	8.6	11.5	18.7	14.4	20.9	21.6	4.8
ND and MN	247	7.7	11.7	8.5	14.6	10.9	21.1	25.5	4.7
		χ^2 = 5.601 n.s.							n.s.

[1]Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 2: Satisfaction with the 2005 Waterfowl Hunt

Table 2-4 Overall change in duck-hunting and goose-hunting satisfaction in North Dakota over the past three seasons

	N	% of hunters indicating that their overall level of satisfaction has _____ over the past three years:					Mean[1]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Ducks	447	4.3	26.0	44.5	20.1	5.1	3.0
Geese	366	6.6	21.9	54.6	13.7	3.3	2.9
		χ^2 = 25.469***					

[1] t = 2.470 (p < 0.05). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 2-5: Overall change in duck and goose hunting satisfaction in North Dakota over the past three seasons, by states hunted

Variable or States hunted	N	% of hunters indicating that their overall level of satisfaction has _____ over the past three years:					Mean[1]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Duck-hunting satisfaction							
ND only	174	4.6	25.9	47.7	15.5	6.3	2.9
ND and MN	270	4.1	26.3	41.9	23.3	4.4	3.0
		χ^2 = 4.804 n.s.					n.s.
Goose-hunting satisfaction							
ND only	137	4.4	21.2	59.1	12.4	2.9	2.9
ND and MN	226	8.0	22.6	51.3	14.6	3.5	2.8
		χ^2 = 3.086 n.s.					n.s.

[1]Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 2-6: Overall change in duck-hunting and goose-hunting satisfaction in North Dakota since they began hunting

	N	% of hunters indicating that their overall level of satisfaction has _____ since they began hunting:					Mean[1]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Ducks	467	6.2	28.5	35.1	24.4	5.8	3.0
Geese	381	6.6	26.5	44.4	18.9	3.7	2.9
		χ^2 = 17.527**					

[1] t = 1.911 (n.s.). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 2: Satisfaction with the 2005 Waterfowl Hunt

Table 2-7: Overall change in duck and goose hunting satisfaction in North Dakota since they began hunting, by states hunted

Variable or States hunted	N	% of hunters indicating that their overall level of satisfaction has _____ since they began hunting:					Mean[1]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Duck-hunting satisfaction							
ND only	177	6.8	28.8	33.9	24.9	5.6	2.9
ND and MN	287	5.9	28.2	35.5	24.4	5.9	3.0
		χ^2 = 0.250 n.s.					
Goose-hunting satisfaction							
ND only	139	5.0	26.6	43.9	20.9	3.6	2.9
ND and MN	239	7.5	26.4	44.4	18.0	3.8	2.8
		χ^2 = 1.221 n.s.					

[1] Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 2-8: Satisfaction with number of ducks and geese seen in the field during the 2005 North Dakota waterfowl hunting season

	N	% of hunters indicating that level of satisfaction:							Mean[1]
		Very dissatisfied	Somewhat dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Somewhat satisfied	Very satisfied	
Ducks	516	3.1	6.8	12.2	4.1	9.1	27.7	37.0	5.4
Geese	438	4.1	8.2	12.6	9.1	15.8	23.7	26.5	5.0
		χ^2 = 67.243***							

[1] t = 5.155 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 2-9: Satisfaction with number of ducks or geese seen in the field during the 2005 North Dakota waterfowl hunting season, by states hunted

Variable or States hunted	N	% of hunters indicating that level of satisfaction:							Mean[1]
		Very dissatisfied	Somewhat dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Somewhat satisfied	Very satisfied	
Ducks seen									
ND only	190	3.7	8.4	13.7	5.8	8.9	26.3	33.2	5.2[2]
ND and MN	323	2.8	5.9	11.5	2.8	9.3	28.2	39.6	5.5[2]
		χ^2 = 6.201 n.s.							
Geese seen									
ND only	156	1.9	9.0	10.9	15.4	13.5	28.8	20.5	5.0[3]
ND and MN	279	5.4	7.9	13.6	5.4	17.2	20.4	30.1	5.0[3]
		χ^2 = 22.152**[2]							

[1] Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001
[2] t = 2.037*.
[3] No significant difference.

Section 2: Satisfaction with the 2005 Waterfowl Hunt

Table 2-10: Likelihood of hunting ducks and geese in North Dakota at some time during the next 5 years.

	N	% of hunters indicating that level of satisfaction:							Mean[1]
		Very unlikely	Somewhat unlikely	Slightly unlikely	Undecided	Slightly likely	Somewhat likely	Very likely	
Ducks	519	2.9	2.1	0.0	2.7	3.1	10.2	79.0	6.5
Geese	475	5.5	2.9	0.6	6.1	5.7	10.1	69.1	6.1
		χ^2 = 46.527***							

[1] t = 6.442***. Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 2-11: Likelihood of hunting ducks and geese in North Dakota at some time during the next 5 years, by states hunted.

Variable or States hunted	N	% of hunters indicating that level of satisfaction:							Mean[1]
		Very unlikely	Somewhat unlikely	Slightly unlikely	Undecided	Slightly likely	Somewhat likely	Very likely	
Ducks seen									
ND only	191	4.2	1.0	0.0	4.2	1.6	11.5	77.5	6.4
ND and MN	324	2.2	2.8	0.0	1.5	4.0	9.6	79.9	6.5
		χ^2 = 10.121 n.s.							n.s.
Geese seen									
ND only	170	8.2	1.2	0.0	5.3	7.1	10.0	68.2	6.1
ND and MN	301	4.0	4.0	1.0	6.3	5.0	10.3	69.4	6.1
		χ^2 = 10.107 n.s.[2]							n.s.

[1] Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 3: 2005 Minnesota Waterfowl Season

Findings:

Results for Part 3 of the waterfowl hunter survey are reviewed below. This section of the survey focused on hunting experiences during the 2005 Minnesota waterfowl-hunting seasons. Only individuals who hunted waterfowl in Minnesota in 2005 completed this section of the survey.

Waterfowl Seasons Hunted in Minnesota in 2005

Nearly two-thirds of respondents (63.3%) indicated that they had hunted waterfowl in Minnesota in 2005. Respondents who had hunted in 2005 were next asked if they had hunted for ducks, Canada Geese, or other geese during the 2005 season. Of those who hunted in Minnesota during 2005, 95.1% had hunted for ducks, 83.9% had hunted for Canada Geese, and 5.8% had hunted for other geese.

Harvest

For each season in which they hunted during the 2005 Minnesota season, respondents were asked to report the number of ducks or geese they personally bagged. The average number of ducks each hunter harvested during the 2005 Minnesota season was 10.1 (Table 3-1). Hunters reported bagging an average of 7.1 Canada Geese and 1.1 other geese.

Average Number of Days Hunting Weekends and Weekdays

Next, respondents were asked to report the number of days they hunted on weekends or holidays and weekdays. On average, hunters spent more days hunting on weekends and holidays (6.8 days) than during the week (5.8 days) (Table 3-2).

Hunting Opening Weekend

More than half of the respondents who hunted during the 2005 Minnesota season hunted opening Saturday (59.0%) or Sunday (58.2%) (Table 3-3).

Areas Hunted

Respondents who had hunted for waterfowl in Minnesota during the 2005 season were asked how many days they hunted in six regions of the state. The greatest proportion of hunter days were spent in the east-central region (28.0%), the northwest region (23.0%), and the southwest region (17.3%) (Table 3-4). On average respondents hunted 3.0 days in the east-central region, 2.6 days in the northwest region, and 2.2 days in the southwest region. Respondents hunted an average of less than 2 days in the other regions. Nearly half of the respondents (46.6%) who hunted for waterfowl in Minnesota in 2005 reported hunting "mostly on privately owned areas" (Table 3-5). About one-third (33.6%) hunted mostly on public-access areas and 19.8% reported hunting on public and private land about the same. On average, respondents traveled 62.1 miles, one-way, to the area they hunted most often in Minnesota (Table 3-6).

Section 3: 2005 Minnesota Waterfowl Season

Who Respondents Hunted With

Respondents were asked how many days they hunted with friends, family members, both friends and family, or alone during the 2005 Minnesota waterfowl season. On average, respondents hunted 4.2 days with only friends, 2.1 days with only family members, 4.0 days with groups including both friends and family, and 1.7 days alone (Table 3-7).

Section 3: 2005 Minnesota Waterfowl Season

Table 3-1: Hunters participating in different waterfowl hunts in Minnesota in 2005

	n	% of hunters[1] indicating they hunted in Minnesota in 2005	n	Number bagged
Ducks	325	95.1	295	10.1
Canada Geese	316	83.9	256	7.1
Other Geese	241	5.8	20	1.1

[1] % for species reflects only % of respondents that hunted waterfowl in Minnesota during 2005

Table 3-2: Average number of days hunting waterfowl in Minnesota on weekends and weekdays

	n	Number of days hunted during 2005 waterfowl season	
		Mean	SD
Total days in Minnesota[1]	323	11.5	10.9
Weekends/Holidays	313	6.8	5.5
Weekdays (Monday-Friday)	276	5.8	7.3

[1] Total days was not asked directly on the survey; it was calculated from weekends/holidays and weekdays.

Table 3-3: Participation in hunting on opening weekend (October 1-2, 2005) of the 2005 Minnesota waterfowl season

n	% hunting opening Saturday in Minnesota	% hunting opening Sunday in Minnesota
329	59.0	58.1

Table 3-4: Average number and percent of days hunting in Minnesota regions

	n	NW	NE	EC	SW	SE	M
Mean	318	2.6	1.1	3.0	2.2	1.3	1.4
Percent	318	23.0%	10.2%	28.0%	17.3%	9.7%	11.8%

Table 3-5: Hunting on public versus private land during the 2005 Minnesota waterfowl season

	n	% of hunters[1] indicating they hunted in Minnesota in 2005…
Mostly on privately owned areas	324	46.6
Mostly on public access areas		33.6
Public and private about the same		19.8

[1] % for areas reflects only % of respondents that actually hunted waterfowl during 2005

Table 3-6: One-way distance traveled to the area most frequently hunted in Minnesota during the 2005 season

n	Average one-way miles	Std. Dev.	Range	
			Low	High
319	62.1	70.0	0	390

Table 3-7: Number of days hunting with friends, family, alone during the 2005 Minnesota waterfowl season

	n	%	Mean	SD	Range	
					Low	High
With only friends	317	33.4	4.2	7.6	0	70
With only family members	317	22.0	2.1	4.4	0	30
With a group including friends and family	317	30.9	4.0	6.9	0	50
Alone	317	13.7	1.7	3.9	0	32

Section 4: Satisfaction with Minnesota Waterfowl Hunting

Findings:

Study participants who had hunted in Minnesota in the past were asked to rate their satisfaction with the general waterfowl-hunting experience for their most recent Minnesota waterfowl season on a 7-point scale where 1 = very dissatisfied, 2 = moderately dissatisfied, 3 = slightly dissatisfied, 4 = neither, 5 = slightly satisfied, 6 = moderately satisfied, and 7 = very satisfied. They were also asked to rate Minnesota hunting experiences, harvest, and hunting regulations for ducks and geese separately using the same response scale. Respondents were also asked about changes in their waterfowl-hunting satisfaction, their satisfaction with the number of ducks and geese seen, and their likelihood of hunting waterfowl in Minnesota in the future.

Satisfaction with the General Waterfowl Hunting Experience in Minnesota

Less than half of the respondents (38.9%) who had hunted in Minnesota reported being satisfied with the general waterfowl-hunting experience during their most recent waterfowl hunting season in the state (Table 4-1). About half (53.8%) of the respondents were dissatisfied and the remaining 7.3% were neither satisfied nor dissatisfied. The overall mean satisfaction score was 3.5.

There was a positive relationship between satisfaction with the general waterfowl-hunting experience and (a) the number of ducks bagged in Minnesota ($r = 0.312$, $p < 0.01$), (b) the number of days hunting in Minnesota ($r = 0.154$, $p < 0.05$), and (c) the number ducks bagged per day of hunting in Minnesota ($r = 0.294$, $p < 0.001$). There was a negative relationship between general Minnesota satisfaction and (a) years hunting in North Dakota ($r = -0.129$, $p < 0.05$) and days hunting in North Dakota ($r = -0.206$, $p < 0.01$). There was a negative relationship between general satisfaction with Minnesota waterfowl hunting and (a) age ($r = -0.268$, $p < 0.01$) and (b) years hunting waterfowl ($r = -0.248$, $p < 0.001$).

Satisfaction with Duck Hunting in Minnesota

Less than half (44.5%) of Minnesota waterfowl hunters were satisfied (slightly, moderately, or very) with their duck-hunting experience in their most recent hunting season in the state; less than 1 in 10 (8.1%) were very satisfied (Table 4-1). Over three-fourths (76.5%) of Minnesota waterfowl hunters were dissatisfied with their duck-hunting harvest; 42.9% reported being very dissatisfied. Satisfaction with duck-hunting regulations was higher than satisfaction with harvest, with 40.9% of respondents reporting satisfaction with the regulations. However, nearly more than one-fourth of respondents (25.9%) felt neither satisfied nor dissatisfied about the duck-hunting regulations, compared to only 6.9% who felt neutral about the duck-hunting experience and only 5.9% who felt neutral about the duck-hunting harvest.

The mean score for duck-harvest satisfaction ($\bar{x} = 2.5$) was significantly lower than the mean scores for experience ($\bar{x} = 3.7$, $t = 13.577$, $p < 0.001$) or regulations ($\bar{x} = 4.1$, $t = 14.353$, $p < 0.001$). The mean satisfaction score for experience was also significantly lower than for regulations ($t = 2.819$, $p < 0.01$).

Section 4: Satisfaction with Minnesota Waterfowl Hunting

Satisfaction with Goose Hunting

Statewide most goose hunters were satisfied (61.6%) with their general goose-hunting experience (Table 4-1). Less than half (45.4%) of goose hunters, however, were satisfied with their harvest. A similar proportion (47.1%) of goose hunters were satisfied with the regulations.

The mean score for goose-harvest satisfaction (mean = 4.0) was significantly lower than the mean scores for experience ($\bar{x}$ = 4.6, t = 8.158, $p < 0.001$) or regulations ($\bar{x}$ = 4.4, t = 3.954, $p < 0.001$). The mean satisfaction score for experience was not significantly higher than for regulations (t = 1.966, n.s.).

Comparison of Duck Hunting and Goose Hunting

We compared mean satisfaction levels for duck and goose hunting. Duck hunters ($\bar{x}$ = 3.7) reported significantly lower levels of satisfaction with experience than goose hunters did ($\bar{x}$ = 4.6) (t = 7.864, $p < 0.001$). There were significant differences between duck hunters ($\bar{x}$ = 2.5) and goose hunters ($\bar{x}$ = 3.9) on harvest satisfaction (t = 11.523, $p < 0.001$), and satisfaction with regulations for duck hunting ($\bar{x}$ = 4.0) and goose hunting ($\bar{x}$ = 4.4) (t = 4.087, $p < 0.001$). (See Table 4-2.)

Changes in Satisfaction Levels

Hunters were asked if their overall level of satisfaction for duck hunting and goose hunting had decreased or increased in the past 3 hunting seasons and since they had begun hunting ducks and geese. Responses were recorded on a 5-point scale on which 1 = greatly decreased, 2 = decreased, 3 = stayed the same, 4 = increased, and 5 = greatly increased.

About three-fourths (75.2%) of duck hunters indicated their overall level of satisfaction with Minnesota duck hunting had decreased in the past 3 years and only 4.7% indicated their satisfaction had increased (Table 4-3). Similarly, 83.8% indicated that their satisfaction had decreased since they began hunting (Table 4-4). About one-third of goose hunters indicated their satisfaction had declined in the past 3 years (35.4%), or since they began goose hunting in the state (36.6%).

Satisfaction With Number of Ducks and Geese Seen in the Field

Nearly 9 out of 10 hunters (88.5%) were dissatisfied with the number of ducks they had seen during their most recent Minnesota waterfowl-hunting season (Table 4-5). About one-third (36.4%) were dissatisfied with the number of geese they had seen in the field during their most recent Minnesota season.

Likelihood of Hunting Waterfowl in Minnesota in the Next Five Years

Despite the reported dissatisfaction with Minnesota waterfowl hunting, nearly two-thirds of respondents indicated that they were ‘very likely’ to hunt ducks (62.9%) and geese (63.8%) in Minnesota in the next 5 years (Table 4-6). About 1 in 10 said that they were unlikely to hunt for ducks (12.9%) or geese (9.4%) in the next 5 years.

Section 4: Satisfaction with Minnesota Waterfowl Hunting

Table 4-1: Satisfaction with most recent Minnesota waterfowl-hunting season.

	n	% of hunters[1] indicating that level of satisfaction:							Mean[2]
		Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	
General waterfowl hunting experience	314	24.2	15.6	14.0	7.3	15.3	16.6	7.0	3.5
Duck hunting experience	321	21.2	13.4	14.0	6.9	19.3	17.1	8.1	3.7[3]
Duck hunting harvest	322	42.9	19.6	14.0	5.9	10.9	5.0	1.9	2.5[3]
Duck hunting regulations	321	11.8	8.4	13.1	25.9	15.0	18.7	7.2	4.1[3]
Goose hunting experience	273	11.0	5.5	12.1	9.9	20.9	26.0	14.7	4.6[4]
Goose hunting harvest	275	17.8	10.9	13.8	12.0	18.2	15.6	11.6	4.0[4]
Goose hunting regulations	276	11.6	4.7	10.1	26.2	12.3	22.1	12.7	4.4[4]

[1] This table includes respondents who have hunted in Minnesota.
[2] Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
[3] $F = 123.439$ ($p < 0.001$) for one-way ANOVA comparing means among three types of duck-hunting satisfaction.
[4] $F = 21.358$ ($p < 0.001$) for one-way ANOVA comparing means among three types of goose-hunting satisfaction.

Table 4-2: Comparison (paired sample t-test) of duck-hunting and goose-hunting satisfaction for most-recent Minnesota waterfowl-hunting season

Satisfaction with…	N	Mean[1]
Duck-hunting experience	259	3.7
Goose-hunting experience		4.6
$t = 7.864$, $p < 0.001$		
Duck-hunting harvest	263	2.5
Goose-hunting harvest		3.9
$t = 11.523$, $p < 0.001$		
Duck-hunting regulations	264	4.0
Goose-hunting regulations		4.4
$t = 4.087$, $p < 0.001$		

[1] Means are based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.

Section 4: Satisfaction with Minnesota Waterfowl Hunting

Table 4-3: Overall change in duck-hunting and goose-hunting satisfaction in Minnesota over the past three seasons

	n	% of hunters[1] indicating that their overall level of satisfaction has _____ over the past three years:					Mean[2]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Ducks	322	37.3	37.9	20.2	4.7	0.0	1.9
Geese	291	13.1	22.3	37.8	22.0	4.8	2.8
		χ^2 = 483.866***					

[1] This table includes those respondents who hunted waterfowl in 2003, 2004 and 2005.
[2] t = 13.521 (p < 0.001). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 4-4: Overall change in duck-hunting and goose-hunting satisfaction in Minnesota since they began hunting

	N	% of hunters[1] indicating that their overall level of satisfaction has _____ since they began hunting:					Mean[2]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Ducks	333	52.3	31.5	10.2	5.7	0.3	1.7
Geese	306	19.0	17.6	19.3	32.4	11.8	3.0
		χ^2 = 1916.817***					

[1] This table includes respondents who have hunted in Minnesota.
[2] t = 16.084 (p < 0.001). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 4-5: Satisfaction with number of ducks and geese seen in the field during the 2005 Minnesota waterfowl hunting season

	n	% of hunters[1] indicating that level of satisfaction:							Mean[2]
		Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	
Ducks	331	55.0	18.1	15.4	2.1	5.7	3.0	0.6	2.0
Geese	299	15.4	10.0	11.0	10.4	19.4	21.4	12.4	4.2
		χ^2 = 1363.186***							

[1] This table includes respondents who have hunted in Minnesota.
[2] t = 18.659 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 4-6: Likelihood of hunting in Minnesota at some time during the next 5 years

	n	% of hunters indicating…							Mean[2]
		Very unlikely	Moderately unlikely	Slightly unlikely	Neither	Slightly likely	Moderately likely	Very likely	
Ducks	340	5.6	4.7	2.6	8.5	5.3	10.3	62.9	5.8
Geese	329	4.9	3.0	1.5	10.0	5.5	11.2	63.8	5.9
		χ^2 = 5.196 n.s.							

[1] t = 1.496 (n.s.). Mean is based on the following scale: 1 = very unlikely; 2 = moderately unlikely; 3 = slightly unlikely, 4 = neither; 5 = slightly likely; 6 = moderately likely; 7 = very likely.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 5: Comparing North Dakota and Minnesota Waterfowl Hunting

Findings:

Hunting Participation in North Dakota and Minnesota

We asked this sample of Minnesota residents who purchased 2005 North Dakota waterfowl hunting licenses about their participation in waterfowl hunting in both North Dakota and Minnesota during the 2005 season and the five previous seasons. In the 2000 waterfowl season, 50.3% of these individuals hunted for waterfowl in North Dakota and 72.0% hunted for waterfowl in Minnesota (χ^2 = 97.789, p < 0.001). With each passing year, a greater proportion of these individuals hunted in North Dakota and a consistent proportion hunted in Minnesota until 2005, when participation declined about 8%. By 2005, 98.9% of the respondents hunted in North Dakota and 63.3% hunted in Minnesota (χ^2 = 5863.947, p < 0.001) (Table 5-1).

We asked respondents who had hunted in each state in 2005 a number of questions about their hunting activity. First, we asked them to indicate if they had hunted for ducks, Canada Geese, or other geese during the 2005 season. A greater proportion of individuals who hunted in North Dakota (98.7%) compared to Minnesota (95.1%) targeted ducks (χ^2 = 31.520, p < 0.001). Similarly, a larger proportion of 2005 North Dakota hunters targeted "other" geese (30.5% North Dakota versus 5.4% Minnesota) (χ^2 = 69.160, p < 0.001). However, a greater proportion of respondents who hunted in Minnesota targeted Canada Geese (83.9% Minnesota, 72.9% North Dakota) (χ^2 = 19.178***, p < 0.001). (Table 5-2)

Next, respondents were asked to indicate how many birds they had bagged in each state. While hunting in North Dakota, respondents bagged significantly more ducks (15.6 North Dakota versus 10.1 Minnesota, t = 6.410, p < 0.001) and "other" geese (4.5 North Dakota versus 1.1 Minnesota, t = 9.036, p < 0.001) than while hunting in Minnesota. However, respondents bagged significantly more Canada Geese in Minnesota ($\bar{x}$ = 7.1) than in North Dakota ($\bar{x}$ = 2.8) (t = 4.209, p < 0.001) (Table 5-3).

Respondents hunted more total days, on average, in Minnesota ($\bar{x}$ = 11.5) than in North Dakota ($\bar{x}$ = 6.4) (t = 8.448, p < 0.001). This was true for weekend days/holidays and for weekdays (Table 5-4).

A greater proportion of respondents hunted on the opening Saturday in Minnesota (59.0%) compared to the opening Saturday in North Dakota (28.8%) (Table 5-5).

Minnesota waterfowl hunters spent more of their North Dakota hunting time on private land compared to their waterfowl hunting in Minnesota (Table 5-6).

Respondents reported traveling further to hunt in the area they hunted most frequently in North Dakota ($\bar{x}$ = 336.8 miles) than in Minnesota ($\bar{x}$ = 62.7) (t = 70.742, p < 0.001) (Table 5-7).

Respondents were asked to write in the number of days they hunted with only friends, only family members, both friends and family, and alone while waterfowl hunting in North Dakota and Minnesota during the 2005 season. On average, respondents hunted more days in Minnesota with each of these groups; a reflection of more days hunting in Minnesota (Table 5-8). While hunting in North Dakota, respondents spent a greater proportion of days hunting with groups including friends and family (41.2%

versus 30.6%). While hunting in Minnesota, respondents spent a greater proportion of days hunting alone (13.5%) compared to days hunting in North Dakota (1.8%). (Table 5-9).

Satisfaction with Hunting in North Dakota and Minnesota

Respondents were asked to report satisfaction with their most recent waterfowl hunting season in North Dakota and Minnesota. Respondents reported significantly higher satisfaction with their most recent North Dakota waterfowl season than their most recent Minnesota season. There were differences between Minnesota and North Dakota for: (a) the general waterfowl hunting experience (6.1 versus 3.5, $t = 22.430$, $p < 0.001$) (Table 5-10), (b) duck hunting experience (6.2 versus 3.7, $t = 21.723$, $p < 0.001$) (Table 5-11), (c) duck hunting harvest (5.8 versus 2.5, $t = 35.623$, $p < 0.001$) (Table 5-12), (d) duck hunting regulations (5.2 versus 4.1, $t = 11.397$, $p < 0.001$) (Table 5-13), (e) goose hunting experience (5.4 versus 4.6, $t = 7.832$, $p < 0.001$) (Table 5-14), (f) goose hunting harvest (4.6 versus 4.0, $t = 5.337$, $p < 0.001$) (Table 5-15), and (g) goose hunting regulations (4.8 versus 4.4, $t = 3.621$, $p < 0.001$) (Table 5-16).

Respondents were asked to report how their satisfaction with waterfowl hunting has changed in the past three seasons and since they began waterfowl hunting. Response on these questions was on a scale of 1 = greatly decreased, 2 = decreased, 3 = stayed the same, 4 = increased, and 5 = greatly increased. Respondents reported declining satisfaction with duck hunting in Minnesota over the past three seasons ($\bar{x} = 1.9$), while satisfaction with duck hunting in North Dakota has remained about the same ($\bar{x} = 3.0$) ($t = 22.223$, $p < 0.001$) (Table 5-17). Similarly, respondents reported declining satisfaction with Minnesota duck hunting since they began hunting ($\bar{x} = 1.7$), with North Dakota satisfaction staying about the same ($\bar{x} = 3.0$) ($t = 26.570$, $p < 0.001$) (Table 5-19). In general respondents reported that their satisfaction with goose hunting has stayed the same in both Minnesota and North Dakota (Tables 5-18, 5-20).

Respondents reported their satisfaction with the number of ducks and geese seen on their most recent North Dakota and Minnesota waterfowl-hunting seasons. On average, respondents were more satisfied with the number of ducks seen in the field in North Dakota ($\bar{x} = 5.4$) than in Minnesota ($\bar{x} = 2.0$) ($t = 44.753$, $p < 0.001$) (Table 5-21). Similarly, they were more satisfied with the number of geese seen in North Dakota ($\bar{x} = 5.0$) than in Minnesota ($\bar{x} = 4.2$) ($t = 6.716$, $p < 0.001$) (Table 5-22).

Respondents were asked to report how likely they would be to go hunting in North Dakota and Minnesota in the next 5 years using the scale 1 = very unlikely to 7 = very likely. Respondents reported that they were somewhat more likely to go duck hunting in North Dakota in the next 5 years ($\bar{x} = 6.5$) than in Minnesota ($\bar{x} = 5.8$) ($t = 6.410$, $p < 0.001$) (Table 5-23). Respondents were slightly more likely to go goose hunting in North Dakota ($\bar{x} = 6.1$) versus Minnesota ($\bar{x} = 5.9$) ($t = 1.347$, $p < 0.05$) (Table 5-24).

Preferences for Hunting in North Dakota and Minnesota

Study participants who had hunted in both North Dakota and Minnesota during the 2005 waterfowl-hunting season were asked to report which state was preferable for various aspects of waterfowl hunting. Response was on the scale: 1 = North Dakota much better, 2 = North Dakota somewhat better, 3 = North Dakota slightly better, 4 = neutral, 5 = Minnesota slightly better, 6 = Minnesota somewhat better, and 7 = Minnesota much better.

Respondents who had hunted in both North Dakota and Minnesota during the 2005 season were asked to rate which state was preferable on a variety of aspects (Table 5-25). For most of the aspects, North Dakota was preferable. For 5 items, North Dakota was strongly preferred, including: (a) overall hunting experience ($\bar{x} = 1.8$), (b) seeing lots of ducks and geese ($\bar{x} = 1.3$), (c) bagging ducks and geese ($\bar{x} =$

1.5), (d) getting away from crowds of people ($\bar{x}$ = 2.0), and (e) access to a lot of different hunting areas ($\bar{x}$ = 2.1). Minnesota was strongly preferred for the item "expenses related to hunting" ($\bar{x}$ = 4.8).

Section 5: Comparing Minnesota and North Dakota Waterfowl Hunting

Table 5-1: Proportion of 2005 North Dakota Nonresident Waterfowl License purchasers from Minnesota who hunted waterfowl in Minnesota and North Dakota in 2005, 2004, 2003, 2002, 2001, 2000

	2005	2004	2003	2002	2001	2000
Minnesota[1]	63.5%	71.4%	71.8%	73.4%	72.4%	72.0%
North Dakota	99.0%	77.1%	70.7%	66.5%	61.2%	50.3%
	χ^2 = 5863.947***	χ^2 = 9.534**	χ^2 = 0.311 n.s.	χ^2 = 10.817*	χ^2 = 27.114***	χ^2 = 97.789***

[1] % is of all survey respondents
[2] *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-2: Respondents participating in different waterfowl hunts in Minnesota and North Dakota in 2005

	% of hunters[1] indicating they hunted for _____ in _____ in 2005		
	Ducks	Canada Geese	Other Geese
Minnesota	95.1	83.9	5.8
North Dakota	98.7	72.9	30.5
	χ^2 = 31.520***	χ^2 = 19.178***	χ^2 = 69.160***

[1] % is of all survey respondents who hunted in each state during 2005
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-3: Number of birds bagged by hunters participating in different waterfowl hunts in Minnesota and North Dakota in 2005

	Mean number of ____ bagged by hunters in _____ in 2005:		
	Ducks	Canada Geese	Other Geese
Minnesota	10.1	7.1	1.1
North Dakota	15.6	2.8	4.5
	t = 6.410***	t = 4.209***	t = 9.036***

*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-4: Average number of weekdays and weekend days/holidays hunting waterfowl in Minnesota and North Dakota

	Mean number of days hunted during 2005 waterfowl season		
	Total[1]	Weekends/Holidays	Weekdays (Monday-Friday)
Minnesota	11.5	6.8	5.8
North Dakota	6.0	2.8	3.7
	t = 8.448***	t = 12.848***	t = 4.784***

[1] Total days hunting was not asked directly in the survey. The number was calculated by adding the number of weekend days/holidays to the number of weekdays.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 5: Comparing Minnesota and North Dakota Waterfowl Hunting

Table 5-5: Participation in hunting on opening weekends (October 1-2, 2005) of the 2005 Minnesota and North Dakota waterfowl season

% hunting opening Saturday in Minnesota	% hunting opening Saturday in North Dakota
59.0	28.8
χ^2 = 146.087***	

*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-6: Hunting on public versus private land during the 2005 Minnesota and North Dakota waterfowl seasons

	N	% of hunters[1] indicating they hunted in Minnesota in 2005…		
		Mostly on privately owned areas	Mostly on public access areas	Public and private about the same
Minnesota	327	46.6	33.6	19.8
North Dakota	521	57.0	17.9	25.1
		χ^2 = 57.843***		

[1] % reflects only respondents that hunted waterfowl during 2005
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-7: One-way distance traveled to the area most frequently hunted in Minnesota during the 2005 season

	N	Average one-way miles
Minnesota	323	62.7
North Dakota	507	336.8
		t = 70.381***

*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-8: Number of days hunting with friends, family, alone during the 2005 waterfowl season

	n	Mean number of days hunting with _____ during 2005 waterfowl season			
		Only friends	Only family	Friends & family	Alone
Minnesota	321	4.2	2.1	4.0	1.6
North Dakota	506	2.3	1.2	2.7	0.2
		t = 4.549***	t = 3.594***	t = 3.273**	t = 6.594***

*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-9: Percentage of hunting days spent hunting with friends, family, alone during the 2005 waterfowl season

	n	Percent of days hunting[1] with _____ during 2005 Minnesota waterfowl season			
		Only friends	Only family	Friends & family	Alone
Minnesota	321	33.4	22.5	30.6	13.5
North Dakota	506	37.5	19.4	41.2	1.8

[1] Percentage calculated from number of days hunting.

Table 5-10: Satisfaction with the general waterfowl hunting experience during most recent Minnesota and North Dakota waterfowl-hunting seasons.

	n	% of hunters indicating that level of satisfaction:							Mean[1]
		Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	
Minnesota	314	24.2	15.6	14.0	7.3	15.3	16.6	7.0	3.5
North Dakota	499	1.6	2.2	3.6	1.6	7.0	33.9	50.1	6.1
		χ^2 = 1602.076***							

[1] t = 22.430 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-11: Satisfaction with the duck hunting experience during most recent Minnesota and North Dakota waterfowl-hunting seasons.

	n	% of hunters indicating that level of satisfaction:							Mean[1]
		Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	
Minnesota	321	21.2	13.4	14.0	6.9	19.3	17.1	8.1	3.7
North Dakota	515	1.6	1.4	3.1	2.3	6.6	28.9	56.1	6.2
		χ^2 = 1561.775***							

[1] t = 21.723 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-12: Satisfaction with the duck hunting harvest during most recent Minnesota and North Dakota waterfowl-hunting seasons.

	n	% of hunters indicating that level of satisfaction: Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Mean[1]
Minnesota	321	42.9	19.6	13.1	5.9	10.9	5.0	1.9	2.5
North Dakota	510	3.1	3.5	5.3	5.1	10.6	28.2	44.1	5.8
		χ^2 = 2109.965***							

[1] t = 35.623 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-13: Satisfaction with the duck hunting regulations during most recent Minnesota and North Dakota waterfowl-hunting seasons.

	n	% of hunters indicating that level of satisfaction: Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Mean[1]
Minnesota	321	11.8	8.4	13.1	25.9	15.0	18.7	7.2	4.1
North Dakota	512	5.5	6.8	7.8	8.8	11.3	29.3	30.5	5.2
		χ^2 = 220.151***							

[1] t = 11.397 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-14: Satisfaction with the goose hunting experience during most recent Minnesota and North Dakota waterfowl-hunting seasons.

	n	% of hunters indicating that level of satisfaction: Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Mean[1]
Minnesota	273	11.0	5.5	12.1	9.9	20.9	26.0	14.7	4.6
North Dakota	388	1.5	4.1	7.5	12.1	16.0	26.3	32.5	5.4
		χ^2 = 196.554***							

[1] t = 7.832 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 5: Comparing Minnesota and North Dakota Waterfowl Hunting

Table 5-15: Satisfaction with the goose hunting harvest during most recent Minnesota and North Dakota waterfowl-hunting seasons.

	n	% of hunters indicating that level of satisfaction: Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Mean[1]
Minnesota	275	17.8	10.9	13.8	12.0	18.2	15.6	11.6	4.0
North Dakota	386	6.5	9.1	12.2	18.4	16.3	18.4	19.2	4.6
		χ^2 = 70.745***							

[1] t = 5.337 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-16: Satisfaction with the goose hunting regulations during most recent Minnesota and North Dakota waterfowl-hunting seasons.

	n	% of hunters indicating that level of satisfaction: Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Mean[1]
Minnesota	276	11.6	4.7	10.1	26.2	12.3	22.1	12.7	4.4
North Dakota	386	6.5	10.6	9.6	16.1	12.2	21.0	24.1	4.8
		χ^2 = 56.214***							

[1] t = 3.621 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-17: Overall change in duck-hunting satisfaction in Minnesota and North Dakota over the past three seasons

	n	% of hunters indicating that their overall level of satisfaction with duck hunting has _____ over the past three years: Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	Mean[1]
Minnesota	322	37.3	37.9	20.2	4.7	0.0	1.9
North Dakota	447	4.3	26.0	44.5	20.1	5.1	3.0
		χ^2 = 839.798***					

[1] t = 22.223 (p < 0.001). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-18: Overall change in goose-hunting satisfaction in Minnesota and North Dakota over the past three seasons

	n	% of hunters indicating that their overall level of satisfaction with goose hunting has _____ over the past three years:					Mean[1]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Minnesota	291	13.1	22.3	37.8	22.0	4.8	2.8
North Dakota	366	6.6	21.9	54.6	13.7	3.3	2.9
		χ^2 = 51.528***					

[1] t = 1.096 (n.s.). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-19: Overall change in duck-hunting satisfaction in Minnesota and North Dakota since began hunting

	N	% of hunters indicating that their overall level of satisfaction with duck hunting has _____ since they began hunting:					Mean[1]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Minnesota	333	52.3	31.5	10.2	5.7	0.3	1.7
North Dakota	467	6.2	28.5	35.1	24.4	5.8	3.0
		χ^2 = 1232.198***					

[1] t = 26.570 (p < 0.001). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-20: Overall change in goose-hunting satisfaction in Minnesota and North Dakota since began hunting

	N	% of hunters indicating that their overall level of satisfaction with goose hunting has _____ since they began hunting:					Mean[1]
		Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	
Minnesota	311	18.6	17.4	19.6	32.2	12.2	3.0
North Dakota	381	6.6	26.5	44.4	18.9	3.7	2.9
		χ^2 = 208.922***					

[1] t = 1.372 (n.s.). Mean is based on the following scale: 1 = greatly decreased; 2 = decreased; 3 = stayed the same, 4 = increased; 5 = greatly increased.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 5: Comparing Minnesota and North Dakota Waterfowl Hunting

Table 5-21: Satisfaction with number of ducks seen in the field during the 2005 Minnesota and North Dakota waterfowl hunting seasons

	n	% of hunters indicating that level of satisfaction:							Mean[1]
		Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	
Minnesota	331	55.0	18.1	15.4	2.1	5.7	3.0	0.6	2.0
North Dakota	516	3.1	6.8	12.2	4.1	9.1	27.7	37.0	5.4
		χ^2 = 12833.874***							

[1] t = 44.753 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-22: Satisfaction with number of geese seen in the field during the 2005 Minnesota and North Dakota waterfowl hunting seasons

	n	% of hunters indicating that level of satisfaction:							Mean[1]
		Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	
Minnesota	299	15.4	10.0	11.0	10.4	19.4	21.4	12.4	4.2
North Dakota	438	4.1	8.2	12.6	9.1	15.8	23.7	26.5	5.0
		χ^2 = 110.777***							

[1] t = 6.716 (p < 0.001). Mean is based on the following scale: 1 = very dissatisfied; 2 = moderately dissatisfied; 3 = slightly dissatisfied, 4 = neither; 5 = slightly satisfied; 6 = moderately satisfied; 7 = very satisfied.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-23: Likelihood of hunting <u>for ducks</u> in Minnesota and North Dakota at some time during the next 5 years

	n	% of hunters indicating…							Mean[1]
		Very unlikely	Moderately unlikely	Slightly unlikely	Neither	Slightly likely	Moderately likely	Very likely	
Minnesota	340	5.6	4.7	2.6	8.5	5.3	10.3	62.9	5.8
North Dakota	519	2.9	2.1	2.7	0.0	3.1	10.2	79.0	6.5
		χ^2 = 179.481***							

[1] t = 6.410 (p < 0.001). Mean is based on the following scale: 1 = very unlikely; 2 = moderately unlikely 3 = slightly unlikely 4 = neither; 5 = slightly likely 6 = moderately likely; 7 = very likely.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 5: Comparing Minnesota and North Dakota Waterfowl Hunting

Table 5-24: Likelihood of hunting <u>for geese</u> in Minnesota and North Dakota at some time during the next 5 years

	n	% of hunters indicating…							Mean[1]
		Very unlikely	Moderately unlikely	Slightly unlikely	Neither	Slightly likely	Moderately likely	Very likely	
Minnesota	329	4.9	3.0	1.5	10.0	5.5	11.2	62.8	5.9
North Dakota	475	5.5	2.9	0.6	6.1	5.7	10.1	69.1	6.1
		χ^2 = 14.184*							

[1] t = 1.347 (n.s.). Mean is based on the following scale: 1 = very unlikely; 2 = moderately unlikely 3 = slightly unlikely 4 = neither; 5 = slightly likely 6 = moderately likely; 7 = very likely.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 5-25: When you consider the following aspects of your hunting experiences during the 2005 season, is Minnesota or North Dakota preferable for…

Factor	n	% of hunters[1] indicating that…							Mean[2]
		ND much better	ND somewhat better	ND slightly better	Neutral	MN slightly better	MN somewhat better	MN much better	
Overall hunting experience	318	64.5	14.2	8.2	8.2	2.5	1.6	0.9	1.8
Seeing lots of ducks & geese	316	85.8	7.6	3.8	1.6	0.9	0.0	0.3	1.3
Bagging ducks & geese	315	75.6	11.7	5.4	3.8	1.6	1.3	0.6	1.5
Expenses related to hunting	313	10.9	3.5	4.5	28.1	12.1	13.7	27.2	4.8
Travel time	315	4.4	0.6	1.0	12.4	10.8	17.8	53.0	5.9
Hunting regulations	316	13.9	10.1	9.2	48.4	8.2	4.7	5.4	3.6
Hunting with friends	313	22.7	6.7	5.4	55.0	4.2	3.2	2.9	3.3
Hunting with family	311	21.2	5.5	3.5	54.7	5.8	4.8	4.5	3.5
Getting away from crowds of people	319	55.8	15.0	9.4	16.9	1.3	0.6	0.9	2.0
Enjoying nature & the outdoors	316	24.1	9.2	5.4	52.2	2.8	3.5	2.8	3.2
Good behavior of other waterfowl hunters	317	24.3	11.0	10.4	50.2	1.9	1.9	0.3	3.0
Access to a lot of different hunting areas	317	54.6	15.8	8.5	15.5	1.6	2.2	1.9	2.1

[1] Responses include only hunters who hunted in both North Dakota and Minnesota in 2005.
[2] F = 349.400 (p < 0.001) for one-way ANOVA comparing means among regions. Mean is based on the following scale: 1 = ND much better, 2 = ND somewhat better, 3 = ND slightly better, 4 = neutral, 5 = MN slightly better, 6 = MN somewhat better, 7 = MN much better.

Section 6: Constraints to Waterfowl Hunting

Findings:

Ease of going Hunting in North Dakota and Minnesota

Respondents were asked to respond to the statement "If I want to, I can easily go waterfowl hunting in…" for both North Dakota and Minnesota. Responses were on the scale of 1 = definitely false to 7 = definitely true. Respondents indicated that it was slightly easier to go hunting in Minnesota ($\bar{x}$ = 5.8) than in North Dakota ($\bar{x}$ = 5.6) (t = 2.284, p < 0.05) (Table 6-1). Respondents who hunted in both North Dakota and Minnesota rated the ease of going hunting in Minnesota significantly higher ($\bar{x}$ = 6.2) than respondents who hunted only in North Dakota ($\bar{x}$ = 5.1) (Table 6-2). There was no significant difference in the ease of hunting in North Dakota between these two groups (Table 6-2).

Limitations to Hunting in North Dakota and Minnesota

Respondents were asked to rate limitations to hunting in North Dakota and Minnesota on a scale of 1 = not at all limiting to 5 = very limiting (Table 6-3).

Six constraints were seen as significantly more limiting to hunting in North Dakota than Minnesota: (a) family commitments (2.6 versus 2.3; t = 7.945, p < 0.001), (b) work commitments (2.9 versus 2.7; t = 6.543, p < 0.001), (c) cost of licenses (2.8 versus 1.8; t = 17.360, p < 0.001), (d) travel costs (3.0 versus 1.8; t = 21.069, p < 0.001), (e) hunting regulations too restrictive (2.5 versus 2.2; t = 3.954, p < 0.001), and (f) availability of hunting partners (1.9 versus 1.8; t = 3.225, p < 0.01).

Four constraints were seen as significantly more limiting to hunting in Minnesota than North Dakota: (a) crowding at hunting areas (3.3 versus 2.1; t = 18.692, p < 0.001), (b) waterfowl populations too low (3.9 versus 2.2; t = 23.177, p < 0.001), (c) the type of people who hunt (2.1 versus 1.8; t = 7.483, p < 0.001), and (d) the timing of waterfowl migration (2.8 versus 2.6; t = 4.629, p < 0.001).

There was not a significant difference between the states for 7 constraints: (a) cost of equipment ($\bar{x}$ = 2.1; t = 1.903, n.s.), (b) insufficient hunting skills ($\bar{x}$ = 1.3; t = 0.750, n.s.), (c) interest in other recreational activities ($\bar{x}$ = 2.1; t = 1.902, n.s.), (d) no desire or need for waterfowl as food ($\bar{x}$ = 1.7; t = 1.660, n.s.), (e) not enough leisure time (2.6 North Dakota versus 2.5 Minnesota; t = 1.280, n.s.), (f) the amount of effort required to go hunting ($\bar{x}$ = 2.0; t = 0.522, n.s.), and (g) no hunting opportunities near my home ($\bar{x}$ = 2.8; t = 0.221, n.s.).

It appears that respondents who hunt in both states perceive fewer constraints to their waterfowl hunting than respondents who only hunt in North Dakota. Respondents who hunted in both North Dakota and Minnesota felt that the following factors were less limiting to their hunting in Minnesota than respondents who hunted in only North Dakota did: (a) crowding at hunting areas, (b) hunting regulations too restrictive, (c) availability of hunting partners, (d) insufficient hunting skills, (e) interest in other recreational activities, (f) waterfowl populations too low, (g) no desire or need for waterfowl as food, (h) the type of people that hunt, (i) the amount of effort require to go hunting, (j) no hunting opportunities near my home (Table 6-4). Similarly, the respondents who hunted in both states felt that several factors were less limiting to their hunting in North Dakota, including (a) work commitments, (b) hunting regulations too restrictive, (c) insufficient hunting skills, (d) interest in other recreational activities, and

(e) the amount of effort require to go hunting (Table 6-5). Travel costs related to hunting in North Dakota were rated as more limiting by respondents who hunted in both states compared to those who hunted only in North Dakota (Table 6-5).

Older respondents viewed constraints related to family, work, costs, regulations, and time as less limiting than younger people did.

Section 6: Constraints to Waterfowl Hunting

Table 6-1: If I want to, I can easily go waterfowl hunting in…

	N	% of hunters indicating:							Mean[1]
		Definitely false	Moderately false	Slightly false	Neutral	Slightly true	Moderately true	Definitely true	
Minnesota	508	4.7	3.5	3.5	6.7	10.2	19.1	52.2	5.8
North Dakota	517	4.3	6.2	7.4	4.1	12.0	23.4	42.7	5.6
		χ^2 = 40.564***[2]							

[1] t = 2.284 (p < 0.05). Mean is based on the following scale: 1 = definitely false; 2 = moderately false; 3 = slightly false, 4 = neutral; 5 = slightly true, 6 = moderately true, 7 = definitely true.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 6-2: If I want to, I can easily go waterfowl hunting in …, by states hunted

	N	% of hunters indicating:							Mean[1]
		Definitely false	Moderately false	Slightly false	Neutral	Slightly true	Moderately true	Definitely true	
Minnesota									
ND only	181	9.9	6.6	5.5	10.5	13.8	16.0	37.6	5.1
ND and MN	317	1.3	1.9	2.5	4.1	8.5	21.5	60.3	6.2
		χ^2 = 53.258***, Cramer's V = 0.327							F = 56.284*** η = 0.319
North Dakota									
ND only	190	4.2	4.7	6.8	4.2	12.6	20.0	47.4	5.7
ND and MN	317	4.4	7.3	7.9	3.8	12.0	24.6	40.1	5.5
		χ^2 = 4.056, n.s.							n.s.

[1] Mean is based on the following scale: 1 = definitely false; 2 = moderately false; 3 = slightly false, 4 = neutral; 5 = slightly true, 6 = moderately true, 7 = definitely true.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 6-3: Constraints to waterfowl hunting in Minnesota and North Dakota

	N	% of hunters indicating: Not at all limiting 1	2	3	4	Very limiting 5	Mean[1]
Family Commitments							
Minnesota	474	33.1	24.3	25.7	12.4	4.4	2.3
North Dakota	504	25.4	21.0	27.0	20.2	6.3	2.6
		χ^2 = 40.318***[2]					t = 7.945***
Work Commitments							
Minnesota	473	24.7	19.0	28.5	20.1	7.6	2.7
North Dakota	505	21.8	14.7	24.0	27.9	11.7	2.9
		χ^2 = 37.014***[2]					t = 6.543***
Crowding at Hunting Areas							
Minnesota	473	13.7	14.6	25.2	24.7	21.8	3.3
North Dakota	504	40.1	26.6	24.6	5.8	3.0	2.1
		χ^2 = 459.426***[2]					t = 18.692***
Cost of Equipment							
Minnesota	466	38.0	26.0	29.6	5.2	1.3	2.1
North Dakota	501	34.7	28.1	29.7	6.4	1.0	2.1
		χ^2 = 4.128 n.s.[2]					n.s.
Cost of Licenses							
Minnesota	474	50.0	26.4	20.0	1.9	1.7	1.8
North Dakota	504	22.0	18.5	25.8	24.4	9.3	2.8
		χ^2 = 1617.902***[2]					t = 17.360***
Travel Costs							
Minnesota	473	51.2	27.1	15.2	5.3	1.3	1.8
North Dakota	505	16.6	18.8	27.3	27.7	9.5	3.0
		χ^2 = 930.077***[2]					t = 21.069***
Hunting Regulations too Restrictive							
Minnesota	473	36.8	21.6	29.0	8.5	4.2	2.2
North Dakota	505	30.1	19.4	28.7	12.5	9.3	2.5
		χ^2 = 47.689***[2]					t = 3.954***
Availability of Hunting Partners							
Minnesota	472	53.2	21.2	19.5	5.1	1.1	1.8
North Dakota	505	47.5	24.6	17.4	8.7	1.8	1.9
		χ^2 = 22.409***[2]					t = 3.225**
Insufficient Hunting Skills							
Minnesota	471	82.8	10.4	4.7	0.8	1.3	1.3
North Dakota	501	80.0	12.6	5.2	1.0	1.2	1.3
		χ^2 = 3.175 n.s.[2]					n.s.
Interest in Other Recreational Activities							
Minnesota	474	40.1	22.6	25.1	9.5	2.7	2.1
North Dakota	502	42.4	20.7	25.7	9.2	2.0	2.1
		χ^2 = 2.615 n.s.[2]					n.s.
Waterfowl Populations too low							
Minnesota	473	8.9	7.2	13.3	23.7	46.9	3.9
North Dakota	502	38.8	23.7	23.9	8.6	5.0	2.2
		χ^2 = 977.070***[2]					t = 23.177***

[1] Mean is based on the following scale: 1 = not at all limiting to 5 = very limiting.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 6-3: Constraints to waterfowl hunting in Minnesota and North Dakota (continued)

	N	% of hunters indicating: Not at all limiting 1	2	3	4	Very limiting 5	Mean[1]
No Desire or Need for Waterfowl as Food							
Minnesota	469	59.1	15.8	20.3	2.8	2.1	1.7
North Dakota	500	58.2	18.4	19.2	2.8	1.4	1.7
		χ^2 = 3.775 n.s.[2]					n.s.
Not Enough Leisure Time							
Minnesota	469	29.6	17.9	29.4	15.1	7.9	2.5
North Dakota	500	30.2	15.4	28.4	17.8	8.2	2.6
		χ^2 = 4.392 n.s.[2]					n.s.
The Type of People That Hunt							
Minnesota	474	43.7	17.1	27.8	8.0	3.4	2.1
North Dakota	504	50.8	19.6	25.6	3.6	0.4	1.8
		χ^2 = 34.370***[2]					t = 7.483
The Amount of Effort Required to go Hunting							
Minnesota	475	47.6	23.2	19.2	6.5	3.6	2.0
North Dakota	504	45.2	23.6	20.4	8.3	2.4	2.0
		χ^2 = 5.598 n.s.[2]					n.s.
No Hunting Opportunities Near my Home							
Minnesota	476	31.7	13.2	17.9	18.3	18.9	2.8
North Dakota	487	29.8	12.7	24.2	14.0	19.3	2.8
		χ^2 = 16.752**[2]					n.s.
The Timing of the Waterfowl Migration							
Minnesota	475	23.6	13.1	34.9	16.6	11.8	2.8
North Dakota	502	25.3	17.7	38.2	13.9	4.8	2.6
		χ^2 = 33.700***[2]					t = 4.629***

[1] Mean is based on the following scale: 1 = not at all limiting to 5 = very limiting.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 6-4: Constraints to waterfowl hunting in Minnesota, by states hunted

	N	% of hunters indicating: Not at all limiting 1	2	3	4	Very limiting 5	Mean[1]
Family commitments							
ND only	155	31.6	23.2	27.7	12.3	5.2	2.4
ND and MN	310	32.9	25.5	25.2	12.6	3.9	2.3
		χ^2 = 0.939 n.s.					n.s.
Work commitments							
ND only	155	28.4	15.5	29.0	17.4	9.7	2.7
ND and MN	309	22.0	21.4	28.2	21.7	6.8	2.7
		χ^2 = 5.637 n.s.					n.s.
Crowding at hunting areas							
ND only	155	14.2	6.5	25.2	26.5	27.7	3.5
ND and MN	309	12.6	18.8	25.6	23.9	19.1	3.2
		χ^2 = 14.662**, Cramer's V = 0.178					t = 2.250*
Cost of equipment							
ND only	151	41.7	20.5	31.1	6.0	0.7	2.0
ND and MN	306	35.0	28.8	29.7	4.9	1.6	2.1
		χ^2 = 4.876 n.s.					n.s.
Cost of licenses							
ND only	154	48.7	24.0	26.0	0.6	0.6	1.8
ND and MN	311	49.8	28.0	17.4	2.6	2.3	1.8
		χ^2 = 7.910 n.s.					n.s.
Travel costs							
ND only	154	49.4	24.7	22.1	3.2	0.6	1.8
ND and MN	310	51.6	28.7	11.6	6.5	1.6	1.8
		χ^2 = 10.884*, Cramer's V = 0.153					n.s.
Hunting regulations too restrictive							
ND only	153	33.3	19.6	33.3	5.9	7.8	2.4
ND and MN	311	37.9	22.8	27.0	10.0	2.3	2.2
		χ^2 = 12.314*, Cramer's V = 0.163					n.s.
Availability of hunting partners							
ND only	152	46.1	17.8	26.3	7.2	2.6	2.0
ND and MN	311	55.9	23.2	16.4	4.2	0.3	1.7
		χ^2 = 15.278**, Cramer's V = 0.182					t = 3.370**
Insufficient hunting skills							
ND only	152	78.3	11.2	6.6	1.3	2.6	1.4
ND and MN	310	84.5	10.3	3.9	0.6	0.6	1.2
		χ^2 = 5.750 n.s.					t = 2.317*
Interest in other recreational activities							
ND only	154	31.2	18.8	35.1	9.7	5.2	2.4
ND and MN	311	44.1	24.4	20.9	9.3	1.3	2.0
		χ^2 = 19.921**, Cramer's V = 0.207					t = 3.640***
Waterfowl populations too low							
ND only	153	4.6	4.6	10.5	20.9	59.5	4.3
ND and MN	311	10.3	8.7	14.8	25.4	40.8	3.8
		χ^2 = 16.233**, Cramer's V = 0.187					t = 3.864***

[1] Mean is based on the following scale: 1 = not at all limiting to 5 = very limiting.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 6-4: Constraints to waterfowl hunting in Minnesota, by states hunted (continued)

	N	% of hunters indicating: Not at all limiting 1	2	3	4	Very limiting 5	Mean[1]
No desire or need for waterfowl as food							
ND only	151	56.3	17.2	19.9	1.3	5.3	1.8
ND and MN	309	59.9	14.9	21.0	3.6	0.6	1.7
		χ^2 = 12.526*, Cramer's V = 0.165					n.s.
Not enough leisure time							
ND only	153	28.8	16.3	34.6	12.4	7.8	2.5
ND and MN	307	30.0	18.9	27.4	16.0	7.8	2.5
		χ^2 = 3.103 n.s.					n.s.
The type of people that hunt							
ND only	153	39.2	18.3	24.8	10.5	7.2	2.3
ND and MN	312	45.2	17.0	29.5	7.1	1.3	2.0
		χ^2 = 14.308**, Cramer's V = 0.175					t = 2.291*
The amount of effort required to go hunting							
ND only	154	35.7	24.0	25.3	9.7	5.2	2.3
ND and MN	312	52.6	23.4	16.0	5.1	2.9	1.8
		χ^2 = 15.720**, Cramer's V = 0.184					t = 3.890***
No hunting opportunities near my home							
ND only	155	20.6	9.7	19.4	19.4	31.0	3.3
ND and MN	312	36.5	15.4	17.3	17.9	12.8	2.6
		χ^2 = 29.317***, Cramer's V = 0.251					t = 5.197***
The timing of waterfowl migration							
ND only	154	20.8	14.3	42.2	12.3	10.4	2.8
ND and MN	312	23.7	12.8	31.7	18.9	12.8	2.8
		χ^2 = 6.942 n.s.					n.s.

[1] Mean is based on the following scale: 1 = not at all limiting to 5 = very limiting.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 6-5: Constraints to waterfowl hunting in North Dakota, by states hunted

	N	% of hunters indicating: Not at all limiting 1	2	3	4	Very limiting 5	Mean[1]
Family commitments							
ND only	188	25.0	22.3	29.8	16.0	6.9	2.6
ND and MN	306	24.5	20.9	26.1	22.5	5.9	2.6
		χ^2 = 3.406 n.s.					n.s.
Work commitments							
ND only	187	27.3	13.9	25.1	21.9	11.8	2.8
ND and MN	308	17.5	15.6	23.4	31.8	11.7	3.1
		χ^2 = 9.629*, Cramer's V = 0.139					t = 2.256*
Crowding at hunting areas							
ND only	187	39.0	26.2	26.7	5.3	2.7	2.1
ND and MN	307	39.7	27.7	23.5	6.2	2.9	2.1
		χ^2 = 0.784 n.s.					n.s.
Cost of equipment							
ND only	185	37.8	26.5	28.1	7.0	0.5	2.1
ND and MN	306	31.7	29.4	31.7	5.9	1.3	2.2
		χ^2 = 3.021 n.s.					n.s.
Cost of licenses							
ND only	186	24.2	19.4	26.9	20.4	9.1	2.7
ND and MN	308	20.8	17.9	25.6	26.6	9.1	2.9
		χ^2 = 2.653 n.s.					n.s.
Travel costs							
ND only	187	17.6	21.9	29.9	22.5	8.0	2.8
ND and MN	308	15.6	16.9	26.3	30.5	10.7	3.0
		χ^2 = 6.057 n.s.					t = 1.994*
Hunting regulations too restrictive							
ND only	186	24.7	17.2	33.9	11.3	12.9	2.7
ND and MN	309	32.4	21.4	25.6	13.6	7.1	2.4
		χ^2 = 10.759*, Cramer's V = 0.147					t = 2.414*
Availability of hunting partners							
ND only	186	48.9	22.0	20.4	7.0	1.6	1.9
ND and MN	309	46.0	26.5	15.5	10.0	1.9	2.0
		χ^2 = 4.042 n.s.					n.s.
Insufficient hunting skill							
ND only	184	73.9	15.8	6.5	1.6	2.2	1.4
ND and MN	307	83.4	11.1	4.2	0.7	0.7	1.2
		χ^2 = 7.709 n.s.					t = 2.726**
Interest in other recreational activities							
ND only	183	32.2	20.8	34.4	9.8	2.7	2.3
ND and MN	309	48.2	20.7	21.4	8.4	1.3	1.9
		χ^2 = 15.985**, Cramer's V = 0.180					t = 3.579***
Waterfowl populations too low							
ND only	184	35.3	25.5	25.0	10.9	3.3	2.2
ND and MN	308	40.9	22.7	23.1	7.1	6.2	2.2
		χ^2 = 5.284 n.s.					n.s.

[1] Mean is based on the following scale: 1 = not at all limiting to 5 = very limiting.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 6-5: Constraints to waterfowl hunting in North Dakota, by states hunted (continued)

	N	% of hunters indicating: Not at all limiting 1	2	3	4	Very limiting 5	Mean[1]
No desire or need for waterfowl as food							
ND only	183	56.3	21.9	16.9	2.2	2.7	1.7
ND and MN	307	59.0	16.0	21.2	3.3	0.7	1.7
		χ^2 = 7.321 n.s.					n.s.
Not enough leisure time							
ND only	185	30.3	17.3	30.3	14.6	7.6	2.5
ND and MN	305	30.2	14.4	27.9	19.0	8.5	2.6
		χ^2 = 2.270 n.s.					n.s.
The type of people that hunt							
ND only	185	48.1	19.5	26.5	5.4	0.5	1.9
ND and MN	309	52.1	20.4	24.9	2.6	0.0	1.8
		χ^2 = 4.716 n.s.					n.s.
The amount of effort required to go hunting							
ND only	186	37.6	25.8	23.7	9.1	3.8	2.2
ND and MN	308	49.0	23.1	18.5	7.8	1.6	1.9
		χ^2 = 7.673 n.s.					t = 2.531*
No hunting opportunities near my home							
ND only	182	26.9	13.7	24.2	13.7	21.4	2.9
ND and MN	295	30.8	12.5	24.7	13.9	18.0	2.8
		χ^2 = 1.430 n.s.					n.s.
The timing of waterfowl migration							
ND only	185	24.9	18.9	40.0	11.4	4.9	2.5
ND and MN	307	24.4	17.6	38.1	15.0	4.9	2.6
		χ^2 = 1.346 n.s.					n.s.

[1] Mean is based on the following scale: 1 = not at all limiting to 5 = very limiting.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 7: Motivations for and Involvement in Waterfowl Hunting

Findings:

Motivations

Respondents were asked to report how important 12 aspects of waterfowl hunting were to them using the scale 1 = not at all important to 5 = extremely important (Table 7-1). The three most highly rated items were: (a) enjoying nature and the outdoors ($\bar{x}$ = 4.6), (b) getting away from crowds of people ($\bar{x}$ = 4.5) and (c) good behavior among other waterfowl hunters ($\bar{x}$ = 4.4). The three least important items were: (a) getting food for my family ($\bar{x}$ = 2.0), (b) being on my own ($\bar{x}$ = 3.1), and (c) bagging ducks and geese ($\bar{x}$ = 3.4). The other six items were all rated close to 4 (very important) on the 5-point scale.

Respondents who hunted in both North Dakota and Minnesota rated three motivations slightly higher than the respondents who hunted only in North Dakota did (Table 7-2). These include: (a) hunting with family ($\bar{x}$ = 4.1 vs. 3.9), (b) getting food for my family ($\bar{x}$ = 2.1 vs. 1.9), and (c) reducing tension and stress ($\bar{x}$ = 4.1 vs. 3.8).

Importance of and Financial Investment in Waterfowl Hunting

Respondents answered a number of questions related to the importance of waterfowl hunting in their lives. One question asked respondents to select one of five statements that indicated how important waterfowl hunting was to them (Table 7-3). The majority of respondents (61.8%) indicated that waterfowl hunting was "one of my most important recreational activities." Respondents who hunted in both North Dakota and Minnesota indicated that waterfowl hunting was a more important recreational activity to them than those who hunted only in North Dakota. Over one-fifth (20.4%) of respondents who hunted in both states indicated that "waterfowl hunting is my most important recreational activity," compared to only 6.8% of respondents who only hunted in North Dakota.

Respondents were asked to report how much they spent on waterfowl hunting each year using the categories 1 = $250 or less, 2 = $251-1,000, 3 = $1,001-5,000 and 4 = over $5,000 (Table 7-4). The majority of respondents (61.8%) indicated that they spent between $251 and $1,000 on waterfowl hunting each year. Respondents who hunted in both North Dakota and Minnesota indicated that they spent more annually on waterfowl hunting, compared to those who hunted only in North Dakota.

Involvement/Commitment to Waterfowl Hunting

Respondents were asked to rate 21 items addressing their involvement and commitment to waterfowl hunting, using the scale 1 = strongly disagree to 5 = strongly agree (Table 7-5). Factor analysis was used to classify the 21 items. Factor analysis examines the underlying structure of variables based on correlations in response. Using factor analysis, we identified five dimensions of waterfowl hunting; we labeled these (a) attraction, (b) centrality, (c) knowledge, (d) identity/self-expression, and (e) volitional control.

Seven items loaded on (i.e. correlated highly with) the *attraction* factor (α = 0.846, $\bar{x}$ = 4.2). Attraction items included: (a) waterfowl hunting is one of the most enjoyable things I do ($\bar{x}$ = 4.4), (b) waterfowl hunting interests me ($\bar{x}$ = 4.6), (c) waterfowl hunting is important to me ($\bar{x}$ = 4.5), (d) for me to change my preference from waterfowl hunting to another leisure activity would require major rethinking ($\bar{x}$ = 3.8), (e) even if close friends recommended another recreational activity, I would not change my preference from waterfowl hunting ($\bar{x}$ = 3.8), (f) I have acquired equipment that I would not use if I quit waterfowl hunting ($\bar{x}$ = 4.3), (g) I have close friendships that are based on a common interest in waterfowl hunting ($\bar{x}$ = 4.0).

Five items loaded on the *centrality* factor (α = 0.864, $\bar{x}$ = 3.3). Centrality items included: (a) I find that a lot of my life is organized around waterfowl hunting ($\bar{x}$ = 3.3), (b) waterfowl hunting has a central role in my life ($\bar{x}$ = 3.3), (c) most of my friends are in some way connected with waterfowl hunting ($\bar{x}$ = 3.3), (d) I find a lot of my life organized around waterfowl-hunting activities ($\bar{x}$ = 3.1), (e) compared to other waterfowl hunters, I own a lot of waterfowl-hunting equipment ($\bar{x}$ = 3.5).

Three items loaded on the *knowledge* factor (α = 0.779, $\bar{x}$ = 4.4). Knowledge items included: (a) I am knowledgeable about waterfowl hunting ($\bar{x}$ = 4.4), (b) I don't really know much about waterfowl hunting (reversed) ($\bar{x}$ = 4.6), (c) I consider myself an educated consumer regarding waterfowl hunting ($\bar{x}$ = 4.2).

Four items loaded on the *identity/self-expression* factor (α = 0.739, $\bar{x}$ = 3.9). Identity items included: (a) when I am waterfowl hunting, others see me the way I want them to see me ($\bar{x}$ = 3.8), (b) you can tell a lot about a person when you see them waterfowl hunting ($\bar{x}$ = 3.6), (c) when I am waterfowl hunting I can really be myself ($\bar{x}$ = 3.9), (d) I enjoy discussing waterfowl hunting with my friends ($\bar{x}$ = 4.3).

Two items loaded on the *volitional control* factor (α = 0.515, $\bar{x}$ = 4.4). Control items included (a) the decision to go waterfowl hunting is primarily my own ($\bar{x}$ = 4.4) and (b) the decision to go waterfowl hunting is not entirely my own (reversed) ($\bar{x}$ = 4.3).

Across 20 of the 21 items measuring involvement and commitment to waterfowl hunting, respondents who hunted in both North Dakota and Minnesota rated their involvement in the activity higher than the respondents who hunted in only North Dakota (Table 7-6).

Importance of Bagging Waterfowl

Respondents reported the minimum number of ducks and geese they would need to harvest in a day and in a season to feel satisfied. The most frequent response (mode) for ducks was 2 per day with an average (mean) of 2.9 and a range of 0 to 15 (Table 7-7). For geese, the most common response was 1 per day with a mean of 1.6 and range of responses from 0 to 20. There were no significant differences in the number of ducks or geese needed to harvest per day between respondents who hunted in only North Dakota and those who hunted in both North Dakota and Minnesota (Table 7-8).

Respondents most frequently indicated that they would need to bag 10 ducks per season to feel satisfied with a mean of 17.3 and a range from 0 to 200 (Table 7-9). For geese, respondents most commonly indicated the need to bag 10 geese per season with an average of 9.2 and a range of 0-200. Compared to those who hunted in only North Dakota, respondents who hunted in both states indicated that they would need to bag more ducks and geese in a season in order to feel satisfied (Table 7-10).

Section 7: Motivations for and Involvement in Waterfowl Hunting

Table 7-1: Motivations for waterfowl hunting: Importance of…

	n	Not at all	Slightly	Somewhat	Very	Extremely	Mean[1]
Access to a lot of different hunting areas	522	1.1	4.6	19.2	39.5	35.6	4.0
Bagging ducks and geese	521	3.1	11.5	40.7	32.8	11.9	3.4
Being on my own	521	15.5	14.0	32.1	26.7	11.7	3.1
Hunting with friends	524	1.1	3.1	13.7	47.7	34.4	4.1
Hunting with family	525	5.9	4.4	11.6	38.1	40.0	4.0
Enjoying nature and the outdoors	525	0.2	0.2	3.6	33.3	62.7	4.6
Getting away from crowds of people	526	0.8	0.8	7.0	29.7	61.8	4.5
Getting food for my family	523	42.8	27.0	19.5	7.6	3.1	2.0
Good behavior among other waterfowl hunters	523	0.2	2.1	7.6	37.5	52.6	4.4
Hunting with a dog	521	7.9	6.7	16.7	24.6	44.1	3.9
Reducing tension and stress	525	3.6	5.7	20.2	29.3	41.1	4.0
Seeing a lot of ducks and geese	526	0.8	1.3	19.6	39.2	39.2	4.2

Notes:
[1] $F = 339.575$, $P < 0.001$, $\eta = 0.404$. Mean is based on the scale: 1 = not at all important, 2 = slightly important, 3 = somewhat important, 4 = very important, 5 = extremely important.

Table 7-2: Motivations for waterfowl hunting: Importance of… by state(s) hunted.

	n	Not at all	Slightly	Somewhat	Very	Extremely	Mean[1]
Access to a lot of different hunting areas							
ND only	192	1.0	4.7	19.8	37.5	37.0	4.1
ND and MN	320	1.3	4.4	18.8	40.0	35.6	4.0
		$\chi^2 = 0.391$ n.s.					n.s.
Bagging ducks and geese							
ND only	193	2.6	12.4	38.3	35.8	10.9	3.4
ND and MN	318	3.5	10.4	42.5	31.1	12.6	3.4
		$\chi^2 = 2.311$ n.s.					n.s.
Being on my own							
ND only	192	17.7	13.0	32.3	28.6	8.3	3.0
ND and MN	319	14.7	15.0	31.0	25.4	13.8	3.1
		$\chi^2 = 4.593$ n.s.					n.s.
Hunting with friends							
ND only	193	1.6	4.1	15.5	46.1	32.6	4.0
ND and MN	321	0.9	2.5	13.1	48.6	34.9	4.1
		$\chi^2 = 2.310$ n.s.					n.s.
Hunting with family							
ND only	193	8.3	5.2	15.5	32.1	38.9	3.9
ND and MN	322	4.7	4.0	8.7	41.9	40.7	4.1
		$\chi^2 = 11.154$*, Cramer's V = 0.147					t = 2.168*
Enjoying nature and the outdoors							
ND only	193	0.0	0.0	4.1	38.9	57.0	4.5
ND and MN	322	0.3	0.3	3.4	30.4	65.5	4.6
		$\chi^2 = 5.322$ n.s.					n.s.

[1] Mean is based on the scale: 1 = not at all important, 2 = slightly important, 3 = somewhat important, 4 = very important, 5 = extremely important.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-2: Motivations for waterfowl hunting: Importance of… by state(s) hunted (continued).

	n	Not at all	Slightly	Somewhat	Very	Extremely	Mean[1]
Getting away from crowds of people							
ND only	194	1.0	1.5	7.2	29.4	60.8	4.5
ND and MN	322	0.6	0.3	7.1	29.8	62.1	4.5
		χ^2 = 2.689 n.s.					n.s.
Getting food for my family							
ND only	193	49.2	24.9	17.6	6.2	2.1	1.9
ND and MN	320	39.4	27.2	20.9	8.8	3.8	2.1
		χ^2 = 5.706 n.s.					t = 2.319*
Good behavior among other waterfowl hunters							
ND only	194	0.5	1.5	8.8	42.8	46.4	4.3
ND and MN	319	0.0	2.5	7.2	34.5	55.8	4.4
		χ^2 = 6.791 n.s.					n.s.
Importance of… hunting with a dog							
ND only	193	9.3	7.8	18.7	23.8	40.4	3.8
ND and MN	318	7.2	6.0	15.7	25.2	45.9	4.0
		χ^2 = 2.765 n.s.					n.s.
Reducing tension and stress							
ND only	193	5.7	9.3	21.8	30.6	32.6	3.8
ND and MN	322	2.2	3.7	19.9	29.2	45.0	4.1
		χ^2 = 15.658**, Cramer's V = 0.174					t = 3.724***
Seeing a lot of ducks and geese							
ND only	194	0.5	1.5	17.5	46.4	34.0	4.1
ND and MN	322	0.9	1.2	21.1	34.2	42.5	4.2
		χ^2 = 8.052 n.s.					n.s.

[1] Mean is based on the scale: 1 = not at all important, 2 = slightly important, 3 = somewhat important, 4 = very important, 5 = extremely important.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-3: Importance of waterfowl hunting by state(s) hunted

	N	% of hunters indicating…				
		…my most important recreational activity	…one of my most important recreational activities	…no more important than my other recreational activities	…less important than my other recreational activities	…one of my least important recreational activities.
All respondents	523	15.5	61.8	19.7	3.1	0.0
ND only	190	6.8	56.8	31.1	5.3	0.0
ND and MN	323	20.4	65.0	13.3	1.2	0.0
		χ^2 = 41.675***, Cramer's V = 0.285				

Notes:
*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-4: Amount spent on waterfowl hunting each year by state(s) hunted

		% of hunters indicating…			
	N	**$250 or less**	**$251-$1,000**	**$1,001-$5,000**	**Over $5,000**
All respondents	524	9.5	61.8	27.7	1.0
ND only	192	15.6	61.5	21.9	1.0
ND and MN	322	5.6	62.4	31.4	0.6
		χ^2 = 17.156**, Cramer's V = 0.183			

Notes:
*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-5: Involvement with and commitment to waterfowl hunting

	N	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Waterfowl hunting is one of the most enjoyable things I do.	526	0.6	2.7	9.7	34.8	52.3	4.4
I am knowledgeable about waterfowl hunting.	525	0.8	1.0	5.7	41.5	51.0	4.4
The decision to go waterfowl hunting is primarily my own.	521	1.5	1.7	6.3	35.1	55.3	4.4
I find that a lot of my life is organized around waterfowl hunting.	521	4.0	24.6	29.4	26.9	15.2	3.3
Waterfowl hunting has a central role in my life.	521	5.8	20.3	30.9	26.9	16.1	3.3
Most of my friends are in some way connected with waterfowl hunting.	522	2.7	20.7	28.5	37.4	10.7	3.3
When I am waterfowl hunting, others see me the way I want them to see me.	516	2.5	5.8	26.4	43.4	21.9	3.8
I don't really know much about waterfowl hunting.	518	60.8	33.0	3.9	1.4	1.0	1.5
I consider myself an educated consumer regarding waterfowl hunting.	524	1.3	1.7	7.4	53.4	36.1	4.2
Waterfowl hunting interests me.	524	0.2	0.0	1.3	37.4	61.1	4.6
Waterfowl hunting is important to me.	522	0.2	0.8	7.3	37.0	54.8	4.5
You can tell a lot about a person when you see them waterfowl hunting.	521	2.3	8.4	32.6	41.5	15.2	3.6
When I am waterfowl hunting I can really be myself.	521	0.6	2.3	26.7	46.1	24.4	3.9
I enjoy discussing waterfowl hunting with my friends.	521	0.2	0.8	8.8	53.4	36.9	4.3
The decision to go waterfowl hunting is no entirely my own.	521	37.4	32.1	11.7	14.0	4.8	2.2
For me to change my preference from waterfowl hunting to another leisure activity would require major rethinking.	519	3.1	11.4	22.4	30.3	32.9	3.8
I find a lot of my life organized around waterfowl-hunting activities.	522	5.2	25.7	32.4	24.3	12.5	3.1
Even if close friends recommended another recreational activity, I would not change my preference from waterfowl hunting.	520	2.1	10.2	22.3	37.3	28.1	3.8
I have acquired equipment that I would not use if I quit waterfowl hunting.	523	2.5	4.6	5.4	40.5	47.0	4.3
I have close friendships that are based on a common interest in waterfowl hunting.	522	1.1	5.7	15.5	44.8	32.8	4.0
Compared to other waterfowl hunters, I own a lot of waterfowl-hunting equipment.	524	3.1	15.5	34.7	26.5	20.2	3.5

Notes:

[1] $F = 482.378$ ($p < 0.001$), $\eta = 0.500$. Mean is based on the scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

Table 7-6: Involvement with and commitment to waterfowl hunting by state(s) hunted

	N	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Waterfowl hunting is one of the most enjoyable things I do.							
ND only	192	0.5	3.6	11.5	42.2	42.2	4.2
ND and MN	324	0.6	2.2	8.0	30.9	58.3	4.4
		χ^2 = 12.941*, Cramer's V = 0.158					t = 3.056**
I am knowledgeable about waterfowl hunting.							
ND only	191	1.0	1.0	9.9	49.2	38.7	4.2
ND and MN	324	0.6	0.6	3.1	37.7	58.0	4.5
		χ^2 = 23.227***, Cramer's V = 0.212					t = 4.485***
The decision to go waterfowl hunting is primarily my own.							
ND only	188	1.6	2.1	8.5	38.8	48.9	4.3
ND and MN	323	1.5	1.5	5.0	32.8	59.1	4.5
		χ^2 = 6.087 n.s.					t = 2.024*
I find that a lot of my life is organized around waterfowl hunting.							
ND only	189	5.3	37.6	27.5	22.8	6.9	2.9
ND and MN	322	3.1	16.5	31.1	29.5	19.9	3.5
		χ^2 = 39.182***, Cramer's V = 0.277					t = 5.965***
Waterfowl hunting has a central role in my life.							
ND only	191	8.9	31.4	33.5	19.4	6.8	2.8
ND and MN	320	3.1	13.8	29.7	31.9	21.6	3.6
		χ^2 = 49.552***, Cramer's V = 0.311					t = 7.316***
Most of my friends are in some way connected with waterfowl hunting.							
ND only	189	3.7	28.6	29.1	32.3	6.3	3.1
ND and MN	323	1.9	16.4	28.5	39.9	13.3	3.5
		χ^2 = 17.325**, Cramer's V = 0.184					t = 4.138***
When I am waterfowl hunting, others see me the way I want them to see me.							
ND only	188	2.7	11.2	31.4	44.1	10.6	3.5
ND and MN	318	1.9	2.8	23.6	43.4	28.3	3.9
		χ^2 = 33.871***, Cramer's V = 0.259					t = 5.341***
I don't really know much about waterfowl hunting.							
ND only	188	44.7	45.7	4.8	2.7	2.1	1.7
ND and MN	320	70.0	25.9	3.4	0.3	0.3	1.4
		χ^2 = 36.523***, Cramer's V = 0 .268					t = 5.735***
I consider myself an educated consumer regarding waterfowl hunting.							
ND only	191	1.0	2.1	10.5	61.3	25.1	4.1
ND and MN	323	1.5	1.5	5.3	48.9	42.7	4.3
		χ^2 = 18.631**, Cramer's V = 0.190					t = 3.246**
Waterfowl hunting interests me.							
ND only	192	0.5	0.0	2.6	52.6	44.3	4.4
ND and MN	322	0.0	0.0	0.6	28.3	71.1	4.7
		χ^2 = 38.423***, Cramer's V = 0.273					t = 6.395***

Notes:

[1] Mean is based on the scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-6: Involvement with and commitment to waterfowl hunting by state(s) hunted

	N	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean[1]
Waterfowl hunting is important to me.							
ND only	190	0.5	2.1	13.2	47.9	36.3	4.2
ND and MN	322	0.0	0.0	3.7	30.7	65.5	4.6
		χ^2 = 51.297***, Cramer's V = 0.317					t = 7.511***
You can tell a lot about a person when you see them waterfowl hunting.							
ND only	189	2.1	11.6	38.1	40.2	7.9	3.4
ND and MN	322	2.2	6.5	29.5	43.2	18.6	3.7
		χ^2 = 15.932**, Cramer's V = 0.177					t = 3.545***
When I am waterfowl hunting I can really be myself.							
ND only	190	1.1	3.2	33.7	49.5	12.6	3.7
ND and MN	321	0.3	1.9	21.8	45.5	30.5	4.0
		χ^2 = 24.801***, Cramer's V = 0.220					t = 4.819***
I enjoy discussing waterfowl hunting with my friends.							
ND only	191	0.5	1.0	11.5	66.0	20.9	4.1
ND and MN	320	0.0	0.6	6.9	46.3	46.3	4.4
		χ^2 = 34.438***, Cramer's V = 0.260					t = 5.513***
The decision to go waterfowl hunting is not entirely my own.							
ND only	189	33.3	30.7	12.2	20.1	3.7	2.3
ND and MN	322	40.1	32.6	11.2	10.9	5.3	2.1
		χ^2 = 9.415 n.s.					n.s.
For me to change my preference from waterfowl hunting to another leisure activity would require major rethinking.							
ND only	188	3.7	18.6	29.8	31.4	16.5	3.4
ND and MN	321	2.8	6.9	17.8	30.5	42.1	4.0
		χ^2 = 46.490***, Cramer's V = 0.302					t = 6.508***
I find a lot of my life organized around waterfowl-hunting activities.							
ND only	190	10.0	35.8	33.2	15.3	5.8	2.7
ND and MN	322	2.2	19.3	32.6	30.1	15.8	3.4
		χ^2 = 47.978***, Cramer's V = 0.306					t = 7.100***
Even if close friends recommended another recreational activity, I would not change my preference from waterfowl hunting.							
ND only	188	3.7	12.8	30.3	40.4	12.8	3.5
ND and MN	322	1.2	8.7	17.7	35.7	36.6	4.0
		χ^2 = 38.784***, Cramer's V = 0.276					t = 5.677***
I have acquired equipment that I would not use if I quit waterfowl hunting.							
ND only	190	3.2	6.8	6.8	45.8	37.4	4.1
ND and MN	323	1.9	3.1	4.3	37.8	52.9	4.4
		χ^2 = 14.077**, Cramer's V = 0.166					t = 3.538***
I have close friendships that are based on a common interest in waterfowl hunting.							
ND only	189	2.1	9.5	19.6	51.9	16.9	3.7
ND and MN	323	0.6	2.8	13.6	41.8	41.2	4.2
		χ^2 = 39.615***, Cramer's V = 0.278					t = 6.093***
Compared to other waterfowl hunters, I own a lot of waterfowl-hunting equipment.							
ND only	191	5.8	21.5	41.4	22.0	9.4	3.1
ND and MN	323	1.2	11.5	31.6	28.8	26.9	3.7
		χ^2 = 39.725***, Cramer's V = 0.278					t = 6.499***

[1] Mean is based on the scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-7: Minimum number of ducks and geese needed to harvest in a day to feel satisfied

	n	Mean[1]	SD	Median	Mode	Range	
						Low	High
Ducks	483	2.9	1.8	3.0	2.0	0	15
Geese	457	1.6	1.6	1.0	1.0	0	20

[1] t = 17.077 (p < 0.001)
*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-8: Minimum number of waterfowl needed to harvest in a day to feel satisfied by state(s) hunted

	n	Mean	SD	Median	Mode	Range	
						Low	High
Ducks							
ND only	175	3.1	2.1	3.0	4.0	0	15
ND and MN	299	2.9	1.6	3.0	2.0	0	8
		t = 1.146 n.s.					
Geese							
ND only	163	1.6	2.0	1.0	1.0	0	20
ND and MN	285	1.6	1.2	1.0	1.0	0	6
		t = 0.542 n.s.					

*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-9: Minimum number of ducks and geese needed to harvest in a season to feel satisfied

	n	Mean[1]	SD	Median	Mode	Range	
						Low	High
Ducks	472	17.3	17.0	12.0	10.0	0	200
Geese	453	9.2	14.1	6.0	10.0	0	200

[1] t = 14.344 (p < 0.001)
*p < 0.05, **p < 0.01, ***p < 0.001

Table 7-10: Minimum number of ducks needed to harvest in a season to feel satisfied by state(s) hunted

	n	Mean	SD	Median	Mode	Range	
						Low	High
Ducks							
ND only	175	13.5	11.5	10.0	10.0	0	90
ND and MN	288	19.8	19.4	15.0	20.0	0	200
		F = 3.949***					
Geese							
ND only	164	6.6	9.3	5.0	0.0	0	90
ND and MN	280	10.8	16.2	6.0	10.0	0	200
		F = 3.015**					

*p < 0.05, **p < 0.01, ***p < 0.001

Section 8: Quality of Minnesota and North Dakota Waterfowl Hunting

Findings:

Opinions about Changes in Hunting Quality in North Dakota and Minnesota

Respondents were asked to respond to nine items addressing changes in the quality of waterfowl hunting in North Dakota and Minnesota over the last 5 years (Table 8-1). There were significant differences for the ratings of Minnesota changes and North Dakota changes for all items except "the amount of time I have to hunt waterfowl." In general, survey respondents felt that hunting quality in North Dakota was about the same, while Minnesota hunting had gotten somewhat worse. In particular, the greatest declines in the quality of Minnesota waterfowl hunting were reported for: (a) waterfowl habitat where I hunt ($\bar{x}$ = 2.0), (b) when waterfowl are arriving in my area ($\bar{x}$ = 1.9), (c) the length of time waterfowl are staying in my area ($\bar{x}$ = 1.9), (d) overall waterfowl numbers ($\bar{x}$ = 1.6), and (e) the number places to hunt ($\bar{x}$ = 2.2). For each of these items, over 50% of respondents indicated that quality had gotten worse.

Respondents who hunted in both North Dakota and Minnesota reported that the quality of hunting in Minnesota has not declined as much as the respondents who hunted only in North Dakota did (Table 8-2). Respondents who hunted only in North Dakota rated five of the nine changes in quality worse in Minnesota than the respondents who hunted in both states did: (a) waterfowl habitat where I hunt, (b) when waterfowl are arriving in my area, (c) ease of understanding regulations, (d) the number of place to hunt, and (e) the amount of time I have to hunt waterfowl. There were no significant difference in quality changes in North Dakota between respondents who only hunted in that state and respondents who hunted in both states (Table 8-3).

Changes in Problems Associated With Hunting in North Dakota and Minnesota

Respondents were asked to respond to eight items addressing changes in problems associated with waterfowl hunting in North Dakota and Minnesota over the last 5 years (Table 8-4). In general, survey respondents felt that problems in North Dakota were about the same, while problems in Minnesota had gotten worse.

Respondents who hunted in both states rated one item, waterfowl arriving after the season is closed in Minnesota, as slightly worse than respondents who only hunted in North Dakota (Table 8-5). There were no significant difference in changes in problems in North Dakota between respondents who only hunted in that state and respondents who hunted in both states (Table 8-6).

Section 8: Quality of Minnesota and North Dakota Waterfowl Hunting

Table 8-1: Changes in hunting quality by state

	N	% of respondents who said that quality is…					Mean[1]
		Much worse	Somewhat worse	Neither better or worse	Somewhat better	Much better	
Waterfowl habitat where I hunt							
Minnesota	456	32.2	39.5	24.3	3.5	0.4	2.0
North Dakota	494	1.8	19.6	51.4	20.2	6.9	3.1
		χ^2 = 1201.737***[2]					t = 20.511***
When waterfowl are arriving in my area							
Minnesota	450	37.3	38.4	21.1	2.9	0.2	1.9
North Dakota	493	3.7	21.3	53.8	16.0	5.3	3.0
		χ^2 = 1296.909***[2]					t = 20.274***
The length of time waterfowl are staying in my area							
Minnesota	454	40.7	34.1	22.0	3.1	0.0	1.9
North Dakota	495	3.6	16.2	60.6	14.7	4.8	3.0
		χ^2 = 1234.478***[2]					t = 21.354***
Timing of waterfowl seasons							
Minnesota	457	11.8	14.0	65.2	7.4	1.5	2.7
North Dakota	497	4.0	10.3	68.8	12.7	4.2	3.0
		χ^2 = 73.358***[2]					t = 6.446***
Overall waterfowl numbers							
Minnesota	447	58.2	25.7	12.1	3.6	0.4	1.6
North Dakota	489	3.7	25.4	41.5	19.2	10.2	3.1
		χ^2 = 1979.400***[2]					t = 23.055***
Ease of understanding regulations							
Minnesota	453	7.3	12.1	70.2	8.8	1.5	2.9
North Dakota	492	3.7	14.8	65.7	12.4	3.5	3.0
		χ^2 = 31.987***[2]					t = 2.804**
The number of places to hunt							
Minnesota	453	25.2	34.0	36.0	4.2	0.7	2.2
North Dakota	493	7.3	24.5	42.8	15.2	10.1	3.0
		χ^2 = 893.530***[2]					t = 12.617***
Amount of time I have to hunt waterfowl							
Minnesota	456	7.5	18.0	57.0	11.4	6.1	2.9
North Dakota	496	4.8	18.1	55.8	14.7	6.5	3.0
		χ^2 = 9.540*[2]					n.s.
Weather patterns for waterfowl hunting							
Minnesota	452	8.4	22.6	64.6	4.4	0.0	2.7
North Dakota	494	3.8	20.6	65.4	7.1	3.0	2.9
		χ^2 = 199.522***[2]					t = 5.491***

[1]Mean based on scale: 1 = much worse, 2 = somewhat worse, 3 = neither better nor worse, 4 = somewhat better, 5 = much better.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 8-2: Changes in Minnesota hunting quality by state(s) hunted.

	N	% of respondents who said that quality is…					Mean[1]
		Much worse	Somewhat worse	Neither better or worse	Somewhat better	Much better	
Waterfowl habitat where I hunt							
ND only	138	42.0	36.2	18.8	2.2	0.7	1.8
ND and MN	311	28.0	41.5	26.0	4.2	0.3	2.1
		χ^2 = 10.017*, Cramer's V = 0.149					t = 2.744**
When waterfowl are arriving in my area							
ND only	135	42.2	39.3	18.5	0.0	0.0	1.8
ND and MN	308	35.7	38.0	21.8	4.2	0.3	2.0
		χ^2 = 7.703 n.s.					t = 2.207*
The length of time waterfowl are staying in my area							
ND only	135	44.4	32.6	21.5	1.5	0.0	1.8
ND and MN	312	39.1	35.6	21.5	3.8	0.0	1.9
		χ^2 = 2.585 n.s.					n.s.
Timing of waterfowl seasons							
ND only	138	12.3	13.8	68.1	4.3	1.4	2.7
ND and MN	312	11.9	14.4	63.5	8.7	1.6	2.7
		χ^2 = 2.799 n.s.					n.s.
Overall waterfowl numbers							
ND only	137	62.0	22.6	13.1	2.2	0.0	1.6
ND and MN	303	56.8	27.1	11.6	4.0	0.7	1.7
		χ^2 = 3.142 n.s.					n.s.
Ease of understanding regulations							
ND only	136	9.6	15.4	68.4	4.4	2.2	2.7
ND and MN	310	6.5	11.0	70.6	10.6	1.3	2.9
		χ^2 = 7.542 n.s.					t = 1.989*
The number of places to hunt							
ND only	137	33.6	40.1	24.8	1.5	0.0	1.9
ND and MN	309	21.4	32.0	40.5	5.2	1.0	2.3
		χ^2 = 18.539**, Cramer's V = 0.204					t = 4.271***
Amount of time I have to hunt waterfowl							
ND only	137	13.9	17.5	54.7	8.0	5.8	2.7
ND and MN	312	4.8	17.9	58.0	13.1	6.1	3.0
		χ^2 = 12.668*, Cramer's V = 0.168					t = 2.510*
Weather patterns for waterfowl hunting							
ND only	134	9.0	21.6	63.4	6.0	0.0	2.7
ND and MN	311	8.0	23.5	64.6	3.9	0.0	2.6
		χ^2 = 1.182 n.s.					n.s.

[1] Mean based on scale: 1 = much worse, 2 = somewhat worse, 3 = neither better nor worse, 4 = somewhat better, 5 = much better.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 8-3: Changes in North Dakota in hunting quality by state(s) hunted.

	N	% of respondents who said that quality is…					Mean[1]
		Much worse	Somewhat worse	Neither better or worse	Somewhat better	Much better	
Waterfowl habitat where I hunt							
ND only	183	2.7	17.5	51.4	19.7	8.7	3.1
ND and MN	301	1.3	20.6	51.2	20.9	6.0	3.1
				χ^2 = 3.099 n.s.			n.s.
When waterfowl are arriving in my area							
ND only	182	5.5	20.9	52.7	16.5	4.4	2.9
ND and MN	301	2.7	21.3	54.2	15.9	6.0	3.0
				χ^2 = 3.048 n.s.			n.s.
The length of time waterfowl are staying in my area							
ND only	182	4.4	17.0	60.4	15.4	2.7	3.0
ND and MN	303	3.3	15.5	60.1	14.9	6.3	3.1
				χ^2 = 3.408 n.s.			n.s.
Timing of waterfowl seasons							
ND only	184	4.3	10.3	70.1	12.5	2.7	3.0
ND and MN	303	4.0	10.6	67.3	12.9	5.3	3.1
				χ^2 = 1.934 n.s.			n.s.
Overall waterfowl numbers							
ND only	182	3.3	28.0	40.1	22.0	6.6	3.0
ND and MN	297	4.0	23.6	41.8	18.2	12.5	3.1
				χ^2 = 5.748 n.s.			n.s.
Ease of understanding regulations							
ND only	181	2.8	17.1	64.6	13.3	2.2	3.0
ND and MN	301	4.3	13.6	65.4	12.3	4.3	3.0
				χ^2 = 3.184 n.s.			n.s.
The number of places to hunt							
ND only	182	6.6	27.5	41.8	14.8	9.3	2.9
ND and MN	302	7.6	22.8	43.0	15.9	10.6	3.0
				χ^2 = 1.455 n.s.			n.s.
Amount of time I have to hunt waterfowl							
ND only	183	4.9	16.4	55.7	17.5	5.5	3.0
ND and MN	303	5.0	19.1	55.8	12.9	7.3	3.0
				χ^2 = 2.699 n.s.			n.s.
Weather patterns for waterfowl hunting							
ND only	182	1.6	20.9	65.9	8.8	2.7	2.9
ND and MN	302	4.6	21.2	64.6	6.3	3.3	2.8
				χ^2 = 4.021 n.s.			n.s.

[1]Mean based on scale: 1 = much worse, 2 = somewhat worse, 3 = neither better nor worse, 4 = somewhat better, 5 = much better.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 8-4: Problems in last 5 years by state.

	N	% of respondents who said that quality is…					Mean[1]
		Much worse	Somewhat worse	Neither better or worse	Somewhat better	Much better	
Crowding at hunting areas							
Minnesota	452	26.1	37.8	32.3	3.5	0.2	2.1
North Dakota	494	6.7	26.7	56.5	7.1	3.0	2.7
		χ^2 = 371.428***[2]					t = 11.909***
Hunting pressure							
Minnesota	449	25.4	35.6	35.6	2.7	0.7	2.2
North Dakota	492	5.9	29.9	54.1	7.9	2.2	2.7
		χ^2 = 194.041***[2]					t = 10.954***
Waterfowl unable to find rest areas							
Minnesota	445	22.2	26.5	46.1	4.3	0.9	2.4
North Dakota	490	2.0	14.1	66.7	12.0	5.1	3.0
		χ^2 = 329.547***[2]					t = 13.205***
Shifting waterfowl migration routes							
Minnesota	448	48.9	31.5	18.1	1.3	0.2	1.7
North Dakota	488	4.1	22.5	57.2	11.9	4.3	2.9
		χ^2 = 1394.251***[2]					t = 21.114***
Interference from other hunters							
Minnesota	450	21.6	36.0	37.8	4.0	0.7	2.3
North Dakota	488	4.3	22.1	62.9	7.6	3.1	2.8
		χ^2 = 233.114***[2]					t = 11.787***
Waterfowl arriving after the season is closed							
Minnesota	451	18.8	31.0	46.6	3.3	0.2	2.4
North Dakota	488	3.9	17.8	71.5	6.1	0.6	2.8
		χ^2 = 165.688***[2]					t = 10.866***
Waterfowl concentrating on fewer areas							
Minnesota	450	22.2	38.4	37.8	1.1	0.4	2.2
North Dakota	491	3.1	21.4	66.8	7.3	1.4	2.8
		χ^2 = 409.482***[2]					t = 13.497***
Waterfowl numbers on opening weekend							
Minnesota	449	39.6	30.3	26.1	3.8	0.2	2.0
North Dakota	467	3.2	14.1	63.6	12.8	6.2	3.1
		χ^2 = 1302.061***[2]					t = 18.633***

[1] Mean based on scale: 1 = much worse, 2 = somewhat worse, 3 = neither better nor worse, 4 = somewhat better, 5 = much better.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 8-5: Problems in Minnesota in last 5 years by state(s) hunted.

	N	% of respondents who said that quality is…					Mean[1]
		Much worse	Somewhat worse	Neither better or worse	Somewhat better	Much better	
Crowding at hunting areas.							
ND only	134	26.9	37.3	32.8	2.2	0.7	2.1
ND and MN	311	26.0	38.6	31.2	4.2	0.0	2.1
		χ^2 = 3.446 n.s.					n.s.
Hunting pressure							
ND only	133	24.8	38.3	33.8	1.5	1.5	2.2
ND and MN	309	25.9	35.3	35.3	3.2	0.3	2.2
		χ^2 = 3.276 n.s.					n.s.
Waterfowl unable to find rest areas							
ND only	134	23.1	26.9	43.3	5.2	1.5	2.4
ND and MN	305	21.6	26.6	47.2	3.9	0.7	2.4
		χ^2 = 1.483 n.s.					n.s.
Shifting waterfowl migration routes							
ND only	134	52.2	25.4	21.6	0.7	0.0	1.7
ND and MN	308	48.1	34.1	15.9	1.6	0.3	1.7
		χ^2 = 5.292 n.s.					n.s.
Interference from other hunters							
ND only	133	23.3	36.8	36.1	3.0	0.8	2.2
ND and MN	311	20.9	36.0	37.9	4.5	0.6	2.3
		χ^2 = 0.882 n.s.					n.s.
Waterfowl arriving after the season is closed							
ND only	134	9.7	34.3	53.7	2.2	0.0	2.5
ND and MN	311	22.8	29.9	43.1	3.9	0.3	2.3
		χ^2 = 12.589*, Cramer's V = 0.168					t = 2.296*
Waterfowl concentrating on fewer areas							
ND only	133	24.1	36.8	36.1	1.5	1.5	2.2
ND and MN	311	21.9	39.2	37.9	1.0	0.0	2.2
		χ^2 = 5.340 n.s.					n.s.
Waterfowl numbers on opening weekend							
ND only	134	41.0	30.6	26.9	1.5	0.0	1.9
ND and MN	309	39.2	30.7	25.2	4.5	0.3	2.0
		χ^2 = 3.002 n.s.					n.s.

[1] Mean based on scale: 1 = much worse, 2 = somewhat worse, 3 = neither better nor worse, 4 = somewhat better, 5 = much better.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 8-6: Problems in North Dakota in last 5 years by state(s) hunted.

	N	% of respondents who said that quality is…					Mean[1]
		Much worse	Somewhat worse	Neither better or worse	Somewhat better	Much better	
Crowding at hunting areas							
ND only	183	4.9	25.1	59.6	7.7	2.7	2.8
ND and MN	301	7.6	27.9	54.2	7.0	3.3	2.7
		χ^2 = 2.394 n.s.					n.s.
Hunting pressure							
ND only	183	6.0	29.5	54.6	8.2	1.6	2.7
ND and MN	299	6.0	30.1	53.2	8.0	2.7	2.7
		χ^2 = 0.597 n.s.					n.s.
Waterfowl unable to find rest areas							
ND only	183	1.6	14.2	66.7	15.3	2.2	3.0
ND and MN	298	2.3	14.1	66.4	10.4	6.7	3.1
		χ^2 = 7.148 n.s.					n.s.
Shifting waterfowl migration routes							
ND only	180	3.3	26.7	56.1	10.6	3.3	2.8
ND and MN	299	4.3	20.1	57.5	13.0	5.0	2.9
		χ^2 = 3.802 n.s.					n.s.
Interference from other hunters							
ND only	180	4.4	23.3	63.3	7.2	1.7	2.8
ND and MN	300	4.0	22.0	62.0	8.0	4.0	2.9
		χ^2 = 2.223 n.s.					n.s.
Waterfowl arriving after the season is closed							
ND only	181	3.9	13.8	77.9	3.9	0.6	2.8
ND and MN	298	4.0	20.1	67.4	7.7	0.7	2.8
		χ^2 = 6.957 n.s.					n.s.
Waterfowl concentrating on fewer areas							
ND only	181	2.8	24.3	63.5	8.3	1.1	2.8
ND and MN	301	3.3	18.9	69.1	7.0	1.7	2.9
		χ^2 = 2.694 n.s.					n.s.
Waterfowl numbers on opening weekend.							
ND only	178	3.4	16.3	63.5	13.5	3.4	3.0
ND and MN	280	3.2	12.5	63.2	12.9	8.2	3.1
		χ^2 = 5.194 n.s.					n.s.

[1] Mean based on scale: 1 = much worse, 2 = somewhat worse, 3 = neither better nor worse, 4 = somewhat better, 5 = much better.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 9: Characteristics of Respondents

Findings:

Hunter Age

The average age of respondents was 45.6 years. Respondents' ages ranged from 17 to 90 years (Table 9-1). This is significantly older than the age of respondents to the 2005 survey of Minnesota waterfowl hunters ($\bar{x}$ = 42.4 years) (t = 8.551, p<0.001) (Schroeder et al., 2007). Respondents who hunted in both North Dakota and Minnesota in 2005 were significantly younger ($\bar{x}$ = 43 years, t = 4.633, p < 0.001, η = 0.201) than respondents who only hunted in North Dakota ($\bar{x}$ = 50 years).

Years Living in Minnesota

Respondents had lived in Minnesota for an average of 40.6 years (Table 9-2). This was 89.4% of respondents' lives. Respondents who hunted in both North Dakota and Minnesota in 2005 had spent significantly fewer years ($\bar{x}$ = 39 years), but a greater proportion of their lives (92.1%) living in Minnesota than respondents who only hunted in North Dakota ($\bar{x}$ = 43 years, 85.3%).

Years Waterfowl Hunting

Respondents were asked to report the year they first hunted waterfowl in any state or country, how many total years they had hunted waterfowl in North Dakota, and how many years since 1995 they hunted waterfowl in both North Dakota and Minnesota. On average, respondents had been hunting waterfowl for 30 years, with responses ranging from 1 to 73 years (Table 9-3). The average number of years hunting waterfowl in this sample ($\bar{x}$ = 30.1 years) was significantly higher than the average for 2005 Minnesota resident waterfowl hunters ($\bar{x}$ = 27.2) (t = 8.661, p < 0.001) (Schroeder et al., 2007). Respondents who hunted in both North Dakota and Minnesota in 2005 had been hunting for fewer years ($\bar{x}$ = 28.6 years) than respondents who only hunted in North Dakota ($\bar{x}$ = 32.4 years).

Respondents had hunted an average of 8.5 years in North Dakota, with a range from 1 to 70 years (Table 9-4). Nearly 95% of respondents had hunted in Minnesota (Table 9-5). Respondents who hunted in both North Dakota and Minnesota in 2005 had been hunting in North Dakota for fewer years ($\bar{x}$ = 6.7 years) than respondents who only hunted in North Dakota ($\bar{x}$ = 11.2 years).

The proportion of this sample of Minnesota residents who had hunted in North Dakota in the past 5 years increased from 51% in 2000 to 99% in 2005 (Table 9-8). The proportion of these respondents who had hunted in Minnesota had decreased from 72% in 2000 to 66% in 2005 (Table 9-7). In 2000, 36.5% of these respondents hunted for waterfowl only in Minnesota, 35.5% hunted in both Minnesota and North Dakota, 15.3% hunted only in North Dakota, and 12.6% did not hunt for waterfowl in either state (Table 9-9). In 2005, about two-thirds of these respondents hunted for waterfowl in both Minnesota and North Dakota, while about one-third of the respondents hunted only in North Dakota.

Days Hunting Waterfowl

Respondents who hunted in both states hunted significantly more days ($\bar{x}$ = 17.4) than respondents who hunted only in North Dakota ($\bar{x}$ = 6.0) (t = 13.000, p < 0.001) (Table 9-10). As noted in Section 1, there was no significant difference in the number of days respondents hunted in North Dakota, so the respondents who hunted in both states hunted their additional days in Minnesota. The respondents who hunted in both Minnesota and North Dakota appear to be quite avid waterfowl hunters.

We calculated the total number of days respondents who hunted in both North Dakota and Minnesota hunted during the 2005 seasons in both states. On average, respondents who hunted in both North Dakota and Minnesota hunted a total of 17.4 days during the 2005 season. This was not significantly higher than results from a sample of 2005 Minnesota waterfowl hunters, which found that respondents who hunted in both North Dakota and Minnesota hunted an average of 16.8 total days in both states (Schroeder et al., 2007). Similarly, among individuals who hunted in both North Dakota and Minnesota, there were no significant differences between the two samples in the number of days hunting in either state (Schroeder et al., 2007). Schroeder et al. (2007) found that individuals who hunted only in Minnesota hunted an average of 10.0 days during 2005; this number of days is lower than the average of 11.9 Minnesota waterfowl-hunting days among respondents from that sample who hunted in both Minnesota and North Dakota (t = 2.069, p < 0.05), and lower than the average of 11.5 Minnesota waterfowl-hunting days among respondents to this survey who hunted in both states (t = 2.588, p < 0.05). These results suggest that hunters who hunt in both Minnesota and North Dakota do not replace their Minnesota hunting days with days hunting in North Dakota. Rather, they are avid waterfowl hunters who hunt significantly more days in Minnesota than hunters who only hunt in that state, in addition to hunting in North Dakota.

Membership in Conservation and Hunting Organizations

Almost three-fourths (70.2%) of the respondents reported that they belonged to a conservation/hunting organization. This was a significantly greater percentage than the proportion of respondents (57.2%) to the 2005 Minnesota waterfowl survey who reported a membership in a conservation or hunting group (χ^2 = 194.429, p < 0.001). As shown in Table 9-11, respondents reported membership in a wide variety of organizations. More than one-half (56.2%) of respondents reported membership in Ducks Unlimited and one in ten reported membership in either Delta Waterfowl (9.1%) or the Minnesota Waterfowl Association (8.0%). About one-fifth of respondents (19.6%) reported memberships in local sportsman's clubs. Over one-fourth of respondents (29.8%) did not belong to any hunting/conservation organizations. Respondents who hunted in both states reported greater levels of membership in conservation and hunting organizations.

Late Respondents

A comparison of reluctant respondents to other respondents found that late respondents had hunted waterfowl for somewhat fewer years (22.5 versus 30.1 years; t = 10.735, p < 0.001) and had hunted for fewer years in North Dakota (6.9 versus 8.5; t = 3.539, p < 0.001). They had hunted somewhat less often over the past 5 years in North Dakota (Table 9-12). In general, participation in waterfowl hunting in Minnesota in the past 5 years was similar between the two groups (Table 9-13).

Section 9: Respondent Characteristics

Table 9-1: Age

	n	Year born	Age	SD	Range	
					Low	High
All respondents	523	1960.4	45.6	15.4	17.0	90.0
ND only	190	1956.5	49.5	14.9	20.0	90.0
ND and MN	323	1962.9	43.1	15.2	17.0	86.0
		t = 4.633***				

*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-2: Years and Proportion of Life in Minnesota

	n	Mean years	%
All respondents	513	40.6	89.4%
ND only	186	42.5	85.3%
ND and MN	317	39.4	92.1%
		t = 2.073*	

*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-3: Years Hunting Waterfowl

	n	Mean years	SD	Range	
				Low	High
All respondents	511	30.1	16.0	1.0	73.0
ND only	187	32.4	16.7	1.0	72.0
ND and MN	317	28.6	15.5	2.0	73.0
		t = 2.593*			

*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-4: Years Hunting Waterfowl in North Dakota

	n	Mean years	SD	Range	
				Low	High
All respondents	491	8.5	10.0	1.0	70.0
ND only	180	11.2	12.7	1.0	70.0
ND and MN	304	6.7	7.3	1.0	62.0
		t = 4.948***			

*p < 0.05, **p < 0.01, ***p < 0.001

Section 9: Respondent Characteristics

Table 9-5: Ever Hunted Waterfowl in Minnesota

	n	% Yes
All respondents	520	94.4%
ND only	187	85.6%
ND and MN	327	100.0%
		χ^2 = 49.832***, Cramer's V = 0.311

*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-6: Years of the previous 6, hunting waterfowl in Minnesota and North Dakota.

	2005	2004	2003	2002	2001	2000
Minnesota[1]	63.5%	71.4%	71.8%	73.4%	72.4%	72.0%
North Dakota	99.0%	77.1%	70.7%	66.5%	61.2%	50.3%
	χ^2 = 5863.947***	χ^2 = 9.534**	χ^2 = 0.311 n.s.	χ^2 = 10.817*	χ^2 = 27.114***	χ^2 = 97.789***

[1] % is of all survey respondents
*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-7: Years of the previous 6, hunting waterfowl in Minnesota.

	% of respondents[1] who hunted in…					
	2000	2001	2002	2003	2004	2005
All respondents	72%	72%	73%	72%	71%	63%
ND only	40%	38%	37%	32%	28%	0%
ND and MN	90%	92%	94%	95%	96%	100%
	χ^2 = 142.934*** CV = 0.529	χ^2 = 173.997*** CV = 0.584	χ^2 = 193.980*** CV = 0.617	χ^2 = 229.354*** CV = 0.671	χ^2 = 271.405*** CV = 0.729	χ^2 = 513.000*** CV = 1.000

[1]Frequencies based on all survey respondents.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-8: Years of the previous 6, hunting waterfowl in North Dakota.

	% of respondents[1] who hunted in…					
	2000	2001	2002	2003	2004	2005
All respondents	50%	61%	67%	71%	77%	99%
ND only	55%	62%	67%	74%	79%	100%
ND and MN	47%	60%	66%	68%	76%	100%
	χ^2 = 2.727 n.s.	χ^2 = 0.229 n.s.	χ^2 = 0.112 n.s.	χ^2 = 1.868 n.s.	χ^2 = 0.555 n.s.	Not calculated.

[1]Frequencies based on all survey respondents.
*p < 0.05, **p < 0.01, ***p < 0.001

Section 9: Respondent Characteristics

Table 9-9: Trends in hunting in Minnesota and North Dakota during the previous 6 years.

	N	% of respondents who hunted in…					
		2000	2001	2002	2003	2004	2005
North Dakota only	515	15.3%	17.5%	18.6%	21.6%	23.9%	33.3%
Minnesota only		36.5%	28.3%	25.0%	22.9%	17.9%	0.4%
Both		35.5%	44.1%	48.3%	48.9%	53.8%	65.7%
Neither		12.6%	10.1%	8.0%	6.6%	4.5%	0.6%

[1]F = 2.039 (p = 0.070).
*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-10: Total number of days hunting during 2005.

	n	Mean number of days hunting (ND+MN)	% Avid[1]	% Intermediate	% Novice
All respondents	522	13.1	20.3	55.7	23.9
ND only	195	6.0	0.0	46.7	53.3
ND and MN	627	17.4	32.4	61.2	6.4
		t = 13.000***	χ^2 = 180.076***, Cramer's V = 0.587		

*p < 0.05, **p < 0.01, ***p < 0.001
[1] Categories derived from Humburg (2002). Avid = 20+ days; Intermediate = 2-19 days; Novice = 0-5 days

Table 9-11: Membership in hunting and conservation organizations

	% of respondents belonging to…					
	Ducks Unlimited	Delta Waterfowl	Minnesota Waterfowl Association	Local Sportsman's club	Other national/statewide conservation/hunting organizations	Not a member[2]
All respondents	56.2	9.1	8.0	19.6	11.5	29.8
ND only	47.1	6.4	3.2	17.0	9.6	38.5
ND and MN	61.8	11.0	11.0	21.1	12.3	24.8
	χ^2 = 10.433** CV = 0.144	χ^2 = 3.034 n.s.	χ^2 = 9.747** CV = 0.139	χ^2 = 1.268 n.s.	χ^2 = 0.877 n.s.	χ^2 = 10.927** CV = 0.145

[1] "Not a member of any conservation/hunting organization" was not a direct question. It was determined by counting those respondents who did not indicate they were members of any of the group categories.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-12: Reluctant respondents versus early respondents: North Dakota waterfowl hunting during the previous 6 years.

	N	% of respondents who hunted in…					
		2000	2001	2002	2003	2004	2005
Follow-up survey respondents	48	45.8%	50.0%	56.3%	60.4%	79.2%	93.8%
Full survey respondents	529	50.3%	61.2%	66.5%	70.7%	77.1%	98.7%
		χ^2 = 4.284*	χ^2 = 26.769***	χ^2 = 22.549***	χ^2 = 23.461***	n.s.	χ^2 = 23.343***

[1]Frequencies based on all survey respondents.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 9-13: Reluctant respondents versus early respondents: Minnesota waterfowl hunting during the previous 6 years.

	N	% of respondents who hunted in…					
		2000	2001	2002	2003	2004	2005
Follow-up survey respondents	43	79.1%	74.4%	69.8%	69.8%	74.4%	56.0%
Full survey respondents	518	72.0%	72.4%	73.4%	71.8%	71.4%	65.1%
		χ^2 = 15.761***	n.s.	n.s.	n.s.	n.s.	χ^2 = 11.391**

[1]Frequencies based on all survey respondents.
*p < 0.05, **p < 0.01, ***p < 0.001

References Cited

Dillman, D. (2000). *Mail and Internet surveys: The tailored design method.* New York: John Wiley & Sons, Inc.

Fulton, D.C., J. Vlaming, J.S. Lawrence, and E.W. Price. (2002). *The 2000 waterfowl hunting season in Minnesota: A study of hunters' opinions and activities.* Final Report to Minnesota Department of Natural Resources. USGS Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota, St. Paul, MN.

Humburg, D. D., D.A. Graber, and A.H. Raedeke. (2002). *Missouri Waterfowl Status, 2002.* Missouri Department of Conservation.

Schroeder, S.A., D.C. Fulton, J.S. Lawrence, & S.D. Cordts. (2007). *The 2005 Waterfowl Hunting Season in Minnesota: A Study of Hunters' Opinions and Activities.* Final Report to Minnesota Department of Natural Resources. USGS Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota, St. Paul, MN.

Schroeder, S.A., D.C. Fulton, and J.S. Lawrence. (2003). *The 2002 Waterfowl Hunting Season in Minnesota: A Study of Hunters' Opinions and Activities*. Final Report to Minnesota Department of Natural Resources. USGS Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota, St. Paul, MN.

Appendix A: Survey Instrument

WATERFOWL HUNTING IN NORTH DAKOTA

A survey of Minnesota residents who hunt waterfowl in North Dakota

A cooperative study conducted by the University of Minnesota for the Minnesota Department of Natural Resources

Your help on this study is greatly appreciated!

Please return your completed questionnaire in the enclosed envelope. The envelope is self-addressed and no postage is required. Thanks!

Minnesota Cooperative Fish and Wildlife Research Unit,
Department of Fisheries, Wildlife and Conservation Biology
University of Minnesota
St. Paul, Minnesota 55108-6124
(612) 624-3479
sas@umn.edu

Appendix A: Survey Instrument

Part I. Your Waterfowl Hunting Background

We would like to know about your background and experience as a waterfowl hunter.

Q1. In what year did you first hunt waterfowl (in any state or country)?

_____ year **(*If you have never hunted waterfowl, please enter '0' here, and return your survey*.)**

Q2. How many years have you hunted waterfowl in North Dakota?

_____ years

Q3. For the previous 5 years, excluding the most recent (2005) waterfowl hunting season, please indicate which years you hunted waterfowl in North Dakota? (*Check all that apply*.)

- ❑ 2004
- ❑ 2003
- ❑ 2002
- ❑ 2001
- ❑ 2000
- ❑ I did not hunt waterfowl in North Dakota during any of these years.

Q4. Did you hunt waterfowl in North Dakota during the 2005 season? (*Please check one.)*

- ❑ No. → (***Skip to Part III, question Q18.***)
- ❑ Yes. **(*Please continue with Part II, Q5*.)**

Part II. Your 2005 North Dakota Waterfowl Hunting Season

Next we have a few questions about your hunting experiences during the 2005 North Dakota waterfowl-hunting season. (*If you did not hunt waterfowl in North Dakota in 2005 please skip to Part III, question Q18.)*

Q5. Please indicate whether you hunted for the following kinds of waterfowl in North Dakota in 2005. If you did hunt, estimate the total number of that kind of waterfowl you bagged (shot and retrieved).

During the 2005 waterfowl season, did you hunt in North Dakota for:	*Circle yes or no.*		If yes, how many did you personally bag in ND? (*Write in number.*)
Ducks	No	Yes	_____ducks
Canada Geese	No	Yes	_____geese
Other Geese (Snow Geese, Swan, etc.)	No	Yes	_____geese/swans

Q6. During the 2005 North Dakota waterfowl season, about how many days did you hunt on…

Weekend days or holidays: _____days

Weekdays (Monday-Friday): _____days

Q7. Did you hunt the first day (October 1, 2005) that nonresidents were permitted to hunt waterfowl during the 2005 North Dakota waterfowl season? (*Please check one*.)

- ❑ No
- ❑ Yes

Q8. During the 2005 North Dakota waterfowl-hunting season, I hunted waterfowl… *(Please check one.)*

- ❑ mostly on privately owned areas
- ❑ mostly on public access areas (Wildlife Management Areas, Waterfowl Production Areas, P.L.O.T.S. lands, waters with public access)
- ❑ public and private about the same

Q9. Approximately how far from your current residence did you travel (one-way) to the area you hunted most often in North Dakota for waterfowl during the 2005 season?

_____ miles

Q10. During the 2005 North Dakota waterfowl season, did you hunt with a paid hunting guide?

I **goose** hunted with a paid guide _____never _____sometimes _____always

I **duck** hunted with a paid guide _____never _____sometimes _____always

Q11. During the 2005 North Dakota waterfowl season, about how many days did you hunt…

With only friend(s) _____days

With only family member(s): _____days

With a group including friends and family: _____days

Alone: _____days

Q12. When you went to North Dakota to hunt waterfowl during the 2005 season, did you participate in any of the following other activities? (*Check all that apply.*)

- ❑ Visited family who live in North Dakota
- ❑ Visited friends who live in North Dakota
- ❑ Hunted for game other than waterfowl. (List game targeted: _____)
- ❑ Went sight-seeing
- ❑ Other (please indicate): _____

Q13. During your most recent North Dakota waterfowl hunting season, how satisfied or dissatisfied were you with the following? (*Please circle one response for each. If you did not hunt ducks or geese please circle "9" in the far right column.*)

	Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Did not hunt ducks/geese
General waterfowl hunting experience	1	2	3	4	5	6	7	9
DUCKS:								
hunting experience	1	2	3	4	5	6	7	9
hunting harvest	1	2	3	4	5	6	7	9
hunting regulations	1	2	3	4	5	6	7	9
GEESE:								
hunting experience	1	2	3	4	5	6	7	9
hunting harvest	1	2	3	4	5	6	7	9
hunting regulations	1	2	3	4	5	6	7	9

Q14. During the past three duck and goose hunting seasons in North Dakota, would you say your overall level of satisfaction with waterfowl hunting in North Dakota has generally decreased or increased? *(Please circle one for each.) (If you did not hunt waterfowl during the past 3 seasons, please skip to the next question.)*

	Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	Did not hunt ducks/geese
Ducks	1	2	3	4	5	9
Geese	1	2	3	4	5	9

Q15. Since you began hunting ducks and geese in North Dakota, would you say your overall satisfaction with duck and goose hunting in North Dakota has decreased or increased? (*Please circle one response for each.) (If this was your first year hunting in North Dakota, please skip to the next question.)*

	Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	Did not hunt ducks/geese
Ducks	1	2	3	4	5	9
Geese	1	2	3	4	5	9

Q16. During your most recent North Dakota waterfowl hunting season, how satisfied or dissatisfied were you with the number of ducks and geese you saw in the field? (*Please circle one response for each.*)

	Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly	Moderately satisfied	Very satisfied	Did not hunt ducks/geese
Number of ducks **seen**	1	2	3	4	5	6	7	9
Number of geese **seen**	1	2	3	4	5	6	7	9

Q17. Please indicate how likely it is you will hunt ducks and geese in North Dakota at some time during the next 5 years. (*Please circle one response for each activity.)*

	Very Unlikely	Somewhat Unlikely	Slightly Unlikely	Undecided	Slightly Likely	Somewhat Likely	Very Likely
Ducks	1	2	3	4	5	6	7
Geese	1	2	3	4	5	6	7

Part III. Minnesota Waterfowl Hunting

Q18. Have you ever hunted for waterfowl in Minnesota?

- ❑ No. → (*Skip to Part V, question Q36.*)
- ❑ Yes. *(Please continue with the next question.)*

Note: This section addresses hunting in Minnesota! If you have never hunted waterfowl in Minnesota, skip to Q36.

Q19. For the 5 years, excluding the most recent (2005) waterfowl season, indicate which years you hunted waterfowl in Minnesota, if any. (*Check all that apply.*)

- ❑ 2004
- ❑ 2003
- ❑ 2002
- ❑ 2001
- ❑ 2000
- ❑ I did not hunt waterfowl in Minnesota during any of these years.

Q20. Did you hunt waterfowl in Minnesota during the 2005 season? (*Please check one.)*

- ❑ No. → (*Skip to Part V, question Q36.*)
- ❑ Yes. *(Please continue with Q21.)*

Q21. Please indicate whether you hunted for the following kinds of waterfowl in Minnesota in 2005. If you did hunt, estimate the total number of that kind of waterfowl you bagged (shot and retrieved).

During the 2005 waterfowl season, did you hunt in Minnesota for:	*Circle yes or no.*	If yes, how many did you personally bag in MN? (*Write in number.*)
Ducks	No Yes	_____ducks
Canada Geese	No Yes	_____geese
Other Geese (Snow Geese, etc.)	No Yes	_____geese

Q22. During the 2005 Minnesota waterfowl season, about how many days did you hunt on…

Weekend days or holidays: _____days

Weekdays (Monday-Friday): _____days

Q23. Did you hunt the <u>opening Saturday</u> (Oct. 1) of the 2005 Minnesota season? (*Please check <u>one</u>.*)

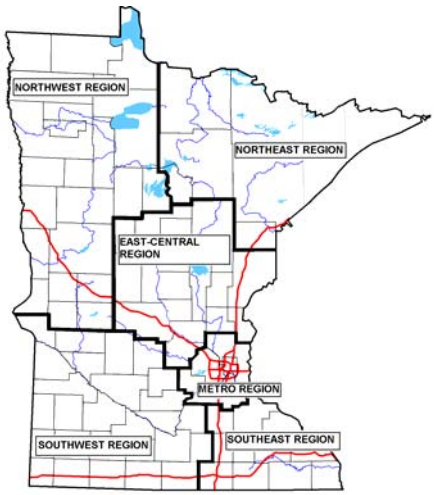
- ❑ No
- ❑ Yes

Q24. Did you hunt the <u>first Sunday</u> (Oct. 2) of the 2005 Minnesota season? (*Please check <u>one</u>.*)

- ❑ No
- ❑ Yes

Q25. During the 2005 Minnesota waterfowl-hunting season, how many days did you hunt in each region? (*See map.*) *Do not include days hunted during the special September or December goose seasons.*

Region	Number of Days
Northwest region	days
Northeast region	days
East-central region	days
Southwest region	days
Southeast region	days
Metro region	days



Q26. During the 2005 Minnesota waterfowl-hunting season, I hunted waterfowl… (*Check one of the following.*)

- ❑ mostly on privately owned areas
- ❑ mostly on public access areas (Wildlife Management Areas, Waterfowl Production Areas, waters with public access)
- ❑ public and private about the same

Q27. Approximately how far from your current residence did you travel (one-way) to the area you hunted most often in Minnesota for waterfowl during the 2005 season?

_____ miles

Q28. During the 2005 Minnesota waterfowl season, about how many days did you hunt…

With only friend(s): _____days

With only family member(s) _____days

With a group including friends and family: _____days

Alone: _____days

Q29. During your most recent Minnesota waterfowl hunting season, how satisfied or dissatisfied were you with the following? (*Please circle one response for each. If you did not hunt ducks or geese please circle "9" in the far right column.*)

	Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Did not hunt ducks/geese
General waterfowl hunting experience	1	2	3	4	5	6	7	9
DUCKS:								
hunting experience	1	2	3	4	5	6	7	9
hunting harvest	1	2	3	4	5	6	7	9
hunting regulations	1	2	3	4	5	6	7	9
GEESE:								
hunting experience	1	2	3	4	5	6	7	9
hunting harvest	1	2	3	4	5	6	7	9
hunting regulations	1	2	3	4	5	6	7	9

Q30. During the past three duck and goose hunting seasons in Minnesota, would you say your overall level of satisfaction with waterfowl hunting in Minnesota has generally decreased or increased? *(Please circle one for each.) (If you did not hunt waterfowl in Minnesota during the past 3 seasons, please skip to the next question.)*

	Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	Did not hunt ducks/geese
Ducks	1	2	3	4	5	9
Geese	1	2	3	4	5	9

Q31. Since you began hunting ducks and geese in Minnesota, would you say your overall satisfaction with duck and goose hunting in Minnesota has decreased or increased? (*Please circle one response for each.) (If this was your first year hunting in Minnesota, please skip to the next question.)*

	Greatly decreased	Decreased	Stayed the same	Increased	Greatly increased	Did not hunt ducks/geese
Ducks	1	2	3	4	5	9
Geese	1	2	3	4	5	9

Q32. During your most recent Minnesota waterfowl hunting season, how satisfied or dissatisfied were you with the number of ducks and geese you saw in the field? (*Please circle one response for each*.)

	Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly	Moderately satisfied	Very satisfied	Did not hunt ducks/geese
Number of ducks **seen**	1	2	3	4	5	6	7	9
Number of geese **seen**	1	2	3	4	5	6	7	9

Q33. Please indicate how likely it is you will hunt ducks and geese at some time during the next 5 years in Minnesota. (*Please circle one response for each activity.)*

	Very Unlikely	Somewhat Unlikely	Slightly Unlikely	Undecided	Slightly Likely	Somewhat Likely	Very Likely
Ducks	1	2	3	4	5	6	7
Geese	1	2	3	4	5	6	7

Part IV. Hunting in North Dakota versus Minnesota

Q34. Did you hunt waterfowl in North Dakota AND in Minnesota during the 2005 season? (*Please check one.)*

- ❑ No. ⟶ (***Skip to Part V, question Q36.***)
- ❑ Yes. (Please continue with *Q35*.)

Q35. When you consider the following aspects of your hunting experiences during the 2005 season, which state (North Dakota or Minnesota) is preferable?

	ND much better	ND somewhat better	ND slightly better	Neutral	MN slightly better	MN somewhat better	MN much better
Overall hunting experience	1	2	3	4	5	6	7
Seeing lots of ducks & geese	1	2	3	4	5	6	7
Bagging ducks & geese	1	2	3	4	5	6	7
Expenses related to hunting	1	2	3	4	5	6	7
Travel time	1	2	3	4	5	6	7
Hunting regulations	1	2	3	4	5	6	7
Hunting with friends	1	2	3	4	5	6	7
Hunting with family	1	2	3	4	5	6	7
Getting away from crowds of people	1	2	3	4	5	6	7
Enjoying nature & the outdoors	1	2	3	4	5	6	7
Good behavior of other waterfowl hunters	1	2	3	4	5	6	7
Access to a lot of different hunting areas	1	2	3	4	5	6	7

Part V. General Waterfowl Hunting Information

Q36. How important is waterfowl hunting to you? (*Please check one*.)

- ❑ It is my most important recreational activity.
- ❑ It is one of my most important recreational activities.
- ❑ It is no more important than my other recreational activities.
- ❑ It is less important than my other recreational activities.
- ❑ It is one of my least important recreational activities.

Q37. About how much do you spend on waterfowl hunting each year? (*Please check one*.)

- ❑ $250 or less
- ❑ $251-$1,000
- ❑ $1,001-$5,000
- ❑ Over $5,000

Q38. Please indicate how much you agree or disagree with the following statements about waterfowl hunting. *Please circle one response for each:*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Waterfowl hunting is one of the most enjoyable things I do.	1	2	3	4	5
I am knowledgeable about waterfowl hunting.	1	2	3	4	5
The decision to go waterfowl hunting is primarily my own.	1	2	3	4	5
I find that a lot of my life is organized around waterfowl hunting.	1	2	3	4	5
Waterfowl hunting has a central role in my life.	1	2	3	4	5
Most of my friends are in some way connected with waterfowl hunting.	1	2	3	4	5
When I am waterfowl hunting, others see me the way I want them to see me.	1	2	3	4	5
I don't really know much about waterfowl hunting.	1	2	3	4	5
I consider myself an educated consumer regarding waterfowl hunting.	1	2	3	4	5
Waterfowl hunting interests me.	1	2	3	4	5
Waterfowl hunting is important to me.	1	2	3	4	5
You can tell a lot about a person when you see them waterfowl hunting.	1	2	3	4	5
When I am waterfowl hunting I can really be myself.	1	2	3	4	5
I enjoy discussing waterfowl hunting with my friends.	1	2	3	4	5
The decision to go waterfowl hunting is not entirely my own.	1	2	3	4	5
For me to change my preference from waterfowl hunting to another leisure activity would require major rethinking.	1	2	3	4	5
I find a lot of my life organized around waterfowl-hunting activities.	1	2	3	4	5
Even if close friends recommended another recreational activity, I would not change my preference from waterfowl hunting.	1	2	3	4	5
I have acquired equipment that I would not use if I quit waterfowl hunting.	1	2	3	4	5
I have close friendships that are based on a common interest in waterfowl hunting.	1	2	3	4	5
Compared to other waterfowl hunters, I own a lot of waterfowl-hunting equipment.	1	2	3	4	5

Q39. What is the minimum number of ducks you need to harvest in a day's hunt to feel satisfied with your harvest?

_____ ducks

Q40. What is the minimum number of ducks you need to harvest in a season to feel satisfied with your harvest?

_____ ducks

Q41. What is the minimum number of geese you need to harvest in a day's hunt to feel satisfied with your harvest?

_____ geese

Q42. What is the minimum number of geese you need to harvest in a season to feel satisfied with your harvest?

_____ geese

Part VI. Motivations for Waterfowl Hunting

Q43. Below is a list of possible experiences that might affect how satisfied you are with waterfowl hunting. Please tell us how important each one is to your waterfowl hunting satisfaction

	HOW IMPORTANT TO YOU?				
	Not at all	**Slightly**	**Somewhat**	**Very**	**Extremely**
Access to a lot of different hunting areas	1	2	3	4	5
Bagging ducks and geese	1	2	3	4	5
Being on my own	1	2	3	4	5
Hunting with friends	1	2	3	4	5
Hunting with family	1	2	3	4	5
Enjoying nature and the outdoors	1	2	3	4	5
Getting away from crowds of people	1	2	3	4	5
Getting food for my family	1	2	3	4	5
Good behavior among other waterfowl hunters	1	2	3	4	5
Hunting with a dog	1	2	3	4	5
Reducing tension and stress	1	2	3	4	5
Seeing a lot of ducks and geese	1	2	3	4	5

Q44. Thinking about changes in hunting quality over the last 5 years, how much better or worse do you think the following have become in North Dakota and in Minnesota? *(Please answer even if you did not hunt all of the past 5 years.)*

	Changes in hunting quality in North Dakota					Changes in hunting quality in Minnesota				
	Much worse	Somewhat worse	Neither better nor worse	Somewhat better	Much better	Much worse	Somewhat worse	Neither better nor worse	Somewhat better	Much better
Waterfowl habitat where I hunt	1	2	3	4	5	1	2	3	4	5
When waterfowl are arriving in my area	1	2	3	4	5	1	2	3	4	5
The length of time waterfowl are staying in my area	1	2	3	4	5	1	2	3	4	5
Timing of waterfowl seasons	1	2	3	4	5	1	2	3	4	5
Overall waterfowl numbers	1	2	3	4	5	1	2	3	4	5
Ease of understanding regulations	1	2	3	4	5	1	2	3	4	5
The number of places to hunt	1	2	3	4	5	1	2	3	4	5
Amount of time I have to hunt waterfowl	1	2	3	4	5	1	2	3	4	5
Weather patterns for waterfowl hunting	1	2	3	4	5	1	2	3	4	5

Q45. Indicate how much more or less of a problem the following have become over the last 5 years in North Dakota and Minnesota. *(Please answer even if you did not hunt all of the past 5 years.)*

	Changes in hunting problems in North Dakota					Changes in hunting problems in Minnesota				
	Much worse	Somewhat worse	Neither better nor worse	Somewhat better	Much better	Much worse	Somewhat worse	Neither better nor worse	Somewhat better	Much better
Crowding at hunting areas	1	2	3	4	5	1	2	3	4	5
Hunting pressure	1	2	3	4	5	1	2	3	4	5
Waterfowl unable to find rest areas	1	2	3	4	5	1	2	3	4	5
Shifting waterfowl migration routes	1	2	3	4	5	1	2	3	4	5
Interference from other hunters	1	2	3	4	5	1	2	3	4	5
Waterfowl arriving after the season is closed	1	2	3	4	5	1	2	3	4	5
Waterfowl concentrating on fewer areas	1	2	3	4	5	1	2	3	4	5
Waterfowl numbers on opening weekend	1	2	3	4	5	1	2	3	4	5

Part VII. Constraints to your Waterfowl Hunting

	Definitely False	Moderately False	Slightly False	Neutral	Slightly True	Moderately True	Definitely True
Q46. If I want to, I can easily go waterfowl hunting in North Dakota.	1	2	3	4	5	6	7

	Definitely False	Moderately False	Slightly False	Neutral	Slightly True	Moderately True	Definitely True
Q47. If I want to, I can easily go waterfowl hunting in Minnesota.	1	2	3	4	5	6	7

Q48. How much do the following factors limit your waterfowl hunting participation? Circle the number for how much the factor limits your waterfowl hunting in North Dakota and in Minnesota. *Circle one response for each:*

	HOW MUCH LISTED FACTORS LIMIT YOUR WATERFOWL HUNTING IN NORTH DAKOTA					HOW MUCH LISTED FACTORS LIMIT YOUR WATERFOWL HUNTING IN MINNESOTA				
	Not at all Limiting				Very Limiting	Not at all Limiting				Very Limiting
Family commitments	1	2	3	4	5	1	2	3	4	5
Work commitments	1	2	3	4	5	1	2	3	4	5
Crowding at hunting areas	1	2	3	4	5	1	2	3	4	5
Cost of equipment	1	2	3	4	5	1	2	3	4	5
Cost of licenses	1	2	3	4	5	1	2	3	4	5
Travel costs	1	2	3	4	5	1	2	3	4	5
Hunting regulations too restrictive	1	2	3	4	5	1	2	3	4	5
Availability of hunting partners	1	2	3	4	5	1	2	3	4	5
Insufficient hunting skills	1	2	3	4	5	1	2	3	4	5
Interest in other recreational activities	1	2	3	4	5	1	2	3	4	5
Waterfowl populations too low	1	2	3	4	5	1	2	3	4	5
No desire or need for waterfowl as food	1	2	3	4	5	1	2	3	4	5
Not enough leisure time	1	2	3	4	5	1	2	3	4	5
The type of people that hunt	1	2	3	4	5	1	2	3	4	5
The amount of effort required to go hunting	1	2	3	4	5	1	2	3	4	5
No hunting opportunities near my home	1	2	3	4	5	1	2	3	4	5
The timing of waterfowl migration	1	2	3	4	5	1	2	3	4	5

Part VIII. Background Information

Q49. Are you currently a member of: (*Check all that apply*.)

- ❑ Ducks Unlimited
- ❑ Delta Waterfowl
- ❑ Minnesota Waterfowl Association
- ❑ Local sportsman's club
- ❑ Other national/statewide conservation/hunting organization(s) *Please specify*: _____

Q50. In what year were you born?

_____ year

Q51. How many years have you lived in Minnesota?

_____ years

Please write additional comments on additional sheets. Survey results will be available in the summer of 2006 on the Minnesota Department of Natural Resources Web site, **www.dnr.state.mn.us**. If you have a question about the survey, contact Sue at 612-624-3479. If you have a specific question about waterfowl hunting, please contact the Minnesota DNR at 1-888-MINNDNR.

Appendix B: Nonresponse Survey Instrument

Appendix B: Nonresponse Survey Instrument

Dear «FNAME» «LNAME», «ID»

During the past few months, we have sent you several mailings about a waterfowl survey that we are conducting for the Minnesota Department of Natural Resources.

We are sending you this final contact because we are concerned that people who did not respond to the survey may differ from those who responded. This one-page follow-up survey includes a few questions from our original survey. Your response to this short questionnaire will assure that our survey results are as accurate as possible.

We appreciate your willingness to complete this short survey as we conclude this effort to better understand waterfowl hunting in North Dakota and Minnesota. We would be happy to answer any questions you have about the study. Please call or e-mail the project manager for the study, Sue Schroeder, at (612) 624-3479 or sas@umn.edu.

Sincerely,

David C. Fulton, Ph.D.
Associate Professor

• •

Follow-up to Study of North Dakota Waterfowl Hunters

Q1. In what year did you first hunt waterfowl (in any state or country)?

_________ year (***If you have never hunted waterfowl, please enter '0' here, and return your survey.***)

Part I. North Dakota Waterfowl Hunting

Q2. How many years have you hunted waterfowl in North Dakota?

_________ years ***(If you have never hunted waterfowl in North Dakota, please skip to Part II.)***

Q3. For the previous 5 years, excluding the most recent (2005) waterfowl hunting season, please indicate which years you hunted waterfowl in North Dakota? (*Check all that apply.*)

- ❑ 2004
- ❑ 2003
- ❑ 2002
- ❑ 2001
- ❑ 2000
- ❑ I did not hunt waterfowl in North Dakota during any of these years.

Q4. Did you hunt waterfowl in North Dakota during the 2005 season? (*Please check one.*)

- ❑ No.
- ❑ Yes.

Q5. Please indicate how likely it is you will hunt ducks and geese in North Dakota at some time during the next 5 years. (*Please circle one response for each activity.*)

	Very Unlikely	Somewhat Unlikely	Slightly Unlikely	Undecided	Slightly Likely	Somewhat Likely	Very Likely
Ducks	1	2	3	4	5	6	7
Geese	1	2	3	4	5	6	7

Part II. Minnesota Waterfowl Hunting

Q6. Have you ever hunted for waterfowl in Minnesota?

- ❑ No. → (***You have completed the survey, please return it in the enclosed envelope.***)
- ❑ Yes. ***(Please continue with the next question.)***

Q7. For the 5 previous years, excluding the most recent (2005) waterfowl season, indicate which years you hunted waterfowl in Minnesota, if any. (*Check all that apply*.)

- ❑ 2004
- ❑ 2003
- ❑ 2002
- ❑ 2001
- ❑ 2000
- ❑ I did not hunt waterfowl in Minnesota during any of these years.

Q8. Did you hunt waterfowl in Minnesota during the 2005 season? (*Please check one.*)

- ❑ No.
- ❑ Yes.

Part III. Hunting in North Dakota versus Minnesota

Q9. Did you hunt waterfowl in North Dakota AND in Minnesota during the 2005 season? (*Please check one.*)

- ❑ No. → (***You have completed the survey, please return it in the enclosed envelope.***)
- ❑ Yes. (***Please continue with the next question.***)

Q10. When you consider the following aspects of your hunting experiences during the 2005 season, which state (North Dakota or Minnesota) is preferable?

	ND much better	ND somewhat better	ND slightly better	Neutral	MN slightly better	MN somewhat better	MN much better
Overall hunting experience	1	2	3	4	5	6	7
Seeing lots of ducks & geese	1	2	3	4	5	6	7
Bagging ducks & geese	1	2	3	4	5	6	7
Expenses related to hunting	1	2	3	4	5	6	7
Travel time	1	2	3	4	5	6	7
Hunting regulations	1	2	3	4	5	6	7
Hunting with friends	1	2	3	4	5	6	7
Hunting with family	1	2	3	4	5	6	7
Getting away from crowds of people	1	2	3	4	5	6	7
Enjoying nature & the outdoors	1	2	3	4	5	6	7
Good behavior of other waterfowl hunters	1	2	3	4	5	6	7
Access to a lot of different hunting areas	1	2	3	4	5	6	7

THANK YOU FOR YOUR HELP!

Please return the completed questionnaire in the enclosed self-addressed, stamped envelope.

Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota;
200 Hodson Hall, 1980 Folwell Avenue
St. Paul, Minnesota 55108