

The 2007 Waterfowl Hunting Season in Minnesota: A Study of Hunters' Opinions and Activities



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Final Report

A cooperative study conducted by:

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

The 2007 Waterfowl Hunting Season in Minnesota: A Study of Hunters' Opinions and Activities

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Executive Summary

This study of the 2007 Minnesota waterfowl-hunting season was conducted to assess waterfowl hunters’:

- participation and activities,
- satisfaction, and
- attitudes about bag limits.

The survey was distributed to 800 waterfowl hunters; 469 completed surveys were used for this analysis. After adjusting for undeliverable surveys and invalid respondents, the response rate was 60.7%.

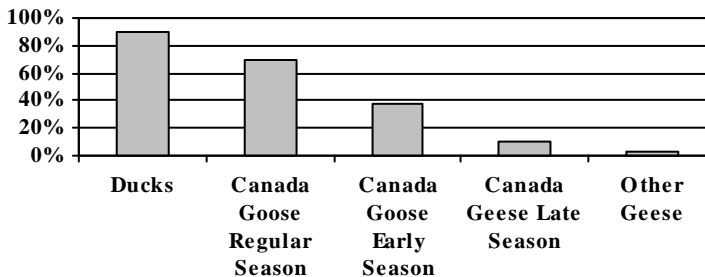
Experiences

Ninety percent of survey respondents hunted waterfowl during the 2007 Minnesota season. Respondents who had hunted in 2007 were asked if they had hunted for ducks, Canada Geese during the Early September, Regular, and Late December seasons, and other geese. Responses ranged from 90% for ducks to only 3% for other geese (Figure S-1).

Hunters reported bagging an average of 10.0 ducks, 5.7 Canada geese, and 12.9 “other” geese over the course of the 2007 Minnesota season. Respondents hunted an average of 6.6 days on weekends and holidays, and 4.4 days during the week.

Participation levels in different hunts were similar to previous years. The proportion of hunters who reported bagging no ducks during the season decreased from 2005, while the proportion of hunters who reported bagging more than 10 ducks during the season increased during this time period.

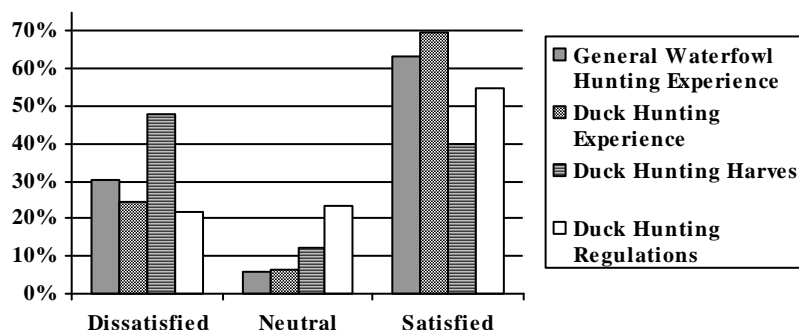
Figure S-1: Percentage of Hunters Participating in Activities in 2005



Satisfaction

Nearly two-thirds of hunters (64%) reported being satisfied with their general waterfowl-hunting experience. Hunters who had bagged more ducks and those who had been hunting for fewer years reported higher levels of satisfaction.

Figure S-2: Satisfaction With Hunting in 2007



Over two-thirds of respondents (70%) were satisfied with their 2007 duck-hunting experience (Figure S-2). However, only 40% of respondents were satisfied with their duck-hunting harvest. Satisfaction with duck-hunting regulations fell between satisfaction levels for experience and harvest. Nearly one in four respondents felt neither satisfied nor dissatisfied about the duck-hunting regulations, compared to about 10% for duck-hunting experience or harvest. There was a significant positive relationship between the number of ducks bagged and satisfaction with duck-hunting harvest.

About two-thirds of goose hunters were satisfied with their general goose-hunting experience. Forty-three percent of respondents were satisfied with their goose harvest. About half of goose hunters (52%) indicated they were satisfied with goose-hunting regulations. The number of geese bagged appears to have a positive influence on satisfaction with goose-hunting harvest.

Satisfaction with the general waterfowl-hunting experience appears to have improved since the survey of the 2005 season. Satisfaction was significantly higher than for the 2005 season, but it was still significantly lower than for the 2000 and 2002 seasons.

Bag Limits

The bag limit was 6 ducks per day during the 2007 season, compared to 4 ducks per day during the most recent survey year (2005). Hunters were asked if they felt the 6-duck bag limit and the 1 hen mallard daily bag limit were too low, too high, or about right. Over half of respondents (61%) felt that the 6-duck bag limit was “about right,” with 26% saying it was “too high,” and 5% saying “too low.” In the survey of the 2005 season, about the same proportion of respondents said the bag limit was “about right,” however, a greater proportion of respondents (16%) indicated the 2005 limit was “too low” and a smaller proportion (13%) said it was “too high” (Schroeder et al., 2007a). Sixty-two percent of respondents felt that the 1 hen mallard daily bag limit was “about right,” with 14% saying “too high,” and 17% “too low.” These proportions were very similar to results for the one-hen bag limit in the survey for the 2005 season (Schroeder et al., 2007a).

Respondents were asked whether the Minnesota DNR should restrict hunters to fewer ducks than permitted by the U.S. Fish and Wildlife Service. Over one-third (37%) of respondents indicated that the DNR should set regulations more restrictive than the 6-duck daily bag limit, and 41% indicated that the DNR should set stricter regulations than the 2-hen mallard bag limit.

Respondents were evenly divided between whether the bag limit “should be set as large as possible” (49.5%) and “should not exceed a certain size” (50.5%). Individuals who felt that the limit should not exceed a certain size were asked to indicate what the maximum bag limit should be. Responses ranged from 2 to 12 ducks, with a mean of 5.5 ducks.

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Introduction

Minnesota has a large number of waterfowl hunters, and regularly documents hunter participation and harvest. The U.S. Fish and Wildlife Service (USFWS) estimates hunter numbers and harvest annually via the Federal Harvest Estimates and the Harvest Information Program. The Minnesota Department of Natural Resources (DNR) also estimates hunter numbers and harvest through its Small Game Hunter Survey. Minnesota participated in the North American Duck Hunter Survey (Ringelman, 1997), and Minnesota hunter responses have been compared to those in the rest of the United States (Lawrence & Ringelman, 2001). In order to develop more information about satisfaction with waterfowl hunting in Minnesota and preferences concerning hunting regulations and experiences, data were collected from waterfowl hunters after the 2000 season (Fulton et al., 2002). A study of the 2002 waterfowl season provided updated information on hunter satisfaction (Schroeder et al., 2004). This report also detailed hunters' experiences during the 2002 hunting season and hunters' attitudes about management issues such as season timing, mechanical decoys, and youth waterfowl hunting (Schroeder et al., 2004). A study of the 2005 season extended information on satisfaction, hunter motivations, hunting quality, and opinions about regulations, season dates, mechanical decoys, and youth waterfowl hunting day (Schroeder et al., 2007a). Three additional studies of the 2005 season were conducted to examine: (a) new Minnesota waterfowl hunters (Schroeder et al., 2007b), (b) Minnesota residents who hunted for waterfowl in North Dakota (Schroeder et al., 2007c), and (c) individuals who had responded to the 2000 waterfowl survey (Schroeder et al., 2007d).

Development of annual waterfowl-hunting regulations must be within the frameworks established by the U.S. Fish and Wildlife Service. However, Minnesota and other states have some latitude to adjust season structure based on state characteristics and hunter preferences. A Saturday opening day, a youth waterfowl hunt, and customized regulations are examples of regulations that can be modified by hunter preference. Hunter surveys like the one described in this report provide a better understanding of where the DNR Division of Fish and Wildlife needs to focus information and education efforts.

In 2005, Minnesota DNR reduced the daily duck bag limit to 4 ducks, less than the 6 ducks allowed in the Federal frameworks. The State also set the mallard hen limit at 1 daily, instead of 2 allowed by the U.S. Fish and Wildlife Service. The waterfowl hunter survey conducted after the 2005 season (Schroeder et al., 2006a) allowed us to examine hunter opinions regarding these changes. In 2007, Minnesota DNR decided to return to the 6 duck daily bag limit allowed in the Federal frameworks, but maintained the 1 hen mallard restriction. This provided a unique opportunity to examine hunter opinions in response to changing bag limits and restricting duck hunting opportunity more than Federal regulations. This survey conducted following the 2007 season only considered statewide estimates of hunter activity and opinions, in contrast to earlier waterfowl hunters surveys that examined hunter responses by region within Minnesota (Fulton et al., 2002, Schroeder et al., 2004, 2007a)

Study Purpose and Objectives

This study was conducted to provide ongoing information on waterfowl hunter demographics and attitudes in Minnesota. Its overall purpose was to measure hunter participation, satisfaction, and attitudes about bag limits.

The specific objectives of this study were to:

1. Describe hunter effort in Minnesota in 2007 including: species and seasons hunted; number of days hunted; effort during weekdays and weekends; importance of waterfowl hunting, and membership in hunter organizations.
2. Describe hunting satisfaction with waterfowl (duck and goose) hunting in Minnesota in 2007.
3. Determine Minnesota waterfowl hunters' opinions concerning bag limits.
4. Determine general characteristics of waterfowl hunters in Minnesota.
5. Examine trends in waterfowl hunters' characteristics and opinions over time.

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 2007 state waterfowl stamp. The sampling frame used to draw the study sample was the Minnesota Department of Natural Resource's (DNR) Electronic Licensing System (ELS). A random sample of 800 Minnesota residents in the ELS was drawn. The target sample size was $n = 400$ statewide.

Data Collection

Data were collected using a mail-back survey following a process outlined by Dillman (2000) to enhance response rates (Appendix A). 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 March and May 2008. 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. In order to measure nonresponse bias, a final one-page survey (Appendix B) was distributed to individuals who had not responded to the main survey.

Survey Instrument

The data collection instrument was a 4-page self-administered survey with 3 pages of questions (Appendix A). The questionnaire addressed the following topics:

- Part 1: Background and length of experience as a waterfowl hunter;
- Part 2: Hunting experiences during the 2007 Minnesota waterfowl-hunting seasons, including: species hunted, waterfowl bagged, number of weekdays and weekend days hunted;
- Part 3: Satisfaction with duck and goose hunting including general experience, harvest, and regulations, and satisfaction with the number of ducks and geese seen in the field;
- Part 4: General waterfowl hunting information including importance of the activity; opinions on bag limits, and information about group membership.

Additional information concerning age and gender of respondents was obtained from the ELS database.

Data Entry and Analysis

Data were keypunched and the data were analyzed using the Statistical Program for the Social Sciences (SPSS for Windows 15.0). We computed basic descriptive statistics and frequencies for the statewide results. Results were compared using one-way analysis of variance and cross-tabulations.

Survey Response Rate

Of the 800 questionnaires mailed, 27 were undeliverable, sent to a deceased person, or otherwise invalid. Of the 773 remaining surveys, a total of 469 were returned, resulting in an overall response rate of 60.7%.

Table I-1: Response rate

	Initial sample size	Number invalid	Valid sample size	Full-length surveys completed and returned	Response rate %	Non-response surveys returned	Total response rate
Statewide sample	800	27	773	469	60.7%	27	64.2%

Data Weighting

The age distribution of respondents differed significantly from the population of waterfowl hunters ($\chi^2 = 39.523^{***}$). People between 40 and 64 years of age returned the survey at a significantly higher rate than other people. Weights correcting this age bias were calculated and applied to the data. While there were a few statistically significant differences between the weighted and unweighted data, weighting the data did not change results beyond the margin of error for the survey and the effect size of all differences were minimal. For this reason, data were not weighted for age bias in any of the results reported here (see section 4 for respondent/study population age comparison).

Based on the nonresponse survey (Appendix B), it appears that nonrespondents were less likely to have hunted during the 2007 season, and they may be less likely to support more restrictive duck bag limits than the USFWS framework. Weights correcting these potential nonresponse biases were calculated and applied to the data. Again, there were a few statistically significant differences between the weighted and unweighted data, but weighting the data did not change results beyond the margin of error for the survey. Therefore, data were not weighted to correct for nonresponse bias in any of the results reported here (see section 4 for description of late respondents used to gauge nonresponse bias).

Section 1: Waterfowl Hunting Experiences, Participation, and Importance

Waterfowl Seasons Hunted in Minnesota in 2007

Statewide 89.5% of the survey respondents indicated that they had hunted waterfowl in 2007 (Table 1-1). Respondents who had hunted in 2007 were asked if they had hunted for ducks and Canada Geese during the early September, regular, and late December seasons. At the statewide level, 90.4% of 2007 waterfowl hunters indicated they had hunted ducks while 69.2% had hunted Canada Geese during the regular season. Approximately, 4 out of 10 respondents (38.0%) hunted Canada Geese during the early season, while approximately 1 in 10 hunted Canada Geese during the late season (10.1%). Less than 5% of respondents hunted “other” geese (2.6%). Statewide, 19.0% of respondents hunted ducks exclusively and 4.3% hunted geese exclusively.

Harvest

For each season in which they hunted, respondents were asked to report the number of ducks or geese they personally bagged. Nearly 90,000 waterfowl stamp purchasers hunted in 2007 (Table 1-2) The statewide estimate of the average number of ducks each hunter harvested during the season was 10.0 (Table 1-3). Hunters reported an average of 5.0 geese during the early season, 3.1 during the regular season, and 3.5 during the late season. For all Canada Goose seasons combined, hunters reported an average of 5.7 Canada Geese for the year. On average, hunters harvested 12.9 “other” geese. Total harvest was estimated at 909,000 ducks and 394,000 Canada geese (Table 1-4).

Average Number of Days Hunting Weekends and Weekdays

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 (6.6 days) than during the week (4.4 days) (Table 1-5).

Importance of Waterfowl Hunting and Membership in Hunting/Conservation Organizations

Respondents were asked how important waterfowl hunting was to them. The majority of respondents (50.9%) indicated that it was “one of my most important recreational activities.” Over one-fourth (27.0%) indicated that it was “no more important than my other recreational activities.” About 11% indicated that waterfowl hunting was their “most important recreational activity.” Less than 10% selected the other options (Table 1-6).

More than half of the respondents (58.2%) reported that they belonged to a conservation/hunting organization. More than one-third (37.5%) reported membership in Ducks Unlimited and 6.1% reported membership in Minnesota Waterfowl Association. About one-fourth (25.8%) reported membership in a local sportsmen’s club (Table 1-7).

Section 1: Waterfowl Hunting Experiences, Participation, and Importance

Table 1-1: Proportion of hunters participating in different waterfowl hunts

% of hunters¹ indicating they hunted in Minnesota in 2007							
n	%Who actually hunted in 2007	n	Ducks	Canada Geese Early September	Canada Geese Regular Season	Canada Geese Late Season	Other geese
465	89.5%	416	90.4%	38.0%	69.2%	10.1%	2.6%

¹ % for species reflects only % of respondents that actually hunted waterfowl during 2007.

Table 1-2: Estimate of the number of hunters participating in different waterfowl hunts

N	Actually hunted in 2007	Ducks	Canada Geese Early September	Canada Geese Regular Season	Canada Geese Late Season	Other geese
100,009	89,508	80,915	34,013	61,940	9,040	2,327

Table 1-3: Average number of birds bagged

Average number of birds bagged in Minnesota in 2007 per hunter for that specific season					
Ducks	Canada Geese Early September	Canada Geese Regular Season	Canada Geese Late Season	Total Canada Geese All Seasons	Other Geese
10.0	5.0	3.1	3.5	5.7	12.9

Table 1-4: Estimates of harvest

Ducks	Canada Geese Early September	Canada Geese Regular Season	Canada Geese Late Season	Total Canada Geese All Seasons	Other geese
809,150	170,065	192,014	31,640	393,719	30,018

Section 1: Waterfowl Hunting Experiences, Participation, and Importance

Table 1-5: Average number of days hunting on weekends and weekdays

Mean number of days hunted during 2007 waterfowl season		
Weekends/Holidays	Weekdays (Monday-Friday)	Total
6.6	4.4	10.2

Table 1-6: How important is waterfowl hunting to you?

N	% of hunters indicating...					Mean¹
	...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.	
466	10.9%	50.9%	27.0%	9.0%	2.1%	2.4

¹ Mean is based on the following scale: 1= my most important recreational activity, 2= one of my most important recreational activities, 3= no more important than my other recreational activities, 4= less important than my other recreational activities, 5= one of my least important recreational activities.

Table 1-7: Membership in hunting-related groups

% of hunters indicating membership in that group:					
No Groups¹	Ducks Unlimited	Delta Waterfowl	MN Waterfowl Assn.	Local sportsmen's club	Other
41.8%	37.5%	3.2%	6.1%	25.8%	3.9%

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.

Section 2: Satisfaction With the 2007 Waterfowl Hunt

Study participants were asked to rate their satisfaction with their waterfowl-hunting experiences 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 General Waterfowl Hunting Experience

Nearly two-thirds of hunters (63.6%) reported being satisfied with their general waterfowl-hunting experience, with 30.5% expressing dissatisfaction. Statewide the overall mean satisfaction score was 4.6 (Table 2-1). As we have found in previous waterfowl studies, there was a significant negative relationship ($r = -0.258$, $p < 0.001$) between general waterfowl hunting satisfaction and the number of years of waterfowl hunting in Minnesota. As in previous studies, we also found a positive relationship between satisfaction and the number of ducks bagged during the season ($r = 0.209$, $p < 0.001$).

Satisfaction With Duck Hunting

About two-thirds (68.0%) of duck hunters were satisfied (slightly, moderately, or very) with their duck-hunting experience in 2007; of these 15.9% were very satisfied. Conversely, 25.6% of respondents were dissatisfied (slightly, moderately, or very), with 9.7% very dissatisfied with their duck-hunting experience. About one in four (40.1%) of respondents were satisfied with their duck-hunting harvest. Nearly half (47.9%) of the respondents were dissatisfied with their duck harvest. Only 6.3% were very satisfied with their duck harvest. Satisfaction with duck-hunting regulations was higher than satisfaction with harvest, with 55.0% of respondents reporting satisfaction with the regulations, including 40.3% of respondents who were moderately or very satisfied. However, nearly one-fourth of respondents (23.4%) felt neither satisfied nor dissatisfied about the duck-hunting regulations, compared to only 6.4% who felt neutral about the duck-hunting experience and only 12.0% who felt neutral about the duck-hunting harvest. (Table 2-2).

The mean score for duck-harvest satisfaction ($\bar{x} = 3.8$) was significantly lower than the mean scores for experience ($\bar{x} = 4.9$, $t = 11.688$, $p < 0.001$) or regulations ($\bar{x} = 4.7$, $t = 9.581$, $p < 0.001$). The mean satisfaction score for experience was not significantly different from regulations.

There was a significant positive relationship ($r = 0.287$, $p < 0.001$) between the number of ducks bagged and the satisfaction with the duck-hunting harvest. As the number of ducks bagged increases, satisfaction moderately increases.

Section 2: Satisfaction with the 2007 Waterfowl Hunt

Satisfaction With Goose Hunting

Most goose hunters were satisfied (66.6%) with their general goose-hunting experience, with slightly less than half reporting that they were moderately (34.2%) or very (15.3%) satisfied (Table 2-3). Goose hunters were less satisfied with their harvest, however. A total of 36.7% reported being dissatisfied with their harvest with 11.2% moderately dissatisfied and 10.9% very dissatisfied. About half (52.2%) of the goose hunters indicated they were satisfied with the goose-hunting regulations with 26.4% moderately satisfied and 14.1% very satisfied.

The mean score for goose-harvest satisfaction ($\bar{x} = 4.1$) was significantly lower than the mean scores for experience ($\bar{x} = 5.0$, $t = 8.641$, $p < 0.001$) or regulations ($\bar{x} = 4.7$, $t = 5.690$, $p < 0.001$). The mean satisfaction score for experience was not significantly different from regulations.

There was a statistically significant correlation ($r = 0.387$, $p < 0.001$) between the total number of geese bagged in 2007 and satisfaction with the goose-hunting harvest. The number of geese bagged appears to have a positive influence on satisfaction with goose-hunting harvest.

Comparison of Duck Hunting and Goose Hunting

We compared mean satisfaction levels for duck and goose hunting (Table 2-4). Statewide, respondents were significantly less satisfied with duck hunting than goose hunting for harvest (3.8 vs. 4.0) ($t = 2.234$, $p < 0.05$). There was no difference between duck- and goose-hunting satisfaction for experience or regulations.

Satisfaction With the Number of Ducks and Geese Seen in the Field

Hunters were asked about how satisfied they were with the number of ducks and geese seen in the field during the season. Responses were recorded on a 7-point scale on which 1 = very dissatisfied, 2 = moderately dissatisfied, 3 = slightly dissatisfied, 4 = neither, 5 = slightly satisfied, 6 = moderately satisfied, and 7 = very satisfied.

Over one-third (37.7%) of respondents were satisfied with the number of ducks that they saw in the field, with 7.1% very satisfied (Table 2-5). Over half of the respondents (57.3%) were satisfied with the number of geese that they saw in the field, including 17.1% who were very satisfied.

Number of Ducks and Geese Needed to bag to be Satisfied

Hunters were asked how many ducks and geese they needed to harvest in a day or during the season to feel satisfied with their harvest. Response was open ended.

On average, respondents needed to bag 2.5 ducks per day to feel satisfied with their harvest (Table 2-6). Respondents reported needing to bag 15.1 ducks on average during the season (Table 2-7) to feel satisfied. On average, respondents reported needing to bag 1.5 geese per day (Table 2-6) and 9.2 geese (Table 2-7) per season in order to feel satisfied.

Section 2: Satisfaction with the 2007 Waterfowl Hunt

Table 2-1: Satisfaction with the general waterfowl-hunting experience for the 2007 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	417	9.4%	8.6%	12.5%	6.0%	18.5%	34.5%	10.6%	4.6
Duck hunting experience	390	9.7%	4.6%	11.3%	6.4%	14.4%	37.7%	15.9%	4.9
Goose hunting experience	333	5.1%	5.1%	8.1%	15.0%	17.1%	34.2%	15.3%	5.0

¹ This table does not include those respondents who did not hunt ducks or geese in Minnesota in 2007.

² F = 11.640*** for one-way ANOVA comparing means. 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. n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-2: Satisfaction with duck hunting for the 2007 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	
Duck hunting experience	390	9.7%	4.6%	11.3%	6.4%	14.4%	37.7%	15.9%	4.9
Duck hunting harvest	382	14.4%	14.1%	19.4%	12.0%	16.5%	17.3%	6.3%	3.8
Duck hunting regulations	380	5.0%	5.8%	10.8%	23.4%	14.7%	25.0%	15.3%	4.7

¹ This table does not include those respondents who did not hunt ducks in Minnesota in 2007.

² F = 80.689*** for one-way ANOVA comparing means. 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. n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-3: Satisfaction with goose hunting for the 2007 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	
Goose hunting experience	333	5.1%	5.1%	8.1%	15.0%	17.1%	34.2%	15.3%	5.0
Goose hunting harvest	329	10.9%	11.2%	14.6%	20.7%	13.7%	18.2%	10.6%	4.1
Goose hunting regulations	341	4.4%	7.0%	7.9%	28.4%	11.7%	26.4%	14.1%	4.7

¹ This table does not include those respondents who did not hunt geese in Minnesota in 2007.

² F = 42.503*** for one-way ANOVA comparing means. 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. n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 2: Satisfaction with the 2007 Waterfowl Hunt

Table 2-4: Comparison of duck-hunting and goose-hunting satisfaction

Satisfaction with... ¹	N	Mean ²
Duck-hunting experience	307	4.8
Goose-hunting experience		4.9
t= 0.909 n.s. ³		
Duck-hunting harvest	301	3.8
Goose-hunting harvest		4.0
t= 2.234*		
Duck-hunting regulations	309	4.7
Goose-hunting regulations		4.7
t= 0.000 n.s.		

¹ This table does not include those respondents who did not hunt ducks or geese in Minnesota in 2007.

² 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.

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

³ Paired samples t-test conducted for respondents who reported satisfaction for both questions.

Table 2-5: Satisfaction with number of ducks and geese seen in the field during the 2007 Minnesota waterfowl hunting season

Type of waterfowl	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	393	24.2%	18.6%	15.3%	4.3%	14.2%	16.3%	7.1%	3.4
Geese	368	6.8%	9.2%	14.1%	12.5%	18.2%	22.0%	17.1%	4.6
$\chi^2=$, Cramer's V=0.									

¹ This table does not include those respondents who did not hunt ducks or geese in Minnesota in 2007.

² t = 9.445***. 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.

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-6: Minimum number of ducks and geese needed to harvest in a day to feel satisfied

Waterfowl type	n	Mean number
Ducks	433	2.5
Geese		1.5
t = 12.497***		

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 2-7: Minimum number of ducks and geese needed to harvest in a season to feel satisfied

Waterfowl type	n	Mean number
Ducks	431	15.1
Geese		9.2
t = 10.155***		

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 3: Opinions on Bag Limits

Opinions About bag Limits

Hunters were asked if they felt the 6-duck bag limit and the 1-hen mallard daily bag limit for the 2007 season were too low, too high, or about right. Over half of respondents (60.9%) felt that the 6-duck bag limit was about right, and 62.4% of respondents felt that the 1-hen mallard daily bag limit was about right (Table 3-1).

Respondents were evenly divided between whether the bag limit “should be set as large as possible” (49.5%) and “should not exceed a certain size” (50.5%) (Table 3-2). Individuals who felt that the limit should not exceed a certain size were asked to indicate what the maximum bag limit should be. Responses ranged from 2 to 12 ducks, with a mean of 5.5 ducks (Table 3-3).

Respondents were asked whether the Minnesota DNR should restrict hunters to fewer ducks than permitted by the U.S. Fish and Wildlife Service because some hunters believe it is inappropriate to shoot that many ducks. Nearly two-thirds (64.5%) of respondents indicated that the DNR should set regulations more restrictive than the 6-duck daily bag limit, and 55.4% indicated that the DNR should set stricter regulations than the 2-hen mallard bag limit (Table 3-4).

Section 3: Opinions About Bag Limits

Table 3-1: Opinion on 2007 Minnesota bag limits

Bag limit	n	% of hunters indicating that the bag limit is...			
		Too low	About right	Too high	No opinion
6 duck daily bag limit	463	4.8%	60.9%	25.7%	8.6%
1 hen mallard daily bag limit	465	16.6%	62.4%	14.4%	6.7%

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 3-2: When duck populations are high, do you believe: (a) that the bag limit should be set as large as possible as long as duck populations will not be harmed, or (b) that the maximum bag should not exceed a certain size.

n	% of hunters indicating that the bag limit...	
	should be set as large as possible	should not exceed a certain size
457	49.5%	50.5%

Table 3-3: Among respondents who believe that the maximum bag should not exceed a certain size, the desired maximum duck bag limit.

n	Maximum desired bag limit when duck populations are high	
	Range	Mean
222	2-12 ducks	5.5

Table 3-4: Opinion on Minnesota bag limits being more restrictive than USFWS framework

USFWS Bag limit	n	% of hunters indicating...		
		Yes	No	Undecided
6 duck daily bag limit	420	64.5%	22.1%	13.3%
2 hen mallard daily bag limit	460	55.4%	30.7%	13.9%

Section 4: Hunter Characteristics

Age

Respondents had an average age of 43 years. A greater proportion of respondents from older age groups returned the survey (Table 4-1). The greatest proportion of respondents came from the 20-29, 30-39, 40-49, and 50-59 age groups (Table 4-2). Respondents from the 40-49, 50-59, and 60-64 age groups are over-represented among respondents, relative to the population of Minnesota waterfowl stamp purchasers.

Hunting Participation

About 90% of hunters in age groups from 20-50 years hunted during the 2007 waterfowl season; participation was somewhat lower in the older age groups (Table 4-3). On average respondents had been hunting waterfowl in Minnesota for 21 years (Table 4-5).

Late Respondents

Compared to the main group of respondents, late respondents were less likely to have hunted during 2007, had been hunting for fewer years in Minnesota, were more satisfied with 2007 duck hunting, and were more supportive of larger bag limits. A comparison of late respondents to other respondents found that late respondents had been hunting for waterfowl in Minnesota somewhat fewer years ($\bar{x} = 15.3$ years) than early respondents ($\bar{x} = 21.0$ years) ($t = 8.374^{***}$). A smaller proportion of late respondents hunted for waterfowl in Minnesota during the 2007 season (74.1%) compared to the main group of respondents (89.5%) ($\chi^2 = 57.181^{***}$). Late respondents were significantly more satisfied with: (a) the general waterfowl hunting experience (5.15 vs. 4.61) ($t = 5.886^{***}$), (b) duck-hunting experience (5.55 vs. 4.88) ($t = 7.109^{***}$), and (c) duck-hunting harvest (4.55 vs. 3.79) ($t = 8.001^{***}$). Compared to the main group of respondents, a greater proportion of late respondents felt that the 6-duck bag limit in 2007 was too low (7.4% vs. 4.8%), the limit was about right (66.7% vs. 60.9%), and had no opinion about the limit (14.8% vs. 8.6%), while a smaller proportion thought the limit was too high (11.1% vs. 25.7%) ($\chi^2 = 107.528^{***}$). A larger proportion of late respondents felt the duck bag limit should be set as large as possible compared to the main group of respondents (54.5% vs. 49.5%) ($\chi^2 = 4.694^*$). Of respondents who felt the bag limit should *not* exceed a certain size, late respondents—on average—felt that size should be larger (5.78 vs. 5.50) ($t = 2.191^*$). A substantially larger proportion of late respondents felt that the DNR should *not* have a more stringent duck limit than that allowed by the US Fish and Wildlife framework (68.0% vs. 22.0%) ($\chi^2 = 546.803^{***}$).

Section 4: Hunter Characteristics

Table 4-1: Age of study sample and survey respondents

Parameter	n	16-17	18-19	20 – 29	30 – 39	40 – 49	50 - 59	60 - 64	65 +
Study population	96,657	2,085	4,875	24,213	19,770	21,903	17,417	3,674	2,720
Study sample	800	8	31	198	160	180	162	40	20
Study respondents	495	2	8	106	89	123	128	25	14
Response rate by age		.25	.26	.54	.56	.68	.79	.63	.70

Table 4-2: Proportion of population and respondents by age category

Parameter	n	16-17	18-19	20 – 29	30 – 39	40 – 49	50 - 59	60 - 64	65 +
Study population	96,657	2.2%	5.0%	25.1%	20.5%	22.7%	18.0%	3.8%	2.8%
Study sample	800	1.0%	3.9%	24.8%	20.0%	22.5%	20.3%	5.0%	2.5%
Study respondents	495	0%	1.6%	21.4%	18.0%	24.8%	25.9%	5.1%	2.8%

Table 4-3: Proportion of respondents from different age categories who actually hunting waterfowl in Minnesota in the year 2007

Age category	N	% No	% Yes
16-17	2	0.0%	100.0%
18-19	8	0.0%	100.0%
20-29	95	10.5%	89.5%
30-39	81	7.4%	92.6%
40-49	117	7.7%	92.3%
50-59	121	13.2%	86.8%
60-64	24	20.8%	79.2%
65+	14	21.4%	78.6%
$\chi^2=8.360$ n.s.			

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 4: Hunter Characteristics

Table 4-4: What year the hunter first hunted waterfowl

Year/decade	% of hunters from who indicated that they first hunted waterfowl (not necessarily in Minnesota) in that year or decade:
	Statewide¹
N	460
2008 ²	0.2%
2007	4.1%
2006	2.0%
2005	1.1%
2004	1.3%
2003	0.9%
2002	0.9%
2001	2.0%
2000	3.0%
1990's	21.5%
1980's	14.8%
1970's	25.2%
1960's	18.3%
1950's	3.7%
1940's	0.9%
1930's	0.2%

¹Actual number years were collected for each hunter and used in computation of the means and medians. Data are presented in categorical form in the table for 10+ years to simplify the table.

²One hunter indicated that they first hunted for waterfowl in 2008. This would only have been possible if they bought a 2007 Minnesota duck stamp, then first hunted in a different, southern, state after January 1. This response may reflect measurement (i.e. respondent) error.

Section 4: Hunter Characteristics

Table 4-5: Number of years hunting waterfowl in Minnesota

# of years	% of hunters who indicated that they have been hunting in Minnesota for _____ years: ¹
	Statewide ²
N	2,325
1	5.4%
2	3.5%
3	2.0%
4	2.0%
5	2.0%
6	4.1%
7	2.2%
8	2.4%
9	2.4%
10 – 19	24.5%
20 – 29	18.2%
30 – 39	16.9%
40 – 49	11.9%
50 – 59	2.4%
60 – 69	0.2%
Mean	21.0
Median	19.0

¹Actual number years were collected for each hunter and used in computation of the means and medians. Data are presented in categorical form in the table for 10+ years to simplify the table.

Section 5: Comparison of 1995, 2000, 2002, 2005 and 2007 Minnesota Waterfowl Hunter Survey Findings

In this section, we compare results from this 2007 waterfowl hunter survey to previous studies of Minnesota waterfowl hunters. In 2000, 2002, and 2005 similar studies of Minnesota waterfowl hunters were completed (Fulton et al. 2002; Schroeder et al., 2004; Schroeder et al., 2007a). Also, in 1995, the Minnesota DNR participated in a survey of duck hunters in 23 states to learn more about duck hunters' experiences and opinions (Ringelman, 1997; Lawrence & Ringelman, 2001). The Ringelman (1997) study surveyed waterfowl hunters for experiences in both 1995 and 1996 because many southern states hunt in January; Minnesota data from this study is only for 1995. Some of the questions asked in these previous surveys are either identical or similar to questions asked in the 2007 waterfowl study. For those questions, a comparison of responses is provided.

Respondent age, Years Hunting and Days Hunting During the Season

The average age of hunters who responded to the survey for the 2007 season was 42.3 years. The average age of respondents to the 1995 and 2000 surveys was approximately 41 years. The average age of respondents to the survey of the 2002 season was 45 years, and the average age of respondents to the survey of the 2005 season was 43 years (Table 5-1). The age of survey respondents for this survey was significantly higher than 1995 and significantly lower than 2002. There were also significant differences between the 2007 data and the earlier sets of data concerning the average number years hunting waterfowl (Table 5-2). Respondents for the 2007 season reported having hunted waterfowl for an average of 25.1 years compared to 23.2 years in 2005, 26.9 years in 2002, 22.5 in 2000, and 22.9 in 1995. The differences in age and years hunting waterfowl may reflect differences in sampling. The samples for the 2000 and 2002 seasons included both Minnesota duck stamp purchasers and individuals 16-18 and over 64 years of age who were not required to purchase a duck stamp but registered through the harvest information program (HIP). The samples from the 2005 and 2007 seasons did not include HIP registrants.

There were small differences among the years in the average number of days spent hunting waterfowl. Respondents reported hunting an average of 10.2 days in 2007, 10.2 days in 2005, 9.7 in 2002, 11.5 in 2000 and 10.7 in 1995 (Table 5-3).

Waterfowl Harvest

Reported frequency of ducks bagged per hunter in 2007 varied significantly from 2000 ($\chi^2 = 36.043^{***}$), 2002 ($\chi^2 = 38.090^{***}$), and 2005 ($\chi^2 = 108.637^{***}$) (Table 5-4). However, the number of ducks bagged in 2007 did not differ significantly from the 1995 season. Hunter success appears to have rebounded in 2007 compared to 2000, 2002, and 2005. During 2000, 2002, and 2005, a larger percentage of hunters reported that they did not bag any ducks, and fewer hunters reported bagging more than 10 ducks during the season.

Section 5: Comparison of 1995, 2000, 2002, 2005 and 2007 Minnesota Waterfowl Hunter Survey Findings

Hunting Participation and Satisfaction

There were some statistically significant differences in participation in the different waterfowl hunts, but differences do not appear substantive (Table 5-5).

Respondents reported significantly lower 2007 satisfaction levels compared to the 2002 or 2000 seasons (Table 5-6). However, general satisfaction was significantly higher in 2007 than it was in 2005.

Group Membership

Reported membership in Ducks Unlimited and Delta Waterfowl was not significantly different in 2007 compared to 2000, 2002, and 2005. However, there were statistically significant changes reported in membership in the Minnesota Waterfowl Association and local sportsmen's clubs. Generally, membership has been declining in the Minnesota Waterfowl Association and increasing in local sportsmen's clubs. Respondents who reported no memberships in conservation or hunting organizations declined from 46.4% in 2000 to 41.8% in 2007. See Table 5-7.

Bag Limits

A significantly greater proportion of respondents (25.7%) felt the 6-duck bag limit in 2007 was "too high." This compares to 12.8% who thought the 4-duck bag limit in 2005 was "too high." About 5% of respondents felt the 2007 6-duck bag limit was too low, compared to 15.8% for the 2005 4-duck limit. The proportion of respondents who felt the limits were "about right" was similar between the 2 years (Table 5-8). There were significant differences in opinions about the 1-duck hen mallard limit between 2005 and 2007, but the differences were not substantive (Table 5-9).

Section 5: Comparison of 1995, 2000, 2002, 2005 and 2007 Minnesota Waterfowl Hunter Survey Findings

Table 5-1: Age of respondents: 1995, 2000, 2002, 2005, and 2007 findings

Study year	N ¹	Average age (years)	Range (years)	t-test, average compared to 2007
1995 hunters	448	40.9	15 - 82	t = 2.273*
2000 hunters	2,454	41.4	16 - 88	n.s.
2002 hunters	3,109	45.3	14 - 88	t = 4.856***
2005 hunters	2,553	43.2	16 - 90	n.s.
2007 hunters	469	42.3	17 - 76	

¹ In 2000, 2002, and 2005, a stratified sample based on region of residence was drawn. Data for those years is weighted to reflect regional proportions in the population. Respondents from 2000 and 2002 include duck stamp buyers and individuals aged 16-18 or over 64 years who are not required to purchase duck stamps but registered through the hunter information program (HIP). The 2005 and 2007 samples did not include individuals from the HIP.

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-2: Number of years hunting ducks/waterfowl: 1995, 2000, 2002, 2005, and 2007 findings

Study year	N ¹	Average number of years hunting ducks/waterfowl ¹	t-test, average compared to 2007
1995 hunters (ducks)	457	22.9	t = 3.051**
2000 hunters (waterfowl)	2,376	22.5	t = 3.607***
2002 hunters (waterfowl)	3,034	26.9	t = 2.503*
2005 hunters (waterfowl)	2,296	23.2	t = 2.635**
2007 hunters (waterfowl)	461	25.1	

¹ In 2000, 2002, and 2005, a stratified sample based on region of residence was drawn. Data for those years is weighted to reflect regional proportions in the population. Because this question is strongly correlated to age, data is also weighted to correct for age. Respondents from 2000 and 2002 include duck stamp buyers and individuals aged 16-18 or over 64 years who are not required to purchase duck stamps but registered through the hunter information program (HIP). The 2005 and 2007 samples did not include individuals from the HIP.

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-3 Number of days hunting waterfowl: 1995, 2000, 2002, 2005, and 2007 findings

Study year	n	Average number of days hunting waterfowl	t-test, average compared to 2007
1995 hunters (waterfowl)	463	10.7	t = 1.199 n.s.
2000 hunters (waterfowl)	2,120	11.5	t = 2.952**
2002 hunters (waterfowl)	3,113	9.7	t = 0.992 n.s.
2005 hunters (waterfowl)	2,120	10.2	t = 0.104 n.s.
2007 hunters (waterfowl)	419	10.2	

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Section 5: Comparison of 1995, 2000, 2002, 2005 and 2007 Minnesota Waterfowl Hunter Survey Findings

Table 5-4: Number of ducks bagged: 1995, 2000, 2002, 2005, and 2007 findings

Number bagged	1995 hunters (%)	2000 hunters (%)	2002 hunters (%)	2005 hunters (%)	2007 hunters (%)
n ¹	458	2,027	2,602	1,946	370
Bagged none	5.3%	14.7%	16.2%	17.0%	6.8%
Bagged 1 – 10	53.6%	53.4%	50.8%	59.8%	51.2%
Bagged more than 10	41.1%	31.9%	32.9%	23.1%	42.1%
Chi-square analysis ²	$\chi^2=2.549$ n.s.	$\chi^2=36.043$ ***	$\chi^2=38.090$ ***	$\chi^2=108.637$ ***	

¹Number of hunters who reported number of ducks bagged during the season, based on data weighted by region for years 2000, 2002, and 2005. Data from 1995 and 2007 was not gathered by region and is unweighted.

²Compares year in column to 2007 results.

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-5: Waterfowl Hunting Activity: 2000, 2002, 2005, and 2007 findings

Study year	n	Hunt ducks	Hunt Canada geese regular season	Hunt Canada geese—early season	Hunt Canada geese—late season	Hunt geese--other
2000 hunters	2,191	92.6% ^a	72.3% ^a	38.5% ^a	9.0% ^a	6.9% ^a
2002 hunters	2,650	93.5% ^b	73.1% ^b	41.9% ^b	13.9% ^b	7.8% ^b
2005 hunters	2,098	92.0% ^c	72.3% ^c	43.6%	13.2%	4.3%
2007 hunters	416	90.4%	69.2%	38.0%	10.1%	2.6%
Chi-square analysis ¹		^a n.s. ^b $\chi^2=6.643$ * ^c n.s.	^a n.s. ^b n.s. ^c n.s.	^a n.s. ^b n.s. ^c $\chi^2=5.342$ *	^a n.s. ^b $\chi^2=5.029$ * ^c n.s.	^a $\chi^2=11.729$ ** ^b $\chi^2=15.376$ *** ^c n.s.

¹Chi-square test ^a compares 2000 to 2007, ^b compares 2002 to 2007, ^c compares 2005 to 2007.

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-6: Overall Satisfaction With Waterfowl Hunting: 2000, 2002, 2005, and 2007 findings

Study year	N	Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neutral	Slightly satisfied	Moderately satisfied	Very satisfied	Chi-square analysis ¹	Means
2000 hunters	1,788	8.8%	10.3%	11.4%	4.0%	15.3%	30.8%	19.5%	$\chi^2=27.606$ ***	4.8 ²
2002 hunters	2,604	7.0%	8.9%	10.4%	5.5%	16.0%	35.0%	17.1%	$\chi^2=17.284$ **	4.9 ³
2005 hunters	1,985	14.2%	14.2%	12.5%	6.0%	16.7%	24.6%	11.7%	$\chi^2=33.938$ ***	4.2 ⁴
2007 hunters	417	9.4%	8.6%	12.5%	6.0%	18.5%	34.5%	10.6%		4.6

¹ Chi-square value compared to 2007.

² 2000 compared to 2007, t=2.043*

³ 2002 compared to 2007, t=3.141**

⁴ 2005 compared to 2007, t=4.545***

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Study of the 2007 Waterfowl-Hunting Season

Section 5: Comparison of 1995, 2000, 2002, 2005 and 2007 Minnesota Waterfowl Hunter Survey Findings

Table 5-7: Group Membership 2000, 2002, 2005, and 2007 findings

Study year	n	Ducks Unlimited	Delta Waterfowl	Minnesota Waterfowl Association	Local sportsman's club	No memberships ¹
2000 hunters	2,454	35.6% ^a	Not asked	11.0% ^a	16.0% ^a	46.4% ^a
2002 hunters	2,635	36.8% ^b	2.9% ^b	10.5% ^b	22.3% ^b	43.9% ^b
2005 hunters	2,392	37.0% ^c	3.5% ^c	7.7% ^c	20.4% ^c	42.9% ^c
2007 hunters	472	37.5%	3.2%	6.1%	25.8%	41.8%
Chi-square analysis ²		^a n.s. ^b n.s. ^c n.s.	^b n.s. ^c n.s.	^a $\chi^2=11.369^{**}$ ^b $\chi^2=9.530^{**}$ ^c n.s.	^a $\chi^2=34.056^{***}$ ^b n.s. ^c $\chi^2=8.626^{**}$	^a $\chi^2=4.082^*$ ^b n.s. ^c n.s.

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.

²Chi-square test ^a compares 2000 to 2007, ^b compares 2002 to 2007, and ^c compares 2005 to 2007. n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-8: Opinion on the duck bag limit in Minnesota

Study year	n	% of hunters indicating that the bag limit is...			
		Too low	About right	Too high	No opinion
2005 4-duck bag limit ¹	2360	15.8%	59.0%	12.8%	12.3%
2007 6-duck bag limit	463	4.8%	60.9%	25.7%	8.6%
$\chi^2=142.278^{***}$					

¹ In 2005, a stratified sample based on region of residence was drawn. Statewide data in this table was weighted to reflect regional proportions in the statewide population.

n.s. = not significant, *p < 0.05, **p < 0.01, ***p < 0.001

Table 5-9: Opinion on the 1 hen mallard bag limit in Minnesota

Study year	n	% of hunters indicating that the bag limit is...			
		Too low	About right	Too high	No opinion
2005 1-hen mallard limit ¹	2361	16.4%	61.1%	12.2%	10.3%
2007 1-hen mallard bag limit	465	16.6%	62.4%	14.4%	6.7%
$\chi^2=23.382^{***}$					

¹ In 2005, a stratified sample based on region of residence was drawn. Statewide data in this table was weighted to reflect regional proportions in the statewide population.

n.s. = not significant, *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, & 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.
- Lawrence, J. S., & J. K. Ringelman. (2001). Duck hunter participation and satisfaction in Minnesota compared to other states - 1996. Pages 195-215 in *Summaries of Wildlife Research Findings, 2001*, Minnesota DNR Wildlife Populations and Research Unit.
- Ringelman, J. K. (1997). Effects of regulations and duck abundance on duck hunter participation and satisfaction. *Transactions of the North American Wildlife and Natural Resources Conference, 62*, 361-376.
- Schroeder, S. A., D. C. Fulton and J. S. Lawrence. (2004). *The 2002 waterfowl hunting season in Minnesota: A study of hunters' opinions and activities*. Final Report to the Minnesota Department of Natural Resources. St. Paul, MN: University of Minnesota, USGS Minnesota Cooperative Fish and Wildlife Research Unit.
- Schroeder, S. A., D. C. Fulton, J. S. Lawrence, and S. D. Cordts. (2007a). *The 2005 Waterfowl Hunting Season in Minnesota: A Study of Hunters' Opinions and Activities*. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology.
- Schroeder, S. A., D. C. Fulton, J. S. Lawrence, and S. D. Cordts. (2007b). *Waterfowl hunting in Minnesota: A study of new waterfowl hunters' opinions and activities*. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology.
- Schroeder, S. A., D. C. Fulton, J. S. Lawrence, and S. D. Cordts. (2007c). *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.
- Schroeder, S. A., D. C. Fulton, J. S. Lawrence, and S. D. Cordts. (2007d). *Waterfowl hunting in Minnesota: A follow-up study of respondents to the 2001 waterfowl survey*. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology.

Appendix A: Survey Instrument

THE 2007 WATERFOWL HUNTING SEASON IN MINNESOTA

A study of hunters' opinions and activities



Lesser scaup

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. Include any additional comments on separate sheets. The envelope is self-addressed and no postage is required. Survey results will be available in the summer of 2008 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.Thanks!

Minnesota Cooperative Fish and Wildlife Research Unit,
Department of Fisheries, Wildlife and Conservation Biology
University of Minnesota
St. Paul, Minnesota 55108-6124
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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, not necessarily in Minnesota? *If uncertain please estimate.*

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

Q2. How many years have you hunted waterfowl in Minnesota? *If uncertain please estimate.*

_____ years.

Q3. Did you hunt waterfowl in Minnesota during the 2007 season? *(Please check one.)*

- No. —————▶ *(Skip to Part IV, question Q8.)*
 Yes. *(Please continue with Part II, Q4.)*

Part II. Your 2007 Minnesota Waterfowl Hunting Season

Next we have a few questions about your hunting experiences during the 2007 Minnesota waterfowl-hunting season. *(If you did not hunt waterfowl in Minnesota in 2007 please skip to question Q7.)*

Q4. Please indicate whether you hunted for the following kinds of waterfowl in Minnesota in 2007. If you did hunt, estimate the total number of that kind of waterfowl you bagged (shot and retrieved).

During the 2007 waterfowl season, did you hunt in Minnesota for:	Please circle no or yes.		If yes, how many did you personally bag in Minnesota? <i>(Write in number bagged.)</i>
Ducks	no	yes	_____ ducks
Canada Geese during:			
Early September Canada Goose Season	no	yes	_____ geese
Regular Canada Goose Season (October—Early December)	no	yes	_____ geese
Late Goose Season (December)	no	yes	_____ geese
Other Geese (Snow Geese, etc.)	no	yes	_____ geese

Q5. During the 2007 Minnesota waterfowl season, about how many days did you hunt on...

Weekend days or holidays: _____ days

Weekdays (Monday-Friday): _____ days

Part III. Your Hunting Satisfaction

Q6. During the 2007 Minnesota waterfowl hunting season, how satisfied or dissatisfied were you with the following? *(Please circle one response for each item on this page and next. 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

Appendix A: Survey Instrument

Q6. Continued

	Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Neither	Slightly satisfied	Moderately satisfied	Very satisfied	Did not hunt ducks/geese
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

Q7. During the 2007 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 satisfied	Moderately satisfied	Very satisfied	Did not hunt ducks/geese
Number of ducks <u>seen</u>	1	2	3	4	5	6	7	9
Number of geese <u>seen</u>	1	2	3	4	5	6	7	9

Part IV. General Waterfowl Hunting Information

Next we have a few general questions about waterfowl hunting. *Please respond to these questions even if you did not hunt waterfowl in Minnesota in 2007.*

Q8. 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.

Q9. What is the minimum number of ducks you need to harvest in a day's hunt to feel satisfied with your harvest?

_____ ducks

Q10. What is the minimum number of ducks you need to harvest in a season to feel satisfied with your harvest?

_____ ducks

Q11. What is the minimum number of geese you need to harvest in a day's hunt to feel satisfied with your harvest?

_____ geese

Q12. What is the minimum number of geese you need to harvest in a season to feel satisfied with your harvest?

_____ geese

Appendix A: Survey Instrument

Q13. The U.S. Fish and Wildlife Service allowed states to have a 6 duck daily bag limit in 2007. Which one statement best describes how you feel about the total daily duck bag limit in Minnesota (6 ducks)?

- The daily limit was too low.
- The daily limit was about right.
- The daily limit was too high.
- No opinion.

Q14. The U.S. Fish and Wildlife Service allowed states to have a 2 hen mallard daily bag limit in 2007. Which one statement best describes how you feel about the hen mallard daily bag limit in Minnesota (1 hen mallard)?

- The daily limit was too low.
- The daily limit was about right.
- The daily limit was too high.
- No opinion.

Q15. When duck populations are high, which one of the following statements best reflects your opinions about how duck bag limits should be set? (Check one.)

- I believe that the bag limit should be set as large as possible as long as duck populations will not be harmed (SKIP TO Q17)
- I believe that the maximum bag should not exceed a certain size (CONTINUE WITH Q16)

▶ **Q16. If you believe the maximum bag should not exceed a certain size, please indicate what you think the maximum duck bag limit should be:**

_____ Ducks (Leave blank if you feel the bag limit should be set as large as possible).

Q17. The current U.S. Fish and Wildlife framework allows 6 ducks in the daily bag because duck populations will support this level of harvest. Should Minnesota DNR restrict waterfowl hunters to less than 6 ducks because some hunters believe it is inappropriate to shoot that many ducks? (Please check one.)

- Yes
- No
- Undecided

Q18. The current U.S. Fish and Wildlife framework allows 2 hen mallards in the daily bag because mallard duck populations will support this level of harvest. Should Minnesota DNR restrict waterfowl hunters to 1 hen in the bag because some hunters believe it is inappropriate to shoot that many ducks? (Please check one.)

- Yes
- No
- Undecided

Q19. 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:* _____

Appendix B: Nonresponse Survey Instrument

Appendix B: Nonresponse Survey Instrument

2007 WATERFOWL HUNTER STUDY—FOLLOW-UP SURVEY

During the past few months, we have sent you several survey mailings. We are sending you this one-page survey because we are concerned that people who have not responded may differ from those who have already responded. We appreciate your willingness to complete this short survey as we conclude this effort to better understand the opinions of waterfowl hunters in Minnesota.

Q1. Did you hunt waterfowl in Minnesota during the 2007 season? (Please check one.)

- No.
 Yes.

Q2. How many years have you hunted waterfowl in Minnesota? If uncertain please estimate.

_____ years.

Q3. During the 2007 Minnesota waterfowl hunting season, how satisfied or dissatisfied were you with the following? (Please circle one response for each item on this page and next. 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

Q4. The U.S. Fish and Wildlife Service allowed states to have a 6 duck daily bag limit in 2007. Which one statement best describes how you feel about the total daily duck bag limit in Minnesota (6 ducks)?

- The daily limit was too low.
 The daily limit was about right.
 The daily limit was too high.
 No opinion.

PLEASE CONTINUE THE SURVEY ON THE BACK OF THE PAGE →→→

Appendix B: Nonresponse Survey Instrument

Q5. Then duck populations are high, which one of the following statements best reflects your opinions about how duck bag limits should be set? (Check one.)

I believe that the bag limit should be set as large as possible as long as duck populations will not be harmed (SKIP TO Q7)

I believe that the maximum bag should not exceed a certain size (CONTINUE WITH Q6)

▶ **Q6. If you believe the maximum bag should not exceed a certain size, please indicate what you think the maximum duck bag limit should be:**

_____ Ducks (Leave blank if you feel the bag limit should be set as large as possible).

Q7. The current U.S. Fish and Wildlife framework allows 6 ducks in the daily bag because duck populations will support this level of harvest. Should Minnesota DNR restrict waterfowl hunters to less than 6 ducks because some hunters believe it is inappropriate to shoot that many ducks? (Please check one.)

- Yes
- No
- Undecided

Q8. 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: _____

Please write any additional comments below or on additional sheets.

*Please complete this questionnaire and return it in the postage-paid return envelope to:
Minnesota Cooperative Fish and Wildlife Research Unit, University of MN,
1980 Folwell Avenue,
St. Paul, MN 55108*