

# 2010-11 NORTH CAROLINA WATERFOWL HUNTER SURVEY



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## EXECUTIVE SUMMARY

### Introduction

We conducted this statewide survey to examine the views and opinions of North Carolina Waterfowl Hunters regarding a variety of topics related to waterfowl hunting and management. This is the first statewide survey of waterfowl hunters in North Carolina in at least 20 years.

### Methods

In late winter and spring of 2011, we surveyed a random sample of 6,000 hunters that were registered in the Harvest Information Program (HIP). The sampling frame included only registrants who indicated that they harvested one or more ducks or geese the previous season. The survey response rate was 66%.

### Results

#### *General Participation*

- 45% of waterfowl hunters started waterfowl hunting before 1990 and 14% started after 2005.
- 74% of waterfowl hunters considered waterfowl hunting to be their most important or one of their most important recreational activities.
- When asked to identify the areas they **most often** hunted waterfowl during the last five years, 55% of waterfowl hunters indicated they most often hunted on private lands, 36% most often hunted on state public waters while 8% most often hunted on NCWRC game lands or national wildlife refuges.
- When asked to identify **all** the areas they hunted waterfowl, 40% of waterfowl hunters indicated they had utilized NCWRC game lands sometime during the last five years.
- Duck hunters in the northern Piedmont appear to hunt on NCWRC game lands (18%) more often than duck hunters in other regions.
- 84% of respondents **did not** take a youth hunting on North Carolina's Youth Waterfowl Hunting Day in February 2011. The most common response (44%) for not taking a youth hunting was not knowing any youth to take.

#### *Barriers to Participation and Satisfaction*

- 56% of waterfowl hunters were satisfied with how the NCWRC manages waterfowl in North Carolina, while 17% were dissatisfied.
- 42% of waterfowl hunters indicated that a major barrier affecting their waterfowl hunting experience and participation was that public waterfowl hunting areas were too crowded. In addition, 35% indicated that difficulty in finding areas to hunt waterfowl on private land was a major barrier.
- Overcrowding on public waterfowl hunting areas and access to private land appears to be a barrier affecting hunters in the Piedmont and Mountain region more than hunters in the Coastal region.

### ***Duck Hunting***

- 75% of respondents duck hunted the most days in the northern or southern Coastal Plain.
- 81% of duck hunters had **not** hunted teal during the September teal season anytime during the last 5 years. The most common response for not participating the in September teal season was that environmental conditions were not favorable for an enjoyable hunt (25%).
- During the 2010-11 season, 66% of respondents indicated they hunted ducks at least 6 days and 73% indicated they harvested at least 6 ducks.
- In order to reduce harvest of specific species (e.g., black ducks, pintails, canvasbacks, scaup) with lower population levels, 71% of respondents were opposed to reducing the overall season length of 60 days and 66% were opposed to reducing the overall daily bag. Most (57%) respondents were supportive of closing the seasons for just those species with lower population levels so that the current season length and bag limit could remain as current.

### ***Opinions on Duck Migration and Distribution***

- When asked if most ducks arrive after the season closes, 39% of waterfowl hunters agreed with this statement while 29% disagreed.
- When asked if the distribution of ducks in areas they most often hunted had changed over time, 53% agreed while only 11% disagreed.
- When asked if more ducks are found in areas without hunter access or where no hunting is allowed, compared to when they first started duck hunting, 54% of respondents agreed while 13% disagreed.

### ***Opinions on Duck Season Structure***

- 35% of respondents disagreed that the NCWRC should keep the current duck hunting season structure, while 31% agreed that current duck season structure should be retained.
- Respondents hunting the most days in the Piedmont and Mountain regions were more supportive of keeping the current duck hunting season structure than Coastal Plain hunters.
- When asked about specific, potential changes to the current duck hunting season structure,
  - 52% of respondents were in favor of doing away with the 4-day October segment and moving those days later in the year while 30% of respondents disagreed with moving the October segment. Coastal Plain hunters were more supportive of doing away with the October days than those hunters in the Piedmont and Mountain regions.
  - There appeared to be little support for moving the early October hunting days to later in October.
  - There appeared to be little support for reducing the 2 week closed period between the 2<sup>nd</sup> and 3<sup>rd</sup> segments to 1 week.
  - When asked if the NCWRC should offer all 60 duck hunting days as late as possible with no season splits, 42% of respondents agreed while 33% disagreed. Coastal Plain hunters were more supportive of having all 60 hunting days occur as late as possible than those hunters in the Piedmont and Mountain regions.

### ***Canada Goose Hunting***

- 57% of respondents indicated that their hunting and harvest of Canada geese is incidental to their duck hunting.
- 80% of waterfowl hunters that hunted Canada geese during the 2010-11 season hunted 10 days or fewer and 83% harvested 10 or fewer geese.
- Of those respondents that hunted Canada geese west of U.S. 17 during the September season, 36% hunted until ½ hour after sunset, 35% hunted with an unplugged gun while only 5% hunted with an electronic call.
- 70% of goose hunters believed the daily bag of 15 Canada geese during the September season was “about right”.
- 61% of Canada goose hunters indicated that over the last 10 years, the Canada goose population had increased in areas of North Carolina where they most often hunted.
- 39% of Canada goose hunters indicated that the resident goose population should be decreased while 37% indicated that it should remain at current levels.

### **Management Considerations**

- Developing additional public waterfowl hunting areas especially in the Piedmont and Mountain regions would appear to be of great benefit to hunters, as well as programs designed to increase access to public waters and private lands.
- Programs designed to link active waterfowl hunters to interested youth could be a primary means to increase participation in youth waterfowl hunting days.
- Developing one statewide duck hunting season structure that appeals to all waterfowl hunters will be difficult; however the development of hunting zones each with independent seasons is an option that could be considered.

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## **INTRODUCTION**

Establishing annual harvest regulations in response to fluctuations in a diverse array of waterfowl populations has resulted in a rather complex system of waterfowl hunting regulations. Given there can be more than one “biologically” acceptable regulatory option, waterfowl managers are challenged to understand which of these options may be the most desirable by an equally diverse group of waterfowl hunters. Surveys of waterfowl hunters at the state, flyway and national levels are an integral part of understanding hunter satisfaction and any potential barriers to waterfowl hunter recruitment and retention.

The North Carolina Wildlife Resources Commission (NCWRC) solicits public input as part of its process of establishing annual waterfowl hunting regulations. However, carefully designed surveys remain one of the best tools to evaluate waterfowl hunter opinions because surveys, unlike open public comments, accurately represent the views of waterfowl hunters statewide. The objectives of this survey are to obtain demographic data and preferences of North Carolina waterfowl hunters on regulatory options and other hunting issues.

## **METHODS**

### **Survey Instrument Design**

The survey was conducted in the late winter and spring of 2011. The US Fish and Wildlife Service (USFWS) Harvest Information Program (HIP) served as the sampling frame for this survey as all waterfowl hunters 16 years of age and older are required to be HIP certified. For this study, the sample population was all

hunters who had HIP certification with an effective date of March 1, 2010 thru February 5, 2011 and, according to HIP screening questions, harvested one or more ducks or geese the previous season. Our initial intention was to include waterfowl hunters that indicated they hunted ducks and/or geese but did not bag one or the other, as we believed it important to include the views of this group of hunters. However, after reviewing the initial sampling frame, we noticed that 71% of HIP registrants indicated they hunted either ducks or geese, but did not “bag” either. While we recognize that there is some percentage of hunters that do not bag waterfowl each year, we believed the high percentage reflected in our HIP registration database was significantly inflated and not representative of waterfowl hunters in North Carolina. We believe this inflated number was likely due to incorrect coding of this question by license vendors. Therefore, we decided not to include this group of waterfowl hunters in our sampling frame in order to avoid surveying large numbers of license holders who did not hunt waterfowl.

In order to test the survey instrument, we conducted cognitive interviews with a convenience sample (persons known by NCWRC staff prior to the interviews) of waterfowl hunters. During cognitive interviews, we examined how well questions and directions were interpreted in order to improve the survey instrument wording and design. The final survey instrument contained questions on waterfowl hunting behaviors, barriers to waterfowl hunting, views on waterfowl hunting regulations and season structure, and demographics (Appendix A).

## Survey Implementation

We contacted a random selection of 6,000 hunting license holders who reported harvesting one or more ducks or geese in the previous season. We used four different survey methods (Dillman et al. 2009) in order to investigate ways to minimize costs for future surveys while maintaining response rates (Appendix B, Table 1). We used a traditional mail survey, without the option to respond to the survey online, for the Mail Exclusive group. We initially contacted the Mail Primary and Web Primary groups by mail to ask them to complete the survey online, but during follow-up mailings we gave them the option to complete a paper-based survey.

We had valid email addresses for 33% of the license holders in our sampling frame. We randomly selected 500 such license holders for the Web Exclusive group. We contacted the Web Exclusive group exclusively by email and sent them links to complete the survey online.

## Data weighting

Persons with an email address in the license database were over-represented during sampling because the Web Exclusive group was entirely comprised of persons with email. To correct for this, we weighted respondents based on whether or not we had an email address for them – persons without an email address were given a higher weight than those with an email address. We then compared survey respondents with the entire sampling frame for the following variables: state of residence, age, sex, number of ducks harvested, number of geese harvested and type of hunting license. For all variables except age there were minor differences. There was evidence of an association between age and response to the survey. Therefore, we weighted all statewide

frequency data based on age and email address (Appendix B, Table 2). Following the recommendation of Winship and Radbill (1994), we did not use weighted data for statistical tests which depend on standard errors.

## Data analysis

We analyzed data using IBM SPSS Statistics 19.0 (SPSS Inc. 2010). We calculated frequency distributions and percentages of respondents in each category for every survey question. For bivariate comparisons, we used cross-tabulations, chi-square tests ( $\chi^2$ ) and *F* tests to test null hypotheses that there were not differences between variables. We used a probability value (*P*)  $\leq 0.05$  to indicate statistically significant relationships. We omitted or combined categories in cross-tabulations when  $> 20\%$  of cells had expected values  $< 5$  or when any cells had expected values  $< 1$ . We calculated adjusted residuals to determine which cells in cross-tabulations were significantly different from expected values. An adjusted residual with an absolute value  $\geq 2.0$  was evidence against independence in the cell (Agresti and Finlay 1999). Whenever chi-square or *F* tests had *P*  $\leq 0.05$  we calculated effect sizes (Cramer's *V* for cross-tabulations and *eta* for means) (Vaske 2008). We used Vaske's (2008) guidelines for interpreting effect sizes (Appendix B, Table 3). We calculated means for items which used a 5 point disagreement/agreement scale (Strongly Disagree = 1, Strongly Agree = 5) or opposition/support scale (Strongly Oppose = 1, Strongly Support = 5). We did not include responses of "unsure" in mean calculations. Due to rounding, percentages may not total 100% or may appear off when individual categories were combined. In general, we considered an *eta* and Cramer's *V* statistic of 0.10 worthy of reporting in that it suggested

some relationship in applicable cross-tabulations.

## RESULTS

### Response Rate

The survey response rates by survey method, calculated by omitting incorrect addresses, deceased persons, and persons ineligible to respond, were 67% for Mail Exclusive, 62% for Mail Primary, 60% for Web Primary, 67% for Web Exclusive, and 66% overall (Appendix B, Table 4).

### Waterfowl Hunter Characteristics and Participation

(See Appendix A for response frequencies for all questions)

#### *General Demographics*

Most (94%) waterfowl hunters lived in North Carolina (Question 50), 99% were male (Question 52), and 60% were less than 45 years old (Question 53). Forty-two percent of respondents had at least a Bachelor's or graduate degree (Question 51). Sixty-four percent of waterfowl hunters indicated having a gross household income of \$60,000 or more (Question 54). Most (67%) waterfowl hunters reported spending \$1,000 or less on things related to waterfowl hunting in the past 12 months (Question 7). In general, those waterfowl hunters with a greater household income appear to spend more money on things related to waterfowl hunting than those with a lesser household income (Appendix C, Table 1). Only 28% of waterfowl hunters indicated they had hired a guide/outfitter for waterfowl hunting in North Carolina during the last 5 years (excludes controlled shooting preserves) (Question 10).

#### *General Participation*

Waterfowl hunters were asked about their general participation in waterfowl hunting seasons in North Carolina. Eighty-percent of respondents hunted waterfowl (ducks, geese, brant, or swans) in North Carolina sometime during the last 5 years (Question 1). Only respondents who had hunted waterfowl during the last 5 years could respond to the other questions in the survey.

Forty-five percent of waterfowl hunters started waterfowl hunting before 1990 and 14% started waterfowl hunting after 2005 (Question 3). Most (74%) waterfowl hunters considered waterfowl hunting to be one of their most important or their most important recreational activity (Question 2). Most waterfowl hunters (66%) had gone on one or more overnight trips to hunt waterfowl in North Carolina (Question 4).

When asked to identify all the areas they hunted waterfowl in North Carolina in the last 5 years (Question 5), more waterfowl hunters utilized state public waters (75%) and private lands (owned-56%; leased-54%; not owned or leased-47%) than NCWRC game lands (40%) or national wildlife refuges (20%).

When asked to identify the areas where they **most often** hunted waterfowl in North Carolina in the last 5 years, most (55%) waterfowl hunters indicated they most often hunted on private property, 36% of hunters most often hunted on state public waters, while only 8% most often hunted on NCWRC game lands or national wildlife refuges (Question 6). Duck hunters in the northern Piedmont appear to hunt on WRC game lands (18%) more often than duck hunters in other regions (Appendix C, Table 2).

Most (84%) respondents did not take a youth hunting on North Carolina's Youth Waterfowl Hunting Day during the 2010-11 season (Question 8). The most common response (44%) by waterfowl hunters for not taking a youth hunting on Youth Waterfowl Hunting Day was not knowing any youth to take (Question 9).

### ***Barriers to Participation and Satisfaction***

We asked several questions about general satisfaction with waterfowl management in North Carolina and barriers to waterfowl hunting participation. Most (56%) waterfowl hunters were satisfied with how NCWRC manages waterfowl in North Carolina (Question 15), while 17% were dissatisfied. We chose to emulate a question included in the National Duck Hunter Survey (NDHS) (Childress & Williams 2006) that asked the amount of "trust" waterfowl hunters place on various groups to represent their interests (Question 14). Waterfowl hunters in North Carolina placed high trust in avid/experienced duck hunters (72%) and conservation groups like Ducks Unlimited or Delta Waterfowl (62%). Few placed high trust in outdoor writers/TV personalities (12%) and legislators (3%). Forty-one percent of waterfowl hunters in North Carolina placed high trust in waterfowl biologists, while 39% of respondents indicated high trust in NCWRC.

Waterfowl hunters were asked to identify things that may affect their waterfowl hunting experiences and participation in waterfowl hunting in North Carolina (Question 11). The percentage of waterfowl hunters who indicated the following were **major** barriers affecting their waterfowl hunting experiences and participation were: public waterfowl hunting areas are too crowded – 42%, difficult to find

areas to hunt waterfowl on private land – 35%, lack of access to areas to hunt waterfowl due to waterfront development – 28%, waterfowl populations are too low – 20%, unethical behavior by other hunters – 15%, work or family obligations or health problems – 13%, waterfowl hunting regulations are too confusing – 11%, and waterfowl hunting is too expensive – 5%.

When examining responses in relation to the region most often hunted (Appendix C, Table 3) duck hunters who hunted the most days in the last five years in the Piedmont and Mountain regions indicated that finding areas to hunt ducks on private land was a major barrier more often than coastal hunters. Duck hunters who hunted the most days in the last 5 years in the Piedmont indicated that public waterfowl hunting areas are too crowded more often than hunters in other regions. Duck hunters who hunted the most days in the last five years in the Piedmont and Mountain regions indicated that waterfront development was a major barrier to waterfowl hunting more than hunters in other regions.

### ***Opinions on Motorized Decoys and Pen-reared Mallards***

The use of motorized decoys, i.e. spinning wing decoys, and the release of pen-reared or game-farm mallards into the wild for hunting purposes are both controversial practices. Due to issues related to fair chase and potential for excessive harvest, several states prohibit the use of motorized decoys during all or portions of their waterfowl seasons (Ackerman et al. 2006). Potential areas of conflict associated with the release of pen-reared mallards include increased risk of disease transmission, genetic diversity and hybridization issues, and conflicts

with monitoring programs (US Fish & Wildlife Service 2002).

We asked waterfowl hunters in North Carolina their opinions on these two topics. Most (84%) waterfowl hunters indicated that the use of motorized, spinning wing decoys for waterfowl hunting should remain legal (Question 12), and 64% percent of waterfowl hunters believed the release of pen-reared or game-farm mallards into the wild for hunting (excluding controlled shooting preserves) should be allowed in North Carolina (Question 13).

### ***Waterfowl Permit Hunts and NCWRC Waterfowl Impoundments***

The North Carolina Wildlife Resources Commission provides a variety of opportunities to hunt on game lands specifically managed for waterfowl. Many of these areas can be hunted only after obtaining a permit through the Permit Hunting Opportunities Program. We asked several questions to ascertain the general knowledge of the program by waterfowl hunters and use of NCWRC waterfowl impoundments. Although most waterfowl hunters (72%) had heard of the Permit Hunting Opportunities Program (Question 47), most (60%) respondents had not applied for any waterfowl permit hunts in the last 5 years (Question 48). Twenty-five percent of respondents had applied for one or more waterfowl permit hunts for at least one, but not all, of the last 5 years, and 15% indicated applying for at least 1 permit hunt every year over the last 5 years. Most (81%) waterfowl hunters indicated they do not or rarely hunt on NCWRC waterfowl impoundments, while 4% indicated that most of their annual waterfowl hunting trips occur on NCWRC waterfowl impoundments (Question 49).

## **Duck Hunting**

### ***General Participation***

**Note: Only those individuals indicating they hunted ducks during the last 5 years were allowed to answer questions regarding participation (Questions 17-34)**

Waterfowl hunters were asked about their participation in North Carolina's duck season over the last five years. Ninety-nine percent hunted ducks during one or more of the last 5 hunting seasons, with most (66%) hunting all 5 seasons (Question 16). Seventy-five percent of respondents indicated they hunted ducks the most days in the northern (38%) or southern (36%) Coastal Plain, while only 2% indicated hunting ducks the most days in the mountains (Question 17). Most (81%) waterfowl hunters had not hunted teal during the September teal season in North Carolina during the last five years (Question 20), and the most common reason (selected by 25% of respondents) for not doing so was because the environmental conditions are not favorable for an enjoyable hunt (e.g. too hot, too many mosquitoes) (Question 21). When waterfowl hunters were asked about their participation during the 2010-11 duck season in North Carolina, 66% indicated they hunted ducks at least 6 days (Question 18), and 73% harvested at least six ducks (Question 19).

### ***Opinions on Duck Season Length and Daily Bag Limits***

Since the late 1990's, federal frameworks have allowed North Carolina to choose a 60-day duck season and 6-duck daily bag limit. While 53% of waterfowl hunters believed the current duck season length of 60 days was about right, 42% indicated it was too short (Question 22). Most hunters (74%) believed the current daily bag

limit of 6 ducks was about right (Question 23). Twenty-eight percent of respondents indicated they would hunt ducks with any size daily bag limit, while 53% indicated they would no longer hunt ducks if the daily bag limit was only 3 ducks (Question 27).

#### ***Opinions on Species with Low Population Levels***

Over time, 60-day duck seasons could result in too much harvest on some species with low population levels (e.g. black ducks, pintails, canvasbacks, scaup). This excessive harvest could occur even when daily bag limits are low for these species. Waterfowl hunters were asked to indicate how much they disagreed or agreed with a series of statements about season options to reduce harvest on species with low population levels (Question 26). Respondents were asked to rate their level of disagreement/agreement on a five point scale (1=Strongly Oppose; 5=Strongly Support) (Appendix C, Table 4).

When asked if the overall duck season length of 60 days should be shorter to reduce harvest on species with lower population levels, most (71%) waterfowl hunters were opposed, 9% were supportive, 13% were neutral, and 7% were unsure (mean=1.8).

When asked if the overall daily duck bag limit of 6 ducks should be lower to reduce harvest on species with lower population levels, most (66%) waterfowl hunters were opposed, 14% were supportive, 14% were neutral, and 6% were unsure (mean=2.0).

When asked if the seasons should be closed just for those species with lower population levels so the overall duck season length and daily bag limit could remain as is, most (57%) waterfowl hunters were supportive, 19% were opposed,

17% were neutral, and 7% were unsure (mean=3.7).

#### ***Opinions on Duck Season Structure***

Currently, federal frameworks allow NCWRC to open the duck season on the Saturday closest to September 24, and mandates that the season be closed no later than the last Sunday in January. The current structure for the 60-day duck season in North Carolina includes 3 segments. The first segment opens in early October and is 4 days. The second segment opens in mid-November and is approximately 3 weeks. There is a closed period of approximately 2 weeks following the close of the second segment. The third and final segment opens in mid-December and runs as late as federal guidelines allow. Waterfowl hunters were asked to indicate how much they disagreed or agreed with a series of statements about the current duck season structure (Question 24). Respondents were asked to rate their level of disagreement/agreement on a five point scale (1=Strongly Disagree; 5=Strongly Agree) (Appendix C, Tables 5-7).

There appears to be no clear statewide support for making changes to the current duck season structure. Thirty-five percent of waterfowl hunters disagreed, 31% agreed, 27% were neutral, and 7% were unsure (mean=2.9) if NCWRC should keep the current season structure. However, those respondents who most often hunted ducks in the Piedmont and Mountain regions had higher agreement, on average, with keeping the current duck season structure, than those who most often hunted ducks in the Coastal Plain.

When asked if NCWRC should do away with the early October segment and add these days to the third segment, most (52%) waterfowl hunters agreed (mean=3.4). Only 30%

disagreed, while 11% were neutral and 8% were unsure. Those respondents who most often hunted ducks in the Coastal Plain had higher agreement, on average, with doing away with the early October segment and adding these days to the third segment, than those most often hunting ducks in the Piedmont and Mountain regions.

When asked if NCWRC should keep the October segment, but move it later in October, 38% of waterfowl hunters disagreed, 29% agreed, 21% were neutral, and 12% were unsure (mean=2.8). There was no clear relationship between keeping the October segment, but moving it later in October, and the region duck hunters most often hunted.

When asked if NCWRC should keep a closed period between the second and third segments, but the closed period should be reduced to one week, 33% of waterfowl hunters disagreed, 28% agreed, 23% were neutral, and 16% were unsure (mean=2.9). There was no clear relationship between keeping the closed period between the second and third segments, but reducing the close period to one week, and the region duck hunters most often hunted.

When asked if NCWRC should offer all 60 hunting days as late as possible with no season splits, 42% of waterfowl hunters agreed, 33% disagreed, 15% were neutral, and 10% were unsure (mean=3.2). Those respondents most often hunting ducks in the Coastal Plain had higher agreement, on average, with offering all 60 hunting days as late as possible with no season splits than those hunting ducks most often in the Piedmont and Mountain regions.

#### ***Opinions on Duck/Goose Season Overlap***

Waterfowl hunters were asked to indicate how much they disagreed or agreed with statements

about overlap in duck and goose seasons (Question 46). Respondents were asked to rate their level of disagreement/agreement on a five point scale (1=Strongly Disagree; 5=Strongly Agree) (Appendix C, Table 8).

When asked if duck and goose seasons should overlap as much as possible, most (69%) waterfowl hunters agreed, 6% disagreed, 16% were neutral, and 9% were unsure (mean=4.2). When asked if duck and goose seasons should begin on the same day, 50% of waterfowl hunters agreed, 13% disagreed, 24% were neutral, and 13% were unsure (mean=3.7).

#### ***Opinions on Duck Migration and Distribution, and Changes in Duck Numbers and Hunting Quality***

Waterfowl hunters were asked to indicate how much they disagreed or agreed with a series of statements about duck migration, duck distribution and changes in duck numbers over time (Question 25). Respondents were asked to rate their level of disagreement/agreement on a five point scale (1=Strongly Disagree; 5=Strongly Agree) (Appendix C, Tables 9-10).

When asked if most ducks arrive after the season closes in the areas they hunt, 39% of waterfowl hunters agreed, 29% disagreed, 25% were neutral, and 7% were unsure (mean=3.2).

When asked if duck numbers in the areas they hunt have decreased over time, compared to when they first started duck hunting, 43% of waterfowl hunters agreed, 28% disagreed, 22% were neutral, and 7% were unsure (mean=3.3).

When asked if the distribution of ducks in the areas they hunt have changed over time, compared to when they first started duck hunting, most (53%) waterfowl hunters agreed

(mean=3.7). Only 11% disagreed, while 25% were neutral and 10% were unsure.

When asked if more ducks are found in areas without hunter access or where no hunting is allowed, compared to when they first started duck hunting, most (54%) waterfowl hunters agreed (mean=3.8). Only 13% disagreed, while 20% were neutral and 14% were unsure.

Waterfowl hunters in the Piedmont tended to have higher agreement, on average, than Coastal Plain hunters that more ducks are found in areas with restricted access, compared to when they first started duck hunting.

Forty-eight percent of waterfowl hunters indicated the overall quality of their duck hunting had gotten worse, compared to when they first started duck hunting, while only 18% indicated it had gotten better (Question 34). In general, those who began duck hunting earlier indicated the quality of their hunting had gotten worse, compared to those who began duck hunting later. (Appendix C, Table 11).

### ***Opinions on Diving Ducks and Sea Ducks***

Waterfowl hunters were asked about their experiences hunting sea ducks and open water diving ducks on coastal sounds or coastal rivers in North Carolina. In general, most (58%) waterfowl hunters indicated that they target diving ducks in North Carolina coastal areas (Question 29). Of these, 47% indicated that the number of days they pursue diving ducks has remained the same, while 41% indicated it has decreased over time. Most (53%) waterfowl hunters did not target diving ducks on coastal sounds or coastal rivers in North Carolina during the 2010-11 season (Question 28). Thirty-four percent of respondents that indicated they targeted diving ducks on coastal areas during the 2010-11 season in North Carolina hunted 6 days or more. Most (60%) waterfowl hunters

do not or rarely hunt scaup, but 69% of waterfowl hunters who hunt scaup or other open water diving ducks indicated they would hunt fewer days or quit hunting scaup or other open water diving ducks if the scaup bag limit was reduced to 1 bird per day (Question 30).

Most (85%) waterfowl hunters indicated that they have never or rarely hunt sea ducks (Question 31). Most (87%) sea duck hunters indicated that the number of days they specifically hunt sea ducks in North Carolina has either stayed about the same or decreased over time. Few (13%) indicated that the number of days they specifically hunt sea ducks has increased over time (Question 32). Excluding those who indicated they have never hunted sea ducks, only 41% of waterfowl hunters specifically hunted sea ducks ( $\geq 1$  day) in North Carolina during the 2010-11 season, and of those, most (85%) hunted 1 to 5 days (Question 33).

## **Canada Goose Hunting**

### ***General Participation***

**Note: Only those individuals indicating they hunted Canada geese during the last 5 years were allowed to answer questions regarding participation (Questions 36-45)**

Waterfowl hunters were asked about their participation in North Carolina's Canada goose seasons over the last five years. Most (65%) hunted Canada geese during one or more of the last 5 hunting seasons (Question 35). Most (57%) respondents indicated that their hunting and harvest of Canada geese is incidental to their duck hunting (Question 42). Sixty-three percent of waterfowl hunters who hunted Canada geese during the regular goose season (after September) in the last 5 years most often hunted in the Resident Population (RP) Zone

(Question 43). Most (80%) waterfowl hunters who hunted Canada geese in North Carolina during the 2010-11 season hunted 10 days or less (Question 36), and most (83%) harvested 10 geese or fewer (Question 37).

### ***Opinions on September Seasons***

Waterfowl hunters who had hunted Canada geese in the last 5 years were asked about their participation in North Carolina's September Canada goose season in 2010-11. Forty-eight percent of those respondents indicated they hunted Canada geese in September in North Carolina during the 2010-11 season (Question 38). Most (63%) Canada goose hunters who hunted Canada geese in September in 2010-11 hunted only west of US 17. Twenty-three percent hunted only east of US 17, while 14% hunted both east and west of US 17 (Question 39). Of those who hunted Canada geese in September west of US 17, 36% hunted until ½ hour after sunset, 35% hunted with an unplugged gun, while only 5% hunted with an electronic call (Question 40). Most (70%) Canada goose hunters thought the current daily bag limit (15) for Canada geese in North Carolina in September was about right (Question 41).

### ***Opinions on Canada goose Populations***

Most (61%) Canada goose hunters indicated that over the last 10 years, the Canada goose population has increased in areas of North Carolina where they most often hunt (Question 44). When asked to describe their opinion on resident Canada goose population management in North Carolina (Question 45), most (76%) Canada goose hunters indicated the resident population should remain at the current level (37%) or be decreased (39%).

## **DISCUSSION**

Based on this survey, waterfowl hunters in North Carolina are predominately male and appear to be slightly younger than waterfowl hunters nationwide. Sixty percent of waterfowl hunters in North Carolina were less than 45 years old compared to 53% of waterfowl hunters nationwide, as reported in the NDHS (Childress & Williams 2006). Similar to results from the NDHS, most North Carolina waterfowl hunters indicate waterfowl hunting is one, if not their most important recreational activity. Waterfowl hunters in North Carolina report a higher level of education and gross household income than other statewide hunter groups. Compared to a survey of deer hunters in North Carolina (Palmer 2009), waterfowl hunters in North Carolina had higher levels of education, with 42% of waterfowl hunters having a Bachelor's or graduate degree compared to 20% of deer hunters. Likewise, North Carolina waterfowl hunters reported higher levels of gross household income (65% ≥ \$60,000) than deer hunters in North Carolina (43% ≥ \$60,000). Most spend \$1,000 or less on things related to waterfowl hunting and most travel on one or more overnight trips to hunt waterfowl. Most began waterfowl hunting after 1990.

Most waterfowl hunters indicated satisfaction with the way NCWRC manages waterfowl in North Carolina. While most placed their highest trust in avid/experienced duck hunters and conservation groups like Ducks Unlimited or Delta Waterfowl to represent their interests, waterfowl hunters in North Carolina reported having higher trust (39%) in NCWRC than reported for wildlife agencies in general nationwide (20%) (Childress & Williams 2006).

State public waters and private lands are used by more waterfowl hunters than NCWRC game

lands or other public areas such as national wildlife refuges. Waterfowl hunters in the Piedmont utilize game lands more often than waterfowl hunters in other regions.

North Carolina waterfowl hunters most often reported that crowding of public waterfowl hunting areas, access to private lands, and waterfront development are major barriers affecting their waterfowl hunting experiences. It appears these barriers affect waterfowl hunters in the Piedmont and Mountains more so than those in the Coastal Plain. Developing additional public waterfowl hunting areas in the Piedmont and Mountain regions would appear to be of great benefit to hunters in these areas, as well as programs designed to increase access to public waters and private lands.

Because of the variety of species involved, and the varying seasons, bag limits, and hunting zones, waterfowl hunting regulations are more complex than those of other species or species groups. Anecdotally, we hear that some waterfowl hunters quit hunting due to regulations complexity. Although this survey could not measure opinions of hunters that had discontinued waterfowl hunting, the inherent complexity of waterfowl regulations was not reported by most waterfowl hunters as a major barrier to their participation.

Participation in North Carolina's Youth Waterfowl Hunting Day appears to be very low (16% participation). In a 2010 survey of Virginia waterfowl hunters, 91% of respondents indicated not taking a youth hunting on Virginia's Youth Waterfowl Day (Jagnow et al. 2010). Most waterfowl hunters in North Carolina indicated not knowing a youth to take as the most important reason for not taking a youth hunting on Youth Waterfowl Hunting

Day. Programs designed to link active waterfowl hunters to interested youth could be a primary means to increase participation on this special day.

Most waterfowl hunters in North Carolina indicated the use of motorized, i.e. spinning wing decoys should remain legal, compared to approximately one-half of respondents in the NDHS (Childress & Williams 2006) who indicated they should be allowed. Most believed the release of pen-reared or game-farm mallards into the wild for hunting purposes should also be allowed in North Carolina. We note that 19% of respondents were unsure of their opinion on the issue of pen-reared mallard releases. This is likely due to their lack of direct contact with the practice and general lack of knowledge about the issues.

Although most waterfowl hunters are familiar with NCWRC's Permit Hunting Opportunities Program, most had not applied for any waterfowl permit hunts on NCWRC game lands in the last 5 years and most indicated they do not or rarely hunt on NCWRC waterfowl impoundments. Most waterfowl hunters statewide indicated crowding on public waterfowl areas to be a barrier affecting their waterfowl hunting experience and participation. Over the last several years, NCWRC has taken steps to alleviate crowding on its waterfowl impoundments by requiring permits, establishing zoned hunts, and establishing hunter quotas. It is unclear if crowding on "public" waterfowl areas pertains equally to NCWRC waterfowl impoundments as it does to other public waterfowl areas such as the many large reservoirs in the Piedmont (Falls Lake, Jordan Lake, Shearon Harris Lake) or general state public waters.

Almost all waterfowl hunters had participated in one or more of North Carolina's duck seasons over the last five years. The harvest and days afield for North Carolina duck hunters in 2010-11 was slightly below that reported in the NDHS (Childress & Williams 2006), where 84% of waterfowl hunters surveyed indicated they hunted ducks at least 6 days annually, and 85% harvested at least 6 ducks per year, on average, over a 5-year period. It is not surprising most duck hunters reported spending the most days hunting in the Coastal Plain, given waterfowl populations have historically been highest here compared to other regions of North Carolina. Although this survey indicates most waterfowl hunters do not hunt teal during the September teal season, elimination of this hunt due to lack of participation or to take advantage of expanded hunting methods for resident Canada geese east of US 17 (September Teal Zone) would likely be met with some opposition.

In general, waterfowl hunters appear to believe duck numbers and the quality of their duck hunting have decreased over time, compared to when they first started hunting. Similarly, many indicate the distribution of ducks has changed over time and ducks are increasingly found in areas where access is restricted or hunting is not allowed, particularly in the Piedmont. As noted earlier, development of new waterfowl hunting areas and programs designed to increase hunter access to private lands may help address this issue. We frequently hear from a vocal group of hunters that the majority of ducks always seem to arrive after the close of the duck season. While 39% of respondents agreed that most ducks arrive after the season closes (compared to 29% that disagreed), this was not as high as might have been expected based on anecdotal reports.

Most waterfowl hunters in North Carolina seem to be satisfied with the current duck season length of 60 days and the current daily bag limit of 6 ducks. However, it is interesting to note that 42% of respondents believed the current 60-day duck season is too short. Based upon comments NCWRC solicits from the public each year on proposed waterfowl seasons, a growing number of hunters appear to believe the general duck season should be extended outside the current federal frameworks to include hunting days in February. It's unclear how expansion of other waterfowl seasons into February (e.g. Canada geese) and the ability to hold youth waterfowl hunting days outside the federal frameworks for ducks factor into duck hunter opinions on the length of the current duck season.

For several years, waterfowl managers in the Atlantic Flyway have debated the merits of reducing the current liberal season regulatory package (60 days, 6-duck daily bag) as a means to reduce harvest on some species with lower population levels (black ducks, pintails, canvasbacks, scaup). Most waterfowl hunters we surveyed were opposed to reductions in either the current duck season length or daily bag limit as a means to reduce harvest on those species with lower population levels. However, most were supportive of closed seasons just for those species with lower population levels in order to maintain the current duck season length and daily bag limit. Our results indicate that reductions in the current duck season length and daily bag limit will be met unfavorably by waterfowl hunters in North Carolina. If future reductions are necessary, staff will need to adequately communicate the justification for such measures.

Based on these results, developing one statewide duck hunting season structure that appeals to all waterfowl hunters in North Carolina will be very difficult. Coastal hunters appear to prefer changes in the current duck season structure more so than Piedmont and Mountain hunters. Coastal hunters indicated a preference for dropping the October segment and having all 60 duck hunting days occur as late as possible with no season splits, while Piedmont and Mountain hunters appear to prefer the current season structure. One potential way to satisfy hunters in different regions of North Carolina would be to create two duck hunting zones, e.g., an “eastern” and “western” zone. Under current USFWS guidelines, two duck hunting zones can be created each with no more than 2 segments. Dates may vary between zones. In North Carolina, a western zone could allow for an early October segment, while an eastern zone could offer all 60 hunting days as late as possible. Most waterfowl hunters indicated they wanted duck and goose seasons to overlap as much as possible and begin on the same day, which may be difficult if a two-zone system was adopted. While we did not ask this question, we believe that many duck hunters prefer that later season segments open on a Saturday. Removal of the 4-day October segment will not allow for this to occur. Irrespective of the potential to make future changes to the duck season structure, any changes are likely to be met with some opposition.

Due to long-term declines in scaup populations, a reduced bag limit of 1/day is included in an approved scaup harvest strategy. Results from this survey suggest that a portion of North Carolina coastal diving duck hunters will reduce the amount of time they pursue scaup or other diving ducks if this occurs. It appears few duck

hunters specifically target sea ducks (scoters, eiders, long-tailed ducks).

Most waterfowl hunters had hunted Canada geese during one or more of the last 5 hunting seasons. The harvest of Canada geese and the days spent afield as indicated by goose hunters in this survey are similar to HIP estimates for North Carolina for the 2010-11 season, which indicates, on average, active goose hunters hunted approximately 4 days and harvested 4 Canada geese during the season (Raftovich et al. 2011). Of note, 57% of respondents indicated most of their hunting and harvest of Canada geese occurs incidentally while duck hunting. It is not surprising that during the regular season, most Canada goose hunting occurs within the Resident Population Zone, given its large size and distribution, and more liberal regulations, relative to the other goose zones. Approximately one-half of respondents indicated hunting Canada geese in September, and most of those goose hunters indicated hunting only west of US 17. Of those who hunted Canada geese west of US 17 in September, where expanded methods of take are allowed, few used electronic calls. Most waterfowl hunters thought the current daily bag limit of 15 geese in September was about right. Given this opinion, it is interesting to note that most goose hunters in 2010-11 reported harvesting fewer than 10 Canada geese for the entire goose season.

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**Appendix A: Survey Instrument/Frequencies**

# 2011 North Carolina Waterfowl Hunter Survey



This survey is an opportunity for you to let us know about your experiences and opinions about waterfowl hunting and management in North Carolina. We need to hear from you even if you rarely or never have hunted waterfowl.

## **General Waterfowl Hunting**

1. Have you hunted waterfowl (ducks, geese, brant or swans) in North Carolina anytime during the last 5 years?  
80% Yes (**Continue to question 2**)  
20% No (**Please stop here and return the survey**)
2. How important is waterfowl hunting to you? (**check only one**)  
2% It's one of my least important recreational activities  
6% It's less important than my other recreational activities  
18% It's no more important than my other recreational activities  
58% It's one of my most important recreational activities  
16% It's my most important recreational activity
3. When did you start hunting waterfowl? (**check only one**)  
16% Before 1970  
13% 1970 to 1979  
16% 1980 to 1989  
22% 1990 to 1999  
19% 2000 to 2005  
14% 2006 or later
4. In the last 5 years, have you gone on any overnight trips to hunt waterfowl in North Carolina?  
66% Yes  
34% No

5. In the last 5 years, please indicate **all** the areas where you hunted waterfowl in North Carolina. **(check all that apply)**

54% Private property (leased by me or a hunting partner)  
56% Private property (owned by me or a hunting partner)  
47% Private property (not owned or leased by me or a hunting partner)  
75% State public waters (navigable streams, rivers, coastal sounds and public reservoirs)  
40% Wildlife Commission game lands  
20% National wildlife refuges  
3% Other (please specify): \_\_\_\_\_

6. In the last 5 years, where did you **most often** hunt waterfowl in North Carolina? **(check only one)**

18% Private property (leased by me or a hunting partner)  
24% Private property (owned by me or a hunting partner)  
13% Private property (not owned or leased by me or a hunting partner)  
36% State public waters (navigable streams, rivers, coastal sounds and public reservoirs)  
7% Wildlife Commission game lands  
1% National wildlife refuges  
1% Other (please specify): \_\_\_\_\_

7. About how much money did you spend in North Carolina **and** outside of North Carolina on things related to waterfowl hunting in the past 12 months (for example, licenses, gear, lodging, food and transportation costs, hunting leases, and habitat management)? **(check only one)**

23% \$250 or less  
43% \$251 to \$1,000  
28% \$1,001 to \$5,000  
6% Over \$5,000

8. Did you take a youth waterfowl hunting in North Carolina on Youth Waterfowl Hunting Day during the 2010-11 season (February 6, 2011)?

16% Yes **(Skip to question 10)**  
84% No [ ]

9. If you did not take a youth hunting on Youth Waterfowl Day, what is the **most important** reason you did not do so? (**check only one**)

- 44% Do not know any youth to take
  - 6% Weather conditions not appropriate for taking youth (for example, too cold)
  - 8% Lack of waterfowl in areas that I hunt during that time period
- 23% Work or family obligations or health problems
- 4% Not interested in participating in Youth Waterfowl Day
- 14% Other (please specify): \_\_\_\_\_

10. Have you hired a guide/outfitter for waterfowl hunting in North Carolina anytime during the last 5 years? This does not include hunting on a controlled shooting preserve.

- 28% Yes
- 72% No

11. Some things may affect your waterfowl hunting experiences and participation. Please indicate which of the following are not barriers, minor barriers, or major barriers to your waterfowl hunting in North Carolina. (**check one for each possible barrier**)

	Not a Barrier	Minor Barrier	Major Barrier
Difficult to find areas to hunt waterfowl on private land	27%	38%	35%
Lack of access to areas to hunt waterfowl due to waterfront development	34%	38%	28%
Public waterfowl hunting areas are too crowded	21%	37%	42%
Waterfowl populations are too low	34%	46%	20%
Unethical behavior by other hunters	50%	35%	15%
Work or family obligations or health problems	47%	40%	13%
Waterfowl hunting is too expensive	60%	35%	5%
Waterfowl hunting regulations are too confusing	57%	32%	11%
Other barrier (please specify):			

12. Currently it is legal to use motorized spinning wing decoys for waterfowl hunting. What is your opinion on the use of these decoys? (**check only one**)

- 84% The use of motorized spinning wing decoys should remain legal
- 4% The use of motorized spinning wing decoys should be outlawed
- 12% Unsure

13. Do you believe the release of pen-reared or game-farm mallards into the wild for hunting should be allowed in North Carolina? This refers to the general release of pen-reared mallards, not those releases occurring on controlled shooting preserves.

- 64% Yes
- 17% No
- 19% Unsure

14. How much trust do you put in each of the following to represent interests of waterfowl hunters like you? (**check one for each**)

	None	Low	Medium	High	Unsure
Waterfowl biologists	3%	11%	39%	41%	6%
Flyway Councils	5%	18%	42%	14%	21%
Legislators	38%	41%	12%	3%	7%
Avid/experienced duck hunters	1%	3%	23%	72%	2%
Conservation groups like Ducks Unlimited (DU) or Delta Waterfowl	3%	7%	27%	62%	2%
Outdoor writers/TV personalities	11%	29%	43%	12%	5%
Duck hunting guides	6%	15%	40%	33%	5%
N.C. Wildlife Resources Commission	4%	11%	42%	39%	4%

15. In general, how dissatisfied or satisfied are you with how the N.C. Wildlife Resources Commission manages waterfowl in North Carolina? (**check only one**)

- 4% Very dissatisfied
- 13% Somewhat dissatisfied
- 21% Neither dissatisfied nor satisfied
- 38% Somewhat satisfied
- 18% Very satisfied
- 6% Unsure

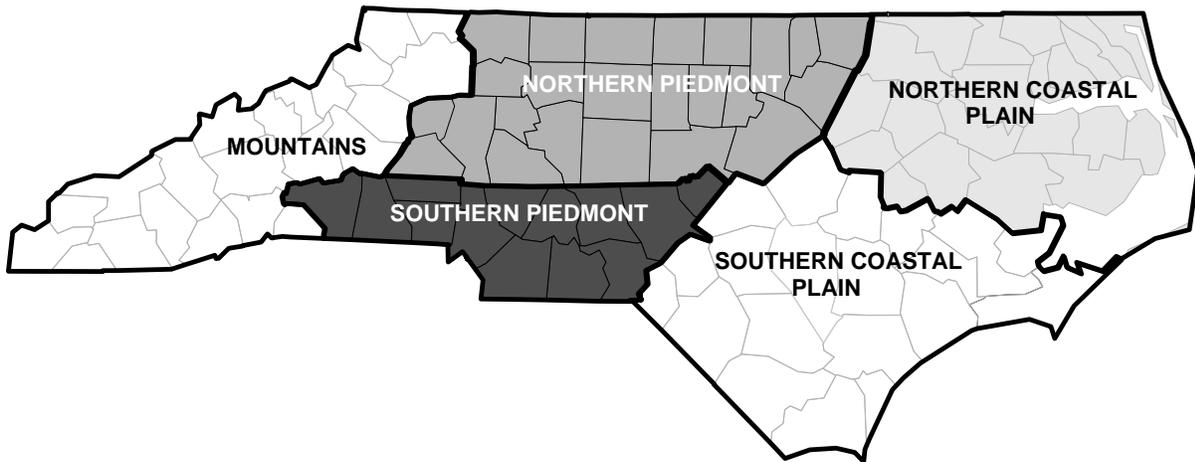
**General Duck Hunting**

16. During which of the last 5 hunting seasons did you hunt ducks in North Carolina? (**check all that apply**)

- 86% 2010-11
- 90% 2009-10
- 86% 2008-09
- 80% 2007-08
- 76% 2006-07
- 1% None of the above (**Skip to question 35 on page 11**)

17. Using the map below, please indicate the region in North Carolina in which you duck hunted **the most days** during the last 5 years. (**check only one**)

- 38% Northern Coastal Plain
- 36% Southern Coastal Plain
- 15% Northern Piedmont
- 8% Southern Piedmont
- 2% Mountains



18. About how many days did you hunt ducks during the 2010-11 season in North Carolina? (**check only one**)

10% 0 days (**Skip to question 20**)

24% 1 to 5 days

21% 6 to 10 days

24% 11 to 20 days

12% 21 to 30 days

9% More than 30 days

19. About how many ducks did you *personally* harvest during the 2010-11 season in North Carolina? (**check only one**)

6% 0 ducks

21% 1 to 5 ducks

21% 6 to 10 ducks

24% 11 to 20 ducks

21% 21 to 50 ducks

7% More than 50 ducks

20. During the last 5 years, have you hunted teal during the September teal season in North Carolina?

19% Yes (**Skip to question 22**)

81% No

21. If you did not hunt teal during the September teal season, what is the *most important* reason you did not do so? (**check only one**)

14% The area open to teal hunting is not in an area that I normally hunt

12% The area open to teal hunting is too far from my home

25% The environmental conditions are not favorable for an enjoyable hunt  
(for example – too hot, too many mosquitoes)

18% Not enough teal for a worthwhile hunt

1% The bag limit is too low

19% Work or family obligations or health problems

11% Other (please specify): \_\_\_\_\_

22. The duck season in North Carolina is currently 60 days. Do you believe this season length is: (**check only one**)

42% Too short

53% About right

1% Too long

4% Unsure

23. The current overall daily bag limit for ducks in North Carolina is 6. Do you believe this daily bag limit is: **(check only one)**

- 20% Too low
- 74% About right
- 3% Too high
- 4% Unsure

24. The N.C. Wildlife Resources Commission sets duck seasons within federal guidelines. The current structure for the 60 day duck season in North Carolina is:

- the 1<sup>st</sup> segment opens in early October and runs for 4 days,
- the 2<sup>nd</sup> segment opens in mid-November and runs for about 3 weeks,
- there is a closed period of about 2 weeks after the 2<sup>nd</sup> segment, and
- the 3<sup>rd</sup> segment opens in mid-December and runs as late as possible (according to federal guidelines).

Please indicate how much you disagree or agree with the following statements about the duck season structure. **(check one for each statement)**

	<div style="display: flex; justify-content: space-between; align-items: center;"> <span>Strongly Disagree</span> <span>Strongly Agree</span> </div> <div style="text-align: center; margin-top: 5px;">  </div>					Unsure
	1	2	3	4	5	
The Commission should keep the current duck season structure.	15%	20%	27%	18%	13%	7%
The Commission should do away with the early October segment and add these days to the 3 <sup>rd</sup> segment.	18%	11%	11%	17%	35%	8%
The Commission should keep the October segment, but move it later in October.	22%	16%	21%	17%	12%	12%
The Commission should keep a closed period between the 2 <sup>nd</sup> and 3 <sup>rd</sup> segments, but the closed period should be reduced to one week.	18%	15%	23%	15%	14%	16%
The Commission should offer all 60 hunting days as late as possible with no season splits.	20%	13%	15%	12%	29%	10%

25. Considering your duck hunting experiences in North Carolina, how much do you disagree or agree with the following statements? (**check one for each statement**)

	Strongly Disagree				Strongly Agree	Unsure
	1	2	3	4	5	
In the areas I hunt, <b>most</b> ducks arrive after the season closes.	11%	19%	25%	22%	17%	7%
Compared to when I first started duck hunting, duck numbers in the areas that I hunt have decreased over time.	10%	18%	22%	20%	23%	7%
Compared to when I first started duck hunting, the distribution of ducks within the areas I hunt have changed over time.	3%	9%	25%	29%	24%	10%
Compared to when I first started duck hunting, more ducks are found in areas without hunter access or where hunting is not allowed.	3%	9%	20%	24%	30%	14%

26. Over time, 60-day duck seasons may result in too much harvest on some species (black ducks, canvasbacks, pintails, scaup, etc.). This excessive harvest may occur even when daily bag limits are low for these species. In order to reduce harvest on these species over time, how much do you oppose or support the season options listed below? (**check one for each statement**)

	Strongly Oppose				Strongly Support	Unsure
	1	2	3	4	5	
The <b>overall duck season length of 60 days</b> should be shorter to reduce harvest on species with lower population levels.	51%	20%	13%	5%	4%	7%
The <b>overall daily duck bag limit of 6</b> should be lower to reduce harvest on species with lower population levels.	45%	21%	14%	8%	6%	6%
The seasons should be closed <b>just for those species with lower population levels</b> so the overall duck season length and daily bag limit can remain as is.	12%	8%	17%	22%	36%	7%

27. How small would the overall daily bag limit have to be before you would no longer hunt ducks? (**check only one**)

- 7% 6 ducks
- 8% 5 ducks
- 21% 4 ducks
- 17% 3 ducks
- 9% 2 ducks
- 28% I'll hunt with any size daily bag limit.
- 9% Unsure

28. About how many days during the 2010-11 season did you target diving ducks on coastal sounds or coastal rivers in North Carolina? (**check only one**)
- 53% 0 days
  - 31% 1 to 5 days
  - 8% 6 to 10 days
  - 8% more than 10 days
29. In general, have the number of days you target diving ducks on coastal sounds or coastal rivers in North Carolina: (**check only one**)
- 24% Decreased over time
  - 27% Stayed about the same
  - 7% Increased over time
  - 42% I do not or rarely target diving ducks in these areas
30. If the scaup bag limit were reduced to 1 bird per day, which of the following best describes how your hunting would be affected? (**check only one**)
- 60% I do not or rarely hunt scaup.
  - 12% The number of days that I hunt scaup or other open water diving ducks would likely not change.
  - 14% I would likely hunt fewer days for scaup or other open water diving ducks.
  - 13% I would likely quit hunting scaup or other open water diving ducks.
31. Approximately how many years have you been specifically hunting sea ducks (scoters, eiders or long-tailed ducks)? (**check only one**)
- 53% I have never hunted sea ducks
  - 32% I rarely hunt sea ducks
  - 8% 1 to 5 years
  - 3% 6 to 10 years
  - 4% more than 10 years
32. In general, have the number of days you specifically hunted sea ducks in North Carolina: (**check only one**)
- 39% Decreased over time
  - 48% Stayed about the same
  - 13% Increased over time

33. About how many days during the 2010-11 season did you specifically hunt for sea ducks in North Carolina? (**check only one**)

- 59% 0 days
- 35% 1 to 5 days
- 4% 6 to 10 days
- 1% 11 to 20 days
- 1% More than 20 days

34. Since you began duck hunting what changes have you observed in the overall quality of your duck hunting in North Carolina? (**check only one**)

- 18% It has gotten much worse
- 30% It has gotten a little worse
- 29% It has stayed about the same
- 14% It has gotten a little better
- 3% It has gotten much better
- 5% Unsure

### **Canada Goose Hunting**

35. During which of the last 5 hunting seasons did you hunt Canada geese in North Carolina? (**check all that apply**)

- 47% 2010-11
- 52% 2009-10
- 47% 2008-09
- 43% 2007-08
- 39% 2006-07
- 35% None of the above (**Skip to question 46 on page 14**)

36. About how many days during the 2010-11 season did you hunt Canada geese in North Carolina? (**check only one**)

- 21% 0 days (**Skip to question 41 on page 12**)
- 44% 1 to 5 days
- 19% 6 to 10 days
- 10% 11 to 20 days
- 4% 21 to 30 days
- 2% More than 30 days

37. About how many Canada geese did you harvest during the 2010-11 season in North Carolina? (**check only one**)
- 27% 0 geese
  - 39% 1 to 5 geese
  - 18% 6 to 10 geese
  - 11% 11 to 20 geese
  - 4% 21 to 50 geese
  - 1% More than 50 geese
38. Did you hunt Canada geese in **September** in North Carolina during the 2010-11 season?
- 48% Yes
  - 52% No (**Skip to question 41**)
39. Did you hunt Canada geese east or west of US Highway 17 in September in North Carolina during the 2010-11 season? (**check only one**)
- 63% Hunted **only west** of US 17
  - 23% Hunted **only east** of US 17 (**Skip to question 41**)
  - 14% Hunted **both west and east** of US 17
40. Which of the following methods did you use during the 2010-11 September goose season? (**check all that apply**)
- 36% Hunted until ½ hour after sunset
  - 35% Hunted with an unplugged gun
  - 5% Hunted with an electronic call
  - 50% Did not use any of the above listed methods
41. The current daily bag limit for Canada geese in North Carolina in September is 15 (the maximum allowed under the current federal guidelines). Do you believe this bag limit is: (**check only one**)
- 13% Too low
  - 70% About right
  - 12% Too high
  - 6% Unsure

42. Which of the following best describes your Canada goose hunting in North Carolina? (**check only one**)

43% Most of my Canada goose hunting and harvest is targeted specifically towards Canada geese.

57% Most of my hunting and harvest of Canada geese is incidental to my duck hunting.

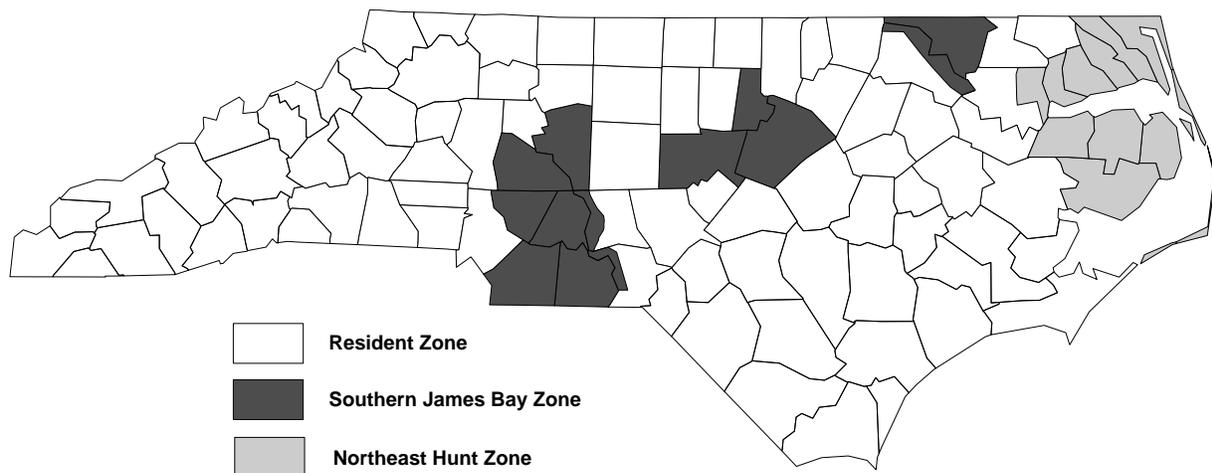
43. Using the map below, please indicate the zone in which you **most often** hunted Canada geese during the regular goose seasons (after September) over the last 5 years. (**check only one**)

63% The Resident Population (RP) Zone

17% The Southern James Bay Population (SJB) Zone

15% The Northeast Goose Hunt Zone

5% Didn't hunt during the regular goose season



44. In areas of North Carolina where you most often hunt Canada geese, which of the following statements best reflects your opinion? (**check only one**)

7% Over the last 10 years, the Canada goose population has decreased.

21% Over the last 10 years, the Canada goose population has remained relatively stable.

61% Over the last 10 years, the Canada goose population has increased.

11% Unsure

45. As a possible resident Canada goose population management goal in North Carolina, which of the following statements best reflects your opinion? (**check only one**)

- 14% The resident Canada goose population should be increased
- 37% The resident Canada goose population should remain at current level
- 39% The resident Canada goose population should be decreased
- 10% Unsure

46. Please indicate how much you disagree or agree with the following statements about duck and goose seasons. (**check one for each statement**)

	Strongly Disagree					Strongly Agree	
	1	2	3	4	5	Unsure	
Duck and goose seasons should overlap as much as possible.	3%	3%	16%	23%	46%	9%	
Duck and goose season segments should begin on the same day.	6%	7%	24%	17%	32%	13%	

**Waterfowl Permit Hunts & N.C. Wildlife Resources Commission Game Lands**

47. The Permit Hunting Opportunities Program, formerly known as Special Hunts, provides opportunities to hunt in North Carolina where hunter access is limited. Before receiving this survey, had you heard of the Permit Hunting Opportunities Program?

- 72% Yes
- 28% No

48. Which of the following best describes your participation in waterfowl permit hunts on N.C. Wildlife Resources Commission game lands over the last 5 years?

(**check only one**)

- 15% I have applied for one or more waterfowl permit hunts every year for the last 5 years.
- 25% I have applied for one or more waterfowl permit hunts for at least one, but **not all** of the last 5 years.
- 60% I have not applied for any waterfowl permits hunts in the last 5 years.

49. Of the following, which best reflects your use of N.C. Wildlife Resources Commission waterfowl impoundments? (**check only one**)

4% Most of my annual waterfowl hunting trips are on Commission waterfowl impoundments.

15% I sometimes hunt on Commission waterfowl impoundments, but for fewer than half of my annual waterfowl hunting trips.

29% I rarely hunt on Commission waterfowl impoundments.

52% I do not hunt on Commission waterfowl impoundments.

### **Background Information**

For us to understand people's responses to the previous questions more fully, we need to know a few things about your background. Remember that your responses are completely confidential.

50. In what state do you live? (**check only one**).

94% North Carolina

6% Other \_\_\_\_\_

51. What is the highest level of formal education you have completed? (**check only one**)

5% Less than a high school graduate

16% High school graduate or GED

22% Some college or trade school

14% Associate or trade school degree

31% Bachelor's or four-year degree

11% Graduate or professional degree

52. Are you male or female?

99% Male

1% Female

53. Please indicate your age. (**check only one**)

1% Under 16

18% 16 to 24

21% 25 to 34

20% 35 to 44

20% 45 to 54

20% 55 and over

54. Which of the following best represents your gross household income (before taxes) last year? (**check only one**)

- 9% Less than \$20,000
- 12% \$20,000 to \$39,999
- 15% \$40,000 to \$59,999
- 16% \$60,000 to \$79,999
- 15% \$80,000 to \$99,999
- 11% \$100,000 to \$119,999
- 23% \$120,000 or more

**Thank you for your participation! If you would like us to notify you when the results of the survey are posted online, please give us your email address: \_\_\_\_\_**

If you have any other comments you would like to share with us, please use the space below.

**Please use the enclosed postage-paid envelope, or mail this survey to:**

**Waterfowl Hunter Survey  
N.C. Wildlife Resources Commission  
1722 Mail Service Center  
Raleigh, NC 27699-1722**

## **Appendix B: Survey Design and Analysis**

Table 1. Survey Contacts.

Time (weeks)	Date <sup>a</sup>	Survey Method			
		Mail Exclusive (N = 4,500)	Mail Primary (N = 500)	Web Primary (N = 500)	Web Exclusive (N = 500)
0	2/23/2011	Full survey mailing <sup>b</sup>	Letter invitation to complete survey online	Letter invitation to complete survey online	Email invitation to complete survey online
1	3/2/2011	Postcard reminder to complete written survey	Postcard reminder to complete survey online	Postcard reminder to complete survey online	Email reminder to complete survey online
4	3/21/2011	Full survey mailing <sup>b</sup>	Full survey mailing <sup>c</sup>	Letter reminder to complete survey online	Email reminder to complete survey online
8	4/18/2011	Full survey mailing <sup>b</sup>	Full survey mailing <sup>c</sup>	Full survey mailing <sup>c</sup>	Email reminder to complete survey online

<sup>a</sup> Approximate date mailed. Varied slightly for some contacts

<sup>b</sup> letter, survey, business reply envelope; no option to respond online

<sup>c</sup> letter, survey, business reply envelope; with option to respond online

Table 2. Data Weighting.

Email in ALVIN?	Age	Sampling Frame		Respondents		Weight <sup>a</sup>
		Count	%	Count	%	
Yes	Under 16	72	0.4%	20	0.5%	3.600
Yes	16 to 24	810	4.9%	214	5.5%	3.785
Yes	25 to 34	1097	6.7%	376	9.7%	2.918
Yes	35 to 44	1110	6.7%	396	10.3%	2.803
Yes	45 to 54	1057	6.4%	368	9.5%	2.872
Yes	55 and over	1365	8.3%	515	13.3%	2.650
No	Under 16	173	1.1%	43	1.1%	4.023
No	16 to 24	2139	13.0%	284	7.4%	7.532
No	25 to 34	2093	12.7%	345	8.9%	6.067
No	35 to 44	2274	13.8%	414	10.7%	5.493
No	45 to 54	1957	11.9%	351	9.1%	5.575
No	55 and over	2312	14.0%	534	13.8%	4.330
	Total	16459		3860		

<sup>a</sup> Weight calculation = (Sampling Frame Count/Respondents Count)\*1

Table 3. Interpretation of effect sizes (adapted from Vaske 2008, p. 108).

Test	Minimal Relationship	Typical Relationship	Substantial Relationship
Cramer's <i>V</i>	.10	.30	.50
<i>eta</i>	.10	.243	.371

Table 4. Final disposition of contacts and response rates.

	Survey Method				Overall
	Mail Exclusive	Mail Primary	Web Primary	Web Exclusive	
Total sent	4500	500	500	500	6000
Responded	2941	294	290	335	3860
Incorrect address	124	24	16	0	164
Deceased	2	0	0	0	2
Ineligible	0	0	0	0	0
Refusal	9	2	0	0	11
No response	1424	180	194	165	1963
Adjusted response rate	67%	62%	60%	67%	66%

**Appendix C: Cross-tabulations  
& statewide disagreement/agreement scores**

Table 1. Money spent on waterfowl hunting (Question 7) by income (Question 54) as reported during a 2011 survey of North Carolina waterfowl hunters.

About how much money did you spend in North Carolina and outside of North Carolina on things related to waterfowl hunting in the past 12 months?	Which of the following best represents your gross household income (before taxes) last year? <sup>a</sup>						
	Less than \$20k	\$20k to \$39k	\$40k to \$59k	\$60k to \$79k	\$80k to \$99k	\$100k to \$119k	\$120k or more
\$250 or less	37% <sup>b</sup>	30% <sup>b</sup>	25%	30% <sup>b</sup>	19%	18%	11% <sup>c</sup>
\$251 to \$1,000	46%	45% <sup>b</sup>	49%	43%	46%	43%	35% <sup>c</sup>
\$1,001 to \$5,000	16% <sup>c</sup>	22% <sup>c</sup>	23% <sup>c</sup>	24% <sup>c</sup>	31%	33%	40% <sup>b</sup>
Over \$5,000	1% <sup>c</sup>	3% <sup>c</sup>	3% <sup>c</sup>	2% <sup>c</sup>	4% <sup>c</sup>	6%	14% <sup>b</sup>

<sup>a</sup>  $\chi^2 = 277.26$ ;  $df = 18$ ;  $P = < .001$ ; Cramer's  $V = .18$

<sup>b</sup> Adjusted residual  $\geq 2$

<sup>c</sup> Adjusted residual  $\leq -2$

Table 2. Area waterfowl hunted (Question 6) by duck hunting region (Question 17) as reported during a 2011 survey of North Carolina waterfowl hunters.

Please indicate the region in North Carolina in which you duck hunted the most days during the last 5 years. <sup>a</sup>					
In the last 5 years, where did you most often hunt waterfowl in North Carolina?	Northern Coastal Plain	Southern Coastal Plain	Northern Piedmont	Southern Piedmont	Mountains <sup>b</sup>
Private property (leased by me or a hunting partner)	19%	19%	15% <sup>c</sup>	22%	-
Private property (owned by me or a hunting partner)	25%	29% <sup>d</sup>	17% <sup>c</sup>	20% <sup>c</sup>	-
Private property (not owned or leased by me or a hunting partner)	11% <sup>c</sup>	12%	15%	17% <sup>d</sup>	-
State public waters (navigable streams, rivers, coastal sounds and public reservoirs)	38% <sup>d</sup>	33%	34%	33%	-
Wildlife Commission game lands	6% <sup>c</sup>	5% <sup>c</sup>	18% <sup>d</sup>	7%	-
National wildlife refuges	1% <sup>d</sup>	0%	0%	0%	-
Other (please specify):	1%	1%	1%	2%	-

<sup>a</sup>  $\chi^2 = 126.70$ ;  $df = 18$ ;  $P < .001$ ; Cramer's  $V = .12$

<sup>b</sup> Category not included due to low numbers of respondents.

<sup>c</sup> Adjusted residual  $\leq -2$

<sup>d</sup> Adjusted residual  $\geq 2$

Table 3. Barriers to waterfowl hunting (Question 11) by duck hunting region (Question 17) as reported during a 2011 survey of North Carolina waterfowl hunters.

		Please indicate the region in North Carolina in which you duck hunted the most days during the last 5 years.				
Please indicate which of the following are not barriers, minor barriers, or major barriers to your waterfowl hunting in North Carolina		Northern Coastal Plain	Southern Coastal Plain	Northern Piedmont	Southern Piedmont	Mountains
Difficult to find areas to hunt waterfowl on private land <sup>a</sup>	Not a Barrier	32% <sup>e</sup>	27%	15% <sup>f</sup>	22%	11% <sup>f</sup>
	Minor Barrier	35% <sup>f</sup>	40%	41%	35%	41%
	Major Barrier	33% <sup>f</sup>	33% <sup>f</sup>	44% <sup>e</sup>	43% <sup>e</sup>	48%
Lack of access to areas to hunt waterfowl due to waterfront development <sup>b</sup>	Not a Barrier	38% <sup>e</sup>	34%	27% <sup>f</sup>	25% <sup>f</sup>	16% <sup>f</sup>
	Minor Barrier	39%	39%	39%	34%	36%
	Major Barrier	23% <sup>f</sup>	27%	34% <sup>e</sup>	41% <sup>e</sup>	48% <sup>e</sup>
Public waterfowl hunting areas are too crowded <sup>c</sup>	Not a Barrier	23% <sup>e</sup>	20%	12% <sup>f</sup>	16%	30%
	Minor Barrier	36%	39%	37%	35%	48%
	Major Barrier	41%	41%	51% <sup>e</sup>	48%	22% <sup>f</sup>
Waterfowl populations are too low <sup>d</sup>	Not a Barrier	38% <sup>e</sup>	33%	29% <sup>f</sup>	26% <sup>f</sup>	33%
	Minor Barrier	45%	48%	48%	44%	43%
	Major Barrier	17% <sup>f</sup>	19%	23%	29% <sup>e</sup>	24%

<sup>a</sup>  $\chi^2 = 73.72$ ;  $df = 8$ ;  $P < .001$ ; Cramer's  $V = .11$

<sup>b</sup>  $\chi^2 = 69.59$ ;  $df = 8$ ;  $P < .001$ ; Cramer's  $V = .11$

<sup>c</sup>  $\chi^2 = 49.75$ ;  $df = 8$ ;  $P < .001$ ; Cramer's  $V = .09$

<sup>d</sup>  $\chi^2 = 35.02$ ;  $df = 8$ ;  $P < .001$ ; Cramer's  $V = .08$

<sup>e</sup> Adjusted residual  $\geq 2$

<sup>f</sup> Adjusted residual  $\leq -2$

Table 4. Mean statewide opposition/support scores regarding statements about duck seasons and excessive harvest on some duck species with low population levels (Question 26). (1=strongly oppose, 5=strongly support)

Statement	Mean Score
The overall duck season length of 60 days should be shorter to reduce harvest on species with lower population levels	1.8
The overall daily duck bag limit of 6 should be lower to reduce harvest on species with lower population levels	2.0
The seasons should be closed just for those species with lower population levels so the overall duck season length and daily bag limit can remain as is	3.7

Table 5. Mean statewide disagreement/agreement scores regarding statements about the duck season structure in North Carolina (Question 24). (1=strongly disagree, 5=strongly agree)

Statement	Mean Score
The Commission should keep the current duck season structure	2.9
The Commission should do away with the early October segment and add these days to the 3 <sup>rd</sup> segment	3.4
The Commission should keep the October segment, but move it later in October	2.8
The Commission should keep a closed period between the 2 <sup>nd</sup> and 3 <sup>rd</sup> segments, but the closed period should be reduced to one week.	2.9
The Commission should offer all 60 hunting days as late as possible with no season splits	3.2

Table 6. Opinions on duck season structure (Question 24) by duck hunting region (Question 17) as reported during a 2011 survey of North Carolina waterfowl hunters.

		Please indicate the region in North Carolina in which you duck hunted the most days during the last 5 years.				
Please indicate how much you disagree or agree with the following statements about the duck season structure. (1=Strongly Disagree; 5=Strongly Agree)		Northern Coastal Plain	Southern Coastal Plain	Northern Piedmont	Southern Piedmont	Mountains
The Commission should keep the current duck season structure. <sup>a</sup>	1	16%	18% <sup>f</sup>	13%	13%	8%
	2	23% <sup>f</sup>	19%	15% <sup>g</sup>	14%	13%
	3	25%	26%	31% <sup>f</sup>	22%	23%
	4	19%	18%	21%	21%	23%
	5	12%	11%	14%	19% <sup>f</sup>	20%
	Unsure	6% <sup>g</sup>	7%	7%	11% <sup>f</sup>	13%
The Commission should do away with the early October segment and add these days to the 3rd segment. <sup>b</sup>	1	15% <sup>g</sup>	14% <sup>g</sup>	30% <sup>f</sup>	24% <sup>f</sup>	42% <sup>f</sup>
	2	10%	11%	16% <sup>f</sup>	13%	13%
	3	10%	10%	11%	12%	13%
	4	19% <sup>f</sup>	18%	11% <sup>g</sup>	12%	15%
	5	39% <sup>f</sup>	39% <sup>f</sup>	24% <sup>g</sup>	26% <sup>g</sup>	13% <sup>g</sup>
	Unsure	6% <sup>g</sup>	8%	8%	13% <sup>f</sup>	5%
The Commission should keep the October segment, but move it later in October. <sup>c</sup>	1	24%	22%	21%	20%	19%
	2	18% <sup>f</sup>	16%	14%	11% <sup>g</sup>	8%
	3	20%	20%	22%	24%	39% <sup>f</sup>
	4	16%	16%	20% <sup>f</sup>	16%	15%
	5	10% <sup>g</sup>	13% <sup>f</sup>	12%	11%	6%
	Unsure	12%	13%	11%	18% <sup>f</sup>	13%
The Commission should keep a closed period between the 2 <sup>nd</sup> and 3 <sup>rd</sup> segments, but the closed period should be reduced to one week. <sup>d</sup>	1	17%	19%	19%	23%	7% <sup>g</sup>
	2	16%	15%	16%	11%	13%
	3	23%	21%	24%	23%	33%
	4	16%	14%	13%	15%	17%
	5	13%	14%	14%	9%	12%
	Unsure	15%	17%	15%	19%	18%
The Commission should offer all 60 hunting days as late as possible with no season splits. <sup>e</sup>	1	18% <sup>g</sup>	17% <sup>g</sup>	26% <sup>f</sup>	26% <sup>f</sup>	25%
	2	13%	14%	14%	13%	31% <sup>f</sup>
	3	16%	15%	14%	14%	15%
	4	14%	13%	11%	9%	8%
	5	31% <sup>f</sup>	32% <sup>f</sup>	24% <sup>g</sup>	22% <sup>g</sup>	11% <sup>g</sup>
	Unsure	8% <sup>g</sup>	9%	12%	16% <sup>f</sup>	10%

<sup>a</sup>  $\chi^2 = 60.19$ ;  $df = 20$ ;  $P = < .001$ ; Cramer's  $V = .07$

<sup>b</sup>  $\chi^2 = 157.37$ ;  $df = 20$ ;  $P = < .001$ ; Cramer's  $V = .11$

<sup>c</sup>  $\chi^2 = 42.27$ ;  $df = 20$ ;  $P = .003$ ; Cramer's  $V = .06$

<sup>d</sup>  $\chi^2 = 24.73$ ;  $df = 20$ ;  $P = .212$ ; Cramer's  $V$  not reported when  $P > .05$ .

<sup>e</sup>  $\chi^2 = 78.58$ ;  $df = 20$ ;  $P = < .001$ ; Cramer's  $V = .08$

<sup>f</sup> Adjusted residual  $\geq 2$

<sup>g</sup> Adjusted residual  $\leq 2$

Table 7. Mean disagreement/agreement<sup>a</sup> with duck season structure options (Question 24) by region duck hunted (Question 17) as reported during a 2011 survey of North Carolina waterfowl hunters. Means within rows with the same letter were significantly different at  $P < .05$  based on Tukey or Tamhane's T2 methods.

	Region duck hunted the most days during last 5 years					<i>F</i>	<i>P</i>	<i>eta</i> <sup>b</sup>
	Northern Coastal Plain	Southern Coastal Plain	Northern Piedmont	Southern Piedmont	Mountains			
The Commission should keep the current duck season structure.	2.9 <sup>ABC</sup>	2.8 <sup>DEF</sup>	3.1 <sup>AD</sup>	3.2 <sup>BE</sup>	3.4 <sup>CF</sup>	7.97	< .001	.11
The Commission should do away with the early October segment and add these days to the 3rd segment.	3.6 <sup>ABC</sup>	3.6 <sup>DEF</sup>	2.8 <sup>AD</sup>	3.0 <sup>BE</sup>	2.4 <sup>CF</sup>	35.12	< .001	.22
The Commission should keep the October segment, but move it later in October.	2.6 <sup>A</sup>	2.8	2.9 <sup>A</sup>	2.8	2.8	2.74	.027	.06
The Commission should keep a closed period between the 2nd and 3rd segments, but the closed period should be reduced to one week.	2.9	2.9	2.8	2.7	3.2	1.39	.236	-
The Commission should offer all 60 hunting days as late as possible with no season splits.	3.3 <sup>ABC</sup>	3.3 <sup>DEF</sup>	2.9 <sup>AD</sup>	2.9 <sup>BE</sup>	2.5 <sup>CF</sup>	11.76	< .001	.13

<sup>a</sup> Mean disagreement/agreement was based on a five point scale: Strongly Disagree = 1, Strongly Agree = 5. Unsure responses were not included in the mean calculations.

<sup>b</sup> *Eta* not reported when  $P \geq .05$ .

Table 8. Mean statewide disagreement/agreement scores regarding statements about overlap in duck and goose seasons in North Carolina (Question 46). (1=strongly disagree, 5=strongly agree)

Statement	Mean Score
Duck and goose seasons should overlap as much as possible	4.2
Duck and goose season segments should begin on the same day	3.7

Table 9. Mean statewide disagreement/agreement scores regarding statements about changes in duck migration, duck distribution, and changes in duck numbers over time in North Carolina (Question 25). (1=strongly disagree, 5=strongly agree)

Statement	Mean Score
In the areas I hunt, most ducks arrive after the season closes	3.2
Compared to when I first started duck hunting, duck numbers in the areas that I hunt have decreased over time.	3.3
Compared to when I first started duck hunting, the distribution of ducks within areas I hunt have changed over time	3.7
Compared to when I first started duck hunting, more ducks are found in areas without hunter access or where hunting is not allowed.	3.8

Table 10. Mean disagreement/agreement<sup>a</sup> with statements about changes in duck migration, duck distribution, and changes in duck numbers over time (Question 25) by region duck hunted (Question 17) as reported during a 2011 survey of North Carolina waterfowl hunters. Means within rows with the same letter were significantly different at  $P < .05$  based on Tukey or Tamhane's T2 methods.

	Region duck hunted the most days during last 5 years					<i>F</i>	<i>P</i>	<i>eta</i> <sup>b</sup>
	Northern Coastal Plain	Southern Coastal Plain	Northern Piedmont	Southern Piedmont	Mountains			
In the areas I hunt, most ducks arrive after the season closes.	3.2	3.2	3.1	3.2	2.8	2.00	.091	-
Compared to when I first started duck hunting, duck numbers in the areas that I hunt have decreased over time.	3.4	3.3	3.2 <sup>A</sup>	3.6 <sup>A</sup>	3.1	3.19	.013	.07
Compared to when I first started duck hunting, the distribution of ducks within the areas I hunt have changed over time.	3.7	3.7	3.7	3.9	3.5	1.93	.102	-
Compared to when I first started duck hunting, more ducks are found in areas without hunter access or where hunting is not allowed.	3.7 <sup>AB</sup>	3.7 <sup>CD</sup>	3.9 <sup>AC</sup>	4.0 <sup>BD</sup>	3.7	7.09	< .001	.10

<sup>a</sup> Mean disagreement/agreement was based on a five point scale: Strongly Disagree = 1, Strongly Agree = 5. Unsure responses were not included in the mean calculations.

<sup>b</sup> *eta* not reported when  $P \geq .05$

Table 11. Opinions on changes in duck hunting quality (Question 34) by when started hunting waterfowl (Question 3).

Since you began duck hunting what changes have you observed in the overall quality of your duck hunting in North Carolina?	When did you start hunting waterfowl? <sup>a</sup>					
	Before 1970	1970 to 1979	1980 to 1989	1990 to 1999	2000 to 2005	2006 or later
It has gotten much worse	34% <sup>b</sup>	26% <sup>b</sup>	18%	16%	10% <sup>c</sup>	7% <sup>c</sup>
It has gotten a little worse	29%	32%	33%	36% <sup>b</sup>	29%	21% <sup>c</sup>
It has stayed about the same	15% <sup>c</sup>	22% <sup>c</sup>	25%	30%	38% <sup>b</sup>	42% <sup>b</sup>
It has gotten a little better	13%	12%	17% <sup>b</sup>	11% <sup>c</sup>	18% <sup>b</sup>	14%
It has gotten much better	5% <sup>b</sup>	4%	3%	3%	1% <sup>c</sup>	3%
Unsure	3%	5%	5%	4%	3% <sup>c</sup>	12% <sup>b</sup>

<sup>a</sup>  $\chi^2 = 317.53$ ;  $df = 25$ ;  $P < .001$ ; Cramer's  $V = .14$

<sup>b</sup> Adjusted residual  $\geq 2$

<sup>c</sup> Adjusted residual  $\leq -2$