

# 2011-12 NORTH CAROLINA DOVE HUNTER SURVEY



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## EXECUTIVE SUMMARY

### **Introduction**

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

### **Methods**

In late winter and spring of 2012, we surveyed a random sample of 6,195 hunters that were registered in the Harvest Information Program (HIP). The sampling frame included only registrants who indicated that they harvested one or more doves the previous season. The survey response rate was 57%.

### **Results**

#### ***General Participation***

- 54% of dove hunters started dove hunting before 1990 and 8% started after 2005.
- 45% of dove hunters considered dove hunting to be their most important or one of their most important recreational activities.
- When asked to identify **all** the areas they hunted doves, only 16% of dove hunters indicated they had hunted on NCWRC game lands sometime during the last five years.
- Dove hunters in the Mountain region appear to hunt on NCWRC game lands (13%) more often than dove hunters in other regions.
- 62% indicated that most of their dove hunting occurs on normal agricultural fields (cut corn) while 17% indicated that most of their dove hunting occurs on areas where crops (millet and sunflower) are grown specifically to attract doves.

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

- 45% of dove hunters were satisfied with how the NCWRC manages doves in North Carolina, while 15% were dissatisfied.
- 45% of dove hunters indicated that a major barrier affecting their dove hunting experience and participation was that public dove hunting areas were too crowded. In addition, 32% indicated that there were no public dove hunting areas near their home as a major barrier.
- Difficulty finding areas to hunt doves on private land and overcrowding on public dove hunting areas appears to be a major barrier affecting hunters in the northern Piedmont and Mountain region more than hunters in other areas.
- 34% of dove hunters indicated that the overall quality of their dove hunting had gotten worse over time compared to 13% that indicated that it had gotten better over time.

### ***Seasonal Hunting Patterns and Opinions on Dove Season Structure***

- Of those respondents that hunted during the 2011-12 season, 74% hunted less than 6 days.
- 70% of dove hunters did not hunt in either the second or third segments of the 2011-12 dove season.
- Of those hunters that hunted during the first segment of the 2011-12 season, 85% indicated that most of their dove hunting occurred during the first two weeks of the first segment.
- 55% of respondents agreed that the NCWRC should keep the current dove hunting season structure, while 10% felt that the current dove season structure should be changed. There were no differences of opinion regarding changes to season structure based on region of hunting or on total number of days hunted.
- When asked specifically if shooting hours should begin one-half hour before sunrise on opening day; 58% of dove hunters agreed, 23% disagreed, 16% were neutral and 2% were unsure.

### **Management Considerations**

- From both statewide and regional perspectives, hunters are supportive of all day shooting for doves on opening day.
- Of the alternative choices provided, there was no support for making changes to the dove season structure. Given the federal frameworks from which to select season dates, hunters are supportive of the current season structure.
- It appears that additional managed dove fields on game lands would be utilized by dove hunters and may ease overcrowding concerns. Additional managed dove fields in the Piedmont and mountains should receive highest priority.
- The NCWRC should consider opportunities to create public dove hunting opportunities on private lands similar to many other southeastern states.

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## **INTRODUCTION**

As measured by numbers of active hunters, dove hunting is the second or third most popular hunting activity in North Carolina (NCWRC-unpublished data). Although participation rates are high, the North Carolina Wildlife Resources Commission (NCWRC) rarely receives questions, comments or concerns from the dove hunting public. This might be because dove hunting regulations rarely change and might be considered relatively liberal. In addition, dove populations tend not to fluctuate widely from year to year and in many locations populations are large enough to allow for good hunting success most years. Other than periodic state surveys to estimate harvest and hunter numbers, to our knowledge, there have been no dove hunter opinion surveys in at least the last 20 years.

The NCWRC solicits public input as part of its process of establishing annual dove hunting regulations. However, carefully designed surveys remain one of the best tools to evaluate hunter opinions because surveys, unlike open public comments, accurately represent the views of hunters statewide (Alessi and Miller 2012). The objectives of this survey were to obtain demographic data and preferences of North Carolina dove hunters regarding regulatory options and other hunting issues. In addition, a better understanding of hunter satisfaction and any potential barriers to dove hunter recruitment and retention are essential when developing programs that may be tailored to dove hunters. Because this survey represents the first statewide survey of dove hunters in many years, results obtained may be used as a baseline for comparison to future surveys.

## **METHODS**

### **Survey Sampling**

The survey was conducted in the late winter and spring of 2012. The US Fish and Wildlife Service (USFWS) Harvest Information Program (HIP) served as the sampling frame for this survey as all dove 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 January 14, 2011 through January 13, 2012 and, according to HIP screening questions, harvested one or more doves the previous season. Our initial intention was to include hunters who indicated they hunted but did not harvest doves, as we believed it important to include the views of this group of hunters. However, upon reviewing the initial sampling frame we discovered that 47% of HIP registrants indicated they hunted but did not “bag” any doves. While we recognize that there is some percentage of hunters that do not bag doves each year, we believe the high percentage reflected in our HIP registration database was considerably inflated and not representative of dove hunters in North Carolina. As we believe this inflated number was likely due to incorrect coding of this question by license vendors, we did not include this group of hunters in our sampling frame in order to avoid surveying large numbers of license holders who did not hunt doves.

### **Survey Instrument Design**

In order to test the survey instrument, we conducted cognitive interviews with a convenience sample of dove hunters (persons known by NCWRC staff prior to the interviews). 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 dove hunting behaviors, views on dove hunting regulations and season structure, barriers to dove hunting and demographics (Appendix A).

### **Survey Implementation**

We contacted a random selection of 6,195 hunting license holders who reported harvesting one or more doves 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 Web Primary group by mail and the Email Primary group by email to ask them to complete the survey online, but during the final survey mailing we gave them the option to complete a paper-based survey. We had valid email addresses for 42% of the license holders in our sampling frame. Because the Email Primary and Email Exclusive groups were contacted by email, and because we found differences in response rates during a 2011 survey of waterfowl hunters based on whether or not individuals had an email address in our automated licensing system (ALVIN), we stratified our sample based on email address in ALVIN.

### **Data Weighting**

To investigate possible nonresponse bias we compared survey respondents with the entire sampling frame for the following variables: state of residence, age, sex, number of doves harvested, type of hunting license and email address. There were differences for all variables except sex and state of residence, and the strength of association between response

and number of doves harvested and email address was minimal. There was evidence of a stronger association between age and type of hunting license and response to the survey. Therefore, we weighted all statewide frequency data based on age and hunting license type (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 ( $\chi^2$ ), *t*-tests 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 tests, *t*-tests or *F*-tests had *P*  $\leq 0.05$  we calculated effect sizes (Cramer's *V* for cross-tabulations and Cohen's *d* or *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). We did not include responses of "unsure" in mean calculations. Due to rounding, percentages may

not total 100% when individual categories were combined. In general, we considered an *eta* and Cramer's *V* statistic  $\geq 0.10$  and a Cohen's *d* value  $\geq 0.20$  worthy of reporting in that they suggested at least a "minimal" relationship.

## RESULTS

### Response Rate

The survey response rates by strata, calculated by omitting incorrect addresses, deceased persons, and persons ineligible to respond, were 51% for Mail Exclusive – no email address in ALVIN, 85% for Mail Exclusive – email address in ALVIN, 36% for Web Primary – no email address in ALVIN, 75% for Web Primary – email address in ALVIN, 67% for Email Primary, 43% for Email Exclusive, and 57% overall (Appendix B, Table 4).

### Dove Hunter Characteristics and Participation

(See Appendix A for response frequencies for all questions)

#### General Demographics

Most (96%) dove hunters lived in North Carolina (Question 31), 96% were male (Question 33), and 51% were 45 years of age or older (Question 34). Thirty-five percent of respondents had at least a Bachelor's degree (Question 32). Fifty-seven percent of dove hunters indicated having a gross household income of \$60,000 or more (Question 35). Fifty-three percent of dove hunters reported spending \$100 or less on things related to dove hunting in the past 12 months (Question 8).

#### General Participation

We asked about general participation in dove hunting in North Carolina. Eighty-percent of respondents hunted doves in North Carolina

sometime during the last 5 years (Question 1). Only respondents who had hunted doves during the last 5 years could respond to the remaining questions in the survey.

Sixty-four percent of dove hunters started dove hunting before 1990 and 8% started dove hunting after 2005 (Question 3). Forty-five percent of dove hunters considered dove hunting to be one of their most important or their most important hunting activity (Question 2). Dove hunters were asked about their participation in North Carolina's dove season over the last five years. The majority (57%) of dove hunters indicated hunting doves each of the last five years (Question 4). Of those dove hunters that indicated that they hunted doves during the 2011-12 season, 75% hunted 1 to five days, while 9% indicated hunting more than 10 days (Question 5). The majority (54%) of dove hunters harvested 15 or fewer doves during the 2011-12 season, while 18% harvested more than 30 doves (Question 6).

Of the five regional choices, dove hunters most often indicated hunting the most days in the last 5 years in the southern Coastal Plain (32%) and the northern Piedmont (29%), while only 4% indicated hunting doves the most days in the mountains (Question 9). Additionally, we asked dove hunters which three counties they dove hunted the most days during the last 5 years (Question 10, Appendix D, Table 1). Respondents most often indicated dove hunting the most days in the following county in each region: Edgecombe (northern Coastal Plain), Robeson (southern Coastal Plain), Wake (northern Piedmont), Union (southern Piedmont) and Burke (mountains).

#### Areas Hunted and Hunting Styles

Dove hunters were asked to identify **all** the areas they hunted doves in North Carolina in

the last 5 years (Question 11). Response percentages included: private property either owned by the respondent or a hunting partner (55%), private property - neither owned or leased (48%) or leased property (39%). Only 16% of dove hunters indicated hunting on game lands during the last 5 years.

When asked to identify the areas where they **most often** hunted doves in North Carolina in the last 5 years, 39% of dove hunters indicated they most often hunted on private property that was owned by them or a hunting partner, while 6% most often hunted on NCWRC game lands (Question 12). Dove hunters in the southern Piedmont (25%) and northern Coastal Plain (25%) appear to hunt on leased land more than expected while dove hunters in the mountains (13%) appear to hunt on NCWRC game lands more often than expected (Appendix C, Table 1).

Dove hunters were asked several questions regarding their use of decoys, shells and retrieving dogs. The majority (61%) of dove hunters have never used traditional silhouette or form decoys (Question 13), while 77% have never used motorized, spinning-wing decoys for dove hunting (Question 14). Most (68%) dove hunters used less than 5 boxes of shells during the 2011-12 season, while 89% used less than 10 boxes of shells (Question 7). Twenty percent of dove hunters typically use a retrieving dog when dove hunting (Question 15).

Most respondents (62%) indicated that the majority of their dove hunting occurs on normal agricultural fields, e.g. cut corn, while 17% indicated that the majority of their dove hunting occurred on areas where crops are grown specifically to attract doves, e.g., millet and sunflower (Question 16). We were also

interested in participation in pay-to-shoot dove hunts. Seventy-six percent of respondents indicated that they have **not** participated in any of these type hunts in the last five years, while 8% indicated that they had participated in pay-to-shoot hunts dove hunts every year for the previous 5 years (Question 17).

### ***Hunting Patterns During the Season***

Dove hunters were asked several questions to determine when during the season their hunting occurs. Of those hunters who indicated that they hunted during the first segment (early September through early October) of the 2011-12 dove season, 19% hunted only one day, 86% hunted less than 7 days while 5% hunted more than 10 days (Question 18). Sixteen percent of hunters indicated that they did not hunt during the first segment of the 2011-12 dove season. During the second dove segment (week of Thanksgiving), 70% of dove hunters indicated they did not hunt during this segment. Similarly, 70% of dove hunters indicated that they did not hunt during the third segment (mid-December through mid-January). We asked a further question to determine more precisely when hunting was occurring within the first segment (Question 19). Of those hunters who indicated hunting during this segment, 20% hunted on opening day only, 56% indicated that most of their dove hunting occurred sometime during the first week while 85% indicated that most of their dove hunting during the first segment occurred sometime during the first two weeks. Fifteen percent of dove hunters who hunted during the first segment indicated that they hunted throughout the segment.

### ***Opinions on Dove Season Structure and Shooting Hours***

Currently, federal frameworks allow the NCWRC to open the dove season no earlier than September 1 and close the season no later than January 15. The current structure for the 70-day dove season in North Carolina includes 3 segments. The first segment typically opens on the first Saturday in September or Labor Day (whichever occurs first) and runs through the first Saturday in October. The second segment opens on the Monday prior to Thanksgiving and continues for the next 6 days. There is a closed period of approximately 3 weeks following the close of the second segment. The third and final segment typically opens in mid-December and runs through January 15<sup>th</sup> or the Saturday prior to January 15<sup>th</sup>. Dove hunters were asked to indicate how much they disagreed or agreed with a series of statements about the current dove season structure (Question 20). Respondents were asked to rate their level of disagreement/agreement on a five point scale (1=Strongly Disagree; 5=Strongly Agree) (Appendix C, Table 2).

There appears to be little support for making changes to the current dove season structure. Ten percent of dove hunters disagreed, 55% agreed, 29% were neutral, and 6% were unsure (mean=3.8) whether or not the NCWRC should keep the current season structure. There were no significant differences of opinion detected based on region of hunting ( $X^2=14.54$ ,  $df=20$ ,  $P=.802$ ).

When asked if NCWRC should do away with the last week of the first segment and add it to the third segment, 37% disagreed, 14% agreed, while 35% were neutral and 14% were unsure (mean=2.5). There were no significant

differences of opinion detected based on region of hunting ( $X^2=29.16$ ,  $df=20$ ,  $P=.085$ ).

When asked if the NCWRC should do away with the last two weeks of the first segment and add them to the third segment, 44% of dove hunters disagreed, 10% agreed, 32% were neutral, and 14% were unsure (mean=2.3). There were no significant differences of opinion detected based on region of hunting ( $X^2=22.23$ ,  $df=20$ ,  $P=.328$ ).

When asked if NCWRC should do away with the 1 week November segment and add it to the third segment, 34% of dove hunters disagreed, 14% agreed, 37% were neutral, and 14% were unsure (mean=2.6). There were no significant differences of opinion detected based on region of hunting ( $X^2=17.91$ ,  $df=20$ ,  $P=.593$ ).

We compared opinions on season structure with hunting participation during the first segment (Appendix C, Tables 3,4). In general, those indicating hunting on opening day only were generally more likely to indicate being neutral or unsure regarding changes to the current dove season structure when compared to respondents that hunted more days during the first segment. Most respondents who hunted throughout the entire first segment were opposed to changes in the dove season structure. Irrespective of how individuals hunted during the first segment, there was more opposition than support to the alternative season structures presented.

Further, we compared opinions on season structure with how many days hunters hunted doves during the 2011-12 season (Appendix C, Tables 5,6). Irrespective of total days hunted, all groups had more opposition than support to the alternative season structures presented. In general, respondents hunting 5 or fewer total

days were more likely to indicate being neutral or unsure than those hunting 6 or more days.

We asked hunters their opinion on shooting hours for doves (Question 21). Respondents were asked to rate their level of disagreement/agreement on a five point scale (1=Strongly Disagree; 5=Strongly Agree) (Appendix C, Table 7). When asked specifically if shooting hours should begin one-half hour before sunrise on opening day, 58% of dove hunters agreed, 23% disagreed, 16% were neutral and 2% were unsure. Conversely, we asked if shooting hours should begin at 12 noon on opening day. Although results were not exactly converse (as one might expect), results were similar in that 49% were opposed to the noon opening, 32% were supportive, 17% were neutral and 2% were unsure. Hunters in all regions agreed with beginning shooting one-half before sunrise; likewise, hunters in all regions disagreed with shooting hours starting at 12 noon on opening day. We found few differences among regions regarding the shooting hour issue (Appendix C, Table 8).

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

We asked several questions about general satisfaction with dove management, quality of hunting in North Carolina and barriers to dove hunting participation. Forty-four percent of dove hunters indicated the overall quality of their dove hunting had gotten worse, compared to when they first started dove hunting, while only 14% indicated it had gotten better (Question 22). In general, those who began dove hunting earlier indicated the quality of their hunting had gotten worse, compared to those who began dove hunting later. (Appendix C, Table 9). Dove hunters in the southern Piedmont were more likely to indicate that the quality of their dove hunting had gotten much

worse over time while dove hunters in the northern Coastal Plain were more likely to indicate that their dove hunting had gotten much better (Appendix C, Table 10).

We asked about general dissatisfaction or satisfaction with management of doves in North Carolina. Of the 6 options, the highest percentage of respondents (31%) indicated that they were neither dissatisfied nor satisfied with how the NCWRC manages doves, although most (45%) were either somewhat satisfied or very satisfied (Question 23).

Dove hunters were asked to identify things that may affect their dove hunting experiences and participation in North Carolina (Question 24). The percentage of dove hunters who indicated the following were **major** barriers affecting their dove hunting experiences and participation were: public dove hunting areas are too crowded – 45%, no public dove hunting areas near my home – 32%, difficult to find areas to hunt doves on private property – 29%, dove populations are too low – 20%, unethical behavior by other hunters – 14%, work or family obligations or health problems – 12%, dove hunting regulations are too confusing – 4%, and dove hunting is too expensive – 2%.

We examined responses in relation to the region most often hunted, (Appendix C, Table 11). Dove hunters who hunted the most days the last five years in the northern Piedmont and mountain regions indicated that finding areas to hunt doves on private land was a major barrier more often than hunters in other regions. In addition, northern Piedmont and mountain dove hunters indicated that public dove hunting areas are too crowded (more often than hunters in other regions). Dove hunters who hunted the most days in the last five years in the mountains

and southern Piedmont regions indicated that no public dove hunting areas near their home was a major barrier to dove hunting more often than hunters in other regions.

### ***Dove Hunting and Wildlife Commission Game Lands***

We asked dove hunters several questions regarding their use of NCWRC game lands and permit hunts. Eighty-five percent of respondents indicated that they have very rarely or never hunted doves on NCWRC game lands, while 5% indicated that they frequently hunt doves on NCWRC game lands (Question 25). Of those respondents who have never or very rarely hunted doves on NCWRC game lands, 67% indicated that they have other places to hunt doves and 40% indicated that there were no game lands near their home as one of their top two reasons for not dove hunting on game lands (Question 26). We asked hunters to list the three game lands that they dove hunted on the most days during the last five years (Question 27, Appendix D, Table 2). The top three game lands statewide included: Butner-Falls of Neuse, Sandhills and Jordan Game Lands. The top game land within each Commission district included: Roanoke River Wetlands (District 1), Holly Shelter (District 2), Butner-Falls of Neuse (District 3), Bladen Lakes State Forest (District 4), Butner-Falls of Neuse (District 5), Sandhills (District 6), Perkins (District 7), South Mountains (District 8) and Sandy Mush (District 9). We also asked hunters their likelihood of dove hunting on game lands if more dove hunting areas were made available near their home (Question 28). A majority (58%) indicated that they were likely to hunt doves on game lands if more areas were made available near their homes, whereas thirty-one percent indicated that they were unlikely to hunt on game lands even if

additional areas were made available near their home. We did not detect a significant relationship between region most often hunted and hunting on game lands if additional areas were made available ( $\chi^2 = 24.20$ ;  $df = 20$ ;  $P = .234$ ). The NCWRC provides a variety of opportunities to hunt on game lands specifically managed for doves. Many of these areas can be hunted only after obtaining a permit through the Permit Hunting Opportunities Program. We asked several questions to determine the general knowledge of the program by dove hunters. Less than half (44%) of dove hunters had heard of the Permit Hunting Opportunities Program (Question 29). Of those dove hunters who had heard of the program, 92% had not applied for any hunts in the last 5 years while 3% had applied for hunts every year for the last 5 years (Question 30).

## **DISCUSSION**

Based on this survey, dove hunters in North Carolina are predominately male and at least 45 years old. Age of dove hunters (51%  $\geq$  45 years) is similar to North Carolina deer hunters (49%  $\geq$  45 years) but considerably older than waterfowl hunters (40%  $\geq$  45 years) (Palmer 2009, Fuller et al. 2011). We caution that hunters less than 16 years of age are underrepresented in the sampling frames for each of these surveys because many are not required to be HIP certified and/or licensed. Compared to surveys of deer hunters and waterfowl hunters in North Carolina (Palmer 2009, Fuller et al. 2011), dove hunters in North Carolina had intermediate levels of education, with 35% of dove hunters having a Bachelor's or graduate degree compared to 20% of deer hunters and 42% of waterfowl hunters. Likewise, North Carolina dove hunters reported intermediate levels of gross household income (57%  $\geq$  \$60,000)

compared to deer hunters (43%  $\geq$  \$60,000) and waterfowl hunters (65%  $\geq$  \$60,000) in North Carolina.

Only 15% of dove hunters were dissatisfied with how the NCWRC manages doves in North Carolina. We note that 40% were either neutral or unsure of their opinion. This is most likely because dove hunting regulations (bag limits and season length) have remained relatively unchanged for many years and that other than game lands dove field management, many hunters likely are unaware of other dove management activities conducted by the NCWRC.

Not unexpectedly, most dove hunting occurs on private lands. With increasing urbanization, changing land use patterns and ownership, we are interested in seeing if dove hunting and land ownership patterns change over time. It is increasingly difficult to simply obtain permission to hunt private property and future surveys should track this issue as it relates to dove hunting. We found that only 6% of dove hunters **most** often hunt on NCWRC game lands and this is similar to that reported by waterfowl hunters (7%) (Fuller et al. 2011). While this is a relatively small percentage of statewide dove hunters; this translates to approximately 3,000 to 4,000 hunters<sup>1</sup> using a relatively small land base as we suspect that a very high percentage of game land dove hunters hunt exclusively on managed dove fields on game lands. Hunters in the mountains use game lands for dove hunting more often than dove hunters in other regions.

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<sup>1</sup> Calculated by multiplying total number of dove hunters by 6%. Total numbers of dove hunters estimated through the Harvest Information Program (HIP) (Raftovich et al. 2012) and through statewide hunter harvest surveys conducted by the NCWRC (unpublished data).

North Carolina dove hunters most often reported crowding of public dove hunting areas, a lack of nearby public dove hunting areas and access to private property as major barriers affecting their dove hunting experiences. Dove hunters in the northern Piedmont and mountains reported difficulty finding areas to hunt dove on private land and overcrowding at public areas at a higher rate than dove hunters in other regions. In addition, dove hunters in the mountains and southern Piedmont report having no nearby public dove hunting areas at a higher rate than dove hunters in other regions.

When we asked dove hunters if they were likely to hunt on game lands if more dove hunting areas were made available near their home, 58% indicated they would do so. Considering the applicable questions collectively, it would appear that additional managed dove fields on game lands would be used by dove hunters and may ease overcrowding concerns. Additional managed dove fields in the Piedmont and mountains should receive highest priority. As an alternative to developing additional managed dove fields on NCWRC game lands, consideration should be given to offering public dove hunting opportunities on private lands. At least 7 southeastern states contract with private landowners to provide public dove hunting opportunities (EMU Dove Technical Committee, unpublished data). All of these states also provide managed dove fields on public lands, therefore these "additional" managed fields are used to complement existing public lands offerings. Further, Shulz et al. (2003) recommend that increased public dove hunting opportunities near urban areas as a means to increased hunter retention and recruitment.

Anecdotally, we recognize that many dove hunters hunt only a few days and most of the effort is centered on opening day and the first several weeks of the season occurring in September. According to the survey, 79% of dove hunters hunted fewer than 6 days for the entire 70-day season while 85% of hunting occurring during the first segment was during the first two weeks. Further, 70% of dove hunters did not participate in the second or third segments of the 2011-12 dove season.

Unlike hunting of some species, dove hunting requires a minimum of equipment. Accordingly, 81% of dove hunters reported spending \$200 or less on dove hunting. This compares to only 23% of waterfowl hunters who reported spending \$250 or less on waterfowl hunting (Fuller et al. 2011). The majority (68%) of dove hunters use less than 5 boxes of shells during the season. Given an average of \$8/box, the majority of dove hunters spend no more than \$32 (\$8 x 4 boxes) each season on ammunition for dove hunting.

The majority of dove hunters (61%) never use traditional silhouette or form decoys for dove hunting. These types of decoys have been on the market for a number of years, so this figure may represent the maximum usage for these types of decoys. Motorized, spinning wing type decoys are relatively new to the market and 77% of hunters indicated never using a motorized decoy. Evidence to date does not suggest that the use of motorized decoys for dove hunting affects harvest or crippling rates (Steven Hayslette, Tennessee Tech University, unpublished data); however, future surveys of dove hunters may want to include questions to measure use of these devices.

Traditionally, most dove hunting has occurred in grain, e.g. corn, fields; post-harvest and we note that 78% of dove hunters currently utilize “normal” agricultural grain fields. Use of traditional, privately owned grain fields will continue to provide the bulk of dove hunting opportunities in the foreseeable future. As described above, providing public access to strategically located private fields would likely be welcomed by dove hunters. Anecdotally, we suspect that the development of fields managed specifically for dove hunting has increased over time and 17% of dove hunters indicated that most of their dove hunting does occur on these areas. Future surveys of dove hunters should measure hunting patterns in relation to crop type. Increases in reliance on “managed” fields for dove hunting would suggest a more-proactive and perhaps more costly approach to dove hunting. We also suspect that participation in pay-to-shoot dove hunts has increased over time and 8% of dove hunters indicated that they have participated in at least one of these type hunts every year for the last 5 years. We believe it important to track participation in these type hunts in future iterations of dove hunter opinion surveys, primarily to simply understand how hunters pursue the sport of dove hunting. Pay-to-shoot dove hunts provide a relatively simple way to hunt doves, especially in an increasingly urbanized environment where obtaining permission to hunt private property and lack of public dove hunting areas is seen as a barrier to participation.

The NCWRC typically receives few comments (pro or con) regarding dove hunting season dates, but we were interested in opinions of dove hunters regarding several possible season structure alternatives. From both statewide and regional perspectives, there was support

for retaining the current dove season structure in North Carolina (mean score=3.8). Conversely, there was little statewide or regional support for any of the alternative season structures presented. Based on results from this survey, we know that the majority of dove hunting occurs very early in the first segment. We were interested to know if opinions from “avid” dove hunters differed from the overall dove hunting public. We attempted to test this by seeing if responses varied to the season options based on either their hunting patterns during the first segment or the total number of days hunted throughout the entire season. Many dove hunters who hunt only a few days during the early season were either neutral or unsure about possible alternatives to the current dove season structure. This might be expected as the various alternatives listed would not have impacted the early portion (first two weeks) of the first segment. However, the relatively small percentage of dove hunters who indicated that they hunted throughout the entire first segment strongly disagreed with any changes to the current structure. Further, there was no evidence to indicate that dove hunters who hunted more than 10 days throughout the season had different opinions regarding season options than those who hunted only a few days. In general, there appears to be no support to modify the current season structure by a majority of dove hunters based on region hunted, hunting participation during the first segment or total number of days hunted throughout the season.

Since the early 1970’s, shooting hours for doves have varied considerably. In recent years (2008-11 and also 1992 and 1993), shooting hours were restricted to noon until sunset on opening day only. Past restrictions have

included noon until sunset shooting hours for the first week of the season (1994-2007) and the entire first segment (1980-84). Restricted shooting hours were also in place from 1972-79 where noon to sunset shooting occurred for the entire season. In contrast, there were no restrictions to shooting hours from 1985-91. The U.S. Fish and Wildlife Service does not place additional shooting hour restrictions beyond the ½ hour before sunrise to sunset time period; therefore, past restrictions have been a NCWRC decision. Shooting hours has been considered a somewhat contentious issue for some as there is a tradition in some areas of the state for a noon-time meal or “pig-picking” with family and friends followed by an afternoon dove hunt. Concerns have also been expressed for hunters double bagging, i.e., illegally taking 2 limits of doves (one in a morning hunt and one in an afternoon hunt). From a statewide and regional perspective, dove hunters were generally supportive of all day shooting on the opening day of dove season. For the 2012-13 season, the NCWRC is allowing all day hunting throughout the season, including opening day.

Most dove hunters were unaware of the NCWRC’s Permit Hunting Opportunities Program. This is in contrast to waterfowl hunters, where 72% of waterfowl hunters were aware of the program. Press releases or targeted magazine articles could be used to increase awareness of the program for dove hunters; however, currently nearly all available permits are being used for all hunts. Adding additional applications from dove hunters without increasing the number of permits or hunt areas would simply decrease the chances of an individual hunter obtaining a permit.

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## **Appendix A: Survey Instrument/Frequencies**

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

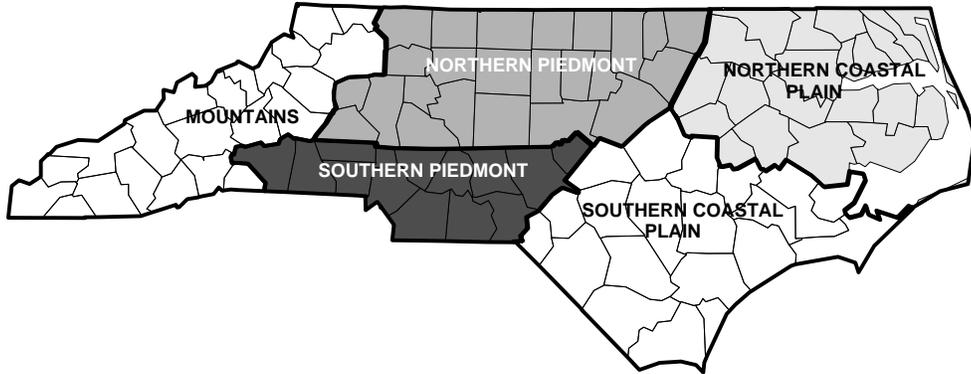
### **General Dove Hunting**

1. Have you hunted mourning doves 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 mourning dove hunting to you? (**check only one**)
  - 4% It's one of my least important hunting activities
  - 20% It's less important than my other hunting activities
  - 30% It's no more important than my other hunting activities
  - 38% It's one of my most important hunting activities
  - 7% It's my most important hunting activity
  
3. When did you start hunting mourning doves? (**check only one**)
  - 26% Before 1970
  - 18% 1970 to 1979
  - 20% 1980 to 1989
  - 18% 1990 to 1999
  - 11% 2000 to 2005
  - 8% 2006 or later
  
4. During which of the last 5 hunting seasons did you hunt doves in North Carolina? (**check all that apply**)
  - 75% 2011-12
  - 84% 2010-11
  - 82% 2009-10
  - 78% 2008-09
  - 78% 2007-08

5. About how many days did you hunt doves during the 2011-12 season in North Carolina? (**check only one**)
- 17% Did not hunt during 2011-12 season (**skip to question 9 on page 4**)
  - 13% 1 day
  - 49% 2 to 5 days
  - 14% 6 to 10 days
  - 8% More than 10 days
6. About how many doves did you personally harvest during the 2011-12 season in North Carolina? (**check only one**)
- 5% 0 doves
  - 49% 1 to 15 doves
  - 28% 16 to 30 doves
  - 14% 31 to 75 doves
  - 4% More than 75 doves
7. About how many boxes of shells did you use for dove hunting during the 2011-12 season in North Carolina? (**check only one**)
- 68% Less than 5 boxes
  - 21% 5 to 9 boxes
  - 7% 10 to 14 boxes
  - 2% 15 to 20 boxes
  - 1% More than 20 boxes
8. About how much money did you spend in North Carolina and outside North Carolina on things related to dove hunting in the past 12 months (for example – ammunition, gear, lodging, food and transportation costs, hunting leases, habitat management)? (**check only one**)
- 53% \$100 or less
  - 28% \$101 to \$200
  - 13% \$201 to \$500
  - 6% Over \$500

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

- 4% Mountains
- 29% Northern Piedmont
- 18% Southern Piedmont
- 17% Northern Coastal Plain
- 32% Southern Coastal Plain



10. In which 3 counties in North Carolina did you dove hunt the most days during the last 5 years?

County Name	
1.	See Appendix D, Table 1
2.	See Appendix D, Table 1
3.	See Appendix D, Table 1

**Areas Hunted and Hunting Styles**

11. Please indicate **all** the areas where you hunted doves in North Carolina in the last 5 years. Note: All national forests in North Carolina are part of the Wildlife Commission game lands program. (**check all that apply**)

- 39% Private property (leased or rented by me or a hunting partner)
- 55% Private property (owned by me or a hunting partner)
- 48% Private property (not owned or leased by me or a hunting partner)
- 16% Wildlife Commission game lands, including national forests
- 3% Other (please specify): \_\_\_\_\_

12. In the last 5 years, where did you **most often** hunt doves in North Carolina?  
Note: All national forests in North Carolina are part of the Wildlife Commission game lands program. (**check only one**)
- 20% Private property (leased or rented by me or a hunting partner)
  - 39% Private property (owned by me or a hunting partner)
  - 33% Private property (not owned or leased by me or a hunting partner)
  - 6% Wildlife Commission game lands, including national forests
  - 2% Other (please specify): \_\_\_\_\_
13. Which of the following best reflects your use of traditional silhouette or form decoys for dove hunting (does not include motorized, spinning-wing decoys)? (**check only one**)
- 9% I almost always use traditional silhouette or form decoys while dove hunting
  - 29% I sometimes use traditional silhouette or form decoys while dove hunting
  - 61% I never use traditional silhouette or form decoys while dove hunting
14. Which of the following best reflects your use of motorized, spinning-wing decoys for dove hunting? (**check only one**)
- 6% I almost always use a motorized, spinning wing decoy or other electronic type decoy while dove hunting
  - 17% I sometimes use a motorized, spinning wing decoy or other electronic type decoy while dove hunting
  - 77% I never use a motorized, spinning wing decoy or other electronic type decoy while dove hunting
15. Do you typically use a retrieving dog while dove hunting?
- 20% Yes
  - 80% No
16. Which of the following best reflects the field crop type for areas you dove hunt (**check only one**)
- 62% Most of my dove hunting occurs on normal agricultural fields (for example – cut corn)
  - 17% Most of my dove hunting occurs on areas where crops are grown specifically to attract doves (for example – millet and sunflower)
  - 16% I hunt about the same amount of time on normal agricultural fields and areas specifically managed for doves
  - 2% Other (please specify): \_\_\_\_\_
  - 2% Unsure

17. Which of the following best reflects your participation in pay-to-shoot dove hunts over the last 5 years? (**check only one**)

- 8% I have participated in one or more pay-to-shoot dove hunts every year for the last 5 years
- 17% I have participated in one or more pay-to-shoot dove hunts for at least one, but not all of the last 5 years
- 76% I have not participated in any pay-to-shoot dove hunts in the last 5 years

**Season Preferences and Satisfaction**

Current federal guidelines allow for a 70 day dove season that may be split into 3 segments. The season can open no earlier than September 1<sup>st</sup> and must end no later than January 15<sup>th</sup>. Currently in North Carolina:

- The 1st segment opens in early September and runs through early October.
- The 2nd segment occurs during the week of Thanksgiving.
- The 3rd segment opens in the middle of December and runs through the middle of January.

18. From the season described above, about how many days did you hunt doves in each segment during the 2011-12 season in North Carolina? (**check one for each segment**)

	Did not hunt during segment	1 day	2 to 6 days	7 to 10 days	More than 10 days
1st segment (September 3 to October 8, 2011)	16%	16%	56%	8%	4%
2nd segment (November 21 to November 26, 2011)	70%	14%	16%		
3rd segment (December 17, 2011 to January 13, 2012)	70%	9%	15%	4%	2%

19. During the 1<sup>st</sup> segment of the 2011-12 dove season (September 3 through October 8), when did **most** of your dove hunting occur? (**check only one**)

- 16% Opening day only
- 31% 1st week
- 24% 1st two weeks
- 12% I hunted throughout the entire 1st segment
- 16% I did not hunt during the 1st segment

20. Considering the current dove season structure as described on the previous page, please indicate how much you disagree or agree with the following statements. (**check one for each statement**) Note: Please review all options before responding.

	<div style="display: flex; justify-content: space-between;"> <span>Strongly Disagree</span> <span>Neutral</span> <span>Strongly Agree</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>←</span> <span></span> <span></span> <span></span> <span>→</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <span>1</span> <span>2</span> <span>3</span> <span>4</span> <span>5</span> </div>					Unsure
The Commission should keep the current dove season structure	5%	5%	29%	19%	36%	6%
The Commission should do away with the last week of the 1st segment and add it to the 3rd segment	26%	11%	35%	7%	7%	14%
The Commission should do away with the last 2 weeks of the 1st segment and add it to the 3rd segment	32%	12%	32%	4%	6%	14%
The Commission should do away with the 1 week November segment and add it to the 3rd segment	25%	9%	37%	7%	8%	14%

Over the past 30 years, legal shooting hours for doves in North Carolina have varied a lot. According to federal guidelines, shooting hours may begin at ½ hour before sunrise throughout the season (including opening day). For the past several years in North Carolina, shooting hours have started at 12 noon on opening day only.

21. Please indicate how much you disagree or agree with the following statements about dove shooting hours. (**check one for each statement**)

	Strongly Disagree		Neutral		Strongly Agree	Unsure
	1	2	3	4	5	
On opening day, shooting hours should begin at ½ hour before sunrise	17%	7%	16%	9%	49%	2%
On opening day only, shooting hours should begin at 12 noon	38%	11%	17%	7%	24%	2%

22. Since you began dove hunting what changes have you seen in the overall quality of your dove hunting in North Carolina? (**check only one**)

- 17% It has gotten much worse
- 27% It has gotten a little worse
- 36% It has stayed about the same
- 10% It has gotten a little better
- 3% It has gotten much better
- 7% Unsure

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

- 5% Very dissatisfied
- 10% Somewhat dissatisfied
- 31% Neither dissatisfied nor satisfied
- 25% Somewhat satisfied
- 20% Very satisfied
- 9% Unsure

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

	Not a Barrier	Minor Barrier	Major Barrier
Difficult to find areas to hunt doves on private property	36%	36%	29%
Public dove hunting areas are too crowded	28%	27%	45%
There are no public dove hunting areas near my home	39%	30%	32%
Dove populations are too low	35%	44%	20%
Disruptive or unethical or behavior by other hunters	53%	33%	14%
Work or family obligations or health problems	53%	35%	12%
Dove hunting is too expensive	78%	20%	2%
Dove hunting regulations are too confusing	75%	21%	4%
Other barrier (please specify):			

### **Dove Hunting and Wildlife Commission Game Lands**

25. Which of the following, best describes your use of N.C. Wildlife Resources Commission game lands for dove hunting during the last 5 years?  
 Note: All national forests in North Carolina are part of the Wildlife Commission game lands program. (**check only one**)

- 85% I have not or very rarely have hunted doves on Commission game lands
- 10% I have occasionally hunted doves on Commission game lands (**skip to question 27**)
- 5% I have frequently hunted doves on Commission game lands (**skip to question 27**)

26. If you **have not or have very rarely** hunted doves on Commission game lands during the last 5 years, what are the **top 2** reasons you did not do so. (**check only two**)

- 40% No dove hunting areas on game lands near my home
- 67% Have other places to dove hunt besides game lands
- 33% Concerned about overcrowding on game lands
- 16% Usually not enough doves on game lands for a worthwhile hunt
- 6% Regulations for hunting on game lands are too confusing
- 5% Other (please specify): \_\_\_\_\_

27. Please list the 3 N.C. Wildlife Resources Commission game lands that you dove hunted most often on in the last 5 years.

Game Land Name	
1.	See Appendix D, Table 2
2.	See Appendix D, Table 2
3.	See Appendix D, Table 2

[ ] I have not or very rarely have hunted doves on Commission game lands

28. If more dove hunting areas on game lands were made available in areas near your home, how unlikely or likely would you be to dove hunt on these areas? (**check only one**)

- 18% Very unlikely
- 12% Somewhat unlikely
- 7% Neither unlikely nor likely
- 28% Somewhat likely
- 30% Very likely
- 4% Unsure

29. 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?

- 44% Yes
- 56% No (**skip to question 31**)

30. Which of the following best describes your participation in dove permit hunts on N.C. Wildlife Resources Commission game lands over the last 5 years? Note: All national forests in North Carolina are part of the Wildlife Commission game lands program. (**check only one**)

3% I have applied for one or more dove permit hunts every year for the last 5 years

5% I have applied for one or more dove permit hunts for at least one, but ***not all*** of the last 5 years

92% I have not applied for any dove permits hunts in the last 5 years

### **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 you are volunteering to participate in this study and you can skip any questions you don't want to answer.

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

96% North Carolina

4% Other (please specify): \_\_\_\_\_

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

6% Less than a high school graduate

21% High school graduate or GED

23% Some college or trade school

16% Associate or trade school degree

26% Bachelor's or four-year degree

9% Graduate or professional degree

33. Are you male or female?

96% Male

4% Female

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

- 0% Under 16
- 14% 16 to 24
- 15% 25 to 34
- 20% 35 to 44
- 21% 45 to 54
- 30% 55 and over

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

- 10% Less than \$20,000
- 15% \$20,000 to \$39,999
- 18% \$40,000 to \$59,999
- 16% \$60,000 to \$79,999
- 14% \$80,000 to \$99,999
- 10% \$100,000 to \$119,999
- 16% \$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 or attach additional sheets.

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

**Dove 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 = 3,596)	Web Primary (N = 1,199)	Email Primary (N = 800)	Email Exclusive (N = 600)
0	2/27/2012	Full survey mailing <sup>b</sup>	Letter invitation to complete survey online	Email invitation to complete survey online	Email invitation to complete survey online
1	3/7/2012	Postcard reminder to complete written survey	Postcard reminder to complete survey online	Email reminder to complete survey online	Email reminder to complete survey online
4	3/26/2012	Full survey mailing <sup>b</sup>	Letter reminder to complete survey online	Email reminder to complete survey online	Email reminder to complete survey online
8	4/23/2012	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.

License Name	Age (yrs.)	Sampling Frame		Respondents		Weight <sup>a</sup>
		Count	%	Count	%	
Age 65 Sportsman	16 to 24	0	0.0%	0	0.0%	-
Comprehensive Hunt	16 to 24	92	3.0%	5	1.5%	18.400
County Hunt (Basic)	16 to 24	34	1.1%	2	0.6%	17.000
Dis Hunt/Inland Fish (Basic)	16 to 24	0	0.0%	0	0.0%	-
Disabled Combo H/F/CRFL Basic	16 to 24	0	0.0%	0	0.0%	-
Disabled Sportsman w CRFL	16 to 24	1	0.0%	0	0.0%	-
Disabled Sportsman	16 to 24	0	0.0%	0	0.0%	-
Hunt/Inland Fish (basic)	16 to 24	91	3.0%	14	4.1%	6.500
Lifetime Comprehensive Hunt	16 to 24	28	0.9%	3	0.9%	9.333
NonRes Sportsman Adult	16 to 24	2	0.1%	0	0.0%	-
NonRes Sportsman Adult w CRFL	16 to 24	0	0.0%	0	0.0%	-
NonRes State Hunt (Basic)	16 to 24	25	0.8%	2	0.6%	12.500
NonRes State Hunt 6-Day	16 to 24	24	0.8%	4	1.2%	6.000
NR Uni Sptm/CRFL Adult	16 to 24	1	0.0%	1	0.3%	1.000

License Name	Age (yrs.)	Sampling Frame		Respondents		Weight <sup>a</sup>
		Count	%	Count	%	
Res Ltime Over 70 Sportsman	16 to 24	0	0.0%	0	0.0%	-
Res Ltime Over 70 Sportsman w CRFL	16 to 24	0	0.0%	0	0.0%	-
Res Sportsman Adult	16 to 24	74	2.4%	8	2.4%	9.250
Res Sportsman Adult w CRFL	16 to 24	98	3.2%	14	4.1%	7.000
Res State Hunt (Basic)	16 to 24	376	12.4%	24	7.1%	15.667
Res Uni Sptm/CRFL Adult	16 to 24	71	2.3%	12	3.6%	5.917
Sportsman	16 to 24	681	22.4%	46	13.6%	14.804
Sportsman Infant	16 to 24	0	0.0%	0	0.0%	-
Sportsman Infant w CRFL	16 to 24	916	30.1%	149	44.1%	6.148
Sportsman Youth	16 to 24	30	1.0%	7	2.1%	4.286
Sportsman Youth w CRFL	16 to 24	262	8.6%	27	8.0%	9.704
Uni Disabled Vet Sptm/CRFL	16 to 24	1	0.0%	0	0.0%	-
Uni Totally Disabled Sptm/CRFL	16 to 24	3	0.1%	0	0.0%	-
Unified Age 65 Sptm/CRFL	16 to 24	0	0.0%	0	0.0%	-
Unified Sptm/CRFL	16 to 24	219	7.2%	19	5.6%	11.526
Unified Sptm/CRFL Youth	16 to 24	11	0.4%	1	0.3%	11.000
Age 65 Sportsman	25 to 34	0	0.0%	0	0.0%	-
Comprehensive Hunt	25 to 34	64	2.1%	6	1.5%	10.667
County Hunt (Basic)	25 to 34	32	1.0%	5	1.2%	6.400
Dis Hunt/Inland Fish (Basic)	25 to 34	0	0.0%	0	0.0%	-
Disabled Combo H/F/CRFL Basic	25 to 34	0	0.0%	0	0.0%	-
Disabled Sportsman w CRFL	25 to 34	1	0.0%	0	0.0%	-
Disabled Sptm	25 to 34	1	0.0%	1	0.2%	1.000
Hunt/Inland Fish (basic)	25 to 34	114	3.7%	15	3.7%	7.600
Ltime Comprehensive Hunt	25 to 34	75	2.4%	17	4.2%	4.412
NonRes Sportsman Adult	25 to 34	2	0.1%	1	0.2%	2.000
NonRes Sportsman Adult w CRFL	25 to 34	7	0.2%	0	0.0%	-
NonRes State Hunt (Basic)	25 to 34	22	0.7%	2	0.5%	11.000
NonRes State Hunt 6-Day	25 to 34	38	1.2%	1	0.2%	38.000
NR Uni Sptm/CRFL Adult	25 to 34	3	0.1%	1	0.2%	3.000
Res Ltime Over 70 Sportsman	25 to 34	0	0.0%	0	0.0%	-
Res Ltime Over 70 Sportsman w CRFL	25 to 34	0	0.0%	0	0.0%	-
Res Sportsman Adult	25 to 34	90	2.9%	12	3.0%	7.500
Res Sportsman Adult w CRFL	25 to 34	366	11.9%	65	16.0%	5.631
Res State Hunt (Basic)	25 to 34	316	10.3%	23	5.7%	13.739
Res Uni Sptm/CRFL Adult	25 to 34	78	2.5%	10	2.5%	7.800
Sportsman	25 to 34	805	26.2%	71	17.5%	11.338
Sportsman Infant	25 to 34	1	0.0%	0	0.0%	-
Sportsman Infant w CRFL	25 to 34	394	12.8%	74	18.3%	5.324
Sportsman Youth	25 to 34	0	0.0%	0	0.0%	-
Sportsman Youth w CRFL	25 to 34	370	12.1%	64	15.8%	5.781
Uni Disabled Vet Sptm/CRFL	25 to 34	7	0.2%	0	0.0%	-
Uni Totally Disabled Sptm/CRFL	25 to 34	3	0.1%	2	0.5%	1.500
Unified Age 65 Sptm/CRFL	25 to 34	0	0.0%	0	0.0%	-
Unified Sptm/CRFL	25 to 34	280	9.1%	35	8.6%	8.000
Unified Sptm/CRFL Youth	25 to 34	0	0.0%	0	0.0%	-

License Name	Age (yrs.)	Sampling Frame		Respondents		Weight <sup>a</sup>
		Count	%	Count	%	
Age 65 Sportsman	35 to 44	0	0.0%	0	0.0%	-
Comprehensive Hunt	35 to 44	56	1.5%	8	1.4%	7.000
County Hunt (Basic)	35 to 44	28	0.8%	1	0.2%	28.000
Dis Hunt/Inland Fish (Basic)	35 to 44	2	0.1%	0	0.0%	-
Disabled Combo H/F/CRFL Basic	35 to 44	3	0.1%	1	0.2%	3.000
Disabled Sportsman w CRFL	35 to 44	14	0.4%	1	0.2%	14.000
Disabled Sptm	35 to 44	12	0.3%	3	0.5%	4.000
Hunt/Inland Fish (basic)	35 to 44	153	4.2%	24	4.1%	6.375
Ltime Comprehensive Hunt	35 to 44	132	3.6%	29	5.0%	4.552
NonRes Sportsman Adult	35 to 44	2	0.1%	0	0.0%	-
NonRes Sportsman Adult w CRFL	35 to 44	12	0.3%	1	0.2%	12.000
NonRes State Hunt (Basic)	35 to 44	38	1.0%	2	0.3%	19.000
NonRes State Hunt 6-Day	35 to 44	40	1.1%	1	0.2%	40.000
NR Uni Sptm/CRFL Adult	35 to 44	0	0.0%	0	0.0%	-
Res Ltime Over 70 Sportsman	35 to 44	0	0.0%	0	0.0%	-
Res Ltime Over 70 Sportsman w CRFL	35 to 44	0	0.0%	0	0.0%	-
Res Sportsman Adult	35 to 44	109	3.0%	29	5.0%	3.759
Res Sportsman Adult w CRFL	35 to 44	1075	29.5%	217	37.1%	4.954
Res State Hunt (Basic)	35 to 44	256	7.0%	23	3.9%	11.130
Res Uni Sptm/CRFL Adult	35 to 44	89	2.4%	19	3.2%	4.684
Sportsman	35 to 44	1013	27.8%	114	19.5%	8.886
Sportsman Infant	35 to 44	0	0.0%	0	0.0%	-
Sportsman Infant w CRFL	35 to 44	1	0.0%	1	0.2%	1.000
Sportsman Youth	35 to 44	0	0.0%	0	0.0%	-
Sportsman Youth w CRFL	35 to 44	204	5.6%	52	8.9%	3.923
Uni Disabled Vet Sptm/CRFL	35 to 44	16	0.4%	4	0.7%	4.000
Uni Totally Disabled Sptm/CRFL	35 to 44	11	0.3%	5	0.9%	2.200
Unified Age 65 Sptm/CRFL	35 to 44	0	0.0%	0	0.0%	-
Unified Sptm/CRFL	35 to 44	378	10.4%	50	8.5%	7.560
Unified Sptm/CRFL Youth	35 to 44	0	0.0%	0	0.0%	-
Age 65 Sportsman	45 to 54	1	0.0%	0	0.0%	-
Comprehensive Hunt	45 to 54	40	1.0%	4	0.5%	10.000
County Hunt (Basic)	45 to 54	20	0.5%	2	0.3%	10.000
Dis Hunt/Inland Fish (Basic)	45 to 54	3	0.1%	2	0.3%	1.500
Disabled Combo H/F/CRFL Basic	45 to 54	6	0.1%	2	0.3%	3.000
Disabled Sportsman w CRFL	45 to 54	61	1.5%	13	1.7%	4.692
Disabled Sptm	45 to 54	19	0.5%	2	0.3%	9.500
Hunt/Inland Fish (basic)	45 to 54	204	4.9%	27	3.5%	7.556
Ltime Comprehensive Hunt	45 to 54	139	3.4%	24	3.1%	5.792
NonRes Sportsman Adult	45 to 54	6	0.1%	2	0.3%	3.000
NonRes Sportsman Adult w CRFL	45 to 54	33	0.8%	2	0.3%	16.500
NonRes State Hunt (Basic)	45 to 54	37	0.9%	5	0.7%	7.400
NonRes State Hunt 6-Day	45 to 54	28	0.7%	7	0.9%	4.000
NR Uni Sptm/CRFL Adult	45 to 54	2	0.0%	0	0.0%	-
Res Ltime Over 70 Sportsman	45 to 54	0	0.0%	0	0.0%	-
Res Ltime Over 70 Sportsman w CRFL	45 to 54	0	0.0%	0	0.0%	-

License Name	Age (yrs.)	Sampling Frame		Respondents		Weight <sup>a</sup>
		Count	%	Count	%	
Res Sportsman Adult	45 to 54	75	1.8%	19	2.5%	3.947
Res Sportsman Adult w CRFL	45 to 54	1758	42.4%	386	50.2%	4.554
Res State Hunt (Basic)	45 to 54	181	4.4%	25	3.3%	7.240
Res Uni Sptm/CRFL Adult	45 to 54	71	1.7%	16	2.1%	4.438
Sportsman	45 to 54	983	23.7%	148	19.2%	6.642
Sportsman Infant	45 to 54	0	0.0%	0	0.0%	-
Sportsman Infant w CRFL	45 to 54	1	0.0%	0	0.0%	-
Sportsman Youth	45 to 54	0	0.0%	0	0.0%	-
Sportsman Youth w CRFL	45 to 54	0	0.0%	0	0.0%	-
Uni Disabled Vet Sptm/CRFL	45 to 54	33	0.8%	5	0.7%	6.600
Uni Totally Disabled Sptm/CRFL	45 to 54	29	0.7%	9	1.2%	3.222
Unified Age 65 Sptm/CRFL	45 to 54	1	0.0%	0	0.0%	-
Unified Sptm/CRFL	45 to 54	413	10.0%	69	9.0%	5.986
Unified Sptm/CRFL Youth	45 to 54	0	0.0%	0	0.0%	-
Age 65 Sportsman	≥55	547	8.5%	103	7.4%	5.311
Comprehensive Hunt	≥55	28	0.4%	9	0.6%	3.111
County Hunt (Basic)	≥55	13	0.2%	0	0.0%	-
Dis Hunt/Inland Fish (Basic)	≥55	17	0.3%	4	0.3%	4.250
Disabled Combo H/F/CRFL Basic	≥55	52	0.8%	10	0.7%	5.200
Disabled Sportsman w CRFL	≥55	167	2.6%	33	2.4%	5.061
Disabled Sptm	≥55	44	0.7%	7	0.5%	6.286
Hunt/Inland Fish (basic)	≥55	198	3.1%	40	2.9%	4.950
Ltime Comprehensive Hunt	≥55	129	2.0%	21	1.5%	6.143
NonRes Sportsman Adult	≥55	5	0.1%	2	0.1%	2.500
NonRes Sportsman Adult w CRFL	≥55	75	1.2%	14	1.0%	5.357
NonRes State Hunt (Basic)	≥55	78	1.2%	14	1.0%	5.571
NonRes State Hunt 6-Day	≥55	29	0.4%	8	0.6%	3.625
NR Uni Sptm/CRFL Adult	≥55	1	0.0%	0	0.0%	-
Res Ltime Over 70 Sportsman	≥55	88	1.4%	16	1.1%	5.500
Res Ltime Over 70 Sportsman w CRFL	≥55	378	5.8%	84	6.0%	4.500
Res Sportsman Adult	≥55	29	0.4%	6	0.4%	4.833
Res Sportsman Adult w CRFL	≥55	2434	37.6%	621	44.5%	3.919
Res State Hunt (Basic)	≥55	149	2.3%	29	2.1%	5.138
Res Uni Sptm/CRFL Adult	≥55	24	0.4%	6	0.4%	4.000
Sportsman	≥55	665	10.3%	96	6.9%	6.927
Sportsman Infant	≥55	0	0.0%	0	0.0%	-
Sportsman Infant w CRFL	≥55	0	0.0%	0	0.0%	-
Sportsman Youth	≥55	0	0.0%	0	0.0%	-
Sportsman Youth w CRFL	≥55	0	0.0%	0	0.0%	-
Uni Disabled Vet Sptm/CRFL	≥55	33	0.5%	6	0.4%	5.500
Uni Totally Disabled Sptm/CRFL	≥55	61	0.9%	14	1.0%	4.357
Unified Age 65 Sptm/CRFL	≥55	829	12.8%	170	12.2%	4.876
Unified Sptm/CRFL	≥55	393	6.1%	82	5.9%	4.793
Unified Sptm/CRFL Youth	≥55	0	0.0%	0	0.0%	-

<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
Cohen's <i>d</i>	.20	.50	.80

Table 4. Final disposition of contacts and response rates.

	Survey Method						Overall
	Mail Exclusive		Web Primary		Email Primary	Email Exclusive	
	No Email in ALVIN	Email in ALVIN	No Email in ALVIN	Email in ALVIN	Email in ALVIN	Email in ALVIN	
Total sent	3196	400	399	800	800	600	6195
Responded	1624	338	140	599	535	256	3492
Incorrect address	38	2	5	3	0	0	48
Deceased	3	0	1	0	0	0	4
Ineligible	1	0	0	2	0	0	3
Refusal	19	0	1	2	1	2	25
No response	1511	60	252	194	264	342	2623
Adjusted response rate	51%	85%	36%	75%	67%	43%	57%

**Appendix C: Cross-tabulations  
& Statewide Disagreement/Agreement scores**

Table 1. Area dove hunted (Question 12) by dove hunting region (Question 9) as reported during a 2012 survey of North Carolina dove hunters.

Please indicate the region in North Carolina in which you dove hunted the most days during the last 5 years. <sup>a</sup>					
In the last 5 years, where did you most often hunt doves in North Carolina?	Mountains	Northern Piedmont	Southern Piedmont	Northern Coastal Plain	Southern Coastal Plain
Private property (leased or rented by me or a hunting partner)	12% <sup>b</sup>	17% <sup>b</sup>	25% <sup>c</sup>	25% <sup>c</sup>	18%
Private property (owned by me or a hunting partner)	30%	42%	39%	37%	39%
Private property (not owned or leased by me or a hunting partner)	45% <sup>c</sup>	33%	28% <sup>b</sup>	33%	37% <sup>c</sup>
Wildlife Commission game lands	13% <sup>c</sup>	7%	7%	3% <sup>b</sup>	5%
Other (please specify):	1%	1%	2%	2%	2%

<sup>a</sup>  $\chi^2 = 56.27$ ;  $df = 16$ ;  $P = < .001$ ; Cramer's  $V = .073$

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

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

Table 2. Mean statewide disagreement/agreement scores regarding statements about the dove season structure in North Carolina (Question 20). (1=strongly disagree, 5=strongly agree)

Statement	Mean Score
The Commission should keep the current dove season structure.	3.8
The Commission should do away with the last week of the 1st segment and add it to the 3rd segment.	2.5
The Commission should do away with the last 2 weeks of the 1st segment and add them to the 3rd segment.	2.3
The Commission should do away with the 1 week November segment and add it to the 3rd segment.	2.6

Table 3. Opinions on dove season structure (Question 20) by when most of dove hunting occurs during the 1<sup>st</sup> segment (Question 19) as reported during a 2012 survey of North Carolina dove hunters.

		During the 1 <sup>st</sup> segment of the 2011-12 dove season, when did most of your dove hunting occur?				
Please indicate how much you disagree or agree with the following statements about the dove season structure. (1=Strongly Disagree; 5=Strongly Agree)		Opening day only	1 <sup>st</sup> week	1 <sup>st</sup> two weeks	I hunted throughout the entire 1 <sup>st</sup> segment	I did not hunt during the 1 <sup>st</sup> segment
The Commission should keep the current dove season structure. <sup>a</sup>	1	5%	6%	6%	5%	4%
	2	5%	5%	6%	3%	5%
	3	30%	26%	30%	21% <sup>f</sup>	34% <sup>e</sup>
	4	16%	20%	20%	20%	17%
	5	36%	40%	34%	47% <sup>e</sup>	30% <sup>f</sup>
	Unsure	8%	4% <sup>f</sup>	4%	4%	10% <sup>e</sup>
The Commission should do away with the last week of the 1 <sup>st</sup> segment and add it to the 3 <sup>rd</sup> segment. <sup>b</sup>	1	20% <sup>f</sup>	24%	28%	44% <sup>e</sup>	22% <sup>f</sup>
	2	8%	9%	13% <sup>e</sup>	15% <sup>e</sup>	9%
	3	42% <sup>e</sup>	37%	31%	19% <sup>f</sup>	38%
	4	3% <sup>f</sup>	8%	10% <sup>e</sup>	6%	7%
	5	7%	8%	8%	8%	7%
	Unsure	19% <sup>e</sup>	14%	10% <sup>f</sup>	8% <sup>f</sup>	17% <sup>e</sup>
The Commission should do away with the last 2 weeks of the first segment and add it to the 3 <sup>rd</sup> segment. <sup>c</sup>	1	25% <sup>f</sup>	30%	33%	55% <sup>e</sup>	25% <sup>f</sup>
	2	8% <sup>f</sup>	11%	13%	14%	9%
	3	41% <sup>e</sup>	34%	32%	17% <sup>f</sup>	36%
	4	2% <sup>f</sup>	4%	6% <sup>e</sup>	2%	5%
	5	4%	7%	6%	6%	7%
	Unsure	20% <sup>e</sup>	14%	10% <sup>f</sup>	6% <sup>f</sup>	18% <sup>e</sup>
The Commission should do away with the 1 week November segment and add it to the 3 <sup>rd</sup> segment. <sup>d</sup>	1	19% <sup>f</sup>	25%	22%	41% <sup>e</sup>	25%
	2	7%	8%	12% <sup>e</sup>	8%	7%
	3	44% <sup>e</sup>	38%	37%	24% <sup>f</sup>	39%
	4	4% <sup>f</sup>	7%	9% <sup>e</sup>	7%	6%
	5	7%	7%	9%	12% <sup>e</sup>	7%
	Unsure	20% <sup>e</sup>	15%	11% <sup>f</sup>	7% <sup>f</sup>	16%

<sup>a</sup>  $\chi^2 = 61.63$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .08$

<sup>b</sup>  $\chi^2 = 124.44$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .11$

<sup>c</sup>  $\chi^2 = 146.52$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .12$

<sup>d</sup>  $\chi^2 = 107.23$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .11$

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

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

Table 4. Mean disagreement/agreement<sup>a</sup> with dove season structure options (Question 20) by when most of dove hunting occurs during the 1<sup>st</sup> segment (Question 19) as reported during a 2012 survey of North Carolina dove hunters. Means within rows with the same letter were significantly different at  $P < .05$  based on Tukey or Tamhane's T2 methods.

	During the 1 <sup>st</sup> segment of the 2011-12 dove season, when did most of your dove hunting occur?					<i>F</i>	<i>P</i>	<i>eta</i>
	Opening day only	1 <sup>st</sup> week	1 <sup>st</sup> two weeks	I hunted throughout the entire 1 <sup>st</sup> segment	I did not hunt during the 1 <sup>st</sup> segment			
The Commission should keep the current dove season structure.	3.8	3.9	3.7 <sup>A</sup>	4.0 <sup>AB</sup>	3.7 <sup>B</sup>	4.38	.002	.085
The Commission should do away with the last week of the 1 <sup>st</sup> segment and add it to the 3 <sup>rd</sup> segment.	2.6 <sup>A</sup>	2.6 <sup>B</sup>	2.5 <sup>C</sup>	2.1 <sup>ABCD</sup>	2.6 <sup>D</sup>	7.93	<.001	.123
The Commission should do away with the last 2 weeks of the first segment and add it to the 3 <sup>rd</sup> segment.	2.4 <sup>A</sup>	2.4 <sup>B</sup>	2.3 <sup>C</sup>	1.8 <sup>ABCD</sup>	2.5 <sup>D</sup>	13.87	<.001	.162
The Commission should do away with the 1 week November segment and add it to the 3 <sup>rd</sup> segment.	2.7	2.6	2.7 <sup>A</sup>	2.4 <sup>A</sup>	2.5	3.20	.012	.078

<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.

Table 5. Opinions on dove season structure (Question 20) by how many days did you dove hunt during the 2011-12 season (Question 5) as reported during a 2012 survey of North Carolina dove hunters.

		About how many days did you hunt doves during the 2011-12 season in North Carolina?				
Please indicate how much you disagree or agree with the following statements about the dove season structure. (1=Strongly Disagree; 5=Strongly Agree)		Did not hunt during the 2011-12 season	1 day	2 to 5 days	6 to 10 days	More than 10 days
The Commission should keep the current dove season structure. <sup>a</sup>	1	4%	2% <sup>f</sup>	6%	5%	10% <sup>e</sup>
	2	4%	3%	5%	6%	8% <sup>e</sup>
	3	31%	31%	28%	27%	23%
	4	20%	18%	20%	22%	13% <sup>f</sup>
	5	30% <sup>f</sup>	36%	38%	37%	43%
	Unsure	10% <sup>e</sup>	9% <sup>e</sup>	4% <sup>f</sup>	3% <sup>f</sup>	3%
The Commission should do away with the last week of the 1 <sup>st</sup> segment and add it to the 3 <sup>rd</sup> segment. <sup>b</sup>	1	22% <sup>f</sup>	17% <sup>f</sup>	25%	32% <sup>e</sup>	45% <sup>e</sup>
	2	11%	8%	10%	16% <sup>e</sup>	9%
	3	37%	43% <sup>e</sup>	37% <sup>e</sup>	26% <sup>f</sup>	14% <sup>f</sup>
	4	6%	6%	7%	9%	9%
	5	5% <sup>f</sup>	4% <sup>f</sup>	8%	9%	16% <sup>e</sup>
	Unsure	18% <sup>e</sup>	22% <sup>e</sup>	13%	8% <sup>f</sup>	6% <sup>f</sup>
The Commission should do away with the last 2 weeks of the first segment and add it to the 3 <sup>rd</sup> segment. <sup>c</sup>	1	26% <sup>f</sup>	21% <sup>f</sup>	32%	38% <sup>e</sup>	49% <sup>e</sup>
	2	12%	7% <sup>f</sup>	11%	19% <sup>e</sup>	10%
	3	34%	42% <sup>e</sup>	34%	23% <sup>f</sup>	19% <sup>f</sup>
	4	3%	4%	4%	4%	3%
	5	6%	4% <sup>f</sup>	6%	8%	11% <sup>e</sup>
	Unsure	19% <sup>e</sup>	22% <sup>e</sup>	12%	8% <sup>f</sup>	7% <sup>f</sup>
The Commission should do away with the 1 week November segment and add it to the 3 <sup>rd</sup> segment. <sup>d</sup>	1	22%	16% <sup>f</sup>	23%	32% <sup>e</sup>	45% <sup>e</sup>
	2	9%	7%	9%	11%	7%
	3	39%	45% <sup>e</sup>	39%	31% <sup>f</sup>	18% <sup>f</sup>
	4	5%	6%	7%	8%	10%
	5	6%	6%	8%	11% <sup>e</sup>	13% <sup>e</sup>
	Unsure	19% <sup>e</sup>	21% <sup>e</sup>	14%	7% <sup>f</sup>	7% <sup>f</sup>

<sup>a</sup>  $\chi^2 = 82.60$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .09$

<sup>b</sup>  $\chi^2 = 162.44$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .13$

<sup>c</sup>  $\chi^2 = 141.38$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .12$

<sup>d</sup>  $\chi^2 = 134.90$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .12$

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

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

Table 6. Mean disagreement/agreement<sup>a</sup> with dove season structure options (Question 20) by how many days did you dove hunt during the 2011-12 season (Question 5) as reported during a 2012 survey of North Carolina dove hunters. Means within rows with the same letter were significantly different at  $P < .05$  based on Tukey or Tamhane's T2 methods.

	About how many days did you hunt doves during the 2011-12 season in North Carolina?					<i>F</i>	<i>P</i>	<i>eta</i> <sup>b</sup>
	Did not hunt during the 2011-12 season	1 day	2 to 5 days	6 to 10 days	More than 10 days			
The Commission should keep the current dove season structure.	3.8	3.9	3.8	3.8	3.7	1.14	.334	-
The Commission should do away with the last week of the 1 <sup>st</sup> segment and add it to the 3 <sup>rd</sup> segment.	2.5	2.6	2.6	2.4	2.4	1.88	.111	-
The Commission should do away with the last 2 weeks of the first segment and add it to the 3 <sup>rd</sup> segment.	2.4	2.5 <sup>AB</sup>	2.3	2.2 <sup>A</sup>	2.1 <sup>B</sup>	3.87	.004	.084
The Commission should do away with the 1 week November segment and add it to the 3 <sup>rd</sup> segment.	2.6	2.7	2.6	2.5	2.4	2.65	.032	.070

<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 7. Mean statewide disagreement/agreement scores regarding statements about shooting hours for doves (Question 21). (1=strongly disagree, 5=strongly agree)

Statement	Mean Score
On opening day, shooting hours should begin at ½ hour before sunrise	3.7
On opening day only, shooting hours should begin at 12 noon	2.7

Table 8. Opinions on dove shooting hours (Question 21) by dove hunting region (Question 9) as reported during a 2012 survey of North Carolina dove hunters.

		Please indicate the region in North Carolina in which you dove hunted the most days during the last 5 years.				
Please indicate how much you disagree or agree with the following statements about dove shooting hours. (1=Strongly Disagree; 5=Strongly Agree)		Mountains	Northern Piedmont	Southern Piedmont	Northern Coastal Plain	Southern Coastal Plain
On opening day, shooting hours should begin at ½ hour before sunrise. <sup>a</sup>	1	14%	16%	15%	18%	21% <sup>c</sup>
	2	5%	8%	5%	8%	7%
	3	9%	16%	17%	18%	15%
	4	10%	10%	10%	9%	8%
	5	59% <sup>c</sup>	48%	49%	45%	48%
	Unsure	2%	2%	3%	3%	2%
On opening day only, shooting hours should begin at 12 noon. <sup>b</sup>	1	47% <sup>c</sup>	37%	38%	36%	36%
	2	11%	12%	12%	11%	9% <sup>d</sup>
	3	13%	17%	19%	17%	16%
	4	6%	8%	7%	8%	8%
	5	20%	25%	22%	25%	30% <sup>c</sup>
	Unsure	3%	1% <sup>d</sup>	3%	3% <sup>c</sup>	2%

<sup>a</sup>  $\chi^2 = 31.78$ ;  $df = 20$ ;  $P = .046$ ; Cramer's  $V = .06$

<sup>b</sup>  $\chi^2 = 29.59$ ;  $df = 20$ ;  $P = .077$ ; Cramer's  $V = .05$

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

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

Table 9. Opinions on changes in dove hunting quality (Question 22) by when started hunting doves (Question 3).

Since you began dove hunting what changes have you seen in the overall quality of your dove hunting in North Carolina?	When did you start hunting mourning doves? <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	25% <sup>b</sup>	21% <sup>b</sup>	15%	11% <sup>c</sup>	7% <sup>c</sup>	7% <sup>c</sup>
It has gotten a little worse	26%	31% <sup>b</sup>	29%	27%	28%	20% <sup>c</sup>
It has stayed about the same	32% <sup>c</sup>	32%	37%	42% <sup>b</sup>	42% <sup>b</sup>	37%
It has gotten a little better	10%	10%	9%	9%	13%	9%
It has gotten much better	3%	2% <sup>c</sup>	4%	4%	3%	4%
Unsure	4% <sup>c</sup>	4% <sup>c</sup>	7%	6%	8%	23% <sup>b</sup>

<sup>a</sup>  $\chi^2 = 182.58$ ;  $df = 25$ ;  $P < .001$ ; Cramer's  $V = .12$

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

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

Table 10. Opinions on changes in dove hunting quality (Question 22) by region most often dove hunted (Question 9).

Please indicate the region in North Carolina in which you dove hunted the most days during the last 5 years. <sup>a</sup>					
Since you began dove hunting what changes have you seen in the overall quality of your dove hunting in North Carolina?	Mountains	Northern Piedmont	Southern Piedmont	Northern Coastal Plain	Southern Coastal Plain
It has gotten much worse	24%	19%	25% <sup>b</sup>	13% <sup>c</sup>	14% <sup>c</sup>
It has gotten a little worse	29%	33% <sup>b</sup>	27%	21% <sup>c</sup>	27%
It has stayed about the same	29%	33%	30% <sup>c</sup>	41% <sup>b</sup>	39% <sup>b</sup>
It has gotten a little better	10%	9%	9%	12%	11%
It has gotten much better	2%	1% <sup>c</sup>	4%	5% <sup>b</sup>	3%
Unsure	7%	5%	7%	7%	7%

<sup>a</sup>  $\chi^2 = 85.21$ ;  $df = 20$ ;  $P < .001$ ; Cramer's  $V = .09$

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

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

Table 11. Barriers to dove hunting (Question 24) by dove hunting region (Question 9) as reported during a 2011 survey of North Carolina dove hunters.

Please indicate which of the following are not barriers, minor barriers, or major barriers to your dove hunting in North Carolina		Please indicate the region in North Carolina in which you dove hunted the most days during the last 5 years.				
		Mountains	Northern Piedmont	Southern Piedmont	Northern Coastal Plain	Southern Coastal Plain
Difficult to find areas to hunt doves on private land <sup>a</sup>	Not a Barrier	19% <sup>f</sup>	33%	32%	43% <sup>e</sup>	38%
	Minor Barrier	29%	33%	37%	36%	38%
	Major Barrier	52% <sup>e</sup>	33% <sup>e</sup>	31%	21% <sup>f</sup>	24% <sup>f</sup>
Public dove hunting areas are too crowded <sup>b</sup>	Not a Barrier	20%	26%	27%	36% <sup>e</sup>	27%
	Minor Barrier	21%	26%	29%	28%	29%
	Major Barrier	59% <sup>e</sup>	48% <sup>e</sup>	44%	36% <sup>f</sup>	44%
There are no public dove hunting areas near my home <sup>c</sup>	Not a Barrier	27% <sup>f</sup>	37%	35%	43%	42% <sup>e</sup>
	Minor Barrier	28%	35% <sup>e</sup>	28%	30%	29%
	Major Barrier	46% <sup>e</sup>	29%	37% <sup>e</sup>	27%	28%
Dove populations are too low <sup>d</sup>	Not a Barrier	25% <sup>f</sup>	32% <sup>f</sup>	27% <sup>f</sup>	44% <sup>e</sup>	40% <sup>e</sup>
	Minor Barrier	42%	44%	46%	42%	43%
	Major Barrier	33% <sup>e</sup>	23% <sup>e</sup>	27% <sup>e</sup>	13% <sup>f</sup>	17% <sup>f</sup>

<sup>a</sup>  $\chi^2 = 68.02$ ;  $df = 8$ ;  $P = < .001$ ; Cramer's  $V = .11$

<sup>b</sup>  $\chi^2 = 32.41$ ;  $df = 8$ ;  $P = < .001$ ; Cramer's  $V = .08$

<sup>c</sup>  $\chi^2 = 35.12$ ;  $df = 8$ ;  $P = < .001$ ; Cramer's  $V = .08$

<sup>d</sup>  $\chi^2 = 68.68$ ;  $df = 8$ ;  $P = < .001$ ; Cramer's  $V = .11$

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

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

**Appendix D: Frequency Distributions of County Most Often Dove Hunted and Game Land Most Often Dove Hunted**

Table 1. Percent frequency of county listed as top 3 counties dove hunted the most days during the last 5 years.

County	% of total responses	County	% of total responses	County	% of total responses
Wake	5.0%	Carteret	2.3%	Tyrrell	0.6%
Iredell	4.2%	Richmond	2.3%	McDowell	0.4%
Robeson	4.2%	Onslow	2.2%	Ashe	0.3%
Duplin	3.8%	Cleveland	2.0%	Chatham	0.3%
Pender	3.7%	Franklin	2.0%	Polk	0.3%
Randolph	3.7%	Bertie	1.8%	Haywood	0.2%
Union	3.7%	Scotland	1.8%	Catawba	0.2%
Rowan	3.7%	Yadkin	1.8%	Alleghany	0.2%
Davidson	3.7%	Durham	1.7%	Macon	0.2%
Bladen	3.7%	Orange	1.7%	Jackson	0.2%
Lincoln	3.5%	Cabarrus	1.7%	Watauga	0.2%
Johnston	3.5%	Wilson	1.7%	Clay	0.1%
Sampson	3.4%	Caldwell	1.6%	Transylvania	0.1%
Pitt	3.3%	Northampton	1.6%	Avery	0.1%
Wayne	3.3%	Gaston	1.6%	Madison	0.1%
Edgecombe	3.3%	Washington	1.5%	Mitchell	<0.1%
Harnett	3.3%	Pamlico	1.5%	Swain	<0.1%
Guilford	3.2%	Martin	1.5%	Dare	<0.1%
Cumberland	3.1%	Greene	1.4%	Chowan	<0.1%
Halifax	3.0%	Warren	1.3%	Lee	<0.1%
Moore	3.0%	Currituck	1.3%	Yancey	<0.1%
Beaufort	3.0%	New Hanover	1.2%		
Craven	3.0%	Alexander	1.2%		
Anson	3.0%	Perquimans	1.2%		
Hyde	2.9%	Mecklenburg	1.2%		
Lenoir	2.9%	Forsyth	1.1%		
Caswell	2.9%	Hoke	1.1%		
Nash	2.7%	Stokes	1.1%		
Rockingham	2.6%	Surry	1.0%		
Columbus	2.5%	Hertford	1.0%		
Alamance	2.5%	Rutherford	1.0%		
Stanly	2.5%	Pasquotank	0.9%		
Montgomery	2.5%	Person	0.9%		
Granville	2.5%	Wilkes	0.9%		
Brunswick	2.4%	Gates	0.7%		
Burke	2.3%	Camden	0.7%		
Jones	2.3%	Buncombe	0.7%		
Davie	2.3%	Henderson	0.7%		

Table 2. Percent frequency of game lands listed as the top 3 game lands dove hunted the most often in the last 5 years.

Game Land	% of total responses		Game Land	% of total responses
Butner Falls of Neuse <sup>1</sup>	18.8%		Angola Bay	.9%
Sandhills <sup>1</sup>	17.5%		Alligator River	.8%
Jordan <sup>1</sup>	12.0%		Lantern Acres <sup>1</sup>	.8%
Uwharrie National Forest <sup>1</sup>	7.6%		Stones Creek <sup>1</sup>	.7%
Holly Shelter <sup>1</sup>	7.5%		Needmore	.7%
R. Wayne Bailey-Caswell <sup>1</sup>	6.5%		Nantahala National Forest	.6%
Croatan National Forest <sup>1</sup>	6.2%		Carteret County	.6%
Roanoke River Wetlands <sup>1</sup>	5.2%		Green Swamp	.6%
Pee Dee River <sup>1</sup>	5.1%		Pisgah WRC	.5%
Bladen Lakes State Forest <sup>1</sup>	3.9%		Hyco	.5%
South Mountains <sup>1</sup>	3.6%		Gull Rock <sup>1</sup>	.5%
Perkins <sup>1</sup>	3.4%		J. Morgan Futch	.5%
Sandy Mush <sup>1</sup>	3.3%		Sutton Lake	.4%
Pisgah National Forest	3.2%		Robeson County	.4%
Suggs Mill Pond <sup>1</sup>	3.0%		Brinkleyville	.3%
Alcoa	2.5%		Buffalo Cove	.3%
Chatham	2.5%		Shocco Creek	.3%
Second Creek <sup>1</sup>	2.2%		Brunswick County	.3%
Harris	1.9%		Dare	.3%
Johns River <sup>1</sup>	1.8%		Chowan	.3%
Tillery <sup>1</sup>	1.7%		Embro	.3%
Catawba	1.7%		Buckhorn	.2%
Linwood	1.6%		Bertie County	.2%
Sampson County	1.4%		Kerr Scott	.2%
Cape Fear River Wetlands	1.2%		Lee	.2%
Columbus County	1.2%		Mayo	.2%
Green River	1.1%		Nicholson Creek	.2%
Neuse River	.9%		Rockfish Creek	.2%
White Oak <sup>1</sup>	.9%		Rocky Run	.2%
Currituck Banks	.9%		Pungo River	.2%

<sup>1</sup> Game Land includes managed dove fields