

2020 Survey of duck hunters in North Carolina: Perspectives towards duck hunting zones and season dates

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Executive Summary

In May 2020, the North Carolina Wildlife Resources Commission (WRC) approved the establishment of two Duck Hunting Zones (DHZs) in North Carolina, with Interstate 95 as the boundary.

- Coastal DHZ – all counties and parts of counties east of Interstate 95.
- Inland DHZ – all counties and parts of counties west of Interstate 95.

The number of season segments (up to three) and season dates can change each year within each zone, but the Coastal and Inland DHZs and the zone boundary must remain in place for 5 hunting seasons (2021-2025).

The WRC's Migratory Game Bird Coordinator and a WRC Social Scientist designed and distributed a survey to North Carolina duck hunters who participated in the 2019-2020 duck hunting season. The objectives of the survey were to:

1. Assess perceived impacts of DHZ establishment on hunters' experiences and understanding of regulations.
2. Assess preferences for season dates between Inland and Coastal duck hunters.
3. Understand perspectives towards Youth Waterfowl Days (YWDs) and Veterans/Military Waterfowl Days (VMWDs).

We identified 40,413 potential hunters using Harvest Information Program screening questions. An online survey was open from September 21, 2020 to October 31, 2020. Duck hunters were recruited to participate with two email reminders and one postcard reminder. We received 6,432 valid responses for analysis for a response rate of 17%.

Characteristics of duck hunter respondents

In general, the sample of respondents was comprised of experienced and passionate duck hunters.

- Most respondents indicated that duck hunting was one of their most important recreational activities, or the most important recreational activity (79%).
- Most respondents have been hunting over 10 years (68%) and very few (2%) harvest no ducks during a typical hunting season.
- 75% of duck hunters hunt fewer than 21 days and most hunters harvest at least one duck during a typical duck season. The most frequent range of ducks harvested during a typical duck season was between 11 and 20 ducks (23%).
- We found evidence of some potential non-response bias in our data, with a slight skew towards more experienced hunters. Therefore, duck hunters who did not respond to the survey are likely to be less avid duck hunters.

Hunting is more popular in the Coastal Zone (East of I-95) than the Inland Zone.

- 66% of duck hunters hunted in the Coastal Zone the most during the previous five duck seasons, whereas 32% hunted in the Inland Zone the most during the previous five duck seasons.

For many analyses and to address Objective 2, hunters were stratified into one of two groups based on their responses to where they hunted the most. This segmentation and associated definitions are used throughout this summary and in the full report:

- **Inland hunters** - Hunters who most frequently duck hunted in the Inland Zone during the past five duck hunting seasons.
- **Coastal hunters** - Hunters who most frequently duck hunted in the Coastal Zone during the past five duck hunting seasons.

Occasionally, we examined responses between hunters who only used the Inland or Coastal Zones and those who used both zones. Such comparisons will be specified.

We also explored where duck hunters went duck hunting, and if they usually cross the I-95 duck zone boundary during a typical season

- Coastal hunters most frequently used public waters for duck hunting (42%) whereas Inland hunters most frequently used non-fee based private lands (38%; e.g. land that the hunter owns, does not lease or pay a fee to use)
- 50% of duck hunters in our sample only hunted in the Coastal Zone during the previous five duck hunting seasons, 12% only hunted in the Inland Zone, and 37% hunted in both zones.

Impacts of DHZ establishment

DHZ establishment could potentially impact some hunters understanding of regulations and duck hunting opportunities, but most thought these aspects of duck hunting would not change.

- Many hunters believe that establishing DHZs has little impact on their understanding of duck hunting regulations ($\geq 49\%$) which was the most frequent response among hunters. However, hunters who used both Inland and Coastal DHZs stated that establishing DHZs would make regulations harder to understand slightly more frequently than hunters who used just one of the DHZs (21% and 12%, respectively).
- When considering the impact of DHZs on hunting opportunities (without knowing the potential differences in regulations), the most frequent response regardless of zone usage, was that DHZs would provide the same opportunities to duck hunt ($\geq 40\%$ for both Coastal and Inland hunters).

Preferences for season dates

Both Inland and Coastal duck hunters believe later season dates are more important to hunt than earlier season dates. Inland hunters believe early October and late October periods are slightly more important compared to Coastal hunters. This was also reflected in their group's responses to questions regarding keeping/abolishing the October season segment.

- Over 50% of Inland and Coastal hunters stated that the late December, early January, and late January periods are very important times to hunt.
- Over 50% of Coastal hunters stated the early October and late October periods are not important, whereas 53% of Inland hunters gave these periods some level of importance (slightly important-very important).
- Inland hunters had a slightly higher median importance level than Coastal hunters (1-not at all important and 2-slightly important, respectively) for the early October and late October periods.
- There were no significant differences in level of importance for late November and Early December hunting periods between Inland and Coastal Hunters.
- Inland hunters were generally more supportive than oppositional for retaining the October season segment; 37% indicated support for keeping the segment, 28% indicated opposition towards keeping the segment.
- Coastal hunters were generally more oppositional than supportive when considering retaining the October season segment; 24% indicated support for keeping the segment whereas 37% indicated opposition for keeping it.

Coastal hunters more frequently preferred two season segments than Inland hunters, who most frequently preferred three season segments. But these differences were minimal.

- Frequency of preference for two season segments: 33% Coastal hunters, 29% Inland hunters.
- Frequency of preference for three season segments: 31% Coastal hunters, 35% Inland hunters.

Hunters were presented questions about preferences around keeping the October season segment. While Inland hunters were slightly more supportive of keeping the October season segment compared to Coastal hunters, they would like it shifted to later in October with a length of 2-3 or 4 days if the segment was retained.

- 40% of Inland hunters indicated support for shifting the October season in the Inland Zone to later in the month if it was retained, and 37% preferred either the 2-3 day or 4-day lengths (74% in total).

- The last full week in October was the most frequently preferred date to hold the October season segment, if retained (53%).
- 65% of Inland hunters selected the first full week of October as their least preferred option if the segment was retained.

All hunters were also presented questions related to abolishing the October season segment. Both Inland and Coastal hunters were more supportive than oppositional towards this change.

- 50% of Inland hunters indicated support for abolishing the October season segment in the Inland Zone and using those days later in the season.
- To further explore support for abolishing the October segment, we segmented Inland hunters into those that only use the Inland Zone and those that use both zones. 43% hunters that only used the Inland zone were supportive of abolishing the October segment whereas 52% of hunters who used both zones were supportive of this change.
- Inland hunters most frequently preferred adding these days to mid-December (44%).
- 62% of Coastal hunters indicated support for abolishing the October season segment in the Coastal Zone and using those days later in the season.
- 48% of Coastal hunters preferred adding these days to mid-December.

Youth Waterfowl Days and Veterans/Military Waterfowl Days

Hunters were generally supportive of both Youth Waterfowl Days (YWDs) and Veterans/Military Waterfowl Days (VMWDs) despite less than half of respondents participating in these special hunting days. Most hunters preferred having these two days after the regular hunting season.

- 42% of duck hunters participated in YWDs, while 90% strongly support or support it.
- 65% of YWD participants preferred having YWDs on a Saturday after the regular duck hunting season.
- 11% of duck hunters participated in VMWDs while 81% strongly supported or supported it.
- Both VMWD participants and non-VMWD participants most frequently preferred holding VMWDs after the regular duck season.

When considering overlapping YWDs and VMWDs, there was a mix of attitudes.

- 66% of hunters who participated in both days strongly supported or supported the overlap.

- 48% and 45% of VMWD only participants and YWD only participants, respectively, indicated support for the overlap.

Most duck hunter respondents were white (85%) males (88%) with more than 2 years of higher education (63%) and earned more than \$75,000 dollars in 2019 (53%).

Introduction

Since 1997, the North Carolina Wildlife Resources Commission (WRC) has established dates for the 60-day duck hunting season within three segments beginning in October and ending in late January, excluding Sundays. Unlike the state's fishing or other hunting regulations, waterfowl regulations are developed collaboratively between the United States Fish and Wildlife Service (USFWS) and state wildlife agencies through the four Flyway Councils (Atlantic, Mississippi, Central, Pacific). A 2011 survey of duck hunters (Fuller et al., 2011) and public comments solicited annually by WRC during the state's regulations-setting process show that hunters have regionally distinct preferences for duck season dates. These data illustrate a point of contention regarding the short October season segment between hunters from the Piedmont and Mountain regions and hunters from the Coastal Plain region. Additionally, duck hunters highlighted other concerns about the longstanding regulatory structure. Specifically, many hunters believed ducks were arriving after the season closed and that the distribution of ducks in areas they most often hunt had changed over time. Thirty-five percent of 2011 respondents disagreed that the WRC should keep the current duck hunting season structure, while 31% thought it should not be changed. More duck hunters in the Piedmont and Mountain regions were supportive of keeping the current structure, whereas Coastal Plain hunters were more oppositional.

In response to these hunters' perspectives, at their May 2020 meeting, the WRC approved the establishment of two Duck Hunting Zones (DHZ) with Interstate 95 as the boundary between the two DHZs (Figure 1). In a 2012 study, more than half of surveyed duck hunters preferred the Interstate 95 boundary (Palmer et al., 2012):

- Coastal DHZ – all counties and parts of counties east of Interstate 95.
- Inland DHZ – all counties and parts of counties west of Interstate 95.



Figure 1: Map of Duck Hunting Zones in North Carolina with Interstate 95 as the boundary.

The purpose of creating DHZs in North Carolina was to allow the WRC to establish different season dates between zones in response to varying migratory duck patterns and hunters' preferences. Following guidelines established by USFWS, each zone may have up to three season segments, and each zone can have either the same or different season dates. The number of season segments (up to three) and season dates can change each year within each zone, but the Coastal and Inland DHZs and the zone boundary must remain in place for 5 hunting seasons (2021-2025).

To determine optimal season dates and number of segments within each DHZ, a WRC Social Scientist worked with the WRC's Migratory Game Bird Coordinator to distribute and analyze an online survey of duck hunters' perspectives towards various aspects of DHZs. The primary objectives were to:

1. Assess perceived impacts of DHZ establishment on hunters' experiences and understanding of regulations.
2. Assess preferences for season dates between Inland and Coastal duck hunters.
3. Understand perspectives towards Youth Waterfowl Days (YWDs) and Veterans/Military Waterfowl Days (VMWDs).

The results of this study will guide the annual establishment of duck hunting dates for the 2021-2025 duck hunting seasons.

Methods

Sampling

After discussions on sampling protocol and data collection alternatives, the WRC decided on a census survey methodology via email. Email surveys were preferred over a census mail survey with paper questionnaires due to costs. This approach sought to identify and distribute an online survey to all potential duck hunters who participated in the 2019-2020 duck hunting season that had valid emails in the WRC license database. Identifying hunters from a single season was deemed more optimal than selecting hunters from a range of years due to sample population size. For example, a census survey of all potential duck hunters from the past five years would have resulted in an unwieldy number of potential respondents, and strongly contribute to stakeholder survey fatigue.

On July 20, 2020 WRC Information Technology staff provided a sampling frame of 258,477 unique Harvest Information Program (HIP) certified hunters that had active certifications from September 1, 2019 to February 29, 2020. HIP certification is required for all migratory game bird hunters (those that hunt ducks, coots, geese, brant, swans, doves, woodcock, rails, gallinules and moorhens, or snipe) and is valid for one year from the day of issuance. Therefore, it is feasible to assume that all individuals within the sampling frame could have hunted ducks in North Carolina during the 2019-

2020 duck season (October 2019 – January 2020). Beyond basic contact information, the data also includes responses to all standard HIP screening questions ([Figure 2](#)).

HIP QUESTIONS

Please answer the following questions and then add the item to the cart.

Will you be hunting migratory birds within the next 12 months?	<input type="radio"/> Yes <input type="radio"/> No
Will you hunt Brant within the next 12 months?	<input type="radio"/> Yes <input type="radio"/> No
Did you hunt Coots/Snipe during the last 12 months?	<input type="radio"/> Yes <input type="radio"/> No
Did you hunt Rail/Gallinule during the last 12 months?	<input type="radio"/> Yes <input type="radio"/> No
How many Doves did you take during the last 12 months?	<input type="radio"/> Did not hunt <input type="radio"/> 0 <input type="radio"/> 1-10 <input type="radio"/> 11-30 <input type="radio"/> More than 30
How many Ducks did you take during the last 12 months?	<input type="radio"/> Did not hunt <input type="radio"/> 0 <input type="radio"/> 1-10 <input type="radio"/> 11-30 <input type="radio"/> More than 30
How many Geese did you take during the last 12 months?	<input type="radio"/> Did not hunt <input type="radio"/> 0 <input type="radio"/> 1-10 <input type="radio"/> 11-30 <input type="radio"/> More than 30
How many Woodcock did you take during the last 12 months?	<input type="radio"/> Did not hunt <input type="radio"/> 0 <input type="radio"/> 1-10 <input type="radio"/> 11-30 <input type="radio"/> More than 30

Figure 2: Harvest Information Program (HIP) questions used to sample active duck hunters for the 2019-2020 duck hunting season.

To identify potential duck hunters from the 2019-2020 season, we filtered out individuals who responded to ‘How many Ducks did you take during the last 12 months?’ by selecting ‘0’, ‘1-10’, ‘11-30’, and ‘More than 30’. This eliminated all hunters who said they ‘Did not hunt’ for ducks in the past 12 months. Based on this criterion, 70,371 of the initial 258,477 unique HIP-certified hunters could be identified as potential duck hunters.

The nature of the 12-month time frame in these questions introduced some error while segmenting 2019-2020 duck hunters. Specifically, the duck season that hunters considered in their answers was variable across the sample; e.g. some duck hunters could reference both the 2018-2019 and 2019-2020 duck seasons because they both fall within a 12-month window. [Figure 3](#) illustrates which duck seasons fall within the 12-month time frame of when hunters in the sample renewed or began their HIP certification (effective date).

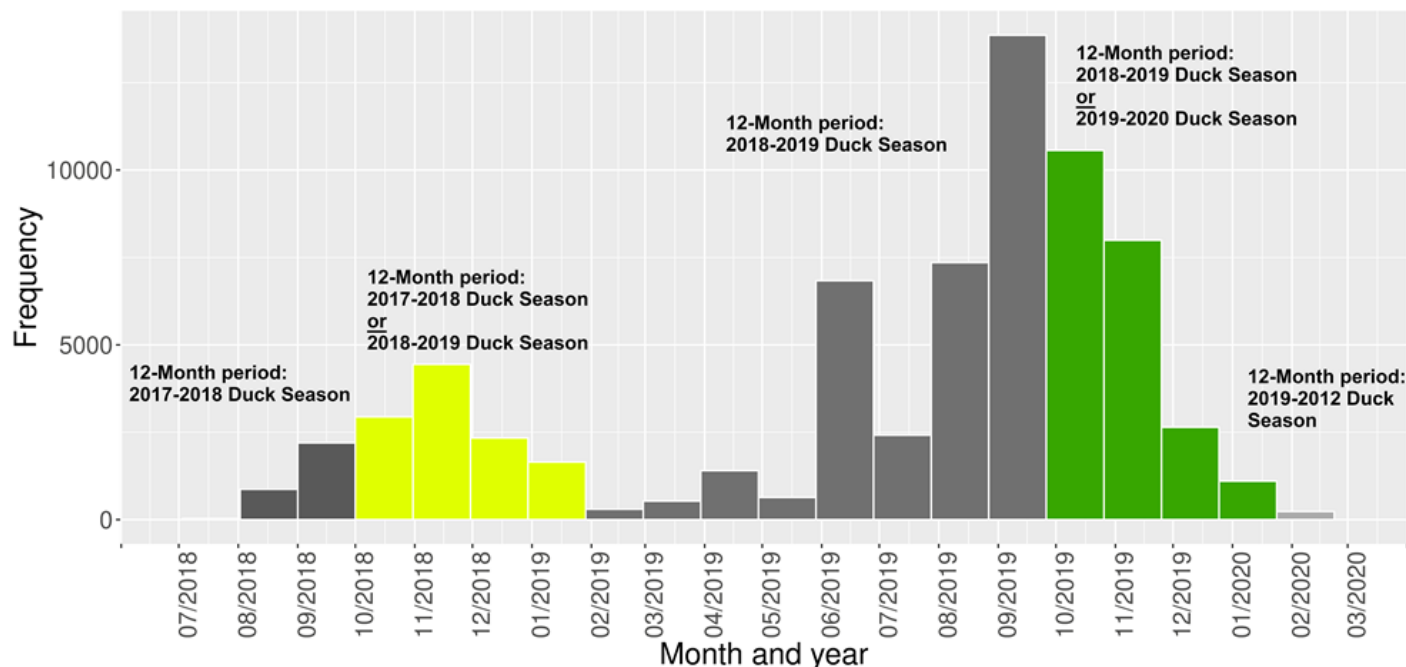


Figure 3: Histogram of when duck hunters with active Harvest Information Program (HIP) certifications renewed or began their HIP certifications. Different colored bars represent the duck hunting season(s) when the HIP certification was active.

Because we wanted to distribute questionnaires to only potential duck hunters with email addresses, we filtered out individuals without email addresses. This process narrowed the sample down to 43,880 potential duck hunters. Therefore, 26,491 (37.6%) potential duck hunters did not have emails in the sample frame. Upon further investigation of the filtered sample, many email addresses were repeated across individuals. This may have occurred when multiple individuals from a single household complete their HIP certification. Additionally, parents may provide their email when registering their children.

We were also interested in only sampling adult duck hunters (≥ 18 years old) due to legal concerns and lack of Institutional Review Board protocols available to the agency. More specifically, North Carolina state law dictates that the age of consent is 18, thus minors require parental permission to participate in research as they are “subject to the supervision and control” of their parents (N.C. Gen. Stats. Ann. §48A-2, 1971; N.C. Gen. Stats. Ann. § 7B-3400, 1998) Because the WRC does not have resources (i.e., Institutional Review Board) to properly vet, or possibly waive the requirement for parental permission, we took the precautionary approach to not include minors in our study. Therefore, we first removed all minors from the sample, which reduced the sample frame to 42,045 potential duck hunters.

Next, we randomly selected one individual from each batch of duplicated emails. The process was randomized to prevent systematic selection of the ‘first’ individual listed

from a group of those with the same email address. This selection process reduced the sample frame size to 40,431 potential duck hunters.

WRC biologists previously estimated the total duck hunting population in North Carolina in 2019 was around 47,000 hunters, whereas the USFWS (using HIP data) estimated there were approximately 29,000 active duck hunters in North Carolina in 2019 (Myers, 2019; Roberts, 2019). However, for the sake of sampling, we took a conservative approach and assumed that there are at least 40,431 hunters in the state. This is likely an underestimate, as the sampling procedure filtered potential hunters who did not have an email address.

The table below illustrates the aforementioned sample selection steps:

Table 1: Sample filtering steps and resulting sample sizes.

Step	Number of individuals in sample frame
Initial full sample frame of HIP-certified hunters active from September 1, 2019 to February 29, 2020	258,477
Only include individuals who responded to, “How many Ducks did you take during the last 12 months?” by selecting ‘0’, ‘1-10’, ‘11-30’, and ‘More than 30’	70,371
Include only individuals with emails	43,880
Include only adults/remove minors	42,045
Randomly select one individual from sets of duplicate email addresses	40,413

Survey distribution

To reach all 40,413 potential 2019-2020 duck hunters identified in the steps above, we used a single online survey link with a mixed multi-contact recruitment approach. The questionnaire was hosted online via Qualtrics with the following three survey recruitment steps (Qualtrics, 2019):

1. Initial email invite to participate in the online survey, distributed from WRC’s iContact service with recognizable domain (‘@ncwildlife.org’)
 - Sent Monday September 21, 2020.
2. Second invite to participate in the online survey, distributed from WRC’s iContact service with recognizable domain (‘@ncwildlife.org’)
 - Sent Monday October 5, 2020.
3. Postcard reminder to complete the survey, with a short URL link
 - Mailed the week of October 12th, 2020.

This multi-outreach method has the capacity to address some coverage error, as some individuals may have invalid emails, but valid mailing addresses. The survey was open from September 21, 2020 to October 31, 2020.

To further encourage participation, each survey included an incentive for a randomized drawing for one of six \$50 Bass Pro Shop gift cards. To be eligible for the random drawing, respondents needed to complete the survey (see the last page) and provide a valid email address.

Screening questions

Due to database entry errors and the 12-month context of HIP questions (described above) it is unlikely that all 40,431 selected duck hunters hunted ducks in 2019-2020. Therefore, we implemented additional in-survey screening questions to further identify respondents by their participation in the 2019-2020 duck season ([Q2.2](#)):

During which of the last 5 hunting seasons did you duck hunt in North Carolina? (Check all that apply)

- ☐ 2019-2020
- ☐ 2018-2019
- ☐ 2017-2018
- ☐ 2016-2017
- ☐ 2015-2016
- ☐ I did not duck hunt during the last 5 years

Individuals who selected '2019-2020' were considered 2019-2020 duck hunters and were included in the analysis. Respondents who did not select '2019-2020' were omitted from the analysis.

Also, due to potential legal factors associated with studying minors, the questionnaire included an age statement within the opening survey consent question ([Q1.2](#)):

By selecting 'Yes' below, you are confirming you are at least 18 years old and agree to participate in this survey:

- ☐ Yes
- ☐ No, I do not wish to participate in this survey or I am younger than 18 years old

Respondents who selected 'No' were not included in the analysis.

Questionnaire design

The online questionnaire was segmented into six parts:

1. Duck hunting activity

- Questions related to hunting location, experience, and avidity (importance of duck hunting to hunters [adapted from Schroeder et al., 2019]).
- 2. New Duck Hunting Zones
 - Questions related to perceived impacts of DHZs on hunting experience and comprehension of regulations.
- 3. Duck season dates and duck season structure
 - Questions related to preferences for number of segments, attitudes towards the October season segment, dispersion of dates, etc.
- 4. Youth Waterfowl Days
 - Questions regarding when the YWDs should occur and general support for the special days.
- 5. Veterans/Military Waterfowl Days
 - Questions regarding when the VMWDs should occur and general support for the special days.
- 6. Background information
 - Questions about special groups hypothesized to impact responses (guides, veterans, private hunt club members) and demographics.

Most questions were constructed by WRC's Migratory Game Bird Coordinator to ensure that responses would inform the regulations-setting process. Some questions were re-ordered and edited by a WRC Social Scientist to improve clarity and minimize biases.

Throughout the survey, there were various questions related to only the Inland or Coastal DHZs. To ensure that these questions were only answered by hunters who hunted in these zones, we employed 'display logic'. Hunters who only hunted in the Inland Zone within the past five hunting seasons were presented with only Inland DHZ specific questions. Similarly, Coastal DHZ hunters only saw Coastal DHZ specific questions. Hunters who hunted both zones received a slightly longer survey as they saw both DHZ specific questions.

Survey pre-tests

To ensure understanding and clarity of questions, we completed interview pre-tests with a convenience sample of North Carolina duck hunters (WRC staff and acquaintances). Due to difficulty comprehending some questions, we completed two rounds of interviews following survey edits.

Non-response bias

Non-response bias, the phenomenon in which respondents and non-respondents vary based on survey variables, is often tested based on the "continuum of resistance" (Filion, 1976; Lin & Schaeffer, 1995). Under this model, later respondents to survey recruitment efforts required more effort to participate and are therefore more similar to non-respondents, whereas early respondents are less similar. To test for non-response bias,

this model was applied by examining differences in a variety of questions between late respondents (duck hunters who responded on or after October 7, 2020) and early respondents (duck hunters who responded before October 7, 2020). These dates were chosen because the 2020-2021 duck hunting season began on October 7, 2020 and was early enough to capture respondents before the postcard outreach mailing. To test for differences, the appropriate statistical techniques were applied.

Analysis

All analysis was completed in IBM Statistical Package for the Social Sciences (SPSS; IBM Corp., 2017).

Using Qualitrics' 'Ballot Box Stuffing' prevention, we were able to identify potential duplicate respondents. We retained the earliest survey response for all duplicates and omitted other responses from the analysis.

Mann-Whitney U test

To compare answers to scalar questions between two groups, we used the Mann-Whitney U test, or rank sum test. This test is a non-parametric alternative to the parametric t-test, that looks for differences in means between two independent samples. Because scalar data (e.g. agree-disagree) is not normally distributed, this test is essentially comparing the median scores between two groups using a ranking scheme. The intention is not to transform the data, but rather put it in a form where the type of assumed distribution is not relevant.

However, because Mann-Whitney U test statistics and associated p -values are heavily influenced by sample size, one may make inappropriate conclusions regarding variable relationships, i.e. results may be statistically significant, but may not provide practical significance (strong, important, and meaningful). Therefore, we report the effect size, r , for each test to eliminate the influence of sample size (Cohen, 2013). This variable can be interpreted as the strength of the difference between two variables, where r values of .10 are minimal, .30 are typical, and .50 are substantial (Vaske, 2008).

Qualitative response coding

Because multiple survey questions were open-ended typed responses, we used inductive/open coding to identify written themes. This approach allows themes to emerge from the data through the coding process (Bernard, 2006). Because of the large sample size of the present project, we analyzed a random sample of 300 open-ended responses. We identified common themes and present quotations as examples.

Results

Survey Response

Of the roughly 40,000 unique email contacts obtained from the WRC license database, 37,933 were contacted. Around 2000 individuals were not contacted due to bounced emails and previous ‘do not contact’ requests. About 800 postcards were not delivered and returned to the WRC. From September 21, 2020 to October 31, 2020, we collected approximately 9,600 responses from potential North Carolina duck hunters ([Figure 4](#)). Most responses occurred on September 21 and October 5 when reminder emails were distributed. Frequency of recorded responses spiked on September 28, October 12, when partially completed surveys were captured, and on November 2 when partial responses were collected during data download.

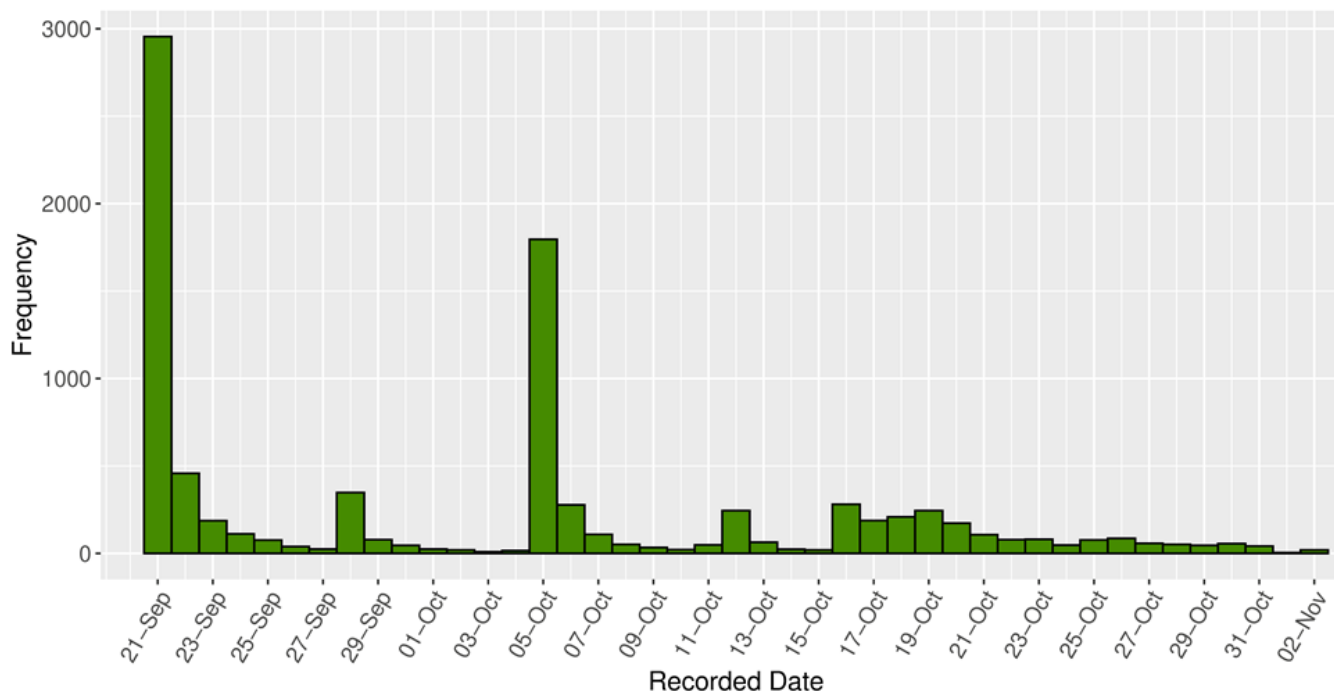


Figure 4: Histogram of dates when duck hunters completed the 2020 Duck Season Survey.

Of the 9,600 responses, approximately 708 were duplicates, 67 did not consent to participate or were minors, about 2,600 did not hunt in the 2019-2020 season, and many were mostly incomplete. By filtering for these variables, the final sample size was 6,432 unique adult duck hunters who participated in the 2019-2020 duck hunting season. The total survey response rate is approximately 25%, but 17% for valid responses.

The highest county level response rates (response rate considering the number of residents per county in our sample frame) came from Perquimans (22%), Dare (21%), Wake (21%), Watauga (20%) and Pamlico (20%; [Figure 5](#)). No hunters from Clay, Graham, Madison, or Swain Counties responded to the survey.

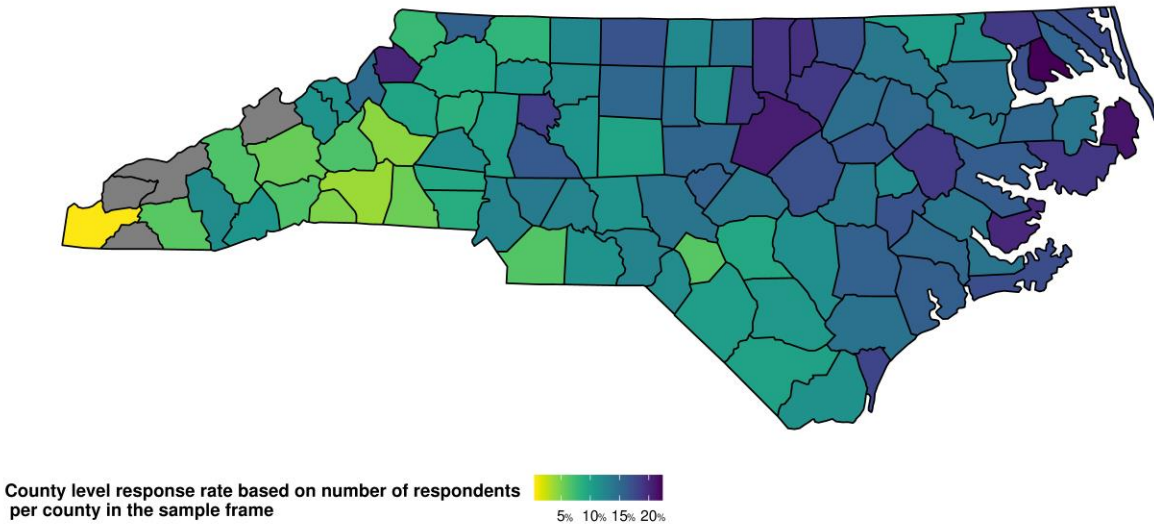


Figure 5: Map of county level response rates (response rate considering the number of residents per county in the sample frame) for the 2020 Duck Season Survey.

Duck hunting activity ([Q2.2-3.9](#))

All respondents in this analysis hunted in 2019-2020 per our filtering protocol. 93% hunted the previous year (2018-2019) then fewer respondents hunted in each of the subsequent three seasons ([Q2.2](#); [Figure 6](#)). This is not an indication of increased hunting participating across the past five years, but rather a glimpse at temporal trends of the hunters who participated the 2019-2020 duck season.

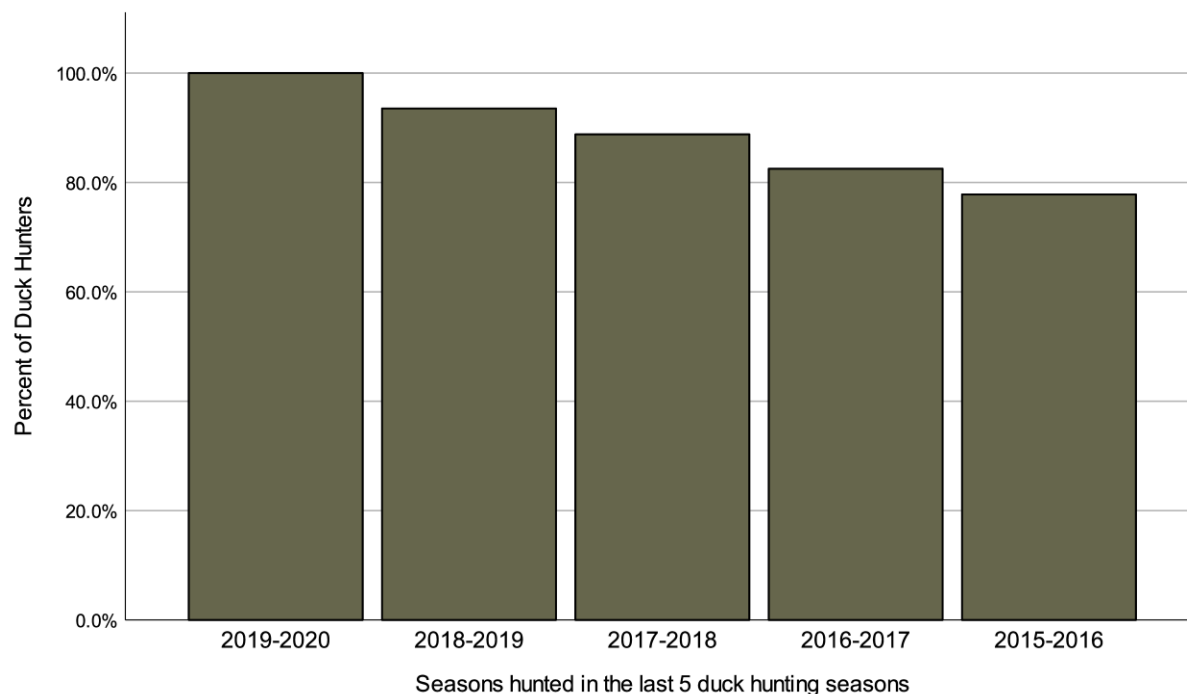


Figure 6: Frequency of duck hunter's participation in the past five duck hunting seasons.

During a typical duck hunting season, most respondents hunt between 11 and 20 days per season (29%) while the fewest hunt more than 30 days (11%) ([Q3.1](#); [Figure 7](#)). 75% of duck hunters in our sample hunted fewer than 21 days per duck season.

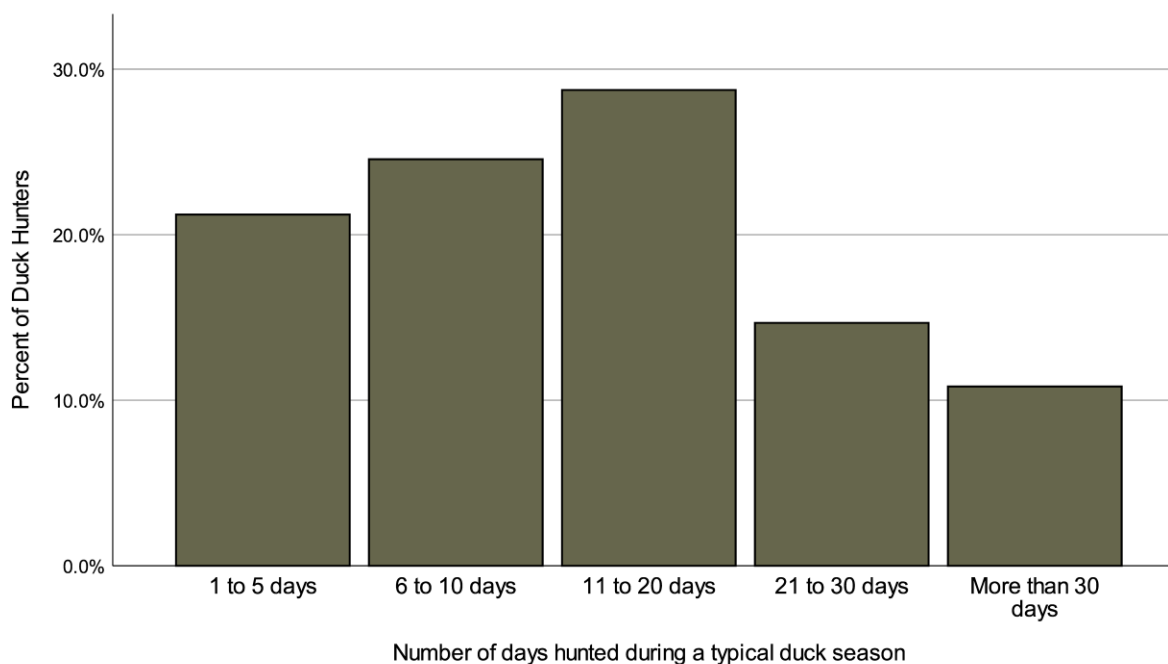


Figure 7: Frequency of the number of days duck hunters usually hunt during a typical duck hunting season.

Most hunters in the sample appear to harvest at least one duck during a typical duck season, with most harvesting about 11 to 20 ducks (23%) (Q3.2; [Figure 8](#)). Very few respondents harvest no ducks during a typical hunting season (2%).

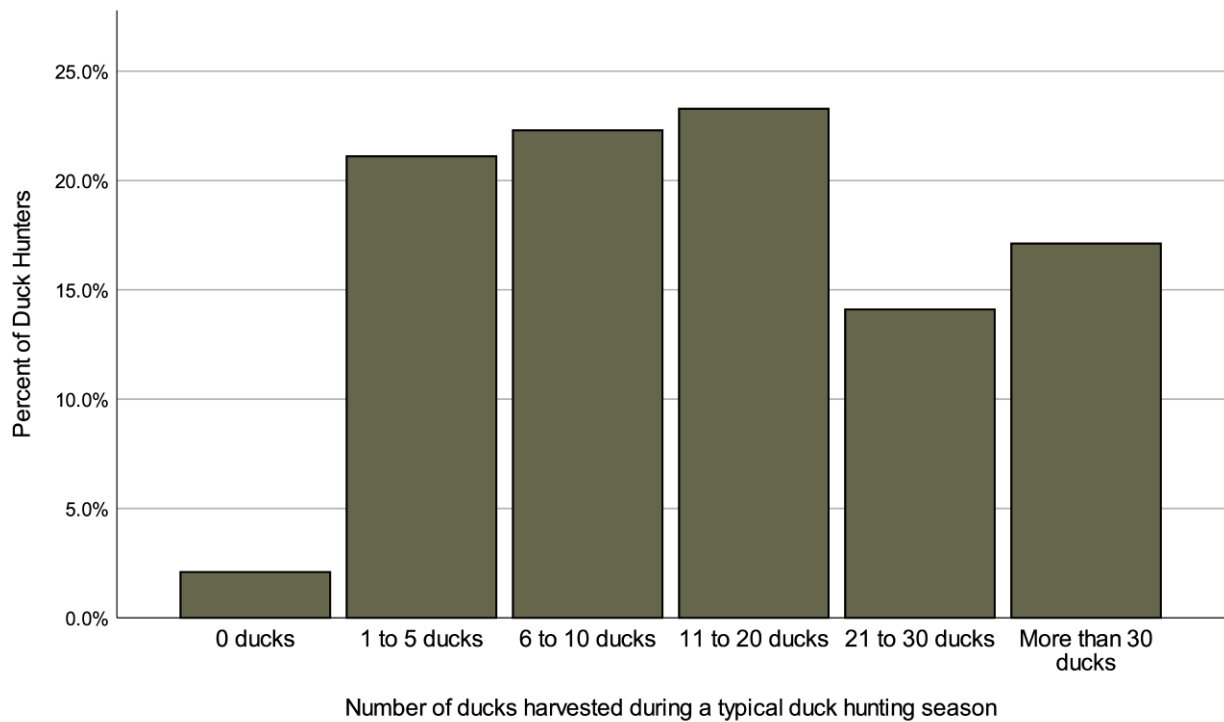


Figure 8: Frequency of the number of ducks hunters usually harvest during a typical duck hunting season.

When examining avidity of the sample, most have been hunting for over 10 years (68%), with 30% of this group attributed to hunters who have been duck hunting for over 30 years (Q3.3; [Figure 9](#)). This experience is also reflected in the importance of duck hunting to respondents. 79% of the sample stated that duck hunting was either one of their most important recreational activities or their most important recreational activity (Q3.4; [Figure 10](#)).

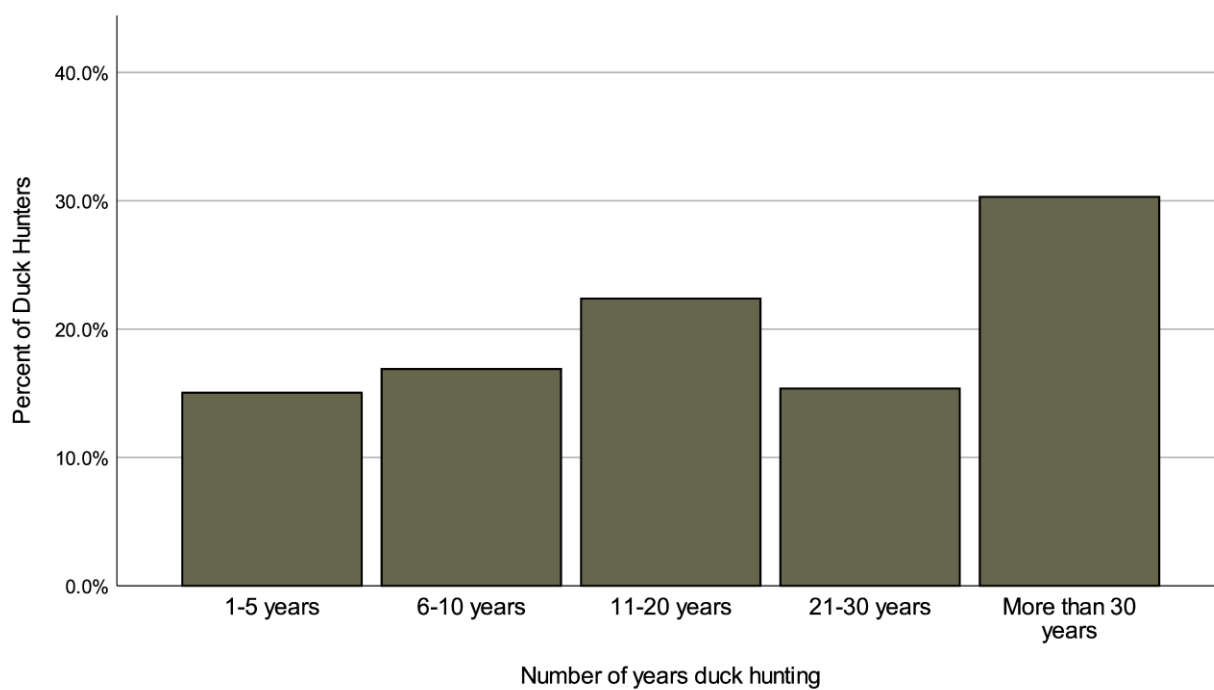


Figure 9: Frequency of duck hunter's number of years duck hunting.

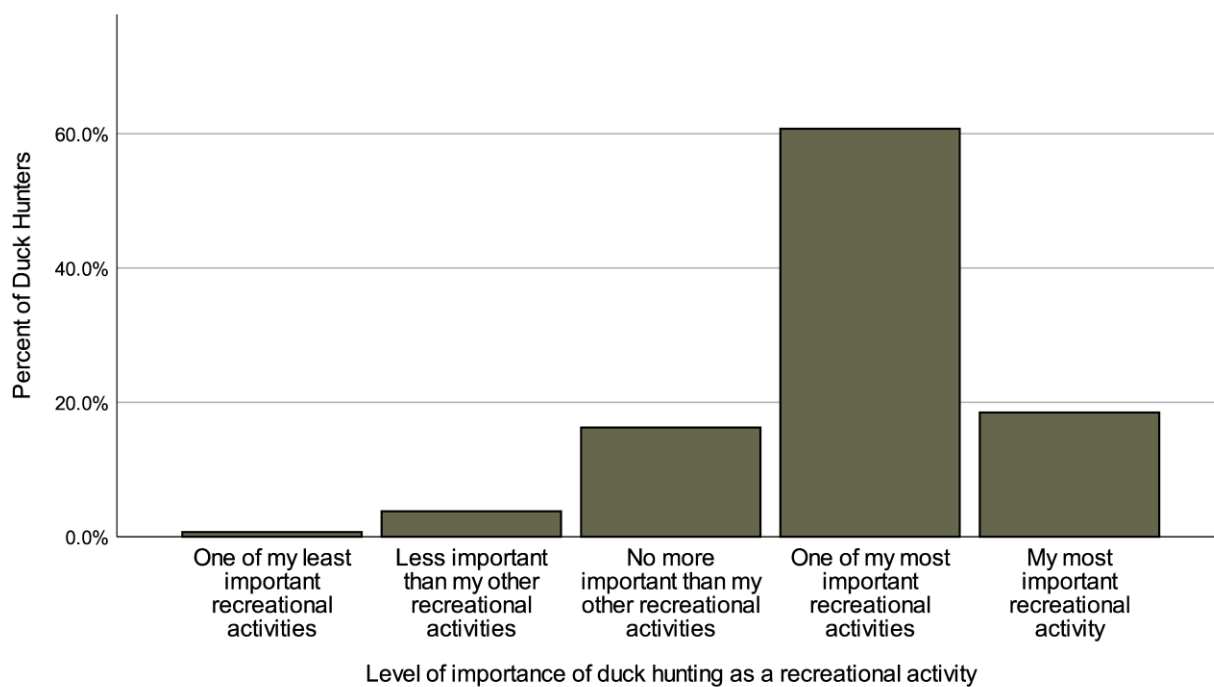


Figure 10: Frequency of duck hunter's level of importance of duck hunting as a recreational activity.

When presented a map of five areas of North Carolina ([Figure 11](#)) and asked which areas they hunted over the last five hunting seasons, over half of all respondents duck hunted in either the Coastal North (69% hunted) or Coastal South (54% hunted) areas, followed by Inland North (37% hunted), Inland South (19.5% hunted), and Inland West (4% hunted; [Q3.7](#)). When asked which area they hunted the most over the last five duck hunting seasons, the responses followed a similar pattern, with Coastal North being the most popular (32% most often hunted), followed by Coastal South (30%), Inland North (25%), Inland South (11%) and Inland West (2%; [Q3.8](#); [Figure 12](#)).

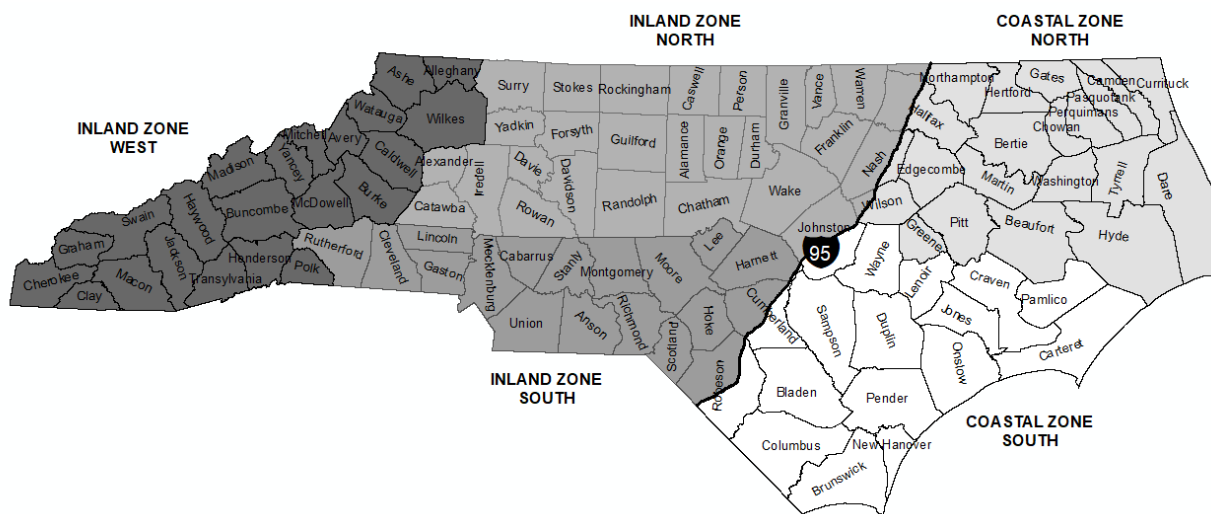


Figure 11: Map presented to hunters that segments the state into five geographical areas to understand where duck hunters are hunting.

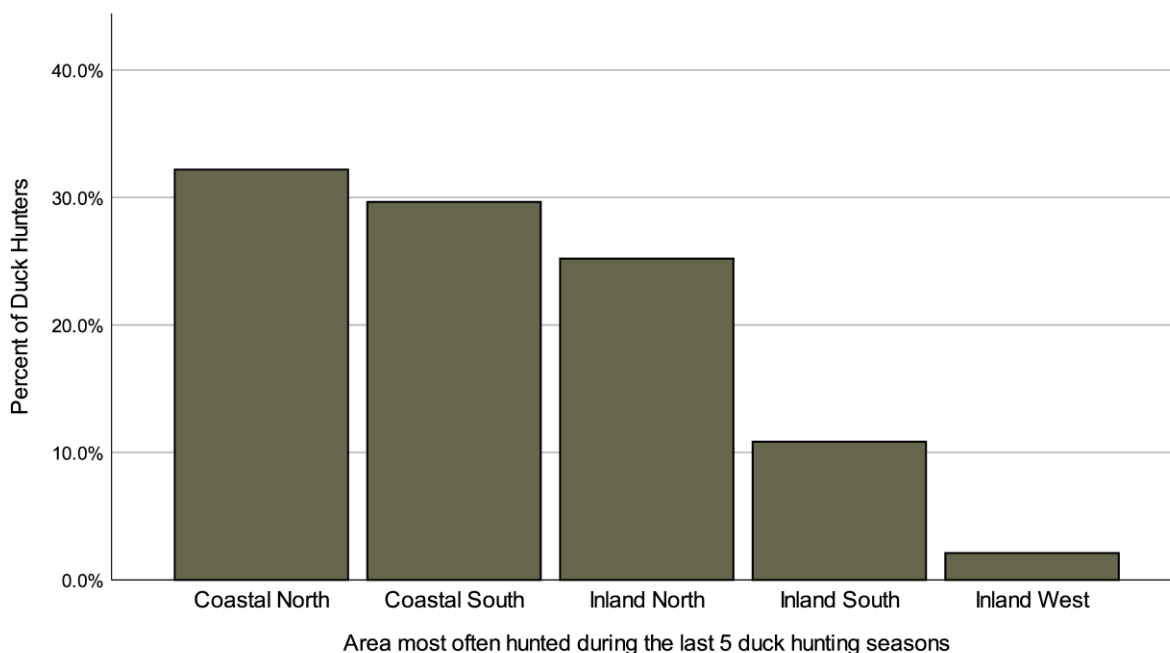


Figure 12: Frequency of which area of North Carolina duck hunters hunted the most during the last five duck hunting seasons.

Based on all the areas they hunted in the past five hunting seasons, respondents were further stratified into three groups: Inland DHZ only hunters, Coastal DHZ only hunters, and both Coastal and Inland DHZ hunters. Most respondents either hunted the Coastal DHZ (50%) or both the Coastal and Inland DHZs (37%; [Figure 13](#)). Very few respondents only hunted the Inland DHZ (13%). When mapping the percentage of hunters per county who hunt in both DHZs, it appears that the majority (>50% per county) of Piedmont region hunters hunt in both DHZs ([Figure 14](#)). Conversely, most Coastal residents appear to hunt in only one zone (presumably, the Coastal Zone).

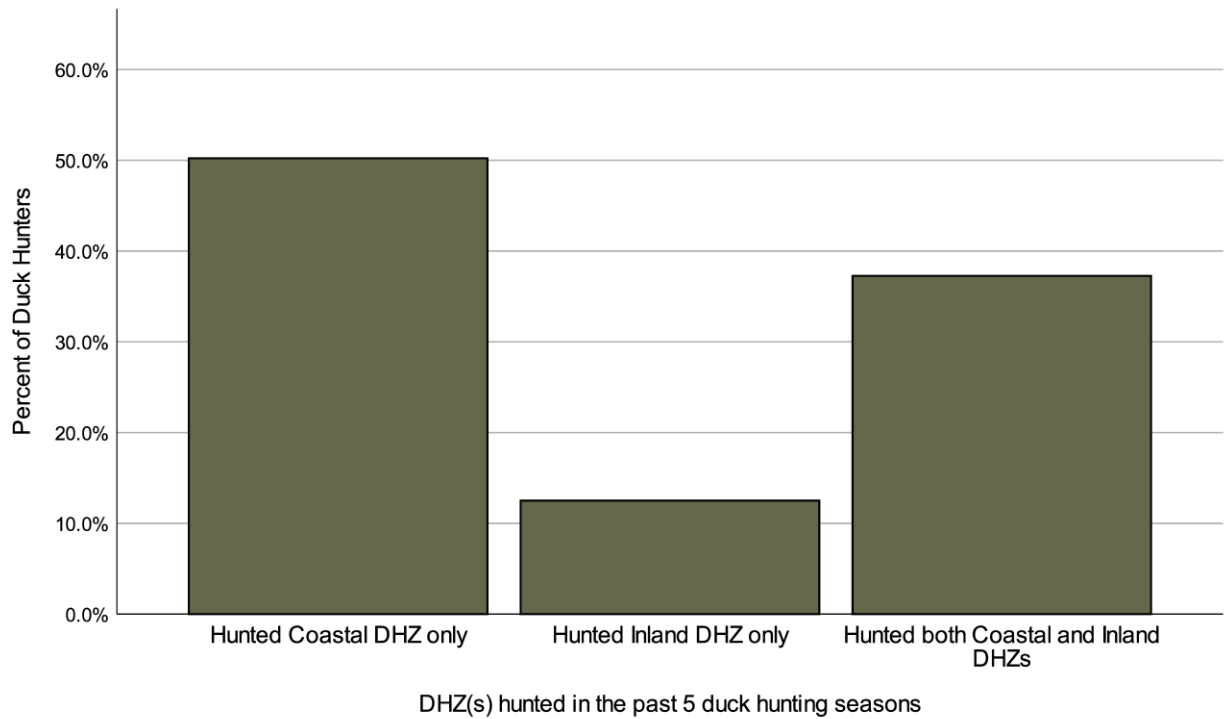


Figure 13: Frequency of which Duck Hunting Zones (DHZs) duck hunters used in the past five hunting seasons.

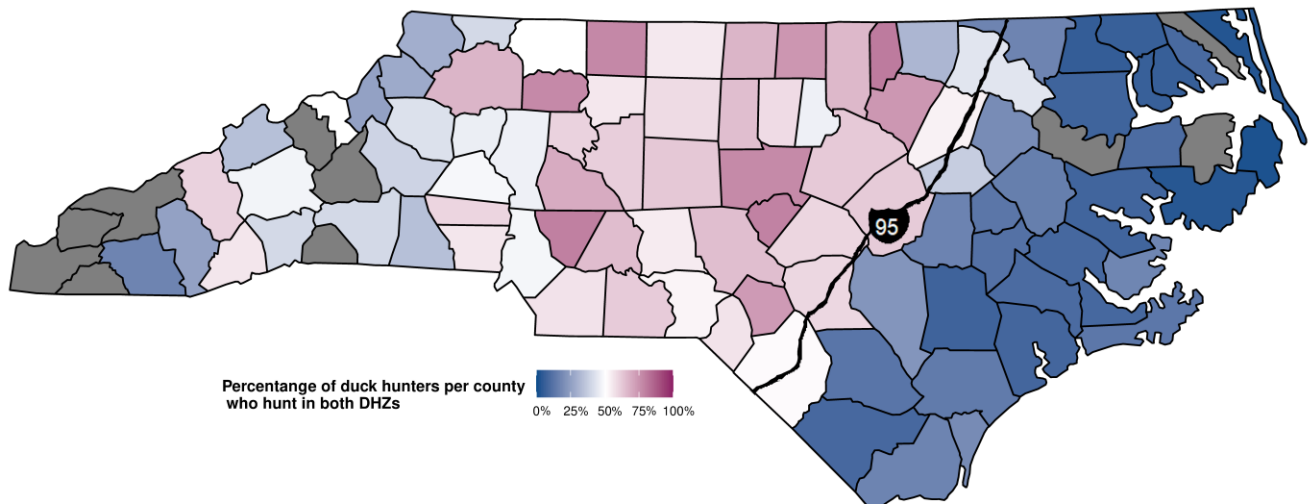


Figure 14: Map of percentage of hunters per county who hunted in both Duck Hunting Zones during the past five duck hunting seasons.

Using the area in which duck hunters hunted the most in the past five hunting seasons (Q3.8), respondents were also stratified into one of two groups: Inland hunters and Coastal hunters. These groupings were used for multiple analyses below and are further described as:

- Inland hunters: Hunters who most frequently duck hunted in the Western Inland, Northern Inland, or Southern Inland areas of North Carolina in the past five hunting seasons. All these areas are in the Inland DHZ.
- Coastal hunters: Hunters who most frequently duck hunted in the Northern Coastal or Southern Coastal areas of North Carolina in the past five hunting seasons. All these areas are in the Coastal DHZ.

Based on these criteria, 66% of the sample was coded as Coastal hunters ($n=4264$), 31% was coded as Inland hunters ($n=2002$), and 3% was unable to be classified due to unanswered survey questions ($n=166$; Figure 15). Therefore, the latter was omitted during analyses examining differences in frequency between zone groups.

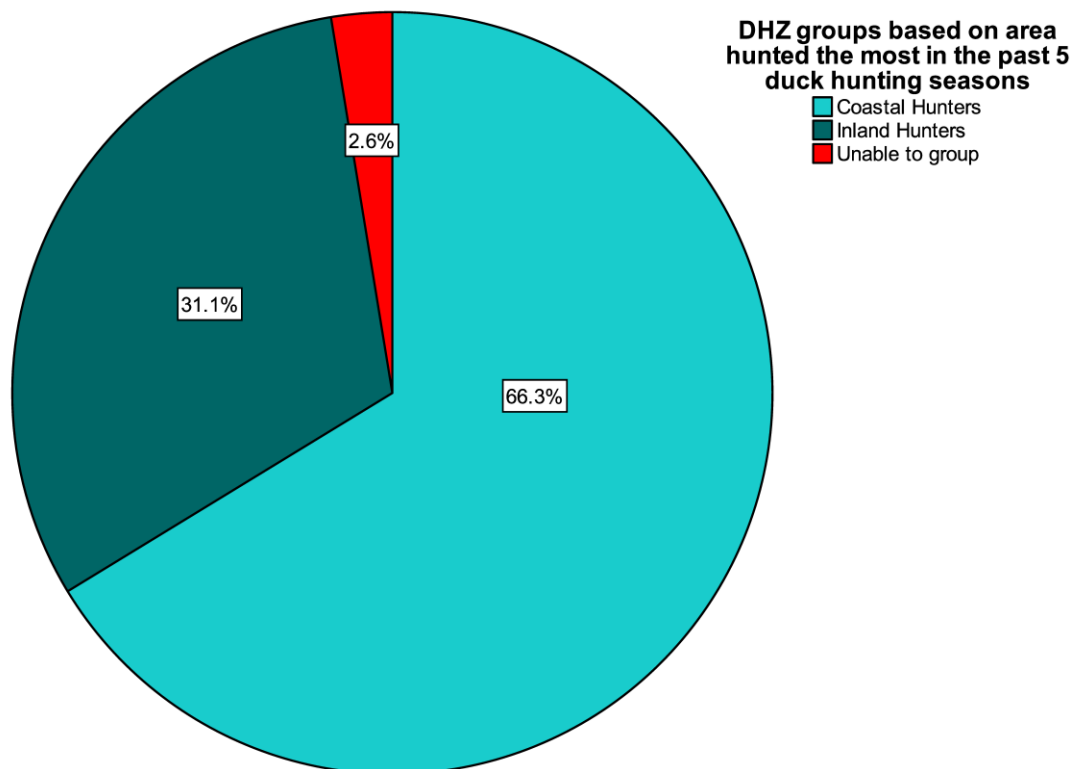


Figure 15: Pie chart of frequency of duck hunters coded as 'Coastal Hunters' and 'Inland Hunters' based on where they hunted the most during the past five duck hunting seasons.

When asked about the type of land or water North Carolina duck hunters utilize for duck hunting, both Inland and Coastal hunters use public waters or no-cost private lands most frequently, while the fewest pay to use private lands or waters ([Q3.5](#); [Figure 16](#)). When asked about which water or land types that they used the most, a few visual differences existed between DHZ groups ([Q3.6](#); [Figure 17](#)). Specifically, Coastal hunters used public water the most (42%), whereas Inland DHZ hunters most frequently used no-cost private lands (38%). Inland zone hunters appear to utilize public lands more frequently than Coastal hunters (22% and 11%, respectively).

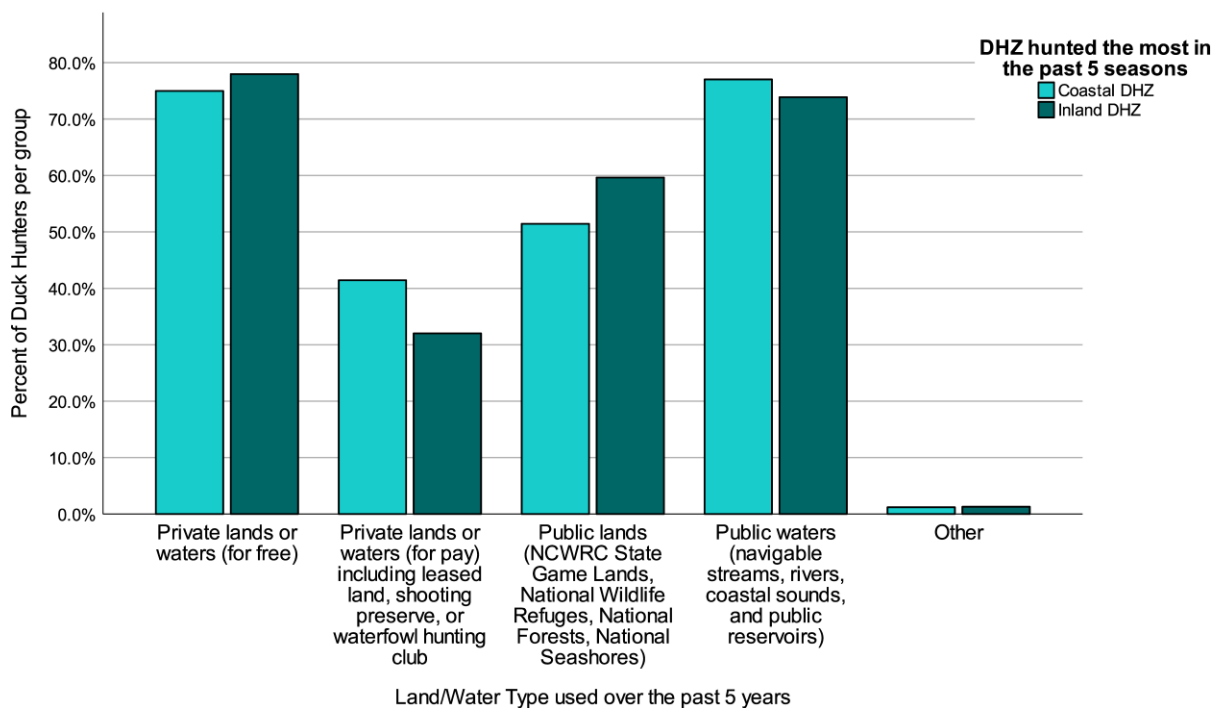


Figure 16: Frequency of the land/water types used for duck hunting over the past five years by Coastal and Inland Duck hunters.

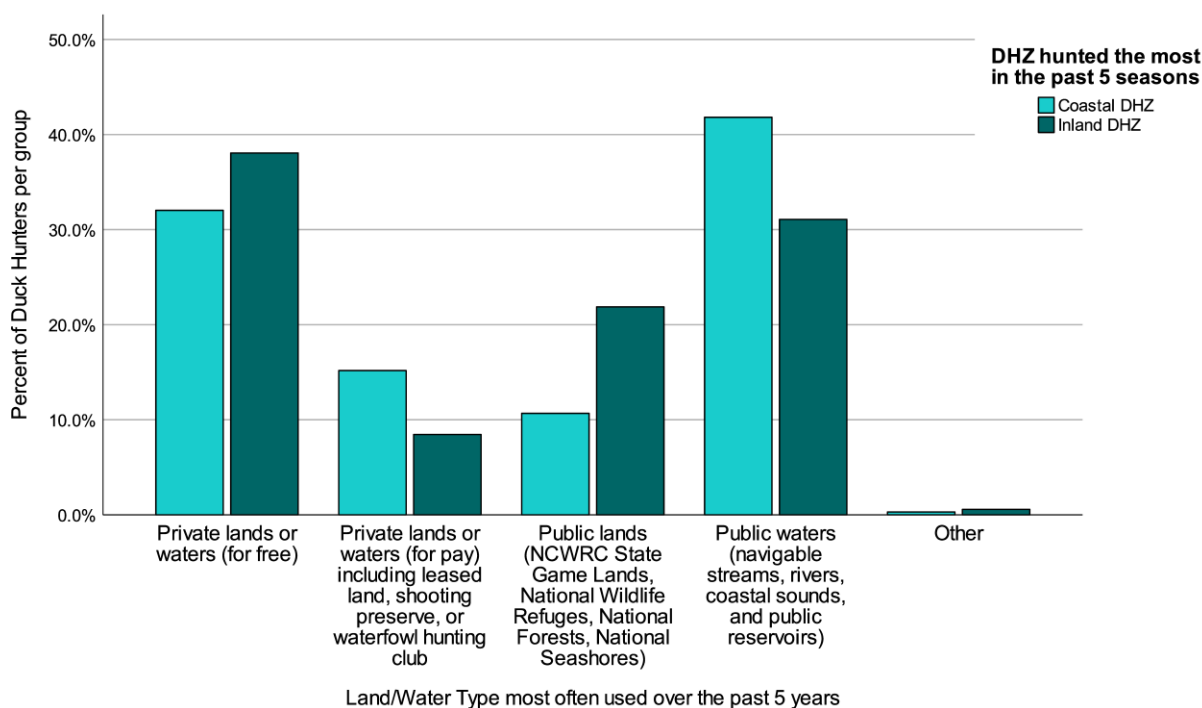


Figure 17: Frequency of the land/water types most often used for duck hunting over the past five years by Coastal and Inland Duck hunters.

New duck hunting zones (Q4.3-4.4)

When examined by DHZ groups, all three groups most frequently stated that zoning will not impact their understand of duck hunting regulations ($\geq 49\%$; Q4.3; Figure 18). However, hunters who used both the Inland and Coastal Zones in the past 5 duck hunting seasons appear to believe that DHZs will make regulations more difficult to understand (21%) compared to hunters who only used either the Inland or Coastal Zones (both 12%). Hunters who only hunted in either the Coastal or Inland Zones most frequently believed that zoning would not impact their duck hunting opportunities ($\sim 50\%$ for both groups; Q4.4; Figure 19). However, many hunters were also unsure about how the DHZs would impact their hunting opportunities ($\sim 31\%$ for all groups). Hunters who used both DHZs in the past 5 years were a bit more variable in their responses, but most stated that zoning would not impact their duck hunting opportunities (40%).

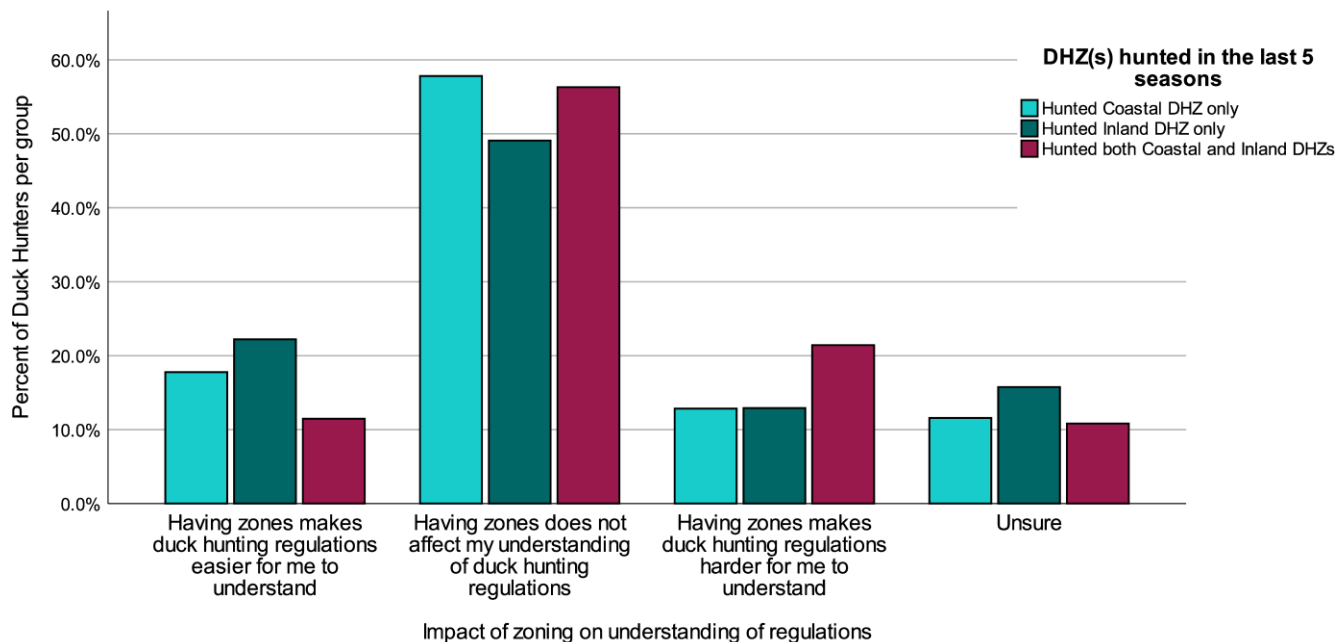


Figure 18: Frequency of responses to the question, 'Please indicate how duck hunting zones may affect your ability to understand duck hunting regulations in North Carolina' segmented by which Duck Hunting Zones (DHZs) duck hunters used in the past five duck hunting seasons.

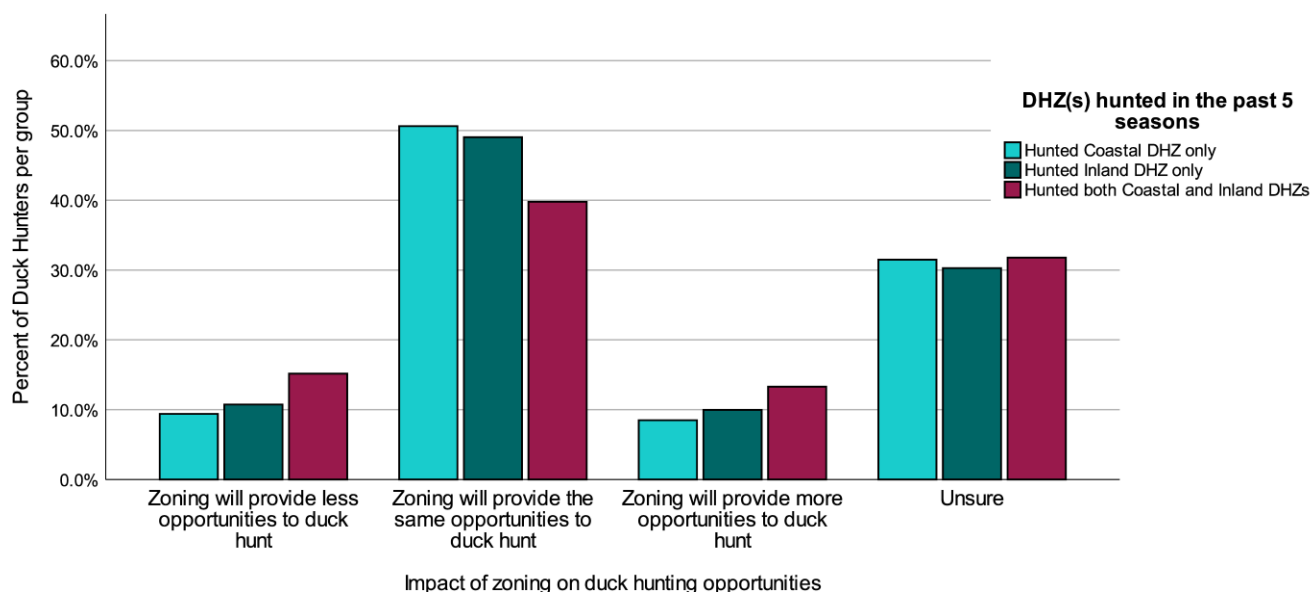


Figure 19: Frequency of responses to the question, 'In general, please indicate how the establishment of duck hunting zones may affect your duck hunting in North Carolina' segmented by which Duck Hunting Zones (DHZs) duck hunters used in the past five duck hunting seasons.

Duck season dates and duck season structure (Q5.2-5.15)

Important times to hunt during the season

Duck hunters were asked about their perceived level of importance given to bimonthly (twice per month) time periods during the duck season (Q5.5). Overall, duck hunters in the sample stated that later season periods are more important to hunt than earlier season periods (Figure 20). However, there were a few minor differences between the Coastal and Inland DHZ hunting groups.

Over 60% of Coastal hunters listed the early October season period as 'not important' (65%). However, less than half of Inland hunters listed this period as 'not important' (47%), resulting in about 53% of Inland hunters giving it some level of importance (slightly important to very important). The medians of importance for the early October season were 1 'not at all important' for Coastal hunters and 2 'Slightly important' for Inland hunters (Table 2). There was a significant effect of DHZ most often hunted on level of importance for the early October season, but the difference was between minimal and typical ($Z=14.39$, $p \leq .001$, $r = .19$).

This trend is slightly mirrored with the late October period, with the majority of Coastal hunters ranking it as not important (53%), while the majority of Inland hunters giving it some level of importance (57%). Similar to the Early October season, the Coastal hunters median rank of importance for the Late October season was 1 'Not at all

important', while Inland hunters had a median of 2 'slightly important'. The ratings of importance between the two groups were significantly different, but minimal ($Z=-9.15$, $p \leq .001$, $r = .12$).

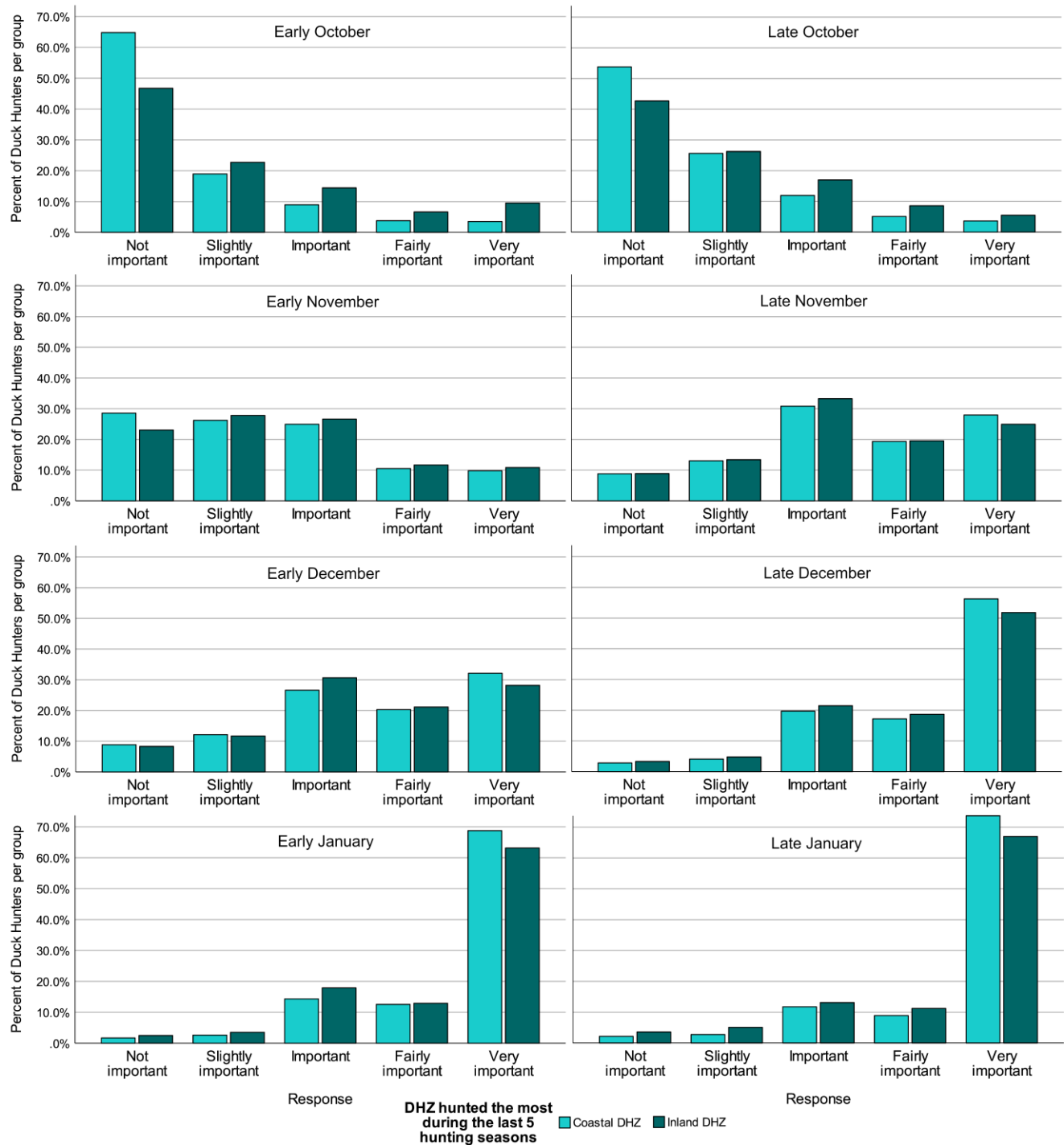


Figure 20: Frequency of duck hunter's level of importance of hunting given to eight bi-monthly periods during a typical duck hunting season segmented by the Duck Hunting Zone (DHZ) hunters used the most during the previous five seasons.

Over the periods given, this trend reversed for the later season with over 50% of hunters from both groups stating that the late December through late January periods are ‘very important’ times to hunt. For these last three time periods, between 2-4% of hunters from both groups stated that hunting during these times was ‘not important’.

There were no notable differences between the medians of the Coastal and Inland groups for all time periods after Late October, as effect size was minimal or lower. We found no significant differences between mean ranks of importance of Coastal and Inland hunters for the Late November or Early December periods, concluding that the two groups assign the same level of importance for these times.

Table 2: Results of Mann-Whitney U test testing for differences in mean ranks of hunting time importance between Coastal and Inland hunters for eight bi-monthly periods during a typical duck season.

Factor	Group	<i>n</i>	Mean rank	Median Level of Importance ¹	Z-Value	<i>r</i>
Early October	Coastal Hunters	3927	2706	1	-14.39***	0.19
	Inland Hunters	1871	3306	2		
Late October	Coastal Hunters	3903	2746	1	-9.15***	0.12
	Inland Hunters	1843	3143	2		
Early November	Coastal Hunters	3914	2830	2	-3.81***	0.05
	Inland Hunters	1856	3003	2		
Late November	Coastal Hunters	3986	2963	3	-1.95	0.03
	Inland Hunters	1881	2873	3		
Early December	Coastal Hunters	3960	2936	4	-1.94	0.03
	Inland Hunters	1855	2848	3		
Late December	Coastal Hunters	4017	2994	5	-3.20***	0.04
	Inland Hunters	1883	2857	5		
Early January	Coastal Hunters	4026	3017	5	-4.69***	0.06
	Inland Hunters	1889	2831	5		
Late January	Coastal Hunters	4028	3033	5	-6.24***	0.08
	Inland Hunters	1888	2799	5		

¹Median on unipolar scales of 1 “Not very important” to 5 “Very important”

***Significant to the $p \leq 0.001$ level

Number of segments and opening and closing of segments

Coastal hunters had very similar frequencies for their preferences for two and three segments in the Coastal DHZ (Q5.2-5.3; Figure 21). Specifically, 33% of Coastal hunters preferred two season segments while 31% preferred three season segments. Inland hunters, however, appear to prefer three season segments (35%) more strongly over two season segments (29%). Between 14% and 16% of hunters had no preference for the number of segments in the zones they hunt. In general, both groups preferred two or three season segments over one season segment.

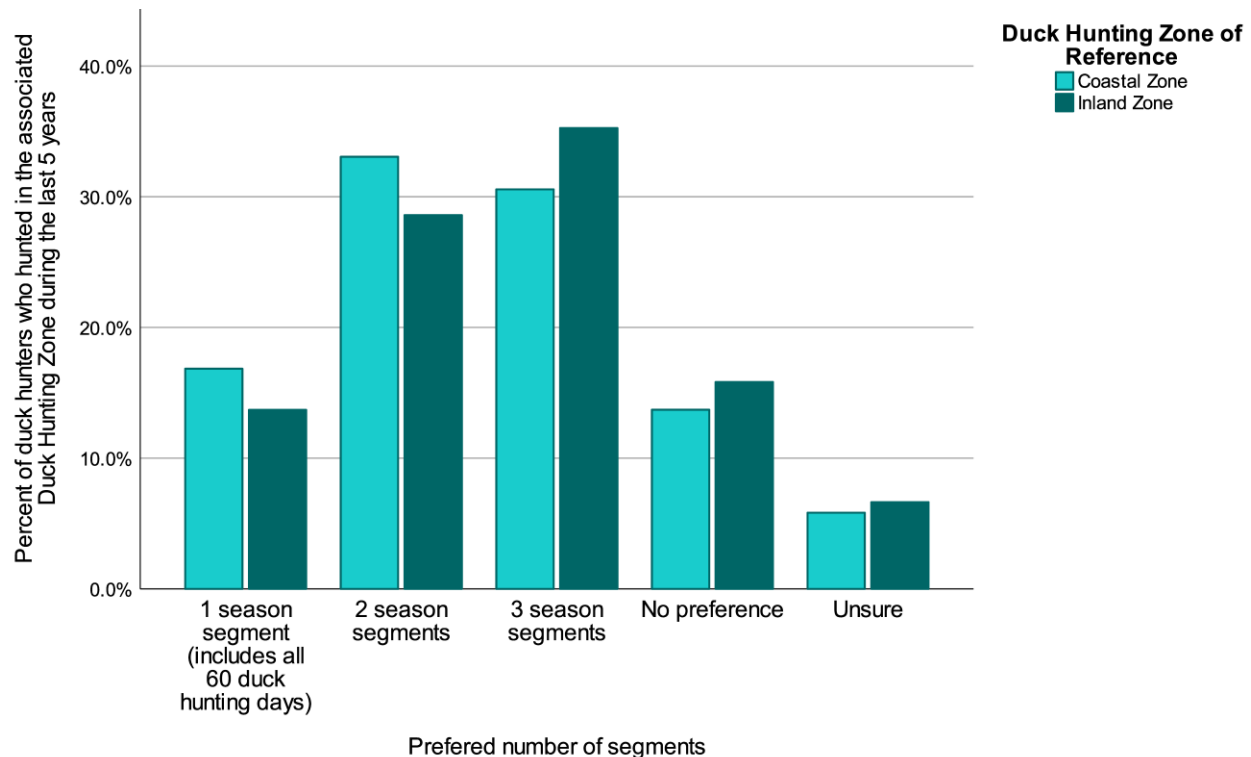


Figure 21: Frequency of responses to the question, 'Please share your preference for the number of duck season segments in the Inland Zone (West of I-95)/Coastal Zone (East of I-95) segmented by Duck Hunting Zone (DHZ) groups. This was presented as two separate questions, with hunters only answering the questions specific to the DHZ they hunted the most in the past five duck hunting seasons.

When considering when duck season segments should open and close, both DHZ hunting groups had similar results (Q5.4; Figures 22-24). Overall, over half of all Coastal and Inland hunters agreed or strongly agreed that the season should both open and close on Saturdays whenever possible (61% and 57%, respectively; Figures 22 & 23, respectively). Despite clear preferences for opening and closing duck hunting segments on Saturdays, the effects of opening and closing a segment on weekdays were mixed across hunters (Q5.4; Figure 24). Specifically, opening or closing a segment on a weekday affects about 45% of Coastal hunters and 47% of Inland hunters, but does not affect 34% of Coastal hunters and 33% of Inland hunters.

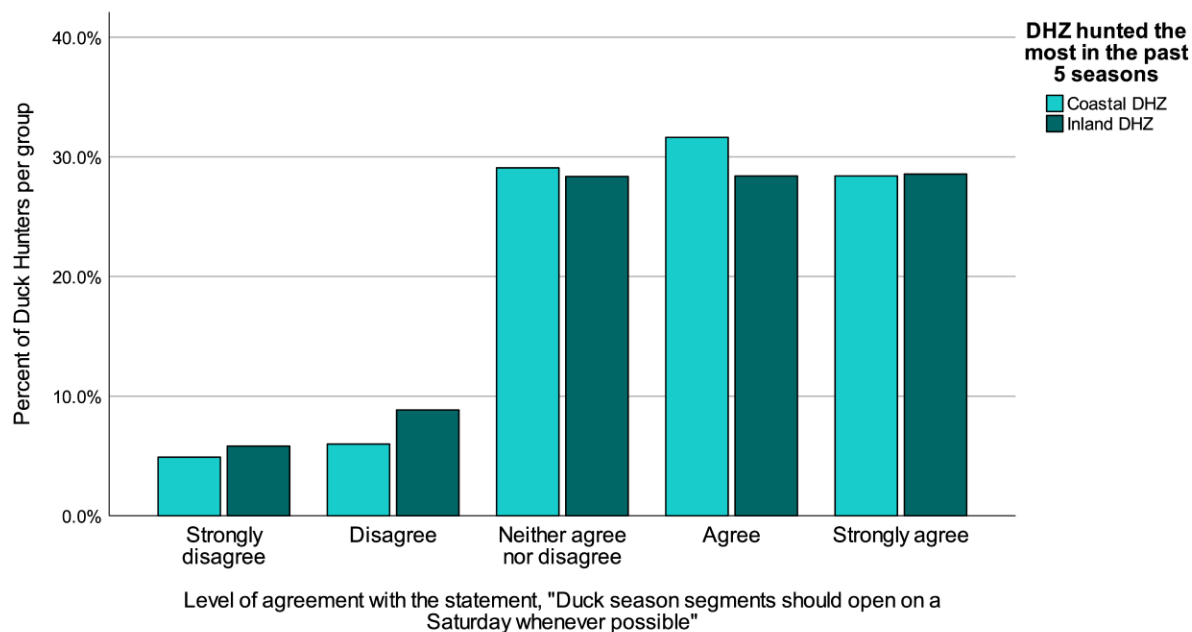


Figure 22: Frequency of responses to the statement, 'Duck season segments should open on a Saturday whenever possible' segmented by Duck Hunting Zone groups.

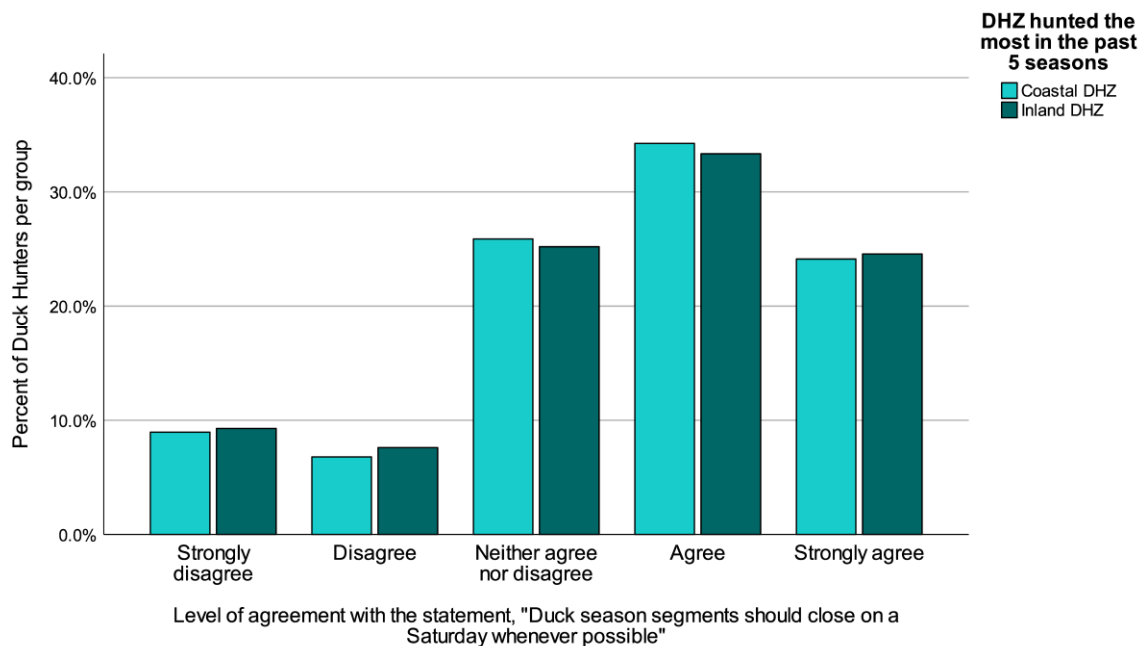


Figure 23: Frequency of responses to the statement, 'Duck season segments should close on a Saturday whenever possible' segmented by Duck Hunting Zone groups.

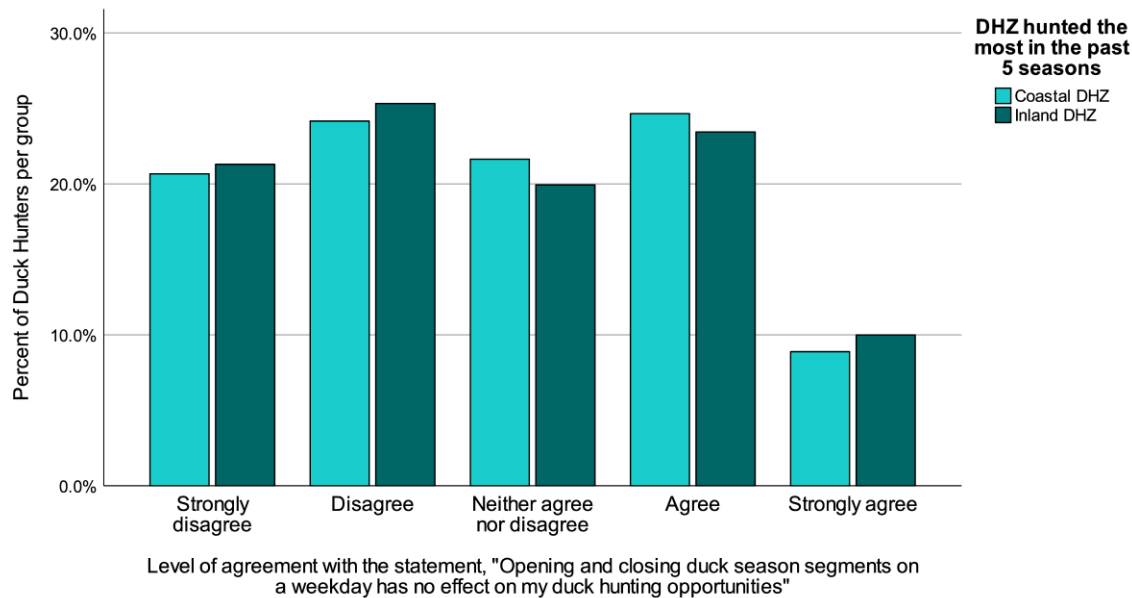


Figure 24: Frequency of responses to the statement, 'Opening or closing duck season segments on a weekday has no effect on my duck hunting opportunities' segmented by Duck Hunting Zone groups.

Keeping the October season

Based on display logic built into the survey, only hunters who said they hunted in a respective zone at some point in the past five years were presented questions related to that zone. For example, if a respondent stated they hunted in only the Coastal North area in [question 3.7](#), they were only presented questions related to the Coastal Zone and were not presented those specific to the Inland Zone. If a respondent stated they hunted in both zones, they received both zone specific questions.

Inland Zone

Inland hunters were generally more supportive than oppositional for retaining the October season segment ([Q5.6](#); [Figure 25](#)). Specifically, 37% strongly supported or supported keeping the segment, 28% strongly opposed or opposed keeping the segment, while 31% were neutral.

When considering keeping the October segment but shifting it later in the month, 40% strongly supported or supported this change whereas 24% strongly opposed or opposed the change ([Q5.6](#); [Figure 25](#)). When forced to decide how long this segment should be if it were to be retained, 37% (74% in total) of hunters chose the '2-3 days' and '4-day' (status quo) options ([Q5.7](#); [Figure 26](#)). Only 17% wished for a longer (5-6 day long) segment. Most hunters preferred that the October segment, if retained, should move to the last week in October (53%; [Q5.8](#); [Figure 27](#)). Conversely, the first full week in

October was the most frequent ‘least preferred’ option presented (65%). However, the second most frequent ‘least preferred’ option was also the last full week in October option.

Coastal Zone

Coastal hunters were generally more oppositional than supportive when considering retaining the October season segment (Q5.6; Figure 25). Specifically, 24% strongly supported or supported keeping the segment whereas 37% strongly opposed or opposed keeping it. 34% of Coastal hunters were neutral.

When considering shifting the October season segment to later in October, more Coastal hunters were supportive of this option than of simply retaining it (Q5.6; Figure 25). About 33% strongly supported or supported this option, while 30% strongly opposed or opposed this option. If retained, Coastal hunters most favored a 2-3 day segment (41%), followed by 4 days (status quo; 33%), and 5-6 days (15%; Figure 26). Like Inland hunters, the last full week in October was the most frequently highest preferred option for when the WRC should hold the segment (63% ranked it ‘most preferred’; Q5.11; Figure 27). The first full week was also the most frequent least preferred option (70%) and the second most frequent ‘least preferred’ option was the last full week in October (16.4%).

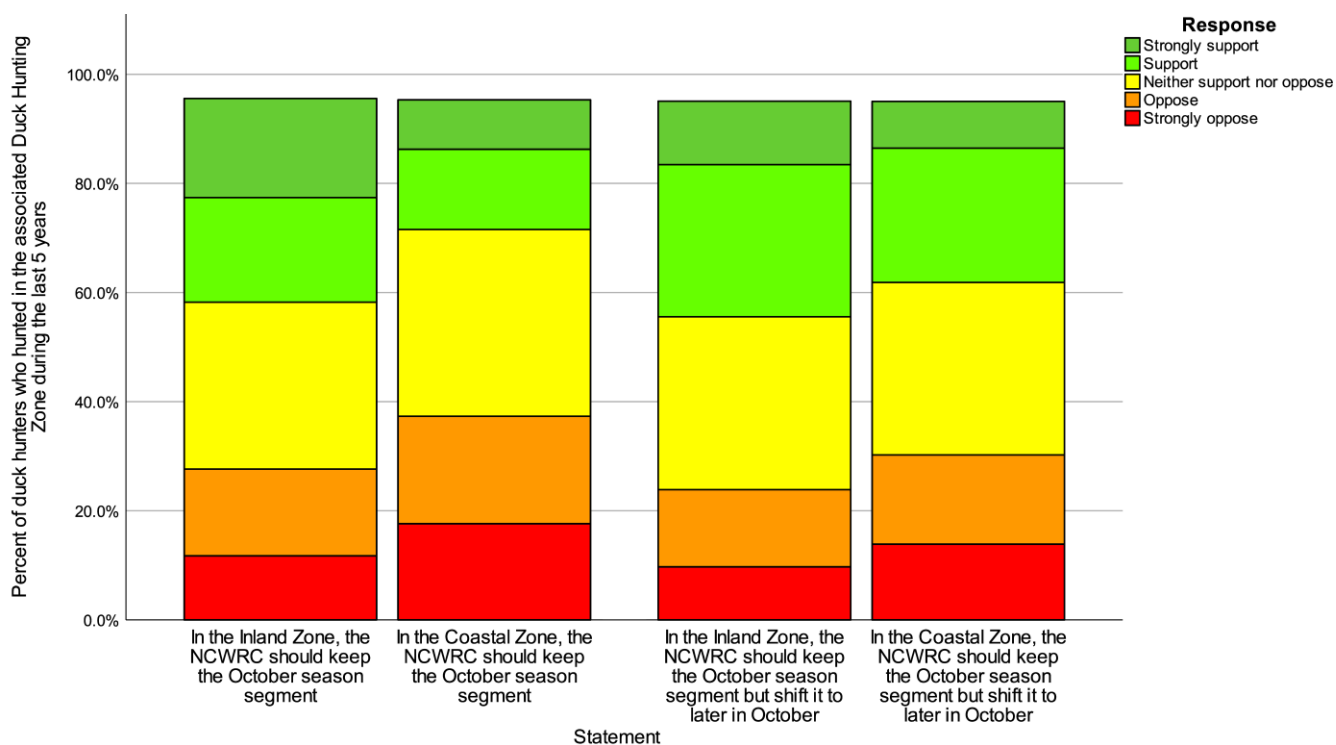


Figure 25: Frequency of responses to questions related to retaining the October season segment divided into responses relative to the Inland or Coastal Duck Hunting Zones.

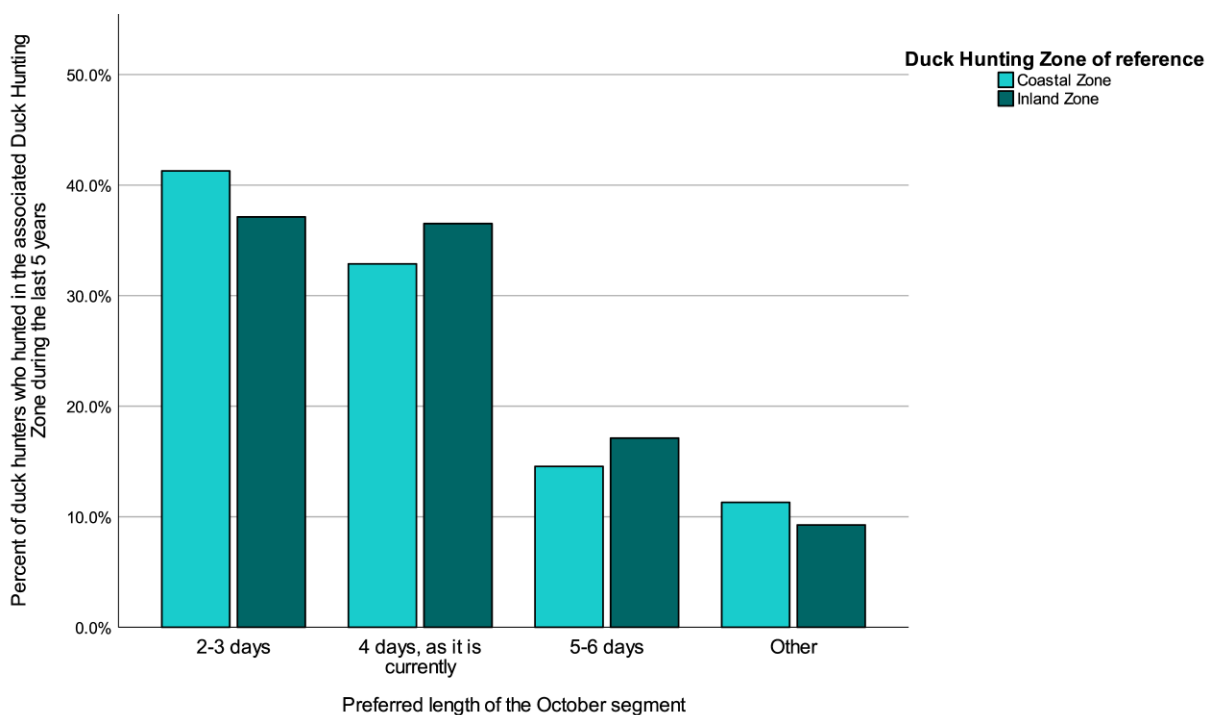


Figure 26: Frequency of preference for the length of the October season segment, if retained, segmented by Duck Hunting Zone groups.

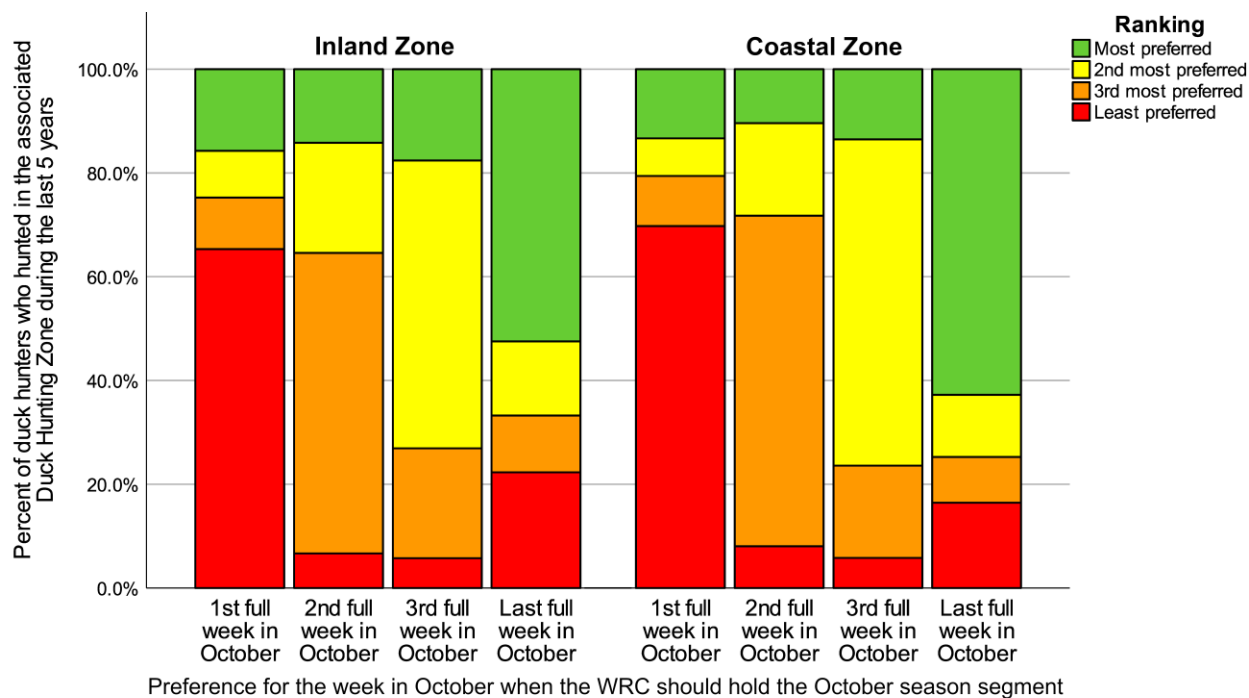


Figure 27: Frequency of ranked preferences for when the October season segment dates should be moved if the WRC retains the segment, grouped by responses relative to the Inland or Coastal Duck Hunting Zone.

Abolishing the October Season

Inland Zone

When presented with the option to remove the October season segment in the Inland Zone and use those days later in the season, 50% of Inland duck hunters strongly supported or supported this change while 25% strongly opposed or opposed this change (Q5.6; [Figure 28](#)). 21% of Inland hunters were neutral. These results were investigated further by hunters who used both Coastal and Inland Zones and those who only used the Inland Zone. Hunters who used both zones appear to be more supportive of removing the October segment (52% strongly support or support) than hunters who only used the Inland Zone (43%; [Figure 29](#)).

When forced to decide preferences for how the WRC should distribute the four October segment days, if the segment was abolished in the Inland Zone, 44% of Inland hunters (the most frequent) listed ‘add the days to mid-December’ as their most preferred’ option (Q5.9; [Figure 30](#)). ‘Distributing the days to allow segments to open and close on Saturdays’ and was the most frequent ‘least preferred’ options (42%), but the 2nd most frequent most preferred option (27%).

Coastal Zone

When presented with the option to remove the October season segment in the Coastal Zone and use those days later in October, 62% of Coastal duck hunters strongly supported or supported this change while 13% strongly opposed or opposed this change (Q5.6; [Figure 28](#)). This is a stronger dichotomy compared to Inland hunters. Shifting the four October segment days to mid-December was the most frequently highest preferred option (48%; Q5.12; [Figure 30](#)). Adding the days to early November and distributing the days to allow opening and closing on Saturdays were the most frequent least preferred (41% and 43%, respectively). However, distributing the days to allow opening and closing on Saturdays was the second most frequent most preferred option.

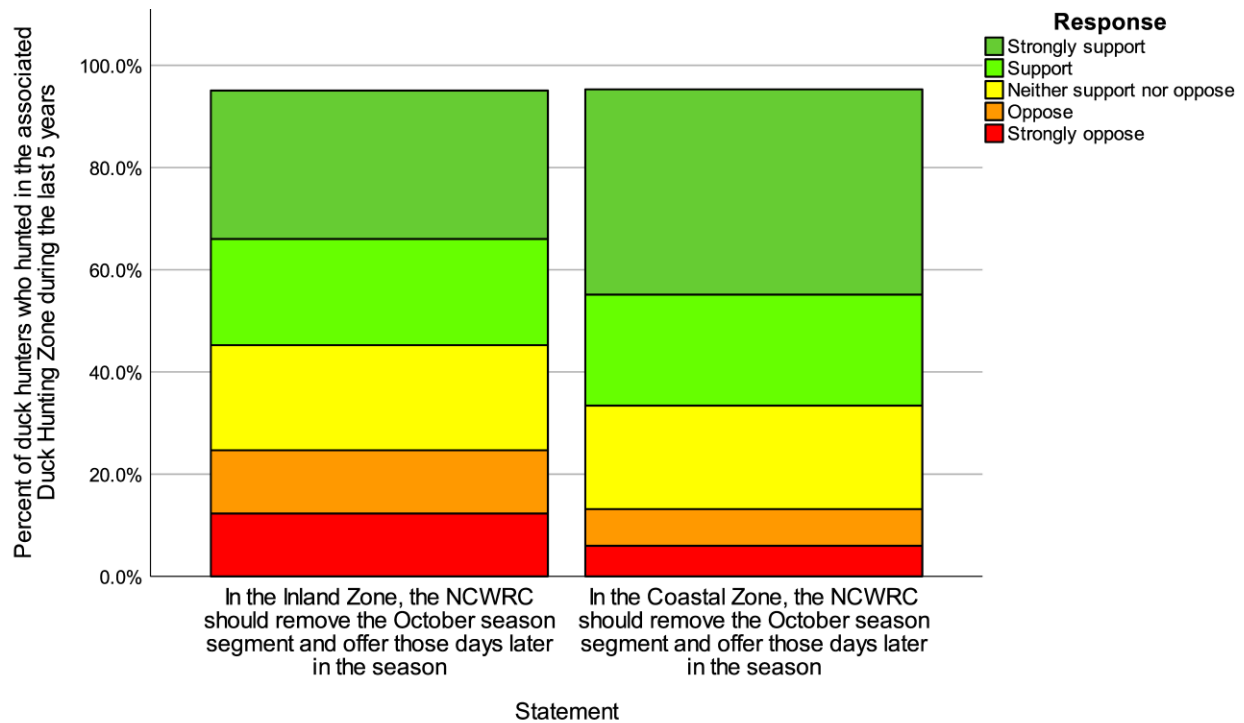


Figure 28: Frequency of questions related to abolishing the October season segment and offering those days later in the season, divided by Inland and Coastal Duck Hunting Zones.

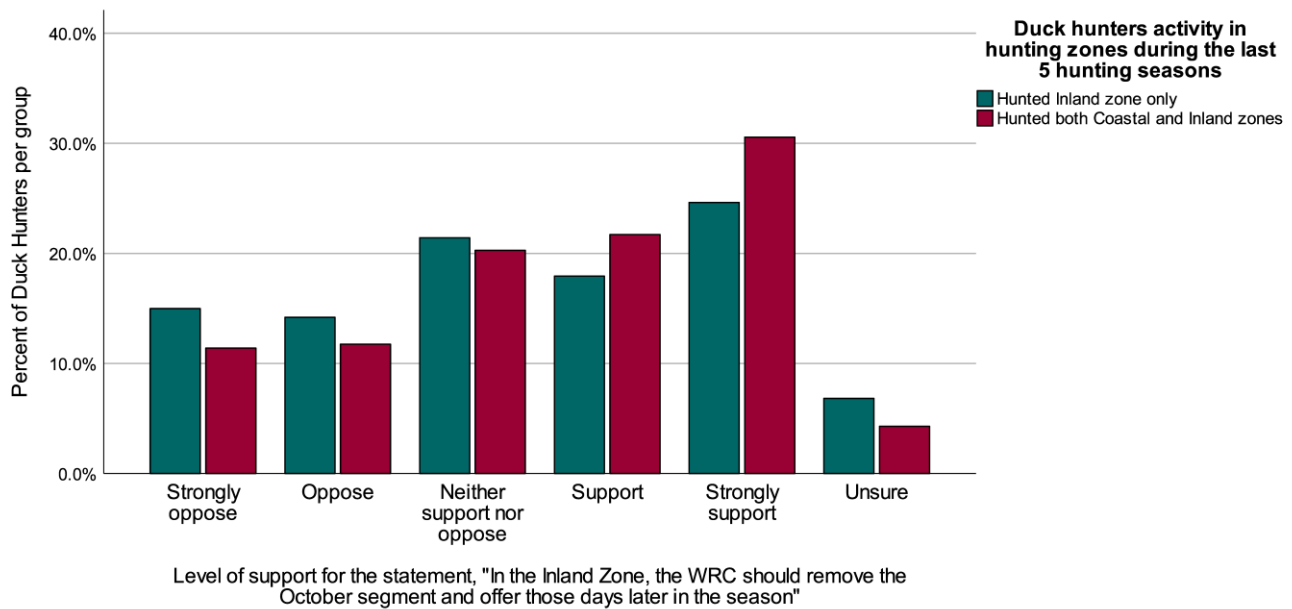


Figure 29: Frequency of questions related to abolishing the October season segment and offering those days later in the season, divided by duck hunters who used in Inland Zone only and both the Coastal and Inland Zones during the last five duck hunting seasons.

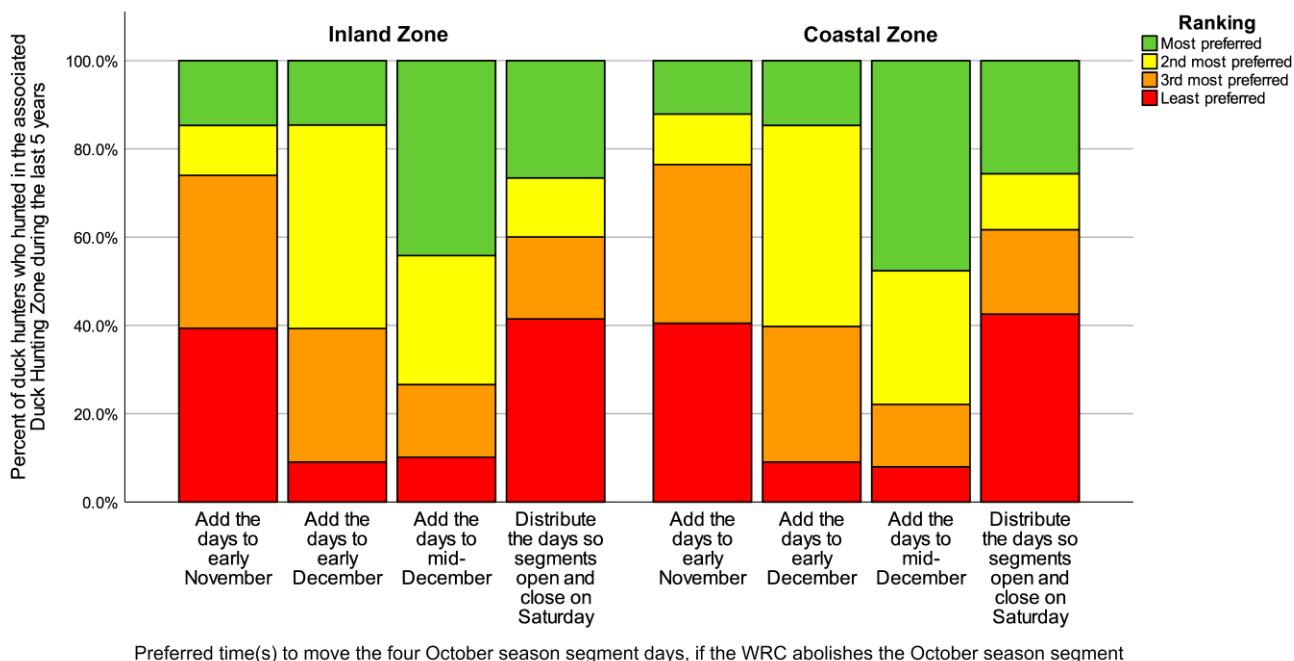


Figure 30: Frequency of ranked preferences for when the October season segment dates should be moved if the WRC abolishes the segment, grouped by responses relative to the Inland or Coastal Duck Hunting Zone.

Hunting on holidays

Most duck hunters in the sample stated that having hunting days allocated during the Thanksgiving and Christmas holiday was important to their enjoyment of duck hunting (87% and 90%, respectively; [Q5.13-5.14](#); [Figure 31](#)). Having duck season dates during the Christmas season was rate 'very important' more frequently than during the Thanksgiving holiday (43% and 36%, respectively).

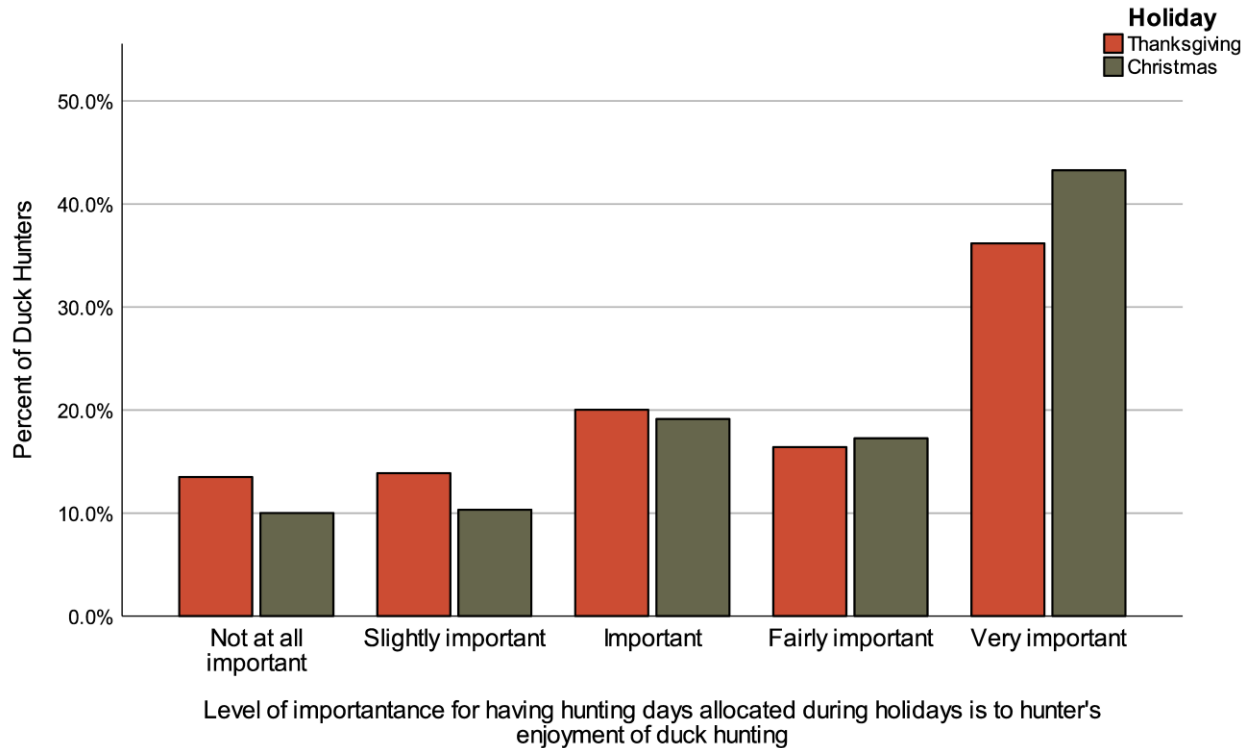


Figure 31: Frequency of level of importance for having duck hunting days allocated during holidays, segmented by Thanksgiving and Christmas.

Open-ended responses related to season structure and dates

Duck hunters were asked to share any additional thoughts on duck hunting season structure and dates, and what they were thinking about when answering questions related to these topics ([Q5.15](#)). The most common theme was ‘as late as possible’, in which respondents were discussing their desire for the WRC to add duck hunting dates in February or explaining their position to remove earlier season dates and add them later in the season. While many hunters simply stated, “the later the better”, many provided rational by drawing on personal observations on climatic or weather changes and associated duck migration shifts through history.

“In my view, removing the early season dates from October would be beneficial to more quality hunting segments in December and/or January. It’s no secret that as our climate continues to shift that our real winter condition are beginning later and later. The early season and even the November session puts pressure on the birds for too long a stretch of time. I’m talking with most of the waterfowl hunters I know we all share the experience of migratory birds arriving later and warmer seasons in general. Again my hope is that NC Wildlife will provide more opportunity later in the season to boost the quality of the experience for hunters while also protecting that waterfowl population

form four months of pressure.”

-Coastal Zone only duck hunter

Most comments related to the October season were in support of abolishing the October season segment and adding the days later in the season. These thoughts were often discussed as a ‘waste of duck hunting days’.

“The October days have always seemed a waste of days that could be enjoyed later in the season when weather is more suitable to waterfowl hunting”

-Coastal Zone only duck hunter

Conversely, while not oppositional to extending the season, many Inland Zone hunters explained the importance of the October season and their desire to keep it.

“Do not like the idea of removing the October or Wood duck season at all. Some of the best inland duck hunting occurs during October for wood ducks and early divers migrate during later November and early December most years. Would like to see season extended into January even if second segment is only 2 weeks instead of 3. Would be nice to extend season into 1st week of February”

-Inland Zone only duck hunter

Another common theme focused on the topic of Sunday hunting in North Carolina. Most hunters who shared their thoughts on this topic were supporters of opening Sunday waterfowl hunting in the state and often used their available time to hunt as rational.

“Again hunting on Sundays should be [allowed]. I would give up an early season and holiday dates to have the weekends to hunt. Because like I stated before the average working man works m-f and cannot hunt but one day a week and that’s Saturday. Are we only having duck season for retirees or the more fortunate people?”

-Coastal and Inland Zone duck hunter

Only a few hunters shared oppositional statements to Sunday hunting, and seemed to focus more on hunting pressure or ‘letting the birds rest’.

“If hunting dates and structure were to change, I would strongly suggest NO Sunday hunting. Duck season is short and a majority is on the weekend. Waterfowl need the day of rest. A lot of pressure from hunters can push birds away, especially in public waters.”

-Coastal Zone only duck hunter

A few other themes emerged, but were not as prevalent or debated amongst respondents, such as the importance of holidays and family/social ties strengthened through duck hunting.

Youth Waterfowl Days (Q6.2-6.4)

About 42% of the sample participated in YWDs during the 2019-2020 duck season, while 58% did not (Q6.4). However, despite participation, 90% of hunters either strongly support or support the special hunting day (Q6.3). When thinking about when YWD's should occur, 65% of YWD participants preferred Saturdays after the regular duck hunting season, only 11% did not have a preference. 39% of non-participants also preferred this timeframe, while 30% did not have a preference (Q6.2; Figure 32).

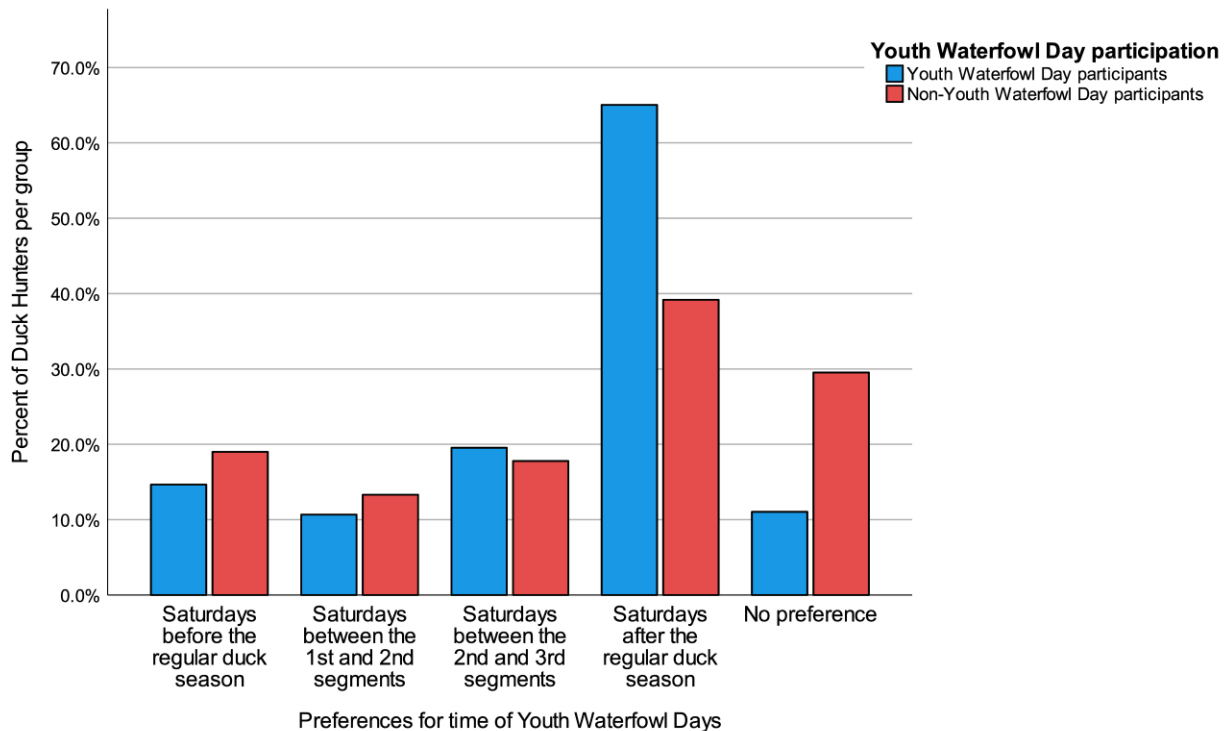


Figure 32: Frequency of preferences for when Youth Waterfowl Days should occur, segmented by participants and non-participants.

Veterans and Military Waterfowl Days (Q7.2-7.5)

Only 11% of North Carolina duck hunters in the sample participated in VMWDs during the 2019-2020 duck seasons (Q7.5). While there was low participation compared to YWDs, 81% of the sample strongly supported or supported VMWDs (Q7.4).

Because we were interested in looking at preferences of non-participant veterans or active military, we segmented respondents into four groups based on military or civilian status and their participation in the 2019-2020 VMWD. Veterans/Active military participants and non-participants, as well as citizen participants most favored hosting VMWDs after the regular duck season (77%, 49%, 58%, respectively; Q7.3; Figure 33). Citizen non-participants most frequent response was 'no preference' (38%).

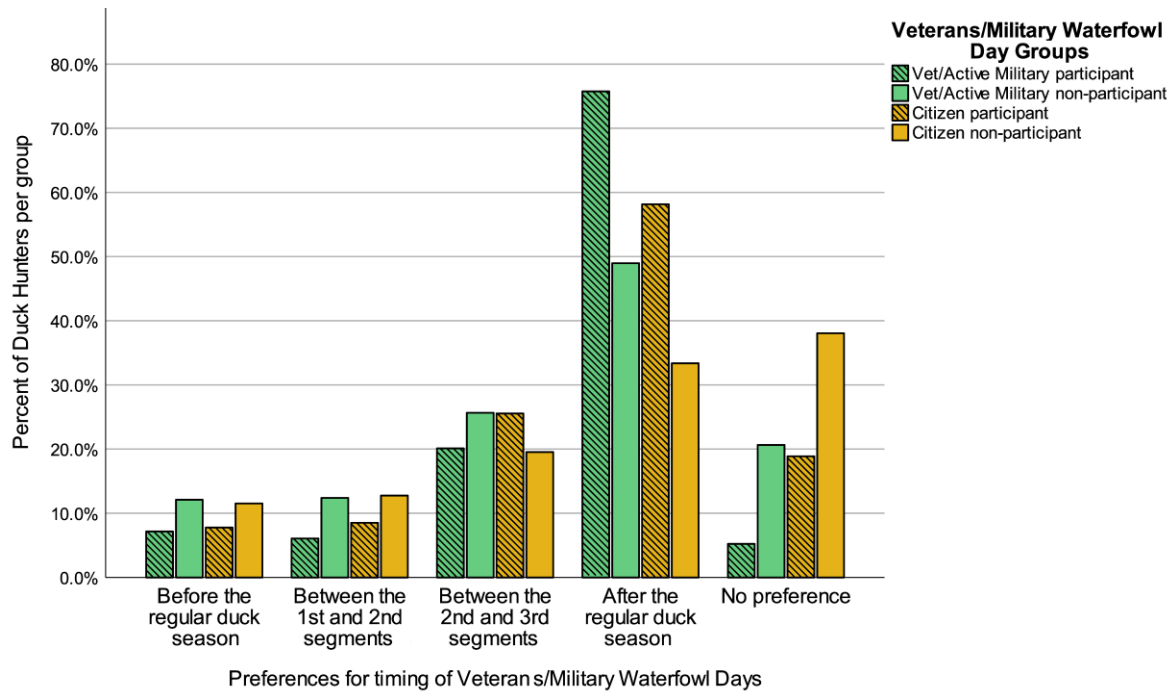


Figure 33: Frequency of preferences for when Veterans/Military Waterfowl Days should occur, segmented by participation and veteran's status groups.

When asked about their preferred day of the week for when VMWDs should occur, 63% of veterans/active military participants preferred Saturday only (Q7.3; Figure 34). The other three groups' most frequent response was 'No preference', followed by 'Saturday only'.

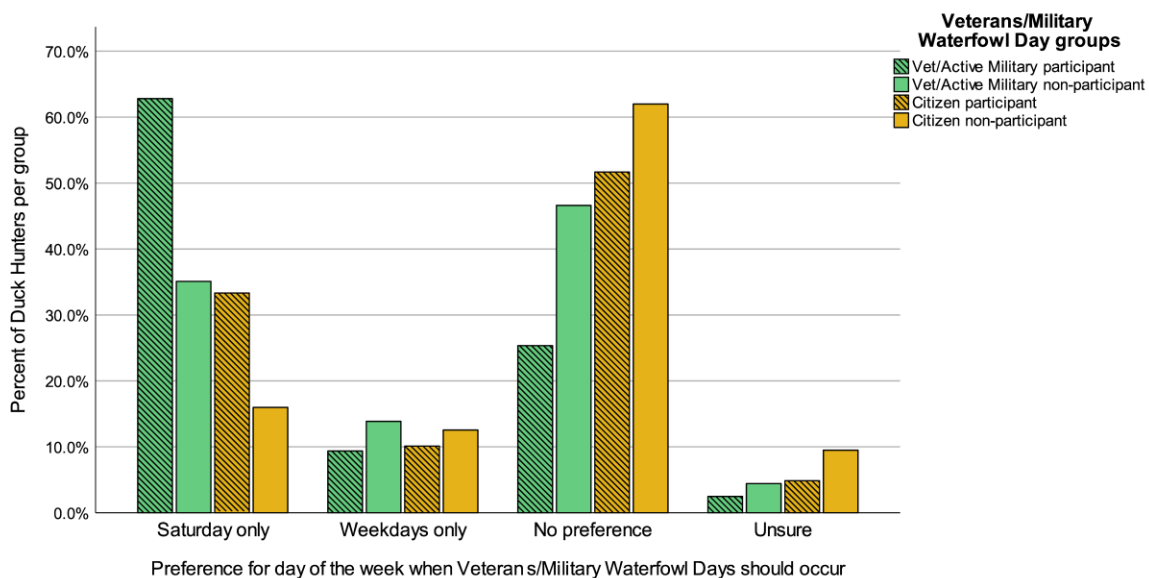


Figure 34: Frequency of preferences for the day of the week when Veterans/Military Waterfowl Days should occur, segmented by participation and veteran's status groups.

Overlap of Youth and Veterans/Military Waterfowl Days (Q7.6)

Duck hunter's support for having VMWDs on the same days as YWDs was mixed ([Q7.6](#); [Figure 35](#)). 66% of hunters who participated in both days strongly supported or supported the overlap. Hunters who participated in only VMWDs or only YWDs were also quite supportive but had lower frequencies for 'strongly support' and 'support' responses compared to participants in both special hunting days (48% and 45%, respectively).

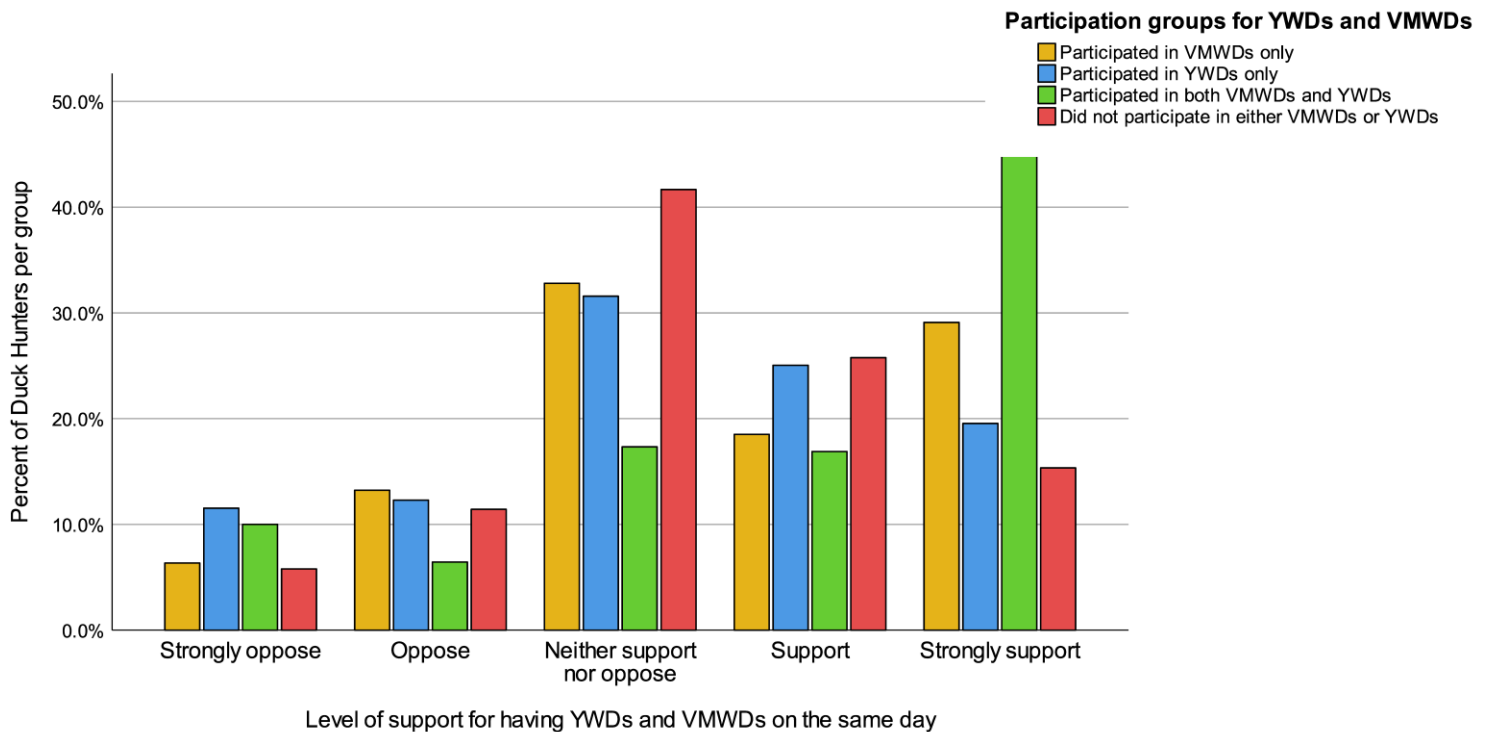


Figure 35: Frequency of responses to the question, 'How much do you support or oppose having Veterans/Military Waterfowl Days on the same days as Youth Waterfowl Days?', segmented by participation in both special hunting days.

Background information (Q8.2-8.11)

Of the total number of duck hunter respondents, 3% were waterfowl hunting guides, 12% were owners or managers of private duck hunting clubs, and 11% were veterans or active members of the armed forces ([Q8.2-8.4](#); [Table 3](#)). Most of the respondents were North Carolina residents (83%), had education above an Associate's degree level (63%), were male (88%), white (85%), and earned over \$75,000 in 2019 (53%) ([Q8.5-8.6](#), [Q8.8](#), [8.10-8.11](#)).

Table 3: Frequency of demographic and background characteristics of duck hunters.

Variable	Percent of respondents
Waterfowl hunting guide	2.5%
Owner manager or member of a private duck hunting club	11.6%
Veteran or a member of the armed forces on active duty	10.9%
Sex	
Male	88.1%
Female	1.4%
Highest level of education	
Less than a high school degree	0.3%
High school degree or equivalent	7.8%
Some college but no degree	17.3%
Associates degree (2-year)	13.4%
Bachelor's degree	36.3%
Master's degree	8.8%
Doctoral/Professional degree (PhD, MD, JD)	4.7%
Other	0.5%
North Carolina residency	
North Carolina resident	82.9%
Not an North Carolina resident	6.9%
2019 household income	
Less than \$20k	1.1%
\$20k to \$34k	2.8%
\$35k to \$49k	6.0%
\$50k to \$74k	12.7%
\$75k to \$99k	15.2%
\$100k to \$149k	18.8%
\$150k or more	19.0%
Race	
White	84.7%
Black	0.2%
American Indian or Alaska Native	0.5%
Asian	0.1%
Hispanic, Latino, or Spanish	0.2%
Native Hawaiian or Pacific Islander	0.0%
Other	0.6%
Mixed	0.8%
Age	44*

*Median age of all respondents

Of the North Carolina residents, we received the most responses from Wake County (9%), New Hanover County (4%), Pitt County (3%), Johnston County (3%), and Carteret County (3%; [Q8.9](#)). When the total population size of the county (from July 2019; North Carolina State Demographer, 2019) is considered, we received the most responses per

100,000 residents from Hyde, Dare, Tyrrell, and Currituck counties (700, 391, 318, 303 per 100,000 residents, respectively; [Figure 36](#)). These frequencies are in line with the number of HIP-certified duck hunters in each county per 100,000 residents in our sample frame. The counties with the most duck hunters (given HIP certification data) are Hyde, Tyrrell, Dare, Currituck (3732, 2306, 1854, and 1748 duck hunters per 100,000 residents, respectively). We did not receive any responses from Clay, Graham, Madison, or Swain Counties.

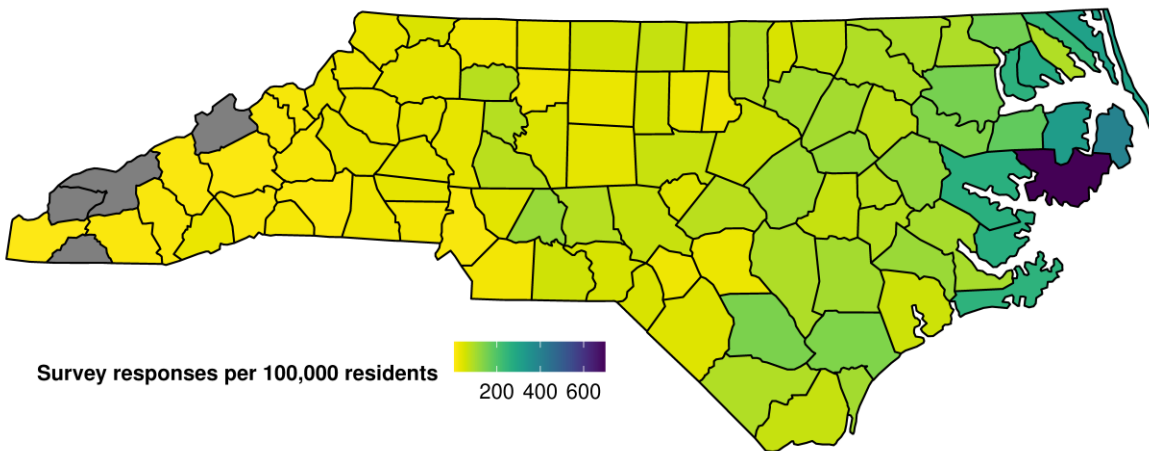


Figure 36: Frequency of responses to the 2020 Duck Season Survey by county per 100,000 residents.

Non-response bias

We compared responses between early (Pre-October 7, 2020) and late (On or post-October 7, 2020) for a variety of questions. There were no significant differences between the groups for questions related to where they hunted, age, or attitudes towards retaining/abolishing the October season segment. However, there were statistically significant differences between the two groups in relation to duck hunting avidity ([Table 4](#)). Specifically, there was a significant difference of mean rank for importance of duck hunting, number of days hunted during a typical duck season, and number of ducks harvested during a typical duck season ($Z=25.91, 75.61, \text{ and } 55.85$, respectively; $p \leq 0.001$). In general, earlier respondents had higher mean ranks for the three variables, indicating a higher avidity for duck hunting. These differences, however, were minimal ($r \leq .10$).

Table 4: Results of Mann-Whitney U test testing for differences in mean ranks of hunting time importance between Coastal and Inland hunters for eight bi-monthly periods during a typical duck season.

Factor	Group	n	Mean rank	Median	Z-Value	r
Importance of duck hunting ¹					25.91***	0.00
	Early respondents	4964	3216	4		
	Late respondents	1363	2969	4		
Number of days hunted during a typical duck season ²					75.61***	0.01
	Early respondents	5018	3304	3		
	Late respondents	1384	2829	2		
Number of ducks harvested during a typical duck season ³					55.85***	0.01
	Early respondents	5015	3287	4		
	Late respondents	1381	2876	3		

¹Measured on a scale of 1 “One of my least important recreational activities” to 5 “My most important recreational activity”

²Measured on a scale of 1 “1 to 5 days” to 5 “More than 30 days”

³Measured on a scale of 1 “0 ducks” to 6 “More than 30 ducks”

***Significant to the $p \leq 0.001$ level

Discussion

From September 21, 2020 to October 21, 2020 the WRC surveyed North Carolina duck hunters who had active HIP certifications during the state’s 2019-2020 duck hunting season. The respondents were skewed to more active and avid duck hunters with many having over 30 years of experience.

Objective 1: Assess perceived impacts of DHZ establishment on hunters’ experiences and understanding of regulations

In 2012, 71% of surveyed duck hunters preferred splitting the state into two separate DHZs, with 58% preferring Interstate-95 as the boundary (Palmer et al., 2012). Therefore, the results of the present study in which most hunters believe that zoning will not impact their understanding of duck hunting regulations, or their duck hunting opportunities are unsurprising. However, many hunters who reside and hunt in the Piedmont or Mountain regions of North Carolina also travel to hunt in the Coastal region. Because slightly more of these hunters mentioned that zoning would make regulations more difficult to understand, clear descriptions and supplementary maps in both the annual Regulations Digest and on the WRC website could assist in hunter’s comprehension and reduce confusion.

In order for a person to understand a message and make the associated behavior change they must be able to comprehend it (Cacioppo & Petty, 1986). Individuals may have trouble processing information if they are bored, have little prior knowledge or

experience, or are not motivated. Across all aspects of WRC's communications, one should consider language accessibility that accommodates people of all ages and abilities.

Hunter's likely do not receive information on regulations solely from the WRC but may rely on word-of-mouth or information shared by organizations. Therefore, partnerships with organizations, such as Ducks Unlimited, could apply social forces, such as norms, to encourage acceptability and understanding of potentially different regulations between the two DHZs without an individual actually reading a regulations digest.

Objective 2: Assess preferences for season dates between Inland and Coastal duck hunters

Perhaps most relevant to determining dates for duck hunting seasons in the Coastal and Inland DHZs were questions related to the importance of being able to hunt during bimonthly (twice a month) periods from October through January. The WRC has collected many public comments on the importance of the October season segment to Inland Zone hunters, but the present investigation was able to explore how a variety of hunters feel towards this early season period. Survey pre-tests, discussions with waterfowl-oriented WRC staff, as well as various comments throughout survey responses indicate that Inland hunters appreciate this season segment for the opportunity to hunt primarily wood ducks, but also other early-migrating duck species. While more hunters in the Inland Zone assign some importance to the October season compared to Coastal Zone hunters, the difference is not as strong as previously thought.

By exploring hunter preferences between two different zones, we were able to tease out some slight differences in opinions between regional user groups. Our findings that Inland hunters were slightly more favorable towards retaining the October season segment were consistent with the 2010 survey of duck hunters (Fuller et al., 2011). However, keeping the October segment during the first week of October was not widely supported by Inland zone hunters. The respondents more strongly prefer the last week in October.

A common theme surrounding survey results was hunters in both zones preferring as many late hunting season dates as possible. Many open-ended comments also shared a preference for pushing some dates into February, as hunters observe many species not arriving until after the season is closed.

Objective 3: Understand perspectives towards Youth Waterfowl Days (YWDs) and Veterans/Military Waterfowl Days (VMWDs)

In general, there was nearly unanimous support for YWDs and VMWDs across our sample of duck hunters, regardless of participation. Preferences for later season dates are also prevalent in results to questions related to timing of special hunting days, as the

most frequent option for when special days should occur was after the regular duck season. Overall, having both YWDs and VMWD on the same Saturdays after the regular duck season appears to satisfy most duck hunters.

Limitations

External validity & response rate issues

Due to the difficulty of identifying ‘true’ 2019-2020 North Carolina Duck hunters from the WRC license database, response rate is not a strong indicator of external validity for this study (i.e. generalizability to the broader duck hunting community). Because of the high number of respondents who did not hunt in 2019-2020, our sampling methodology likely overestimated the number of hunters in this group and thus overestimated our response rate. This was likely a product of using HIP certification activation date to identify our sample frame, as many hunters could have hunted in previous seasons but not the 2019-2020 duck season.

We also appeared to receive more responses from avid and experienced duck hunters, with most hunters in our sample stating duck hunting as one of their most important recreational activities and having over 30 years of experience. While we do not have any benchmark measures for these characteristics of North Carolina duck hunters, we can expect our data to be biased towards these hunters. This is further exemplified in our non-response bias checks as non-respondents are more likely to be less avid hunters. One may expect less avid or less experienced hunters to have more difficulty comprehending regulations or the motivation to travel to another zone to hunt if dates change.

Timing of survey – overlapped with 2020-2021 duck season

Because our online survey was active during the 2020-2021 October season segment, it is possible that respondents who participated following this segment could be considering the current October season in their responses.

Acknowledgements

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References

- Bernard, H. R. (2006). *Research methods in anthropology: Qualitative and quantitative approaches* (4th ed). AltaMira Press.
- Cacioppo, J. T., & Petty, R. E. (1986). The Elaboration Likelihood Model of Persuasion. *Advances in Experimental Social Psychology*, 19, 123–205.
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic press.
- Filion, F. L. (1976). Exploring and Correcting for Nonresponse Bias Using Follow-ups of Non Respondents. *Pacific Sociological Review*, 19(3), 401–408.
<https://doi.org/10.2307/1388756>
- Fuller, J., Howell, D., & Palmer, D. (2011). *2010-11 North Carolina Waterfowl Hunter Survey* (p. 48). North Carolina Wildlife Resources Commission.
- IBM Corp. (2017). *SPSS for Windows, Version 25*.
- Lin, I.-F., & Schaeffer, N. C. (1995). Using Survey Participants to Estimate the Impact of Nonparticipation. *The Public Opinion Quarterly*, 59(2), 236–258. JSTOR.
- Myers, R. (2019). *1949-2019 Duck Harvest and Hunter Trends*. North Carolina Wildlife Resources Commission.
<https://www.ncwildlife.org/Portals/o/Hunting/Documents/Huner%20Harvest%20Survey%20Summaries/Historic%20Hunter%20Harvest%20Trends/1949-2019-Duck-Harvest-and-Hunter-Trends.pdf>
- N.C. Gen. Stats. Ann. §48A-2 (1971)
- N.C. Gen. Stats. Ann. § 7B-3400 (1998)
- North Carolina State Demographer (2019). *Population, Voting Age, Density, Migration*. North Carolina Office of State Budget and Management.
<https://demography.osbm.nc.gov/explore/?sort=modified>
- Palmer, D., Fuller, J., & Howell, D. (2012). *2012 North Carolina Duck Zoning Survey* (pp. 1–6). North Carolina Wildlife Resources Commission.
- Qualtrics. (2019). *Qualtrics* (Version January 2020) [Computer software].
<https://www.qualtrics.com/>
- Roberts, A. J. (2019). *Atlantic Flyway harvest and population survey data book*. U.S. Fish and Wildlife Service.
- Schroeder, S. A., Fulton, D. C., Cornicelli, L., Cordts, S. D., & Lawrence, J. S. (2019). Clarifying how hunt-specific experiences affect satisfaction among more avid and less avid waterfowl hunters. *Wildlife Society Bulletin*, 43(3), 455–467.
<https://doi.org/10.1002/wsb.1006>
- Vaske, J. J. (2008). *Survey Research and Analysis: Applications in Parks, Recreation and Human Dimensions*. Venture.

Appendix

Survey Instrument and response frequencies

Percentages of total responses to each question are written in parenthesis and bold. Percentages may not sum to 100% due to missing values.

Start of Block: Intro Block/Consent

Q1.1 Welcome to the 2020 N.C. Wildlife Resources Commission Duck Season Survey!

Your responses to the following questions will assist the North Carolina Wildlife Resources Commission (NCWRC) as it seeks to meet the needs of the state's duck hunters.

We are interested in hearing from all duck hunters, even those who do not hunt very often.

Information collected from this survey will be used by the NCWRC to inform decisions when establishing future duck seasons. If you agree to take the survey, we ask that you answer the questions honestly and to the best of your knowledge. You do not have to answer every question and may stop at any point in the survey. Your participation is not required, and any information provided is confidential, will be combined with other responses, and will not be used to identify you. The survey should take between 15 and 20 minutes. If you have questions about this survey, please send an email to surveys@ncwildlife.org

Thank you for your time and input, we value your thoughts!

Doug Howell
Migratory Game Bird Coordinator
North Carolina Wildlife Resources Commission



Q1.2 By selecting 'Yes' below, you are confirming you are at least 18 years old and agree to participate in this survey.

- ☐ Yes **(100%)**
- ☐ No, I do not wish to participate in this survey or I am younger than 18 years old **(0% Not included in analysis)**

Skip To: End of Survey If Q1.2 = No, I do not wish to participate in this survey or I am younger than 18 years old

End of Block: Intro Block/Consent

Start of Block: Screen 2

Q2.1 **1. Your Duck Hunting Activity** The following questions will help the NCWRC understand your experiences duck hunting in North Carolina

Q2.2 During which of the last 5 hunting seasons did you duck hunt in North Carolina? (Select all that apply)

- ☐ 2019-2020 **(100%)**
- ☐ 2018-2019 **(93.5%)**
- ☐ 2017-2018 **(88.8%)**
- ☐ 2016-2017 **(82.5%)**
- ☐ 2015-2016 **(77.8%)**
- ☐ I did not duck hunt during the last 5 hunting seasons **(0.1%)**

Start of Block: Preliminary Questions

Q3.1 During a typical duck hunting season, about how many days do you duck hunt in North Carolina?

(Select one)

- ☐ 1 to 5 days **(21.1%)**
- ☐ 6 to 10 days **(24.4%)**
- ☐ 11 to 20 days **(28.6%)**

- ☐ 21 to 30 days **(14.6%)**
- ☐ More than 30 days **(10.8%)**

Q3.2 During a typical duck hunting season, about how many ducks do you personally harvest in North Carolina?
(Select one)

- ☐ 0 ducks **(2.1%)**
- ☐ 1 to 5 ducks **(21.0%)**
- ☐ 6 to 10 ducks **(22.2%)**
- ☐ 11 to 20 ducks **(23.1%)**
- ☐ 21 to 30 ducks **(14.0%)**
- ☐ More than 30 ducks **(17.0%)**

Q3.3 How many years have you been duck hunting?

- ☐ 1-5 years **(14.9%)**
- ☐ 6-10 years **(16.7%)**
- ☐ 11-20 years **(22.2%)**
- ☐ 21-30 years **(15.2%)**
- ☐ More than 30 years **(30.0%)**

Q3.4 How important is duck hunting to you?
(Please select one)

- ☐ One of my least important recreational activities **(0.7%)**
- ☐ Less important than my other recreational activities **(3.7%)**
- ☐ No more important than my other recreational activities **(16.0%)**
- ☐ One of my most important recreational activities **(59.8%)**
- ☐ My most important recreational activity **(18.2%)**

Q3.5 During the last 5 hunting seasons, please indicate all the areas where you hunted ducks in North Carolina.
(Select all that apply)

☐

Private lands or waters (for free) **(75.5%)**

☐ Private lands or waters (for pay) including leased land, shooting preserve, or waterfowl hunting club **(38.2%)**

☐ Public lands (NCWRC State Game Lands, National Wildlife Refuges, National Forests, National Seashores) **(53.9%)**

☐ Public waters (navigable streams, rivers, coastal sounds, and public reservoirs) **(75.6%)**

☐ Other (please describe): **(1.2%)**

Display This Question:

If If During the last 5 hunting seasons, please indicate all the areas where you hunted ducks in North... q://QID12/SelectedChoicesCount Is Greater Than 1

Carry Forward Selected Choices from "Q3.5"

Q3.6 During the last 5 hunting seasons, where did you most often duck hunt in North Carolina.

(Select only one)

☐ Private lands or waters (for free) **(26.5%)**

☐ Private lands or waters (for pay) including leased land, shooting preserve, or waterfowl hunting club **(10.2%)**

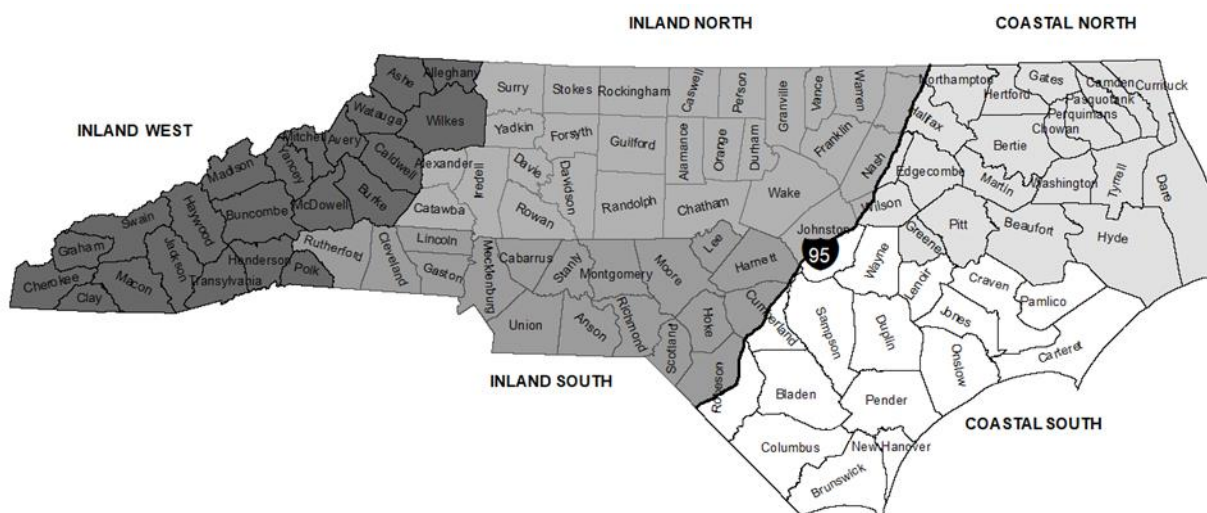
☐ Public lands (NCWRC State Game Lands, National Wildlife Refuges, National Forests, National Seashores) **(11.2%)**

☐ Public waters (navigable streams, rivers, coastal sounds, and public reservoirs) **(29.8%)**

☐ Other (please describe): **(0.3%)**

Q3.7 Using the map below, please indicate all the areas where you hunted ducks during the last 5 hunting seasons.

(Select all that apply)



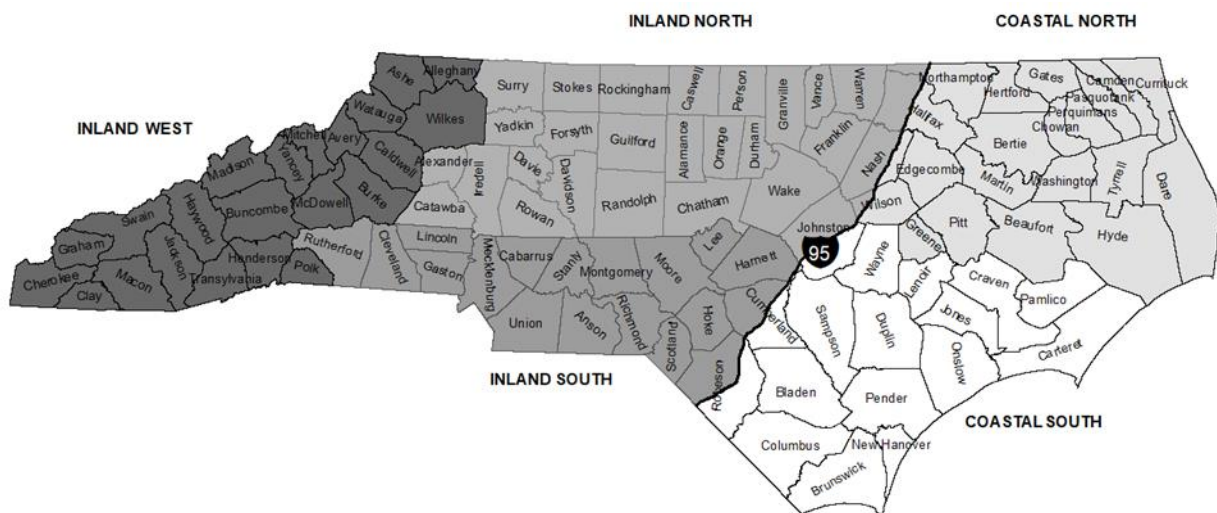
- ☐ Coastal North **(68.3%)**
- ☐ Coastal South **(53.2%)**
- ☐ Inland North **(36.8%)**
- ☐ Inland South **(19.5%)**
- ☐ Inland West **(4.1%)**

Display This Question:

If Using the map below, please indicate all the areas where you hunted ducks during the last 5 hunting seasons. q://QID14/SelectedChoicesCount Is Greater Than 1

Carry Forward Selected Choices from "Q3.7"

Q3.8 Using the map below, please indicate the area where you most often hunted ducks during the last 5 hunting seasons.
(Select only one)



- ☐ Coastal North (**17.4%**)
- ☐ Coastal South (**16.0%**)
- ☐ Inland North (**13.6%**)
- ☐ Inland South (**15.8%**)
- ☐ Inland West (**1.1%**)

End of Block: Preliminary Questions

Start of Block: Duck Hunting Zones

Q4.1 3. New Duck Hunting Zones

Since 1997, the NCWRC has established dates for the 60-day duck hunting season within three season segments beginning in October and ending in late January, excluding Sundays. Based on results of previous duck hunter surveys and public comments received by the NCWRC, regional differences exist in hunters' preferences for duck season dates and the number of season segments.

As a first step in addressing these differences, the NCWRC will establish a Coastal Zone and Inland Zone beginning in the 2021-2022 hunting season, with Interstate 95 as the boundary separating the two duck hunting zones (see map below). In a 2012 survey, Interstate 95 was duck hunter's most preferred boundary for these zones.

Each zone can have no more than 3 season segments and each zone can have either the same or different season dates. The number of season segments (up to three) and season dates can change each year within each zone, but the Coastal and Inland Zones and the zone boundary must remain in place for 5 hunting seasons (2021-2025). Bag limits will be the same in each zone.



Q4.2 The following questions will help the NCWRC understand your viewpoints on duck hunting zones.

Q4.3 Please indicate how duck hunting zones may affect your ability to understand duck hunting regulations in North Carolina.

(Select only one)

- ☐ Having zones makes duck hunting regulations easier for me to understand **(15.5%)**
- ☐ Having zones does not affect my understanding of duck hunting regulations **(54.5%)**
- ☐ Having zones makes duck hunting regulations harder for me to understand **(15.6%)**
- ☐ Unsure **(11.5%)**

Q4.4 Season dates and the number of season segments can be different between the Coastal and Inland Zones. Bag limits will be the same in each zone.

In general, please indicate how the establishment of duck hunting zones may affect your duck hunting in North Carolina?

(Select only one)

- ☐ Zoning will provide less opportunities to duck hunt **(11.4%)**

- ☐ Zoning will provide the same opportunities to duck hunt **(45.0%)**
- ☐ Zoning will provide more opportunities to duck hunt **(10.2%)**
- ☐ Unsure **(30.5%)**

Q4.5 In the space below, please share any other thoughts you have on duck zones. What were you thinking about when considering your answers?

End of Block: Duck Hunting Zones

Start of Block: Duck Season Dates and Duck Season Structure

Q5.1 4. Duck Season Dates and Duck Season Structure

Currently, the NCWRC offers all 60 duck hunting days (excluding Sundays) as a statewide duck season with 3 season segments:

- 1st segment: Opens in early October and runs for 4 days
- 2nd segment: Opens in early November and runs for 3 weeks
- 3rd segment: Opens in late December and runs as late as possible, with January 31st being the latest possible day

Based on this structure, the 2020-2021 duck hunting season dates are:

- October 7th (Wednesday) - October 10th (Saturday)
- November 7th (Saturday) - November 28th (Saturday)
- December 19th (Saturday) - January 30th (Saturday)

The following questions are related to the structure of duck season dates. When answering, please consider the following:

- The state will be divided into two duck hunting zones (Coastal Zone and Inland Zone; see map below)
- Each duck hunting zone can have up to 3 season segments Each duck hunting zone can have different season dates
- Each year, the number of season segments and season dates can change in both duck hunting zones

For questions 5.2-5.3 Only hunters who hunted in the associated Zones received questions about that Zone.

Q5.2 Please share your preference for the number of duck season segments in the Inland Zone (West of I-95).

(Select only one)

- ☐ 1 season segment (includes all 60 duck hunting days) **(6.5%)**
- ☐ 2 season segments **(13.5%)**
- ☐ 3 season segments **(16.7%)**
- ☐ No preference **(7.5%)**
- ☐ Unsure **(3.1%)**

Q5.3 Please share your preference for the number of duck season segments in the Coastal Zone (East of I-95).

(Select only one)

- ☐ 1 season segment (includes all 60 duck hunting days) **(14.0%)**
- ☐ 2 season segments **(27.5%)**
- ☐ 3 season segments **(25.5%)**
- ☐ No preference **(11.4%)**
- ☐ Unsure **(4.9%)**

Q5.4 Please indicate how much you agree or disagree with the following statements about the opening and closing of duck season segments.

(Select one for each statement)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Duck season segments should open on a Saturday whenever possible.	(5.0%)	(6.5%)	(27.5%)	(29.0%)	(26.8%)
Duck season segments should close on a Saturday whenever possible.	(8.6%)	(6.6%)	(24.2%)	(31.9%)	(22.7%)
Opening or closing duck season segments on a weekday has <u>no effect</u> on my duck hunting opportunities.	(19.4%)	(23.0%)	(19.9%)	(22.9%)	(8.8%)

Q5.5 Please indicate how important it is for you to be able to duck hunt during the following times.

Please remember that the duck hunting season can only be 60 days long (about 4 of the time periods below).

(Select one for each time)

	Not important	Slightly important	Important	Fairly important	Very Important
Early October	(54.0%)	(18.5%)	(9.8%)	(4.3%)	(5.0%)
Late October	(45.6%)	(23.5%)	(12.2%)	(5.6%)	(3.8%)
Early November	(24.4%)	(24.4%)	(23.2%)	(9.9%)	(9.2%)
Late November	(8.2%)	(12.3%)	(29.3%)	(17.8%)	(25.0%)
Early December	(7.9%)	(11.1%)	(25.6%)	(18.8%)	(28.3%)
Late December	(2.8%)	(4.1%)	(18.9%)	(16.4%)	(51.0%)
Early January	(1.8%)	(2.7%)	(14.5%)	(11.8%)	(62.5%)
Late January	(2.4%)	(3.3%)	(11.4%)	(9.0%)	(67.3%)

For questions 5.6-5.12 Only hunters who hunted in the associated Zones received questions about that Zone.

Q5.6 Please indicate how much you support or oppose the following statements about an October season segment. For your reference, the October 2020-2021 4-day season segment is from October 7th Wednesday) through October 10th (Saturday).
(Select one for each statement)

	Strongly oppose	Oppose	Neither support nor oppose	Support	Strongly support	<u>Unsure</u>
In the <u>Inland Zone</u> , the NCWRC should keep the October season segment	(5.5%)	(7.4%)	(14.2%)	(8.9%)	(8.4%)	(2.1%)
In the <u>Inland Zone</u> , the NCWRC should keep the October season segment but shift it to later in October	(4.5%)	(6.6%)	(14.8%)	(13.0%)	(5.4%)	(2.3%)
In the <u>Inland Zone</u> , the NCWRC should remove the October season segment and offer those days later in the season	(5.7%)	(5.7%)	(9.5%)	(9.6%)	(13.5%)	(2.3%)
In the <u>Coastal Zone</u> , the NCWRC should keep the October season segment	(14.4%)	(16.1%)	(28.0%)	(12.0%)	(7.4%)	(3.8%)
In the <u>Coastal Zone</u> , the NCWRC should keep the October season segment but shift it to later in October	(11.3%)	(13.4%)	(25.8%)	(20.1%)	(7.0%)	(4.1%)
In the <u>Coastal Zone</u> , the NCWRC should remove the October season segment and offer those days later in the season	(4.9%)	(5.9%)	(16.6%)	(17.8%)	(32.9%)	(3.8%)

Q5.7 If the NCWRC retains the October season segment in the Inland Zone, how long should it be?

For your reference, the October 2020-2021 4-day season segment is from October 7th (Wednesday) through October 10th (Saturday).

(Select only one)

- ☐ The Inland Zone October season segment should be 2-3 days **(16.2%)**
- ☐ The Inland Zone October season segment should be 4 days, as it is currently **(15.9%)**
- ☐ The Inland Zone October season segment should be 5-6 days **(7.4%)**
- ☐ Other (please describe): **(4.0%)**

Q5.8 If the NCWRC retains the October season segment in the Inland Zone, please rank your preferences for the week when it should occur.

(Click and drag the items into your order of preference, with '1' being your most preferred and '4' being your least preferred)

_____ 1st full week in October (**Most Preferred = 6.3%, 2nd most preferred = 3.6%, 3rd most preferred = 4.0%, Least preferred = 26.1%**)

_____ 2nd full week in October (**Most Preferred = 5.7%, 2nd most preferred = 8.5%, 3rd most preferred = 23.1%, Least preferred = 2.7%**)

_____ 3rd full week in October (**Most Preferred = 6.3%, 2nd most preferred = 3.6%, 3rd most preferred = 4.0%, Least preferred = 26.1%**)

_____ Last full week in October (**Most Preferred = 6.3%, 2nd most preferred = 3.6%, 3rd most preferred = 4.0%, Least preferred = 26.1%**)

Q5.9 If the NCWRC abolishes the October season segment in the Inland Zone, please rank your preferences for how the NCWRC should distribute the 4 duck hunting days. (Click and drag the items into your order of preference, with '1' being your most preferred and '4' being your least preferred)

_____ Add the days to early November (**Most Preferred = 5.6%, 2nd most preferred = 4.3%, 3rd most preferred = 13.3%, Least preferred = 15.1%**)

_____ Add the days to early December (**Most Preferred = 5.6%, 2nd most preferred = 17.7%, 3rd most preferred = 11.6%, Least preferred = 3.5%**)

_____ Add the days to mid-December (**Most Preferred = 16.9%, 2nd most preferred = 11.2%, 3rd most preferred = 6.3%, Least preferred = 3.9%**)

_____ The NCWRC should distribute the days as necessary to allow season segments to open and close on Saturday (**Most Preferred = 10.2%, 2nd most preferred = 5.1%, 3rd most preferred = 7.1%, Least preferred = 15.9%**)

Q5.10 If the NCWRC retains the October season segment in the Coastal Zone, how long should it be?

For your reference, the October 2020-2021 4-day season segment is from October 7th (Wednesday) through October 10th (Saturday).

(Select only one)

- ☐ The Coastal Zone October season segment should be 2-3 days (**13.2%**)
- ☐ The Coastal Zone October season segment should be 4 days, as it is currently (**24.8%**)
- ☐ The Coastal Zone October season segment should be 5-6 days (**11.0%**)
- ☐ Other (please describe): (**8.5%**)

Q5.11 If the NCWRC retains the October season segment in the Coastal Zone, please rank your preferences for the week when it should occur.

(Click and drag the items into your order of preference, with '1' being your most preferred and '4' being your least preferred)

_____ 1st full week in October (**Most Preferred = 8.8%, 2nd most preferred = 4.8%, 3rd most preferred = 6.4%, Least preferred = 46.1%**)

_____ 2nd full week in October (**Most Preferred = 6.9%, 2nd most preferred = 11.8%, 3rd most preferred = 42.1%, Least preferred = 5.3%**)

_____ 3rd full week in October (**Most Preferred = 8.9%, 2nd most preferred = 41.6%, 3rd most preferred = 11.8%, Least preferred = 3.8%**)

_____ Last full week in October (**Most Preferred = 41.5%, 2nd most preferred = 7.9%, 3rd most preferred = 5.8%, Least preferred = 10.9%**)

Q5.12 If the NCWRC abolishes the October season segment in the Coastal Zone, please rank your preferences for how the NCWRC should distribute the 4 duck hunting days. (Click and drag the items into your order of preference, with '1' being your most preferred and '4' being your least preferred)

_____ Add the days to early November (**Most Preferred = 7.8%, 2nd most preferred = 7.4%, 3rd most preferred = 23.1%, Least preferred = 26.0%**)

_____ Add the days to early December (**Most Preferred = 9.4%, 2nd most preferred = 29.3%, 3rd most preferred = 19.8%, Least preferred = 5.8%**)

_____ Add the days to mid-December (**Most Preferred = 30.6%, 2nd most preferred = 19.5%, 3rd most preferred = 9.1%, Least preferred = 5.1%**)

_____ The NCWRC should distribute the days as necessary to allow season segments to open and close on Saturday (**Most Preferred = 16.5%, 2nd most preferred = 8.1%, 3rd most preferred = 12.3%, Least preferred = 27.3%**)

Q5.13 Please indicate how important having hunting days allocated during the Thanksgiving holiday is to your enjoyment of duck hunting in North Carolina. (Select only one)

- ☐ Not at all important **(12.3%)**
- ☐ Slightly important **(12.7%)**
- ☐ Important **(18.3%)**
- ☐ Fairly important **(15.0%)**
- ☐ Very important **(33.1%)**

Q5.14 Please indicate how important having hunting days allocated during the Christmas holiday is to your enjoyment of duck hunting in North Carolina. (Select only one)

- ☐ Not at all important **(9.2%)**
- ☐ Slightly important **(9.4%)**
- ☐ Important **(17.5%)**
- ☐ Fairly important **(15.8%)**
- ☐ Very important **(39.6%)**

Q5.15 In the space below, please share any other thoughts you have on duck season dates and structure. What were you thinking about when considering your answers?

End of Block: Duck Season Dates and Duck Season Structure

Start of Block: Youth Waterfowl days

Q6.1 5. Youth Waterfowl Days

In addition to the regular duck season, the NCWRC designates two days as Youth Waterfowl Days.

These days:

- Can occur up to 14 days before or after the regular duck season Can occur in the closed period between season segments
- Must occur on a non-school day (Saturdays)

Based on the guidelines above, Youth Waterfowl Days for the 2020-2021 season could have been set on any of these Saturdays:

- September 26th and October 3rd (before the regular duck season)
- October 17th, October 24th, and October 31st (closed period between the 1st and 2nd season segments)
- December 5th and December 12th (closed period between the 2nd and 3rd season segments)
- February 6th and February 13th (after the regular duck season)

The following questions will help the NCWRC understand your preferences for when Youth Waterfowl Days should occur.

Q6.2 Please indicate your preferred Saturday(s) for when Youth Waterfowl Days should occur.

(Select all that apply)

- ☐ Saturdays before the regular duck season **(15.5%)**
- ☐ Saturdays between the 1st and 2nd segments **(11.1%)**
- ☐ Saturdays between the 2nd and 3rd segments **(16.7%)**
- ☐ Saturdays after the regular duck season **(45.2%)**

Q6.3 How much do you support or oppose Youth Waterfowl Days in North Carolina?

- ☐ Strongly oppose **(0.9%)**
- ☐ Oppose **(1.0%)**
- ☐ Neither oppose nor support **(7.4%)**

- ☐ Support **(23.0%)**
- ☐ Strongly support **(58.1%)**

Q6.4 Did you take a youth hunting or help provide youth hunting opportunities on a Youth Waterfowl Day during the 2019-2020 duck hunting season?
(Select only one)

- ☐ Yes **(37.9%)**
- ☐ No **(52.2%)**

End of Block: Youth Waterfowl days

Start of Block: Veterans/Military Waterfowl Days

Q7.1 6. Veterans/Military Waterfowl Days

In addition to the regular duck season, the NCWRC designates two hunting days as Veterans/Military Waterfowl Days. These days were recently established to provide additional opportunities to veterans and members of the Armed Forces on active duty. These days:

- Can occur up to 14 days before or after the regular duck season Can occur in the closed portion between season segments
- Can be held on the same days as Youth Waterfowl Days

Based on the guidelines above, the Veterans/Military Waterfowl Days during the 2020-2021 could have been set on any of these dates:

- September 26th - October 6th (before the regular duck season)
- October 12th - November 6th (closed period between the first and second season segments)
- November 30th - December 18th (closed period between second and third season segments)
- February 1st - February 13th (after the regular duck season)

The following questions will help the NCWRC understand your preferences for when Veterans/Military Waterfowl Days should occur.

Q7.2 Please indicate your preferred time period(s) when Veterans/Military Waterfowl Days should occur.
(Select all that apply)

- ☐ Before the regular duck season **(10.0%)**

- ☐ Between the 1st and 2nd segments **(10.9%)**
- ☐ Between the 2nd and 3rd segments **(18.1%)**
- ☐ After the regular duck season **(34.3%)**

Q7.3 Please indicate your preferred day of the week when Veterans/Military Waterfowl Days should occur.
(Select only one)

- ☐ Saturday only **(18.7%)**
- ☐ Weekdays only **(11.0%)**
- ☐ No preference **(52.1%)**
- ☐ Unsure **(7.6%)**

Q7.4 How much do you support or oppose Veterans/Military Waterfowl Days in North Carolina?

- ☐ Strongly oppose **(2.6%)**
- ☐ Oppose **(2.8%)**
- ☐ Neither oppose nor support **(11.8%)**
- ☐ Support **(25.0%)**
- ☐ Strongly support **(47.4%)**

Q7.5 Did you participate in Veterans/Military Waterfowl Days during the 2019-2020 duck hunting season?
(Select only one)

- ☐ Yes **(10.0%)**
- ☐ No **(79.7%)**

Q7.6 How much do you support or oppose having Veterans/Military Waterfowl Days on the same days as Youth Waterfowl Days in North Carolina?

- ☐ Strongly oppose **(7.3%)**
- ☐ Oppose **(10.2%)**
- ☐ Neither oppose nor support **(32.3%)**
- ☐ Support **(22.2%)**

- ☐ Strongly support **(17.8%)**

End of Block: Veterans/Military Waterfowl Days

Q8.1 7. Background information

For us to more fully understand your responses to the previous questions, please provide a few things about your background. Remember, your responses are confidential and will not be used to identify you.

Q8.2 Are you currently a waterfowl hunting guide?

- ☐ Yes **(2.5%)**
- ☐ No **(87.6%)**

Q8.3 Are you an owner, manager, or member of a private duck hunting club?

- ☐ Yes **(11.6%)**
- ☐ No **(78.4%)**

Q8.4 Are you a Veteran or a member of the Armed Forces on active duty?

- ☐ Yes **(10.9%)**
- ☐ No **(79.0%)**

Q8.5 What is the highest level of education you have completed?

- ☐ Less than high school degree **(0.3%)**
- ☐ High school graduate (high school diploma or equivalent) **(7.8%)**
- ☐ Some college but no degree **(17.3%)**
- ☐ Associate's degree (2-year) **(13.4%)**
- ☐ Bachelor's degree **(36.3%)**
- ☐ Master's degree **(8.8%)**
- ☐ Doctoral/Professional degree (PhD, MD, JD) **(4.7%)**
- ☐ Other **(0.5%)**
- ☐ Prefer not to share **(0.9%)**

Q8.6 What is your gender?

- ☐ Male **(88.1%)**
- ☐ Female **(1.4%)**
- ☐ Other **(<0.1%)**
- ☐ Prefer not to share **(0.4%)**

Q8.7 In what year where you born? **(N/A)**

Q8.8 Are you a North Carolina Resident?

- ☐ Yes **(100%)**
- ☐ No **(100%)**

Q8.9 In what county do you live?

▼ Alamance ... Yancey **(N/A%)**

Q8.10 Choose one or more race(s) with which you identify:

- ☐ White **(85.6%)**
- ☐ Black or African American **(0.3%)**
- ☐ American Indian or Alaska Native **(1.0%)**
- ☐ Asian **(0.1%)**
- ☐ Middle Eastern or North African **(>0.1%)**
- ☐ Hispanic, Latino or Spanish **(0.5%)**
- ☐ Native Hawaiian or Pacific Islander **(0.1%)**
- ☐ Prefer not to share **(2.5%)**
- ☐ Other **(0.6%)**

Q8.11 Please select a choice below that best describes your 2019 household income.

- ☐ Less than \$20,000 **(1.1%)**
- ☐ \$20,000 to \$34,999 **(2.8%)**
- ☐ \$35,000 to \$49,999 **(6.0%)**

- ☐ \$50,000 to \$74,999 **(12.7%)**
- ☐ \$75,000 to \$99,999 **(15.2%)**
- ☐ \$100,000 to \$149,999 **(18.8%)**
- ☐ \$150,000 or more **(19.0%)**
- ☐ Prefer not to share **(13.5%)**

Q8.12 If you have any other comments you would like to share with us, please type them here:

End of Block: Demographics

Start of Block: Email

Q9.1 If you would like to be entered to win one of six Bass Pro Shops \$50 giftcards, please provide a valid email address (ex. johndoe123@email.com). This will only be used to notify you if you were randomly selected.
Winners will be notified in October 2020.

End of Block: Email