

# North Carolina

## Resident Canada Goose Management Plan





**Division of Wildlife Management**

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**May, 2013**

**NORTH CAROLINA  
RESIDENT CANADA GOOSE MANAGEMENT PLAN**

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**NORTH CAROLINA  
RESIDENT CANADA GOOSE MANAGEMENT PLAN**

**EXECUTIVE SUMMARY**

Resident Canada geese present a unique management challenge. Unlike various populations of migrant Canada geese that spend only a portion of their life cycle in North Carolina and tend to inhabit more rural areas; resident geese can be found statewide, are essentially non-migratory and inhabit rural, suburban and urban environments. Resident geese cause a variety of nuisance problems ranging from defecation on lawns to agricultural depredation. Non-lethal techniques to address nuisance issues are not always effective and when so, simply push offending geese to neighboring areas. Further, lethal control is controversial and often not feasible in urban/suburban locales. While resident geese cause a variety of nuisance and damage problems statewide, they also provide a valuable resource for the citizens of North Carolina. Many people undoubtedly enjoy the viewing resident Canada geese as many flocks are relatively tame and permit relatively close contact. Further, sport hunting of resident Canada geese is very popular statewide. Federal harvest estimates indicate that over the last 5 years, approximately 40,000 Canada geese are harvested each year in North Carolina with 15,000 hunters participating. The majority of this harvest is comprised of resident geese.

Resident Canada geese are protected under the Migratory Bird Treaty Act and ultimate management authority resides with the U.S. Fish and Wildlife Service. However, the North Carolina Wildlife Resources Commission has the ability to implement specific management actions that may be available and provide an overall framework for management of resident geese within the state. Herein, we provide a summary of the current status of resident Canada geese in North Carolina, summarize their positive and negative aspects, and provide a coordinated approach to management.

The overall management goal with respect to resident Canada geese in North Carolina is to:

**Manage resident Canada geese in North Carolina to achieve an optimal balance between their positive aesthetic values, sport hunting opportunities, and conflicts arising from nuisance and depredating geese.**

Achieving this goal will be difficult; however, the Plan recommends a number of strategies that may be implemented to do so. Adequate monitoring of this population is critical. Currently, the NCWRC has no population estimate or any other metric used to track population trends. Effective management of resident Canada geese in North Carolina is dependent on our ability to track trends in this population over time.

## NORTH CAROLINA RESIDENT CANADA GOOSE MANAGEMENT PLAN

### DISTRIBUTION AND STATUS

#### History

Resident Canada geese found in North Carolina today are distinctly different from those that historically nested in the Atlantic Flyway. During pre-colonial times the original stocks were primarily *Branta canadensis canadensis* (Delacour 1954). The present-day resident goose population was introduced after the original stocks were extirpated and is now comprised of various subspecies or races of Canada geese, including *B. c. maxima*, *B. c. moffitti*, *B. c. interior*, *B. c. canadensis*, and possibly other subspecies (Dill and Lee 1970, Pottie and Heusmann 1979, Benson et al. 1982). The first resident geese in North Carolina were likely established by private individuals or waterfowl hunting clubs releasing captive flocks of domesticated or semi-domesticated geese after it became illegal to hunt using live decoys in 1935. In 1983, the North Carolina Wildlife Resources Commission (NCWRC) began a Canada goose stocking program to augment declining migrant goose numbers. Approximately 4,600 nuisance geese from Delaware, New Jersey, New York, Pennsylvania, Virginia, and Ontario, Canada were captured, transported and released in North Carolina, primarily in the Coastal Plain. These geese did not migrate, becoming year-long residents. The stocking program ended in 1988 and Resident Canada goose flocks have increased dramatically since that time.

#### Current Status

Resident Canada geese are now found statewide. It is believed that most resident geese located in the Coastal Plain are descendants from NCWRC stocked birds, while most resident geese in the remaining portions of the state are derived primarily from geese that moved into North Carolina after being stocked in the neighboring states of Georgia, South Carolina, and Virginia. We are unaware of any statewide population estimate for resident Canada geese prior to the goose stocking program in the 1980's. However, it is suspected that prior to the stocking program there were less than 1,000 resident geese statewide.

There have been 3 attempts to estimate the size of the state's resident goose flock since the 1980's. These estimates are based solely on observations by field personnel (primarily NCWRC District Biologists), rather than a standardized ground or aerial survey (Appendix 1). Based only upon these estimates, the resident goose population increased from approximately 5,600 in 1986 to over 96,000 in 1998. After 1986, most increases appear to be in the Piedmont and western portions of the state, while growth appears to have somewhat stabilized over that time in the Coastal Plain. Presently there are an estimated 102,000 resident geese statewide.

## **POSITIVE VALUES AND USES**

### **Aesthetic Values**

Historically, Canada geese have been a symbol of northern wilderness and migrating flocks the harbingers of the changing seasons. Prior to the early 1960's, when wintering Canada goose numbers in North Carolina began to significantly decline, many of our coastal areas were known as "the goose hunting capital of the world". Canada geese are also well represented in the state's rich decoy art and culture, dating back to the market hunting days in the early part of the 20<sup>th</sup> century.

Unlike migrant Canada geese, resident geese may now provide distinctly different aesthetic benefits, and are valued by many people for the aesthetic and recreational opportunities the birds provide, particularly for young, elderly, and amateur bird watchers and naturalists. This may be especially true in areas that are not frequented by significant numbers of migrant geese, adding wildlife diversity to those areas. Despite growing numbers of conflicts associated with resident Canada geese, particularly in urban and suburban areas of the state, most people likely enjoy seeing or hearing some birds, and would not want the population eliminated.

In a 1993 survey of people from 10 metropolitan areas across the U.S., approximately 26% of respondents said they wanted more geese, 54% wanted no change in numbers, and 19% wanted fewer geese in their neighborhood (Conover 1997). At the time of the survey, problems were not so widespread that most residents viewed Canada geese as pests, although support for population reduction went beyond the 5% of respondents who had experienced a problem with them in the previous year. In a public attitude survey about geese in a Long Island, NY community, 78% of respondents said they enjoyed the presence of resident Canada geese, even

though half of those were concerned about problems the birds may cause. Only 11% said they did not enjoy geese and regarded them entirely as nuisances (Loker 1996).

Long-term management of migratory geese in North Carolina and the Atlantic Flyway could be seriously impacted if resident geese become so abundant that all Canada geese become devalued and perceived primarily as pests.

### Sport Hunting and Harvest

Resident geese have become an important part of the sport harvest of Canada geese in North Carolina, supplementing or replacing the migrant goose harvest in some areas of the state, and providing the only Canada goose harvest in other regions. The harvest of resident geese has increased sharply as the population has grown and regulations were modified to provide more hunting opportunity for these birds (Figure 1).

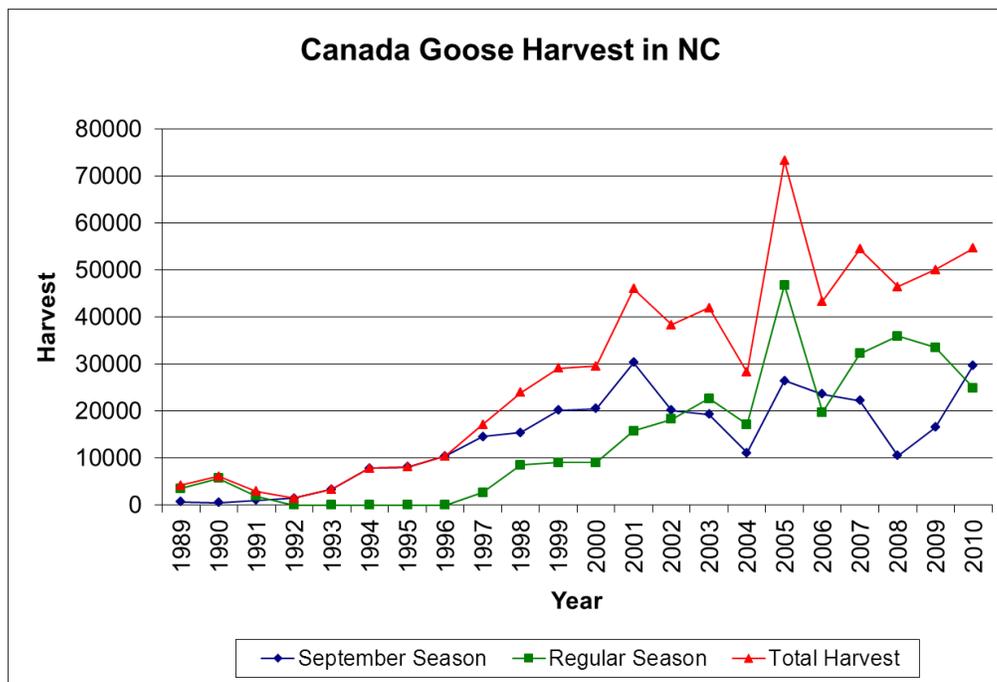


Figure 1. Canada goose harvest in North Carolina, 1989-2010

Prior to 1987, harvest regulations did not differentiate between resident and migrant goose populations. Since then, criteria have been developed to allow special hunting seasons to increase harvest of resident Canada geese at times and places that would not adversely affect

migrant goose populations (Appendix 2). In 1989, a special September Canada goose season was established in North Carolina to reduce damage associated with resident Canada geese and to maintain as much recreation and harvest opportunity as possible (Appendix 3). Since 1999, this special September season has, on average, accounted for approximately one-half of the statewide Canada goose harvest. Based upon statewide hunter harvest and participation surveys conducted by NCWRC biologists, the number of active goose hunters has increased from approximately 5,000 in 1989 to 10,000 in 2010.

During the regular (i.e., fall/winter) season, hunting occurs in specified zones that explicitly consider the presence of the various populations of geese in geographic areas (Appendix 2). Currently, much of the state is classified as a Resident Population (RP) hunt zone, and season length and bag limits are the maximum allowed under the Migratory Bird Treaty Act and United States Fish and Wildlife Service (USFWS) frameworks. There is little opportunity to increase sport hunting opportunities in this area. The Southern James Bay Population (SJBP) and Northeast (NE) hunt zones have been identified as containing migrant geese and accordingly, harvest regulations are more restrictive than the RP zone. Currently, the total season length and bag limit of the SJBP zone is similar to the RP zone, but the season must close prior to when the majority of SJBP geese are available for harvest (December 31). The NE hunt zone is located in all or portions of 13 northeastern counties and includes the area that historically contained large numbers of Atlantic Population (AP) migrant geese. AP geese have declined significantly over time in North Carolina and until recently the NE hunt zone was closed to all fall/winter goose hunting. As a consequence, hunting seasons targeting resident Canada geese may be considered unduly restrictive in this area.

## **DAMAGE AND CONFLICTS**

### **Administrative Responsibility**

Resident Canada geese in North Carolina are involved or implicated in a variety of damage or conflict situations. These situations may be classified as damage to property, agriculture, natural resources, and conflicts with public health and safety (Conover and Chasko 1985). Damage and conflicts occur statewide but are most numerous in urban and suburban

areas where large numbers of geese congregate at parks, corporate lawns, private residences, public swimming areas, marinas and wastewater treatment facilities. Economic loss (real or perceived) attributed to resident Canada geese has not been quantified in North Carolina but likely varies considerably depending on the site and situation (i.e., crop damage vs. lawns, etc.), number of geese involved, and tolerance of property owners. Irrespective of future resident goose population trends, conflicts in the state are likely to increase over time due to increasing human populations.

The NCWRC and U.S. Department of Agriculture - Wildlife Services (USDA-WS) are the two principal agencies responsible for resident Canada goose management in North Carolina. Working within federal guidelines and with partners in the Atlantic Flyway, the NCWRC is responsible for establishing hunting seasons and providing an overall framework on how resident Canada geese will be managed within the state. Through a Memorandum of Understanding, USDA-WS assumes the primary responsibility for responding to requests for wildlife damage assistance involving migratory birds (including resident Canada geese). Typically, when requested, NCWRC staff provides technical guidance to private and public property owners when dealing with nuisance goose issues. However, depending upon severity of the situation and type of damage reported (ranging from excessive droppings to aircraft safety) NCWRC staff may refer requests for assistance directly to USDA-WS. Although some variation may exist between regions or districts, NCWRC staff are typically not involved with actually implementing specific damage abatement techniques such as habitat modification, hazing, or lethal control measures. The NCWRC does not uniformly record technical guidance contacts solely attributed to nuisance Canada goose issues. However, USDA-WS does routinely log phone calls and other contacts relating to Canada geese in North Carolina. From 2004 through 2008, USDA-WS has recorded 694 contacts regarding nuisance goose concerns. The majority of these contacts are related to resident geese.

With the exception of situations covered by the federal Agricultural Depredation Order, permits for all lethal take must be obtained from the USFWS-Region 4. Additional opportunities exist that would allow the NCWRC to issue lethal take (i.e., depredation) permits, under certain circumstances allowed by the USFWS; however, to date the NCWRC has not accepted the authority to do so. Both the NCWRC and USDA-WS may refer landowners to the USFWS for

permits and USDA-WS may facilitate permit issuance from the USFWS for cooperating landowners.

## **Property Damage**

The most common complaints attributed to resident Canada geese are property damage concerns. In 2004, USDA-WS made 191 contacts regarding property damage (70% of all contacts for Canada geese). Most property damage concerns likely center on excessive accumulations of goose feces on lawns and walkways at private residences, businesses, golf courses, and public areas such as parks and athletic fields. Property damage for excessive feces involves damage to lawns, cleanup costs, and loss of property for intended purposes. The other most common form of property damage involves excessive grazing of lawns and turf areas. This type of damage also reduces aesthetics, can be costly to repair, and causes soil erosion.

Property owners experiencing these types of damages generally may deal with the situation either by attempting to disperse geese through repeated harassment or making sites less attractive to geese through habitat modifications. Permits for lethal take may be obtained from the USFWS, but obtaining permits can be difficult and property owners must be able to demonstrate economic loss from goose activities. Lethal take permits are generally not granted for simple “nuisance” issues related to excessive goose droppings. Lethal take of Canada geese is not possible in many areas where property damage occurs due to the urban and suburban location and associated local firearms ordinances. Removal of geese in urban and suburban areas usually requires trapping and offsite euthanasia.

## **Damage to Natural Resources**

Aside from typical property damage concerns, in some cases resident geese may impact natural resources. Goose feces may contribute substantial amounts of phosphorus and nitrogen into wetlands causing aquatic macrophyte growth and algae blooms followed by accelerated eutrophication through nutrient loading (Harris et al. 1981, Manny et al. 1994). Congregations of geese can reduce vegetative cover through feeding and trampling resulting in erosion and sedimentation in wetlands. Herbivory by overabundant resident geese was the cause for decline

in abundant stands of wild rice in Maryland (Haramis & Kearns 2007). In North Carolina, we are aware of two instances where geese have been implicated or known to cause natural resource concerns. At Pea Island National Wildlife Refuge, several hundred resident geese were removed and euthanized by USDA-WS due to excessive foraging on submerged aquatic vegetation (SAV) during the growing season. The loss of SAV's made these food resources unavailable to migrating and wintering waterfowl. In addition, Merchant's Millpond State Park in Gates County has expressed concerns that overabundant resident geese may be causing excessive nutrient loading, detrimental to the natural resources at this location.

### **Damage to Agriculture**

In 2004, 14% of Canada goose related projects conducted in North Carolina by USDA-WS involved agricultural concerns. Grazing of pasture and grain crops can reduce crop yields and livestock forage and can increase costs of agricultural production due to crop replanting. Damage to specific crops can include, among others, corn, soybeans, winter wheat, peanuts and a variety of vegetable crops. A recent survey conducted by the N.C. Department of Agriculture indicated that 3% and 8% of farms statewide reported damage by geese to soybeans and wheat respectively (2010). As with any property owner, agricultural producers are allowed to legally harass geese from problem areas. Additionally, they may lethally take Canada geese in depredation situations under the federal Agricultural Depredation Order from May 1 to August 31 (see page 13). Outside of this time period, producers can request a depredation permit from the USFWS to lethally take a specified number of geese. Fees for this permit range from \$50 to \$100.

### **Human Health & Safety**

Concerns for human health and safety include increased risks of disease transmission from fecal accumulations, bird-aircraft strikes, and aggressive behavior. The potential for human illness from excessive accumulations of feces and/or associated contaminated water is a common concern in many areas, especially public use areas and those frequented by children. A number of potential human pathogens have been isolated from Canada goose feces and include, among

others, *Cryptosporidium*, *Salmonella*, *Listeria*, *Chlamydia* and *Giardia* (Graczyk et al. 1998, U.S. Geologic Survey 2000). Many of these pathogens cause respiratory or intestinal disorders; however, source of infection or causal agent is not easily diagnosed. Further, the potential for transmission of disease or parasites to humans exists, but has not been well documented (Graczyk et al. 1998). Fecal coliform bacteria (*Escherichia coli*) are considered a normal inhabitant of many species, including Canada geese (Hussong et al. 1979). Concern over *E. coli* contamination, particularly when reported as high fecal coliform counts in recreational waters, is typically related more to its presence in feces and index of potential presence of more serious pathogens such as *Salmonella*, rather than concern over inherent *E. coli* pathogenicity (USGS 2000). However one *E. coli* serotype, O157:H7, is one of four groups of *E. coli* capable of producing illness. In North Carolina, public swimming advisories are routinely issued along with occasional closures each year due to elevated levels of fecal coliform bacteria. In many instances, resident waterfowl (including Canada geese) are implicated (J.D. Potts, N.C. Division of Environmental Health, personal communication).

The presence of Canada geese on and around airports creates a significant threat to aviation and human safety. Due to their large body size, flocking characteristics, and abundance and behavior near airports, Canada geese are considered a very hazardous species and have a hazard ranking score exceeded only by deer and vultures (Cleary and Dolbeer 2005). The most recent and well know case involved the forced landing of an Airbus A320 in the Hudson River, NY in January 2009. From 1990-2008, Canada geese were involved in at least 1,181 strikes with civil aircraft in the United States (Dolbeer et al. 2009). Twenty-nine strikes involving Canada geese have occurred in North Carolina during the same time period (Federal Aviation Administration National Wildlife Strike Database 2009). Additionally, Canada goose-aircraft strikes accounted for 17% of reported monetary losses resulting from wildlife strikes to civil aircraft in the U.S. (Dolbeer et al. 2009).

Resident Canada geese pose localized but serious public safety problems during the nesting season when they aggressively defend a nest, nest site, and/or goslings. Aggressive geese may attack children, the elderly, clients, employees, students, and others, and have caused human injuries in the form of falls and bites. Slipping hazards may be caused by a build-up of feces on docks, walkways etc. Geese nesting near roadways create traffic hazards when they

cross the roadway or defend a nest site from cars and pedestrians, potentially resulting in accidents and human injuries.

## **PROGRAMS TO REDUCE DAMAGE AND CONFLICTS**

### **Technical Guidance – Non-lethal Methods**

Both the NCWRC and USDA-WS provide technical guidance to property owners to address nuisance resident Canada goose concerns. There are a variety of techniques available including: habitat modification, modification of human behavior, physical exclusion/deterrents, and hazing. Depending upon site location, severity of the issue, and consistent application of recommendations, non-lethal techniques can be very effective in many situations. Successful non-lethal techniques may move geese from areas of initial conflict, but relocated geese many times simply shift their offending behavior to another location.

### **Lethal Programs**

#### Nest and Egg Depredation Order

Since 2007, landowners in North Carolina may register within a nationwide system administered by the USFWS to conduct resident Canada goose nest and egg destruction activities on their property. No state or federal permits or fees are required to participate; however, registration is through a web-based system only. Prior to the current nest and egg registration system, landowners had to obtain a permit for this activity from USFWS. During the first two years of the current program, registrants in North Carolina reported the destruction of 1,625 nests. The nest destruction program serves dual purposes in that it provides a means to reduce population size or at least slow/stop population increases while providing a method to disperse nuisance nesting geese at specific sites.

#### Agricultural Depredation Order

This federal depredation order authorizes state wildlife agencies to allow landowners actively engaged in commercial agriculture to conduct lethal control to depredating Canada

geese between May 1 and August 31, and destroy nests and eggs from March 1 through June 30. As a condition of state participation, annual reports summarizing the control activities are required. The NCWRC implemented this Depredation Order for the first time in spring 2011. During this first year, 10 landowners participated in the Depredation Order with 18 geese reported taken.

### Public Health Control Order

This order authorizes state wildlife agencies to conduct control activities for resident Canada goose posing a direct threat to human health. A direct threat to human health is defined as one where a federal, state or local public health agency recommends removal of Canada geese they determine to pose a specific, immediate human health threat by creating conditions conducive to the transmission of human or zoonotic pathogens. Management and control activities involving the take of resident Canada geese may occur between April 1 and August 31. The destruction of resident Canada goose nest and eggs may take place between March 1 and June 30. Annual reporting is required. To date, the NCWRC has not participated in this program.

### Special Resident Canada Goose Permit

This special federal permit is available only to state wildlife agencies. After obtaining the permit, state agencies or their designees may undertake lethal control activities when resident Canada geese are causing damage or posing a threat to health and human safety. Lethal control may be applied in agricultural and public health situations along with the control of geese in more generalized depredation scenarios. Control activities may take place from March 11 through August 31. A resident goose population estimate is required along with a requested annual take (i.e., number of geese to be taken). Permits may be issued for up to a 5 year period; however, annual reporting is required. To date, the NCWRC has not participated in this program.

### USDA-WS Trap and Euthanize Program

Since the early 2000's, USDA-WS has implemented a capture and euthanize program across the state to directly reduce goose numbers at specific sites. For a fee, private and public

property owners may contract with USDA-WS for this service. Since 2003, over 2000 geese have been removed. This program is particularly useful in areas where human safety is of the utmost concern, where sport hunting opportunities are limited, or where discharge of firearms is prohibited.

### Sport Hunting

Sport hunting as a tool to reduce local populations should be recommended when local laws allow. Currently, North Carolina has very liberal Canada goose hunting regulations throughout much of the state. However, sport hunting likely has little impact on those groups of Canada geese that spend the majority of their time in urbanized settings. Although hunting has the potential to reduce local and statewide populations of geese, it is not an effective tool to alleviate situations within urban/suburban areas or specific nuisance situations that occur outside of the hunting season.

### Managed Take Program

The Managed Take Program is allowed to states for the expressed purpose of stabilizing and reducing resident Canada goose populations. It allows for a “managed take” of geese from August 1 through August 31. Unplugged guns and electronic calls are allowed. In addition, shooting hours may be extended until ½ after sunset and there is no daily bag limit restriction. The Managed Take Program can only be implemented after a state has demonstrated that other management activities have failed to control populations. An annual breeding population estimate is required. Further, states must maintain records including estimates of participation and total number of geese shot. To date, the NCWRC has not participated in this program.

## **BARRIERS TO OPTMAL MANAGEMENT**

### **Public Perception**

As mentioned previously, public perceptions of Canada geese vary widely. Further, surveys of the North Carolina general public regarding their view of resident Canada geese and management strategies to alleviate damage and conflicts are lacking. Many people likely view

Canada geese as a highly valued species, but individual tolerance for goose behavior differs (Smith et al. 1999). The tolerance of resident Canada geese and opinions on how to control damage and conflicts can result in polarized views within neighborhoods and between adjacent property owners.

### **Rural vs. Urban-Suburban Resident Canada Geese**

Along with differing opinions of goose management, the physical location of geese presents management challenges. There are limited means by which to manage resident geese in urban-suburban areas. Due to firearm discharge ordinances, sport hunting cannot be implemented in many urban-suburban areas and likewise, other methods of lethal control may be difficult to implement due to public opposition. The lack of methods to greatly reduce survival of urban-suburban geese increases the likelihood that populations of resident Canada geese in these environments will increase unabated over time. Conversely, resident Canada geese inhabiting rural portions of the state can be routinely subjected to sport harvest. Also, other methods of lethal control and hazing by pyrotechnics are likely more acceptable and can be implemented more easily in rural landscapes. Balkcom (2010) recently calculated survival rates of 0.958 and 0.682 for urban and rural resident Canada geese, respectively, in Georgia. The main reason for the difference in survival rates between the two cohorts was due to the relative absence of hunting mortality at the urban study site. Survival rate estimates of urban and rural Canada geese in North Carolina are lacking, but likely reflect a similar relationship. It is unknown what, if any, impact current harvest regulations have on geese located in rural areas of the state. However, liberalization of hunting season lengths, bag limits and additional hunting methods including unplugged guns, electronic calls and extended shooting hours may have little impact on urban geese (Balkcom 2010, Coluccy et al. 2004).

### **Presence of Migrant Canada Goose Populations**

Because they cannot be readily distinguished by field observation, management of resident Canada geese is complicated by the presence of migrant populations of Canada geese. Three populations of migrant Canada geese can be found in portions of North Carolina during

the fall and winter and include the SJB, AP, and North Atlantic Population. Due to differences in their life history, migrant geese are generally less productive and have lower annual survival rates. Because of these differences, the impacts to migrant populations from various management actions directed toward resident Canada geese must be considered.

The degree to which increasing numbers of resident Canada geese compete for food resources with migrants is unknown but is not thought to be a problem at this time. The presence of resident geese does confound interpretation of winter surveys that seek to provide long-term trends in migrant goose numbers. Estimates of harvest for either residents or migrants are also compromised by the occurrence of both during the hunting season, making it difficult to evaluate the effects of hunting regulations on each group. The co-existence of 4 separate populations of Canada geese (including residents) makes a unified approach to statewide goose management impossible, and difficult to explain to the general public. For many citizens, their only contact is with resident geese and many are likely not aware that migrant geese even occur in our state. Further, many people believe that our large resident population of Canada geese is a result of migrant geese that simply stopped migrating back to their northern breeding grounds. Studies conducted within the Atlantic Flyway have demonstrated that this has not occurred.

## MANAGEMENT GOAL

The significantly varying issues surrounding resident Canada geese makes constructing a simple, straight-forward management goal and strategies that can be applied on a statewide basis difficult. Reaching an optimal balance between competing objectives will be difficult to achieve and highlights the difficult nature of managing this important resource. To reduce nuisance resident Canada goose complaints and alleviate damage concerns, NCWRC must fully promote and be an active participant in strategies necessary to reduce goose numbers, especially in urban-suburban areas where sport harvest has little impact. However at the same time, NCWRC must be mindful that reduced populations of resident Canada geese in some areas may be unacceptable to a core group of the goose hunting community. The NCWRC should engage goose hunters and other stakeholders to ascertain their opinions and desires regarding future goose hunting opportunities and whether a reduction in current goose numbers is desired or warranted. Considering the wide range of issues, our goal is to:

**“Manage resident Canada geese in North Carolina to achieve an optimal balance between their positive aesthetic values, sport hunting opportunities, and conflicts arising from nuisance and depredating geese.”**

## MANAGEMENT OBJECTIVES AND STRATEGIES

### **OBJECTIVE 1**

**Maintain current goose hunting opportunities, hunter participation and success, and positive aspects of geese in non-hunted areas through the plan period.**

#### **Strategy 1.1**

Monitor goose harvests and hunter trends. An important part of evaluating whether goose hunting success can be maintained at current levels is through monitoring season-wide and September goose harvests, goose hunter numbers and days afield, and estimates of goose harvested/hunter. Many of these estimates are available through the Harvest Information Program (HIP) and through the NCWRC’s Hunter Harvest Survey.

### Strategy 1.2

Monitor trends in population size as one means to evaluate whether goose hunting opportunities are being maintained and determine the relationship that an increasing or declining population has with goose harvest and hunter statistics.

### Strategy 1.3

Implement an annual or specific time period “avid” goose hunter survey. Harvest surveys of “avid” goose hunters will provide valuable insight into long-term hunting success and hunting effort and may be the best indicator of whether hunting opportunities and success is being maintained.

### Strategy 1.4

In conjunction with Strategy 3.3, determine the aesthetic and other qualitative values of resident Canada geese and how best to balance social and biological carrying capacity while considering the desires of hunters and nonhunters.

## **OBJECTIVE 2**

**Alleviate conflicts and damage attributed to nuisance and/or depredating Canada geese to the greatest extent possible.**

### Strategy 2.1

Promote goose egg addling and nest destruction programs as allowed through the national registration system. Since 2007, this national registration system has been available to landowners statewide. Working with USDA-WS, the NCWRC should provide printed materials regarding the program, promote the program on the agencies website and within other media, stress the program to agency staff as solutions to conflicts and damage, and promote this opportunity to various groups and agencies such as Cooperative Extension Service and Homeowner Associations of North Carolina.

### Strategy 2.2

Update any existing literature regarding allowable and effective techniques to reduce conflicts and damage attributed to nuisance and/or depredating Canada geese and promote their usage and distribution to local and city governments and other like interests. Both the NCWRC and USDA-WS have printed materials that describe various nuisance goose management techniques. Materials should be updated and promoted, with a commitment to providing the information through targeted mailings to affected groups and individuals.

### Strategy 2.3

Continue to allow trap and euthanize programs conducted by USDA –WS and promote the program in urbanized settings. While controversial, the trap and euthanize program can be very effective in efficiently removing problem geese and should be promoted in those areas where sport hunting and discharge of firearms is not permitted.

### Strategy 2.4

Convene a group of NCWRC field biologists and administrators to fully evaluate the costs/benefits of obtaining the “Special Resident Canada Goose Permit”. Request this special permit if deemed feasible and appropriate.

### Strategy 2.5

Continue to utilize the Agricultural Depredation Order and consider promoting this option in some fashion to the farming community. Participation in this Depredation Order will become unnecessary if the NCWRC obtains the Special Resident Canada Goose Permit from the USFWS (Strategy 1.4 above).

## **OBJECTIVE 3**

**Conduct research and surveys necessary to fully evaluate management goals and objectives.**

### Strategy 3.1

Initiate a university led research project designed to evaluate several possible survey techniques that may be used to estimate the size of the state’s resident goose population.

Potential techniques may range from direct estimates based on visual surveys of geese or indirect estimates based on a combination of banding/recovery data and harvest data. Optimally, population estimates that can reliably separate the proportion of geese located in urban and rural environments are desired.

### Strategy 3.2

Based on results from research, implement a statewide population survey and conduct a survey at least once every three years. Currently the NCWRC has no reliable population estimate for resident Canada geese in North Carolina. The only estimates available for North Carolina are those generated by NCWRC district biologists (see Appendix 1), which are inadequate for proper management of this population. Without reliable estimates of population size, the management objectives and strategies described above cannot be fully evaluated. Before implementation, various methodologies for obtaining reliable population estimates should be thoroughly evaluated considering monetary costs, manpower needs, and biases associated with various techniques.

### Strategy 3.3

Conduct opinion surveys of goose hunters and other citizens regarding goose management issues. For example, do goose hunters believe that current regulations are too liberal or too conservative and do they desire that resident goose populations be reduced, kept stable, or allowed to increase? Does this vary regionally? How might hunter opinions differ from citizens that have experienced goose damage issues? Opinions from affected groups will help further refine future resident goose management objectives and strategies and will help evaluate objectives described in this plan.

### Strategy 3.4

Identify, quantify and delineate areas of North Carolina where geese cannot be hunted due to urban environments that legally preclude hunting and where hunting is not practical due to housing and land ownership patterns.

### Strategy 3.5

Work with the Atlantic Flyway Technical Section to develop resident Canada goose research projects and participate in research that has implications for range-wide population modeling and management.

### LITERATURE CITED

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Appendix 1. Resident goose population estimates by county and Wildlife Commission district.

	<b>1986</b>	<b>1998</b>	<b>2009</b>
<b>District 1</b>			
Bertie	225	400	300
Camden	0	75	250
Chowan	84	500	500
Currituck	272	900	700
Dare	15	600	650
Gates	0	300	200
Hertford	385	1200	250
Hyde	180	1200	800
Martin	125	300	200
Pasquotank	0	100	450
Perquimans	0	400	550
Tyrrell	0	50	300
Washington	0	400	400
<b>subtotal</b>	<b>1286</b>	<b>6425</b>	<b>5550</b>
<b>District 2</b>			
Beaufort	0	575	575
Carteret	116	200	200
Craven	100	700	700
Duplin	0	500	500
Greene	0	250	250
Jones	200	500	500
Lenoir	50	1000	1000
New Hanover	10	200	200
Onslow	0	430	430
Pamlico	0	200	200
Pender	67	250	250
Pitt	0	275	275
<b>subtotal</b>	<b>543</b>	<b>5080</b>	<b>5080</b>
<b>District 3</b>			
Edgecombe	23	800	1200
Franklin	40	1000	400
Halifax	90	500	1000
Johnston	60	1500	1800
Nash	0	1200	1500
Northampton	240	1200	1800
Vance	40	500	700
Wake	200	2500	4500
Warren	0	400	900
Wayne	0	800	1100
Wilson	12	1200	1500
<b>subtotal</b>	<b>705</b>	<b>11600</b>	<b>16400</b>

Appendix 1 (continued). Resident goose population estimates by county and Wildlife Commission district.

	<b>1986</b>	<b>1998</b>	<b>2009</b>
<b>District 4</b>			
Bladen	100	300	324
Brunswick	0	200	232
Columbus	20	500	456
Cumberland	50	800	770
Harnett	60	600	502
Hoke	0	200	377
Robeson	20	200	339
Sampson	174	1000	694
Scotland	0	200	234
<b>subtotal</b>	<b>424</b>	<b>4000</b>	<b>3928</b>
<b>District 5</b>			
Alamance	200	1500	2500
Caswell	0	1000	1750
Chatham	0	1000	2000
Durham	500	2000	3500
Granville	0	1250	2100
Guilford	200	3000	6000
Lee	0	750	1100
Orange	0	2000	4000
Person	0	1000	1750
Randolph	0	1250	2500
Rockingham	0	1250	3750
<b>subtotal</b>	<b>900</b>	<b>16000</b>	<b>30950</b>
<b>District 6</b>			
Anson	0	400	200
Cabarrus	500	2000	400
Davidson	500	2000	375
Mecklenburg	150	6000	700
Montgomery	0	400	175
Moore	50	1500	650
Richmond	0	600	275
Rowan	0	1500	425
Stanly	0	1500	300
Union	30	1200	400
<b>subtotal</b>	<b>1230</b>	<b>17100</b>	<b>3900</b>

Appendix 1 (continued). Resident goose population estimates by county and Wildlife Commission district.

	<b>1986</b>	<b>1998</b>	<b>2009</b>
<b>District 7</b>			
Alexander	0	800	570
Alleghany	0	300	405
Ashe	0	300	1923
Davie	100	3800	1288
Forsyth	0	5000	2293
Iredell	0	4500	3679
Stokes	0	1500	2215
Surry	0	1500	2441
Watauga	0	0	322
Wilkes	80	3000	1073
Yadkin	0	4000	1699
<b>subtotal</b>	<b>180</b>	<b>24700</b>	<b>17908</b>
<b>District 8</b>			
Avery	0	300	250
Burke	0	300	1500
Caldwell	0	400	750
Catawba	0	3000	3000
Cleveland	20	300	1000
Gaston	25	4000	2000
Lincoln	0	2000	2500
Mcdowell	0	150	750
Mitchell	0	50	250
Rutherford	0	100	750
Yancey	0	50	400
<b>subtotal</b>	<b>45</b>	<b>10650</b>	<b>13150</b>
<b>District 9</b>			
Buncombe	0	300	1000
Cherokee	0	100	1000
Clay	0	400	1000
Graham	0	0	200
Haywood	0	0	100
Henderson	0	150	500
Jackson	0	0	100
Macon	0	0	1000
Madison	0	0	100
Polk	0	0	100
Swain	0	0	200
Transylvania	0	0	100
<b>subtotal</b>	<b>0</b>	<b>950</b>	<b>5400</b>
<b>Statewide Total</b>	<b>5313</b>	<b>96505</b>	<b>102266</b>

Appendix 2. Canada goose seasons and bag limits in North Carolina during the regular waterfowl season, 1987-2009.

Table 1. Canada goose seasons and bag limits (in parentheses) during the regular waterfowl season, 1987-1996.

Year	Hunting Zone	
	East of I-95	West of I-95
1987-88	December 31-January 16 (1)	Closed
1988-89	January 21-31 (1)	Closed
1989-90	January 22-31 (1)	Closed
1990-91	January 21-31 (1)	Closed
1991-92	January 20-31 (1)	Closed
1992-93	Closed	Closed
1993-94	Closed	Closed
1994-95	Closed	Closed
1995-96	Closed	Closed
1996-97	Closed	Closed

Appendix 2 (continued). Canada goose seasons and bag limits in North Carolina during the regular waterfowl season, 1987-2009.

Table 2. Canada goose seasons and bag limits (in parentheses) during the regular waterfowl season, 1997-2001.

Year	Hunting Zone	
	Northeast Hunt Zone	Rest of State
1997-98	Closed <sup>1</sup>	October 1-November 15 (2)
1998-99	Closed <sup>1</sup>	October 1-November 15 (2)
1999-00	Closed <sup>1</sup>	October 1-November 15 (2)
2000-01	Closed <sup>1</sup>	October 2-November 15 (2)
2001-02	Closed <sup>2</sup>	November 3-December 31 (2)

<sup>1</sup>Northeast Hunt Zone includes Bertie, Camden, Chowan, Currituck, Dare, Hyde, Northampton, Pasquotank, Perquimans, Tyrrell and Washington counties.

<sup>2</sup>Northeast Hunt Zone includes Camden, Chowan, Currituck, Dare, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington counties and that portion of Northampton county that is both north of US 158 and east of NC 35, and that portion of Bertie county east of NC 45 and that portion which is both west of US 17 and east of US 13.

Appendix 2 (continued). Canada goose seasons and bag limits in North Carolina during the regular waterfowl season, 1987-2009.

Table 3. Canada goose seasons and bag limits (in parentheses) during the regular waterfowl season, 2002-2009.

Year	Hunt Zone <sup>1</sup>		
	Northeast Hunt Zone	Southern James Bay Hunt Zone	Resident Hunt Zone
2002-03	Closed	Oct. 12-16 Nov.16-Dec. 31 (2)	Nov. 9-30 Dec. 14-Jan. 25 (5)
2003-04	Closed	Oct. 13-25 Nov.15-Dec. 31 (2)	Nov. 8-29 Dec. 13-Jan. 24 (5)
2004-05	Closed	Oct. 6-16 Nov.6-Dec. 31 (2)	Nov. 13-Dec 4 Dec. 18-Jan. 29 (5)
2005-06	Jan. 14-31 <sup>2</sup> (1\season)	Oct. 5-15 Nov.12-Dec. 31 (2)	Oct. 5-8; Nov. 12-Dec. 3; Dec. 17-Jan. 28 (5)
2006-07	Dec. 25-Jan. 27 <sup>3</sup> (1\season)	Oct. 4-14 Nov.11-Dec. 30 (2)	Nov. 11-Dec 2 Dec. 16-Jan. 27 (5)
2007-08	Dec. 24-Jan. 26 <sup>3</sup> (1\season)	Oct. 3-27 Nov.10-Dec. 31 (2)	Oct. 3-27; Nov. 10-Dec. 1; Dec. 15-Jan. 26 (5)
2008-09	Dec. 22-Jan. 24 <sup>3</sup> (1\season)	Oct. 1-25 Nov.8-Dec. 31 (5)	Oct. 1-11; Nov. 8-Dec. 29; Dec. 13-Feb. 7 (5)
2009-10	Jan. 23-Jan. 30 <sup>4</sup> (1)	Oct. 7-Nov. 7 Nov.14-Dec. 31 (5)	Oct. 7-17; Nov. 14-Dec. 5; Dec. 19-Feb. 6 (5)
2010-11	Jan. 22-Jan. 29 <sup>4</sup> (1)	Oct. 6-Nov. 6 Nov.13-Dec. 31 (5)	Oct. 6-16; Nov. 13-Dec. 4; Dec. 18-Feb. 5 (5)
2011-12	Jan. 21-Jan. 28 <sup>4</sup> (1)	Oct. 5-Nov. 4 Nov.12-Dec. 31 (5)	Oct. 5-15; Nov. 12-Dec. 3; Dec. 17-Feb. 4 (5)

<sup>1</sup>See Appendix 2, Figures 1-3 for counties included in the Northeast, Southern James Bay, and Resident Hunt Zones.

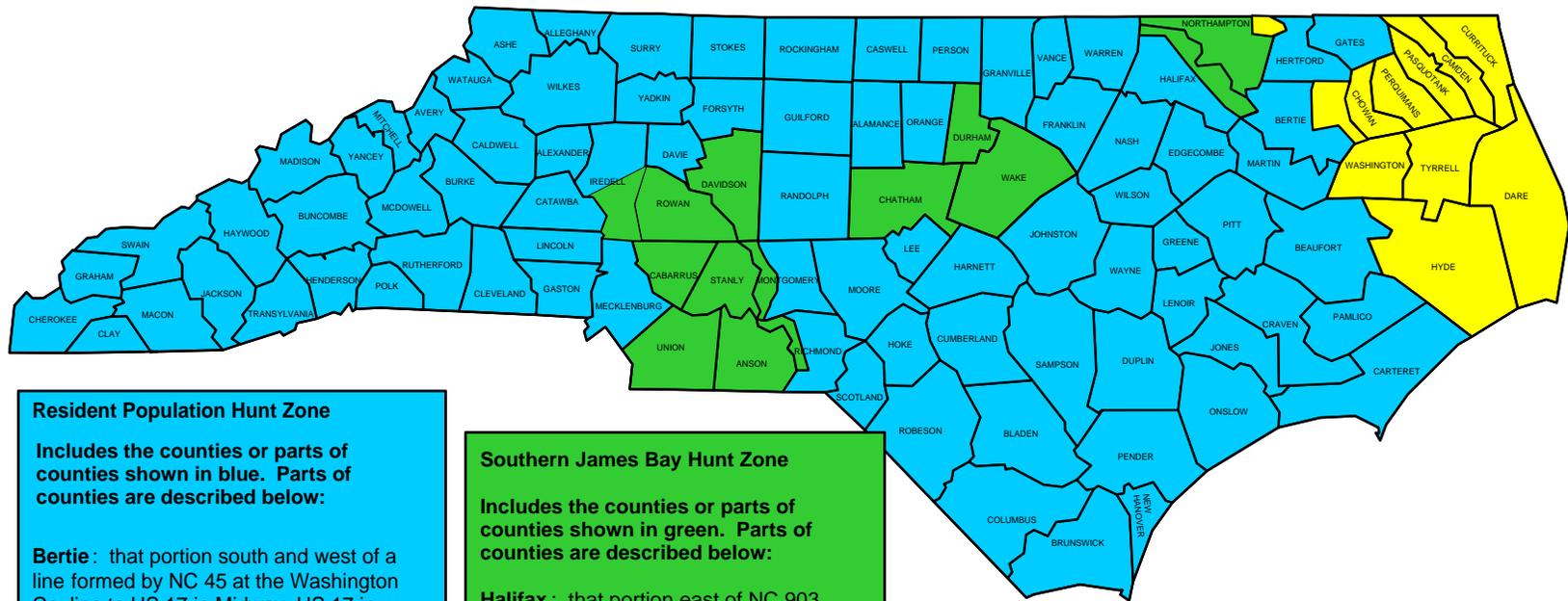
<sup>2</sup>Permit-only season; 500 permits issued.

<sup>3</sup>Permit-only season; 1,000 permits issued.

<sup>4</sup>Permit-only season; Unlimited participation.

Figure 1. Regular season Canada goose hunt zones, 2002-04.

## North Carolina Goose Zones (2002-04)



**Resident Population Hunt Zone**

Includes the counties or parts of counties shown in blue. Parts of counties are described below:

**Bertie** : that portion south and west of a line formed by NC 45 at the Washington Co. line to US 17 in Midway, US 17 in Midway to US 13 in Windsor, US 13 in Windsor to the Hertford Co. line.

**Halifax** : that portion west of NC 903

**Montgomery** : that portion east of NC 109

**Richmond** : all of the county except that portion that is south of NC 73 and west of US 220 and north of US 74

**Iredell** : that portion north of Interstate 40.

**Southern James Bay Hunt Zone**

Includes the counties or parts of counties shown in green. Parts of counties are described below:

**Halifax** : that portion east of NC 903

**Northampton** : all of the county except that part that is both north of US 158 and east of NC 35.

**Montgomery** : that portion west of NC 109.

**Richmond** : that portion that is south of NC 73 and west of US 220 and north of US 74.

**Iredell** : that portion south of Interstate 40.

**Northeast Hunt Zone**

Includes the counties or parts of counties shown in yellow. Parts of counties are described below

**Bertie** : that portion north and east of a line formed by NC 45 at the Washington Co. line to US 17 in Midway, US 17 in Midway to US 13 in Windsor to the Hertford Co. line.

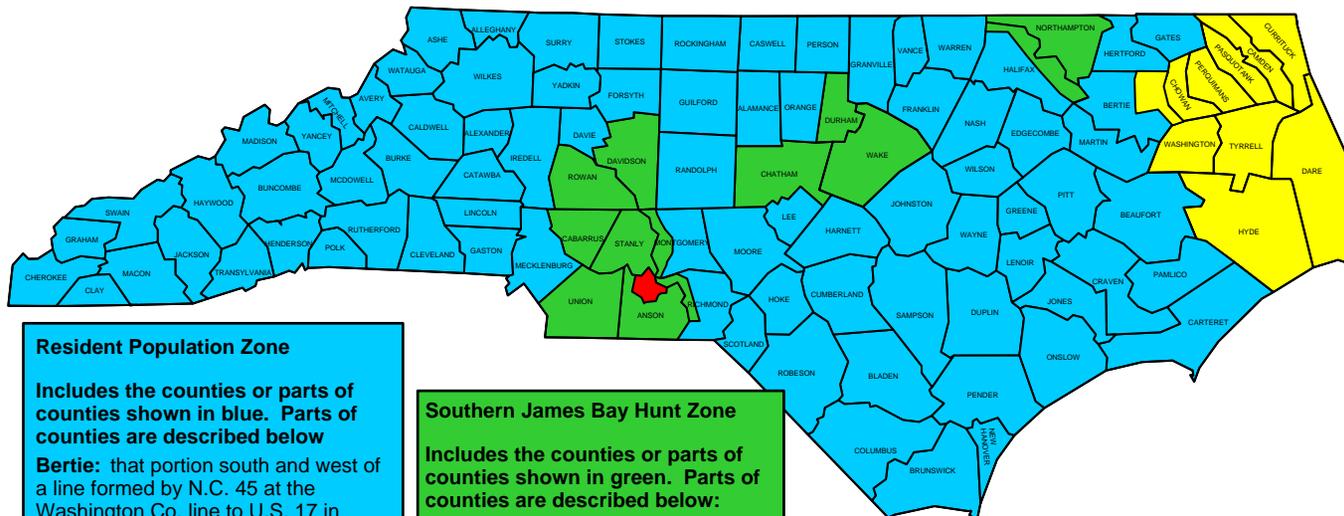
**Northampton** : that portion that is both north of US 158 and east of NC 35.



Appendix 2 (continued). Canada goose seasons and bag limits in North Carolina during the regular waterfowl season, 1987-2009.

Figure 3. Regular season Canada goose hunt zones, 2007-10.

### North Carolina Goose Zones (2007-10)



**Resident Population Zone**  
 Includes the counties or parts of counties shown in blue. Parts of counties are described below  
**Bertie:** that portion south and west of a line formed by N.C. 45 at the Washington Co. line to U.S. 17 in Midway. U.S. 17 in Midway to U.S. 13 in Windsor, U.S. 13 in Windsor to the Hertford Co. line  
**Halifax:** that portion west of N.C. 903  
**Montgomery:** that portion east of N.C. 109  
**Richmond:** all of the county except that portion that is south of N.C. 73 and west of U.S. 220 and north of U.S. 74

**Southern James Bay Hunt Zone**  
 Includes the counties or parts of counties shown in green. Parts of counties are described below:  
**Halifax:** that portion east of N.C. 903  
**Montgomery:** that portion west of N.C. 109  
**Richmond:** that portion that is south of N.C. 73 and west of U.S. 220 and north of U.S. 74

**Northeast Hunt Zone**  
 Includes the counties or parts of counties shown in yellow. Parts of counties are described below:  
**Bertie:** that portion north and east of a line formed by N.C. 45 at the Washington Co. line to U.S. 17 in Midway, U.S. 17 in Midway to U.S. 13 in Windsor to the Hertford Co. line

**Gaddy's Goose Refuge: Closed season for Canada geese after Sept. 30**  
**Portion of Anson Co. north of Ansonville shown in red**  
 For a complete description refer to page 53 of the Regulations Digest or go to our Web site [www.ncwildlife.org](http://www.ncwildlife.org)

Appendix 3. Seasons and bag limits in North Carolina during the special September Canada goose season, 1989-2009.

<b>Year</b>	<b>Season Dates (Bag Limit)</b>	<b>Hunting Zone</b>
1989-90 <sup>1</sup>	September 1-9 (2)	West of I-95 only
1990-91 <sup>1</sup>	September 4-10 (2)	West of I-95 only
1991-92 <sup>1</sup>	September 3-10 (2)	West of I-95 only
1992-93 <sup>1</sup>	September 8-10 (2)	West of I-95 only
1993-94 <sup>1</sup>	September 16-30 (3)	West of I-95 only
1994-95 <sup>1</sup>	September 16-30 (3)	Statewide, except in certain counties <sup>2</sup>
1995-96 <sup>1</sup>	September 6-20 (3); September 16-30 (3)	In northeast counties <sup>3</sup> ; Statewide, except in northeast counties
1996-97 <sup>1</sup>	September 3-20 (3); September 3-30 (3)	In northeast counties <sup>4</sup> ; Statewide, except in northeast counties
1997-98	September 2-20 (3); September 2-30 (3)	In northeast counties <sup>4</sup> ; Statewide, except in northeast counties
1998-99	September 1-20 (3); September 8-30 (3)	In northeast counties <sup>4</sup> ; Statewide, except in northeast counties
1999-00	September 1-20 (5); September 7-30 (5)	In northeast counties <sup>5</sup> ; Statewide, except in northeast counties
2000-01	September 1-20 (5); September 5-30 (5)	In northeast counties <sup>5</sup> ; Statewide, except in northeast counties
2001-02	September 1-20 (5) <sup>6</sup> ; September 4-29 (5)	In northeast counties <sup>5</sup> ; Statewide, except in northeast counties
2002-03	September 2-20 (5) <sup>6</sup> ; September 3-29 (5)	In northeast counties <sup>5</sup> ; Statewide, except in northeast counties
2003-04	September 1-30 (5) <sup>6</sup>	Statewide

Appendix 3 (continued). Seasons and bag limits in North Carolina during the special September Canada goose season, 1989-2009.

<b>Year</b>	<b>Season Dates (Bag Limit)</b>	<b>Hunting Zone</b>
2004-05	September 1-30 (5) <sup>6</sup>	Statewide
2005-06	September 1-30 (5) <sup>7</sup>	Statewide
2006-07	September 1-30 (8) <sup>7</sup>	Statewide
2007-08	September 1-30 (8) <sup>7</sup>	Statewide
2008-09	September 1-30 (8) <sup>7</sup>	Statewide
2009-10	September 1-30 (15)	Statewide
2010-11	September 1-30 (15)	Statewide
2011-12	September 1-30 (15)	Statewide

<sup>1</sup>All hunters were required to obtain a free, special permit to hunt Canada geese during September.

<sup>2</sup>Hunt area expanded statewide except for the counties of Bertie, Beaufort, Camden, Chowan, Currituck, Dare, Gates, Hertford, Hyde, Northampton (east of I-95), Pamlico, Pasquotank, Perquimans, Tyrrell, and Washington.

<sup>3</sup>Northeast counties included Bertie, Camden, Chowan, Currituck, Dare, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington.

<sup>4</sup>Northeast counties included Bertie, Camden, Chowan, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington.

<sup>5</sup>Northeast counties included Bertie, Camden, Chowan, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington plus the addition of Currituck and Hyde counties.

<sup>6</sup>Except in Dare and Currituck counties, where the bag limit is 2.

<sup>7</sup>Except in the area of Dare county that includes Roanoke Island, 1,000 yards around Roanoke Island, and 1,000 yards both north and south of the Hwy. 64 causeway between Roanoke Island and Bodie Island, where the bag limit is 2.