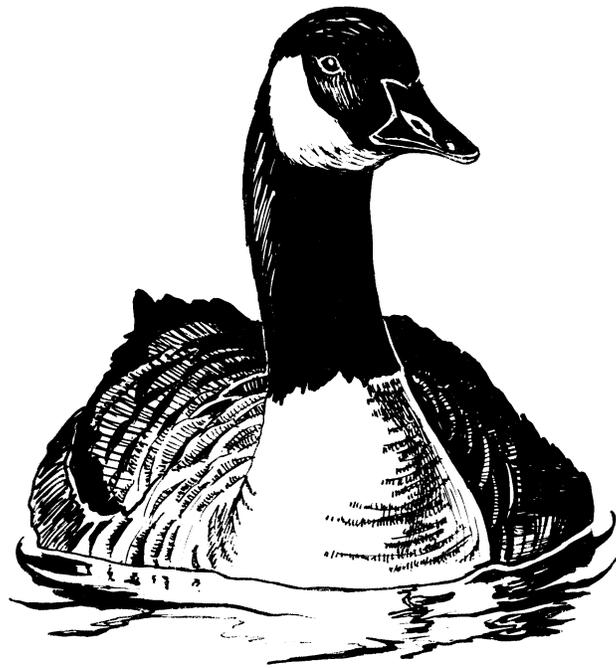


Management Plan for Resident Canada Geese in Nebraska



**Nebraska Game and Parks Commission
July 2006**

Management Plan for Resident Canada Geese in Nebraska

Executive Summary

Restoration efforts in Nebraska and throughout the Central Flyway have significantly contributed to recent increases in resident Canada goose (*Branta canadensis*) populations. While Canada geese provide abundant consumptive and non-consumptive recreational opportunities, resident geese also can cause problems that may range from minor nuisance to human health and safety issues. Thus, a consequence to the increased goose populations is a corresponding increase in the number of complaints and conflicts with humans. A dilemma arises for management agencies to maintain this resource to continue or improve recreational opportunities but also the need to consider and react to nuisance and safety issues. Continued expansion of urban areas, particularly in eastern Nebraska, coupled with increasing populations of Canada geese will likely result in increases in nuisance goose complaints and human health and safety issues in the near future. Specifically, the goals of this management plan are to state population goals, identify and establish consistent, appropriate management actions to meet population goals and alleviate or resolve nuisance geese problems, primarily those associated with resident Canada geese. Based on professional judgment, recent survey information and assuming no change in survival rates and other demographic parameters, the current estimated size of Canada geese in Nebraska in spring, including non-breeders, is approximately 32,000 geese. Most resident Canada geese are located in the Sandhills, followed by the Southeastern District. Populations are probably slightly increasing in all districts except possibly the Sandhills. The population objective for the Southeastern district calls for reduction in numbers, maintaining current levels in the Northeastern and Southcentral, and increases in the Southwest, Panhandle and Sandhills districts. Various management actions and strategies must be used to meet population objectives. Lethal and non-lethal methods will be employed to address nuisance problems. Implementation of surveys, analysis of previously acquired data and directed research will provide information to help guide future management decisions.

Management Plan for Resident Canada Geese in Nebraska

Introduction

Recent increases in Canada goose (*Branta canadensis*) populations have been considered one of the more significant wildlife management accomplishments in North America (Bellrose 1980). In particular are increases in resident or urban nesting geese, mainly due to restoration or introduction of giant Canada geese (*B.c. maxima*) (Gosser et al. 1997, Sheaffer and Malecki 1998). Resident and migrant populations have increased in Nebraska since 1960 due to restoration efforts within and outside the state (Vrtiska and Lyman 2004).

Canada geese provide abundant consumptive and non-consumptive recreational opportunities. Although most residents are favorable to the presence of Canada geese in their community (Coluccy et al. 2001), geese can cause problems that may range from minor nuisance (e.g., defecating on sidewalks) to human health and safety issues (e.g., air traffic safety). Thus, a consequence to the increased goose populations is a corresponding increase in the number of complaints and conflicts with humans (Conover and Chasko 1985). Typically, user groups may be at odds over the proper methods in which to control or solve nuisance problems (Smith et al. 1999), and attitudes toward geese are dependent upon property use and damage by geese, location of residence and land ownership (Coluccy et al. 2001).

Thus, a dilemma arises for management agencies to maintain this resource to continue or improve recreational opportunities but also the need to consider and react to nuisance and safety issues. Given the continued expansion of urban areas and populations of Canada geese, nuisance goose complaints will continue and likely increase in the near future. The Nebraska Game and Parks Commission (NGPC) is the state agency responsible for dealing with migratory bird issues. Because Canada geese are protected by the Migratory Bird Treaty Act, cooperation is necessary with federal agencies, as well as other state and local agencies. Input from the public that may use or otherwise interact with geese also must be considered prior to management actions.

For consistent, efficient and effective management of Canada geese in Nebraska, a management plan is necessary to direct and determine NGPC's goals and policies toward resident Canada geese and identify and develop plans of action for dealing with nuisance Canada goose problems. Specifically, the goals of this management plan are to state population goals,

identify and establish consistent, appropriate management actions to meet population goals and alleviate or resolve nuisance geese problems, primarily those associated with resident Canada geese.

Resident Canada geese are defined as those geese that breed and reside most of the year within Nebraska. This plan and strategies within addresses the breeding population of Canada geese in Nebraska. However, the policies and management actions also may apply to migrant geese that may cause damage or nuisance problems.

This plan also must be considered in conjunction with current and future management plans and policies determined by the Central Flyway for large Canada geese (e.g., Central Flyway Council 1988, 2000). Additionally, the U.S. Fish and Wildlife Service (USFWS) recently released an Environmental Impact Statement (EIS) on resident Canada geese. Strategies identified in the EIS also may provide more lenient or additional management actions.

A brief review of the history and restoration, current population status, distribution and objectives, monitoring efforts and information needs for resident Canada geese in Nebraska are provided in this plan. An appendix with various management actions and techniques that may stop or alleviate nuisance goose problems also is provided.

History and Restoration

Historically, large races of Canada geese were breeding in Nebraska prior to settlement (Hanson and Nelson 1964). However, in Nebraska and across North America in the early 1900's, Canada goose populations were decimated from commercial hunting, unrestricted taking of eggs and loss of habitat (Smith et al. 1999). Population estimates of the Western Prairie Population of Canada geese in the Central Flyway from the late 1960's were documented at approximately 60,000-100,000 birds (Grieb 1968).

Gabig (1986) presented a good review on the history and restoration efforts of Canada geese in Nebraska. Restoration efforts began in Nebraska in 1936 at Crescent Lake National Wildlife Refuge. This attempt and others did establish breeding flocks, but did not flourish as anticipated. To facilitate a restoration effort, NGPC established and maintained captive flocks at the Sacramento-Wilcox Wildlife Management Area (WMA) and Branched Oak Lake. Goslings from the Sac-Wilcox WMA were released at various sites across the Sandhills and the Branched Oak flock produced goslings for stocking in the Salt Valley region near Lincoln (Gabig 1986). Initiated in 1983, goslings from Sac-Wilcox also were distributed along the North Platte River

Valley. Approximately 11,400 goslings were released between 1968-1997 in these three areas (NGPC, admin reports). All of the restoration efforts also utilized area-specific harvest restrictions to assist with increasing breeding populations. The captive flocks were disbanded and distributed to various individuals in the state in 1997.

Additionally, nuisance Canada geese within Nebraska and from other states (e.g., Minnesota) were relocated to restoration areas (NGPC, admin files). The most recent importation from other states was completed in 1998 to the northeastern portion of the state. From 2001-2004, approximately 244 juvenile and 56 adult geese were removed from Lincoln and transported to the other portions of the state (NGPC, admin. reports). Other efforts to restore breeding Canada geese across the state included the installation of nesting structures on WMA's and also providing nesting structures and technical information to the public. The contribution of these efforts to the breeding population is difficult to assess, but likely have led to increases in the breeding population of Canada geese in Nebraska. Finally, individuals with captive flocks across the state also raised Canada geese and produced some free-flying birds that may have contributed to the breeding population (NGPC, admin report).

Current Status

Although the population of Canada geese in the Great Plains were greatly reduced in the early 1900's, recent trends indicate a substantial increase in the number of Canada geese in the Central Flyway since the 1940's (Vrtiska et al. 2004). About 175,000 Canada geese of the Western Prairie and Great Plains populations were counted in December 1981, compared to a high of approximately 710,000 geese in 2002 (Kruse 2005).

Based on professional judgement, recent survey information and assuming no change in survival rates and other demographic parameters (Powell et al. 2004), the current estimated size of Canada geese in Nebraska in spring, including non-breeders, is approximately 32,000 geese (Central Flyway Council 2000). Resident Canada goose populations appear to be distinct populations (Powell et al. 2004). Based on NGPC wildlife management districts, the breeding population status for Canada geese in Nebraska is broken down into 6 regions: 1) Panhandle, 2) Sandhills, 3) Northeast, 4) Southwest, 5) Southeast, and 6) Southcentral (Figure 1).

Panhandle.—The primary breeding area for Canada geese in the Panhandle district is along the North and South Platte rivers and the western portion of the Sandhills in Sheridan and Garden counties. The North Platte River Valley was one of the major restoration efforts

conducted in the state (Gabig 1986). Results of spring surveys conducted from 2003-2005 show that 250 – 370 indicated pairs of Canada geese nest along the North and South Platte rivers and Lodgepole Creek. Geese also nest along creeks and in other lakes and reservoirs in the region. The estimated breeding population in the Panhandle district is estimated at approximately 1,000 breeding pairs. Given the relatively low survival rates (Powell et al. 2004), the Panhandle population is probably stable to slightly increasing.

Sandhills.—The Sandhills region of northcentral Nebraska is the primary breeding range of the Canada goose in Nebraska and was the first area where restoration efforts were initiated (Gabig 1986). The region is particularly conducive for Canada geese nesting with >175,000 acres of open water and marsh and >1.1 million acres of wet meadows (LaGrange 2005). Approximately 4,000 breeding pairs are estimated in the Sandhills region. The Sandhills population is more migratory than other populations in Nebraska (Powell et al. 2004). Additionally, Sandhills geese may be undertaking molt migrations and undergoing additional harvest pressure by early seasons in Canada and September seasons in North and South Dakota. Thus, the Sandhills population may be stable to slightly decreasing.

Northeast.—Most of the landbase in the Northeast district is used for row crop agriculture and does not provide the necessary nesting habitat for large numbers of Canada geese. Primary nesting areas are along the Missouri, Elkhorn and lower Loup rivers. Lakes, reservoirs and smaller impoundments also provide some nesting habitat. The estimated breeding population in the Northeast is approximately 500–750 breeding pairs. The population is probably increasing at a relatively low rate.

Southwest.—Most breeding Canada geese in the Southwest district are located along the Platte River valleys, Sandhill lakes in Arthur, Logan and McPherson counties, and along the lakes, reservoirs, and other rivers and major drainages. Approximately 1,000 breeding pairs are estimated in this district and increasing at a relatively low rate.

Southeast.—The largest concentration of Canada geese in the Southeast district is located around the Salt Valley region in Lancaster County and the Platte River. The numerous lakes and smaller impoundments, including the metropolitan areas of Lincoln and Omaha, located throughout the district also provide abundant, suitable nesting habitat. Given the abundance of breeding habitat, this district is second to the Sandhills in the number of breeding pairs of Canada geese. An estimated 1,500-2,000 breeding pairs are located in this district. Based on

banding data, the population in this area is slightly increasing under current conditions (Powell et al. 2004). However, continued urban expansion may increase population growth rate.

Southcentral.—The Platte River Valley is the primary area for breeding Canada geese in this district. As with the Northeast district, the region's landbase is dominated by row crop agriculture and provides little nesting habitat. However, sandpit lakes along Interstate 80 and around urban areas, as well as flood control impoundments in the southeastern portion of the district, provide some nesting habitat. Although the numerous wetlands of the Rainwater Basin occur primarily in this region, the more ephemeral nature of most of these wetlands does not provide suitable nesting habitat. The current estimate of breeding pairs is approximately 500 and also probably increasing slightly.

Population Objectives

The current state population objective (total birds in spring) is 30,000-50,000, of which the lower limit would equate to approximately 10,000 breeding pairs (Central Flyway Council 2000). The current, estimated number of breeding pairs (approximately 9,250) is close to and may be slightly over the lower limit of the population objective. Increases in the breeding population in some districts may not lead to a proportional increase in nuisance problems but increase recreational opportunity (e.g., Sandhills). However, there is great concern about current status and potential growth of Canada goose populations in eastern Nebraska where population growth is anticipated to increase the number and severity of nuisance complaints. Thus, population objectives for the different districts are based on the anticipated growth of the Canada goose population, current and anticipated growth of urban areas, potential for nuisance goose problems, and contribution to recreational opportunity (Table 1).

The Southeast district followed by the Northeast district has the greatest potential for increases in resident Canada goose populations due to increases occurring around urban areas. Further population increases in these districts would be undesirable given the potential for nuisance complaints. Indeed, given the large metropolitan areas and greatest potential for human/goose conflicts and potential for increased Canada goose populations, reduction in the Southeast district is recommended (Tables 1 and 2). Goose populations in the Northeast and Southcentral should be maintained at current levels given potential for increases in nuisance complaints and increases in goose populations (Tables 1 and 3).

Table 2. Actions, policies and methods for reducing the resident Canada goose population in the Southeast District of Nebraska.

- ◆ Maintain current hunting regulations, consistent with population objectives established by the Central Flyway and the USFWS.
- ◆ Initiate September seasons in remainder of district by 2009.
- ◆ Increase harvest of Canada geese by establishing, removing or reducing refuge areas or restrictions or increase hunting opportunity.
- ◆ Continue to support of USDA APHIS-Wildlife Services personnel at Lincoln and Omaha airports and assist as needed.
- ◆ Actively oil/eliminate eggs and nests in urban areas, particularly in Lincoln and Omaha.
- ◆ Change or establish regulations in order to allow owners and managers of areas (e.g., golf courses, apartment complexes) with nesting geese to oil eggs and remove nests.
- ◆ Change or establish regulations to make individuals or entities agents of NGPC that can assist and potentially deal with nuisance problems.
- ◆ Exclude any part of district from any translocation or supplemental stocking of Canada geese. Geese captured for removal purposes shall be released only west of NE Highway 14.
- ◆ Remove nesting structures on lands owned by NGPC, and encourage the removal of nesting structures on private lands.
- ◆ Discourage initiation of new or expansion of existing flocks of captive Canada geese that may produce free-flying young.
- ◆ Remove juvenile or molting adult geese from problem areas as needed.
- ◆ Initiate and conduct other options identified and allowed in the Resident Canada goose management Environmental Impact Statement.
- ◆ Initiate and conduct breeding population surveys to determine number of Canada geese in district. Initiate studies to investigate growth of populations.
- ◆ Initiate new banding and other programs to obtain necessary information about population demographics, movements and harvest characteristics of district population. Analyze current and past neck collar and banding data.
- ◆ Work with Central Flyway and other entities about participation and support for studies that examine the role of molt migrants and possible impacts on local populations.

Table 2 continued.

- ◆ Limit frequency of changes in Canada goose (i.e., dark goose) zone boundaries similar to those for duck zone changes (i.e., once every 5 years) in order to accurately evaluate management actions.
 - ◆ Inform and garner support from local governments about NGPC policies and goals.
 - ◆ Provide technical assistance on alleviating or reducing Canada goose nuisance problems to landowners, managers, developers and other entities via presentations, workshops, literature and personal contact.
 - ◆ NGPC staff should attend symposia, meetings and workshops that review, discuss and exhibit techniques and methods that may help with alleviating or reducing nuisance problems.
 - ◆ Provide and distribute information via various sources of media to educate public about NGPC goals and population objectives of resident Canada geese in Nebraska and methods and techniques to deal with nuisance Canada geese.
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Table 3. Actions, policies and methods for reducing the resident Canada goose population in the Northeast and Southcentral districts in Nebraska.

- ◆ Maintain current hunting regulations, consistent with population objectives established by the Central Flyway and the USFWS.
- ◆ Initiate September seasons east of Nebraska Highway 14 by 2009.
- ◆ Increase harvest of Canada geese by establishing, removing or reducing refuge areas or restrictions or increase hunting opportunity.
- ◆ Remove resident Canada geese located near airports as warranted.
- ◆ Oil/eliminate eggs and nests in urban areas as needed.
- ◆ Change or establish regulations in order to allow owners and managers of areas (e.g., golf courses, apartment complexes) with nesting geese to oil eggs and remove nests.
- ◆ Change or establish regulations to make individuals or entities agents of NGPC that can assist and potentially deal with nuisance problems.
- ◆ Exclude areas east of NE Highway 14 from any translocation or supplemental stocking of Canada geese.
- ◆ Remove nesting structures on lands owned by NGPC, and encourage the removal of nesting structures on private lands.
- ◆ Discourage initiation of new or expansion of existing flocks of captive Canada geese that may produce free-flying young.
- ◆ Remove juvenile or molting adult geese from problem areas as needed.
- ◆ Initiate and conduct breeding population surveys to determine number of Canada geese in district. Initiate studies to investigate growth of populations.
- ◆ Initiate new banding and other programs to obtain necessary information about population demographics, movements and harvest characteristics of district population.
- ◆ Limit frequency of changes in Canada goose (i.e., dark goose) zone boundaries similar to those for duck zone changes (i.e., once every 5 years) in order to accurately evaluate management actions.
- ◆ Inform and garner support from local governments about NGPC policies and goals.

Table 3 continued.

- ◆ Provide technical assistance on alleviating or reducing Canada goose nuisance problems to landowners, managers and other entities via presentations, workshops, literature and personal contact.
 - ◆ NGPC staff should attend symposia, meetings and workshops that review, discuss and exhibit techniques and methods that may help with alleviating or reducing nuisance problems.
 - ◆ Provide and distribute information via various sources of media to educate public about NGPC goals and population objectives of resident Canada geese in Nebraska and methods and techniques to deal with nuisance Canada geese.
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Generally, increases in the number of breeding Canada geese in the Panhandle, Sandhills and Southwest districts are the least object because the potential for nuisance complaints are the lowest but providing the most in terms of recreational opportunities (Table 1).

Strategies for Meeting Population Objectives

In the Southeast, Northeast and Southcentral districts where the objective is population reduction or stability, specific policies, action, methods and techniques need to be employed to increase mortality of adult birds and/or decrease productivity (Tables 2 and 3). In the Southeast, both mortality and productivity need to be effected for the most efficient and effective population reduction (Table 2). In the Northeast and Southcentral, increased mortality of adults with some decrease in productivity is currently the best means to maintain stable populations (Table 3). In the remaining districts, direct management actions are not required to increase populations (Table 4). Transplanting juvenile or subadult geese from nuisance areas in Nebraska should be continued to supplement populations. However, the population of Canada geese in the Sandhills may require some coordination with the Central Flyway and other state agencies if the limiting factor to population growth is harvest related.

Finally, captive flocks established by private individuals that produce free-flying geese also contribute to recruitment. In July 1989, approximately 2,100 Canada geese were being held in captive flocks (NGPC admin. files). Although the total number of goslings that are allowed to

Table 4. Actions, policies and methods for reducing the resident Canada goose population in the Panhandle, Sandhills and Southwest districts in Nebraska.

- ◆ Maintain current hunting regulations, consistent with population objectives established by the Central Flyway and the USFWS.
 - ◆ Remove resident Canada geese at or near airports as warranted.
 - ◆ Oil/eliminate eggs and nests in urban areas as needed.
 - ◆ Exclude areas from any translocation or supplemental stocking of Canada geese that may cause nuisance problems in future.
 - ◆ Remove juvenile or molting adult geese from problem areas as needed.
 - ◆ Initiate and conduct breeding population surveys to determine number of Canada geese in district. Initiate studies to investigate growth of populations.
 - ◆ Initiate new banding and other programs to obtain necessary information about population demographics, movements and harvest characteristics of district population. Analyze banding data and other data to determine population parameters.
 - ◆ Limit frequency of changes in Canada goose (i.e., dark goose) zone boundaries similar to those for duck zone changes (i.e., once every 5 years) in order to accurately evaluate management actions.
 - ◆ Provide technical assistance on alleviating or reducing Canada goose nuisance problems to landowners, managers and other entities via presentations, workshops, literature and personal contact.
 - ◆ NGPC staff should attend symposia, meetings and workshops that review, discuss and exhibit techniques and methods that may help with alleviating or reducing nuisance problems.
 - ◆ Provide and distribute information via various sources of media to educate public about NGPC goals and population objectives of resident Canada geese in Nebraska and methods and techniques to deal with nuisance Canada geese.
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free-fly is unknown, it is conceivable that >1,000 young are produced by these birds. These captive flocks should be identified and monitored for the number of goslings produced and whether goslings are allowed to free-fly. Individuals that are allowing geese to free-fly in areas

where nuisance complaints are likely to occur should be contacted and encouraged to reduce or eliminate releases or release birds in more favorable areas. A position statement was adopted by NGPC in January 1990 in reference to captive flocks held by private individuals (Appendix A). Other considerations of captive flocks should be in order with this position statement.

Various methods, techniques and actions and the advantages and disadvantages of each to reduce nuisance problems or local populations via habitat modification, nest or egg destruction and depredation or kill permits are discussed in Appendix B. These methods, techniques and actions should be considered and used on a case-by-case basis. Coordination will be potentially required with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service – Wildlife Services (APHIS-WS) and the USFWS. Further, given the serious nature of a potential aircraft strike with a Canada goose and potential threat to human health and safety, a contingency plan addressing this possibility should be developed.

Management, Monitoring and Informational Needs

To increase efficiency and capacity to deal with wildlife nuisance problems, including but not limited to Canada geese, regulation changes are needed to enable non-NGPC personnel to deal with nuisance problems. Regulatory changes need to be enacted to address delegation of actions that individuals suffering damage could take. However, initiating and carrying out the various actions, strategies and analysis brings up the possibility or potential options for attaining additional staff, permanent or temporary, to handle nuisance problems and permitting issues.

A primary need is for the design and implementation of annual or semi-annual breeding population surveys in all districts. Initiation of new surveys or examination of current surveys (e.g., Breeding Bird Survey) is needed to assess population changes and eventually determine if management or harvest actions have been effective. Currently, the May breeding waterfowl and other non-NGPC surveys are conducted. A statewide ground census was conducted in 1988 and 1996 and continuation of such a survey may be sufficient if modified and conducted on a regular basis.

No formal studies have been conducted on population demographics of rural and urban Canada geese. Reliable estimates of recruitment (e.g., nest success, gosling survival) would be helpful in determining population rates of increase or decrease in all districts. A banding program for Canada geese in Nebraska has been conducted annually since 1980 (NGPC, admin reports). Since that time, >26,000 Canada geese have been banded. Full analyses of banding

data would provide estimates of survival rates of some population segments (e.g., Sandhills and in Lancaster and Seward counties). Analysis of these data would determine some population parameters in these areas. Banding should be expanded into other areas to estimate survival rates and harvest derivation and distribution for those subpopulations, as well as assist in evaluation of management actions. Finally, changes in Canada goose (i.e., dark goose) zone boundaries need to be limited in frequency (e.g., similar to duck zone changes) in order to successfully evaluate management actions.

A neck-collar study was initiated in the early 1990's to determine local movements of Canada geese in and around Lincoln with over 300 geese being fitted with neck collars. Analysis of these data would assist in assessing local population demographics around Lincoln. Additionally, determining interactions between rural and urban geese would be assisted by marking (i.e., neck collar, radio-telemetry) studies in other areas. This is particularly important for consideration of further population restoration or reduction efforts. For example, if rural geese primarily migrate to urban centers to breed or molt, then efforts to restore or increase populations may not be desirable. Conversely, increasing harvest in local areas may assist in reducing nuisance problems.

The role of molt migrants on local populations also needs to be determined. This would elucidate interactions or influences of larger population segments with local Nebraska populations. Nebraska could implement restoration or reduction efforts, but if molt migrants from other states serve as a source to local populations, then similar measures probably need to be instituted in those states. Coordination with other Central Flyway and surrounding states is needed to obtain pertinent information.

Finally, revisions to this plan should be conducted on semi-annual intervals to incorporate new methods and techniques, address new or addressed problems, and re-assess population status and objectives. Approximately every five years, an assessment of achievement toward objectives, availability of new information and methods, and techniques and necessity of addressing growing issues should determine whether a revision is required.

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Appendix B

Various Techniques and Methods to Deal with Urban or Nuisance Geese

NGPC policies and premises in managing urban and resident Canada geese:

- ◆ Canada geese provide abundant recreational opportunity, and are a valued resource.
- ◆ Population reduction is the primary long-term solution for reduction of nuisance complaints. While other methods and techniques must be considered and used, this may only shift or change problem areas. Thus, population reduction coupled with other non-lethal means will reduce the number of complaints.
- ◆ The goal of most problem areas is reduction of goose numbers, not elimination of geese. However, in the case of human health and safety concerns (e.g., airports), elimination of geese will be the priority.
- ◆ In most cases, single solutions are not the answer. Multiple techniques may be required over a period of time. Additionally, given manpower and time restraints, empowering those suffering from complaints should be informed about methods and tools to address nuisance problems themselves.
- ◆ Confronting urban goose situations will likely be controversial. Recognition of this is important in resolving nuisance problems. Where applicable, dealing with homeowners associations or quasi-governmental entities is necessary to address nuisance problems.
- ◆ Documentation of nuisance problems is necessary to identify chronic problem areas, effective methods and techniques, and justify more intense management actions.

Description of Management Techniques and Actions

I. Discontinuance of Feeding

Geese are grazers and do not need to be fed. Feeding encourages geese to congregate and in some cases makes them aggressive, attracts other geese and waterfowl, tends to domesticate geese making them harder to scare, harass or relocate, and could lead to an increased susceptibility to disease (e.g., aspergillosis). Cities and local entities should be strongly encouraged to adopt rules to prohibit feeding and institute fines for feeding geese. Additionally, provide literature to inform/educate residents regarding this prohibition, rules and fines and reason why feeding geese is not desired or necessary.

- A. City ordinances, homeowner association rules – make it prerequisite for assistance from NGPC and APHIS-WS. Educate and outreach to residents about feeding and potential problems.

II. Habitat Modification

Geese prefer large, open grassy habitats that are close to water (e.g., parks, golf courses, and residential complexes). Islands or peninsulas also attract nesting geese. Eliminate, modify or increase access to areas that attract geese.

- A. Decrease attractiveness of grazing areas (e.g., bluegrass lawns).
 - 1. Slow plant growth – reduce frequency or eliminate mowing, fertilizer application and/or amount of watering. All increase plant growth that increases palatability to geese.
 - 2. Plant less palatable species – geese prefer bluegrass, fescue, and brome.
 - a. Plant grass that is dormant in the fall and winter.
 - b. Plant tall grass species (e.g., switchgrass, big bluestem).
 - c. Replace grass with ground cover (periwinkle, Japanese pachysandra)
 - 3. Reduce the size of the lawn, as smaller lawns are less attractive.
 - a. Incorporate alternative landscaping (e.g., gazebos, trails).
 - b. Plant trees or shrubs.
 - 4. Vacant lots and common areas
 - a. Allow vegetation to grow; avoid manicured look and avoid planting alfalfa, clover or other preferred vegetation.
 - b. Plant tall growing vegetation (i.e., warm season grasses).
- B. Encourage early freeze-up of water, do not run aerators, fountains, pumps or heaters.
- C. Eliminate or modify islands, peninsulas and nesting structures.
 - 1. Provide access to islands (e.g., bridges) to facilitate mowing of vegetation and repeated human visits.
 - a. Increase visits to islands, especially prior to and during nesting season.
 - b. Maintain retaining walls and riprap to discourage use by molting geese.
 - c. Increase size of riprap around islands 2' in diameter.
 - d. Place rock or other substrate on island to discourage nesting.
 - 2. Remove islands, elimination of nesting sites.
 - 3. Remove existing and prohibit erection of new nesting structures

III. Barriers

Geese prefer to feed, roost, and loaf near water where they can escape if threatened. Restricting movement between water and land may deter geese from an area, especially during molt.

- A. Fences – can be either temporary or permanent fences, depending on problem (just during molt or year-round deterrence). Types of fences may include woven wire, chicken wire, plastic snow fence, construction-site silt fence, chain link, netting, mylar, or monofilament. Opening in fence should be no larger than 3" and be at least 30" tall. Barrier should be long enough to discourage walking around the end and effectiveness is increased with habitat modifications.
- B. Vegetation – natural, yet physical barrier for geese. Provides visual obstruction that geese perceive threat from predators. Should be placed close to foraging areas and works best in low goose numbers with nearby unoccupied habitat and must be

protected from grazing during establishment. Should be dense and at least 30" high (prevent geese from seeing over or through barrier and wide plantings are better than narrow ones.

- C. Rock Barrier – large boulders hinder access (minimum of 2' in diameter). Rock and vegetation barrier combination may enhance effectiveness, but geese may become acclimated to rocks.

IV. Hazing and Scaring

Hazing and scaring are non-lethal methods that typically are accepted by the public. Usually work best when geese first move into an area, combined with other techniques, and used repeatedly. City or local ordinances about discharging firearms or noisemakers need to be explored before use. Urban geese also may be harder to haze than migrants and may become acclimated to devices. Although visual devices are inexpensive, quiet, acceptable and quickly implemented, they also can be regarded as visually ugly, require maintenance and may be targets for vandals. ***Private citizens are allowed to haze, scare or harass geese without any special permits, but geese cannot be touched, harmed/injured or killed.***

A. Acoustic devices - call activated switches (switched on by the call of the geese) may increase effectiveness and reduce maintenance, noise and materials.

1. Sirens, air horns, whistles – can be versatile and can be used via hand-held, remote, or vehicle mounted.
2. Blanks – used in pistols, effective in combination with other scare tactics (i.e., distress tapes).
3. Bangers, screamers, whistle bombs – Usually fired from 15mm launchers and are less expensive than shell crackers. Caution must be used as they may start fires.
4. Radio or taped recording, best when set on timer for variable play back.
5. Distress calls – species specific, natural or synthetic. Effectiveness varies, but more effective when used in combination with visual deterrents.
6. Ultra-sonic – somewhat ineffective when used alone and should be used with screamers, shellcrackers or pyrotechnics.

B. Visual devices

1. Strobe lights – for use at dusk or night, limited application. Quiet but may be visually disturbing.
2. Spotlight or floodlight – set on timer for variable illumination times. For use at dusk or night, but need repeated applications.
3. Lasers – used in low light conditions (dawn, dusk, night time, cloudy days) and can be used on geese at relatively long distance. Lasers expensive and long-term effectiveness unknown (research is on-going).
4. Mylar tape – use as streamers or fence. Holographically embossed tape is more effective. Can be high maintenance.
5. Flags – best when used in a steady wind and placement and frequency of moving flags is important. Large, bright flags are more effective.
6. Eye spot balloons or kites – more eyes the better (e.g., 3 eyes better than 2, 2 better than 1). Pupil in circles better than none and colored irises better

than plain. Head outline diminished effectiveness and increased effectiveness when used with distress calls.

7. Scarecrows – place before arrival of birds. Used with human effigies (moving and holding gun) or distress call, or zon gun more effective. Goose decoys in alarm or dead posture are more effective. Great horned owl and swan decoys have limited effectiveness.

C. Harassment

1. Dogs – chase geese away from unwanted areas. Trained border collies and herding breeds most effective and must be on-going process or geese will return. Invisible fence or long tether to contain dog in residential areas. Best times in spring to prevent nesting and early summer after molt.
2. Swans – very territorial and chase geese away from water areas. However, swan also may attack humans similar to geese and attract other waterfowl that cause problems. May need to feed and maintain open water.
3. Human – geese most responsive to humans, and most effective besides dogs. Considerable manpower and time may be required.
4. Radio controlled aircraft or watercraft – can be used at relatively long distances and effective if persistent. Can be relatively expensive.
5. Boats/personal watercraft – can harass geese on large bodies of water where other techniques are ineffective. Noisy and expensive to operate.

V. Repellents

Repellents are visually and acoustically unobtrusive and acceptable to the public. They can be applied directly to the problem area and are not harmful to geese. Effectiveness of repellents varies due to weather, repellent concentration and frequency of application. Costs can be high and repellents must normally be re-applied frequently. There may be some associated odors and they do not prevent geese from loafing or swimming. Other wildlife also may be affected.

A. Chemical repellents

1. Methyl Anthranilate (brand name-Re-Jex-It) – labeled for application on turf and makes grass unpalatable. Must be re-applied after mowing or precipitation and may harm fish, although labeled for application to water. General use pesticide, easy for landowner use.
2. Bobbex-G brand – organic, made from fish by-products and other ingredients and contains nitrogen and phosphorus. Applied to grass to discourage grazing, but questionable effectiveness.
3. Anthraquinone (Brand name Flight Control) – apply to grass to discourage grazing both via less-palatable and visual deterrent. Does not wash off as fast as methyl-anthranilate.

VI. Control of Reproduction

Egg oiling or addling and nest destruction, when used concurrently with hunting, can greatly assist with reducing populations. Urban geese have few nest predators and are relatively long-lived, thus, the population tends to increase over time. Overall, the number of goslings surviving to flight stage must be lower than the number of adults dying from hunting or disease to reduce

the population. ***Only APHIS-WS, NGPC, or U.S. Fish and Wildlife Service (USFWS), personnel have the authority to oil, addle, or puncture eggs and/or interact with the nests of migratory birds. It is illegal for private citizens to destroy the nest and/or eggs of any migratory waterfowl unless the appropriate permits are secured.***

A. Prevention of egg laying

1. Haze or scare goose pairs prior to initiation of egg laying (legal for private citizens to conduct).
2. Remove eggs and nesting material.
3. Contraception – not effective and expensive. Recent approval of Ovo-control (nicarbazin) for use.

B. Prevention of hatching

1. Oiling eggs – coat eggs with oil (vegetable based only); suffocates embryo.
2. Addling eggs – puncture eggs and physically kill embryo or introduce bacteria.
3. Shaking eggs – shake eggs vigorously to destroy embryo.
4. Dummy eggs – replace eggs in nest with dummy eggs. Geese will continue to incubate dummy eggs, prevents renesting.

VII. Capture and Relocation

Non-lethal methods directed to a specific problem population. Effects are immediate and obvious and typically not as controversial. However, these methods are time and labor intensive, require special equipment, and usually restricted to the 3-week molt period in June and July. Relocation also requires a new site where undesired geese can be moved to or problem is moved to another area. There also is less success with adults (strong homing instinct) but young will imprint on new area at eight weeks of age. Capture and relocation should be considered as a short-term measure and site must be modified to make less attractive. There is the potential for relocated geese to be replaced by other geese in area. ***Capture of geese is only permitted by APHIS-WS, NGPC, or USFWS personnel, or citizens authorized by those agencies or with appropriate permits.***

A. Capture

1. Walk-in or drive traps - humane and nets can be used over and over. However, limited time frame as must be used during 3-week molt period. Also can be time and manpower intensive.
2. Cannon/Rocket netting – can capture relatively large numbers of birds at other times than molt. Can be time and manpower intensive and may not be able to use in some urban situations.
3. Tranquilization - alpha chloralose, an orally digested anesthesia. Non lethal and specific, but slow acting (30-90 minutes). Pre-baiting required and medication must be fed to geese on individual basis. Time consuming, labor intensive and currently restricted for use by certified APHIS-WS personnel.

VIII. Harvest

Hunting is the main source of mortality for most populations of Canada geese and adult female survival key in population dynamics. Hunting outside of the city limits has been long established

but is possibly recognized by geese. Consideration may be given to special early seasons or hunting within city limits to disrupt the routines established by urban geese and specifically targets resident birds. Some season options also must be approved by the Central Flyway, USFWS, and local governing agencies. ***Special regulations may apply to certain actions (e.g., kill permits) and may only be carried out by APHIS-WS, NGPC, or USFWS personnel or authorized personnel under the supervision of APHIS-WS, NGPC, or USFWS.***

A. Hunting

1. Regular seasons

- a. Adjust current regular hunting season structure (season dates, zones) to maximize harvest of resident Canada geese.
- b. Remove or reduce regulations on Canada goose hunting. Around and within Lincoln and Omaha and other metropolitan areas as needed.

2. September seasons - Implement September season (USFWS evaluation requirements needed after Sept 15). Probably best if ran concurrent with early teal season.

3. Implementation of expanded hunting methods (e.g., unplugged shotguns, electronic calls, and one-half hour after sunset) during regular and September seasons – *can only be used when all other waterfowl and crane seasons are closed.*

B. Conservation Order – recently allowed via EIS on resident Canada geese. Must be conducted 1-31 August, and *must include population monitoring and status information (e.g., breeding population surveys).*

C. Depredation permits - issued in special situations (e.g., airports) and may be controversial. Includes airports, nest and egg removal, agricultural and public health problems.. Also used in special situations and may be controversial.

D. Capture and Euthanasia – capture birds and euthanize. Provide birds to local food banks if conditions are met to do so (USDA approved). Used as “last-ditch” effort to reduce populations. Extremely controversial and strong justification needed.