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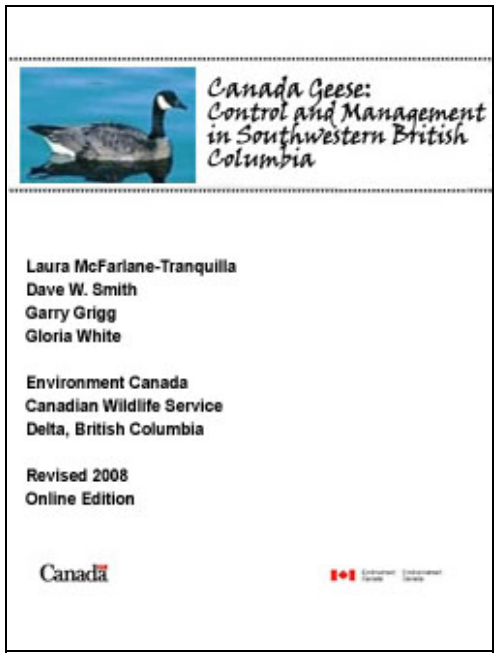

Canada Geese: Control and Management in Southwestern British Columbia

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About this handbook

1. ABOUT THIS HANDBOOK

This handbook is intended for people concerned with the management of Canada Geese in urban and suburban areas, including airports, urban parks, golf courses, schools, cemeteries, turf farms, apartment and townhouse complexes, wetland areas, and farmland. It presents the local history and biology of Canada Geese, outlines appropriate preventive and deterrent techniques for use in problem areas, and provides contact information for users to obtain advice and necessary permits.

LEGAL PROTECTION OF CANADA GEESE

The Canada Goose is a migratory bird that is protected under Canadian law by the *Migratory Birds Convention Act*, which prohibits killing or capturing the birds or damaging, destroying, removing, or disturbing their nests, except as provided for under the *Migratory Birds Regulations*.

Canada Geese, along with all other migratory birds, are protected and managed by the Canadian Wildlife Service of Environment Canada.

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Canada Geese: Control and Management in Southwestern British Columbia

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2. INTRODUCTION

In British Columbia, Canada Geese are among the most familiar birds in the Lower Mainland, on southern Vancouver Island, and on the Gulf Islands. Their V-shaped flight formation is one of the most easily recognized sights signifying the change of seasons. Although Canada Geese provide a welcome opportunity for wildlife viewing, they have become unwelcome residents in many populated areas.[1,2,*]

Canada Geese are attracted to lawns, particularly lawns near water. These two features, lawns and water, are key components of urban and suburban landscapes. Their shared preference for lawns near open water leads to conflict between geese and human interests.[3] Well-kept lawns, golf courses, and city parks provide excellent goose habitat for feeding, raising young, moulting, and resting.[2,3] Once geese have nested successfully, encouraging them to leave an area can be difficult, and their numbers tend to increase in future years.[1,4]

Canada Geese cause a variety of problems. When geese occur in large numbers, they can damage grassy public areas, golf courses, and flowerbeds by stripping the area of vegetation, pulling up new plantings of shrubs and flowers, and compressing or eroding the soil. Goose droppings can foul footpaths, lawns, and lakes, can transmit diseases, and can contaminate nearby water with parasites and coliform bacteria. The risk of aircraft strikes by geese is significant where geese are abundant near air traffic corridors. Also, geese with young can be aggressive towards humans and can cause noise disturbance.[2,5,6,7]

Agricultural crop damage by geese is another problem, particularly in farming areas near towns and cities where municipal bylaws prevent the discharge of firearms for scaring or hunting problem geese.[5,8]

Landowners who object to the presence of Canada Geese can use several techniques to deter geese from their land. However, it is

important to understand their life cycle to determine the appropriate timing of these deterrents. Therefore, this handbook presents the local history and biology of Canada Geese, to help understand their use of habitat in urban and suburban areas, and outlines appropriate preventive and deterrent techniques.

- Superscripts correspond to references given in section 13.

3. LOCAL HISTORY OF URBAN GEESE

Before 1967, the Canada Goose was considered a migrant and an infrequent visitor to the Lower Mainland of British Columbia. During the 1970s, Canada Geese were introduced to the Lower Mainland (and other areas of Canada) to provide a population for both local hunting and wildlife viewing.[5,7,8] Since the 1970s, however, rapid urbanization of the Lower Mainland and Vancouver Island has resulted in the closure of many areas to hunting. Because of a decrease in hunting and because Canada Geese have adapted so well to living in urban and suburban environments, their numbers have increased substantially. In the Lower Fraser Valley, for example, the number of Canada Geese reported in the 1995 Christmas Bird Count (a program in which volunteer birdwatchers count and report birds in their area) was 50 times higher than the number reported in the 1965 Christmas Bird Count (A. Breault, unpublished data). Rapid population growth of urban geese is not unique to British Columbia; rather, it has occurred steadily over the last 30 to 50 years in cities across North America.[3,9,10]

In 1995, the population of Canada Geese wintering in the Lower Mainland was estimated to be more than 12 000 birds.[5] More recent counts (2003) suggest this number to be closer to 9700 (A. Breault, unpublished data). Currently, southern Vancouver Island has a wintering population exceeding 5000 geese.

Most populations of Canada Geese are migratory.[11] However, about half of the wintering population of Canada Geese in southwestern British Columbia are nonmigratory, or year-round residents. Reasons for this include the mild winter conditions, abundant open water, readily available food sources, and decreased predation

threats (less hunting and fewer natural predators) in the region, providing geese with their year-round requirements for breeding, moulting, and overwintering. Although British Columbia has always had mild winters, the recent trend towards a warmer climate has increased the year-round availability of green plant material for goose foraging. In addition, because young geese must learn their migration routes from their parents or other migrating geese within the flock, any offspring of nonmigratory geese will also be nonmigratory and stay year-round in the area where they were hatched.[2]

Although Canada Geese may be perceived as problem wildlife, they are protected under the *Migratory Birds Convention Act*. Thus, they are managed for Canadians by the Canadian Wildlife Service of Environment Canada.[1] However, effective management of urban geese also requires cooperation between land use agencies under various jurisdictions, including federal and provincial wildlife agencies, parks and recreation boards, local and regional governments, farmers, and owners of large properties such as golf courses. Collaboration between all interest groups is critical to the success of any attempt to manage urban Canada Geese.[4,7,10]

4. BIOLOGY

4.1 FOOD

Canada Geese eat plants, including grass shoots, seed heads, emergent corn, and pea sprouts, as well as aquatic vegetation.[3] Where available, they also eat cultivated grains and some vegetable crops. Canada Geese graze while walking on land or through shallow water. Because taller grasses are coarser and offer less nutritional value, geese prefer new grass shoots, which explains their preference for mowed lawns. In agricultural areas, cereal crops,

spring-planted pasture, and early peas and corn are often preferred.

4.2 IMPORTANCE OF WATER

Canada Geese nest near water and prefer secluded areas. Water is used for drinking, preening, and bathing and is the best avenue for escape when geese are threatened. A nest surrounded by water is protected from land-based predators. Nests are usually located on the water's edge or a short distance from the shoreline. Islands in wetlands are prime nesting sites and often accommodate high densities of nests.

4.3 NESTING

In southwestern British Columbia, geese pair up and establish territories by early to mid-March. Nesting pairs tend to use the same general nest site year after year. First-time breeders (two to three years old) generally nest where they learned to fly. The nest is usually a roughly woven collection of grasses and other vegetation and can be up to a metre in diameter. Canada Geese are remarkably adaptable in choosing nest sites. Natural nesting habitat includes marshes, islands, cliffs, and trees; however, Canada Geese have also been reported to nest on barges, log booms, pilings, and apartment balconies and in flower boxes and rooftop gardens.

4.4 EGG LAYING AND CHICK REARING

Egg laying usually starts by the end of March and is completed by the end of April, but it can continue into late May. Mild climatic conditions in some years may allow geese to nest as early as February. The average nest contains five or six eggs (clutch size), but some nests may contain 10 or more eggs. If eggs are destroyed or removed from the nest early during incubation, the goose will often lay replacement eggs. Incubation lasts about 25 days, with peak hatching occurring in early May. Young geese are able to fly two months after hatching.

4.5 MOULTING

Moult of wing feathers occurs once a year between mid-May/early June and late July. Most birds are in moult by mid-June. During this period, adult geese will be flightless for four to six weeks. When flightless, geese are particularly vulnerable to predation and will seek refuge in safe areas. Nonbreeding birds often gather in large moulting flocks at this time. Breeding birds that successfully hatched goslings will stay near their nesting areas to moult while rearing their young. They regain their ability to fly at the same time as their young. Once this happens, young and adult geese move throughout urban and suburban areas, feeding to build fat reserves in preparation for winter.

4.6 MORTALITY

Urban geese live longer than migratory geese. This is because natural predators are scarce and local food sources are abundant in urban areas. Hunting of geese in southwestern British Columbia has declined greatly in recent years, with the closure of areas previously open to hunting and the introduction of municipal bylaws prohibiting the discharge of firearms in urban and suburban areas.[5] A decrease in mortality rates due to reduced hunting combined with a relatively large clutch size, long lifespan (up to 20 years), and abundant food resources have resulted in a rapidly growing goose population.

5. GOOSE MANAGEMENT

Management of Canada Geese in urban and suburban areas requires identifying problem birds and selecting and implementing appropriate techniques for their deterrence. Although the amount of suitable habitat governs the number of geese in a given area, the number of geese defined as "problem birds" will be determined by how they are perceived by the property owners and property users. In some situations, such as on high-rise apartment balconies, even one pair of breeding geese is considered unacceptable. In contrast, breeding geese on large wetland areas with adequate space and limited public access will be tolerated or even encouraged.

In addition to differences in perception of geese as a "problem," there is also a clear difference of public opinion with respect to

acceptable control methods in urban and rural/agricultural areas.[7] This difference, which is likely associated with the scale of goose-induced financial losses in rural/agricultural areas, complicates regional goose management. In addition, special interest groups may call for specific management practices and oppose others.[12] As well, the appropriate timing of deterrents and an integrated approach using several techniques are critical to the successful control of goose populations.[1,2,4]

This is why management of a high-profile species like the Canada Goose requires extra effort to inform the general public of the rationale behind management programs. Goose management must be a coordinated community effort,[4,9] delivered through cooperation between land use agencies at provincial, municipal, public, and private levels.

6. SEASONAL ASPECT OF DETERRENTS

As a result of seasonal differences in goose behaviour, some goose control options do not work consistently throughout all seasons. For example, scaring geese is not effective when they are nesting or raising chicks, as they are reluctant to leave eggs and chicks behind. Appropriately timed deterrents are best.

i. EARLY SPRING: REDUCE THE ATTRACTIVENESS OF FEEDING HABITATS

This is appropriate in all seasons, but it is advisable to do this early in the season before geese arrive at a site and begin to establish territories.

Implement the landscape modifications outlined in section 7.1.2.

ii. EARLY SPRING: PREVENT NESTING

Start discouraging geese early, as pairs may find a suitable nest site as early as February. By mid- to late March, most pairs have already established a breeding territory.

Discourage birds from nesting by using habitat modification and scaring techniques (see sections 7.1.2 and 7.1.4).

Avoid creating nesting habitats, such as artificial islands in lakes.

If you discover goose nests, you may remove the nesting material, provided there are no eggs.

iii. EARLY SUMMER: STERILIZE EGGS

(see section 7.2.2).

iv. MIDSUMMER: ERECT BARRIERS

Geese are reluctant to fly over barriers when they have flightless young with them; instead, they walk between water and foraging areas so they don't leave their chicks behind.

Keep broods away from designated areas with barriers[1] (see section 7.1.2).

v. MID- TO LATE SUMMER: SCARE MOULTING GEESE AWAY

Flocks of moulting geese begin to form in late May. Once established, these flocks are very difficult to displace.

Look for geese gathering on open water and in fields with unobstructed paths to water.

In early May, start checking property regularly to detect flocks of premoulting geese.

To discourage the formation of these flocks, it is essential to begin a scaring technique program as soon as congregations of geese are noticed and *before* the geese become flightless.

vi. LATE SUMMER: LURE GEESE ELSEWHERE

Providing alternative feeding areas with plants that geese prefer to eat will enhance the effectiveness of most hazing and habitat manipulation techniques.[10]

These alternative feeding areas can be in hunting zones or other areas where geese are not perceived to be a problem.

Recognizing that birds may sometimes cause damage to property or pose danger to humans, Section 12 of the *Migratory Birds Convention Act* gives the Canadian Wildlife Service the authority to offer specified alternatives to manage birds causing damage or posing danger. The management tools are described in the *Migratory Birds Regulations*, which provide for the times and conditions under which migratory birds "can be killed, captured or taken, and when nests may be damaged, destroyed, removed or disturbed." Any such activity requires a permit from the Canadian Wildlife Service.

7. GOOSE CONTROL PRESCRIPTIONS

Prevention is the best approach to goose management. Once geese become resident in an area, it can be difficult to move them. However, in areas where geese are established, their numbers can be controlled by both nonlethal and lethal management techniques.[5] The following

sections outline these management techniques in detail.

7.1 NONLETHAL MANAGEMENT

There is no single solution to discouraging Canada Geese.[1] Because geese will adapt or habituate to scaring techniques and because the effectiveness of these techniques varies from season to season, nonlethal techniques are most effective when two or more are combined.[1,3]

7.1.1 STOP FEEDING THE GEESE

Supplemental feeding encourages a high concentration of geese year-round.[12] Geese will not abandon a site as long as people feed them.[3] However, when the diets of geese are not supplemented with handouts and they have to depend on the more limited natural food supply, some or all will move elsewhere.[2] Signs should be posted in public areas to discourage wildlife feeding, and some localities may need to enforce no-feeding regulations or bylaws.

7.1.2 LANDSCAPE MODIFICATION

Although this may not be perceived as an acceptable solution to some urban landowners,[7] landscaping is likely the best long-term solution to human-goose conflicts in urban areas.[2] It is environmentally friendly, easy to implement, and nonlethal to geese.[2,3,12] There are several ways to reduce the attractiveness of urban habitat to geese that do not necessarily reduce its attractiveness to humans. These are described below.

7.1.2.1 BARRIERS

This technique is effective because Canada Geese prefer large open areas that allow them room to take off and land, with a clear line of sight between them and the water so they can see predators.[1,2] Also, they must be able to walk to grazing areas when moulting or escorting their chicks. Barriers impede the access of geese to grazing and block their view of predators.[2,12] Because geese typically do not land in an

area that is less than 10 metres wide, barriers can be used to break a site into smaller spaces.[2] Barriers are typically placed at exits and entrances to ponds and wetlands or areas where geese may graze. The inconvenience and hazard associated with a barrier near preferred escape routes will discourage goose use in most cases. These barriers can include:

PLANT BARRIERS. Dense plantings of tall grass, shrubs, aquatic plants, trees, and bushes can prevent geese from directly accessing shorelines, grazing areas, or safe cover. Plants should be tall enough to prevent geese from seeing over them. Wide plantings are more effective than narrow ones.[2]

FENCES. Fences can be made from woven wire, poultry netting, plastic netting, plastic snow fencing, monofilament wire, or electrified wire.[2,3] Fences should be placed at adult and gosling height and should prevent geese and goslings from walking around, underneath, or through them.[2] Fences can block goose access to water and block walking routes favoured by geese.

GRIDS. Grids or multiple parallel lines of wire, cable, twine, or rope, stretched 30 to 50 centimetres above the surface of ponds or over new plantings, will prevent geese from accessing the area. If the spans over ponds or fields are too great, floats and poles can be used as needed to support the grids.

FLIGHT PATH BARRIERS. Highly visible yellow ropes, flagging tape, shiny Mylar® tape, or CDs strung elevated between trees can block flight paths, making the area less desirable. The ropes should have some slack so they will move in the wind, increasing their visibility and making it more difficult for the geese to predict approach and take-off flight paths.

See wdfw.wa.gov/wlm/living/canada_geese.htm for a full description of barriers.

7.1.2.2 MODIFY LAWN GRASS

Several lawn management techniques are available that may

discourage geese in your area:

MOW LESS FREQUENTLY. Geese prefer tender grass. Longer grass, which has had time to become coarse and fibrous and has fewer new shoots, is not as palatable to geese.[1,2] Either all of a lawn or the part bordering a body of water can be maintained this way.

CHANGE THE TYPE OF GRASS. Alternative types of grass and hay may be naturally repellent to geese.[14,15] Check with your local lawn seed supplier for coarse grass species suitable for your climatic conditions. Geese may be discouraged from remaining in the area if these grasses are planted in habitats that they normally use.

APPLY GOOSE REPELLENT. Application of "goose repellent" to grass can help discourage geese from using a habitat,[2] but it may have limited success.[3] Goose repellent chemicals, which include methyl anthranilate,[2] dolomitic lime,[16] and anthraquinone with plant growth regulator,[17] act as a taste deterrent and are not considered harmful to grass or wildlife. The user must check to see if these chemical repellents are authorized for this type of use or if permits are required for their use.

7.1.3 REMOVAL/RELOCATION

Relocations are carried out only by permitted, qualified personnel. As discussed above (section 4), Canada Geese assemble in large groups when they are moulting and flightless. At this time, they can be rounded up, banded (for future identification), and moved to other areas that are capable of supporting the relocated flock and, ideally, where there are more natural goose predators or where the geese can be hunted during the appropriate season.[5] Band recoveries from hunter-killed birds show that most banded geese shot in the Lower Fraser Valley were locally banded. This suggests that killing of geese by local hunters is working to reduce the numbers of local resident urban geese.[5]

The relocation solution is only short term, as geese tend to return after

they regain their flight feathers or when hunting pressure displaces them from the release sites. In addition, the relocation areas must be approved by both the local municipal government and provincial wildlife biologists. At present, few regional districts are willing to accept relocated flocks, because Canada Geese are already so widespread.

PERMIT REQUIREMENTS

In addition to federal permits, most provinces require permits for capturing, translocating, or disturbing Canada Geese.

Local laws or regulations may also affect the use of control techniques such as firearms, chemicals, and auditory and visual scaring devices.

People or organizations intending to implement such techniques must determine what their responsibilities are under these various laws.

7.1.4 SCARING/HAZING

Scaring devices work best when geese first move into an area or when they are combined with other techniques, as geese quickly habituate to any single method. Hazing involves chasing geese every time they arrive and must be consistently applied until geese leave the area.

A number of scaring techniques can be used to deter geese, and these are described below.

7.1.4.1 SCARING TECHNIQUES REQUIRING A FEDERAL PERMIT

USE OF A FIREARM (either a shotgun or an orchard pistol) to discharge cracker shells, screamers, and bangers is one possible scaring technique. A federal scare permit may be granted to authorized property managers for the purpose of scaring migratory birds causing, or likely to cause, damage to crops or other property in the area. Please note that provincial and municipal bylaws must still be met and that appropriate permits and licences must be obtained before this technique is applied. Many municipal bylaws prohibit the discharge of firearms (the

definition of firearm varies from municipality to municipality).

USE OF AIRCRAFT to harass and scare flocks of geese is usually not practical. However, if you intend to use an airplane to scare geese, you require a federal permit issued by the Canadian Wildlife Service.

RAPTORS (falcons, eagles, and other birds of prey) can be used to scare geese from sites such as golf courses and town and city parks. The owner of such a facility must make an application for a federal permit, listing the name of the falconer conducting the work. If the falconer is self-employed, he or she must have $2 million in liability insurance, a provincial sundry class "A" falconry permit, and a special permit to use a raptor to harass migratory birds. Copies of the liability insurance, sundry permit, and special permit should be submitted with the application for a federal permit.

DOGS trained to chase and retrieve a dummy decoy projected over a problem flock or herding dogs (such as border collies) will successfully scare geese away in some areas.[4] Permits to use dogs to scare geese must be obtained from the British Columbia Ministry of Environment. Dogs must be supervised during this activity. Local bylaws and park regulations must be complied with, and proper permits from the appropriate authorities must be obtained before using this method.

PERMIT REQUIREMENTS

Section 24(3) of the *Migratory Birds Regulations* states that "No person shall, while scaring migratory birds [pursuant to subsection (1) or (2)], kill, wound or take such birds."

In light of this statement, Environment Canada issues scare/kill permits to individuals scaring geese with raptors or dogs, in case birds are killed accidentally during this process.

7.1.4.2 SCARING TECHNIQUES *NOT* REQUIRING A FEDERAL PERMIT

Section 24(1) of the *Migratory Birds Convention Act* states that "any person may, without a permit, use equipment, other than an aircraft or firearms, to scare migratory birds that are causing or are likely to cause damage to crops or other property." Scaring techniques not requiring a federal permit include the following:

PROPANE CANNONS. Portable, propane-fired exploders can effectively displace geese. Equipment must be moved regularly, as geese will become habituated to these devices. Two exploders set at different intervals (for example, one at 10 minutes and the other at 7 minutes) are more effective, because the length of time between explosions is constantly changing, extending the time taken by geese to habituate. This equipment is available from wildlife control companies.

AIR HORNS OR SIRENS. These noise-making devices can be mounted on vehicles, hand-held, or used remotely. They exhibit variable effectiveness, but proximity to human activity or housing may make their use unacceptable.

STROBE LIGHTS/LASERS. Bright flashing strobes can disturb geese after dark or just before dawn. Although the technique is quiet, the light may disturb people. Also available is a long-wavelength "laser pistol," which can be used in low light conditions to scare geese and can be effective at a distance of several hundred metres.[2,18]

DISTRESS TAPES. Recorded distress calls of Canada Geese or other bird species, played loudly in the direction of a goose flock, may displace birds that believe they are also in jeopardy. Calls of eagles or falcons, in combination with models or kites displaying eagle or falcon graphics (see "Scarecrows" below), may also scare geese away.

PHYSICAL BARRIERS (see section 7.1.2 above).

FLAGGING TAPE AND STREAMERS. Lengths of these shiny or bright materials strung between stakes or poles or attached to trees and allowed to move in the wind create a visual distraction that geese may avoid.

BALLOONS AND KITES. Helium balloons with graphics of large eyes and kites shaped like eagles or other large birds of prey are perceived by geese to pose a threat and may help scare them away. Check their availability from wildlife control companies.

IMITATION SWANS. Swans are so aggressive and territorial that Canada Geese will avoid contact with them. A swan family decoy, set in small ponds or lakes, has been effective in some cases.

SCARECROWS. Human, eagle, alligator, or dog effigies (coyote silhouettes) are perceived by geese to pose a threat. Human scarecrows that appear to be carrying a shotgun are also very effective. Bald Eagle decoys that are larger than life size have shown some success, as have inflatable alligators floated in ponds or staked at shore.

FLAGS. A fluttering flag constructed from a black plastic garbage bag and mounted on a tall pole has also been found to discourage goose use. Geese do not like to feed in areas where they sense a threat from overhead, which the fluttering flag represents to them. The dimensions of the flag should be about 0.6 metre by 1 metre. Two or three slits about one-third the length of the flag should be cut in the end of the flag, to make three or four flaps. The flag should be mounted at least 2.5 metres above the ground.

TARPAULINS. Blue tarpaulins stretched out in fields can also deter geese from landing.

MOTION-ACTIVATED SPRINKLERS. Geese may be disturbed by water sprays designed to activate when movement is detected by infrared sensors. The advantage of these devices is that they can operate unattended 24 hours a day, and energy-efficient circuits allow several months of operation on a single battery. However, their effectiveness is limited to quite small areas. Check for motion-activated sprinklers at www.contech-inc.com/products and search for a supplier near you.

NOTE: Geese may quickly learn that nonlethal methods do not pose a threat to them. For nonlethal devices to be effective, they must be stategically placed in areas of high goose use and be moved and

changed frequently. None of these would cause harm to the bird.

7.2 LETHAL MANAGEMENT

If the above nonlethal control efforts prove unsuccessful and goose problems persist, lethal control may be an option. Lethal control includes legal hunting, shooting out of season by permit, egg destruction by permit, and euthanasia by government officials.[2]

7.2.1 HUNTING

Hunting licences for Canada Geese are available. See the website of the Government of British Columbia's Fish and Wildlife Branch for seasons appropriate to your region (www.env.gov.bc.ca/fw/wildlife/hunting/regulations/). In southern British Columbia, multiple hunting seasons ("split seasons") and increased bag limits have been implemented to increase the harvest of resident Canada Geese.[13]

Under specific circumstances, landowners may also apply for a crop depredation permit in order to shoot Canada Geese out of season.

7.2.2 EGG STERILIZATION

PERMIT REQUIREMENTS

In addition to federal permits, most provinces require permits for destroying eggs or nests or for harvesting Canada Geese.

Because egg sterilization is considered to be a lethal technique, a permit from Environment Canada is required. In order to obtain a permit, it must be demonstrated that the birds are causing, or are likely to cause, damage or danger to health, safety, agriculture, or other interests within the community.

Sterilization permits are *not* available to the general public. However, they may be issued to property managers, other levels of government, civic park officials, and golf course managers. The written request must include a description of the situation, an estimate of the number of birds involved, and the names of individuals who will be performing the

procedure and to whom the permit will be issued. Contact information is listed at the end of this handbook (Section 12).

An egg sterilization program has been implemented by over 28 municipalities and landowners in the Lower Fraser Valley, including Burnaby Lake and Stanley Park, since 1988. This program has had a stabilizing effect on goose populations in those areas.5

For a bird as long-lived as the Canada Goose, a long-term commitment to egg sterilization is critical. As fewer eggs hatch, birds may relocate because their breeding attempts failed, and population numbers will eventually fall as adults die naturally.

Egg sterilization can be achieved in two ways:

COATING EGGS WITH OIL. Non-toxic vegetable oil or mineral oil will block air exchange through the pores in the egg and prevent it from hatching.1 Petroleum-based oil is not permitted.

EGG ADDLING. Egg addling is one of the most publicly acceptable management tools to reduce the recruitment of Canada Geese.7 Vigorously shaking the egg prevents it from hatching by disrupting the egg membranes.

For both these procedures, eggs must be replaced in the nest, so the goose continues to incubate. Removing the eggs will likely cause the bird to renest. After about a week of incubating, even if the bird perceives the eggs to be no longer viable, it will be too late for the bird to renest.

Egg sterilization works most effectively when combined with other goose management techniques.4

7.2.2.1 EGG ADDLING PROCEDURE

The dates cited below apply to southwestern British Columbia. Canada Geese nest at slightly different times depending on area, local latitude, and climate.

A) IDENTIFY AREAS WHERE GEESE ARE NESTING (EARLY MARCH) OR WHERE HABITAT CONDITIONS LOOK FAVOURABLE FOR

NESTING GEESE. Locate paired birds in the areas where breeding geese are not wanted. Birds seen frequenting the same location and vocalizing usually indicate a nesting territory.

B) LOCATE NESTS (LATE MARCH/EARLY APRIL). Canada Geese nest in a variety of habitats. Look for a roughly woven mass of grasses, small sticks, and other material. Down feathers in the hollow will usually be visible. Once eggs have been laid, the nest may be camouflaged with vegetation. Look for pieces of down and unusual piles of vegetation. Once a nest has been found, identify it with a number, and record its location on a simple map and data sheet. Flag some nearby landmark with bright tape so the nest can be found later for further treatments. When approaching occupied nests, warding off defensive geese may be necessary; a canoe paddle or short stick works well. Do not strike the geese; they may peck, but generally they will retreat.

C) SHAKE THE EGGS (TWO VISITS: FIRST IN MID-APRIL/SECOND IN LATE APRIL). The addling procedure involves shaking the egg vigorously until the internal fluids can be heard slopping around (imagine a small jar almost full of liquid). With a soft pencil or felt pen, mark the egg with a large "X" and replace it in the nest. On the next visit, shake newly laid eggs, which will not have an "X." Eggs addled successfully from prior visits should be handled carefully in case they have already begun to decay.

D) DATA RECORDING — THIS IS VERY IMPORTANT. A permit requires that accurate records of the number of nests and eggs treated be kept and that these data be submitted to the Permit Section of the Canadian Wildlife Service. Data must be submitted in order to ensure that permits will continue to be issued in subsequent years. This information is used to measure the effectiveness of this type of program and helps plan future management efforts.

8. AGRICULTURAL CONFLICTS

A flock of geese can destroy newly planted pasture or cash crops in a short time if allowed to graze without interference. Geese can be discouraged by using the scare tactics listed in section 7.1.4.2. You must apply for a permit if you want to use the scaring techniques outlined in section 7.1.4.1.

If scaring geese is not effective in preventing the birds from causing *serious* damage to any agricultural property, a crop depredation or kill permit may be issued. This damage must be demonstrated before such a permit is issued, and only after all other nonlethal control techniques have been attempted.

During hunting seasons, farmers experiencing persistent problems with Canada Geese may contact local hunting clubs and allow hunting on their property. Note that this may occur only if the farm is located in an area where discharge of firearms is allowed or where a municipal permit has been acquired.

Well-drained agricultural fields are less attractive to geese and other waterfowl. Application of agricultural best practices such as ditch improvement and maintenance and laser levelling of fields can improve drainage, making fields less attractive to waterfowl.

9. CULL PERMIT

Crop depredation and scare/kill permits are *not* cull permits. Culling is the final step after all other attempts to control geese have been exhausted. A concerted effort for public education and use of other control methods after a cull are highly recommended.

The Canadian Wildlife Service of Environment Canada will consider cull permit requests under the following conditions:

- The applicant must prove that all other management options have already been attempted and that the problem persists.
- The applicant must submit a comprehensive goose management plan indicating what the target population is and how the population will be managed after the cull.
- The applicant must also have done all necessary public consultations within the jurisdiction, to ensure that there is adequate public support for the proposed plan.

The applicant must also make necessary arrangements for the humane destruction of the geese and their disposal.

10. SUMMARY

Implementation of an effective goose management program involves cooperation between land managers and wildlife agencies. Public education outlining the problems associated with too many geese is a vital component of any such program. Any program to stabilize and reduce numbers of geese needs to include efforts to reduce recruitment, increase mortality, increase emigration, and alter habitats. These may be accomplished through egg addling programs, modification of hunting seasons and liberalization of bag limits, relaxation of restrictions on discharging firearms, harassment programs, and habitat modifications through specialized land management practices. The control of Canada Goose populations is a long-term undertaking that requires a persistent cooperative effort on the part of all the players if it is to be effective.

Most importantly, prevention is the solution of choice when dealing with problems associated with Canada Geese. Altering habitats to make areas unsuitable for geese is the best long-term strategy.

11. WEBSITE LINKS

WILDLIFE CONTROL SUPPLIES

Please note:

These links are provided to present a range of options and ideas for goose control. No discrimination is intended against those websites, companies, or products not listed here.Websites, products, and companies listed here are not endorsed by the Canadian Wildlife Service of Environment Canada.

Bird scaring supplies
(Alberta) www.margosupplies.com/canadian1/scare.htm

Bird repellent, fences, and scaring supplies www.wildlifecontrolsupplies.com

Turf goose repellent www.birdbgone.com/goose.htm

Electrical fences for geese www.lakerestoration.com/c-4-goose-control.aspx

FOR MORE INFORMATION

TECHNIQUES TO AVOID CONFLICT BETWEEN HUMANS AND CANADA GEESE

Canadian Wildlife Service (Ontario Region) Management Publications: "Canada Geese and Farms" and "Canada Geese and Shorelines" www.on.ec.gc.ca/wildlife/publications-e.html

Washington Department of Fish and Wildlife: "Living with Wildlife: Canada Geese" wdfw.wa.gov/wlm/living/canada_geese.htm

U.S. Natural Resources and the Environment Publications: "Canada Goose Management Series: Habitat Modification" www.rce.rutgers.edu/pubs/subcategory.asp?cat=6&sub=51

MIGRATORY BIRDS REGULATIONS — British Columbia Ministry of Environment. www.env.gov.bc.ca/cos/info/wildlife_human_interaction/docs/nuisance_fauna.html

MANAGING CANADA GEESE IN URBAN ENVIRONMENTS: A TECHNICAL GUIDE. A.E. Smith, S.R. Craven, and P.D. Curtis, 1999. Jack Berryman Institute Publication 16. www.berrymaninstitute.org/pdf/urbangeese.pdf

MANAGING PROBLEMS CAUSED BY URBAN CANADA GEESE. A.L. Gosser, M.R. Conover, and T.A. Messmer, 1997. Jack Berryman Institute Publication 13. www.berrymaninstitute.org/pdf/geese.pdf

12. CONTACT LIST

GENERAL INFORMATION / PERMITS*

Pacific Wildlife Research Centre Canadian Wildlife

Service Environment Canada 5421 Robertson Road, RR#1 Delta, BC V4K 3N2 Telephone: 604-940-4700 Permitdesk: 604-940-4650 Fax: 604-946-7022 Permits: Crop depredation (scare/kill), egg addling, use of firearms.

*Note: The Province of British Columbia no longer issues crop depredation permits on behalf of Environment Canada.

ENFORCEMENT

(If you see a crime, "observe, record, and report")

Wildlife Enforcement Environment Canada 201–401 Burrard Street Vancouver, BC V6C 3S5 Telephone: 604-666-5892 Duty officer: 604-252-6748 Fax: 604-666-0048

Conservation Officer Service British Columbia Ministry of Environment Offices located throughout British Columbia Telephone: 1-800-663-9453 (24-hour hotline)

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