Management of Canada Geese in Suburban Areas

A Guide to the Basics

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NJ Department of Environmental Protection
Division of Watershed Management

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Acknowledgement:

This guidance document consists of a compilation of the most current available information. Consult the reference section for sources. The document does not reflect an official policy position of the Division, but rather serves to provide basic technical guidance on Canada goose management options.

Introduction

The honking flock of Canada geese overhead brings an internal recognition of nature's intelligence and the timeless changing of the seasons. The high altitude, gracefully shifting 'V' formation always is a source of wonder. Years ago, these sights and sounds were the primary evidence of the flocks.

In many locations along the Atlantic Flyway, which extends from Hudson's Bay, Canada south to Mexico, Canada geese are not abundant. But in New Jersey and several other northeastern states, times have changed. In many areas, resident or non-migrating 'Giant' Canada goose populations are increasing dramatically. In fact, some population projections indicate that the numbers of non-migrating Canada geese may *double* in the next six years.

Many people enjoy the sight of a *few* geese. The problems begin when the numbers of non-migrating birds increase, including:

- overgrazing of turfgrass, which impacts aesthetics and creates an erosion hazard
- grazing of cropland, increasing erosion hazard and crop losses
- accumulations of fecal material on land, creating a health risk
- degraded water quality, from fecal bacteria and elevated nitrogen and phosphorous
- hazards to aircraft at airports
- attacks on humans

Many people do not realize that 'Giant' Canada goose populations were nearly non existent by the early years of the 1900's because of unrestricted harvesting of eggs, draining of wetlands for crop production, and commercial hunting. Strict harvest regulations were enacted, refuges were established, large acreages of turfgrass were established through human sprawl, and goose populations recovered rapidly and dramatically. It is ironic that we did our job so well that now reducing the populations is a critical water quality concern.

This manual provides the most current effective methods known for reducing the impacts 'Giant' Canada geese can have on a specific site or water body. The reader should understand that no single method will be successful in every situation and the best approach likely will be a combination thereof. Canada geese are highly adaptable and possess a short learning curve. Size of the resident flock, site conditions, adjacent land use and social acceptance all will impact the flock control choices available.

Management recommendations in this Guide are referring throughout to the resident 'Giant' Canada goose.

Chapter One: Understanding the Resident Canada Goose

The Canada Goose, (*Branta canadensis*) usually begins nesting at three years of age. Pairs usually stay together for life unless one dies. If that should occur, the other usually will find a new mate within the same breeding season. Since geese can live as long as 20 years, there are many offspring produced by a pair.

'Giant' Canada Geese differ from the seasonally migrating 'Interior' Canada goose. These birds can be up to six pounds heavier, adapted to urban environments, tolerant of humans, and have a very limited migration range. Currently, the number of resident Canada geese is estimated at 83,000.

These birds have two basic requirements: *fresh water* for drinking, resting, nesting and escape from predators; and *tender, succulent vegetation* for food. The plentiful, highly managed lawns of residential neighborhoods, corporate office campuses, golf courses, parks, and some airports provide preferred habitats for these birds.

Canada geese nest within 100 feet of open water - usually directly adjacent. In New Jersey, nesting occurs in mid-April. The nest consists of a large mound of vegetation such as grass and cattails, is concave, nearly two feet in diameter, and lined with soft down originating from the female's breast. Along with proximity to water, the other critical nest location factor is having a good view of the surroundings, for predators. Egg laying usually follows immediately after the nest is constructed. An egg is laid about every two days.

Geese taking flight

4 to 7 eggs make up a typical clutch and incubation is done completely by the female. The male will stand closely and defend the female by striking with its wings and nipping. The incubation period is 25-30 days. Interestingly, incubation does not begin until all of the eggs are laid, so that all goslings hatch the same day.

If the nest or eggs are destroyed, Canada geese will likely re-nest in the same spot. However, timing is critical when re-nesting is concerned. If the eggs or nest are lost more than one week after the start of incubation, re-nesting may not occur. The newly hatched goslings

are led to water within one day after hatching.

The gander's behavior changes markedly after hatching. He previously would have chased off any other geese in the area. Now, 'overnight' he becomes much more tolerant of them. In fact, if there happen to be other clutches of goslings nearby, they will often group together in flocks and be looked after by the adults.
At 10 weeks, the goslings can fly, and begin to adopt most of the adult behavioral characteristics.

Canada geese are grazers. As such, they have a clear preference for tender, mowed and fertilized turf grasses. They prefer to feed in large open areas with few obstructions that give a 360° view of potential predators. These birds have a high tolerance for humans and adapt quickly. Thus, the perfect feeding spot that meets all requirements of the geese is a nice, green, managed lawn area near water...conditions many humans prefer. Hence, the problem.

Geese browsing stormwater basin

Adult Canada geese undergo a complete replacement of their feathers (molting) starting each June, and it lasts about 30-35 days. During the molting period, the birds are unable to fly and are vulnerable. During this period, roundup and capture of small flocks of geese is possible.

Migration of Canada geese nesting in the United States covers relatively short distances, usually not extending past adjoining states. Smaller, Canadian-nesting breeds will migrate south after August 30 to the northern states. Some of these migrating birds will temporarily join urban resident flocks in New Jersey, greatly swelling their numbers. This can create a sudden negative impact on the local plant and water resources.

Canada geese have a remarkable homing instinct, returning each year to the previous nesting site if it was to their liking. This, coupled with their typically long lifespan, compounds the problem of goose-related water quality trouble spots.

Chapter Two: Methods to Manage Canada Geese in Suburban Areas

Generally, the best approach to suburban goose management amounts to a combination of methods- an integrated approach. When choosing appropriate methods, three important factors need to be considered:

- the characteristics at the site that attract geese (food, water, secure nesting)
- the human attitudes and behaviors that attract and protect the geese
- laws and regulations

A management approach is devised based on reducing the preferred site characteristics. This usually means altering human behavior while being respectful toward attitudes. Without this approach, a control program is destined for failure.

The Human Element

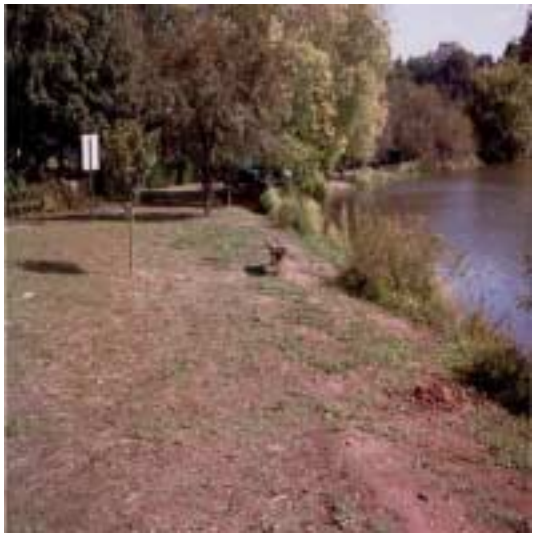
Public attitudes toward geese often conflict, juxtaposing environmental needs with personal belief systems regarding wildlife protection and welfare. Suburban areas contain increased populations, and different groups will define 'nuisance' from geese differently. People have differing tolerances for goose droppings, noise, vegetation damage, fouled waters, and occasionally aggressive behavior. Any method that involves destruction of birds, eggs, or nests will often create a highly emotionally charged atmosphere. In extreme situations, law enforcement personnel can be necessary to preserve public safety if a confrontation is anticipated between the public and the goose management team.

Algae from excess phosphorous

Usually, the first step in reducing these types of conflicts is education. Many people are completely unaware of the environmental degradation that can result from dense non-migrating Canada goose populations. A second step that has been successful is the establishment of citizen task forces. These groups provide a means for concerned stakeholders to become actively involved in educating others and shaping the management strategy.

The actual goose management team charged with developing and implementing the control strategy should be adept at responding to the public in a non-defensive and positive way. They should be able to clearly explain (bilingually, if

necessary) the reason for the control actions. Permits must be present on the site at the time of strategy implementation. These people, who will usually be agency personnel, should have clear guidance from their agency and an experienced local leader at the sites where population management measures will take place.



Overbrowsing of vegetation by geese

Developing the Strategy

The integrated management strategy should consider:

- local community support for the need to take action
- available control options, given the biology of Canada geese and the characteristics of the site
- relative effectiveness of the techniques
- cost, regulatory considerations, and social acceptability of the techniques
- time of year when the resident goose population is greatest

In most cases, it has been learned that there is no single control method that will work every time, everywhere. There may have to be a combination of short term and long term controls in order to have a successful program. Additionally, the methods may be designed to address an existing problem and to prevent a future one from occurring.

An existing goose problem should be evaluated similar to agricultural integrated pest management. The goose management team should determine the 'damage threshold'. That is, the number of geese or the extent of environmental impact that is sufficient to warrant the implementation of controls. Then, actual population reduction and harassment measures may be appropriate along with reduction of goose preferred site conditions (habitat).

An anticipated future goose problem may utilize control methods directed completely toward habitat management.

When complete, the integrated management strategy should be shared with the public and distributed to all stakeholders.

Current Regulatory Status

Canada geese are protected by a number of regulations, primarily the Migratory Bird Treaty Act of 1918. This federal act made it an illegal action to harvest waterfowl or other

migratory birds except during the hunting season or by permit. The Act prevents unrestricted commercial hunting for meat and feathers that was widespread in the United States. Unrestricted egg harvesting was also prohibited by the Act.

This landmark legislation gave the U.S. and Canadian governments the authority to set limits, implement appropriate regulations, and issue permits to take waterfowl. The U.S. Fish and Wildlife Service of the U.S. Department of the Interior administrates and enforces the Act. Other New Jersey regulations that support this Act are the NJ Statutes Annotated Title 23, and the NJ Game Code enforced by the NJ Division of Fish, Game and Wildlife.

In June 1999, The USF&WS ruled to give states the authority to develop a management plan to take action on nuisance resident Canada geese.

Concurrently, the USF&WS began work on an Environmental Impact Statement pertaining to this issue. Procedures designed to directly impact the Canada goose population such as handling nests and eggs, capturing and relocating geese, capturing and euthanizing geese, shooting, and any other activity that involves handling geese, their eggs, and nests requires a depredation permit. The permit application is available from the USDA APHIS Wildlife Services or the U.S. Fish and Wildlife Service.

Canada Goose Management Techniques

Stop all feeding

Efforts to reduce goose populations are often concurrently undermined by 'the people next door' feeding the birds. If feeding of the geese is commonplace, there is no point in trying to scare the birds away.

Canada geese do not need to be fed. Natural foods are abundant. Feeding geese concentrates birds near roads and heavy human use areas, creating a safety hazard. Feeding often results in geese becoming more tame and ultimately more aggressive toward people. Feeding, because it increases crowding of an area so rapidly, increases susceptibility of the birds to diseases like duck plague, avian cholera, and avian botulism. These all can kill large numbers of birds as well as other more desirable waterfowl.

Geese in mall parking island

Education of the public and signage at known concentration spots discouraging feeding is the first step. If the results are unsatisfactory, a 'No-Feed' ordinance may be warranted, accompanied with fines for repeat offenses.

Hazing

Hazing of Canada geese refers to simply scaring or harassing them into leaving the area. Hazing is allowed without a permit provided the birds are not actually handled by a person or attacked by a dog. Hazing is usually not harmful to the geese; consequently some methods are highly acceptable to the public. The major negative is that because the Canada goose is so adaptable, it rapidly becomes accustomed to the hazing and is no longer frightened away.

Hazing should be used as soon as it becomes apparent that geese are beginning to congregate in a particular area. Once a large number of birds have 'settled' into an area, is becomes increasingly difficult to haze them out.

In general, all hazing methods are made more effective by elimination of habitat elements that the Canada geese find attractive at the site.

Noisemakers:

For obvious reasons, these loud devices may not be acceptable near people. They have been used most successfully in agricultural settings. Noisemakers often consist of some form of *pyrotechnics* such as:

- Propane cannons
- Bangers and screamers
- Firing blanks
- Sirens, airhorns, and whistles
- Recorded goose distress calls

Each of these methods may be successful for a time, but geese quickly become habituated to noisemaking, especially if used alone. If proper permits are secured, shooting of several birds can increase the effectiveness of the noisemaking.
Automatic devices usually are preferred. If the devices cannot be triggered automatically, the labor necessary to activate them will add greatly to the cost of the goose abatement program.

Consult with your local police department and comply with all use restrictions. Inform your neighbors, too, since these sounds can be quite startling. For more information on the safe use of pyrotechnics, obtain information from the USDA-APHIS Wildlife Services program.

Visuals:

Visual frightening devices have the advantage of doing the job quietly, so they may be better adapted to suburban applications. They are also relatively inexpensive, safe, and work well with other hazing techniques. On the flip side, they may be visually offensive to people,

may be vandalized often, and require constant checking and upkeep.
Some common visual hazing methods are:

- Mylar tape (scare tape): Scare tape is red on one side, silver on the other, about ½ inch wide. It can be used as a streamer if the geese fly in to the site or in a fence arrangement on 3' tall stakes if the geese walk in. When properly implemented, the tape flashes in the sun and vibrates & rattles in the wind. Obviously, on a mostly cloudy, calm day, its effectiveness is greatly diminished. Also, deer, dogs, and children will break a fence arrangement routinely, requiring constant repair.

- Flags: Flags placed in windy locations in farm fields and near water bodies have been used to discourage geese from landing. Flags may consist of:
  - heavy gauge garbage bags cut with slits on top of 8' tall poles
  - six foot long and 24" wide mylar strips on top of 6 foot poles
  - a six foot tall cross- pole with a large plastic bag attached over the cross forming a scarecrow of sorts

- Eye-spot balloons: These are large, 18"-36" diameter inflatable balls that are decorated with large owl-type eyes. The most effective eye-spot designs are those that have pupils inside the eyes and are colored. These balloons can be tethered between poles or trees, or filled with helium and tethered 15 – 20 feet above the ground.

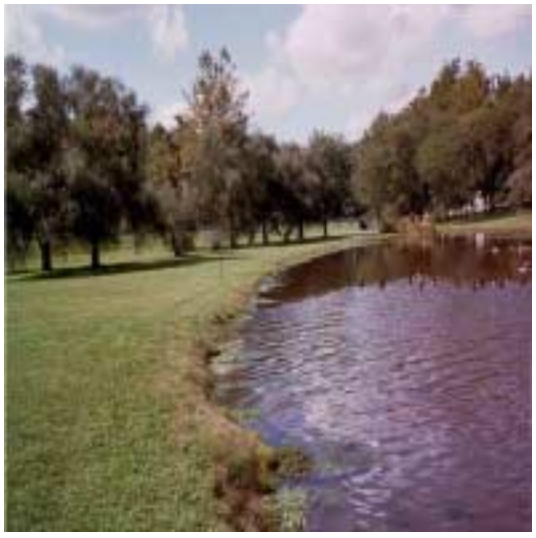
Care must be taken to place the balloons far enough away from trees and wires that the lines will not tangle and the balloons will not puncture.

- Scarecrows: Scarecrows resembling humans with moving arms can scare geese away from small areas. Interestingly, research shows that scarecrow effectiveness increases when coupled with noisemaking (propane cannon) and a replica shotgun being held by the scarecrow (Smith, et. al). Another form of scarecrow that occasionally is effective are those that depict waterfowl themselves. Canada goose decoys with stretched necks (alarm position) can work.
- Remote controlled (RC) aircraft: This method of hazing has been used successfully in the past, primarily at airports. One study at the Reno, Nevada airport showed that by the third day of RC aircraft use, the geese took flight as soon as the aircraft left the ground. After the use of RC aircraft ceased, it took 10 days for the geese to return. This technique has also been used successfully at Auckland, NZ and Tel Aviv, Israel airports. This method can be expensive and labor intensive. However, RC aircraft flying is a popular hobby and often, local clubs exist that

may be interested in using their skills to help to haze geese away from a particular location.

Dogs, Swans, and Falcons

Dogs, usually trained border collies, can be highly successful in hazing. They have been deployed with good results at golf courses and corporate areas. The dogs must be under the supervision of a trained handler. They may be attached to a long lead; allowed to free roam (with an 'invisible fence'); or simply brought in periodically and released to chase the flock away. The best times to use dogs are during spring, to reduce nesting; and in early fall after molting. Dogs cannot be used during the molting period for humane reasons. If dog harassment is ceased for a short period, the geese will often return to reestablish themselves at the site.



Preferred goose habitat: mowed shoreline

Although swans can be territorial and aggressive toward Canada geese, in the long run this is not a preferred method of hazing. Swans can create some of the same problems created by geese. Generally, swans are not recommended.

Trained falcons have been used successfully to haze geese at airports, locally at McGuire Air Force Base and JFK International Airport in New York. Geese at airports are a serious hazard, causing a fatal crash in Alaska in 1995 when several were sucked into engines of an AWACS plane. Falcons are predators, and are recognized and respected by the geese as such. Usually, however, additional hazing measures such as pyrotechnics and propane cannons are necessary.

Altering of Habitat

As stated earlier, the habitat most desirable to geese is a large, flat to gently rolling managed turf area close to a lake, pond, or slow moving watercourse. Many land uses in suburbia provide this environment: large corporate campuses, suburban lawns, commercial centers, parks, and golf courses.

Habitat alteration consists of eliminating, modifying, or reducing access to areas that provide attractive spots for geese. The irony here is that this often creates a problem for the public, because access to lawn areas adjacent to water is also highly desirable to most humans. In fact, surveys have indicated that people in general are reluctant to perform the habitat

modifications necessary to have a significant impact on resident goose populations. A 1991 British Columbia survey showed that 84% of respondents opposed such measures. (Smith, et.al)

Habitat modification is most effective before geese have established themselves in an area. If the desirability of a site is reduced before a non-migratory population establishes itself, chances are far better of avoiding a problem. Once a flock of geese is settled in an area, however, other measures coinciding with habitat work are needed. Although initial expense for habitat alteration may be higher than other measures, in the long run it is often the most cost effective solution.

Habitat alteration should not be done at a single location if other similar desirable habitats exist within a short distance. Coordination between stakeholders is essential to ensure that a more widespread approach is taken. Otherwise, the geese may simply vacate one spot and increase the density at the next desirable site in the area.

Athletic fields with heavily managed turf should be kept at least 400 feet away from the water's edge. This will, however, only have a big impact during molting season. During times when geese can fly, they will routinely utilize turf areas a mile or more away from the water.

Reducing adjacent turf

Canada geese prefer lush, mowed turf. The mowing and continual fresh, succulent high carbohydrate regrowth of the grass provides preferred food. In New Jersey, turf grasses usually consist of cool-season varieties of bluegrass, ryegrass, and fescues. One way to reduce the palatability is to simply reduce or eliminate fertilizer application and watering. If grass is allowed to grow to higher lengths, the tender young shoots become more difficult for the geese to detect, being below the older, tougher, more fibrous growth. A mowing height of 8 inches will reduce the attractiveness of the grass to the geese.

Shoreline buffer of tall vegetation

A more comprehensive measure is to change the grass cover to a mixture of warm season grasses like switchgrass, bluestems, wheatgrass, and indiangrass combined with wildflowers.

This, in essence, mimics a prairie ecosystem, and is not preferred by geese. This type of vegetation will require far less mowing and maintenance and often is visually attractive if implemented in a natural, curvilinear design blending with the natural contours. One caution: although tall vegetation will not be browsed for food, it may provide adequate nesting sites to some geese.

Another approach to reduce the area of turf is to convert it to non-palatable ground covers. Common plants not preferred by Canada geese include: periwinkle (*Vinca spp.*); myrtle (*Myrtus spp.*); pachysandra (*Pachysandra terminalis*); English ivy (*Hedera helix*); and hosta (*Hosta spp.*).

Barrier fencing

Fencing is an effective method for excluding walking geese from a lawn area. Fencing can be made of mylar tape, woven wire, chicken wire, plastic construction fence, electric 2-wire, chainlink, rock, or other suitable materials. Openings in the fencing should be no larger than 3 inches and must be at least 24 inches tall. The fencing must also extend far enough to prevent the geese from simply walking around the ends.

Fences have been found to be most effective during limited flight periods: pre-nesting, molting, and when there are new goslings. The effectiveness of a fence barrier is often enhanced by a vegetative shoreline buffer *(see vegetative buffer section)*.
If the fence is made from smooth wire, rope, or heavy monofilament line, it should have at least three strands set at 12, 18, and 24 inches above the ground. Support stakes should be close enough to prevent sagging – no more than 10 feet apart.

Rock barriers

When geese leave a water body, they generally use routes that allow them easy access to land and a clear view. Large (2-3 ft. diameter) boulders placed along the shoreline can act as a barrier to geese trying to access the land around the water. These boulders, especially if used in conjunction with taller shoreline vegetation, can enhance the visual interest of the water's edge.

Vegetative Buffers

Changing the landscape of a site is generally considered to be the most effective, humane, and environmentally friendly long-term goose management technique. Since a highly managed turf near water is the ultimate for geese, the best choices are changing the surrounding turf; or changing the water-turf interface, the shoreline.

Generally, Canada geese avoid feeding, nesting, and loafing in areas where tall vegetation provides an obstruction to the surrounding areas. An important secondary benefit of

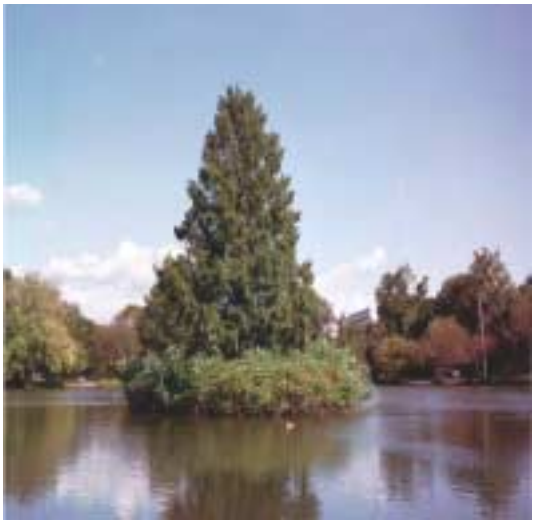
this method is that the vegetation, usually consisting of tall native adapted grasses, shrubs, and trees, will help to act as a filtering buffer, removing pollutants contained in storm runoff flowing from the adjacent area to the water body.

The vegetation must be at least 24 inches high and dense enough to prevent the geese from seeing through it. Tall, stiff stemmed native warm season grasses are good choices. Shrubs should be native species also, and adapted to the conditions of the site. The vegetative barrier should be at least 25 feet wide. Creating a narrow S-shaped path will allow human access to the water's edge, while still obscuring its view. If desired, this path can access another narrow footpath running along the actual shoreline. Having a shoreline path inside of the vegetative barrier can provide a means of hazing and disruption to the geese. If a shore footpath is put in place, be sure to stabilize the shoreline to prevent bank erosion.

Taller native adapted trees can also be used with the grasses and shrubs to screen the shoreline. The trees should be spaced adequately to allow for their mature size. They should also be spaced so that a dense shade canopy does not form- the understory grass and shrub vegetation will need a good deal of sun.

Straight Shoreline Elimination

Long, straight shorelines and islands are optimum nesting locations for Canada geese, providing security and a clear view of possible predators. Islands are difficult and expensive to remove once a lake is filled with water. Additionally, people often find islands to be visually appealing. Typically, the most efficient way to deal with island nesting sites is through hazing.



Wooded pond island

Shoreline modification can also be quite expensive, requiring large equipment and, often, permits from the NJDEP. The idea is to eliminate or drastically reduce the long uninterrupted shore view that geese prefer. Creation of peninsulas and coves with short-radius curves will shorten the distance that geese can see in all directions. This, coupled with fence or rock barriers and tall shoreline vegetation can reduce the attractiveness of a water body to the geese. This may also make conditions more aesthetically

favorable for sections of shoreline trails and benches.

Overhead lines

A network of multiple parallel lines or a grid of heavy (10 gauge minimum) wire or twine stretched 2 to 3 feet above a water surface or feeding area restricts goose landing. The parallel lines can be 20 to 75 feet apart and do not have to be spaced equidistant. A grid arrangement can range from 10 to 30 feet square. The overhead system can be visually emphasized with the addition of mylar tape streamers attached at wide intervals. Fencing should be installed at the perimeter of the area being protected by the overhead lines to prevent geese from walking in underneath.

Any overhead line system should be in place before geese discover a site for the season. Maintenance is necessary to prevent sagging or to replace broken lines.
Overhead line systems have some obvious negative effects - they cannot treat a large area; they are visually distracting and unappealing; they can greatly restrict human access to the water; and the risk exists for bird entanglement, injury and death.

Repellents

There are several Canada goose repellents that can be effective for limited times. The repellents are sprayed on the turf before geese return for the season. Repellents do not harm geese and are usually accepted by the public. The active ingredient is methyl anthranilate, which is made from natural biodegradable food grade ingredients and is non-toxic to humans, dogs, cats, or birds. Methyl anthranilate is a chemical that makes the grass unpalatable to the geese. It generally does not persist, although its effects can endure longer if fogged into an area rather than sprayed.

Generally, for best results repellents should be applied only to dry and just mowed turf, in full sun, at temperatures over 50° F. 2-3 hours of drying time must be allowed after application. Applications generally should be repeated every 4-5 days; if rain falls within 24 hours after application, it may have to be repeated.

Direct Population Impact Measures

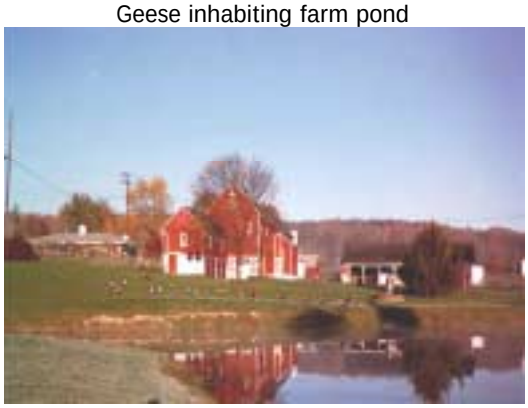
Goose Removal

There are several clear advantages to physical removal of Canada geese from a problem site. Removal is applied directly to impact a population problem, the effects are immediate, and less risk exists that the geese will move and create problems elsewhere. Relocating or killing of geese outside of legal hunting seasons requires permits. In addition, killing of geese often stirs local controversy.

Nets

Some removal techniques require the capture of live geese. This is done during the flightless, molting season in early to mid-summer. They are then easily rounded up by driving them into special nets. The net should be set up on a dry, flat area away from roads or other areas where the geese could be injured.

Geese inhabiting farm pond



The capture net should be 48-60 inches tall and made of a non-abrasive material so that the geese are not injured by it during the process. Generally, poles are erected every 12-15 feet for support of the net, which is in an upright position. The net is arranged in a tight, semi-circular orientation with an opening large enough to get the geese in but small enough to keep them in. Wildlife personnel herd the geese into the net by walking slowly with hands in front for protection. If geese are on the water and need to be herded toward a net on shore, canoes, kayaks, and rowboats can be used if it's too deep for wading. Once the geese are contained in the net, the opening is quickly closed. Geese can then be handled and tagged, if desired. A truck can then be backed up to the opening, and the geese are herded into the truck for removal.

Cannon nets are an efficient technique for capturing a flock of geese. An area is baited with waste grain, and a large net is folded flat and attached to projectiles. Once a suitable number of birds is within the target area, the cannons are triggered and the net is shot out over the geese. Wildlife personnel then hand capture the birds from under the net. This technique requires large open areas free of trees and shrubs that can foul the net.

Relocation

Moving geese from urban environments can be successful. The reason that it sometimes fails is that Canada geese have very strong homing instincts and they tend to return to their previous nesting area. The other obvious shortcoming is that an area willing to receive the geese has to be established, and there are less and less of these areas within a reasonable distance from the suburban problem area.

In a Minnesota study (Keefe, 1996), adult geese were trapped and moved to Oklahoma for several years. 10 to 20 percent of the adults returned to their original Minnesota capture site. Overall, relocation reduced the breeding population by 40-50 percent after one year and 70-90 percent after two years.

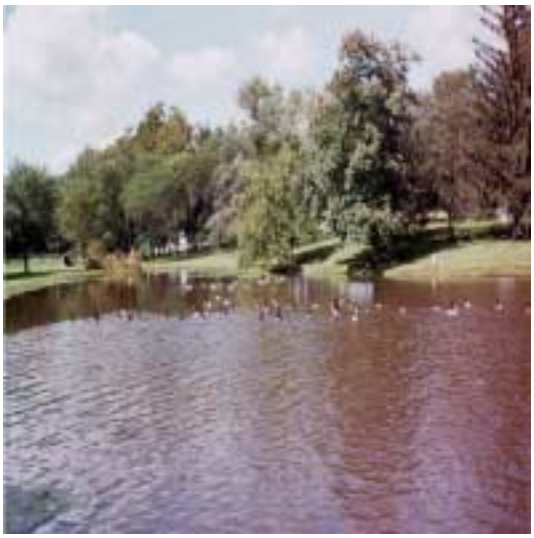
An Ohio and Michigan study (Smith, et.al) found moving juvenile, flightless geese from urban areas to state operated wildlife management areas where hunting is done successfully removed geese from some problem areas. Juveniles do not have as highly developed a homing instinct as adults, and most stayed near the release point in the wildlife management area, adding to the sport harvest there.

Harvesting of Geese

Almost without exception, harvesting (shooting) of problem geese will create a local controversy and be met with some animal welfare opposition that must be addressed in a considerate manner. Public education including evening meetings, website and printed material will be needed far more for this technique than for any other goose management measure. Time for the educational process to take place should be built into the goose management timetable.

Urban flocks of Canada geese can be difficult to hunt because of the obvious hazards to people and property. This along with the same regulatory guidelines designed to protect migratory waterfowl have limited the effectiveness of typical waterfowl seasons for controlling populations of suburban Canada geese. Where it is done, harvesting has enhanced other management options. Shooting increases noise disturbance, reduces protected areas available to the birds for feeding or nesting, emphasizes habitat changes, and reduces adults, which is the most effective way to reduce the long-term population. Harvesting of adults can be augmented with egg removal or puncturing (this is termed 'addling'- see page 18).

The facts show that hunting is the most cost effective method for managing the suburban Canada goose population. The NJ Division of Fish, Game, and Wildlife sets Canada goose hunting seasons. Currently, there are two, one in September, the other in January and February.



Park pond with resident flock

Managed hunts are often the best way to reduce goose numbers in urbanized areas. Many states have opened early seasons, commencing September 1, in order to remove more resident geese. A more effective, site specific hunting approach is through issuance of special purpose kill permits where several trained individuals do the

hunting at a particular, limited location, such as an airport. Cooperation with local law enforcement will be necessary. Testing of interested hunters will need to be administered and an orientation for those hired must be provided. This permitting method has also been used successfully at some golf courses and parks. To ensure public safety, these areas are then closed several hours on a set schedule for several weeks.

Shotguns are used for goose hunting. Shotguns propel a small mass of pellets over short distances, impacting the target area at ranges up to 40 yards. This means that shotguns have the *maximum* potential to hit the target with the *minimal* potential to impact a non-target animal or human.
Several states have used harvested geese in community food banks, homeless shelters and soup kitchens. Geese used for this may be either netted or hunted. This is a very positive approach that should always be investigated when a local harvesting/relocation measure is being considered. As of 1999, USDA approval was required for goose meat donation to food banks, so it was necessary to use USDA-inspected processing plants. Goose meat should be inspected for steel shot. Also, assurance should exist that the geese have not ingested pesticides, contaminating their meat. Although this is more unlikely in urban areas, there have been instances of goose poisonings related to agricultural chemicals in farm locales.

Reproduction Control

Canada geese have a lifespan that can exceed 20 years if they survive their first year. Although reduction of the adult population is the most effective way to impact a pest flock, another method that can help is to reduce the reproduction rate. These methods should be considered where hunting or other means of reducing the number of adults are not feasible.

In order to have the same impact as eliminating one adult, ALL eggs produced by that adult must be removed for its entire lifetime, which is usually a far more labor intensive and costly method. Additionally, reduction efforts must be nearly 100% effective in a given area, since a small number of nests or eggs that are missed can offset the ones that are removed. Population models have shown mathematically that a resident Canada goose population could remain stable even if up to 72% of the eggs were removed. Even if 95% of the eggs were removed, it would take ten years just to reduce the population to a level 75% of the original (Barnard 1991).

Nest removal

The removal or destruction of a nest requires breeding geese to move, build a new nest immediately, or nest later in the season. This is a very labor-intensive approach, requiring daily visits to nesting sites.

Also, since geese are very proficient at locating their nests in safe areas, they may be on islands or other difficult to access locations.

Egg Management

Eggs can be impacted in several ways that will terminate the viability of embryos. Just like with nest destruction, you must be able to find and get to the nest, making it a fairly labor intensive approach. All methods require that the eggs be carefully replaced in the nest to prevent the goose from being aware that the eggs have been tampered with. If this is not done, the geese will quickly lay more eggs. Typically, 4 to 7 eggs will be present in a complete nesting clutch.
The most common methods of impacting the eggs are: addling, puncturing, and oiling. For humane reasons, these methods should be done as early in the incubation process as possible, while being late enough to get all the eggs of that clutch.

Optimum habitat

Addling

Addling simply involves vigorously shaking the eggs found in the nest. The eggs must be shaken to the point that liquid is heard moving around inside.

Puncturing

Puncturing is accomplished by poking a strong, sharp pin through one end of the egg. This allows harmful bacteria to enter the egg.
Oiling
Oiling eggs works through the principle that oil prevents gases from diffusing through the shell, depriving oxygen from the embryo. The usual method is to either brush, spray, or dunk the eggs using 100 percent food grade corn oil.

Dummy eggs

Viable eggs can be removed from the nest and replaced with artificial or ‘dummy’ eggs made of wood or plastic. Also, unfertilized or hard-boiled ‘real’ eggs can be used. The goose will continue to incubate the eggs rather than re-nest.
In Toronto, Ontario, this method combined with hunting reduced the local Canada goose population by 40%. This method is less labor intensive than some of the previous because the nests are visited only one time.

Conclusion

Problems with resident Canada geese will likely continue to increase in the coming years. The combined factors of low adult mortality and favorable habitat conditions for breeding and feeding indicate that resident goose flocks may double every five years. (Smith, et al 1999)

Solving conflicts between people and Canada geese will continue to create a significant management challenge for wildlife biologists and policy makers. A delicate balance must be achieved between the biological and social issues that revolve around the impacts of resident geese.

Management techniques exist that have proven to be successful. The challenge will lie in making the correct choices.

Sunrise.....or sunset?

Who to Contact:

The *USDA Animal Plant and Health Inspection Service (APHIS) Wildlife Services* program is authorized and directed by law to assist landowners, corporations, agencies, and others in resolving damage situations involving federally managed wildlife. Wildlife Services is the agency primarily responsible for handling requests regarding Canada goose damage problems in New Jersey. This is accomplished through close cooperation with the U.S. Fish and Wildlife Service and N.J. Division of Fish, Game, and Wildlife. Assistance typically consists of providing information on control techniques, sources of bird control supplies, assistance with the permit process, and implementation of operational goose damage management activities through funded contracts.

U.S. Department of Agriculture - (APHIS) Wildlife Services
New Jersey office: Pittstown, N.J. (908) 735-5654

New Jersey Division of Fish Game and Wildlife: (609) 292-2965
For goose sport hunting information.

U.S. Department of the Interior - Fish and Wildlife Service (413) 253-8698
For actual issuance of permits to handle nests and eggs, shoot geese to reinforce harassment techniques, capture and/or euthanize geese.

References:

Note: *Much of this Guide has been adapted for New Jersey from the Cornell Cooperative Extension Publication, Managing Canada Geese in Urban Environments: A Technical Guide. This publication is available from Cornell Cooperative Extension, Media and Technology Resource Center, Ithaca, NY. Phone 607-255-2080; fax 607-255-9946; e-mail Dist_Center@cce.cornell.edu*

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Keefe,T. Feasibility Study on Processing Nuisance Canada Geese for Human Consumption. Minnesota DNR, Section of Wildlife. 1996.

Sellmer, J. Ornamental Horticulture Monthly Newsletter Vol. 1, No. 1 Penn State University, University Park, PA. 1998

Smith, A. E.; Craven, S. R.; Curtis, P. D. Managing Canada Geese in Urban Environments: A Technical Guide. Jack Berryman Institute Publication 16, and Cornell Cooperative Extension, Ithaca, NY. 1999.

USDA - APHIS Wildlife Services. Canada Goose Damage Management Resource Guide. Pittstown, NJ 2000.

www.gpnc.org/canada.htm. Canada Goose

Appendix 1. Bird Control Devices: Sources of Supply

September 1999 USDA APHIS Wildlife Services

Consult Federal, State and local laws and regulations prior to purchase and use of these products. Listing of company and product names does not indicate or imply endorsement by the USDA, APHIS Wildlife Services Program or NRCS.

AUTOMATIC EXPLODERS

Bird Barrier
300 Calvert Ave.
Alexandria, VA 22301
1-800-6624737

Margo Supplies, Ltd.
Site 20, Box 11, RR #6
Calgary, Alberta, Canada T2M4L5
(403)285-9731

OESCO, Inc.
P.O. Box 540
Conway, MA 01341
(413)369-4335

Reed-Joseph International Co.
P.O. Box 894
Greenville, MS 38702-0894
1-800-647-5554

Sutton Agricultural Enterprises, Inc.
746 Vertin Ave.
Salinas, CA 93901
(831)422-9693

Wildlife Control Technology, Inc.
2501 N. Sunnyside Ave.
Fresno, CA 93727
1-800-235-0262

BALLOONS

Bird Barrier
300 Calvert Ave.
Alexandria, VA 22301
1-800-662-4737

Bird-X, Inc.
300 N. Elizabeth St.
Chicago, IL 60607
1-800-662-5021

Margo Supplies, Ltd.
Site 20, Box 11, RR #6
Calgary, Alberta, Canada, T2M4L5
(403)285-9731

Nixalite of America, Inc.
P.O. Box 727
East Moline, IL 61244
1-800-624-1189

OESCO, Inc.
P.O. Box 540
Conway, MA 01341
(413)369-4335

Reed-Joseph International
P.O. Box 894
Greenville, MS 38702-0894
1-800-647-5554

Sutton Agricultural Enterprises, Inc.
746 Vertin Ave.
Salinas, CA 93901
(831)-4229693

The Tanglefoot Co.
714 Straight Ave., SW
Grand Rapids, MI 49504
(616)459-4139

Wildlife Control Technology, Inc.
2501 N. Sunnyside Ave.
Frenso, CA 93727
1-800-235-0262

CHEMICAL REPELLENTS

Avitrol:

Avirol Corp.
7644 E. 46th St.
Tulsa, OK 74145
1-800-633-5069

GOOSE REPELLENTS:

Bird-X, Inc.
300 N. Elizabeth St.
Chicago, IL 60607
1-800-662-5021

Lesco, Inc.
3521 Silverside Rd.
Wilmington, DE 19810
1-800-321-5325

Nixalite of America, Inc.
P.O. Box 727
East Moline, IL 61244
1-800-624-1189

RJ Advantage
501 Murray Rd.
Cincinatti, OH 45217-1014
1-800-423-2473

DISTRESS CALL/SOUND SYSTEMS

Bird Barrier
300 Clavert Ave.
Alexandria, VA 22301
1-800-662-4737

Bird-X, Inc.
300 N. Elizabeth St.
Chicago, IL 60607
1-800-662-5021

Johnny Stewart
P.O. Box 7594
Waco, TX 76714
1-800-537-0652

Margo Supplies, Ltd.
Suite 20, Box 11, RR #6
Calgary, Alberta, Canada, T2M4L5
(403)285-9731

OESCO, Inc.
P.O. Box 540
Conway, MA 01341
(413)369-4335

Reed-Joseph International Co.
P.O. Box 894
Greenville, MS 38702-0894
1-800-647-5554

Sutton Agricultural Enterprises, Inc.
746 Vertin Ave.
Salinas, CA 93901
(831)422-9693

Weitech, Inc.
P.O. Box 1659
Sisters, OR 97759
1-800-343-2659

Wildlife Control Technology, Inc.
2501 N. Sunnyside Ave.
Fresno, CA 93727
1-800-235-0262

NETTING

Bird Barrier
300 Calvert Ave.
Alexandria, VA 22301
1-800-662-4737

Bird-X, Inc.
300 N. Elizabeth St.
Chicago, IL 60607
1-800-662-5021

J.T. Eaton and Co., Inc.
1393 E. Highland Rd.
Twinsburg, OH 44087
1-800-321-3421

Hot Foot America LP
298 Belvedere Ave.
Belvedere, CA 94920
1-800-332-1872

Internet, Inc.
7300 49th Ave. N.
Minneapolis, MN 55428
1-800-328-8456

J.A. Cissel Mfg. Co.
1995 Rugters University Blvd.
Lakewood, NJ 08701
1-800-631-2234

Nixalite of America, Inc.
P.O. Box 727
East Moline, IL 61244
1-800-624-1189

OESCO, Inc.
P.O. Box 540
Conway, MA 01341
(413)369-4335

Sutton Agricultural Enterprises, Inc.
746 Vertin Ave.
Salinas, CA 93901
(831)422-9693

Wildlife Control Technology, Inc.
2501 N. Sunnyside Ave.
Fresno, CA 93727
1-800-235-0262

PORCUPINE WIRES

Bird Barrier
300 Calvert Ave.
Alexandria, VA 22301
1-800-662-4737

Bird-X, Inc.
300 N. Elizabeth St.
Chicago, IL 60607
1-800-662-5021

Cat Claw, Inc.
P.O. Box 5250
Johnston, PA 15904
1-800-832-2473

Hot-Foot America LP
298 Belvedere Ave.
Belvedere, CA 94920
1-800-332-1872

Nixalite of America, Inc.
P.O. Box 727
East Moline, IL 61244
1-800-624-1189

PYROTECHNIC DEVICES

Bird Barrier
300 Calvert Ave.
Alexandria, VA 22301
1-800-662-4737

Margo Supplies, Ltd.
Sutie 20, Box 11, RR #6
Calgary, Alberta, Canada, T2M4L5
(403)285-9731

Reed-Joseph International Co.
P.O. Box 894
Greenville,MS 38702-0894
1-800-647-5554

Stoneco, Inc.
P.O. Box 765
Trinidad, CO 81082
(719)846-2853

Sutton Agricultural Enterprises, Inc.
746 Vertin Ave.
Salinas, CA 93901
(831)422-9693

Wildlife Control Technology, Inc.
2501 N. Sunnyside Ave.
Fresno, Ca 93727
1-800-235-0262

REFLECTIVE TAPE

Bird Barrier
300 Calvert Ave.
Alexandria, VA 22301
1-800-662-4737

Bird-X, Inc.
300 N. Elizabeth
Chicago. IL 60607
1-800-662-5021

Margo Supplies, Ltd
Sutie 20, Box 11, RR #6
Calgary, Alberta, Canada, T2M4L5
(403)285-9731

OESCO, Inc.
P.O. Box 540
Conway, MA 01341
(413)369-4335

Reed-Joseph International Co.
P.O. Box 894
Greenville, MS 38702-0984
1-800-662-4737

Sutton Agricultural Enterprises, Ltd
746 Vertin Ave.
Salinas, CA 93901
(831) 422-9693

The Tanglefoot Co.
314 Straight Ave., SW
Grand Rapids, MI
(616)459-4139

Wildlife Control Technology, Inc.
2501 N. Sunnyside Ave.
Fresno, CA 93727
1-800-235-0262

TRAPS

Bird Barrier
300 Calvert Ave.
Alexandria, VA 22301
1-800-662-4737

Margo Supplies, Ltd
Suite 20, Box 11, RR #6
Calgary, Alberta, Canada, T2M4L5
(403) 285-9731

Minnesota Trapline Products
6699 156th Ave., NW
Pennock, MN 56279
(320) 599-4176

National Live Trap Corp.
Box 302
Tomahawk, WI 54487
(715) 453-2249

Reed-Joseph International Co.
P.O. Box 894
Greenville, MS 38702-0894
1-800-647-5554

Tomahawk Live Trap Co.
P.O. Box 323
Tomahawk, WI 54487
1-800-272-8727

Wildlife Control Technology, Inc.
2501 N. Sunnyside Ave.
Fresno, CA 93727
1-800-235-0262

TRAINED DOGS

Geese Management
PO Box 1504
Newton, PA 18940
(215) 968-0843

NJ Wild Geese Control
PO Box 7293
North Arlington, NJ 07031
njgeese@aol.com

Supplies Source:

Janet L. Bucknall
State Director, Wildlife Biologist

United States Department of Agriculture
Animal and Plant Inspection Service
Wildlife Services

140-C Locust Grove Road
Pittstown, NJ 08867

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