The Division of Parks and Forestry
Goose Management Program

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I. Introduction:

Canada geese, like other wildlife, provide people with a valuable contact with nature. Because of their prolific nature, site tenacity, longevity, size, and tolerance of human activities they are, however, often associated with problem situations. The increasing populations of resident Canada geese in New Jersey are resulting in increasing numbers of conflicts with human activities and increasing concerns related to human health and safety. Problems with Canada geese include an unacceptable and potentially dangerous accumulation of feces, goose aggression during nesting season, over grazing of landscape vegetation, which is damaging to natural resources and unacceptable safety hazards for vehicles.

Migratory Canada geese are those birds that nest and raise their young in the arctic and sub-arctic regions of Canada. Migratory Canada geese make seasonal movements to areas that are outside of the area in which they nest and raise their young.

Resident Canada geese are those birds that nest and/or reside on a year-round basis within the Atlantic Flyway. They are hatched and/or nest in the United States. Resident geese spend most of the year near their breeding areas, although many in the northern latitudes do make seasonal movements. Resident geese now comprise the largest population of geese in the Atlantic Flyway.

New Jersey's resident Canada geese populations are believed to have originated from birds that were released or escaped from captivity by private waterfowl breeders and hunters, as well as through introduction and immigration from other states. The resident Canada goose populations are steadily increasing in New Jersey. The increase can be attributed to resident Canada geese generally mature and breed at earlier ages than do the migratory Canada geese; this shortens the resident geese's generation time. Resident geese also have a lack of fear of humans, which allows them to readily nest in many man made structures in addition to more traditional nesting locations. This results in resident geese having a much higher nesting success than do migratory geese.

New Jersey State Parks, Forests, and Recreation Areas
Both our park visitors and resident Canada geese find State park recreational facilities such as picnic areas, lawns and swimming beaches attractive and conflicts between the human park visitors and geese occur. Although other impacts are present, the most prevalent impacts of the resident geese populations are accumulations of feces and aggressive goose behavior towards park visitors. A foraging Canada goose defecates between 5.2 and 8.8 times per hour and the maximum fecal deposition rate is 0.39 pounds (dry weight) per day.

Since the mid 1990s the State Park Service has made application and received annual depredation permits from the US Fish and Wildlife Service to control the increasing numbers of Canada geese that use our recreation facilities. Initially the permit allowed the State Park Service to disrupt nesting and addle eggs at specific locations. A "kill" provision was added to the annual permit in the year 2000 and the permit was expanded to all areas administrated by the Division of Parks and Forestry in 2006.

II. Resident Canada Goose Management Plan

The most effective approach to resolve the conflict between our park visitors and the high populations of geese at our recreational facilities is to integrate several methods of controls simultaneously or sequentially. The best combination of effective management methods should be implemented in a cost-effective manner while minimizing potential harm to humans, the resident Canada geese and the environment.

All areas must have an Integrated Canada Goose Management Plan in place. Area staff should have full knowledge of the plan prior to control measures being implemented.

The plan must provide for recording of all measures taken and their results and should reflect a progression of measures from non-lethal to lethal. All control measures must follow conditions as stated in the Annual Depredation Permit that is issued to the State Park Service by the US Fish and Wildlife Service.

The goal is to eliminate the health and safety hazards produced by the presence of geese at areas administrated by the Division of Parks and Forestry.

The objectives are to define the tolerance levels at an area for Canada goose populations and to work within the limits of the USDA Depredation permit to maintain goose populations to that level. Total elimination of geese from any area would never be successful and would not necessarily be desirable. Minimally the area plan would outline procedures to prevent geese from accessing beach areas and surrounding grass areas and setting up residence at State parks, forests, recreation areas, and golf course facilities.

Each State Park Service area and each local population of Canada geese are unique. As such, techniques that work best at one area may or may not be appropriate at another area. Those measures that worked on one flock of Canada geese may or may not be as successful on the next flock, which may seek to inhabit the same area. As park managers, we must be flexible in our approach to removing the geese from our recreational facilities.

A. Area Manager and Regional Supervisor Responsibilities

Each area manager is responsible for the development and maintenance of a Resident Canada Goose Management Plan for his or her area(s). Each area plan will assess the local resident Canada goose population and its impact on that area. For those areas where resident Canada geese populations have no impact and control measures are not necessary, a statement to this fact is all that is needed in the plan. For areas where geese do impact area facilities and visitors, those measures both non-lethal and lethal that will be implemented/continued to control the Canada goose population will be specified. Area staff, both permanent and seasonal must have full knowledge of the plan. Plans are to be reviewed and updated annually. Area plans are to be on file at the area and regional offices.

Regional Supervisors are responsible for approval of the area plans for those areas in his or her region.

B. Area Resident Canada Goose Management Plan

The success of a cost-effective management plan for Canada geese will depend on identifying the site characteristics that attract geese (food, nesting structure, security, water etc). Lessening the attractiveness of the site to geese will lessen the geese population at that site.

The following points will greatly increase the probability of developing a successful goose management plan.

1. A single, quick fix solution is unlikely to reduce goose problems over time. An integrated approach using several techniques in combination is much more likely to be successful in time.
2. Timing is critical.
3. Public relations or outreach is important to success.
4. Use common sense.
5. It is rarely desirable or possible to eliminate all geese in a given area. Most management programs strive for a reduction in goose numbers and related problems to a level that can be tolerated.

The control of resident Canada goose populations at State park areas is an approach using Physical Distractions, Direct Goose Contact, and Visitor Outreach.

Various methods require the expertise of different staff to implement and be successful. Pyrotechnics and dispatching individual geese are the responsibilities of TRAINED State Park Police Officers while Maintenance Staff who have been certified in the application of chemicals products must do the application of repellents. VSA, Maintenance, Interpretive, and other staff should perform removing nests and treating eggs as needed. The placement of physical barriers is best done by Maintenance Personnel. Public outreach is everyone's responsibility. Funding for the individual area programs will be through Regional and area budgets.

1. Physical Distractions

The physical distraction measures that are presented in this section are meant for those areas with water access for recreational purposes such as swimming, boating, or fishing. Snow fencing, balloons, Mylar streamer, etc. are temporary structures that may be removed to allow human access to the water for recreational purposes. In areas, where water access for recreational activities is not a concern, other measures that are more restrictive or permanent may be substituted.

Creating "No Access Zones" - The first step in resident Canada goose management is the establishment of a "No Access Zone." These zones will discourage geese from moving into an area and staying on the beach and/or mowed grass area. The zones can be established through permanent changes in landscape design or temporary structures such as snow fencing and harassment techniques such as the use of noisemakers, flags, etc. to warn the geese that they are not welcome on the beach.

Harassment - As the geese leave the water and access the beach area, they may be redirected out of the area by staff using a variety of methods, as needed to discourage them from moving/staying on the beach and/or moving to the grass area. Examples may include noisemakers, flags, etc. to warn the geese that they are not welcome on the beach. Performed by seasonal staff.

Snow Fencing - Temporary snow fencing may be used to create "No Access Zones". Snow fencing can be installed at the beach area early in the season and removed by Memorial Day weekend. For those areas outside of the swimming beaches, fencing may be left standing until after the goslings have fledged.

Balloons - Balloons may be used to make facilities less attractive to geese populations. All balloons must be tethered to their respective sources on 40 to 50 foot monofilament lines. They can be red and white balloons, as well as scare-eyes, octopus and avikite predator balloons.

An Example of Integrated Goose Control Using balloons:

Pre-memorial Day

Balloons will be tethered on the temporary snow fence at the beach area. Fencing will be removed by Memorial Day weekend. Fencing may be left standing in locations out side of the swimming beach area as needed.

Balloons will be placed on the edges of swimming areas; two red and two white will be installed.

Balloons will be placed in the center of the lakes; one or two balloons/avikites will be secured to fly over the water.

4x4, 7-foot posts will be installed around the pond areas and scare-eye balloons will be installed.

After Memorial Day

Four to six, 4x4 posts, 7 feet above the ground, will be installed.

The balloons over the water surface will be adjusted and moved as needed, possibly every week or two.

Mylar Tape - Mylar tape may be installed as streamers or twisted on the monofilament fishing line of some of the balloons as needed. It may also be attached to a wooden stake and fluttered in the breeze.

Flags – Flagging on posts or plastic bags may be installed and moved as needed. They should be angled into the ground so that they will blow in the breeze. They should be moved every few days and can be placed along the water's edge at a ratio of 1 per 25' frontage.

Pyrotechnics - A banger gun can be used to scare geese from the water and beach area. This would be conducted all season. A log will be used to track the number of geese affected, time, date, and location of use, type and number of pyrotechnics fired and user's name. When no geese are present, the gun will not be used and it will be recorded as such. The location will be moved regularly and the time of day will change. Performed by trained Ranger staff only.

Chemical Control Agents - Repellent treatment - Chemical repellents may be used as needed. They are ReJex-iT ®, GooseChase®, Goose-B-Gone®, and Bird Shield® and Flight Control®. If other methods of treatment are ineffective in minimizing the population, an emergency application of one of these chemicals will be applied in early June, to assist in deterring geese from staying through the summer season. Repellent treatment is most successful where smaller areas are treated; treatment of larger areas is not as effective a control. Maintenance staff, who are certified to apply chemicals, following standard procedures for pesticide applications will apply the chemical repellents.

2. Direct Goose Contact

When Physical Distractions are not enough to discourage resident Canada goose populations from moving into an area, a more aggressive program must be followed.

Nesting disruption and egg treatment are key to other activities that are used to control resident Canada geese. If the geese do not have goslings to protect and care for, they are much easier to harass and are more likely to move out of an area to other locations where their impact is less.

Disrupt nesting process – In March and April, use scare techniques such as flagging or human presence to scare geese away from the area. If mating pairs of geese are found building nests, but eggs have not been laid, destroy the nests. *Some sources do not advocate destroying nests as soon as they are being built. They maintain that the bird pairs will only rebuild the nest, either at the same location or at another site that may not be discovered.* Once eggs are laid, or nests have been rebuilt do not scare away the birds, treat their eggs. Record the number of nests and their locations (both those nests destroyed and those not destroyed). Reviewing records of past year's nesting locations will aid in locating new nests. Any available staff members can scare the birds.

Treat eggs – in April / May, seek out nesting pairs of geese. During the nesting period, the male goose will usually be within 50 feet of the nest and the female will be found motionless on the nest. Geese prefer to nest on islands, muskrat houses, old stumps, floating platforms, or other objects out away from the shoreline. In New Jersey geese will also be found nesting on golf courses, in parking lots, along roadways and on doorsteps and rooftops. Once the nest has been found, a careful approach is necessary, since nesting waterfowl are very protective of their nests, eggs, and space. Consider night activities by 2 staff/ volunteer, for safety and ease in locating nests and keeping geese away while eggs are treated. Treatment includes Mineral oil coating, Puncturing, Freezing, or Shaking (addling). Eggs are placed back into the nests and the pair of geese are allowed to return to their nests. After nests have been abandoned they may be removed. *See Appendices for further details about egg treating*. A log must be maintained to record dates, locations, the number of nests, the number of eggs treated, and staff names. Staff who are trained in egg treatment can perform this task as needed.

Dispatching Geese - Dispatching geese can be highly effective in removing specific troublesome birds and in supplementing harassment. Shooting a few individuals from a large flock can reinforce birds' fear of harassment techniques. Dispatching is used to reduce goose problems only when lethal methods are determined to be appropriate. Dispatching geese is most effective when done in connection with pyrotechnics (noise making) because the geese are not sure if the noise from the shotgun is just noise or a member of the group will be killed. A log will be maintained to track the number of geese affected, time, date, and location, and shooter's name. Since dispatching geese can be controversial, this activity will only take place when the public is not present and the location will be moved regularly and the time of day will change. Dispatching geese is to be performed by TRAINED State Park Police Officers. At areas where there are no State Park Police assignments, arrangements for dispatching geese will be made through the State Park Police chain of command.

3. Visitor Outreach

Besides nesting disruption and egg treatment, the next most important part of an area's Resident Canada Goose Control Plan is visitor outreach. The public's understanding of why specific measures are being taken and their support of these measures are necessary for the success or failure of an area's goose control program. Visitor outreach is the responsibility of all staff who has public contact both permanent and seasonal, Law Enforcement Officers, Historians, Naturalists, Visitor Service Assistants, Secretarial, Superintendents and Maintenance.

Enforcement - Enforcement of the "No Feeding" policy will be performed daily, especially during the hours the swimming area is open. Signage will support this aspect of the program. Reinforced by Rangers, Visitor Service Assistants and Interpretive Staff.

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Signage - Signs will be installed to advise the public not to feed the geese. The signage will be in two languages – English and Spanish. Signs will be developed as part of the non-metal sign program and made available to areas through annual Regional non-metal sign requests.

Handouts – Standard Handouts will be developed and distributed as needed to educate the public about the Goose control program and the need for the public to assist us in implementing our program. Suggested locations where handouts will be distributed include visitor contact stations where the public enter the park, at a specific recreation facility such as a bathhouse complex and through mailing with other materials that may be requested by the public. General leaflets will be prepared and made available to areas for use and other informational documents will be prepared and distributed as needed.

Bulletin Boards - Notification boards or bulletin boards will be utilized in/near the bathhouse complexes and picnic areas/pavilions to educate the public about the need for the goose management program. The non-lethal steps being utilized to manage the geese will be listed. This material will be prepared and maintained by Superintendent and Interpretive Staff.

C. Removal of entire populations through Capture and Euthanization

The difference between dispatching geese and capture and euthanization is that dispatching removes selected individuals from a population of geese to reinforce pyrotechnics and to remove problem individuals. Capture and euthanization removes and eliminates an entire population of geese.

Wildlife is regarded as providing ecological, educational, economic, recreational, and aesthetic benefits and there is enjoyment in knowing that wildlife exists and contributes to natural ecosystems. Canada geese, like all wildlife, provide people with valued contact with nature. They do contribute to the quality of life in New Jersey. Some people have expressed opposition to the killing of geese or domestic waterfowl during Canada goose damage management activities. Some people believe that specific populations should be captured and relocated to another area to alleviate damage or threats to human safety.

Some people directly affected by damage from Canada geese sometimes oppose removal of birds regardless of the amount of damage.

Annual roundups and euthanization have been criticized as inhumane. Critics claim that these measures do not permanently rid a community of Canada geese; they only clear the habitat for other geese to move in the following year. Some jurisdictions have been criticized for killing thousands of Canada geese year after year without even attempting any of the many non-lethal strategies for dissuading geese from areas where they are not wanted. Humane organizations maintain that by stopping the feeding of geese, habitat management, use of chemical repellents, and diverting birds to other areas will be enough to manage any resident Canada goose population. Some organizations even oppose removal of individual geese from a local population. A few organizations will claim treating eggs is not considered a humane control method.

When all other methods of control of resident Canada geese populations fail, capture and euthanization is the only viable alternative. Resident geese are usually captured with nets or by hand. The time for capturing resident Canada geese is during their molting period, from May through August. Migrant Canada geese would not be effected since they are only present in New Jersey from mid-September through April. Once captured, geese would either be shipped to poultry processing locations for processing for human consumption and donated to charitable organizations or euthanized and either buried or incinerated.

The advantage of this lethal management is that it is applied directly to the problem goose population, its effects are obvious and immediate, and carries no risk that the geese will return or move and create conflicts elsewhere.

Because these measures are, however, subject to so much public criticism, the final determination to capture and euthanize resident Canada geese at any one area must be at the Division level. An area's plan for capture and euthanization of resident geese must have the Regional endorsement and be forwarded to the Director of the Division of Parks and Forestry for approval before implementation. The plan must include documentation as to dates, times, places, and persons where non-lethal and lethal measures had been used and were not successful. The plan must also include how the birds will be rounded up, penned, shipped and finally killed in a humane way. If the birds are to be processed for human consumption, the name of the processing location, costs and final distribution location must be included in the request. If the birds are to be destroyed, the disposition of the dead birds must be indicated.

Removal of a goose population through capture and euthanization will be permitted only if there are no goslings in the population that is to be captured. An area's plan for capture and euthanization of geese must include egg addling records to verify that egg addling has taken place that spring and that there are no young that will be effected by this procedure.

The Annual Depredation permit issued by the US Fish and Wildlife Service authorizes taking a specific number of Canada Geese each year. It **DOES NOT** include authorization to round up entire goose populations and euthanize them. If capture and euthanization is determined to be the method of control for a specific troublesome goose population, application to amend the Annual Depredation permit would have to be made and authorization received before the activity could be permitted.

D. Record Keeping and Reporting

As holder of an Annual Depredation Permit, the State Park Service is required to submit an annual report to the US Fish and Wildlife Service detailing activities, including the time, numbers and location of birds, eggs, and nests taken and non-lethal techniques utilized, before the end of each year. (50CFR21.26)

A log will be maintained at each area implementing/continuing goose control measures to record the number of nests, eggs and geese affected, time, date, and location of use, and name and or initials of the State Park Service agent. In addition to lethal measures the

log will also indicate those non-lethal measures taken along with initiating date and duration. These logs will be maintained at the areas for a minimum of five (5) years. In addition to backing up the data submission to the US Fish and Wildlife Service, these records provide valuable information regarding geese populations at a specific area. Although the US Fish and Wildlife Service indicate record retention for five years, areas may maintain records for longer periods to support specific management strategies for resident Canada goose populations.

In October, each area manager must submit through his/her Regional Supervisor and Assistant Director a final report of activities to the Director, Division of Parks and Forestry on forms provided. Each area manager will also provide a summary of lethal and non-lethal measures taken during the year and how these measures followed the Area's "Integrated Wildlife Damage Management Plan." In areas where no activities took place, the form should indicate that "NO ACTIVITIES TOOK PLACE."

III. Appendices

A. Methods of controls available to reduce goose damage:

- Elimination of artificial feeding
- Habitat modifications
- Harassment
- Chemical sprays
- Lethal control

1. Eliminate artificial feeding

All artificial feeding by visitors should be stopped immediately. In public areas, signs should be posted that read, "Do Not Feed Waterfowl." People who feed the geese need to be educated about the problems they are creating. When fed by hand, geese become concentrated, making them more aggressive toward people because they are expecting to be fed. Hand feeding also makes geese more susceptible to diseases, such as avian botulism and avian cholera. Moreover, artificial feeding, especially with bread, rarely provides the proper nutrients that geese require. Thus, artificially fed geese often develop wing deformities, which hamper their ability to fly. A no-feeding policy needs to be implemented and enforced.

2. Habitat modification

Habitat modifications can either be permanent or temporary. For many State Park facilities, permanent modifications will be costly and inappropriate. Where site renovations and re-landscaping are being planned, considerations should be made to incorporate permanent habitat modifications into the landscape design. When permanent modifications are inappropriate, temporary modifications should be used.

Permanent modifications

Canada geese provide an excellent example of a wildlife species whose behavior can be fairly easily modified by managing the landscape. They not only prefer to walk between water and land but also must be able to walk to grazing areas when molting or escorting goslings. Habitat modifications can be made that eliminate or reduce those landscape features that geese prefer and/or add specific features that make a site appear inconvenient or unsafe to geese. The following landscape principles can be effective in minimizing the attractiveness of an area to geese.

- Reduce sightlines to less than thirty feet.
- Use landscaping that physically reduces access to forage areas.
- Reduce the size of foraging areas.
- Reduce the palatability of the forage vegetation. Use coarse grasses rather than the goose preferred grasses like Kentucky Blue, fescues or timothy.

Grasses and shrubs that grow as little as eighteen inches high can be placed in a ten-foot band at the water’s edge to serve as a deterrent to geese. These grasses and shrubs will impede their access to grazing and block their view of predators. There are side benefits to this kind of landscape alteration as well. It reduces mowing, filters the runoff of fertilizers and herbicides from lawn surfaces, increases habitat for other wildlife species such as songbirds, and has an aesthetic appeal to many that is more satisfying than the homogeneous and neatly trimmed lawn run down to water's edge.

Canada geese prefer a gentle, grassy slope coming out of the water that enables them to easily walk into and out of the water to feed or rest. If access to the water is poor, the adult geese may leave that area to raise their young elsewhere. To steepen the shoreline, a vertical seawall about 3 feet above the surface of the water may be built or create a 63-degree angle slope from the water's edge. Riprap, while ineffective on gentle slopes, is often effective on steeper ones.

Canada geese typically prefer to use a route from a body of water that allows them a clear view of predators. By planting large, dense shrubs or placing large rocks (2 feet in

diameter or more) along a shoreline; a barrier is created that geese will be reluctant to penetrate.
Note: Sometimes giant Canada geese adapt to rocks and vegetation barriers. If so, fencing may need to be added.

Using Plants as Management Tools

Replacing plants that geese like to eat with ones they do not typically bother may discourage them from remaining in an area.

Geese prefer:	*Geese do not prefer:*
Kentucky bluegrass	Mature tall fescue
Brome grass	Periwinkle
Canary grass	Myrtle
Colonial bentgrass	Pachysandra
Timothy	English ivy
Perennial ryegrass	Orchard grass
Perennial bent grass	Hosta or plantain lily
Quackgrass	Ground juniper
Red fescue	Switch grass
White clover	

Temporary modifications

Permanent habitat modifications may not be acceptable because of the costs associated with these changes or due to the fact that landscaping in the area is new. Temporary measures may be just as effective as permanent modifications. Fencing acts as a sufficient barrier, and while it lacks many of the side benefits of habitat changes; it can be put up before nesting season to discourage geese and then removed when nesting has begun elsewhere. Fencing is also effective during the flightless periods. Fences that may be considered include snow, single or dual strands of cord or wire, or chicken wire. Electric fencing could also be appropriate; however, it should not be used in public-use areas.

Allowing grass and shrubs to grow in ten-foot bands around ponds will impede geese access to grazing areas and block their view of predators.

Remove domestic waterfowl

Flocks of urban waterfowl are known to act as “decoys” and attract migrating waterfowl. (At one time, the use of live decoys was permitted for hunting Canada geese. Federal regulations were issued that prohibited this use.) Birds learn to locate food sources by watching the behavior of other birds. If domestic waterfowl, including mute swans, are allowed to remain, they often act as decoys to attract geese into areas where they are not wanted. There may be some reluctance to removing some or all decoy birds because of the enjoyment of their presence.

Water Surface Covering

Canada geese may be excluded from ponds using overhead wire grids or “ball blankets. Wire grids and “ball blankets” with balls approximately five inches in diameter work best on small ponds, but may be considered aesthetically unappealing to some people. Both the grids and blankets will make a pond unusable for boating, swimming, fishing and other water type activities.

Mylar tape, flagging and balloons

Mylar tape, flagging and balloons are visual deterrents that can be used in conjunction with other exclusion methods. Mylar tape is 1/2 inch wide, red on one side and shiny on the other. To use Mylar tape as a fence, string one or two strands between two posts and twist the tape two or three times. When the wind blows, the tape rotates; balloons and flagging will create a flashing action. This unfamiliar flash acts as a visual barrier and makes the geese shy away from the area.

3. Harassment

Canada geese seek areas where they can go about their daily activities with minimum disturbance. If someone or something bothers them enough, they usually will find another

area where they will not be disturbed. However, they sometimes become accustomed to some harassment techniques when they learn they won't be harmed.

Harassment techniques usually will not stop damage once it has started. They are, however, useful in preventing damage before it begins. If Canada geese were raised in an area or have become accustomed to using it for feeding, they will be more difficult to move.

Dogs
Using dogs to harass geese from an area has become one of the most popular and successful methods. While some nuisance animal businesses use highly trained border collies, just about any athletic, medium-large dog capable of obeying commands can be used. Control of the dog is vital because dogs used in this manner are legally considered an extension of your hand and must not be allowed to catch, injure or kill a Canada goose.

Typically, a handler and a dog enter an area occupied by unwanted geese. On command, the dog is allowed to chase after the geese. Geese will likely seek refuge from the dog in a nearby body of water. If this is the case, the dog can be allowed to enter the water. To make this method more effective, use a boat or pyrotechnics to further harass the geese. Harassment should continue and be repeated until the geese leave the area permanently.

Pyrotechnics
Although not all geese react to pyrotechnics, most do. Pyrotechnics are specially designed Class C fireworks that are used to frighten wildlife. The types of pyrotechnics in this class include:

- Screamers and bangers -large bottle rocket-type devices fired from a 15-mm starter's pistol that whistle loudly or explode.
- Shellcrackers, firecrackers fired from a 12-gauge shotgun.

The distance a particular pyrotechnic device will travel varies from 50 to several hundred yards depending on manufacturer and type. Check with the manufacturer to be sure that a particular device fits your needs. Individuals using pyrotechnics should be trained in their use, and should wear eye and ear protection. Be cautious when using them in populated areas. Pyrotechnics are enhanced when used with dispatching individuals from the general goose population. Used alone, geese get use to the noise produced but when individuals are removed from that same population the fear factor is maintained.

Propane Cannons
Propane cannons are popular tools in use at hundreds of airports around the country. Many farmers also have used them with some success. They operate from the gas in a standard propane tank. On a timed basis, a small amount of propane is ignited, producing a loud report that can be heard more than a mile away.

The simplest models explode every 30 seconds to 30 minutes, based on the setting. More sophisticated models use computer chips to control the detonation more randomly, on a particular schedule or by remote control. Canada geese, like many other animals, have the ability to quickly adapt to the use of propane cannons and sometimes quit responding without additional aversive conditioning.

Their effectiveness can be greatly increased if the timing of the detonations and locations of the cannons are frequently changed and when they are supplemented with other harassment techniques and dispatching.

Propane cannons may not be suitable for large communities because the devices are loud and may be more of a nuisance than the geese.

Chasing
Chasing geese on foot or in a golf cart is labor intensive; but in conjunction with other harassment methods, it can be successful if people are persistent. The idea is to chase

geese long enough to cause them to go elsewhere, where they can live without being chased.

Lasers

It has been found that lasers can be used effectively to harass and scare off resident geese. The lasers are used at dawn, dusk, and at night during the times that flocks of geese are preparing to bed for the evening. The geese think that the lasers are predators and will not land for the evening. Lasers are an alternative to pyrotechnics and propane cannons when the effect of noise from these other techniques is undesirable.

Other Techniques

Other techniques that can be used to harass Canada geese include:

- high pressure water sprayers
- air horns
- beating pots and pans together

When coupled with other techniques, they encourage Canada geese to move from an area. The key is to be more persistent than the geese are. As long as the geese are not physically harmed, these harassment techniques are legal.

4. Chemical Repellents

Chemical repellents applied to lawns and other vegetation where there are high numbers of geese do work. These repellents are water soluble; therefore, moderate to heavy rain or daily watering and/or mowing will remove them from treated vegetation and additional applications may be required. These chemicals cause geese to move to nearby untreated areas. Chemical repellents work best when smaller areas are to be treated. Treatment of larger areas is less effective.

Methyl anthranilate is a registered repellent for Canada geese, which is marketed under the trade names ReJeX-it, GooseChase, Goose-B-Gone, and Bird Shield. These products help change the bird's behavior. When applied to grass where geese feed, methyl anthranilate makes the grass unpalatable. Geese may still frequent the treated area, but they will not feed there.

Anthraquinone, trade name Flight Control has also been used for Canada geese control in our park areas. Anthraquinone repels geese in two ways. First, geese experience a harmless "gut reaction" after eating the grass. Secondly, the grass appears unnatural and uninviting because the chemical brings out the ultraviolet spectrum when applied to turf. The combined strange look of the grass with the intestinal reaction experienced, geese will look else where to loaf and feed. Flight Control will not wash off after a rain, but needs to be reapplied after mowing. This chemical has low toxicity to birds and mammals.

5. Lethal Controls

Lethal methods to control resident Canada geese include nest/egg destruction, live capture and transportation to poultry processing facilities, live capture and euthanization, and dispatching (shooting).

Nest & Egg Destruction

Addling: Egg shaking, oiling, freezing, or puncturing prevents the embryo from developing. Egg destruction can reduce production of goslings, which slows the rapid growth of local goose populations and eliminates the aggression of adult geese protecting their young.

1. Oiling – Mark the egg with a felt-tip pen, place a few drops of mineral oil on the egg or saturate a napkin with oil and gently wipe the entire surface of the egg. Return the egg to the nest.
2. Chilling – Collect eggs and place them in a freezer for approximately 45 minutes so the egg is chilled but not frozen. Allow to warm to room temperature, then mark egg with a felt-tip pen and return to the nest.

3. Shaking – Lift the eggs from the nest and shake vigorously for up to 5 minutes. Mark egg and return to the nest. Shaking must break the yolk, thus preventing eggs from hatching. This procedure is not recommended for a large number of eggs.
4. Puncturing – Insert a large safety pin or poultry skewer into the point end of the egg and rotate the pin in a circular motion to break the yolk. Return egg to nest.

Nests should be revisited and eggs treated at 7 to 10 day intervals throughout the season until no new eggs are encountered. Second visits to a nest may reveal new eggs, which would be unmarked. If an egg has begun hatching (gosling attempting to exit the egg) the egg is to be placed back in the nest and allowed to hatch completely without interruption. Testing eggs to determine age can be easily done by placing the eggs in water. Eggs that sink when placed in a vessel of water have been incubated less than 14 days and can be treated. Eggs that float when placed in a vessel of water are to be returned to the nest and allowed to continue incubation.

Place all addled eggs back into the nest and allow the female goose to retun to the nest. The female will continue to set on the addled eggs for a long time. By the time that she does abandon the nest and clutch of eggs, the mating period will have pasted. Once a nest is abandoned, the eggs should be removed. A nest containing addled eggs is subject to predation by other animals.

A pair of Canada geese can increase to more than 50 birds in as little as five years. With sufficient sustained effort, the number of geese produced using these methods will be reduced.

Dispatching (Shooting)
Dispatching geese can be highly effective in removing individual birds from specific areas and in supplementing harassment. Shooting a few individuals from a large flock can reinforce birds' fear of pyrotechnic techniques. The birds do not know when the noise is fake or a real danger. Taking geese in this manor is used to reduce goose problems when lethal methods are determined to be appropriate.

Capture and Euthanize
The most efficient way to reduce the size of an urban-suburban flock of resident Canada geese is to increase mortality among adults. Hunting is the major cause of goose mortality, but geese may seldom be available to hunters in an urban or suburban environment. For the purposes of lethal control, resident geese are usually captured with nets or by hand. Resident Canada geese would primarily be captured from May through August, and would not include migrant geese. Migrant Canada geese are present in New Jersey from mid-September through April. Once captured, geese would either be shipped to poultry processing locations for processing for human consumption and donated to charitable organizations or euthanized and either buried or incinerated.

The advantage of this lethal management is that it would be applied directly to the problem goose population, its effects are obvious and immediate, and carries no risk that the geese will return or move and create conflicts elsewhere.

6. Legal hunting
Legal hunting can be used successfully to reduce some populations of resident Canada geese. Legal hunting also reinforces harassment programs. In some states, hunting has had a major impact on the distribution of geese populations. For those states, goose densities during the summer in hunted areas were lower than densities in unhunted areas. In New Jersey, geese may be legally hunted during three seasons: a regular season, a special September season, and a special winter season. The "Special September Season and Winter season goose hunting season are very important in reducing New Jersey's resident goose populations. The Atlantic Flyway Council has stated that while these seasons have contributed in targeting harvest of resident geese, additional measures are needed to effectively manage the resident goose population. For park managers, this means that merely opening an area to hunting Canada geese will not solve the problem of a high resident Canada goose population. Other controls, both non-lethal and lethal will also have to be implemented.

7. Methods that ARE NOT recommended

The methods listed below are often asked about, but are not recommended.

Plastic Scare Devices

Plastic swans, alligators, owls, snakes and dead goose decoys, as a rule, have not proven to be effective in repelling Canada geese. There have been some reports of dead goose decoys floating in small ponds keeping migrant geese at bay. But in general, the effectiveness of these devices is short lived, and they are not recommended.

Windmills

Recently windmills have been offered for sale to use to discourage geese from using areas. These devices have been found to be poorly constructed and will not last.

Mute Swans

Live Mute swans are ineffective at preventing Canada geese from using or nesting on ponds. Additionally, swans can be aggressive towards humans and may have undesirable effects on native aquatic vegetation. The use of mute swans as a Canada goose damage management technique is ineffective, and is not recommended.

Capture & Relocation

Capture and relocation of geese that cause a particular conflict is commonly requested. This is not a viable solution for adult geese because the birds imprint on the area where they learn to fly and most will return to the capture site or a similar setting.

Since giant Canada geese already occupy virtually all suitable habitats, there is limited opportunity to relocate juvenile geese without creating similar problems at release sites. Relocation is effective for young juveniles because they imprint on the release area where they learn to fly rather than returning to the area where they were captured.

Toxicants

There are no toxicants registered with the Environmental Protection Agency for controlling Canada geese in the United States.

IV. References:

Depredation Permit issued to the New Jersey Division of Parks and Forestry, State Park Service

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