

## **Chapter 11 - Optional Measures**

At the Highway Agency's discretion, the stormwater program may also include Optional Measures (OMs), which are Best Management Practices (BMPs) that are not implemented as Statewide Basic Requirements or Additional Measures but that prevent or reduce the pollution of the waters of the State. These OMs are voluntary BMPs that may further enhance a Highway Agency's stormwater program and may target a specific pollutant of concern or problem affecting the Highway Agency. The SPPP should include any OM that the Highway Agency plans on implementing, along with an implementation schedule. If a Highway Agency does not implement an OM identified in their SPPP, the Highway Agency will not be considered to be in violation of the permit.

Suggested Optional Measures include:

- Wildlife Management;
- Fertilizer and Pesticide Management;
- Retrofit of Existing Stormwater Management Measures;
- Road De-icing, and;
- Planting of Native Vegetation in Existing Landscapes.

Highway Agencies are not limited to those topics and may develop an OM on their own if they feel it will help to reduce or prevent the pollution of the waters of the State. Whenever an OM is implemented it should be reviewed periodically to check its effectiveness. If the desired results are not being accomplished the OM should either be improved, modified or abandoned.

### **Wildlife Management**

The Canada goose (*Branta canadensis*) is probably the most commonly recognized bird in New Jersey, and with good reason. New Jersey currently has about 85,000 geese, which places us with the highest density of Canada geese in the United States: 12 geese per square kilometer.

However, this wasn't always the case. In 1967, one subspecies, the Aleutian Canada goose, was listed as endangered by the U.S. Fish and Wildlife Service. This was primarily due to the introduction of a non-native arctic fox species to their nesting island, which became predatory on the defenseless geese. This introduction led to a population decline to approximately 800 geese. The Canada goose population was declining so rapidly that state and federal biologists resorted to importing thousands of mating pairs of geese from the Midwest in the 1960's to ensure their survival in the Mid-Atlantic States. Under the cover of the 1916 Migratory Bird Treaty (which prohibited spring shooting, limited the shooting season, and put a quota system on bag limits) and the federal wildlife agency, the geese began to thrive.

Today, Canada geese populations are broken down into two distinct groups: the migratory population and the resident population. Currently, the migratory population is below management objectives, and thus is still strictly protected by the U.S. Fish and Wildlife Service and the 1916 Migratory Bird Treaty. The resident population, however, continues to grow at an alarming rate. If nothing is done to control the resident geese in the Atlantic flyway, their population is estimated to exceed 1.6 million by 2012.

This Optional Measure addresses the concerns raised by the ever increasing Canada goose population in New Jersey, and the impacts they have on our environment.

Canada geese are grazers, their diet consisting mainly of grasses and other green vegetation. They tend to be attracted to urban sites with short lawns, and they will almost always choose fertilized lawns over unfertilized lawns. For these reasons geese are often found congregating on rest areas and service areas.

Canada geese nest in the spring and nesting sites are usually surrounded by, or very close to, water. Water provides the geese with access to food, drink and an escape from predators. Nesting females also tend to use the same nesting site year after year, which makes it difficult to remove them once they breed in an area. In addition to this, once a year the geese begin a complete molt of their flight feathers. During this period the geese will be unable to fly, thus making it necessary for them to be in areas near water with a close food source.

These characteristics of the Canada goose, in addition to their increasing populations, often conflict with human interests, necessitating some form of management. Depending on the severity of the problem, non-lethal or lethal methods may be chosen. The management control methods listed below are only recommendations and may be implemented as needed. However, using two or more of the following techniques will provide better results than relying on just one method.

### **Non-Lethal Control Measures**

#### Barriers

Barriers can be effective in small areas where the geese tend to walk from their feeding source to the water. A low fence or other barrier, such as high vegetation, that prevents the geese from easily moving from grassy areas to the water may be all that is needed to solve the problem. Fencing works best during their summer molt when the birds cannot fly into the water. The barriers can either be permanent or temporary.

#### Overhead Wire Grids

Overhead wire grids are typically made out of polypropylene lines and placed over a body of water, which is usually supported by fiberglass rod posts that are evenly spaced around the perimeter. A two-strand perimeter fence should also surround the area to deny entry to the pond from the sides. The overhead wire grid prevents the geese from landing in the water by reducing the long take-off and landing zones needed by the Canada geese.

#### Scare Decoys

Scare decoys, such as the Dead Canadian Goose, will discourage geese from nesting or feeding near a body of water. This method is typically most effective where the problem area is small in size.

#### Repellants

Repellants are substances that can be sprayed on the lawn to deter the geese by making the grass taste bad to them. Biodegradable deterrents using human-safe food flavoring derived from grapes (methyl anthranilate) can be sprayed on an area and will last about 14 days per application. Other deterrents contain an ultraviolet repellent to visually deter the birds. Before this method is used, however, local regulations must be checked to ensure use near ponds or wetlands.

### Sound Deterrents

Sound deterrents must be in place early in the season to be effective. Sound deterrents can be as simple as banging on ordinary pots and pans, or as complex as pistol-launched pyrotechnics, firecrackers, or liquid propane gas cannons. To be most effective the sound deterrents should go off under the birds as they come in to land. Sound deterrents are the best option for large-scale geese problems, but may not be suitable for residential or public areas. Additionally, a permit to discharge a firearm may be required.

### Visual Deterrents

Visual deterrents include items such as balloons, streamers, flags and scarecrows. Large red, white, yellow, or mylar balloons have proven to be most effective. They should be filled with helium and tethered on a monofilament line to scare the geese. To increase the balloons' effectiveness, large eyespots can be drawn on. Any visual deterrent used should be moved periodically to make sure that the geese don't become accustomed to them.

### Hazing

Hazing the geese includes chasing the geese from any area where they are not welcome. People or livestock herding dogs that are trained to chase geese can be used to haze the geese, however special permits may be required to use dogs to haze geese. This can be an effective method of control in areas where noise and appearance are important considerations.

### Education

Educating the public is a very important part of goose management. Many times people attract large number of geese to an area by feeding them. By feeding the geese, they are only encouraged to stay in the area. (Many people also don't realize that bread is not a nutritional food source for geese and can actually harm them.) In addition to adopting and implementing the wildlife feeding regulatory mechanism and educating the public about not feeding the geese, people should also be made aware of the ideal habitat of the Canada goose, and what they can do to make their property less attractive to the geese. Since geese typically like to live near ponds, access to these ponds should be limited. In the springtime, the ponds can be fenced off, or high vegetation can be allowed to grow around the pond. If the pond has an aerator, it should be turned off in the wintertime to allow the pond to freeze over. Also, old goose nests or goose nest platforms should be removed (no permit is required to remove these).

## **Lethal Control Measures**

### Hunting

The most effective, but controversial, method of population control of the Canada geese is to allow a hunting season for them. Several states, including New Jersey, currently have a hunting season for Canada geese. There are presently three hunting seasons for Canada geese in New Jersey: the regular Canada goose season, September season and winter season, with bag limits ranging from two to five geese. More information can be found on this topic by visiting the New Jersey Fish and Wildlife webpage ([www.njfishandwildlife.com](http://www.njfishandwildlife.com)), or the NJDEP webpage ([www.state.nj.us/dep/fgw](http://www.state.nj.us/dep/fgw)).

### Egg Addling, Oiling, or Replacing

One means of population control for the Canada goose is to ensure that they don't produce offspring. The easiest way to accomplish this is to alter their eggs so that they are no longer viable. There are several ways that this can be done, however, it should be kept in mind that if a goose

cannot find its egg, or realizes that it has been tampered with, it will simply find a new nest and lay more eggs. Additionally, all of these methods can be very time consuming and dangerous. The nest must be watched for times when the geese are not nearby so that they do not see their eggs being tampered with. If the geese do see someone near their nest, they may become aggressive.

Egg addling means that the eggs are shaken to mix up the contents, or a small hole is poked in the shell so that the inside can be stirred up. Both of these methods will destroy the egg, making sure it does not hatch.

Egg oiling involves rubbing a thin layer of oil on the outside of the entire shell. This prevents the egg from “breathing” and suffocates it.

Replacing the real eggs with wooden or other artificial eggs may also be effective. Remember, if the eggs are simply removed, the geese will just lay more. If the eggs are replaced with artificial eggs, though, the geese will continue to incubate them as if they were real.

Although the resident population of the Canada goose continues to grow at an alarming rate, and continue to claim more and more recreational areas as their own, this is not the major complaint. The major complaint is not attributed to what they take from these areas, but rather what they leave behind. The average Canada goose produces two to four pounds of droppings a day. These droppings can contain salmonella bacteria that persist (in wet droppings) for up to one month.

Substances that are derived from goose droppings can cause water quality problems, including noxious algal blooms, beach closings, and the spread of fowl related diseases.

When geese droppings are allowed to enter the water, the nutrient level increases. This can lead to excessive plant and algal growth, which is directly related to a loss of habitat and wildlife including fish kills and eutrophication. Eutrophication can permanently change the character of a lake by increasing the organic content, eventually converting it into marsh and land areas.

Many beach closings have also been attributed to geese. When an excessive number of geese congregate near a beach or waterway, their fecal matter can sometimes overload the normal capacity of a beach to absorb natural wastes, thus degrading the water quality and requiring the area to close to the public.

Finally, geese can be responsible for the spread of some fowl related diseases. Among these are viral, bacterial and parasitic diseases, to which only waterfowl are susceptible.

The costs associated with implementing this optional measure can be highly variable, depending on the method(s) chosen, and the frequency they must be repeated. Additionally, some of the options are more time consuming or require special permits, which may add to the pre-existing cost of the actual control measure.

While it is difficult to quantify the benefits an area will receive through managing goose populations, it is reasonable to assume that any reduction in their population will have a positive effect on the environment. The amount of benefits received will depend on the severity of the problem in the first place, the method(s) chosen to control the goose populations, and how frequently the control methods are repeated.

More information on this topic can be found at:

[http://www.state.nj.us/dep/watershedmgt/DOCS/BMP\\_DOCS/Goosedraft.pdf](http://www.state.nj.us/dep/watershedmgt/DOCS/BMP_DOCS/Goosedraft.pdf)

<http://www.fv.umn.edu/research/goose/html/default.html>

<http://www.wildlifedamagecontrol.com/canadageese.htm>

[http://www.pacd.org/resources/lake\\_notes/geese02.htm](http://www.pacd.org/resources/lake_notes/geese02.htm)

<http://www.birdcontrolsupplies.com/bobbexg.htm>

<http://www.wnrmag.com/stories/1998/dec98/geese.htm>

## **Fertilizer and Pesticide Management Program**

The Department recommends that Highway Agencies adopt, as an Optional Measure, a fertilizer and pesticide management program that restrict their use of such chemicals. This is especially important in highways located near lakes, rivers or bays.

### *Fertilizer management*

A fertilizer management program may include the following restrictions:

- Require soil samples to be tested to determine which nutrients, if any, are necessary before any fertilizers are applied.
- Allow nitrogen-based fertilizers only in slow-release formulas.
- Forbid the use of phosphorous-based fertilizers unless soil testing demonstrates a need for it.
- Prohibit the use of fertilizer within 25 feet of any lake, stream, drain, river, wetland, or natural waterway.
- Require that fertilizers be watered within 24 hours of application.
- Prohibit fertilizer applications when heavy rainfall is anticipated.
- Ban the application of fertilizers before April 15 and after November 15, when there is a risk that frost will prevent the nutrients from being absorbed into the soil.
- Require applicators to take precautions against applying fertilizers to impervious surfaces, such as driveways and sidewalks, where the nutrients will simply wash away into storm sewers or nearby waterways with the next rainfall.

### *Pesticide management*

A pesticide management program should at a minimum conform with the Pesticide Control Code (N.J.A.C. 7:30). This program may, for example, address the following issues:

- The proper storage of pesticides (N.J.A.C. 7:30–1.9, 9.4)
- Pesticide application/use and safety equipment (N.J.A.C. 7:30–2.2, 2.3, 9.3, 9.7, 10.3)
- The proper methods of disposal of pesticides, their containers, and equipment that holds or has held a pesticide (N.J.A.C. 7:30–9.6, 11.2, 11.3)
- Accidental pesticide misapplications, spills, and emergency containment (N.J.A.C. 7:30–9.14, 9.15, 11.1)

## **Retrofit of Existing Stormwater Management Measures**

For more information on this topic please see Chapter 8 of the New Jersey Stormwater Best Management Practices Manual at:

<http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm>

### **Road De-icing**

Road de-icing is a common practice during and after winter storms. Essentially it consists of applying salt (NaCl), or other types of de-icing materials, to lower the freezing temperature of the precipitation. Lowering the freezing temperature of the snow and ice causes it to melt quicker, and allows motorists to travel roadways safely. Excessive use of de-icers can be environmentally detrimental due to increasing sediment loads and soluble materials entering surface and ground water. The excessive use of de-icers may adversely affect roadside vegetation, pollute waterways and/or groundwater, as well as adversely affect aquatic life or cause corrosion.

However, the use of road salt is a public safety issue as well as a water quality issue. The short-term need for clear, safe winter roadways outweighs the environmental impacts. None of the recommendations here are to be construed as advocating the reduction of de-icing efforts to the point of jeopardizing public safety. Rather, most are simple techniques that can be easily integrated into existing de-icing practices that can reduce the impact on surface and ground water quality.

Road salts were identified in the early 1970's as a pollutant source after high levels of sodium, calcium and chloride were found in public water supply wells. Aside from contaminating potable surface and ground water, high levels of sodium chloride can kill roadside vegetation, impair aquatic ecosystems and corrode infrastructure such as bridges, roads and stormwater management devices.

Application of typical de-icers and alternative de-icers should be considered when formulating a de-icing policy. New, safer alternatives are being developed that may lessen our dependence on traditional de-icers. Alternative de-icing materials and techniques should be considered whenever possible.

#### **Application of De-icing Materials**

In general, the Department promotes the smart use of salt and other de-icing materials. This concept encourages Highway Agencies to consider a wide range of options when formulating a management policy on the application of de-icing materials. These de-icing policies should take into consideration storm characteristics, roadway conditions, road characteristics, the type and availability of equipment, and availability and need of alternative de-icing materials (other than NaCl). Reduced application rates and alternative de-icing practices should be incorporated in environmentally sensitive areas, areas that drain to surface drinking water sources (reservoirs), and groundwater recharge areas (e.g., ground water supply wells, and wellhead protection areas). Reduced application rates may also be considered on secondary roads or on other roads rarely traveled.

One of the most effective means in preventing over-application is the use of calibrated spreaders, which ensure delivering de-icing materials at the predetermined optimal application rate. Automated controls on spreaders are recommended to ensure a consistent and correct application. The spreader should be calibrated prior to a snow storm event and periodically during the snow season, regardless

of whether or not automatic or manual controls are used. A regular schedule of maintenance for snow removing equipment (including salt spreaders) should be incorporated into a snow management policy. Poor maintenance of the snow removal equipment is often responsible for excessive salt use. Guidelines for the calibration of spreaders and determination of application rates are given in the EPA document *Manual for De-icing Chemicals: Application Practices*.

De-icing is recommended for snowfalls of less than two inches and for road surfaces with packed snow already on the road surfaces. A management policy of de-icing of roadways should consider factors such as length and duration of the snowfall and initial conditions of the roadway which will be salted. The salting of road surfaces after the snow has accumulated will only result in the applied rock salt being removed with the snow when plowed.

### **De-icing Materials and Alternative De-icing Materials**

In most instances winter de-icing materials consist of rock salt (NaCl) or a combination of rock salt and sand. The effectiveness of this mixture is significantly reduced at temperatures below 25 degrees Fahrenheit. As a result, it is not practical to increase the amount of rock salt when spreading below 25 degrees Fahrenheit. At temperatures lower than 25 degrees Fahrenheit, rock salt can be applied with calcium chloride (CaCl), which increases the effectiveness of the deicer at temperatures down to -25 degrees Fahrenheit.

Various mixtures of sodium chloride, calcium chloride and sand can be used depending on the sensitivity of the area. The State of Connecticut recommends a 7:2 sand pre-mix be used in sensitive areas. Pre-mix is 3.5 parts sodium chloride and 1 part calcium chloride by weight. Use of higher ratios of calcium salts is recommended environmentally since calcium poses fewer problems than sodium.

New de-icing materials are periodically developed which are more environmentally friendly and can be used in sensitive areas or as an alternative to traditional de-icers. In some instances, the costs of these new materials are prohibitive on a large-scale basis but they could be used in smaller target areas.

One of the best alternatives to de-icing materials is sand. Sand has no de-icing properties but when used as a mix with rock salt, can be helpful in areas where increased traction is needed and where a reduction of rock salt is desired. Ash and cinders are another low tech alternative to calcium chloride. While using sand, gravel, ash and cinders reduce the amount of sodium, they have their own environmental problems, specifically, causing sedimentation and increasing suspended solids in receiving waters.

**NOTE:** The New Jersey Department of Environmental Protection does not promote the use of any specific product discussed below.

Calcium Chloride: Has a lower freezing point than rock salt. Absorbs moisture readily and stays on the pavement longer than rock salt. Used in "wetting" of roadways prior to snowfall.

Calcium Magnesium Acetate: Less effective, better environmentally.

Magnesium Chloride: Basically as effective as calcium chloride in adhering to the road surface and has comparable freezing temperature.

Potassium Acetate: Does not have the chloride residual problems associated with other de-icers. Does not cause corrosion and has a low environmental impact.

Potassium Chloride: Is similar in performance and cost to calcium chloride and magnesium chloride. Has a similar chloride residual problem.

Urea: Less corrosive than rock salt and has little to no effect on roadside vegetation.

### **Reduction of the Application of De-icing Materials**

Remote sensors along roadways can be used to determine which parts of roadways have ice on them. Some sensors can detect ice as thin as 0.005 inches. Using this technology will enable the effective delivery of de-icing material to sections of roadway that need it most rather than spreading on the entire roadway.

The state of Vermont has used a strategy that employs an application curve for efficient salting. Application rates vary with temperature. The study “Smart Salting: A Winter Maintenance Strategy” is available from the Vermont Agency of Transportation.

Structural controls are another way to reduce over-application of de-icing materials. Snow fences are used to keep snow from being blown into drifts. Studies show that fences minimize costs associated with snow clearing, reduce the formation of compacted snow, and reduce the need for chemicals. Mechanical snow removal costs approximately 100 times more than trapping snow with fences.

## **Planting of Native Vegetation in Existing Landscapes**

For new development and redevelopment projects the Stormwater Management rules require low maintenance landscaping that encourages the retention and planting of native vegetation, and that minimizes the use of lawns, fertilizers and pesticides. The Department is recommending that as an Optional Measure Highway Agencies incorporate these same concepts into their own existing developed areas and open space. Planting native (or well-adapted) trees and shrubs in a watershed will help restore a healthy stream environment. Plantings help to improve local water quality by preventing erosion, slowing stormwater runoff, and provide food and shelter for wildlife. The NJ Watershed Ambassadors can help organize and implement volunteer plantings. Information on the NJ Watershed Ambassadors program may be found at [http://www.nj.gov/dep/watershedmgt/ambassadors\\_index.htm](http://www.nj.gov/dep/watershedmgt/ambassadors_index.htm). For more information on landscaping and native species please see Chapter 7 of the New Jersey Stormwater Best Management Practices Manual.

(<http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm>)