

Lake Auburn Outlet Beach Assessment

Proposed Final Draft

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Completed for:

Lake Auburn
Watershed Protection Commission
Auburn, Maine

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Summary

Lake Auburn, located in Auburn, Maine is the primary source of drinking water for over 45,000 people in the Lewiston-Auburn area. There is a strict “No Body Contact Rule” in Lake Auburn to help protect and limit the contamination of this vital drinking water resource. Only in Lake Auburn’s outlet ‘pond’ has swimming been permitted. This small body of water, hereinafter called “the outlet pond,” is located just before the outlet dam and Bobbin Mill Brook.

The outlet pond’s park area is roughly 3 acres and includes a park with a small beach, volleyball courts and picnic tables. There is also a snack shack and bathhouse within the park. The land is comprised mostly of grass cover except for mature trees scattered throughout the landscape. A paved parking lot also contains around 20-30 parking spaces within the site (Figure 1). The beach and park is typically open all summer to Auburn residents. Swimming has typically been open to the public from Memorial Day to Labor Day, however, in 2012, water quality concerns led to it being closed to body contact recreation.

The beach area is small and exhibits some erosion where the sandy beach meets the grassy park area (Figure 2). The outlet pond is



Figure 1. View of the Parking Lot

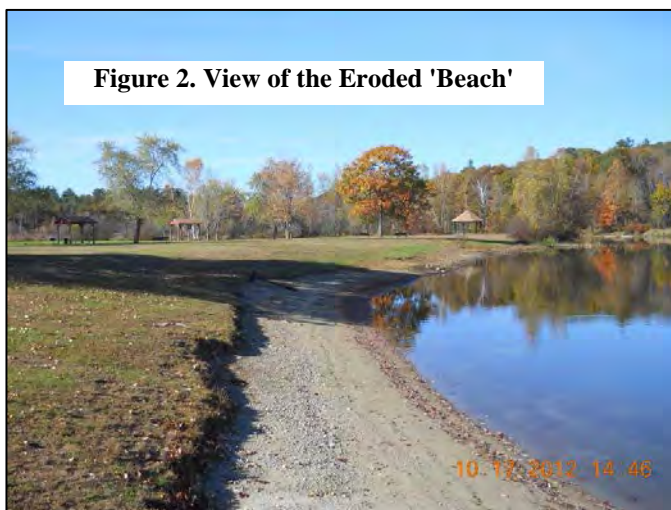
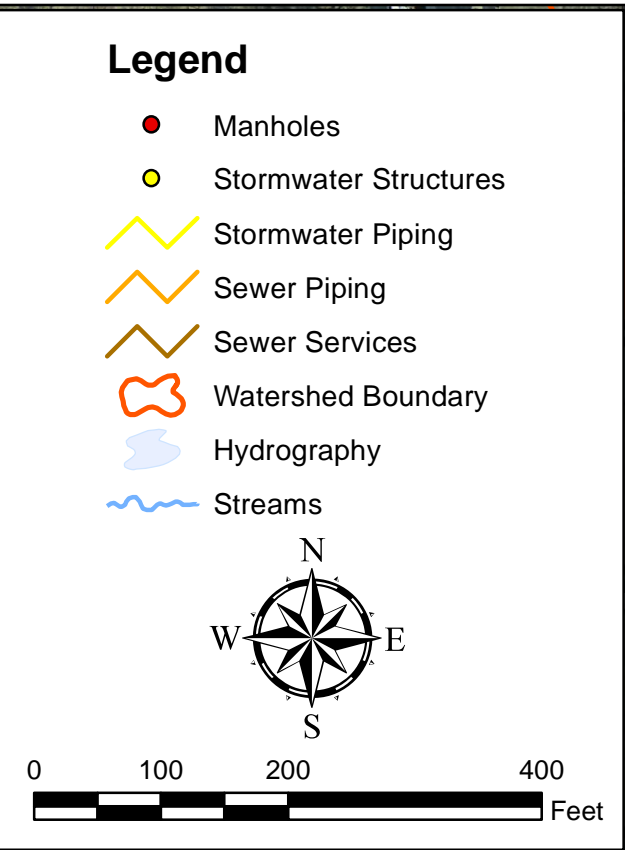


Figure 2. View of the Eroded 'Beach'

also quite stagnant because the Route 4 bridge culvert significantly restricts flow from the lake. It is also quite shallow. During dam repairs, the pond was drained and found to be about three feet deep in most of the pond, with a small “stream” running from the Route 4 culvert to the outlet. The stream is deeper than the rest of the pond at about eight feet deep. In August, 2012, a bathing advisory was issued due to elevated levels of bacteria. This advisory has raised concern as to whether this area should continue to be a public bathing beach.

This report summarizes the available data for the outlet pond and beach, and provides recommendations for its future use. Figure 3, on the next page, shows a map of the outlet pond and park features.



**Figure 3
Locus Map**

Lake Auburn Watershed
Central Maine

Data Source: Auburn Water and Sewerage District; Maine GIS



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The Project Scope of Work

This project was initiated to evaluate the outlet pond's use for primary body contact recreation, namely swimming. The project assesses whether the pond can meet current beach quality criteria, and if so, what improvements are needed to keep the beach open to swimming. It also includes a brief evaluation of other suitable recreational pursuits if the outlet pond and beach are not found to be suitable to maintain for swimming. The scope of the project includes:

1. Map the drainage area around the beach, including stormwater drainage and sewer infrastructure, to assist in identification of potential pollutant sources. Identify potential pollution sources using the mapping and a site visit.
2. Conduct a site visit to review the beach, surrounding drainage area and potential pollutant sources (e.g., stormwater outfalls, impervious surfaces, waterfowl, etc.). Contact local officials to obtain input on pollution sources and recent changes, if any, to the beach area.
3. Review available water quality (bacteria) data within Lake Auburn and at the outlet. Review sampling protocols used for lake samples and beach samples.
4. Review flow data and turnover of water in the beach area using available records.
5. Develop a closure protocol using EPA Beach Criteria, including future sampling protocols.
6. Develop a brief assessment of Bobbin Mill Brook downstream and whether it would be affected by use of the "pond" as a bathing beach.
7. Develop recommendations for future use of the beach for swimming or other recreational pursuits and an order of magnitude cost estimate for the changes needed to provide a safe and suitable recreational area. Include an assessment of the capacity of the park and beach.

The remainder of the report describes the results of these efforts.

Capacity of the Park and Beach

According to the American Society of Planning Officials, Standards for Outdoor Recreational Areas¹, one "effective foot" of shoreline is defined as a 1 lineal foot of shoreline with the following:

- 100 foot wide band of water suitable for swimming;
- 200 foot wide strip of beach for sunbathing and playing;
- 100 foot wide buffer zone for utilities and picnicking; and
- 265 foot wide strip for parking where attendance is dependent on automobiles.

¹ Report No. 194. January 1965.

Each 10 effective feet of shoreline can provide space for 20 persons at any one time.

An additional standard from the same source states that in Westchester County, New York, 150 square feet of beach area is required for each person using the beach.

CEI identified approximately 300 feet of shoreline that meets the above parameters for a beach. CEI assumed this section of beach is located to the north of the parking lot area and stretches to approximately 75 feet south of the gazebo, located at the northernmost point of the park. This section of shoreline is not necessarily a sandy beach, however for purposes of beach capacity estimations, CEI assumed that a 10 -15 foot wide section along this portion of shoreline would commonly be used as the “beach zone”.

The nature of the existing beach area and parking lot do not meet the criteria for a common “sandy” recreational beach area and the buffers listed above would not apply. For the length of shoreline provided at the park, a substantial expansion project would be required to meet those standards for a recreational beach.

Based on the park layout and intent of the existing beach area, the Westchester County criteria seem more applicable in this case. Assuming the existing beach is between 3,000 and 4,500 square feet (300 feet long x 10 - 15 feet wide), the beach capacity could be approximately 20 - 30 people (4,500 - 3,000 SF / 150 SF/Person). Based on the existing parking lot size of 25 spaces and some additional parking capacity on the street, the parking lot capacity exceeds the beach capacity. Currently, the 25 plus spaces provide capacity for nearly 65 people (25 cars at 2.5 people per car). This far exceeds the 20-30 person beach capacity. The excess parking capacity likely promotes overcrowding of the beach area with a likely result of degraded water quality.

CEI also estimates that the park provides approximately 1,050 total feet of useable shoreline for fishing or walking.

Water Quality of the Pond

To help keep humans safe from illness, it is important that water quality be frequently monitored in areas where there is direct contact with water. A total of 5 samples should be taken within a rolling 30 day cycle to establish a geometric mean of values that will meet the EPA guidance². Water quality monitoring in the form of grab samples with analysis for certain types of bacteria is typically used to assess the safety of water for primary contact recreation. The primary target is fecal contamination because it could cause gastrointestinal illnesses in humans if there are excessive pathogens in the water from human and animal feces. For direct recreational use, *Enterococci* and *Escherichia coli*, also known as *E. coli* (two types of bacteria), are considered the best indicators of pathogens in both fresh and marine water.

² EPA Region 1 NE Beaches Website Questions and Answers
<http://www.epa.gov/region1/eco/beaches/qa.html>

The U.S. Environmental Protection Agency (EPA) has published research showing the relationship between the quality of bathing water and health effects. Symptomatic illnesses between swimming and non-swimming beach-goers show that swimmers who bathe in water contaminated with fecal bacteria are at greater risk of contracting gastroenteritis. Symptoms may include gastrointestinal distress/upset, including nausea, vomiting, abdominal cramps and diarrhea, among others. As the quality of the bathing water degrades, the swimming-associated illness rate increases.

The 2012 Recreational Water Quality Criteria (RWQC) provides updated recommendations to the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000 for fecal indicator bacteria in coastal and noncoastal waters being used for direct contact recreation. The RWQC sets forth two separate recommendations of what type and level of fecal indicator bacteria could cause the unintended illness of humans coming in direct contact with a water body. Table 1 quantifies what levels of *Enterococci* and *E. coli* are considered potentially harmful based on the RWQC. Direct exposure of water below these levels is considered safe based on either criterion. These recommendations are meant to guide regulations when updating local water quality standards.

Table 1. Recommended 2012 EPA Recreational Water Quality Criteria ³	
Range	
Indicator	(cfu/100mL)
<i>Enterococci</i> (marine & fresh)	30 - 35
<i>E. coli</i> (fresh)	100 - 126

Note: Values represent geometric mean.

Figures 4 and 5 show the results of sampling at the outlet pond for bacteria, in comparison to the EPA criteria in Table 1. The results indicate frequent excursions of bacteria well over recommended limits, both for *Enterococcus* and *E. coli*. Some of the sample results are high enough to require that we plot them on a log scale, suggesting potentially very high levels of bacteria. Independent of whether or not fecal contamination is the cause, high nutrients in the pond can elevate bacterial counts. Any bacteria can be opportunistic pathogens, and may cause ear or sinus infections.

³ EPA. 2012 Recreational Water Quality Criteria.
<http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/>
 See Appendix A for EPA Report on Recreational Water Quality Criteria

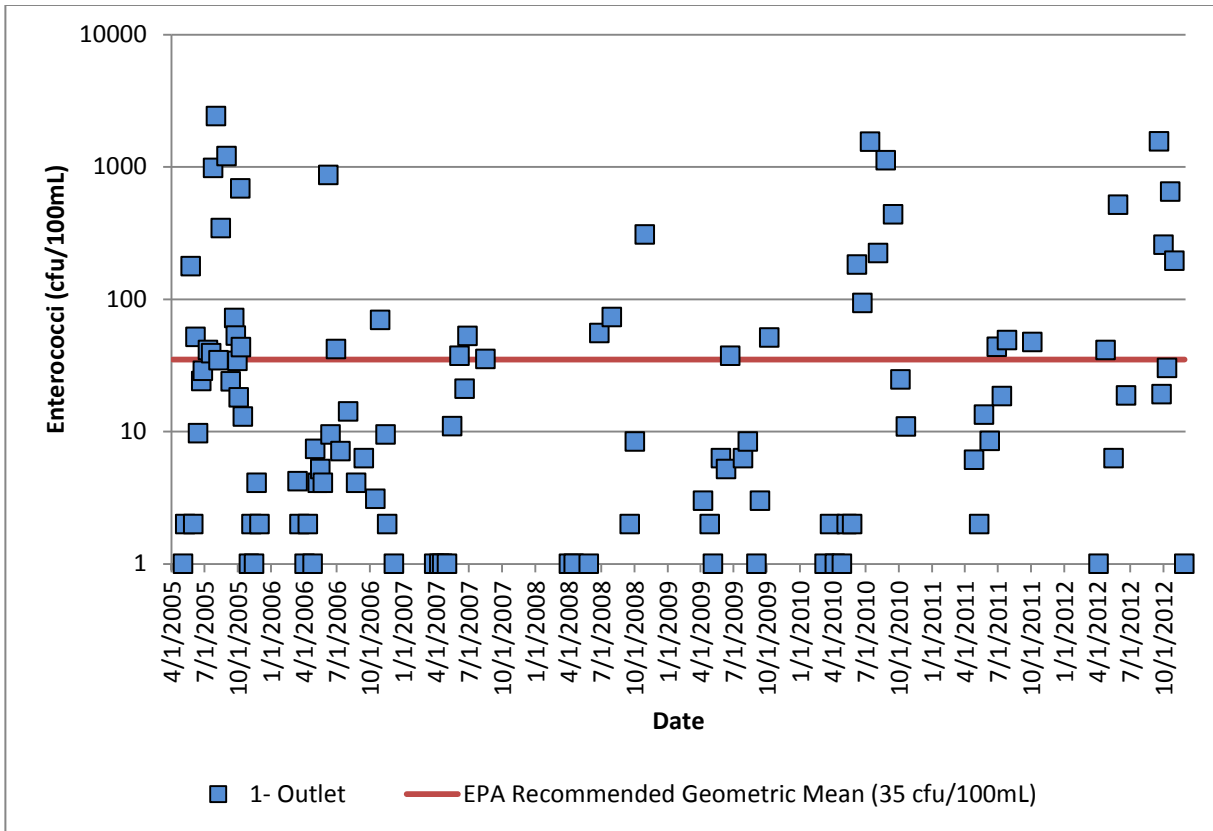


Figure 4. Raw water *Enterococci* levels at the monitoring Site near the beach 2005-2012.

Note: Since April 2005, a total of 120 samples have been taken at the beach and 38 of those samples (nearly a third of the total) exceeded the 35 cfu / 100 mL threshold for *Enterococci* levels

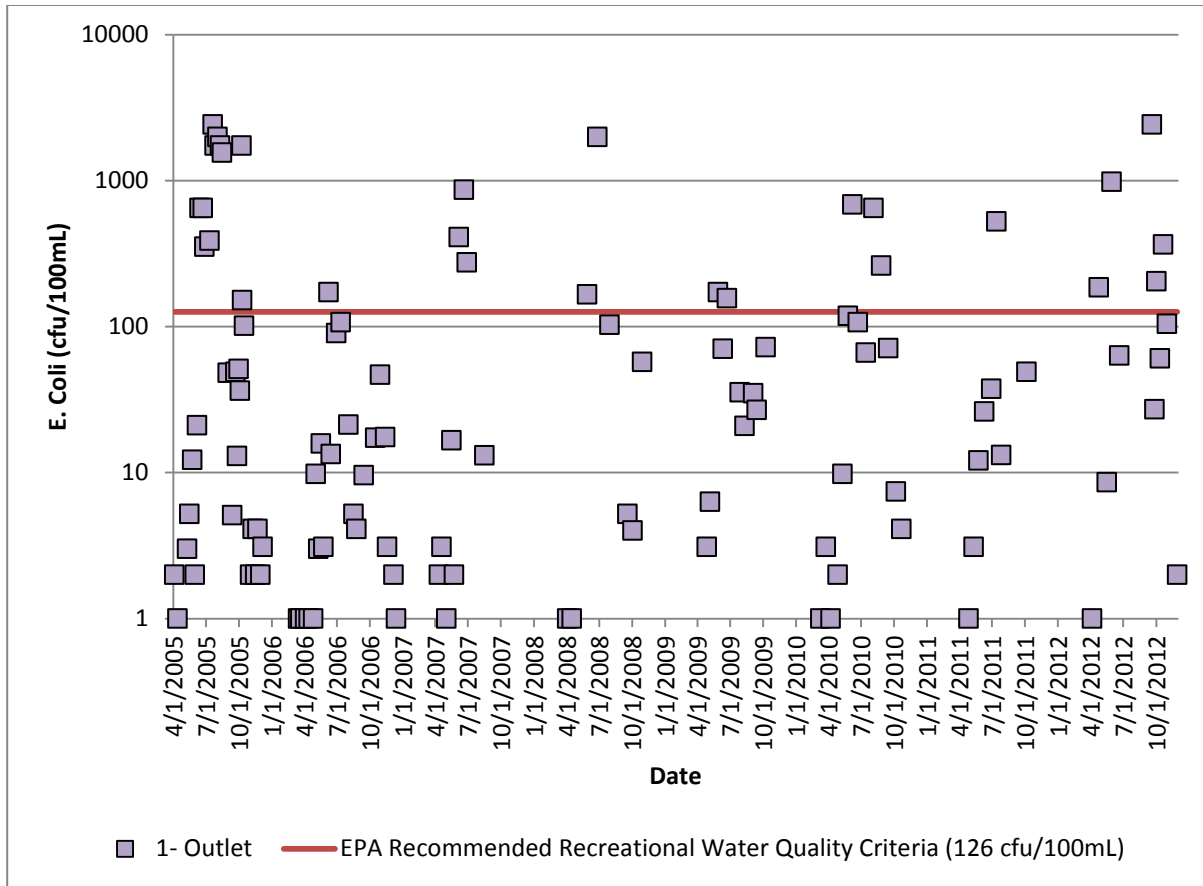


Figure 5. Raw water *Escherichia coli* levels at the monitoring Site near the beach 2005-2012.

Note: Since April 2005, a total of 120 samples have been taken at the beach and 29 of those samples (about one fourth of the total) exceeded the 126 cfu / 100 mL threshold for *Escherichia coli* levels

Potential Pollutant Sources

The outlet pond's poor water quality likely stems from several factors, including the poor circulation in the pond. Since Lake Auburn is a natural lake with a deep hole of over 100 feet, much of the lake is separated from the outlet by both distance and depth. Further, the flow to the outlet pond from Lake Auburn is extremely limited by the culvert under Route 4, which is only about 25 feet wide. This narrow opening between lake and pond isolates the pond from mixing that occurs in the larger lake. There also may be times each year when the overflow from the lake contains algal mats and storm debris that then enter the pond. This material gets trapped in the pond, since some of it cannot be released over the outlet weir.

The outlet weir is currently managed to maintain fairly consistent lake elevations and prevent flooding of surrounding properties during large storm events. The LAWPC is currently funding an algal study of Lake Auburn, which will include an evaluation of the need for appropriate Standard Operating Procedures (SOPs), to maintain a healthy drinking water supply.

Besides a minimal amount of inflow from Lake Auburn, the remainder of the outlet pond's "watershed" is drainage from Route 4 and from mostly impervious areas to the east (a school and roads). The Route 4 drainage enters either directly or through catch basins and a ditch that lies along the west side of the park. Other drainage comes from the school area to the east, which is largely impervious, such that most of the drainage runoff could be contaminated with bacteria, heavy metals, oil, grease, and nutrients from these areas.

In addition, the outlet of the pond does not spill at all when the weather is dry, leaving the pond completely stagnant and exposed to pollutants from its small watershed. Because the outlet pond is stagnant with little inflow and outflow, debris, sand from the highway, waterfowl feces, pollutants associated with runoff from the park, and eroded beach material likely sink and create a muck layer on the bottom of the outlet pond.

Although this study did not involve any sediment depth mapping in the pond, there may be decayed vegetation and deposited sediment on the bottom. These sediments can create an oxygen demand that usually leads to anaerobic conditions and phosphorus loading, as has been noted to occur in Lake Auburn, albeit on a much different scale. Due to this smaller size and shallower depths of the pond, phosphorus loadings from sediments could contribute a significant amount of pollution to the pond.

In summary, this outlet pond's poor water quality likely stems from several factors shown roughly in order of importance below⁴:

1. The **poor circulation in the pond** as evidenced by its isolation from the main body of water of Lake Auburn, and the typically low overflow rate at the outlet spillway. Since Lake Auburn is a natural lake with a deep hole of over 100 feet, much of the lake is separated from the outlet by both distance and depth. The water that does go out the outlet is the surficial overflow and may sometimes include floating algal mats and debris. In dry summers, the lake may not flow out into the pond, leaving it completely stagnant and exposed to pollutants from its small watershed that flow in during even the smallest rain events. The need for modified SOPs for releasing flows over the outlet weir to promote a healthy drinking water supply are being evaluated as part of an ongoing algal study of Lake Auburn.
2. **Route 4** is a major thoroughfare and is likely to contribute considerable stormwater pollutants to the pond from vehicular runoff materials such as oil and grease, sediments from sanding and heavy metals from brake wear, among other types of pollutants common to transportation. Even in summers with little rainfall, these pollutants build up and are washed off into the pond with the slightest storms.
3. **Waterfowl inputs**, especially from geese that use the lawn areas for feeding, are a problem at this park, as in most U.S. parks these days. Geese prefer this kind of habitat and are difficult to remove without adding fencing or shrubbery close to the

⁴ This study did not involve modeling of the inputs of pollutants from various sources. The order of importance is based on similar sites. Further study would be needed to confirm these findings.

water to interfere with the land/water access. They can contribute a significant amount of fecal matter, as well as just fouling the grassed areas.

The LAWPC began a gull harassment program on Lake Auburn in 2005. In 2011, the program was extended to the Lake Auburn Outlet Beach. Specifically, the United States Department of Agriculture (USDA) removed geese from the beach area in June/July of 2011. The beach was closed during this time to allow the USDA to roundup the geese while they were molting. The USDA tried the same removal procedure again in 2012, but was unable to round up the geese. In 2012, the geese were molting at a nearby driving range, rather than the beach, and the USDA was unable to round them up at this time. The geese then migrated to the beach area after molting. At that time, the beach was open and populated with people, such that USDA could not remove them.

Although the LAWPC program has discouraged some of the geese, it should be noted here that Canadian geese are a growing and persistent problem at many parks, golf courses and waterways, especially where lawn or mowed grass areas are next to water bodies. It is unlikely that they can be permanently discouraged as long as there is a beach and grass that are proximal to the water.⁵

4. The various signs of **erosion along the beach** and around the pond can accelerate the outlet pond filling up with sediment and adding an increased amount of bacteria and pollutants. Since the pond is small and exhibits a slow turnover rate, these pollutants might stay around in larger quantities for longer periods of time.
5. Inputs from **overcrowding of the beach and the swimming areas** could lead to high bacterial counts and more beach closures. The large parking lot could lead to significant numbers of bathers at the beach. Small children still in diapers in particular can spread illnesses caused by organisms that include *E. coli*, *Shigella*, *Cryptosporidium* and *Giardia*. People with diarrhea generally are the source of most of these organisms, although they can also come from wildlife and pets. The risk at the outlet pond is much greater than at a public swimming pool, since public pools are usually inaccessible to wildlife or pets and are chlorinated to kill organisms that can lead to illness in humans.
6. **Proximal impervious surfaces** surrounding the beach area contribute pollutants, including nutrients, sediments and oil and grease. The park and beach have no formal drainage system, so pollutants from the grounds can easily enter the pond from stormwater runoff.

⁵ See Appendix B for When Geese Become a Problem, NYS Dept. of Environmental Conservation, May 2007

Potential Water Quality Improvements

How can water quality in the outlet pond be improved? Some of the improvements that would be needed to remedy water quality in the outlet pond include:

- ***Dredging.*** The Outlet Beach area has a strip of sand but no real beach. The “wading” area of the pond is up to three feet deep with the “channel” area about eight feet deep. A sandy bottom and high clarity are usually desirable for a beach with swimming, both for safety and comfort. Dredging of mucky sediments could improve this swimming area, although it is quite limited in size. Beach nourishment or bringing in sand to replenish the beach area would also be desirable to improve conditions.
- ***In pond aeration to improve circulation.*** Aeration is commonly used to improve the circulation of ponds and does so by allowing mixing of bottom and upper layers of the water column. This is helpful because it tends to reduce the anaerobic layer (water layer lacking oxygen) in the bottom of water bodies that can lead to internal recycling of pollutants from the bottom. Although the pond is shallow and may get minimal mixing from wind action on the surface, there may still be anaerobic conditions due to its stagnant nature. This lack of oxygen commonly occurs when decomposing materials in the bottom of ponds create an oxygen demand which strips the water of oxygen and can result in fish kills, and also creates chemical reactions that release more pollutants from the bottom sediments. Aerating the water column may help to reduce any oxygen problems with the pond.
- ***Treatment of Route 4 runoff ditch.*** Currently a ditch runs alongside Route 4 on the park side and captures a considerable amount of runoff from Route 4. Untreated runoff that enters this ditch then enters the outlet pond. Runoff from roadways is typically highly contaminated with oil and grease, nutrients such as phosphorus, bacteria and heavy metals. This “ditch” could be turned into a treatment unit that would improve water quality of the Route 4 discharge, both to the outlet pond and downstream. Additional runoff that now enters Lake Auburn on the west side of Route 4 might also be diverted to this treatment area. A fairly low maintenance, reasonably low cost wetlands treatment system could be developed in this space if the grades are appropriate to do so.
- ***Restoration and revetment of the shoreline.*** The shoreline currently erodes in the “beach” area. This may worsen over time, particularly if the area continues to be used for recreation such as fishing. A more formal path with erosion control along the entire bank could both open up the entire shoreline to fishing, as well as protect the bank to further erosion. Alternatively, the shoreline could be stabilized with shrubs that would help to control erosion and also to discourage geese that like to walk up on grassed areas directly from the water.
- ***Treatment of parking lot runoff.*** The current parking lot is quite large for the size of the park. This parking lot could be downsized and/or the runoff treated before directly entering the pond. Depending on what use the beach has, it may be that the

parking lot could become park land and the entrance restricted to maintenance access only. Parking would be on the street just outside the grounds. This would allow more recreational area for picnicking and fishing, and also limit open dumping and the problem of needing to treat runoff from the parking lot. Since the park is small, considerable downsizing could be accomplished saving money and reducing the impact on water quality.

- **Separate Swimming Area.** If the outlet beach is used for future swimming activities, a boom to keep out floating materials from a dedicated swimming area should be added, in addition to implementing the other recommendations for improving water quality.

Alternative Uses for the Park and Beach

There are a number of options that could be considered for the future of the park. This report focuses on three basic alternatives: 1) the improvements needed to make a safe and clean bathing beach; 2) the improvements needed to convert the park and beach to fishing and bird watching; and 3) taking little or no action.

Alternative 1: Swimming Beach

The costs to make the swimming improvements described above are estimated in the range of \$400,000 - \$600,000 in capital costs, not including any work on the beach house, restroom facilities or other structures. It would include:

- Constructing an aeration station
- Shoreline erosion control and revetment
- Construction of a stormwater wetlands treatment system for the Route 4 ditch
- Changes to the parking lot to reduce its size and control runoff

Options for dredging the outlet pond to improve capacity and circulation of water within the swimming area could also be explored under this alternative. Assuming a cost of \$40 –\$ 50 per cubic yard, dredging options could increase the cost of this alternative by 0.5 to 1.5 million dollars depending on how much material is removed. This price assumes a cost to sample material, dredge, transport off-site and re-use the material; however, it does not include any contingencies for disposal of sediment material that could not be re-used safely and/or legally.

The pond area is approximately 283,000 SF or 6.5 acres. If the entire area were dredged at different average depths, the resulting volumes and associated costs would be:

1 foot deep = 10,500 CY and at a cost of approximately \$500,000 plus

2 feet deep = 20,980 CY and at a cost of approximately \$1,000,000 plus

3 feet deep = 31,470 CY and at a cost of approximately \$1,500,000 plus

Depending on how much dredging is done (which would require further study since there are no sediment depth maps available), the cost would be on the order of \$900,000 to \$2.1 million. The estimated operations and maintenance costs would be an additional \$20,000-\$40,000 per year, not including lifeguards, monitoring, laboratory analysis or other maintenance to the park or beach. If the beach were open for swimming, monitoring for fecal bacteria should be done weekly at a minimum for *Enterococcus* and *E. coli*. If aeration is installed, monitoring for dissolved oxygen levels and phosphorus would also need to be done monthly or more often.

If there were to be a full upgrade to the park, beach areas and the facilities, the cost could easily exceed 2-3 million dollars. There would also be no guarantee that swimming would be open all summer long. Since the water quality is poor at present, those improvements would increase clarity and improve the situation, but probably not to a level safe for continuous use as a swimming beach. If this is the chosen alternative, then further analysis will be needed to prepare a bathymetric (bottom contour) map of the outlet pond and a survey of the shoreline. These have been included in the costs. The work would require 12 – 16 months.

Alternative 2: Fishing and Bird Watching

If the area were closed to swimming, but improved for fishing, the costs would be much less: estimated at \$65,000 and with minimal annual costs. The area seems to be quite accessible, so handicapped accessible fishing would be a nice addition. The shoreline could be opened up to fishing all the way around the beach and towards Route 4 with some fairly inexpensive erosion controls. Minimal treatment of the ditch that drains Route 4 could provide a much more aesthetically attractive area, and reduction in the size of the parking lot could further improve the aesthetics of the park. For cost purposes, this alternative includes:

- Grading of the park and ditch with re-vegetation
- Reducing the impervious parking lot area
- Placement of erosion control measures along the shoreline
- Construction of a handicap accessible fishing platform
- Installation of "No Swimming" signage

Providing these alternative recreational opportunities would involve limited improvements along the shoreline, removal of all or part of the parking lot, and perhaps construction of a handicap accessible fishing pier. This alternative would not include any upgrades to the existing buildings, however, options could be explored for these improvements to minimize impacts to the park and future maintenance costs. Additionally, a portion of the park could be used for a stormwater treatment system for Route 4, for example, wetlands treatment that could also provide enhanced bird watching.

This work could be accomplished over time for affordability without the rush of trying to meet an upcoming bathing season that is likely to be missed, in any event. Planning would include consultation with the state Department of Transportation, as well as Maine Department of Environmental Protection and Maine Department of Inland Fisheries and Wildlife. Time for implementation would be 12-16 months for construction and establishing vegetation.

Alternative 3: Decommissioning Beach and Park

The option to do little or nothing is also available. It would include "no swimming" signage at the least, and to avoid increasing vandalism and illegal dumping, the parking lot area would be reduced and existing buildings demolished. This cost is estimated at \$30,000, which would convert the park area back to a more naturalized state and minimize impacts from any future public access. The work would take 6-12 months depending on when it begins.

Recommendations

The water quality of the outlet pond is highly compromised due to a combination of: a) poor circulation; b) minimal fresh inflow from the watershed; c) little groundwater inflow, and d) high volumes of stormwater input from Route 4 and from the open grassed area of the park. Geese frequent the grassed area, as they do in many parts of the northeast, and add additional pollutants to the outlet pond.

The outlet pond's water quality does not meet EPA's new beaches criteria much of the time. In order to remedy this, several significant actions would be needed as described above, and there is no guarantee that these efforts would be completely successful and bring swimming back to the beach. More importantly, the beach is far from ideal in shape or size. The beach is narrow and not very long, while the swimming area is quite small with a sometimes mucky bottom that many people may find unpleasant.

The costs to improve this particular beach for continued swimming are high, in the tens of thousands of dollars per swimmer depending on the components of the alternative. If the area were really significantly improved with dredging, beach nourishment and reconstruction of the shoreline, the costs could be more than \$50,000 per swimmer. If swimming is the most important factor, then there are much better alternatives including construction of a pool or investment at a larger, cleaner resource pond.

Based on these factors, and on the high cost of the needed improvements to meet a swimming goal, we recommend either Alternative 2 or 3, as described above. Since the park could only support about 20-30 people at a given time compared to a relatively high cost, there may be better local parks to make this type of investment where there would be a higher return for the monetary and maintenance investment. The beach should be closed to swimming permanently to protect public health, with posting of "No Swimming" signage immediately.

To determine the best use of limited funds, it is recommended that a broader evaluation of all of the available ponds/beaches in Auburn and surrounding areas be conducted to compare the benefits and costs of the various recreational investments. The evaluation should include a ranking of beach capacity for each potential resource, compared to the potential benefits and costs of needed improvements.

Appendix A

EPA Report on Recreational Water Quality

2012 Recreational Water Quality Criteria

Summary

EPA has released its 2012 recreational water quality criteria (RWQC) recommendations for protecting human health in all coastal and non-coastal waters designated for primary contact recreation use. EPA provides two sets of recommended criteria. Primary contact recreation is protected if either set of criteria recommendations are adopted into state water quality standards.

These recommendations are intended as guidance to states, territories and authorized tribes in developing water quality standards to protect swimmers from exposure to water that contains organisms that indicate the presence of fecal contamination.

Background

EPA last issued ambient water quality criteria recommendations for recreational waters in 1986. EPA issues such recommendations under the authority of the Clean Water Act (CWA). Amendments to the CWA by the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000 direct EPA to conduct studies associated with pathogens and human health, and to publish new or revised criteria recommendations for pathogens and pathogen indicators based on those studies. These 2012 RWQC meet those requirements.

The 2012 RWQC rely on the latest research and science, including studies that show a link between illness and fecal contamination in recreational waters. They are based on the use of two bacterial indicators of fecal contamination, *E. coli* and enterococci. The new criteria are designed to protect primary contact recreation, including swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities where a high degree of bodily contact with the water, immersion and ingestion are likely.

What are the recommendations?

The 2012 RWQC offer two sets of numeric concentration thresholds, either of which would protect the designated use of primary contact recreation and, therefore, would protect the public from exposure to harmful levels of pathogens. Illness rates upon which these recommendations are based use the National Epidemiological and Environmental Assessment of Recreational Water (NEEAR) definition of gastrointestinal illness, which is not limited to illnesses which exhibit a fever.

The RWQC consist of three components: magnitude, duration and frequency. The magnitude of the bacterial indicators are described by both a geometric mean (GM) and a statistical threshold value (STV) for the bacteria samples. The STV approximates the 90th percentile of the water quality distribution and is intended to be a value that should not be exceeded by more than 10 percent of the samples taken. The table summarizes the magnitude component of the recommendations. All three components are explained in more detail in the sections below.

CRITERIA ELEMENTS	Recommendation 1 Estimated Illness Rate 36/1,000		Recommendation 2 Estimated Illness Rate 32/1,000	
	GM (cfu/100 mL)	STV (cfu/100 mL)	GM (cfu/100 mL)	STV (cfu/100 mL)
Enterococci (marine & fresh)	35	130	30	110
<i>E. coli</i> (fresh)	126	410	100	320

Water quality criteria recommendations are intended as guidance in establishing new or revised water quality standards. They are not regulations themselves. States and authorized tribes have the discretion to adopt, where appropriate, other scientifically defensible water quality criteria that differ from EPA's recommended criteria.

RECOMMENDATION 1: MAGNITUDE

Enterococci: Culturable enterococci at a

geometric mean (GM) of 35 colony forming units (CFU per 100 milliliters (mL) and a statistical threshold value (STV) of 130 cfu per 100 mL, measured using *EPA Method 1600*, or any other equivalent method that measures culturable enterococci.

E. coli: Culturable *E. coli* at a GM of 126 cfu per 100 mL and an STV of 410 cfu per 100 mL measured using *EPA Method 1603*, or any other equivalent method that measures culturable *E. coli*.

RECOMMENDATION 2: MAGNITUDE

Enterococci: Culturable enterococci at a GM of 30 cfu per 100 mL and an STV of 110 cfu per 100 mL, measured using *EPA Method 1600*, or any other equivalent method that measures culturable enterococci.

E. coli: Culturable *E. coli* at a GM of 100 cfu per 100 mL and an STV of 320 cfu per 100 mL measured using *EPA Method 1603*, or any other equivalent method that measures culturable *E. coli*.

FOR BOTH RECOMMENDATIONS

Duration and Frequency: The waterbody GM should not be greater than the selected GM magnitude in any 30-day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval.

How are these criteria different from the 1986 criteria?

Similar Protection for Fresh and Marine Waters: The EPA used an analysis of NEEAR water quality data to refine the illness rate estimate for the recommended marine criterion for enterococci. The 2012 RWQC values now protect public health similarly in both marine and fresh waters.

A New Measurement Value: EPA is introducing a new term, Statistical Threshold Value (STV), to be used in conjunction with the recommended GM value.

New Early Alert Tool: In addition to recommending criteria values, EPA is now also

providing states with Beach Action Values (BAVs) for use in notification programs. The BAV is provided for states to use as a precautionary tool to provide an early alert to beachgoers, including families with children.

A Single Level of Beach Use: The 1986 bacteria criteria document included four single sample maximum (SSM) values appropriate for different levels of beach usage (use intensities). In the 2012 RWQC, EPA removed those recommendations and instead provided states with optional, precautionary BAVs for use in monitoring and notification programs.

More Tools for Assessing and Managing Recreational Waters: EPA is providing information on tools for evaluating and managing recreational waters, such as predictive modeling and sanitary surveys. The Agency is also providing tools for developing site-specific criteria such as epidemiological studies, quantitative microbial risk assessment, and use of alternative indicators or methods. The EPA has developed and validated a molecular testing method using quantitative polymerase chain reaction (qPCR) as a rapid analytical technique for the detection of enterococci in recreational water (EPA Method 1611). For the purposes of beach monitoring, a state may use a qPCR method on a site-specific basis.

Where can I find more information?

EPA has put the 2012 RWQC document, support documents, and the Federal Register Notice, in the docket (Docket identification No. EPA-HQ-OW-2011-0466) which can be accessed via EPA's website at <http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/index.cfm>.

You can also contact Sharon Nappier at nappier.sharon@epa.gov or (202)566-0740, or contact Tracy Bone at bone.tracy@epa.gov or (202) 564-5257 for more information.

Appendix B

When Geese Become a Problem



New York State Department of Environmental Conservation
 Division of Fish, Wildlife and Marine Resources
 and
 U.S. Department of Agriculture
 Animal and Plant Health Inspection Service



When Geese Become a Problem

May 2007

Canada geese...

...are a valuable natural resource that provide recreation and enjoyment to bird watchers, hunters, and the general public throughout New York State. The sight of the distinctive V-formation of a flock of Canada geese flying high overhead in spring or fall is a sign of the changing seasons. But in recent years, flocks of local-nesting or “resident” geese have become year-round inhabitants of our parks, waterways, residential areas, and golf courses, and too often, they are causing significant problems.

In urban and suburban areas throughout New York State, expanses of short grass, abundant lakes and ponds, lack of natural predators, limited hunting, and supplemental feeding have created an explosion in resident goose numbers. While most people find a few geese acceptable, problems develop as local flocks grow and the droppings become excessive (a goose produces about a pound of droppings per day). Problems include over-grazed lawns, accumulations of droppings and feathers on play areas and walkways, nutrient loading to ponds, public health concerns at beaches and drinking water supplies, aggressive behavior by nesting birds, and safety hazards near roads and airports.

This document describes the most effective methods currently available to discourage geese from settling on your property and to reduce problems with geese that have already become established on a site. **For more information, contact any of the agency offices listed at the end of this booklet.**

Population Growth

In the early 1900s, only a handful of Canada geese nested in the wild in New York State. These geese were descendants of captive birds released by private individuals in the Lower Hudson Valley and on Long Island. Local flocks grew rapidly and spread to other areas. During the 1950s and 1960s, game farm geese were released by the State Conservation Department on wildlife management areas in upstate New York (north and west of Albany).

Today, New York’s resident Canada goose population numbers close to 200,000 birds, with nesting documented all across the state. The estimated number of geese breeding in New York has more than doubled since population surveys began in 1989 (Fig. 1).

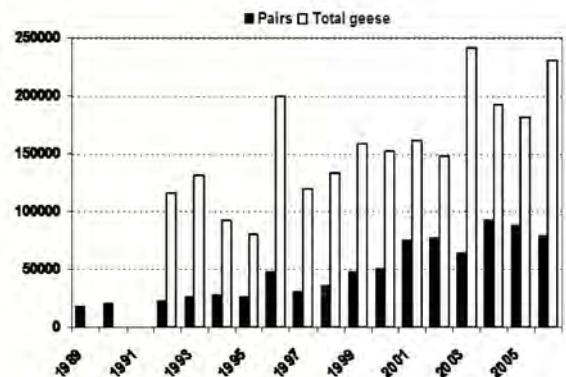


Figure 1. Estimated number of resident Canada geese (breeding pairs and total birds) in New York State, based on spring surveys, 1989-2006.

Legal Status

All Canada geese, including resident flocks, are protected by Federal and State laws and regulations. In New York, management responsibility for Canada geese is shared by the U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture (USDA), and the New York State Department of Environmental Conservation (DEC). It is illegal to hunt, kill, sell, purchase, or possess migratory birds or their parts (feathers, nests, eggs, etc.) except as permitted by regulations adopted by USFWS and DEC. **Special permits are required for some of the control methods discussed in this booklet.**

Goose Biology

Resident geese are long-lived in suburban areas. Some will live more than 20 years. Most geese begin breeding when they are 2-3 years old and they nest every year for the rest of their lives. They mate for life, but if one member of a pair dies, the other will mate again. Geese lay an average of 5-6 eggs per nest, and about half will hatch and become free-flying birds in the fall. **A female goose may produce more than 50 young over her lifetime.**

The annual life cycle for geese begins in late winter when adult pairs return to nesting areas in late February or March, as soon as waters open up. Egg-laying (1-2 weeks) and incubation (about 4 weeks) generally extend through April, with the peak of hatching in late April or early May, depending on location in the state. Geese will aggressively defend their nests, and may attack if approached. Non-breeding geese often remain nearby in feeding flocks during the nesting season. After hatching, goose families may move considerable distances from nesting areas to brood-rearing areas, appearing suddenly “out of nowhere” at ponds bordered by lawns.

After nesting, geese undergo an annual “molt”, a 4-5 week flightless period when they shed and re-grow their outer wing feathers. Molting occurs between mid-June and late July, and the birds resume flight by August. During the molt,

geese congregate at ponds or lakes that provide a safe place to rest, feed and escape danger. Severe conflicts with people often occur at this time of year because the geese concentrate on lawns next to water and can't leave during that period. Before the molt, some geese without young travel hundreds of miles to favored molting areas. These “molt migrations” account for the disappearance or arrival of some local goose flocks in early June.

After the molt and through the fall, geese gradually increase the distance of their feeding flights and are more likely to be found away from water. Large resident flocks, sometimes joined by migrant geese in October, may feed on athletic fields and other large lawns during the day, and return to larger lakes and ponds to roost at night. This continues until ice or snow eliminates feeding areas and forces birds to other open water areas nearby or to the south, where they remain until milder weather returns and nesting areas open up.

“Resident” geese, as their name implies, spend most of their lives in one area, although some travel hundreds of miles to wintering areas. Resident geese are distinct from the migratory populations that breed in northern Canada. **Banding studies have shown that resident geese are not simply migrant geese that stopped flying north to breed.** In fact, Canada geese have a strong tendency to return to where they were born and use the same nesting and feeding sites year after year. This makes it hard to eliminate geese once they become settled in a local area.

Discouraging Geese

There are many ways to discourage geese from settling in your area. No single technique is universally effective and socially acceptable. **Persistent application of a combination of methods is usually necessary and yields the best results.**

Goose problems in suburban areas are especially difficult because birds are not afraid of people and may become accustomed to scaring techniques. Also, some techniques are not

compatible with desired human uses of suburban properties. For example, loud noisemakers in residential areas, putting grid wires over swimming areas, or letting grass grow tall on athletic fields are not practical remedies in those situations. But don't rule out any technique that might work; dogs under strict supervision can safely be used in parks and schools, and controlled hunting has been successfully used at some golf courses.

Begin control measures as soon as you notice geese in your area, and be persistent. Once geese settle in a particular location, they will be more tolerant of disturbances and be difficult to disperse. No method works well with just a few attempts, and a comprehensive, long-term strategy is usually needed.

Control measures work in various ways. Some reduce the biological capacity of an area to support geese by reducing availability of food or habitat. Other methods disperse geese to other sites where, hopefully, they are of less concern. Some techniques reduce the actual number of geese to a level that people can tolerate ("social carrying capacity").

Control techniques described in this booklet include only those that have the best chance for success based on past experience. Other methods may work, and new techniques will undoubtedly be developed in the future. **We welcome reports on the effectiveness of any goose control measures that you employ.**

Discontinue Feeding

Although many people enjoy feeding waterfowl in parks and on private property, this often contributes to goose problems. Feeding may cause large numbers of geese to congregate in larger numbers than natural habitats would support. Well-fed domestic waterfowl often act as decoys, attracting even more birds to a site. Feeding usually occurs in the most accessible areas, making a mess of heavily used lawns, walkways, roads, and parking areas.

Supplemental feeding also teaches geese to be unafraid of people, making control measures

less effective. Feeding may be unhealthy for the birds too, especially if bread or popcorn become a large part of their diet. Geese that depend on human handouts are less likely to migrate when severe winter weather arrives, and are more vulnerable to disease. Once feeding is discontinued, some geese will disperse and revert to using higher quality natural foods.

Supplemental feeding should be stopped as a first step in any control program. Wild geese are very capable of finding other food and will survive without handouts from humans. Some success in reducing goose feeding may be achieved through simple public education, such as posting of signs. DEC can provide examples of signs to help with this technique.



**PLEASE
DON'T FEED WATERFOWL**

REGULAR FEEDING CAN CAUSE:

- ✓ Unnatural Behavior
- ✓ Pollution
- ✓ Overcrowding
- ✓ Delayed Migration
- ✓ Poor Nutrition and Disease

Many people enjoy feeding waterfowl, but the effects of this seemingly generous act can be harmful. If you care about waterfowl, please stop feeding them and allow them to return to their natural habits.

LET'S KEEP WILDLIFE WILD.

Support Federal, State, and Private Organizations and their efforts to conserve waterfowl and their natural habitats.

For more information about the effects of feeding waterfowl, contact the New York State Department of Environmental Conservation Office nearest you.

Further reduction of feeding may require adoption and enforcement of local ordinances with penalties such as fines or "community service" (cleaning up droppings, for example!) for violations.

Allow Hunting

More than 30,000 people hunt waterfowl in New York State each year, and close to 100,000 Canada geese are taken annually. Hunting in

urban-suburban areas is often limited by lack of open spaces and local ordinances prohibiting discharge of firearms. However, open shoreline areas, reservoirs and large private properties where access can be controlled (such as golf courses) are good places to try hunting.

Where it can be done safely, hunting can help slow the growth of resident goose flocks. Hunting removes some birds and discourages others from returning to problem areas. It also increases the effectiveness of noisemakers, because geese will learn that loud noises may be a real threat to their survival.

Goose hunting is permitted in most areas of New York State during September, when few migratory geese from Canada are present. Hunting is allowed also in fall and winter, but regulations tend to be more restrictive than to protect migratory geese that may be in the state at that time. To hunt waterfowl in New York, a person must have a State hunting license (which requires a hunter safety course), a federal Migratory Bird Hunting Stamp, and be registered in New York's Harvest Information Program. Hunters should check local laws regarding discharge of firearms.

Landowners concerned about potential conflicts can easily limit the number of hunters and times they allow hunting on their property. For more information about goose hunting regulations or setting up a controlled hunt, contact DEC.

Modify Habitat

Geese are grazing birds that prefer short, green grass or other herbaceous vegetation for feeding. Well-manicured lawns and newly seeded areas provide excellent habitat for these grazing birds.

Wherever possible, let grass or other vegetation grow to its full height (10-14") around water bodies so that it is less attractive to geese. In time, most geese will stop feeding in those areas. Instead of grass, plant or encourage native shrubs or less palatable ground cover, such as ivy, pachysandra, or junipers, around the shoreline of ponds and along walkways where geese are a problem.

You can also plant grass species that are less palatable to geese, including some that go dormant in the winter. Geese tend to prefer Kentucky bluegrass, and are less attracted to fescue. Also, minimize use of lawn fertilizers to reduce the nutritional value of grass to the birds.

It is very difficult to eliminate goose nesting habitat. Geese rarely nest in open lawns where they feed. Typically, they build nests on the ground close to water, hidden by vegetation. However, geese are very adaptable and nest in a variety of habitats, including woodlands, flower gardens, and rooftops. Islands and peninsulas are preferred nesting sites, and often support many more nesting geese than mainland shorelines. Avoid creating such features during landscaping of ponds in problem areas. Local zoning regulations may be a way to discourage habitat developments that favor geese.

Install Grid Wires

Geese normally rest on open water or along shorelines to feel safe from predators. They also tend to land and take off from open water when feeding on adjacent lawns. Where practical, construct a system of suspended wires over the water to deny the birds access to such areas. Single strands of #14 wire or 80-100 pound test monofilament line can be arranged in a grid with 10-15 feet between wires. Each wire must be secured so that it remains 12-18" above the water surface, and perimeter fencing may be needed to keep geese from walking under the grid. To reduce the risk of birds flying into the wires, attach brightly colored rope, flagging or other markers to make them more visible.

Wire systems are not practical for ponds used for swimming, fishing, or other recreation. However, golf course ponds, reflecting pools, wastewater ponds, and newly seeded lawns with limited public access, may be suitable. Human disturbance (vandalism) of grid wires may be a problem in public areas.

Install Fencing

Fencing or other physical barriers can be

effective where geese tend to land on water and walk up onto adjacent lawns to feed or rest. Fencing works best during the summer molt, when geese are unable to fly and must walk between feeding and resting areas. In these situations, fencing, dense shrubbery, or other physical barriers installed close to the water's edge are effective ways to control goose movements. Fences must completely enclose the site to be effective. Fencing may also be used to block aggressive birds on nests near buildings or walkways. Although birds can get around most fencing, direct attacks may be prevented. Fencing around large open areas, such as athletic fields or ponds, has little effect on free-flying birds.

Goose control fences should be at least 30" tall (48-60" to block aggressive birds) and solidly constructed. Welded wire garden fencing (2" x 4" mesh) is durable and will last years. Less expensive plastic or nylon netting is effective, but will have to be replaced more often. Fences may be hidden by planting shrubs close by. Snow fencing or erosion control fabric may be used as a temporary barrier to molting geese. Fencing made of two parallel monofilament fish lines (20 pound test) strung 6" and 12" above ground and secured by stakes at 6' intervals can work, but is less reliable. Some success has been reported with low voltage electric fencing.

Use Visual Scaring Devices

Various materials may be used to create a visual image that geese will avoid, especially if they are not already established on a site, such as newly seeded areas. Geese are normally reluctant to linger beneath an object hovering over head. However, visual scaring devices are not likely to be effective on suburban lawns where trees or other overhead objects exist and where geese have been feeding for years.

One inexpensive visual deterrent for geese is Mylar tape that reflects sunlight to produce a flashing effect. When a breeze causes the tape to move, it pulsates and produces a humming sound that repels birds. This product comes in 1/2"-6" widths. To discourage geese from walking up onto lawns from water, string the

tape along the water's edge. To ensure maximum reflection and noise production, leave some slack in the tape and twist the material as you string it from stake to stake.

Another visual scaring technique is the placement of flagging or balloons on poles (6' or taller) or other objects in and around an area to be protected. Flagging can be made of 3-6' strips of 1" colored plastic tape or 2' x 2' pieces of orange construction flagging. Bird-scaring balloons, 30" diameter, with large eye-spots and helium filled, are sold at some garden or party supply stores. Numerous flags or balloons may be needed to protect each acre of open lawn. These materials should be located where they will not become entangled in tree branches or power lines. They also may be subject to theft or vandalism in areas open to the public. If geese become acclimated, frequent relocation of the materials is recommended.

For small ponds, remote control boats have been used to repel geese, and these may be practical if staff or volunteers are available on a daily basis to help out.

Use Noisemakers

Geese may be discouraged from an area through the use of various noisemakers or pyrotechnics. Shell crackers are special shells fired from a 12-gauge shotgun that project a firecracker up to 100 yards. Other devices, such as screamer sirens, bird-bangers, and whistle bombs, are fired into the air from a hand-held starter pistol or flare pistol. These devices generally have a range of 25-30 yards.

Automatic exploders that ignite propane gas to produce loud explosions at timed intervals are effective for migrant geese in agricultural fields, but are not suitable for residential or public areas.

Noisemakers work best as preventive measures before geese establish a habit of using an area and where the birds are too confined to simply move away from the noise. At sites with a history of frequent use by geese and people, the birds may become acclimated in 1-2 weeks.

Noise devices are often not effective for moving nesting geese.

Before using any of these techniques, check with local law enforcement agencies (police) about noise control ordinances, fire safety codes, or restrictions on possession and discharge of firearms. Obtain special permits if necessary. In some areas, starter pistols are considered a handgun, and their possession and use may be regulated. Federal and state permits are not necessary to harass geese with these techniques, as long as the birds are not physically harmed.

Where discharge of firearms is allowed, occasional shooting of geese can increase the effectiveness of noisemakers, as geese associate the sound with a real threat. Special Federal and State permits are generally needed to shoot geese outside of established hunting seasons.

Apply Goose Repellents

The U.S. Environmental Protection Agency and DEC have approved the use of one product, ReJeXiT®, as a goose repellent on lawns. Geese will feed less often on treated lawns because they dislike the taste. However, geese may still walk across treated areas to get to adjacent untreated areas.

The active ingredient in ReJeXiT® is methyl anthranilate (MA), a human-safe food flavoring derived from grapes. The material is available at some garden supply centers and costs about \$125 per acre per application. Several applications per year are usually necessary. Therefore, it is most practical and cost-effective for homeowners with only small areas of lawn to protect. For best results, follow directions on product labels; if too dilute, it won't work, if too concentrated, it can kill the grass.

ReJeXiT® may not be used in ponds or wetlands in New York State, and a DEC Article 24 (Freshwater Wetland) permit is needed to apply it within 100 feet of a regulated wetland. No other repellents, including products containing formulations of MA, have been approved for use in New York State.

Use Dogs to Chase Geese

Use of trained dogs to chase geese is among the most effective techniques available today. It is widely used to disperse geese from golf courses, parks, athletic fields and corporate properties. Border collies or other breeds with herding instincts tend to work best. The dogs must be closely supervised during this activity. Except where permitted, compliance with local leash laws or park regulations is still required. Initially, chasing must be done several times per day for several weeks, after which less frequent but regular patrols will still be needed. Geese will not become acclimated to the threat of being chased by dogs.

This method is most practical where the dog and handler are on-site at all times, or where daily service (as needed) is available from private handlers. Another approach is to allow dogs to roam freely in a fenced (above ground or "invisible" dog fence) area that is not open to the public, but this may be less effective. Dogs generally should not be used when geese are nesting or unable to fly, such as during the molt or when goslings are present. Use of dogs may not be practical near busy roads or where a property is divided into many small sections by fences, buildings, or other barriers. Also, dogs can not easily repel geese from large water areas, but may be able to keep geese off shoreline lawns or beaches. Although this technique has proven effective, it can be expensive and labor intensive.

Control Goose Nesting

Geese usually return in spring to the area where they hatched or where they nested previously. Over time, this results in increasing numbers of geese in areas that once had just a few birds. Local population growth may be controlled by preventing geese from nesting successfully. Although it is difficult to eliminate nesting habitat, harassment in early spring may prevent geese from nesting on a particular site. However, they may still nest nearby where they are not subject to harassment.

If nest prevention fails, treating the eggs to prevent hatching is an option. This can be done by puncturing, shaking, freezing or applying 100% corn oil to all of the eggs in a nest. The female goose will continue incubating the eggs until the nesting season is over. If the nest is simply destroyed or all the eggs are removed, the female may re-nest and lay new eggs.

Federal and state regulations apply to any disturbance or treatment of Canada goose nests or eggs. However, federal rules only require that persons register on-line at: <https://epermits.fws.gov/eRCGR> before conducting this activity. This website is also a good source of information about egg treatment.

Egg treatment helps in several ways. First, it directly reduces the number of geese that will be present on a site later in the year. Second, geese without young will be more easily repelled from a site after the nesting season. Finally, if conducted on a large enough scale (throughout a town), it can help slow the growth of a local goose population, and over time lead to stable or declining numbers. Egg treatment may be necessary for 5-10 years before effects on goose numbers are evident.

Capture and Remove Geese

An effective method of relief for sites with problems during the summer, or to help reduce year-round goose numbers in an area, is capture and removal of geese. **Federal and state permits are required for this activity.**

Geese are easy to capture during the molt by simply herding them into holding pens. In large areas, it may be necessary to remove geese for several years to get maximum results. After geese are removed, the capture site will have substantially fewer geese for the rest of the summer or longer. Over time, geese from surrounding areas may move in if preventive measures are not in place.

Geese removed from problem areas can be processed and donated to charities for use as food. If properly handled by a licensed poultry processor, goose meat is a healthy and well-

received source of food for needy people. However, this method is controversial. Media interest, protests and legal challenges from animal rights activists can be expected.

Relocation of geese is not an option at this time. In the past, DEC captured thousands of geese from problem areas and shipped the birds to other states that wanted to establish their own resident goose populations. Opportunities for out-of-state transfers have been exhausted as resident goose flocks now occur throughout the U.S. In some states, problem geese are moved to public hunting areas to reduce the likelihood of the birds returning. In New York State, there are no known areas where problem geese from other areas would be welcome.

Relocation of geese is also less effective than permanent removal. Banding studies have shown that some relocated geese return to their initial capture locations by the following summer. Some have returned to New York from as far away as Maine, South Carolina and Oklahoma. Geese taken short distances (less than 50 miles) may return soon after they are able to fly. Adult geese are most likely to return, whereas goslings moved without parent birds will often join a local flock and remain in the release area. Birds that don't return may seek out areas similar to where they were captured, and may cause problems there too.

Many wildlife and animal health professionals are concerned that relocating problem wildlife increases the risk that diseases may be spread to wildlife or domestic stock in other areas.

Not Recommended

For almost any goose control method that has been tried, there have been successes and failures. However, the following methods are not recommended at this time for various reasons: use of swans (real ones create other problems; fake ones don't work); bird distress calls (effective for some bird species, but not proven for geese); scarecrows or dead goose decoys (ineffective for resident geese); use of trained birds of prey to chase geese (labor-intensive, generally not available); sterilization

(very labor-intensive for surgery, no chemical contraceptives available in the foreseeable future); fountains or aerators in ponds (not effective, may even attract geese); introduction of predators (already present where habitat is suitable, and none take only geese); disease (impossible to control and protect other animals); and use of poisons (illegal).

“Community-based” Goose Management

Simply chasing geese from one place to another does not address the underlying problem of too many geese, and may simply move the problem from one property owner to another. This is not an effective strategy for communities with widespread goose problems. Therefore, DEC and USDA encourage local governments and landowners to work together to implement comprehensive management programs that include a variety of techniques. Control measures will be most effective if coordinated among nearby sites in a community.

While some measures can be tried at little or no cost, others are more costly and beyond the means of some property owners. In these instances, local governments may want to hire a local “goose control officer” to work throughout a community, similar to other animal control work. Duties could include posting “no feeding” areas, installing fences, handling dogs, treating eggs, and removing geese. This way, the cost of goose management would be shared by all the residents of a community, including those who benefit from the geese as well as those who may experience problems.

Permits

Federal and State laws and regulations govern the capture, handling, or killing of Canada geese, including disturbance of goose nests or eggs. Permits are required for some activities, but there are exceptions. For more information, see the DEC publication “*Permit Requirements for Take of Canada Geese in New York - Questions and Answers*”.

Plan Ahead

Property owners and communities that have experienced problems in the past can expect geese to return again unless control measures are implemented. The best time to act is in late winter, before nesting begins, or as soon as geese show up where they are not wanted. If any permits are needed, allow plenty of lead time (45-60 days) for processing.

For more information...

If the techniques described in this document are unsuccessful, or if you want more information, contact USDA-Wildlife Services or any DEC regional wildlife office for assistance.

USDA can provide information by phone or by mail and will conduct site visits in some cases. USDA also can provide control services on-site under funded cooperative agreements (for a fee). For help in New York State, contact:

USDA APHIS - Wildlife Services
1930 Route 9
Castleton, NY 12033-9653
Phone: (518) 477-4837

DEC can provide technical information and advice, and refer you to licensed wildlife control specialists who can help. DEC generally does not provide field assistance to landowners with goose problems, but will work with local governments to help develop community-based management programs. For assistance, contact the nearest DEC regional office, and for other DEC publications, go to: www.dec.ny.gov.

An excellent reference for goose control planning is “*Managing Canada Geese in Urban Environments: A Technical Guide*”. This manual provides details for selecting and implementing various techniques to reduce conflicts with geese. To order or download a copy, try an internet search for the publication title or contact Cornell Cooperative Extension, Ithaca, NY 14853 (607) 254-6556.

Good luck!