

Proposed Amendment of the Management Strategy for Double-crested Cormorants at Presqu'ile Provincial Park

1: Introduction

A management strategy was released in 2002 to guide the Ministry of Natural Resources (MNR) in a four year management program to reduce the population of Double-crested Cormorants (cormorants) in Presqu'ile Provincial Park. The objective of the strategy is to control cormorant nesting activity in order to protect High Bluff Island's western woodland habitat, a significant ecosystem that is habitat for a number of colonial waterbird species.

The 2002 strategy provided for a combination of nest removal, harassment and oiling of eggs in ground nests to control cormorants, and it was restricted to High Bluff Island. A minor amendment to the strategy was approved in 2003, in response to new information on bird behaviour, to expand the control area for the oiling of eggs in ground nests to both High Bluff Island and Gull Island (the Presqu'ile islands). As a further improvement in 2004, the control area for nest removal and harassment will be expanded to include cormorant nest sites in any area of woody vegetation on the Presqu'ile islands. Additional details are found in section 2: Project Description, on page 2.

The first year of implementation of the strategy was 2003. Implementation of the 2002 strategy, as modified by the two minor amendments of 2003 and 2004, will continue separate from the decision on the proposed major amendment.

Based on an assessment of the 2003 control program, the current control methods are inadequate to meet the objective of the strategy. So, a major amendment is now proposed to improve the effectiveness of the strategy. The proposed major amendment adds shooting of breeding adult cormorants as a control technique for any area of woody vegetation on High Bluff Island.

Details of the proposed management techniques are found in section 6: Management Technique Evaluation and Selection, on page 15.

The proposed cormorant strategy focuses on protecting woodland ecosystems on the islands that are prime nesting habitat for a number of colonial waterbird species. The Presqu'ile strategy is not directly related to the fisheries component of MNR's broader cormorant research, monitoring and experimental control program, but complements it by reducing overall cormorant numbers in eastern Lake Ontario.

The direction to prepare a cormorant management strategy comes from the *Presqu'ile Provincial Park Management Plan*. The management plan was approved in 2000, and provided the following direction with respect to cormorants:

- "A cormorant management strategy will be developed for the park, within the framework of:*
- *MNR's 1998 policy statement that control may be considered if cormorants are having significant adverse ecological impacts on specific habitats or other species, and*
 - *MNR's 2000 announcement of a five year cormorant research, monitoring, and experimental control program, focusing on the park area and several other locations.*

This strategy will deal with cormorant impacts on specific park values (vegetation, terrestrial habitat, other bird species)."

Consultation with affected residents, stakeholders, government ministries and others was an important part of the preparation of the strategy approved in April 2002. (A summary of this public input was presented in the appendix to that document.)

Public comment is now invited on this proposed major amendment of the strategy. Following the comment period, the final strategy will be completed and made available for inspection. The final strategy will include a summary of the public comment received on the proposed strategy.

Please direct comments to the following address. Comments must be received by April 16, 2004:

Ministry of Natural Resources
Ontario Parks, South Eastern Zone
51 Heakes Lane
Kingston, Ontario K7M 9B1
FAX: 613-536-7228

This proposed amendment addresses MNR policy and *Environmental Assessment Act* requirements (i.e. Exemption Order MNR-59/2). Individuals are encouraged to raise any concerns regarding the proposed amendment early in the process.

2: Project Description

Ontario Parks has completed an assessment of the impacts of Double-crested Cormorants at Presqu'ile Provincial Park. Between 1982 and 2002, the number of Double-crested Cormorant nests at Presqu'ile Provincial Park rose from one nest to 12,082 nests. Of the total number of nests in Presqu'ile in 2002, 43 percent of cormorants nested on the ground (5,189 nests) and 57 percent in trees (6,893 nests). Over time, the nesting activity of these birds has killed all trees on Gull Island and now threatens the remaining woody vegetation on High Bluff Island.

Maintaining the woodland habitat is not possible without ensuring the survival of the trees and shrubs themselves and maintaining the trees and shrubs on the islands is not possible without removing nesting cormorants from all areas of woody vegetation. In order to protect representative woodland flora and fauna, while retaining maximum diversity of nesting colonial bird species, Double-crested Cormorants will be removed from the woody vegetation on the Presqu'ile islands. The Presqu'ile strategy is not directly related to the fisheries component of MNR's broader cormorant research, monitoring and experimental control program, but complements it by reducing overall cormorant numbers in eastern Lake Ontario.

Adaptive management changes to the strategy from 2002 to 2004 are described in the following paragraphs.

2002 approved strategy

The 2002 strategy focussed on High Bluff Island. Although shooting was considered through the strategy, the selected approach involved other techniques and did not include shooting. The

strategy directed that the cormorants using the approximately 3050 tree nests in the western woodland of High Bluff Island would be discouraged from nesting through the removal of nests, and subsequent harassment of adult cormorants that return to the trees to try to nest again. In addition, a limited program to oil the eggs laid in ground nests was identified. Eggs were to be sprayed with oil approved for this purpose. Oiling prevents eggs from hatching. This strategy was expected to provide other tree nesting colonial waterbirds such as Great Egrets, Great Blue Herons and Black-crowned Night-Herons with continued nesting habitat at Presqu'île Provincial Park.

2003 and 2004 minor amendments

Before implementation began it was determined that nest removal and harassment actions in the western woodland of High Bluff Island would most likely result in relocation of the cormorants to ground nests on both High Bluff Island and adjacent Gull Island. The recruitment of birds fledged from ground nests on Gull Island would continue to hamper the objectives of the strategy, and therefore oiling of eggs in those ground nests was required. As a result of this new information on cormorant behaviour, a minor amendment to the strategy was approved in 2003, to expand the program of oiling of eggs in cormorant ground nests to all ground nests on both High Bluff Island and Gull Island.

Controlling cormorant nesting activity to protect High Bluff Island's significant woodland habitat and ensuring continued habitat for other colonial waterbird species remains as the objective of the management strategy. However, limiting control to just some areas of woody vegetation is ineffective, given that all areas of woody vegetation on the Presqu'île islands are habitat for cormorants and a number of other colonial waterbird species. So, the objective has been broadened and as a result, in 2004, the control area for nest removal and harassment will be expanded to include cormorant nest sites in any area of woody vegetation on the Presqu'île islands.

2004 major amendment

The management strategy was carried out for the first time in the spring and summer of 2003.

Following this action, there were 4,631 cormorant tree nests remaining on High Bluff Island. The majority of these nests (3,707) were located in the eastern woodland, where management actions did not occur. Although the number of successful cormorant nests declined as a result of the management actions, the number of breeding adults was not affected. Because cormorants are long-living birds, limiting reproduction alone is not an efficient means of reducing the population of a colony. As a result of analysis of the 2003 management actions the techniques, noted above, are no longer expected to meet the objectives of the strategy in protecting the woodland vegetation on the Presqu'île islands.

In order to improve the effectiveness of the management strategy, additional management techniques are required. A major amendment is proposed to allow shooting of breeding adult cormorants as a control technique in any area of woody vegetation on High Bluff Island. In areas where shooting would occur, only limited nest removal will be required. In cases where non-target colonial waterbirds could be at risk, limited removal of nests may occur in place of shooting. This technique is described further in section 3: Project Alternatives, on page 5.

Habitat for ground colonies will be created by the placement of woody material in suitable nesting locations. This creation of habitat will encourage re-nesting cormorants to use areas where control can be done by oiling eggs. Egg oiling and harassment of cormorants will

continue, using the 2002 strategy and its minor amendments of 2003 and 2004, as well as limited nest removal as required.

Further explanation of the actions for the proposed amendment are outlined in section 6: Management Technique Evaluation and Selection, on page 15.

The 2002 strategy involves four years of management actions. The amended management actions will be taken for the remaining three years of the strategy (2004 to 2006). The proposed actions will limit the negative impacts from cormorants that have been identified on the Presqu'île islands. The impacts of the actions will be monitored as described on page 17 in section 7: Implementation Details, during and following the management actions. Each year, a review and evaluation will be completed. Following evaluation, appropriate revisions may be made to the combination of preferred techniques outlined in this management strategy to ensure that the strategy is responsive to new information and that its objectives continue to be met.



Figure 1: Cormorants and their nests in living, dying and dead trees on High Bluff Island

Presqu'ile Provincial Park Area

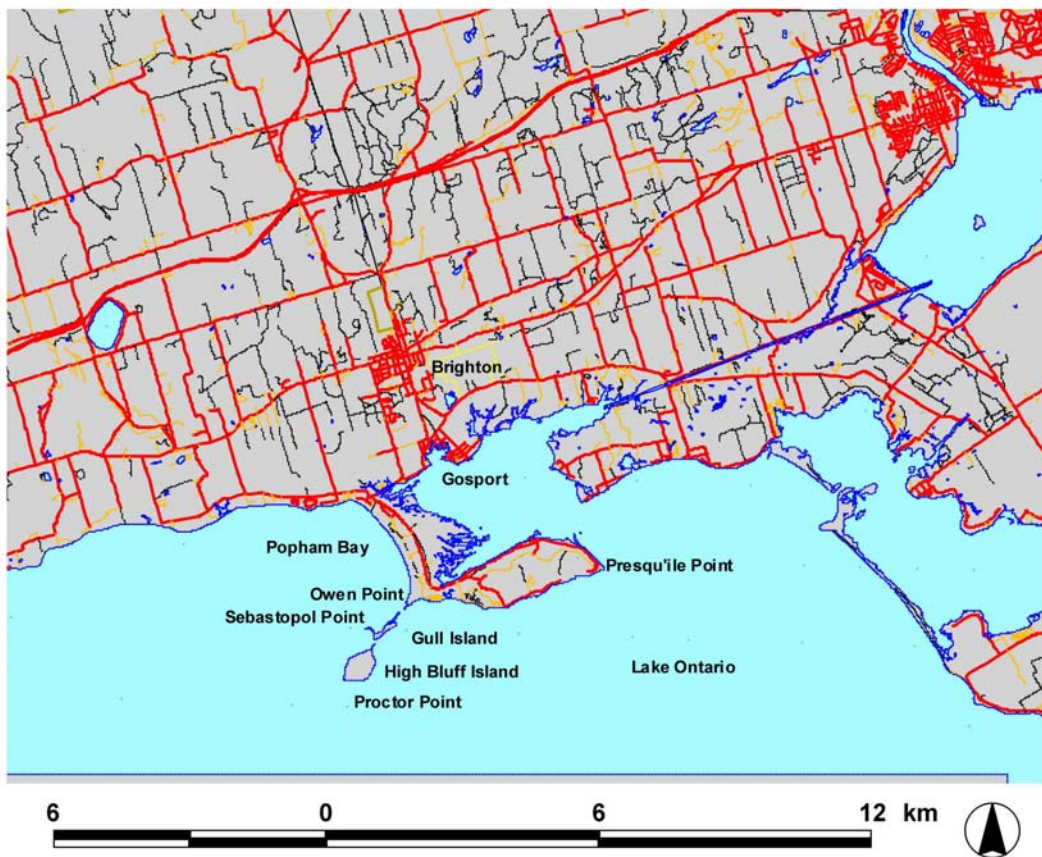


Figure 2: Regional Setting

3: Project Alternatives

A number of alternative techniques were considered to achieve the protection of woodland habitat on the Presqu'ile islands. They include nest removal, harassment, egg oiling, shooting and taking no direct action. These techniques are explained below. An evaluation of the techniques is found in Table 3.

Do Nothing

The “do nothing” option will result in the loss of woody vegetation on High Bluff Island as occurred on adjacent Gull Island in the late 1980s and early 1990s. It will not allow the woodland habitat on the islands to be sustained. As a result, colonial and other bird species will lose nesting habitat at Presqu'ile Provincial Park and cormorant numbers will continue to increase. The cormorant colony at Presqu'ile comprises the majority of the population in the eastern Lake Ontario and upper St Lawrence River area and is included in MNR's broader strategy for cormorants.

Nest Removal

Existing cormorant nests are removed by hand or by knocking them from the trees with long poles. (The use of firehoses for this purpose was found to be ineffective.) This discourages birds from occupying the nesting trees. This process has proved to be labour-intensive given the number of nests to be removed and the habit of displaced cormorants to rebuild nests. The very high level tree nests cannot be removed using this technique. In 2003, displaced birds were observed nesting again at other ground and tree locations on the islands. This method risks displacing cormorants and causing increasing pressure on other nearby sites.

Harassment

Birds attempting to nest are discouraged by the use of harassment tools such as noisemakers, “scare-crow” devices and optical devices. In 2003, displaced birds were observed attempting to nest again at other ground and tree locations within the park and may have attempted to nest beyond the park boundaries. Disturbance of perching or roosting birds may best occur at dusk to prevent cormorants from roosting in trees following the application of other techniques.

Oiling

Oiling of eggs is a management tool that has been successfully used to reduce ground nesting cormorant populations. It has been found to be effective on ground nests at Presqu’île in order to slow the rate of increase in the cormorant population. In 2003, eggs were treated with mineral oil approved by Health Canada. This technique is not practical in tree nesting populations as occurs at Presqu’île with a significant proportion of the cormorants. This technique can be made more effective through the creation of additional ground habitat sites once migration is finished; this involves the manual placement of woody material in suitable locations on the islands.

Shooting

Birds nesting or attempting to nest are killed by shooting using a low velocity bullet fired from a rifle equipped with a scope. This technique would be used for breeding adult cormorants nesting at all heights in trees and other woody vegetation on High Bluff Island. Birds in flight will not be shot. The disposal of cormorant carcasses will conform with all applicable laws and regulations.

4: Project Study Area

The study area includes two park islands within the park’s nature reserve zone NR2. The 2002 strategy was restricted to High Bluff Island, which lies 2 km southwest of the Presqu’île peninsula. As described in section 2: Project Description, on page 2, Gull Island was added to the study area in 2003 through a minor amendment to the strategy. High Bluff Island is 38.16 ha in area and Gull Island is 7.25 ha in area.

Landform Features

The landforms of this site include a limited lakeshore representation of a limestone island, shingle beach and gravel bar features. High Bluff Island is a low, essentially flat limestone outcrop that has a thin mantle of lacustrine sands and clays in its interior, shingle beaches at its periphery, and remnant shingle beach at its interior. Gull Island, expanding towards the peninsula from High Bluff Island, is a discontinuously exposed shingle and gravel bar which has a protected bay and small interior pond.

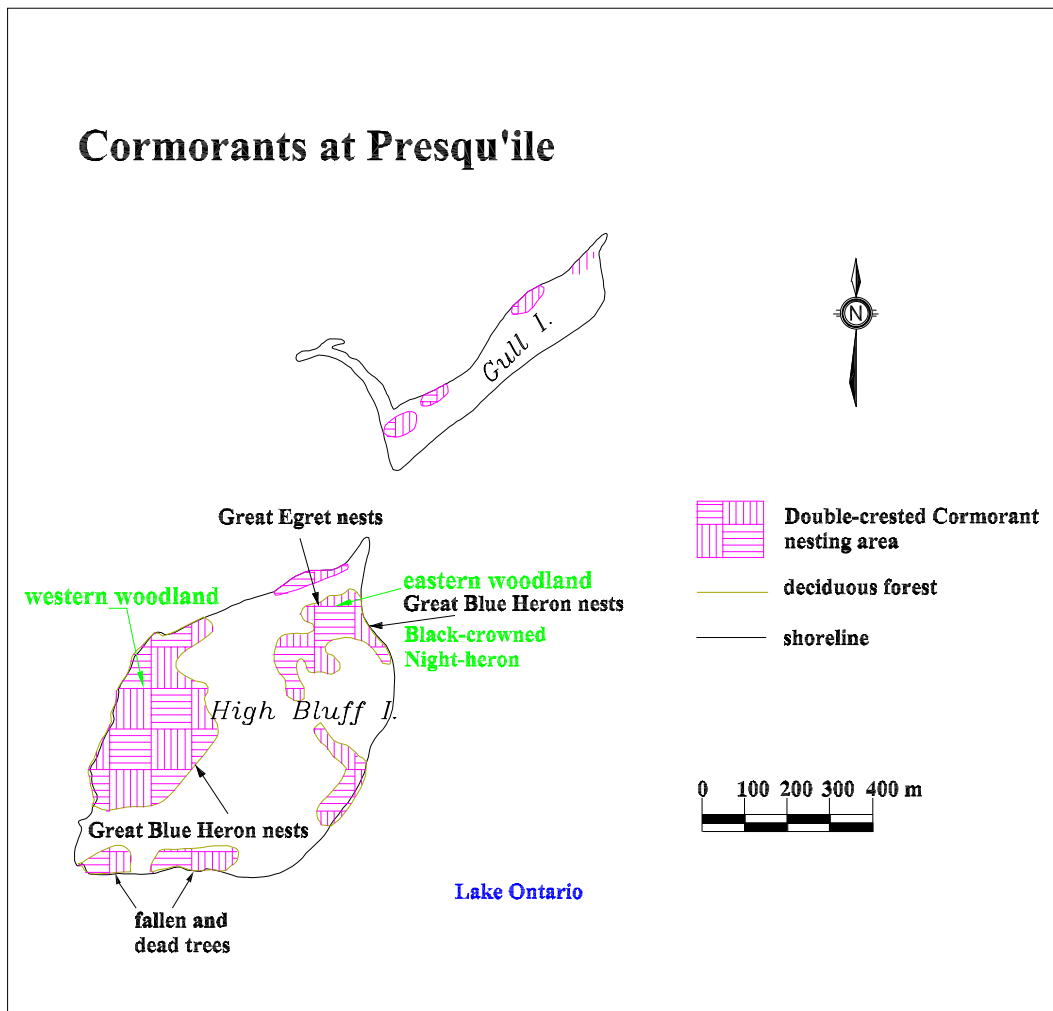


Figure 3: Project Study Area (nest locations from 2000)

Flora

High Bluff Island

The wooded areas of High Bluff Island consist of two major woodlands, on opposite ends of the island. The western woodland is 8.75 ha and the eastern woodland is 2.88 ha in area. Scattered individual trees are found throughout much of the island's interior. (See Figure 6.)

Until the early 1990s, a 1.55 ha strip of ash, poplar and cedar stretched along the island's southern shoreline from the navigation beacon to Proctor Point, the island's southwestern corner. (See Figure 4.) These trees have since died and fallen as a result of colonization by cormorants. (See Figure 5.)

Most of High Bluff Island's interior presents successional fields and thickets of Red-osier Dogwood (*Cornus stolonifera*), Choke Cherry (*Prunus virginiana*), Canada Bluegrass (*Poa compressa*), Canada Goldenrod (*Solidago canadensis*) and others.

The western end of High Bluff Island supports a forest type which is unique in the park. Very mature Sugar Maple (*Acer saccharum*), Red Oak (*Quercus rubra*) and Black Maple (*Acer saccharum ssp nigrum*) make up the tree cover. Dominant understory species include Virginia Waterleaf or John's Cabbage (*Hydrophyllum virginianum*) and Cutleaf Toothwort (*Cardamine concatenata*). The woodland is considered significant because of the age of the trees, the uncommon species association and the rarity of mature forest on islands in Lake Ontario.

The eastern woodland is dominated by White Ash (*Fraxinus americana*), White Cedar (*Thuja occidentalis*), Crack Willow (*Salix fragilis*) and White Birch (*Betula papyrifera*).

Gull Island

At one time, Gull Island supported at least 19 trees of moderate size. By the mid-1990s cormorants had destroyed all of Gull Island's woody vegetation with the exception of some shrubs on Sebastapol Point.

Significant Flora

According to the published lists of the Ministry of Natural Resources (MNR) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) there are no known plant species of special concern, threatened or endangered status on Gull Island or High Bluff Island. Significant species are listed in Table 1.

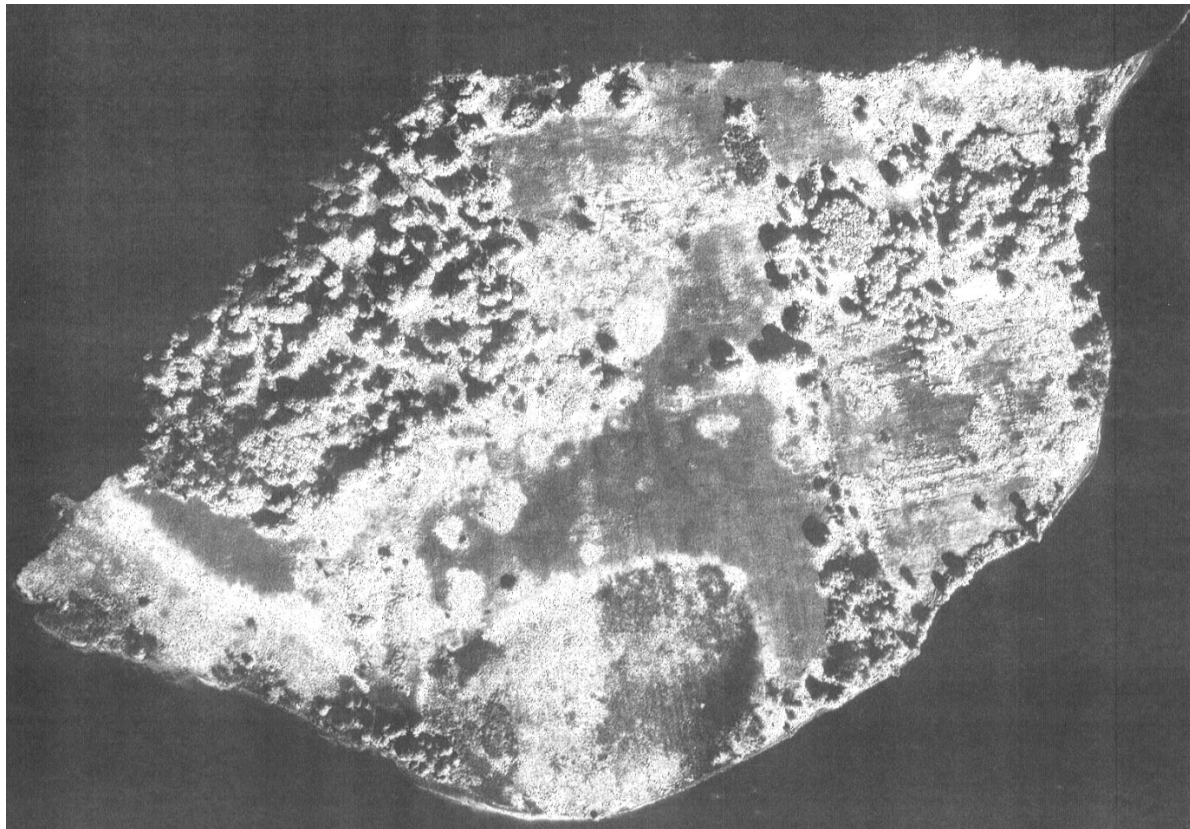


Figure 4: aerial photo of High Bluff Island, 1978

Table 1.

SIGNIFICANT FLORA ON HIGH BLUFF ISLAND AND THEIR RANKINGS FROM THE NATURAL HERITAGE INFORMATION CENTRE

Species	NHIC Status *	Comments
Black Maple (<i>Acer saccharum ssp nigrum</i>)	S4?	Ranking uncertain. Large specimens found in the western woodland of High Bluff Island. Also found in other wooded areas of the Presqu'île peninsula. This species is at the northern edge of its range in Ontario.
Bushy Cinquefoil (<i>Potentilla paradoxa</i>)	S3	Specimens were recorded in the former wooded area on the southwestern shoreline of High Bluff Island. In 2000, a single specimen was located to the north of this area.
Smith's Club-rush (<i>Schoenoplectus smithii</i>)	S2?	Ranking uncertain. Thought to be between 6 and 20 sites in Ontario although not certain.

***Natural Heritage Information Centre (NHIC) Provincial Ranking System**

S1 Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.

S2 Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

S3 Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.

S4 Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

S5 Very common and demonstrably secure in Ontario

S? Unranked, or, if following a ranking, rank **uncertain** (e.g. S3?).

Fauna

a) Colonial Waterbirds

The recent addition of Great Blue Heron and Great Egret as nesting species on the Presqu'île islands has increased the number of species of colonial waterbirds breeding on the islands from seven to nine. A tenth colonial waterbird species, Cattle Egret (*Bubulcus ibis*) bred on Gull Island in 1962, 1964 and 1965. Cattle Egrets have been seen frequently in recent years and could breed again.

The species of colonial waterbirds which nested on Gull Island and High Bluff Island in 2000 and 2003 are listed in Table 2.

TABLE 2.
COLONIAL WATERBIRDS BREEDING ON GULL ISLAND AND HIGH BLUFF ISLAND
IN 2000 AND 2003 AND THEIR RANKINGS FROM THE
NATURAL HERITAGE INFORMATION CENTRE

Species	NHIC Status *
Black-crowned Night-Heron <i>Nycticorax nycticorax</i>	S3B, SZN
Caspian Tern <i>Sterna caspia</i>	S3B, SZN
Common Tern <i>Sterna hirundo</i>	S4B, SZN
Double-crested Cormorant <i>Phalacrocorax auritus</i>	S4B, SZN
Great Blue Heron <i>Ardea herodias</i>	S5B, SZN
Great Egret <i>Casmerodius albus</i>	S2B, SZN
Greater Black-backed Gull <i>Larus marinus</i>	S2B, SZN
Herring Gull <i>Larus argentatus</i>	S5B, SZN
Ring-billed Gull <i>Larus delawarensis</i>	S5B, SZN

B Breeding in Ontario (following a ranking e.g. S3B)*

SZN Non-breeding migrants/vagrants*

*Refer to Table 1 for explanation of other NHIC ranking codes.

Much research has been done on the colonial waterbirds of Presqu'ile and, as a result, their populations have been tracked quite closely. Below is a description of the status of colonial waterbird species (other than cormorants, which are described in previous sections) that breed on High Bluff Island or Gull Island, listed from most to least abundant. The Black-crowned Night-Heron, Great Blue Heron and Great Egret nest in woody vegetation; all other species listed are ground nesters (gulls and terns).

Ring-billed Gull

The Ring-billed Gull is by far the most abundant colonial waterbird at Presqu'ile. From an initial discovery of 10 nests in 1948, the park's Ring-billed Gull colonies grew to a peak population of 69,417 pairs in 1990. In 1999, when the population was last tallied, it consisted of 55,699 pairs. Numerous chicks were observed during the management program in 2003.

Caspian Tern

Caspian Terns have enjoyed remarkable population growth at Presqu'ile in the last decade. From ten nests in the mid-1980s and 102 nests in 1990, the colony has grown to 1002 nests in June of 2003.

Herring Gull

The second most abundant gull species at Presqu'ile is the Herring Gull. In 1990 there was a total of 89 pairs on the islands. In 1999, it had increased to 213 pairs. In 2003, 270 pairs were counted. Many chicks were observed on the islands during the 2003 breeding season.

Common Tern

The Common Tern was the most abundant colonial waterbird nesting at Presqu'ile during the 1960s. From a population once estimated at 10,000 pairs, it declined dramatically in the early 1970s to a few pairs. In recent years, the colony has stabilized with up to 150 nests each year.

Black-crowned Night-Heron

The nocturnal Black-crowned Night-Heron is a species which nests in woody vegetation and has been recorded at Presqu'ile since 1962. Numbers of pairs have ranged from 15 to around 80. Over the years, this species has nested in a variety of locations on the Presqu'ile islands.

Black-crowned Night-Heron nests were not counted in 1999 and 2000 to avoid disturbing the Great Blue Herons and Great Egrets that use the same woodland. In 2003, 80 nests were counted, and at least 150 chicks fledged. So, the colony appears healthy.

Great Blue Heron

In 1998, Great Blue Herons started nesting in trees on the western shore of High Bluff Island with a single nest. In 1999, five nests were found in the eastern woodland of High Bluff. In 2000, 14 nests were located on High Bluff Island. In 2003, 25 successful heron nests were found on High Bluff Island.

Great Egret

The High Bluff Island colony was the first of two known Great Egret colonies on Lake Ontario. A single nest and pair of Great Egrets were found on May 19, 1999. On June 12, 2000 two nests were noted, one containing three young and a second nest containing eggs. The egret nests are located in shrubby vegetation beneath several large trees containing both cormorant and Black-crowned Night-Heron nests. In 2003, five active nests were counted and although cormorants ruined several nesting attempts by this species, a minimum of ten young successfully fledged.

Greater Black-backed Gull

The typically marine Greater Black-backed Gull also nests at Presqu'île. Usually, two to four pairs can be found. The Presqu'île colony of this species is one of the first known nesting locations on the Great Lakes with the first nest having been discovered in 1962. The *Atlas of the Breeding Birds of Ontario* (1985) lists eight confirmed nestings of this species in the province during the period 1981 to 1985. Two were at Presqu'île. In 2003, two pair were found nesting on Gull Island and four chicks successfully fledged.

b) Non-Colonial Waterbird Species

Birds use the Presqu'île islands throughout the year. The variety of habitats and location at the southwest corner of the Presqu'île peninsula make these islands attractive to birds.



Figure 5: aerial photo of High Bluff Island, 1998

Many species frequent the shorelines, especially at Gull Island during autumn migration. Waterfowl stage along the shorelines of both islands and diving species can form massive rafts in the adjacent waters.

Park records show that birds of prey including Bald Eagles (*Haliaeetus leucocephalus*) and Peregrine Falcons (*Falco peregrinus anatum*) hunt from the islands. Bald Eagles formerly bred on High Bluff Island. Snowy Owls (*Nyctea scandiaca*) frequent Gull Island, being reported in 40 different years since 1961.

c) Non-Avian Fauna

Non-avian fauna, especially mammals, are largely conspicuously absent from the Presqu'île islands. This is one of the qualities that allows ground nesting colonial birds to establish themselves. Nevertheless, a large population of White-tailed Deer (*Odocoileus virginianus*) lives permanently on High Bluff Island. Occasionally, other large mammals such as foxes and Raccoon (*Procyon lotor*) can be found on Gull Island and High Bluff Island. Meadow Voles (*Microtus pennsylvannicus*) are common, occasionally abundant in the pasture areas of High Bluff Island.

There is a rich assemblage of insects on the Prequ'île islands. Of particular note is the Monarch butterfly (*Danaus plexippus*), which uses High Bluff Island as a roosting area during migration. Extensive Milkweed (*Asclepes sp.*) also provides food to the larvae of this species.

Aesthetic Values

A 1988 report of a visit by the Canadian Wildlife Service to High Bluff Island, noted: "At High Bluff we were struck by the beauty of the island. In my experience, it is the most beautiful island on the lower Great Lakes". The report continues: "although the waterbird colonies are an asset to the island, and hence to Presqu'île Provincial Park, their continued growth will sooner or later have a negative impact on vegetational variety and visual beauty of the island".



Figure 6: aerial photo of High Bluff Island, 2002

5: Environmental Analysis

Terrestrial Resources

The primary objective of reducing cormorant numbers on the Presqu'ile islands is to protect woodland habitat. By reducing the numbers of nesting and roosting birds the negative effects of their guano and nest building activity will be minimized resulting in healthier forest cover. This forest cover provides habitat for several species requiring woodland habitat. Some of the more significant bird species include tree nesting colonial waterbirds such as Great Blue Heron, Great Egret and Black-crowned Night-Heron. High Bluff Island supports one of two nesting colonies of Great Egrets on Lake Ontario and is one of five colonies of this species in Ontario.

Maintenance of woody vegetation also provides protection from soil erosion. On nearby Gull Island considerable erosion has occurred as cormorant nesting eliminated woody vegetation.

Each breeding season, large numbers of colonial birds die on the Presqu'ile islands. Analysis for toxins in Presqu'ile cormorants collected in 2001 indicates that levels are very low.

Aquatic Resources

While cormorant management at Presqu'ile Provincial Park is designed to protect terrestrial habitat, the proposal complements the research of MNR's Fish and Wildlife Branch in assessing the influence of cormorants on fish stocks in eastern Lake Ontario. It is expected that reducing cormorant numbers may have positive effects on adjacent aquatic habitats (e.g. reductions in nutrient run-off into surrounding waters and reduced foraging pressure on local fish populations). Further assessment would be required to confirm such effects.

Land Use

Cormorant management will have no impact on existing land use. Public access to Gull Island and High Bluff Island is prohibited from March 10 until September 10 each year, to prevent disturbance to the nesting colonial waterbirds.

Social Concerns

Cormorant management on the Presqu'ile islands will protect woodland habitat. Minimal noise will result from shooting of cormorants; there will be some noise caused by the removal of nests and harassment of any cormorants which return to try nesting again. The high level of noise associated with the 100,000 breeding gulls on the park islands is expected to overwhelm most, if not all, of the noise associated with shooting, nest removal and harassment. The control program will occur at times when park attendance is low.

Economic

There are no significant economic impacts anticipated in implementing the proposed cormorant management strategy.

6: Management Technique Evaluation and Selection

In 2002, the selection of the preferred management technique was based on the following criteria:

- Efficacy of protecting the western woodland of High Bluff Island
- Potential for negative impacts on other colonial waterbird species
- Potential for shifting the problem elsewhere within the park or beyond park boundaries
- Social considerations regarding management practice.

The overriding criterion is the efficacy of protecting woodland vegetation. This is paramount because nesting cormorants are now using all wooded areas on the Presqu'île islands and monitoring in 2000 and 2002 confirms that the health of these areas is rapidly deteriorating.

Based on a review of the alternative techniques and an evaluation of the 2003 program, management techniques additional to those approved in the 2002 strategy will be required, in order to more effectively reduce the cormorant population to achieve the objectives of the strategy. It is proposed that for the remaining three years (2004 to 2006), the cormorant management program be expanded to all areas of High Bluff Island and Gull Island, and will involve:

- shooting of breeding adult cormorants on High Bluff Island from all nests in all woody vegetation;
- removal of cormorant tree nests where necessary to protect non-target species;
- harassment (roost disturbance) of cormorants; and
- oiling of all cormorant eggs in ground nests.

Ground colony habitat will be created to encourage re-nesting cormorants to use areas where control can be done by oiling eggs. Cormorant nests on the ground are easily managed by oiling eggs and artificially induced colonies will be more easily managed than natural sites, which occur among dense clusters of dead branches. Observations will be made to determine the success of these artificially induced colonies.

This combination of techniques is expected to result in the removal of nearly all nesting cormorants from woody vegetation on the Presqu'île islands. These management techniques are subject to the clear objective of preventing avoidable disturbance to non-target colonial waterbirds.

Management techniques will be adjusted if the birds respond in a manner different than anticipated or if there are inadvertent impacts on other colonial waterbird species. One or more of the above noted techniques may be suspended in any one year, and may be reintroduced later, dependent upon evaluation of the program.

Evaluation of the alternative techniques is presented in Table 3, on page 16.

Table 3. Evaluation of alternative techniques

Criteria ▶	Efficacy in Protection of Woodland Habitat	Potential for negative impacts on other colonial waterbird species	Potential for shifting cormorants elsewhere	Social considerations
Technique ▼				
Do Nothing	No protection to woodland habitat. Trees will die and habitat will be lost.	As trees die other tree nesting colonial waterbird species will lose nesting habitat. Those that nest close to the ground such as Black-crowned Night-Herons will be forced to find new nesting locations due to cormorant guano dropping from overhead nests.	Until existing habitat is saturated the do-nothing approach has the smallest potential for encouraging the establishment of “satellite” colonies. After saturation occurs the excess young will look elsewhere for new colony locations.	The do-nothing alternative has some public acceptance. However, many groups, including bird enthusiasts have advocated control.
Removal of Birds by Shooting	Expected to result in high mortality of adult birds and a correspondingly rapid decline in cormorant numbers. Habitat protection will be improved, and the health of woodland vegetation is expected to improve.	Disturbance to other tree nesting colonial waterbird species is expected to be minimal. Where non-target species are too close to cormorants and may be at risk, nest removal can be used in place of shooting.	Shooting breeding adults has a low potential for shifting cormorants elsewhere.	There is some concern socially with killing of wildlife as a resource management tool. There is generally a strong division between those strongly in support of this tool, and those adamantly opposed.
Nest Removal	Success in discouraging cormorant nesting is expected to result in improved health of woodland vegetation.	Experience of 2003 indicates there is moderate potential for disturbance to other colonial species as a result of nest removal in both the eastern and western woodland.	Nest removal has a high potential for encouraging the establishment of “satellite” colonies, as the disturbed birds will look elsewhere to nest.	Social acceptance may be moderate. The results of nest removal, especially the development of new colonies, may result in a negative reaction.
Egg Oiling	Impractical for tree nests, as they are inaccessible. Oiling eggs in ground nests would reduce the population growth of the colony. Effectiveness can be improved by inducing ground nesting in created habitat.	Prior to 2003 implementation it was felt that egg oiling would result in a moderate level of disturbance to other ground nesting species, however egg oiling in 2003 resulted in low disturbance.	Egg oiling has a limited potential to encourage the establishment of “satellite” colonies, as disturbed birds may look elsewhere to nest.	Social acceptance may be moderate. This is a low disturbance management technique that prevents eggs from hatching.
Harassment (post nesting period)	Used alone, harassment has proven to vary in its effectiveness at other sites.	Harassment will be used in the later stages of the program to prevent roosting and therefore will have minimal impact on other colonial species that will have finished their nesting season.	Harassment has a low to moderate potential for encouraging the establishment of “satellite” colonies, as the disturbed birds will be done nesting.	Social acceptance may be moderate. The effects of harassment, especially the development of new colonies, may result in a negative reaction.

7: Implementation Details

The management program may occur annually between the end of April and the middle of September, generally with most intensive management during May and June. The shooting component of the program will be focussed as narrowly as possible to the pre-summer period to avoid adult birds with hatched young. Management activity will occur daily for several weeks at the outset to be followed by activity every other day as the cormorant nesting instinct declines. Management activities on Gull Island will be restricted to oiling of eggs in ground nests, limited nest removal in shrubby vegetation and creation of ground habitat. Management on High Bluff Island will include a combination of egg oiling, shooting of adult birds, harassment and nest removal, and the creation of ground habitat.

The most effective dates for each of the management techniques in the proposed amendment of the strategy overlap, and may vary considerably each year depending on weather and spring migration dates.

It is proposed that shooting of breeding adult cormorants occur in all nests in woody vegetation on High Bluff Island. The number of birds shot each year will depend on the number of active tree nests; in other locations an average of one bird was shot for each active nest. For example, prior to the management program in 2003 there were 6,000 cormorant nests in trees on High Bluff Island. Based on an average of one bird per nest this would result in a maximum of 6,000 birds, however experience elsewhere indicates that this maximum will not be reached in any given year. The number of birds shot each year will depend on operational and logistical challenges. Where non-target species are at risk, the cormorant nests in that area may be knocked from trees with poles or by hand if possible. The shooting of birds with hatched young will be avoided through modifications in the timing of various management techniques, as noted above.

Throughout the entire breeding period shooting and limited nest removal will continue and will be accompanied, as required, by harassment. Harassment tools may include: noisemakers, "scare-crow" and optical devices. Experimental devices may also be employed, if and when they become available.

Oiling of cormorant eggs in ground nests on both High Bluff Island and Gull Island will occur throughout the entire breeding season, subject to the clear objective of avoiding disturbance to non-target nesting colonial waterbirds. Cormorant eggs that have been laid in nests on the ground will be sprayed with oil approved for this use. Oiling prevents eggs from hatching.

If management activities cause significant disturbance to other colonial bird species then management will cease or it will be modified to avoid undue stress on these species. Other species, especially Black-crowned Night-Herons and Great Egrets, will be watched when carrying out the management activity. If signs of significant stress occur, such as incubating birds leaving their nests, then management activity will cease. At that time management personnel will assess the situation and will only resume activity if it can be conducted without causing significant stress to non-target species. If significant stress recurs then management activity will cease until suitable alternative strategies are established. The priority is to avoid disturbing non-target colonial waterbirds.

Habitat restoration activities may be initiated during the period of this strategy to complement the management techniques and help achieve the objective of protecting all woody vegetation on the Presqu'île islands.

Project Monitoring, Evaluation and Reporting

MNR (Ontario Parks) will carry out the project using an adaptive management approach. This approach ensures that management activities are monitored, evaluated and adjusted in response to the effectiveness of management efforts.

A report completed in 2000 provides an analysis of the impacts of Double-crested Cormorants at Presqu'île Provincial Park. Specific studies to assess the damage to vegetation in the western woodland of High Bluff Island were also completed in 2000 and 2002. Reports from these studies conclude that the forest is in serious decline, which will continue as long as there is prolonged pressure from cormorant nesting. A report completed following the 2003 management program noted that although there was a decline in the number of successful cormorant nests as a result of the management actions, the number of breeding birds was not affected and there was an increase in Presqu'île's cormorant population.

Monitoring will be carried out to determine:

- 1) The degree to which the nesting cormorants in the target areas of the Presqu'île islands was prevented.
- 2) Any negative effects on other nesting colonial waterbirds including opportunities for reducing any negative effects.
- 3) The effects of management activities on vegetation and habitat over the life of the project.

Specific monitoring techniques and measures will be described in an operational plan, related to the following needs. MNR will seek the cooperation and participation of interested groups in carrying out some aspects of the monitoring program. For example, during the 2002 consultation process, groups such as the Presqu'île Important Bird Area Committee and the Presqu'île-Brighton Naturalists offered to assist with monitoring efforts.

Monitoring Prior to the Management Program (2002)

The following actions were carried out:

- Excluding Ring-billed Gulls, the number and location of all colonial nesting birds on High Bluff Island were identified.
- The health of the western woodland of High Bluff Island was assessed repeating the method used in 2000. (Individual trees along grid lines were identified and data was recorded about each: diameter at breast height, percent leaf loss and crown dieback.)
- Aerial photography was obtained to assess the condition of vegetation immediately prior to management.

Monitoring During Annual Management Activities (2003-2006)

- Monitor the arrival of cormorants and other species, and monitor nesting activity to determine the appropriate date for initial control efforts.

- Identify the location of other species to be avoided, immediately prior to, during and after annual operations. Monitor these to observe nesting behaviour. (If signs of stress occur, such as incubating birds leaving their nests, then management activity will cease).
- Following control actions, monitor new nesting or re-nesting activity to determine need for additional control actions, and repeat this as necessary.
- Record the number of cormorant nests in untreated areas of the woody vegetation, for example, any areas that may be left untreated to minimize disturbance of other nesting colonial waterbirds.
- Record the number of successful nests in treated areas.
- Record the number of partially or fully constructed cormorant nests that were removed during each exercise.
- Record the number of birds killed by shooting.
- Record the number of eggs oiled and estimate the hatching rates.
- Observe and estimate the species and number of successful and unsuccessful non-target colonial waterbird nests.
- In 2004, re-assess the health of the western woodland of High Bluff Island repeating the method used in 2000 and 2002 and assess health other areas of woody vegetation. (Individual trees along grid lines are identified and data is recorded about each: diameter at breast height, percent leaf loss and crown dieback.)
- Record and monitor the number and location of nests within artificially induced ground nesting sites.

Monitoring After the Management Program (2006)

- Obtain new aerial photography.
- Re-assess the health of the western woodland of High Bluff Island repeating the method used in 2000, 2002 and 2004 and assess health of other areas of woody vegetation. (Individual trees along grid lines are identified and data is recorded about each: diameter at breast height, percent leaf loss and crown dieback.)
- Assess the degree of disturbance to other colonial waterbird species by counting nesting pairs and estimating populations, and comparing results to historical data.

Evaluation and Reporting

- Evaluate and report on results annually to assess effectiveness of management actions and to identify modifications to the management program as needed.
- Prepare a summary report after the fourth year to describe the effectiveness of the management efforts and recommend ways to modify control measures, to ensure protection of all woody vegetation on the Presqu'île islands and to prevent disturbance to non-target colonial waterbirds. Document any habitat restoration activity that has been undertaken and make recommendations on ways to enhance habitat restoration. It is anticipated that a maintenance program will be required to ensure continued protection of woodland vegetation following the completion of the management strategy in 2006.

8: Summary of Consultation

Prior consultation related to the management of Double-crested Cormorants has occurred at two levels of planning: preparation of the park management plan and preparation of the management strategy in 2002.

Park Management Plan

The management plan for Presqu'île Provincial Park was prepared between 1995 and 2000 with five formal stages of planning and numerous consultation activities. During this process, there was strong support to develop a management strategy to address cormorants, as described in the Summary of Public Response (October 2000). The management plan enabled the development of this strategy to deal with cormorant impacts on park values.

Draft Cormorant Management Strategy (2002)

The *Environmental Assessment Act* directs that proposals that could affect the province's natural resources be assessed and that decisions be made in accordance with the requirements of the act. Under the act, Exemption Order MNR-59/2, which addresses the provincial parks program, helps to achieve environmental protection. It requires that projects and activities in provincial parks follow provincial park guidelines and policies and that plans be made available for public review. Accordingly, a *Draft Management Strategy for Double-crested Cormorants at Presqu'île Provincial Park* was prepared and issued for public comment. The following methods were used to inform people about this strategy:

- Posting on the Environmental Bill of Rights (EBR) Environmental Registry.
- Direct mailing to a wide array of local residents, groups, government ministries and First Nations.
- Inserting notices in area newspapers.
- Meeting with a variety of interested people and groups.

MNR received a wide array of comments and suggestions on its proposals. All input was fully considered in making the decision to approve the strategy. The following modifications were included in the strategy:

- effectiveness monitoring was enhanced to identify monitoring needs during and after spring management actions; and
- reporting of the results of monitoring and operations will aid in ensuring an adaptive management approach. This approach enables this strategy to be adjusted in response to the results of management efforts.

The strategy retained an emphasis on the protection of other colonial nesting waterbirds.

A more aggressive program to shoot cormorants was not proposed in the draft strategy, but was suggested by many people. At that time, although shooting was considered as a technique, in the context of the range of alternatives and factors (e.g., ecological, economic and social), the ministry determined that other actions such as nest removal, harassment and egg oiling would be used to achieve the removal of cormorants from the western woodlands on High Bluff Island. This approach was intended to achieve a balance of the ecological and social impacts and concerns raised by people commenting on the management strategy.

Approved Cormorant Management Strategy (2002)

The 2002 management strategy was widely distributed for inspection and notice was provided using the methods described above for the draft strategy. Implementation of the strategy began in the spring of 2003.

A copy of the approved strategy can be obtained from the Ontario Parks office noted in the introduction, or from: http://www.OntarioParks.com/english/pres_planning.html

Proposed Amendment of the Cormorant Management Strategy (2004)

MNR has now determined that an amendment of the strategy is desirable before continuing with implementation in the 2004 season. Public comment is invited on the proposed amendment. Please refer to the introduction for details.

The amendment process will follow MNR policy and requirements under *Environmental Assessment Act* Exemption Order MNR 59/2. Individuals are encouraged to raise any concerns regarding the proposed amendment early in the process.