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Project Description and Scope of  
Environmental Assessment  
For  
Implementation of the  
Proposed Middle Island Conservation Plan  
Point Pelee National Park



Photo Credit: John Haig, 2003

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# 1.0 Introduction

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## 1.1 Background

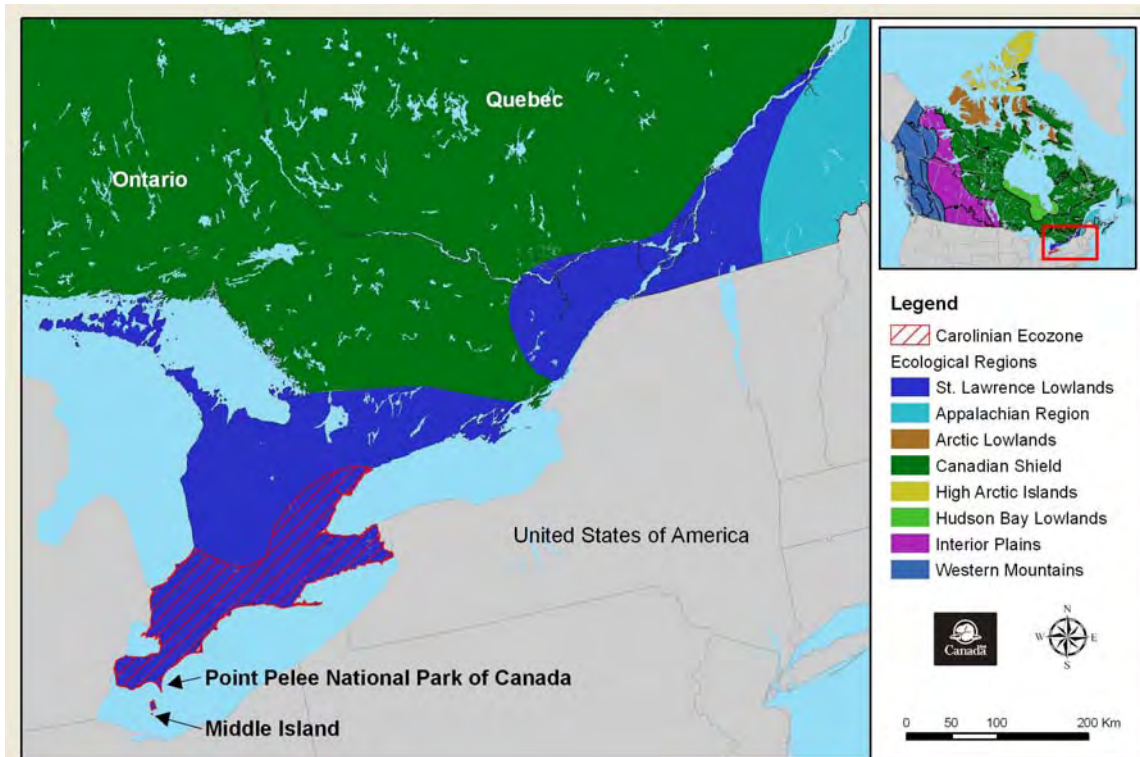
Middle Island is part of a twenty-one-island chain in the western basin of Lake Erie, in the province of Ontario. In 2000, this 18.5 ha (48 acre) island became part of Point Pelee National Park of Canada. Point Pelee National Park (including Middle Island) is found in the Carolinian ecozone of the St. Lawrence Lowlands (Figure 1), the southern most ecological region of Canada. Within the ecozone, native forest cover has been reduced from 80% to 11%, and in Essex County, where Point Pelee National Park is located, to only 5%. Middle Island possesses unique and rare vegetation communities distinct from the mainland. In total, Middle Island harbours 33 provincially rare species and nine Species at Risk listed under the federal Species at Risk Act (Table 1). The island provides nesting habitat for several species of forest-breeding birds and supports nesting colonies of six colonial waterbird species (great blue heron, great egret, black-crowned night heron, herring gull, ring-billed gull and double-crested cormorant). The island lays on the path of two major North American migration routes, the Mississippi and Atlantic flyways, providing an important stopover for migratory birds and Monarch butterflies. To protect these rare and unique features, the island is managed within the national park as a Zone 1-Special Preservation<sup>1</sup> area. Other organizations have also recognised the significance of the ecological features on Middle Island. The Ontario Ministry of Natural Resources has designated the island as, an *Area of Natural and Scientific Interest* and an *Environmentally Significant Area*. The Carolinian Canada Coalition has included Middle Island as a *Carolinian Canada Signature Site* and, the island is part of the *Pelee Island Archipelago Important Bird Area* designated by Birdlife International.

**Table 1.** Middle Island species at risk protected under the *Species at Risk Act* and their designations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

<b>Plants</b>	<b>Reptiles</b>	<b>Insects</b>
RED MULBERRY (Endangered) AMERICAN WATER-WILLOW (Threatened) WILD HYACINTH (Threatened) KENTUCKY COFFEE-TREE (Threatened) COMMON HOPTREE (Threatened) BLUE ASH (Special Concern)	LAKE ERIE WATERSNAKE (Endangered) EASTERN FOXSNAKE (Threatened)	MONARCH (Special Concern)

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<sup>1</sup> Parks Canada uses zoning to manage land use within National Parks. *Zone 1 – Special Preservation* is the zone that provides the highest level of protection for ecological resources and the least level of public use. This zone recognizes areas of a National Park that contain or support unique, rare or endangered features or the best examples of features.



**Figure 1.** St. Lawrence Lowlands and the Carolinian Ecozone.

Maintenance and restoration of ecological integrity<sup>2</sup> has been legislated as the first priority for management of national parks in the *Canada National Park Act*. In Point Pelee National Park, research and monitoring has concluded that the high density of double-crested cormorant nests on Middle Island is causing significant and potentially irreversible impairment of the island's rare Carolinian ecosystem. Parks Canada considers the double-crested cormorant population nesting on Middle Island to be hyperabundant<sup>3</sup>. In response, Parks Canada has developed a *Proposed Middle Island Conservation Plan (The Plan)*. It is a five-year plan with the goal to restore ecological integrity on Middle Island by using an adaptive management<sup>4</sup> approach. *The Plan* is:

<sup>2</sup> Ecological integrity is defined in the *Canada National Parks Act* as, with respect to a park, a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes

<sup>3</sup> A hyperabundant wildlife population is defined in Parks Canada's Management Directive 4.4.11 *Management of Hyperabundant Wildlife Populations in Canada's National Parks* as a wildlife population that clearly exceeds the upper range of natural variability that is characteristic of the ecosystem, and as a result, there is a demonstrable long-term negative impact on ecological integrity.

<sup>4</sup> Adaptive management is defined in Parks Canada's Management Directive 4.4.11 *Management of Hyperabundant Wildlife Populations in Canada's National Parks* as a type of natural resource management in which decisions are made as part of an ongoing science-based process. It involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

- in compliance with direction detailed in the applicable legislation, policies, plans and strategies;
- based on the best available science; and
- considers the results of public and stakeholder communications/consultations.

*The Plan* proposes a suite of active management<sup>5</sup> actions to reduce and monitor double-crested cormorant nest densities on Middle Island including culling adult breeding birds and, to protect individual species at risk through the physical removal of nests and use of deterrents. *The Plan* divides Middle Island into two management zones and a habitat model zone. As nest reductions, logistically, could not be effected immediately over the entire island, active management actions would focus first in management zone – priority 1 and the habitat model zone and then shift to management zone - priority 2. *The Plan* includes an extensive research and monitoring program to evaluate the active management activities, to provide information for future conservation planning, and calls for a communications plan to work in conjunction with *The Plan*.

To guide active management on Middle Island, a habitat model has been developed. The model hypothesizes a range of sustainable double-crested cormorant nest densities on Middle Island for the long-term maintenance, regeneration and restoration of the island's native biodiversity and ecosystem processes. To validate the proposed target ranges for nest numbers, and to meaningfully reduce the loss of dense (healthy) forest canopy cover on Middle Island, Parks Canada is proposing to use four management approaches to stop and then reverse the adverse effects caused by the hyperabundant double-crested cormorant population nesting on Middle Island. *The Plan* proposes to:

- 1) Reduce double-crested cormorant nest densities in the two management zones comprising 14.6 ha of the island's total 18 ha forested area to within a target range that would enable restoration and protection of the representative Carolinian vegetation communities and species at risk;
- 2) Reduce double-crested cormorant nest densities in a 3.4 ha habitat model zone to a target nest density predicted by the habitat model to ascertain if this preliminary prediction for nest number is indeed sustainable;
- 3) Reduce double-crested cormorant nest densities in very specific areas, as necessary, to protect species at risk through the removal of nests and the application of deterrents; and
- 4) Establish a monitoring and research program to investigate long-term ecological integrity restoration needs, methods and techniques for Middle Island.

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<sup>5</sup> Active management is defined in Parks Canada's Management Directive 4.4.11 *Management of Hyperabundant Wildlife Populations in Canada's National Parks* as any prescribed course of action directed towards maintaining or changing the condition of cultural, physical or biological resources to achieve Parks Canada objectives.

Before proceeding with implementation of the *Proposed Middle Island Conservation Plan*, Parks Canada is conducting a detailed environmental assessment at the screening level under the *Canadian Environmental Assessment Act* (CEAA) and a review by an Animal Care Task Force, as per the *Canadian Council on Animal Care*.

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## **1.2 The Proponent**

Parks Canada is a federal agency with responsibility for managing national parks, marine conservation areas and national historic sites in Canada. Parks Canada's mandate is, on behalf of the people of Canada, to protect and present nationally significant examples of Canada's natural and cultural heritage and to foster public understanding, appreciation and enjoyment in ways that ensure their ecological and commemorative integrity for present and future generations.

The contact for additional information related to this environmental assessment is:

Marian Stranak  
Superintendent  
Point Pelee National Park of Canada  
407 Monarch Lane, RR#1  
Leamington ON N8H 3V4  
E-mail: pelee.info@pc.gc.ca  
Fax: 519 322-1277

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## **1.3 Regulatory Context**

Implementation of the *Proposed Middle Island Conservation Plan* is considered a project under the *Canadian Environmental Assessment Act* because culling from a population of a wildlife species, which requires an authorization under paragraph 15(1)(a) of the *National Parks Wildlife Regulations*, is included in the *Inclusion List Regulations* (Part 1, Sec 5). Under Section 5 of the *Canadian Environmental Assessment Act*, an environmental assessment is required in relation to this project because the Parks Canada Agency is the proponent.

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## **1.4 Purpose/Need for Active Management on Middle Island**

As a result of research and monitoring, Parks Canada has clear evidence that the current nest density of the double-crested cormorant colony poses a significant and ongoing threat to the ecological integrity of Middle Island, including its unique Carolinian vegetation communities and SARA listed species at risk.

Double-crested cormorant nesting was first recorded on Middle Island in 1987 and 1988 with 3 and 25 nests respectively. When acquired by Parks Canada in 2000, the number had increased to 5,202 nests. There was concern that the ecological values of the island

were being compromised. The high density of double-crested cormorant nests was thought to be degrading the island's ecosystem.

Over the last decade, research and monitoring have shown the nesting population of double-crested cormorants on Middle Island is hyperabundant. Between 1995 and 2006, a study to quantitatively assess the relationship between the distribution of nesting double-crested cormorants and forest health has recorded a 41% loss of dense (healthy) forest canopy on Middle Island. Additional studies have shown the cascading effects of the high number of double-crested cormorant nests and the associated activities of the nesting population have changed the structure, composition and function of Middle Island's ecosystem. Documented impacts include the elimination of some under story vegetation assemblages and the reduced diversity of others; changes in the distribution and/or composition of native fauna species; and changes to soil chemistry. Based on the adverse effects recorded to date and considering information gathered from other similar sites in the Great Lakes, Parks Canada projects that without an immediate and maintained decrease in double-crested cormorant nest density on the island, there will be an almost complete loss of ecological integrity of the significant Carolinian ecosystem on Middle Island in less than a decade.

Double-crested cormorants impact the trees in their breeding colonies through the physical breaking of branches, the stripping of foliage for nesting material and through the combined weight of birds and nests. Nesting trees are usually killed 3-10 years after nesting begins. Deposition of guano on trees, leaves and soil can affect photosynthesis, damaging and eventually killing the surrounding sub-canopy vegetation and altering soil chemistry. Although Middle Island also provides nesting opportunities for five other colonial waterbird species, their nest numbers are significantly lower than that of the double-crested cormorant. Other colonial nesting waterbirds also cause physical impacts to vegetation, however, double-crested cormorant impacts are more extensive and occur with greater intensity. Double-crested cormorants are also known to adapt to the available nesting habitat in a colony by moving nests down the canopy layers and onto the ground as large then small trees are killed. This behaviour is typically not seen with other colonial waterbird tree-nesting species, such as herons. Research and monitoring indicates that the other tree-nesting waterbird species would ultimately be displaced once the nesting double-crested cormorant colony has killed all suitable nesting trees and moved to the ground.

These ecological integrity concerns underscore the need for Parks Canada to implement an effective adaptive and active ecosystem management program to reduce the density of double-crested cormorant nests on Middle Island. Parks Canada has a policy to guide the management of hyperabundant wildlife populations in national parks, Management Directive 4.4.11. *The Plan* is consistent with the policy. Based on the available scientific information, the option of doing nothing would be inconsistent with Parks Canada's legislated mandate to maintain and restore ecological integrity in national parks.

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## 2.0 The Proposed Middle Island Conservation Plan

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### 2.1 Management Approaches

The *Proposed Middle Island Conservation Plan* is an adaptive management plan designed to restore ecological integrity to the island using active management. The goal set out in *The Plan* is to protect and to restore the ecological integrity of the Carolinian ecosystem on Middle Island, including the species at risk protected under the *Species at Risk Act*. *The Plan* also outlines four objectives:

1. To significantly reduce the loss of dense (healthy) forest canopy cover on Middle Island due to the impacts of double-crested cormorant nesting;
2. To protect SARA-listed species at risk and areas of the island containing relatively intact examples of each Carolinian vegetation type;
3. To investigate the sustainable number of double-crested cormorant nests which can be supported by the island ecosystem; and
4. To continue monitoring and research to determine the need and means for restoration of ecological integrity on Middle Island.

Parks Canada would use an adaptive management approach, ensuring that active management activities on Middle Island are monitored, evaluated and adjusted in response to the effectiveness in achieving the ecological integrity goal and objectives, changing circumstances and new information. To address the unacceptable impacts associated with high double-crested cormorant nest densities on Middle Island, Parks Canada is proposing the suite of management approaches outlined below:

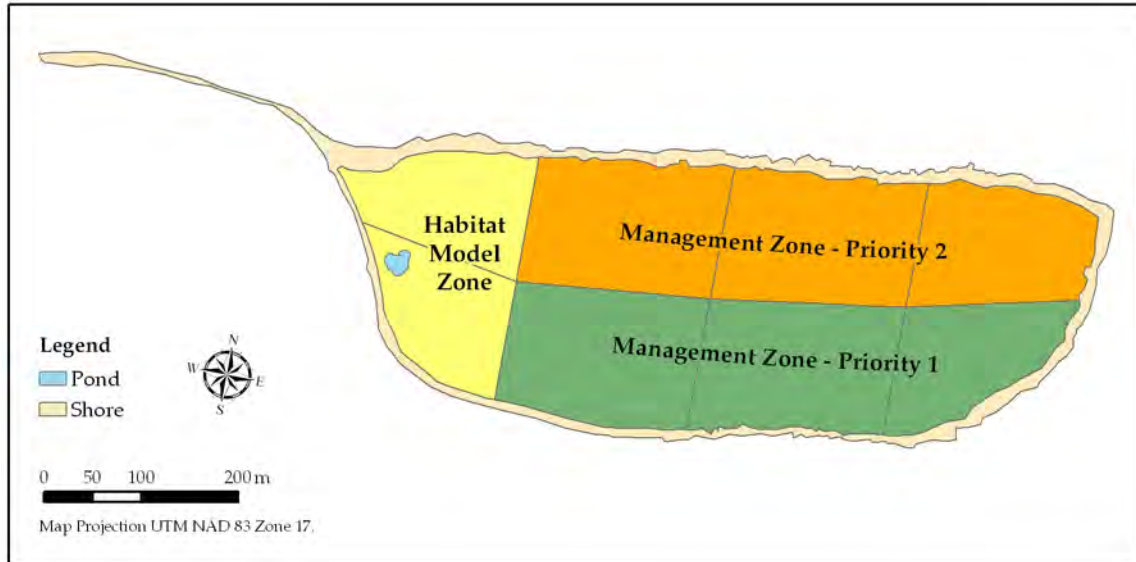
#### **Management Approach I: Reduction of double-crested cormorant nest densities in a management zone (split into two priority zones) comprising 14.6 ha of the island's total 18 ha forested area.**

The island is divided into two management zones, management zone - priority 1 and management zone - priority 2 (Figure 2). As nest reductions would not be effected immediately over the entire island, active management would be focussed first in priority zone 1 and would then shift to priority zone 2.

The designation of priority zones ensures the protection of relatively intact examples of each vegetation community type and habitat protection for species at risk.

The priority zones were chosen based on the presence of relatively undamaged vegetation communities, the location of species at risk and the presence of different forest types.





**Figure 2.** Middle Island showing the habitat model zone and the two management zones with priority for culling activities.

An adaptive management approach, determined by annual June nest counts, would ensure that the number of double-crested cormorants culled resulted in a reduction in nest numbers to the target range of 30-60 nests/ha within the 14.6 ha management zone. The target range of 30-60 nests/ha has been selected as habitat modelling has predicted that a nest density of 60 nests/ha would be sustainable for the island's Carolinian vegetation over the long term. However, the island ecosystem has already sustained significant impact due to the high number of double-crested cormorant nests. An initial lower nest density would allow for recovery and restoration as well as for further testing of the model. Using the precautionary principle, the lower end of the range (30 nests/ha) is hypothesized to be lowest nest density attainable by the 'low-impact to the ecosystem' operational methods and techniques proposed in *The Plan*.

This approach could reduce the current 4,026 nests (the number of double-crested cormorant nests counted in the management zones in 2007) to between 438 and 876 nests by 2012.

Based on previous May and June nest counts as well as the results of similar active management activities at other sites, a reduction in nest numbers of approximately 20-30% per year of *The Plan* is predicted. However, there is some evidence that culling activities may become more effective as the nesting colony becomes smaller. Therefore, as an adaptive management approach, the targeted reduction number would be adjusted accordingly.

Effectiveness of culling activities may also vary with the overall double-crested cormorant population size in Lake Erie and the Great Lakes as a whole. Nest counts of double-crested cormorants will take place on all other Lake Erie colonies in order to monitor the broader population trend. This information will be used to guide and refine *The Plan* implementation.

Qualified and experienced Parks Canada staff would undertake all active management activities, including culling, nest removal and the use of deterrents. Shooting of adult double-crested cormorants would be by small calibre, highly accurate rifles with 4 power scopes to ensure effective culling. Only stationary double-crested cormorants associated with nests (i.e. nesting pairs) in trees would be culled. Flying double-crested cormorants and those with hatched young in nests would not be shot. Shooting would occur in 20-minute intervals to allow for reduced disturbance to other colonial nesters. This approach would allow the adults of other colonial nesting species to return to the nest before eggs have a chance to heat/cool, therefore minimizing the impact on nesting success/failure.

To ensure the safety of all personnel present on the island, an assistant/observer would accompany each shooter. Safety guidelines and mitigations related to shooting activities would be developed with the Occupational Health & Safety Committee and strictly adhered to.

To ensure the ethical and humane treatment of double-crested cormorants, an Animal Care Task Force (ACTF), coordinated by Parks Canada, will review the *Proposed Middle Island Conservation Plan* and all management activities, which involve handling and manipulation of wildlife.

Early timing of the project and efforts to cull early nesters will ensure hatchlings are not present. However, in the unlikely event where a hatchling is found, in a nest where the adult double-crested cormorants have been culled, that hatchling would be humanely euthanized. Protocols to ensure less than 50% gestation of potential double-crested cormorant eggs will be developed in accordance with the Animal Care Task Force.

Disturbance to other nesting birds, the double-crested cormorant nesting colony and the vegetation communities will be minimized by using sound suppressed weapons and as few personnel as possible. There would be no use of motorized vehicles or heavy equipment on the island. Carcasses of culled birds would be left where they fall, with the exception of carcasses on the shoreline and a small number needed for research purposes. Additional mitigation techniques may be outlined in the environmental assessment and provided by the Animal Care Task Force review. Human disturbance would also be minimized through the use of other techniques, including low volume radios, minimized movement, camouflaged clothing, etc.

Ensuring minimal disturbance to the nesting colony during active management activities will also minimize dispersal of double-crested cormorants to other colonies and help to prevent the possible establishment of new colonies.

### **Management Approach II: Reduction of double-crested cormorant nest densities in a 3.4 ha habitat model zone.**

The proposed habitat model zone (Figure 2) is a 3.4 ha area located on the west side of the island. The zone is needed to ascertain, through research and monitoring, if nest

numbers predicted by the habitat model are sustainable and to provide monitoring information to contribute to the development of a carrying capacity model for double-crested cormorant nests for the island.

Selection of the habitat model zone was based on the following criteria:

- an area large enough to provide a reasonable representation of island habitats for testing of the model;
- an area containing a range of sites from heavily damaged to low damaged to allow for monitoring of a range of vegetation responses from progressive damage to re-generation; and
- an area satisfying the first two criteria, yet containing no significant amount of the most intact and undamaged areas remaining on the island and that contains no significant numbers or populations of species at risk.

The habitat model zone would be reduced to a target nest density of 60 nests/ha. This nest density is the best estimate of a potentially long-term sustainable nest density based on current scientific information available, including:

- analysis of monitoring data of tree damage indices from 2004-2007 on Middle Island related to double-crested cormorant nest densities;
- review of historical double-crested cormorant nest numbers on Middle Island and West Sister Island to assess nest densities over time compared to relative forest canopy health; and
- preliminary work on a carrying capacity model for double-crested cormorant nest numbers in Carolinian forest island communities.

Qualified and experienced Parks Canada staff would shoot adult double-crested cormorants associated with nests in trees as described in Management Approach I. Reduction of double-crested cormorant nests in the habitat model zone would begin in year one of *The Plan* and based on predicted effectiveness rates, the target nest numbers for the habitat model zone could be obtained by 2010.

**Management Approach III: Reduction of double-crested cormorant nest densities in very specific areas, as necessary, to protect species at risk.**

The removal of nest material and the use of deterrents would be used to prevent double-crested cormorants from nesting in or around specific areas critical to the survival of species at risk, regardless of location on Middle Island. Areas chosen for nest removal and the use of deterrents would be determined in collaboration with Parks Canada species at risk biologists and on the basis of location information for individual species at risk. Nests would be removed with extendable forestry poles early in the nesting season, before hatching of eggs has taken place. Removal of new nests in these specific locations may be required throughout the breeding period, but would always take place soon after nest establishment and before hatching of eggs.

“Scare-crows” or other deterrents would be used as much as possible to impede the construction of new nests in these areas so that further nest removal is not required.

Priority would be given to the technique that would cause the least disturbance to other nesting colonial waterbirds.

An adaptive management approach will ensure these management activities are monitored, evaluated and adjusted in response to the effectiveness in achieving the ecological integrity goal and objectives.

Baseline data has been collected for species at risk locations. Monitoring for effectiveness of these active management actions would also include nest counts and vegetation monitoring.

**Management Approach IV: Monitoring and research program to investigate ecological integrity restoration needs, methods and techniques for Middle Island.**

Areas of Middle Island already impacted by many years of high double-crested cormorant nest densities may require restoration to recover and support the native biodiversity characteristic of the Carolinian ecozone. Cooperative work and partnerships have been established with researchers in academic institutions and other government organizations to investigate aspects of restoration such as soil chemistry and baseline forest canopy response and recovery. Parks Canada would continue to work with others to fill gaps in knowledge.

Monitoring and research of Middle Island's ecological integrity was implemented to establish changes in forest health and to assess the state of the island's ecosystem. These monitoring activities were put in place, as part of the Point Pelee National Park ecological integrity monitoring program, prior to the proposed active management and could therefore serve as baseline studies for evaluation. This would include: vegetation community types and species at risk monitoring, nest number counts of all colonial waterbirds, aerial assessment of forest cover, ground assessment of forest health, and soil sampling/analysis. Ecological integrity monitoring would continue over the life of *The Plan* and would provide a measure of the effects of the management approaches in *The Plan* to affect the recovery of the island's ecosystem and the response of the island's ecosystem to active management.

Research and monitoring to evaluate the success of the proposed active management approaches and techniques as well as identification of the needs for the long-term protection and restoration of ecological integrity would also occur. Evaluation methods would include: annual monitoring of changes in nest densities of double-crested cormorants in all zones, monitoring of disturbance during management approaches to other nesting colonial waterbirds, recording of the number of birds killed by culling, recording of wounding rate of culling activities, recording of the location and extent of all active management activities taken under Management Approach III and assessment of mercury levels of carcasses. Parks Canada would also work with other agencies to monitor double-crested cormorant nest counts at other Lake Erie nesting colonies to identify possible dispersal of double-crested cormorants to other colonies or the

establishment of new colonies. Restoration monitoring would include: impacts of double-crested cormorant nesting on soil and implications for vegetation recovery, detailed tree count and forest structure measurements in the habitat model zone on Middle Island, continued research on the carrying capacity model for double-crested cormorant nests and vegetation communities, investigation of the possibility of establishing a control site for vegetation monitoring at a suitable location, and fall roosting/loafing surveys of double-crested cormorants on Middle Island.

The research and monitoring program would be further developed in consultation and in cooperation with partners and stakeholders.

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## **2.2 Timing/Schedule**

Implementation of the *Proposed Middle Island Conservation Plan* would be over a 5-year period beginning in the spring of 2008 and ending in 2012. Annual culls, in both the management zones and the habitat model zone, would begin early in the nesting season (early April) for a number of days over a period of three to four weeks and continue each subsequent nesting season until the ecological integrity goal and objectives of *The Plan* were achieved. The proposed timing for culling activities has been selected as the most humane, because culling adult double-crested cormorant nesting pairs early in the nesting season, before egg hatching, would prevent chicks from being abandoned. Nest removal and the use of deterrents may be required during the nesting period, but would always take place soon after nest establishment and before the hatching of eggs.

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## **2.3 Alternatives to Active Management**

There is no viable alternative to active management on Middle Island. Research and monitoring have demonstrated the current nest numbers of double-crested cormorants pose a significant and ongoing threat to the ecological integrity of Middle Island. Thus a reduction in nest numbers is deemed necessary as the *Canada National Parks Act* (2000) mandates the maintenance and restoration of ecological integrity as the first priority when considering all aspects of national park management.

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## **2.4 Alternative Active Management Approaches Considered**

Parks Canada considered six active management approaches to mitigate the adverse effects of the hyperabundant population of double-crested cormorants nesting on Middle Island. These included: nest destruction, displacement, artificial nesting platforms, predator introduction, egg oiling and culling of adult double-crested cormorants. These potential active management options were reviewed primarily on the basis of their ability to meet the ecological integrity goal and objectives for Middle Island. Other considerations included: the behaviour of double-crested cormorants and the ecology of the island, availability of appropriate facilities and expertise, social considerations, cost

effectiveness and humane treatment of individuals of the hyperabundant population. Public and stakeholder communications/consultation were undertaken in 2007 to share information, seek additional information and to gain an understanding of the different values, interests, concerns, attitudes and perspectives on this ecological integrity challenge facing Parks Canada.

**2.4.1 Nest Destruction/Removal of Nest Material:** This option has been shown to reduce nest densities in some situations, particularly in ground nesting colonies where nest material is scarce. However in tree nesting situations re-nesting can be rapid (1 to 3 days), usually resulting in additional destruction of vegetation for new nesting material. This method is extremely labour intensive and logistically difficult in tree nesting colonies. This method must also be repeated throughout the nesting season, causing continued disturbance to other nesting birds and vegetation. Disturbed double-crested cormorants could also move to other areas of the island or adjacent islands. Parks Canada's ecological integrity goal for Middle Island cannot be met using this technique alone. The negative impacts caused by island-wide implementation and the inability to reduce nest numbers in the time frame necessary render this method unacceptable for broad application on Middle Island. However, this method could be implemented in small areas at a fine scale to protect individual species at risk.

**2.4.2 Displacement:** For this option, birds attempting to nest or roost are discouraged from doing so by the use of harassment techniques such as noisemakers, propane exploders, pyrotechnics, distress call and sound producing devices, visual repellents and scaring tactics, lasers, and scarecrows. Disadvantages of harassment as an option for Middle Island are that: 1) this method has no effect on the total population; 2) double-crested cormorants readily become habituated to many scaring devices; 3) the method could redistribute birds to areas where they had not previously nested and impact other landowners; and 4) the method is not species specific and would disturb other colonial nesting waterbirds. Documented effectiveness of this technique has only been proven in displacing roosting birds, not nesting birds.

**2.4.3 Artificial Nesting Platforms:** There has been little research or practical application to date on the effectiveness of this option. Theoretically, this method would involve providing nesting opportunities at another location, away from the natural resources to be protected. This technique would need to be combined with displacement techniques to move double-crested cormorants to the new nesting location. It is possible that additional structures may actually increase opportunities for the island population to nest. This method could prove practical with small nest numbers if further research advances application of the technique. Given the size of the double-crested cormorant population nesting on Middle Island and the proposed reduction in nest numbers, this option is not considered feasible as a primary means of reducing nest density and protecting sensitive ecosystem elements.

**2.4.4 Predator Introduction:** Raccoons are the only potentially significant predator of double-crested cormorant eggs found on Middle Island. There is evidence that people have been capturing and releasing raccoons into the double-crested cormorant colony for

many years. Dead raccoons have been regularly documented in early spring. It is reasonable to assume the raccoons starve after the migratory colonial waterbirds leave in the fall, and there is no food source over the winter. There is no evidence that raccoon predation has any effect on the number of double-crested cormorant nests on Middle Island. However, raccoon predation of eggs is thought to have a negative effect on herring gull nesting success, as their eggs are found on the ground and are readily accessible. This management option is not seen to be viable for active management to reduce nest numbers due to the inability to control the effects and the disturbance to other colonial waterbirds.

Herring gulls in mixed colonial waterbird colonies have been documented to destroy double-crested cormorant eggs if the colony is disturbed. This behaviour has not been observed on Middle Island.

Setting up nesting platforms to attract bald eagles, which predate and deter double-crested cormorants from their territory, has been suggested as a possible active management option. Although bald eagles are known to have nested on Middle Island, there is a very low probability of a pair establishing a nest given the high double-crested cormorant nest densities currently found on Middle Island. Even if successful, the level of predation/aversion by a bald eagle pair is not likely to have a significant affect on the double-crested cormorant nesting population at its current level. This could be an option to investigate for application once a lower nest density has been achieved.

**2.4.5 Egg Oiling:** Applying inert mineral oil to eggs has been carried out for some ground nesting populations. All of the double-crested cormorant nests on Middle Island are located in trees and as such, egg oiling is not considered feasible, particularly at the current nest numbers. One major advantage of oiling is that the birds would continue to incubate eggs until it is too late in the season to re-lay. However, this technique does not reduce the adult population. With a mean adult lifespan of 6.1 years (birds can live up to 17 years), double-crested cormorant nest densities could not be immediately reduced and reductions would only occur over a long period of repeated application. Given the impaired state of the Middle Island ecosystem, nest reductions are required immediately. Eggs must also be oiled multiple times throughout the breeding season and therefore this option could cause a moderate level of disturbance to ground vegetation and other colonial waterbirds.

**2.4.6 Culling by Shooting:** Both male and female breeding adults from a nest are shot to prevent re-nesting. Shooting is timed during nest establishment and prior to chick hatching, so that young are not left to starve or be preyed upon. The Canadian Council on Animal Care (CCAC) *Guidelines on: the Care and Use of Wildlife* (2003) considers shooting to be an effective means of humanely destroying animals in the field. The American Veterinary Medical Association (AMVA) *Report of the AVMA Panel on Euthanasia* considers a properly placed gunshot to be a quick and humane method of euthanasia and while other methods might be suitable for domestic animals or captive birds, the AMVA states that in some circumstances, a gunshot may be the only practical method of euthanasia. Culling of adult double-crested cormorants has proven to be an effective method to reduce double-crested cormorant nest densities by agencies striving to achieve similar ecological goals and objectives at other sites. This option reduces the

nesting population immediately and can be applied in a variety of ways both temporally and spatially within the ecosystem. Research has shown that with the correct procedures, equipment and training, the effects of double-crested cormorant culling activities on surrounding nesting colonial waterbirds have been shown to be minimal, short-term and localized.

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## 3.0 Scope of Environmental Assessment

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### 3.1 Scope of the Project

The scope of the project refers to the components of the proposal that must be considered for purposes of the environmental assessment. The environmental assessment will focus on the physical activities associated with implementation of the *Proposed Middle Island Conservation Plan*. There are no physical works associated with the project. While this environmental assessment addresses the proposed management activities in this 5-year adaptive conservation plan, it is with the understanding that subsequent iterations of *The Plan* will address the next stages in protection and restoration of the Carolinian ecosystem of Middle Island and may propose new and/or different management approaches and techniques. This may require a new environmental assessment.

Included in the project are the following activities:

- Adult double-crested cormorant reduction through culling in the two management zones and the habitat model zone
  - Including: activities of shooters and assistants/observers and the establishment of a temporary base camp;
- Transportation to and from Middle Island during management activities;
- Handling and removal of some carcasses (small number of samples only) from the island for research and monitoring purposes;
- Patrol around Middle Island to ensure public safety during active management activities, particularly culling;
- Physical nest removal and the installation of deterrents to protect areas critical to the survival of individual species at risk; and
- Limited assistant/observer and media presence.

Additional related activities may be identified during the conduct of the environmental assessment. If so, these will be included in the detailed description of the project in the environmental assessment report.

Excluded from this environmental assessment is the monitoring and research program to investigate ecological integrity restoration needs, methods and techniques for Middle Island.



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### 3.2 Temporal and Spatial Boundaries

The spatial boundaries of this environmental screening include the areas affected by the project activities identified above under Section 3.1 Scope of the Project. These include, the footprint of Middle Island, a 1.6km area around the island and the route between the island and the mainland where personnel and equipment would be marshaled. For assessment of cumulative environmental effects the spatial scope includes the whole of Lake Erie and the mainland area of Point Pelee National Park.

Temporally, the assessment of the project encompasses both the developmental and the operational phases of the project. The developmental phase includes the establishment of a base camp. The operational phase includes the shooting activities, physical nest removal and the use of deterrents, transportation to and from the island, patrol around Middle Island for public safety and some carcass handling and removal as outlined in Section 2.2 Timing/Schedule. The temporal boundary for the assessment of environmental effects resulting directly from the development and operation of the project on specific environmental factors will be from early April to late May. Cumulative effects will be assessed for an additional 5-year period following the initial active management activities.

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### 3.3 Factors to Be Considered

This environmental screening will address the environmental effects of the project as defined by Section 16 (1)(a) to (d) of the *Canadian Environmental Assessment Act*. The factors to be taken into consideration for this assessment include the following:

- Environmental effects, including effects on the ecological integrity of Middle Island;
- Cumulative effects;
- Accidental and malfunction effects;
- Significance of effects;
- Public comments; and
- Mitigation.

In addition Parks Canada has determined the following factors to be relevant to the environmental assessment under Section 16 (1) (e) of CEAA:

- Alternatives to the Project; and
- Alternative means to carry out the Project.

In scoping the factors, it was determined the following Valued Environmental Components (VECs) will be considered:

- *Soil Quality*: The consideration of the environmental effects of management activities on soil quality will focus on mercury and lead contamination. Although

soil quality is expected to increase with a decreased double-crested cormorant nesting population, environmental effects from contaminant loads due to double-crested cormorant carcasses and shell casings will be assessed.

- *Vegetation*: The consideration of the environmental effects of management activities on vegetation will focus on damage to species at risk and rare vegetation communities. Although vegetation recovery is expected with a decreased double-crested cormorant nesting population, environmental effects on species at risk and vegetation communities from trampling and management activities will be assessed.
- *Wildlife*: The consideration of the environmental effects of management activities on wildlife will focus on double-crested cormorants, other colonial waterbird species and species at risk (particularly the Lake Erie watersnake). Colonial waterbirds are highly susceptible to disturbance and the assessment will consider potential impacts of management activities on nesting success. Environmental effects on scavenging species (particularly gulls) will be assessed in relation to lead poisoning.
- *Public Health and Safety*: The consideration of the environmental effects of management activities on public health and safety will focus on potential of disease from double-crested cormorant carcasses and hazards in relation to culling activities, including safety of the public when shooting is taking place on Middle Island.
- *Historical and Archaeological Resources*: The consideration of the environmental effects of management activities on historical and archaeological resources will focus on Level 2 cultural resources, as resources found on Middle Island fall under this classification.

The environmental assessment will identify and evaluate the adverse effects of the physical activities associated with the implementation of the *Proposed Middle Island Conservation Plan*. The environmental assessment will also detail mitigation measures designed to avoid or minimize any adverse effects that may result from the Project, and will recommend an appropriate follow-up program if necessary.