



Draft Environmental Assessment Screening Report

For

Implementation of the proposed Middle Island
Conservation Plan: Reducing Double-Crested
Cormorants Impacts

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Location: Point Pelee National Park of Canada

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Parks Canada
Parcs Canada

Canada

PROJECT TITLE	Implementation of the Proposed Middle Island Conservation Plan: Reducing Double-Crested Cormorant Impacts		
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LOCATION OF PROJECT	Middle Island, Point Pelee National Park of Canada – Lake Erie, Ontario
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PROJECT DESCRIPTION

Located in the Western Lake Erie basin archipelago, Middle Island is an 18.5 ha (48 acre) island part of Point Pelee National Park. It is a tadpole shaped island situated 4 km south of Pelee Island and 100 m north of the U.S. border (Figure 1). Found in the Carolinian ecozone of the St. Lawrence Lowlands, Middle Island possesses unique and rare vegetation communities distinct from the mainland. Research and monitoring has concluded that the high density of double-crested cormorant (*Phalacrocorax auritus*) nests on Middle Island is causing significant and potentially irreversible impairment of the island's rare Carolinian ecosystem, including its nine species at risk listed under the federal *Species at Risk Act*. Parks Canada considers the double-crested cormorant population nesting on Middle Island to be hyperabundant¹.

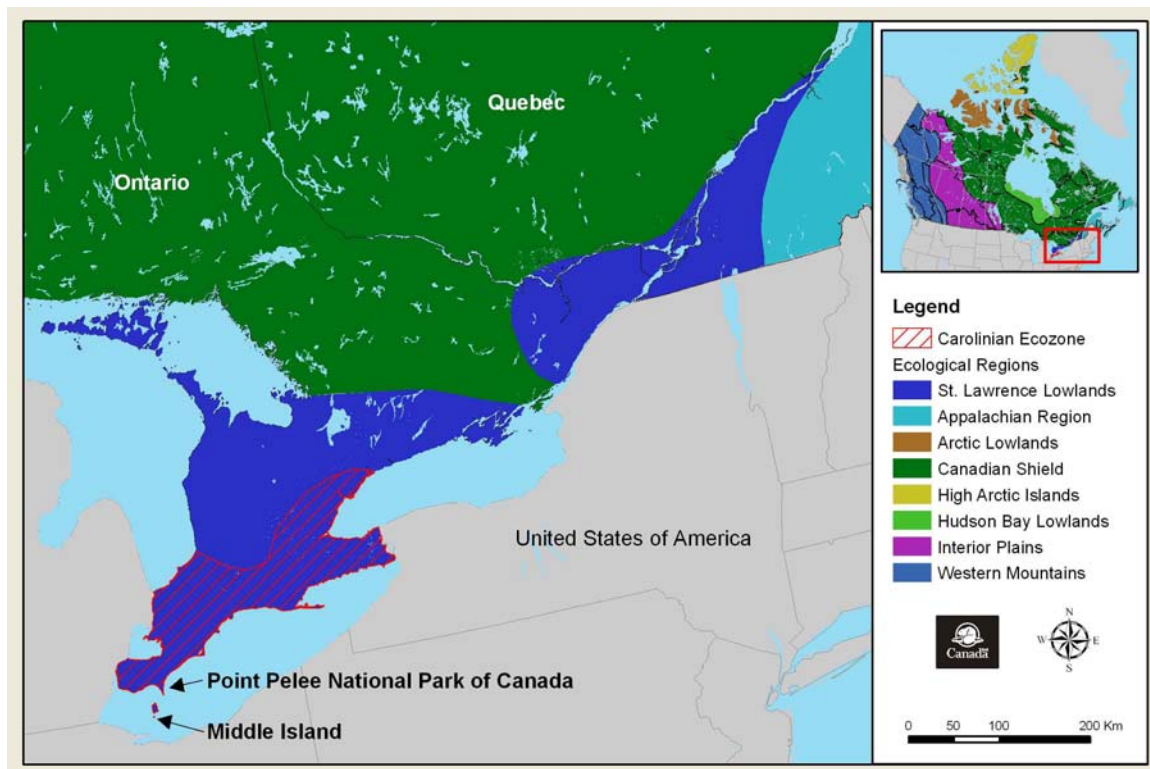


Figure 1. St. Lawrence Lowlands and the Carolinian Ecozone.

In response to these ecological impacts, Parks Canada has developed a proposed *Middle Island Conservation Plan (The Plan)*. It is a five-year plan (beginning in 2008) with the goal to restore ecological integrity² on Middle Island by using an adaptive management approach³. *The Plan* is:

¹ 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.

² 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.

- 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 conducted in 2007.

The Plan proposes a suite of active management⁴ activities to reduce and monitor double-crested cormorant nest densities on Middle Island. This would include the culling of adult breeding birds and, to protect individual SARA-listed species at risk, the physical removal of nests and use of deterrents. *The Plan* divides Middle Island into two management zones and a habitat model zone (Figure 2). As nest reductions, logistically, could not be effected immediately over the entire island, active management activities 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 and to provide information for future conservation planning, a summary of the communications consultations and calls for a communications plan to work in conjunction with *The Plan*.

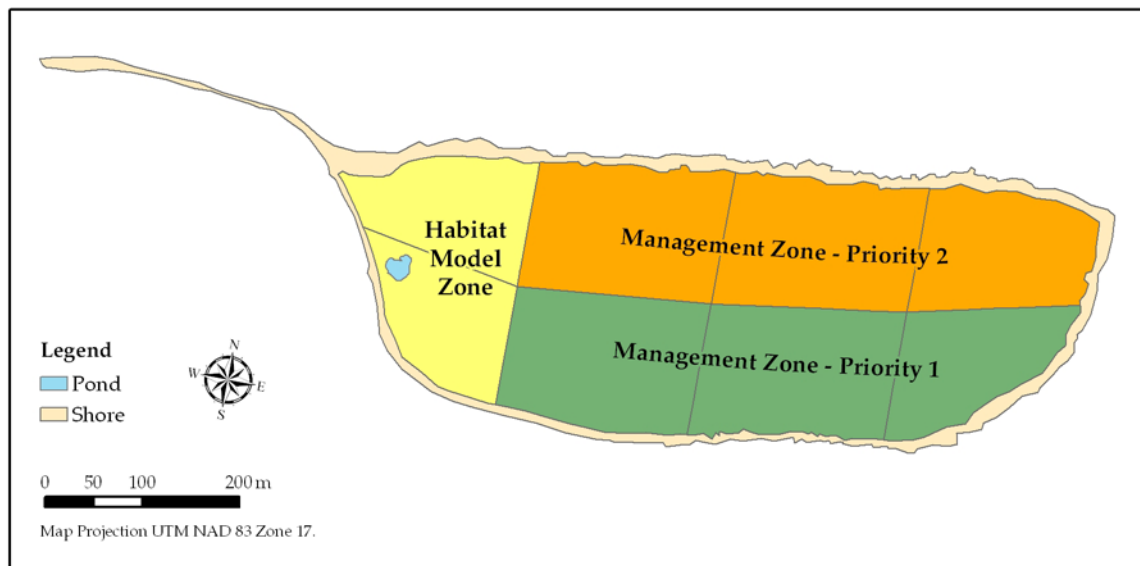


Figure 2. Middle Island showing the habitat model zone and the two management zones with priority for culling activities.

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

³ 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.

⁴ 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.

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 of 30-60 nests/ha. This would enable restoration and protection of the representative Carolinian vegetation communities and SARA-listed 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, of 60 nests/ha. The habitat model zone would be used 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 SARA-listed 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.

The activities identified for the purpose of this environmental assessment report associated with *The Plan's* management approaches are:

- The culling of adult double-crested cormorants in the priority management zones and the habitat model zone:
 - Qualified and experienced Parks Canada personnel would undertake all active management activities, including culling, nest removal and the use of deterrents.
 - Culling of adult double-crested cormorants would be by small caliber (.17 HMR), highly accurate rifles with 4 power scopes.
 - Line of fire would be towards Canadian waters only.
 - Only stationary double-crested cormorants associated with nests (i.e. nesting pairs) in trees would be culled. Flying double-crested cormorants and those with late-stage embryo eggs and hatched young in nests would not be shot.
 - Timing of culling activities would be limited to early stages of incubation (less than 50% gestation of the eggs).
 - Shooting would occur in 20-minute intervals to allow for reduced disturbance to other colonial nesters.
 - Wounded double-crested cormorants that land on the island would be dispatched immediately or as soon as safe to do so if the bird lands out of sight. Wounded double-crested cormorants on land would be dispatched using .17 caliber rifles.
 - If a wounded double-crested cormorant is able to fly to open water, the shooter would notify the patrol boat operators of the approximate location and direction of flight. The wounded bird would then be dispatched by Parks Canada personnel using a 12-gauge shotgun at close range and recovered using a long-handled net as soon as safe and practical.
 - Rate of wounding data would be collected and compiled after each culling day for review.
 - Shell cases would be left where they lay.
 - Parks Canada personnel conducting culling operations would be well trained to identify double-crested cormorants and all other possible non-target birds that could be encountered.
 - 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 (management zone- priority 1 and management zone- priority 2).
 - The target range of 30-60 nests/ha has been selected for the two management zones, as habitat modeling has predicted that a nest density of 60 nests/ha should 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* and would be applied in the two management zones.
- 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.
 - This 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 in the two management zones, and could reduce the habitat model zone to 458 nests from 662 nests (the number of double crested cormorant nests counted in the habitat model zone in 2007).
 - 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 would take place on all other Lake Erie colonies in order to monitor the regional population trend. This information would be used to guide and refine *The Plan* implementation and to ensure that population viability for this species in Lake Erie is not put at risk.
 - To ensure the safety of all personnel present on the island, an assistant would accompany each shooter. Safety guidelines, shooting protocols and mitigations related to culling activities are outlined in *The Plan* and would be reviewed by the Point Pelee National Park's Occupational Health & Safety Committee and recommendations strictly adhered to.
 - To ensure the ethical and humane treatment of double-crested cormorants, an Animal Care Task Force (ACTF), coordinated by Parks Canada, has reviewed the proposed *Middle Island Conservation Plan* and all associated active management activities that involve the handling and manipulation of wildlife. Measures to ensure the humane treatment of wildlife have been incorporated into *The Plan*.
 - Early timing of the project and efforts to cull early nesters or to exclude them from culling activities would 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 by cervical dislocation. Protocols so that adult double-crested cormorants would not be culled from a nest with eggs greater than 50% gestation have been developed in accordance with the Animal Care Task Force recommendation.
 - Sound suppressed weapons and as few Parks Canada personnel as possible would be used to minimize disturbance to the colonial waterbirds and vegetation communities on the island. Low volume radios, minimized and slow movements, and camouflaged clothing would also be used.
 - There would be no use of motorized vehicles or heavy equipment on the island.
 - To reduce impacts to vegetation, carcasses of culled birds would be left where they fall with the exception of carcasses on the shoreline, in the lake and the number needed for research purposes.
 - Ensuring minimal disturbance to the nesting colony during active management activities would also minimize dispersal of double-crested cormorants to other colonies and help to prevent the establishment of new colonies.
 - All Parks Canada personnel operating on the island would be aware of the possible presence of the endangered Lake Erie watersnake and would follow protocols established by Parks Canada species at risk biologists to minimize any possible disturbance to the snakes or their habitat.
 - Active management and monitoring activities would not occur on days of inclement weather (extreme cold, heat, and rain) to prevent exposure of eggs of colonial waterbirds to weather extremes.

- The establishment and operation of a temporary base camp:
 - A temporary base camp would be established on Middle Island in a clearing for use during culling operations only.
 - Overnight stays would occur only in emergency situations such as when inclement weather would prevent Parks Canada personnel from leaving the island.
 - The camp would consist of a small tent for shelter (approximately 12 ft x 12 ft) for Parks Canada personnel during breaks in operations.
 - A small propane heater may be used inside the tent and supplies, water, first aid kits and some food products would be stored during active management operations.

- Transportation of personnel to and from Middle Island during active management activities:
 - Travel to and from Middle Island would be by boat. No docking facilities exist on Middle Island and a small inflatable raft would be used to shuttle people and supplies from moored boats to the shore. All fuelling of boats would take place at local marinas.
 - A maximum of 3 boats, plus two small inflatable rafts would be used.
 - All Parks Canada personnel would wear approved floatation devices. Wearing full body floater suits is recommended to provide adequate thermal protection due to low water temperatures in April and May.
 - Boat operations would be at the discretion of the boat operator's judgment. Weather forecasts and current conditions would be considered prior to departure, while enroute and throughout the day.

- Carcass handling and removal from the island for research and monitoring purposes:
 - Double-crested cormorant carcasses would be left where they lay. However, to minimize the possibility of spreading disease through the scavenging of carcasses by gulls, the shoreline of the island would be monitored after each culling activity and carcasses on the shoreline would be collected for companion studies or moved into vegetated areas.
 - Carcasses of wounded birds dispatched on the water would be returned to the vegetated areas of the island.
 - A maximum of 200 carcasses would be collected from the island for companion studies each year of *The Plan*.
 - Collection for research purposes would occur on only one day, after culling activities have ceased for that day.
 - In order to ensure a representative sample of the island nesting population is obtained, carcasses would be collected from all management zones.
 - Assistants would collect carcasses, 3 to 4 at a time. They would be placed into plastic bags and removed from the island to a boat.
 - Carcasses would be hand loaded into containers/boxes on a boat for transportation to the mainland.
 - Carcasses would be subjected to handling procedures that comply with direction provided by the Canadian Cooperative Wildlife Health Centre (CCWHC).
 - Specimens would be bagged and frozen before transportation to appropriate testing facilities.
 - Sterilization techniques, as required, to prevent the spread of contagious avifaunal diseases, would be followed.
 - Personnel collecting carcasses would do so in compliance with Parks Canada's *Strategy For Management of Highly Pathogenic Avian Influenza*.

- Patrol around Middle Island to ensure public safety during culling activities:
 - An Area Closure⁵ issued by the Point Pelee National Park Superintendent would restrict public access onto Middle Island from March 1st to Sept. 1st each year of *The Plan*.
 - The Area Closure would be posted as per the Canada National Parks Act.
 - Area Closure notices would be posted at all local marinas, with chartered boats operators, at ferry terminals, at key public areas in Point Pelee National Park (on Middle Island and in the mainland portion of the national park) and on Parks Canada's Point Pelee National Park website.
 - A public safety zone would be maintained for the waters within 1 statute mile (1.6km) of the island. A Safety Notice on the Notice to Shipping radio broadcast would be implemented by the Canadian Coast Guard. Broadcast would begin 4 hours before culling activities begin.
 - Although this does not legally close the area to mariners, boaters would be informed that there is a public safety zone in effect for the area.
 - Vessels in the public safety zone would be identified and cautioned on the public safety risks and issues, and advised to leave the public safety zone immediately by a peace officer.
 - Patrols would be conducted, as required, to ensure no unauthorized access and entry onto Middle Island occurs.
 - Two observer boats would intercept other boats that are on course for entering the public safety zone while culling activities are occurring.

- Nest removal and the installation of deterrents to protect areas critical to the survival of individual SARA-listed 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 SARA-listed species at risk, regardless of location on Middle Island. All other nests affected by active management activities will remain in place in order to minimize potential adverse effects to vegetation.
 - 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 SARA-listed species at risk.
 - Nests would be removed with extendable forestry poles early in the nesting season, before hatching of eggs has taken place.
 - Square fiberglass cross-sectioned forestry poles would be used as the primary tool to remove double-crested cormorant nesting material from trees to prevent nest establishment.
 - The pole consists of 8 ft long fiberglass poles fitted together with couplings. A maximum of 7 pole sections would be used at a time for reasons of safety.
 - 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 eggs have reached 50% gestation.
 - If further protection to individual SARA-listed species is required beyond nest material removal then a deterrent would be used.
 - "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.
 - For deterrents, simple construction of a mannequin using a pair of coveralls stuffed with plastic bags would be used first and tested for effectiveness.

⁵ An Area Closure is defined under the *Canada National Parks Act, National Parks General Regulations* Section 36(1) as where the superintendent deems it necessary for the prevention of any seasonal or temporary danger to persons, flora, fauna or natural objects in a Park, he may by notice in writing close to public use or traffic any area in the Park for the period he considers the danger will continue. Specifically, the Area Closure for Middle Island is required in order to minimize disturbance to the nesting colonies, of the six (6) species of colonial waterbirds, located on Middle Island.

- The “scare-crow” would be placed in the tree at the approximate height of nesting using a lightweight rope thrown up over a branch or using a forestry pole.
- Limited media and observer presence:
 - If the Superintendent deems that an exception to the Area Closure is necessary to allow for media and observer access to the island, this will be made to a limited number of media and observers under specified conditions.
 - Media and observers granted access to the island would require authorization under section 7 (5) of the *National Parks General Regulations* of the *Canada National Parks Act*.
 - First priority will be given to members of the media.
 - A maximum of 3 groups of people per day, for a maximum of 30 minutes each would be allowed on the island.
 - Groups would consist of up to 4 people accompanied and led under the direction of Parks Canada personnel.
 - Disturbance to the colonial waterbird colony and risks to public safety would be minimized by restricting access to the island to a maximum of two trips per week, on non-culling days, over a 2-week period.
 - To minimize disturbance to the colonial waterbird colony and risks to public safety, Parks Canada personnel would be present to regulate behaviour, location and time on the island of any media and observers.

The Plan calls for a minimal number of Parks Canada personnel to affect the active management activities: a maximum of 4 shooters and 4 assistants on the island; 2 personnel to use forestry poles and aid in carcass collection on the island; 2 boat operators; and 2 shooters (one on each boat to dispatch wounded birds that may reach the water). Further, to ensure the humane and ethical treatment of wildlife during active management activities, a Parks Canada veterinarian, on the island, and potentially an Ontario SPCA officer, on one of the boats, would also be part of the culling activities.

Implementation of *The 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, well 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.

PROJECT RATIONALE

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, studies 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 and a 40%

loss of significant plant species 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, including the loss of species at risk.

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. *Management of Hyperabundant Wildlife Populations in Canada's National Parks*. The Plan is consistent with that 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.

PROJECT APPROACH AND POSSIBLE ALTERNATIVES

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.

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.

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.

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 nesting 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.

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.

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 and the lack of suitable super-canopy trees. Even if successful, the level of predation/aversion by a bald eagle pair is not likely to have a significant effect on the double-crested cormorant nesting population at its current level. This option would be further investigated for application on Middle Island once a lower nest density has been achieved.

Egg Oiling: Applying inert mineral oil to eggs has been carried out for some ground nesting populations of double-crested cormorants. 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.

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.

PROJECT COMPATIBILITY WITH POINT PELEE NATIONAL PARK MANAGEMENT PLAN, NATIONAL PARK POLICY, AND LEGISLATION

<input checked="" type="checkbox"/>	The project has been reviewed and found to be compatible with the park or site management plan
<input type="checkbox"/>	The project is not compatible with the park or site management plan

Maintenance and restoration of ecological integrity has been legislated as the first priority for management of national parks in the *Canada National Park Act* (Section 8 (2)). Parks Canada has developed the proposed *Middle Island Conservation Plan* in compliance with this direction and that of other relevant legislation, policies, plans and strategies (Appendix 1).

The Point Pelee National Park Management Plan (1995) includes the following objectives:

“In accordance with the National Parks Act and Parks Canada policy, the maintenance of the ecological integrity of the Carolinian forest and southern Great Lakes marsh ecosystems represented in the park will be the prime considerations in the planning, operation and management of Point Pelee.”

“To provide the greatest possible protection to those features, processes, habitats or populations of species, which are unique, sensitive, rare or endangered in a park, regional, national or international context.”

“To emphasize the protection of habitats which are of limited distribution and extent, and without which adequate populations of many species could not survive.”

“To base the management of the natural resources of Point Pelee National Park on sound scientific knowledge, coordinating research and resource management with other agencies and landowners in the region.”

Forest ecosystem health has also been identified in the *Point Pelee National Park: 2006 State of the Park Report (2007)* as in poor condition and in decline. The double-crested cormorant ecological measure is assessed to be in poor condition and declining due to the current high number of nesting double-crested cormorants on Middle Island and the corresponding impacts to vegetation communities and island fauna.

The Plan's goal 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* 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.

These objectives and the project are fully compatible with the *Point Pelee National Park Management Plan* as well as *Parks Canada Policy for National Parks* and the *Canada National Parks Act*.

SCOPE OF ENVIRONMENTAL ASSESSMENT

Scope of project

The scope of the project refers to the components of the proposal that will be considered for purposes of the environmental assessment. This environmental assessment focuses 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 active 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 and the establishment of a temporary base camp;
- Transportation to and from Middle Island during active management activities, including establishment, operation and decommissioning of a temporary base camp;
- Handling and removal of some carcasses 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 SARA-listed species at risk; and
- Limited media and observer presence.

Excluded from this environmental assessment is the monitoring and research program outlined in *The Plan*. The program is designed to assess the success of management approaches to meet the ecological integrity goal and objectives for Middle Island, to investigate ecological integrity restoration needs, and to identify new methods and techniques for Middle Island.

Scope of factors to be considered

This environmental assessment addresses the environmental effects of the project as defined by Section 16 (1)(a) to (d) of the *Canadian Environmental Assessment Act*. The factors 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, it also includes the direct effects of the project on cultural resources as mandated by *Parks Canada Guiding Principles and Operational Policies* and *Parks Canada Impact Assessment Directive 2.4.2*.

Potentially affected ecological and/or cultural resources were used to determine the valued environmental components (VECs) and identified using the Environmental Effects Identification Grid (Table 2).

In scoping the factors, it was determined that the following valued environmental components (VECs) should be considered:

- *Soil Quality*: The consideration of the environmental effects of active management activities on soil quality focuses 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 brass shell casings and copper jacketed lead bullets are assessed.
- *Vegetation*: The consideration of the environmental effects of active management activities on vegetation focuses 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 active management activities are assessed.
- *Wildlife*: The consideration of the environmental effects of active management activities on wildlife focuses 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 active management activities on nesting success. Environmental effects on scavenging species (particularly gulls) are assessed in relation to lead poisoning.
- *Public Health and Safety*: The consideration of the environmental effects of active management activities on public health and safety focuses on the potential of contracting/ and or spreading disease from double-crested cormorant carcasses and hazards in relation to culling activities, including safety of the public when culling is taking place on Middle Island.

- *Visitor Experience*: As Middle Island is part of Point Pelee National Park and managed as a *Zone 1 – Special Preservation* area no visitor amenities/facilities are provided on the island. Thus visitor use of the island is minimal. In addition, an Area Closure is in effect on the island between March 1st and September 1st each year. This is required in order to minimize disturbance to the nesting colonies, of the six (6) species of colonial waterbirds, located on Middle Island. Therefore consideration of the effects of the project on visitor experience focuses on indirect effects to visitors who may be affected by boycotts or other forms of protest, in other parts of the national park, by those opposed to Parks Canada's proposed active management activities, particularly culling of adult double-crested cormorants.

- *Historical and Archaeological Resources*: The consideration of the environmental effects of active management activities on historical and archaeological resources focuses on Level II cultural resources⁶. Cultural resources found on Middle Island fall under this classification.

The environmental assessment identifies and evaluates 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 adverse effects that may result from the Project.

Temporal and Spatial Boundaries

The spatial boundaries of this environmental assessment include the areas affected by the project activities identified above under 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 the western basin 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 culling 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. The temporal boundary for the assessment of environmental effects resulting directly from the development and operation of the project on specific environmental factors is from early April to late May. Cumulative effects are assessed for an additional 5-year period following the initial active management activities.

DESCRIPTION OF ENVIRONMENT

Physical environment

Middle Island is located within the St. Lawrence Lowlands, a Canadian physiographic subdivision, and the Southern Ontario region known as Pelee Island. It is comprised of rocky resistant limestone shelves and exposed gravel beaches and bars, with a limestone gravel spit extending westward. The island is well above lake level and consists of a solid table of Devonian Dundee Formation Limestone. The limestone bedrock is exposed along most of the shoreline, forming shore ledges and large rock slabs around the majority of the island and deep fissures on its eastern end.

Soils on Middle Island consist of Farmington loam, characterized by an overburden of variable texture underlain by limestone bedrock at depths of 1 meter or less. These alkaline soils are well supplied with lime, low in phosphorous and potassium, which tends to be low in organic matter. These soils are also characterized by fair drainage and on Middle

⁶ A Level II cultural resource is defined under the *Parks Canada Guiding Principles and Operational Policies - Cultural Resource Management Policy* as a resource that is not of national historic significance but may have historic value and thus is considered a cultural resource requiring protection.

Island soil moisture varies from frequent saturation in the spring (since internal drainage is constrained due to the underlying bedrock) to a prevalence of droughty conditions later in the season.

Recent research has shown that soil composition differs in low and high double-crested cormorant activity areas. In areas where significant double-crested cormorant impacts were observed, soil samples had an electrical conductivity greater than 1. Electric conductivity is related to the concentration of salts in the soil, and values higher than 1 cause damage to many plants by preventing or delaying seed germinations and killing or seriously retarding the growth of established plants. In addition, areas of double-crested cormorant activity that were considered highly disturbed, exhibited increases in soil nitrogen, phosphorus and organic matter. Results showed that nitrate and phosphorous concentrations in the soil samples in the double-crested cormorant colonized areas of Middle Island were statistically different than the soil concentrations of the non-colonized reference area of Middle Sister Island. Decreased soil pH was also observed in double-crested cormorant activity areas due to the deposition of uric acid.

Middle Island possesses its own unique microclimate. Although it sits within the greater climatic region of Southern Ontario and is comparable to Pelee Island, the influence of Lake Erie on the island's climate is great. The island is classified as a temperate, humid-continental climate. The thermal stability of the lake allows for lesser temperature extremes, a warmer climate and the longest growing season in Ontario. However, lake influence and a flat topography also result in Middle Island having the driest climate in Ontario (i.e. only 75 days of measurable precipitation). This "warmer-than-normal" microclimate results in a vegetation community composition unique to Canada and other northern latitudes.

Storms, fire, wave, wind and ice action are disturbances that, historically, have impacted the island's vegetation. These natural processes cause mostly small-scale openings in the forest canopy resulting in a mosaic of habitats on the island of various levels of succession, contributing to the island's rich biodiversity. There is evidence that the island periodically experiences major storms, as species typical of open habitats or are shade intolerant have changed in composition over time. Similarly, ice and wave action have formed and altered the limestone beaches. However, there is no record of these large-scale disturbances throughout the period that researchers have been observing the island (over the last 50 years or so), although wind and wave action as well as ice scour are still natural processes on the island.

Biological environment

Point Pelee National Park (including Middle Island) is found in the Carolinian ecozone of the St. Lawrence Lowlands (Figure 1), the southernmost ecological region of Canada. Within this ecozone, native forest cover has been reduced from 80% to 11%, and in Essex County, where Point Pelee National Park is located, only 5% of native forest covers remains. Middle Island forest cover is regionally very important for the conservation of ecozone biodiversity.

There are seven different vegetation communities on Middle Island. These include: two wetlands communities (due to small size mapped as 1 community; Forbs Mineral Meadow Marsh and Duckweed Mixed Shallow Aquatic), one beach community (Bedrock Open Beach/Bar), one cultural community (Cultural Thicket) and five forested communities (Hackberry Forest, Thicket/Young Hackberry Forest, Hackberry/Sugar Maple Forest, Hackberry-Blue Ash-Common Hoptree Forest, and Hackberry-Kentucky Coffee-Tree Forest). Many of these communities are variations of the common hackberry (*Celtis occidentalis*) forest, which is considered provincially rare (S2) in Ontario. An early successional forest composed mainly of hackberry is also present in the area of the old airstrip and taxi-way. This area can be visually distinguished from the rest of the island, in recent aerial photographs, as a greener "X".

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. This decrease translates to a 6 ha loss in the total area of dense canopy of the original 16.8 ha total over 8 years (between 1995 and 2003). 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 or reduced diversity of understory vegetation assemblages and changes in the distribution and/or composition of native fauna species.

In total, Middle Island harbours 33 provincially rare species and nine species at risk listed under the federal *Species at Risk Act* (Table 1). Twenty-five significant vascular plant species have been recorded on Middle Island. Six of these plants are SARA-listed species at risk; the red mulberry (*Morus rubra*), common hoptree (*Ptelea trifoliata*), Kentucky coffee-tree (*Gymnocladus dioica*), blue ash (*Fraxinus quadrangulata*), wild hyacinth (*Camassia scilloides*) and American water-willow (*Justicia americana*). American water-willow and two provincially significant species, upright greenbrier (*Smilax eckirrhata*) and trailing wild bean (*Strophostyles helvola*), were only observed in historical data and therefore are likely to have been temporary colonies and are not currently found on Middle Island.

Besides double-crested cormorants, the island supports nesting colonies of five other waterbird species; great blue heron (*Ardea herodias*), great egret (*Ardea alba*), black-crowned night heron (*Nycticorax nycticorax*), herring gull (*Larus argentatus*) and ring-billed gull (*Larus delawarensis*) and provides nesting habitat for several species of forest-breeding birds. The double-crested cormorant began nesting on Middle Island in 1987 with 3 nests. The nesting population on Middle Island increased to 5,202 nests by 2000, when the island was acquired, and has since averaged, with slight fluctuations, at approximately 5,000 nests per year. In 2007, the nest numbers of double-crested cormorants (4,688) were significantly higher than the great blue herons (304), great egrets (27), and black-crowned night herons (15). Research on individual colonies has shown that the double-crested cormorant can displace other nesting waterbirds through habitat loss, direct competition for nests and nesting sites and indirectly from tree nesting activities when double-crested cormorants establish nests above other colonial waterbirds in the canopy. However, no regional or overall population impacts or trends on other colonial waterbirds have been demonstrated to date.

In addition, 13 (2002) to 15 (2005) other species of birds were considered as breeding on Middle Island, as they displayed some breeding evidence. 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.

In a 2002 survey, 13 species of butterflies were seen on the island; 2 of these being significant species, the monarch butterfly (*Danaus plexippus*), which is a SARA-listed species at risk, and the hackberry butterfly (*Asterocampa celtis*), which is provincially rare. Giant swallowtails (*Papilio cresphonte*), also listed as provincially rare, were previously recorded on the island in 1988 but were not observed in 2002. Middle Island may also be important for migrating monarch butterflies every fall as they are funnelled across Lake Erie via the Point Pelee Peninsula landform.

The Lake Erie watersnake (*Nerodia sipedon insularum*) was formerly abundant on Middle Island, with 400 captured in a five hour period in 1949. In 2007, thirty Lake Erie watersnakes were found. Parks Canada and the Ontario Ministry of Natural Resources continue to monitor Lake Erie watersnakes on Middle Island. Historically, the eastern foxsnake has also been documented on Middle Island, the last record being in 1988. With no record since 1988, it was believed to be extirpated from the island. In 2007, a dead foxsnake was recorded on Middle Island. However, it is possible that the carcass may have been transported to the island by a bird.

As part of the federal government's legislative responsibilities for SARA-listed species at risk, recovery strategies and/or management plans and critical habitat descriptions are currently being developed for the 7 SARA-listed species at risk currently found on Middle Island. These are red mulberry, Kentucky coffee-tree, common hoptree, blue ash, wild hyacinth, Lake Erie watersnake and the monarch butterfly.

Although historical records of domestic mammals (sheep, goats, pigs) exist for Middle Island, there are no resident large mammals presently on the island. Although researchers have observed live raccoons on occasion, this is usually followed by the discovery of a raccoon carcass in the spring. A lack of food, shelter and inclement weather make the island inhospitable to mammals and usually results in their inability to survive the winter. The presence of raccoons on the island can also be explained, as there is evidence that people have been capturing and releasing raccoons into the double-crested cormorant colony for many years.

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).

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

Human environment

Since the mid 1800's, land use of Middle Island has varied from an area of summer retreat to once supporting a hotel and casino complete with an airstrip, a taxiway and a small man-made lagoon. As a result, a number of structures and cultural resources have been identified on the island. Aboriginal use of the western basin of Lake Erie has been recorded as far back as the 6th century A.D. Subsequent archaeological surveys have identified evidence of this use by the several pre-contact sites found on Middle Island.

In 1983 an archaeological survey, by the regional archaeologist of Ontario, identified eight pre-contact and five historic sites. Subsequent surveys in 2000 and 2003 by Parks Canada archaeologists inventoried the remains of the clubhouse complex, the lighthouse, anchorage pins in the shoreline, midden deposits, fishing shanty remains, caretaker's cabin remains, bottle dumps and general surface scatter; as well as the 6 pre-contact aboriginal sites. Further detail of these significant cultural resource sites is documented in Parks Canada archaeological reports (Ross, 2000; Mortimer, 2003).

To protect the rare and unique ecosystem and features of Middle Island, the island is managed within Point Pelee National Park as a *Zone 1-Special Preservation* area. 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 and/or cultural 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.

Currently, there is very little human activity on the island. Middle Island is only accessible to the public by boat, with no docks or landing areas on the island. Recent human use has been by researchers (Parks Canada and its partners) and by the occasional transient boater. The island is closed to the public during colonial waterbird nesting season (from March 1st to September 1st). Visitor attendance to Middle Island is minimal. Visitation is not facilitated as the island is managed as a *Zone 1 – Special Preservation* area and resources are strictly managed for preservation. There are no visitor amenities/facilities on the island. Double-crested cormorant guano and its smell also act as a deterrent to visitation. During winter months the island is inaccessible.

Poison ivy, ticks, chiggers, stinging nettle, rusted metal and broken glass, debris that has been washed ashore, trip hazards, tree and limb deadfall, island crevasses, slippery rocks along the shoreline, double-crested cormorant guano and fish regurgitation, all represent potential human safety hazards. All of these hazards can be mitigated for using Parks Canada's Safety Procedures and Safe Work Practices. Some effort in the past has been made to clear debris that has been washed onto the island. In 2000, a Katimavik youth crew participated in a Middle Island clean-up effort, supervised by Parks Canada archaeologists, removing any "junk" or garbage previously washed or dumped onshore. Although a portion of material was removed, any material potentially protecting cultural or archaeological artefacts (e.g.: caretaker's cabin filled with refuse) were left undisturbed.

METHODOLOGY

The approach of this environmental assessment was to: (i) identify the main project components and associated activities; (ii) identify the valued environmental components in the area; and (iii) assess potential interaction between project activities and valued environmental components by using the environmental effects grid (Table 2). Subsequently, potential adverse effects resulting from an interaction amongst project activities and valued environmental components were described and mitigation measures identified. Moreover, the significance of these effects was assessed, and the likelihood or probability of significant adverse environmental effects occurring was evaluated. Attention was also given to cumulative effects. Key documents and other information sources used in preparing this environmental assessment are identified under the References and Experts Consulted section of this report.

ENVIRONMENTAL EFFECTS INCLUDING CUMULATIVE EFFECTS

Potential environmental effects are identified in the environmental effects grid located in Table 2.

Table 2: Environmental Effects Grid

Activities identified below are based on the specific characteristics of the project		ENVIRONMENTAL EFFECTS IDENTIFICATION GRID																											
		ENVIRONMENTAL COMPONENTS																											
		PHYSICAL ENVIRONMENT								BIOLOGICAL ENVIRONMENT									HUMAN ENVIRONMENT										
		AIR		SOIL			WATER			LAND RESOURCES	FLORA			FAUNA			HABITAT			CULTURAL RESOURCES	VISITOR EXPERIENCE	PUBLIC HEALTH & SAFETY							
		QUALITY	NOISE EXPOSURE	QUALITY	DRAINAGE	EROSION	QUANTITY	QUALITY	QUANTITY		Ground	Surface	LAND	AQUATIC	MARINE	LAND	AQUATIC	MARINE	LAND				AQUATIC	MARINE					
PHYSICAL ACTIVITIES PROPOSED MIDDLE ISLAND CONSERVATION PLAN ACTIVITIES	Culling of adult double-crested cormorants			+									+							+									
	Establishment of temporary base camp																												
	Transportation to and from Middle Island	-	-																										
	Handling and removal of carcasses																												
	Patrol around Middle Island/public safety zone																												
	Physical Nest Removal			+																									
	Use of Deterrents			+																									
	Limited media/observer presence																												

Based on this analysis, the following potential environmental effects have been identified in association with each valued environmental component:

Air Quality:

- Slight reduction in air quality due to boat engine emissions is not significant; the western basin of Lake Erie is an area of heavy boat use.

Noise Exposure:

- Noise from culling activities is minimal, as guns are equipped with sound suppressors and a public safety zone of 1 statute mile (1.6 km) will be maintained around the island.

Soil/Water Quality:

- Motorboat use has a potential for soil/water contamination due to accidental fuel spill.
- Potential water/soil contamination from wastes associated with active management activities (e.g. bullet casings, garbage, etc.).
- Potential for mercury or lead contamination to soil/water is minimal. Mercury data from double-crested cormorant carcasses in Lake Erie have been shown to be below threshold levels. However, to ensure the population of double-crested cormorants nesting on Middle Island is consistent with this data, carcasses will be collected and tested.
- Lead contamination to soils or water is minimal due to the choice of calibre. However, lead contamination to wildlife will be mitigated for. Casings are made from inert metals (brass and copper).

Flora, Fauna & Habitat (Land):

- Some vegetation may be trampled during active management activities and during media and observer presence.
- Some vegetation (including species at risk) may be damaged by forestry poles during nest removals and installation of deterrents.
- Some vegetation may be trampled due to temporary base camp (i.e. tent).
- Some wildlife (specifically other nesting colonial waterbirds) may be disturbed by human presence (Parks Canada personnel, media and observers) and culling activities.
- Risk of colonial waterbird species individuals being displaced from the island due to active management activities and/or human presence.
- Species at risk (particularly Lake Erie watersnake) may be disturbed by human presence.
- Some scavenging wildlife species may be impacted by carcasses left on the island (particularly lead poisoning from scavenged carcasses).
- Active management activities will alter the size and may alter gender/age composition of the double-crested cormorant population.
- Shots fired may not kill double-crested cormorants quickly or may only wound the bird, resulting in distress and possible fleeing from the island onto the lake.
- Birds other than double-crested cormorants may accidentally be wounded or shot.

Flora, Fauna & Habitat (Aquatic):

- Accidental fuel spills from motorboats may be hazardous to some species of flora and fauna.
- Potential water contamination from wastes and carcasses associated with active management activities may harm aquatic species.

Visitor Experience:

- Double-crested cormorant carcasses or other remnants of culling activities (e.g. bullet casings) could detract from visitor experience. However, the island has been and will be closed to visitors during the colonial waterbird nesting season as per the annual Area Closure (March 1st to September 1st). Visitor attendance to Middle Island is minimal.

Visitation is not facilitated as the island is managed as a *Zone 1 – Special Preservation* area. There are no visitor amenities/facilities on the island.

- The consideration of the effects of the project on visitor experience focuses on indirect effects to visitors who may be affected by boycotts or other forms of protest, in other parts of the national park, by those opposed to Parks Canada's proposed active management activities, particularly the culling of adult double-crested cormorants. Active management activities may take place during periods of high visitation to the national park (i.e. spring bird migrations).

Public Health and Safety:

- Risk of disease associated with close contact with wildlife.
- Increased safety risk associated with culling activities.

Historical Resources and Archaeological Resources:

- Risk of inadvertent Level II cultural resource destruction from personnel on the island.

Cumulative effects are changes to the environment that are caused by this project in combination with other past, present, and future initiatives. Active management activities, particularly culling, may coincide with other provincial or international culling activities in the western basin of Lake Erie. This interaction may further lower the double-crested cormorant nesting population in the western basin of Lake Erie. However, given that the project is specific to Middle Island only and that the double-crested cormorant nesting population on Middle Island is hyperabundant, as well as where culling activities could occur in the western basin of Lake Erie, it is unlikely to have a significant impact on the larger Great Lakes nesting population. The implementation of the proposed *Middle Island Conservation Plan* may coincide with other research projects on Middle Island. This may result in an increased stress to the other colonial waterbird nesting populations and trampling to vegetation. However, these effects are not expected to be significant with the application of the recommended mitigation measures.

MITIGATION MEASURES

A number of mitigation measures must be implemented to decrease the likelihood and significance of the potential adverse environmental effects including cumulative effects associated with the implementation of the proposed *Middle Island Conservation Plan*. These mitigation measures are listed below. These measures are also outlined in Appendix 2 in association with the potential environmental effect for which they mitigate.

Mitigation measures for potential adverse environmental effects:

- Environmental emergency response procedures must be initiated immediately in the event of a spill.
- Any fuel, oil, or hazardous material spill must be immediately reported to a Parks Canada official and the Ministry of the Environment – Spills Action Centre (416-325-3000 or 1-800-268-6060).
- All boats must be maintained in good working order.
- Boats and additional fuel containers will only be fuelled at local marinas by marina staff.
- Carcasses will be tested for mercury levels to determine if levels are higher than other sites.
- Non-toxic ammunition will be used as it becomes available for .17 calibre rifles used in active management activities.
- Non-toxic ammunition will be use in 12 gauge shotguns used to dispatch wounded birds in the lake.
- All wastes must be collected and brought back from Middle Island, sorted, and disposed of properly in accordance with provincial regulations.
- If concentrated areas of brass casings are observed (due to stationary shooters in an area for an extended period of time) efforts will be made to collect casings.

- Wastes shall not be burned or buried on site.
- Human waste shall be collected in portable units and removed from the island.

- All personnel, media and observers will walk along/use paths that will cause the least amount of disturbance to vegetation wherever possible.
- Areas of vegetation representative of healthy Carolinian forest understory will be avoided whenever possible.
- Personnel on Middle Island will know the location of species at risk, including SARA-listed and provincially significant species.
- Assistants will be able to identify species at risk.
- Media and observers granted access to the island will be aware of mitigation protocols and under direct supervision of Parks Canada personnel at all times to avoid damage to species at risk and minimize disturbance.
- Only those carcasses necessary for research will be removed from vegetated areas. Carcasses that fall in significant areas of healthy Carolinian forest understory or near species at risk, will be left where they lie.
- To avoid increased vegetation damage, plastic bags used in carcass removal will not be dragged on the ground.

- Only nests impacting individual SARA-listed species at risk will be removed.
- Particular care around mature SARA-listed species at risk individuals will be taken (specifically red mulberry, Kentucky coffee tree and blue ash).
- Practice of forestry pole use, to avoid unnecessary damage, will occur prior to nest removal.
- A maximum length of 7 forestry pole sections will be observed.
- Control will be maintained at all times over forestry poles.

- Base camp will be installed in an area where there are no species at risk.
- Base camp will be in an area where there is no significant representation of healthy Carolinian forest understory.

- Any birds or wildlife encountered that are not involved with the active management activities shall not be touched, harassed, or harmed in any way.
- If high sensitivity to disturbance of nesting colonial waterbirds is observed in the early phases of active management activities (early April), timing of active management activities will be adjusted.
- Personnel will be aware of the location of species at risk and existing protocols to minimize disturbance will be followed (particularly Lake Erie watersnake mitigations: e.g. no stepping on loose rocks on the shoreline).
- Personnel will be aware of location of nesting non-target colonial waterbirds.
- Range of disturbance/reaction distances will be taken and observed.
- Personnel will only be in disturbance range of non-target species when active management dictates (noise levels and movement will be kept to a minimum in these areas).
- Culling activities will not occur in a given area for more than 45 minutes in order to minimize disturbance to non-target colonial waterbirds.
- If disturbance occurs, “buffer” days in between active management activities and/or media/observer presence events will be implemented.
- Methods of culling activities (stationary vs. quick moving shooters) will be tested and the method with the least amount of disturbance will be chosen.
- Exposure of eggs of non-target colonial waterbirds will be minimized (disturbance on very cold and very warm days will be avoided, time birds are off nest will be recorded and minimized).
- Assistants on the island and personnel on boats will watch for potential predation of unattended nests (through disturbance) by herring gulls or crows. If predation occurs, active management activities will allow non-target colonial waterbirds to return to their nests, and activities causing disturbance will be reassessed.
- Media and observers granted access to the island will be limited to areas that cause the least amount of disturbance to non-target colonial waterbirds wherever possible.

- Nesting double-crested cormorant nest numbers will be reduced only to targets necessary for ecological integrity recovery.

- If culling activities become more effective as the nesting colony becomes smaller, target numbers will be adjusted accordingly.
- Both adult double-crested cormorants associated with an individual nest will be culled.
- No eggs greater than 50% gestation or young will be removed.

- Only qualified and experienced Parks Canada personnel will undertake all culling activities.
- Parks Canada personnel undertaking all culling activities must be able (and tested) to consistently hit a 3 cm target.
- Only stationary birds at which the shooter has a clear, safe shot may be culled.
- No freestanding shots will be made.
- Only shots to the base of the neck, ensuring cervical separation and humane killing, will be made.
- Protocols for wounded birds will be strictly followed (including 20 minute intervals, radio calls to boats on lake of any wounded birds).
- Wounded double-crested cormorants that land on the island in vegetated areas will be dispatched immediately or as soon as safe to do so if the bird lands out of sight.
- Wounded double-crested cormorants that fly out onto the lake will be identified by observers on Parks Canada boats and dispatched immediately or as soon as safe to do so.
- Shooting in poor light conditions will not occur.
- Shooting towards known concentrations of non-target species will be avoided where possible to minimize chance of ricochet and wounding of non-target species.
- Nests of non-target species will not be in direct line of fire.

- Visitors to Point Pelee National Park will be informed of active management activities occurring within the national park.
- Visitors will be provided with opportunities to express their views on the project (e.g. comments/feedback forms).
- Any complaints in a loss of visitor experience will be documented and addressed.
- Protocols for dealing with protests and protestors will be developed and followed in order to mitigate for loss of visitor experience.

- Carcasses will be removed from the shoreline and placed within vegetated areas.
- Only Parks Canada personnel will handle carcasses.
- Parks Canada personnel will wear rubber gloves when handling carcasses.
- Safe work practices must be in place prior to beginning the active management activities.
- Parks Canada will follow direction provided in the *Strategy For Management of Highly Pathogenic Avian Influenza*.

- All non-park personnel (media/observers) on the island must have written permission of the Superintendent of Point Pelee National Park to access the island.
- To reduce the risk to public safety, media and observer presence on the island will not occur during culling activities.
- To reduce the risk to public safety all media and observers granted access to the island will adhere to safety protocols.
- Personnel are required to indicate when they have safely returned from the island each day.
- A minimum of two people will be present on the island during the active management activities.

- All personnel on the island will be aware of locations of cultural resource and avoid disturbing these areas, where possible.
- Base camp will not be erected in close proximity to any existing cultural resources.

Mitigations measures for potential adverse cumulative effects:

- Additional projects on Middle Island during active management activities will be reduced to essential projects only.

- Additional projects or personnel will not occur on active management days and, where possible, will leave “buffer” days in between active management activities and any additional projects.
- Locations of non-target nesting colonial waterbirds and plant species at risk will be avoided whenever possible.

RESIDUAL ADVERSE EFFECTS & SIGNIFICANCE

Residual adverse effects including cumulative effects are environmental effects that will persist after mitigating measures have been implemented. The purpose of significance determination is stated under the *Canadian Environmental Assessment Act* as to ensure that projects that are to be carried out in Canada or on federal lands do not cause significant adverse environmental effects. For the purpose of this environmental assessment significance has been determined based on the magnitude, geographic extent, duration of the activity, frequency and reversibility of the identified residual adverse environmental effects.

With regard to this project, the following residual adverse environmental effects have been identified and their significance evaluated:

Some Vegetation May be Trampled or Damaged:

- Identified mitigation measures limit vegetation trampling/damage to a small number of individual plants.
- Early timing of the project ensures that understory growth on Middle Island will be minimal at the time of active management activities.
- Minimal herbaceous cover would allow for easy identification of species at risk and a recovery period for trampled vegetation.
- Identified mitigation measures limit vegetation trampling/damage to a short period of disturbance (only several days over a 3 to 4 week period).
- Identified mitigation measures limit additional projects on Middle Island during active management activities to essential projects only.
- Identified mitigation measures limit vegetation trampling/damage to paths that will cause the least amount of disturbance to vegetation on Middle Island.
- Residual effects to vegetation are not expected to threaten the integrity (abundance and/or distribution) of the populations of plant species representative Carolinian vegetation communities.
- Residual effects to species at risk would not jeopardize the survival or recovery of the species and would not have any population-level impact.
- Inventory of SARA-listed species at risk and ground assessment of forest health and forest regeneration will aid in these determinations.
- 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, including the loss of species at risk. The proposed active management activities are expected to improve the ecological integrity of Middle Island.

Therefore the residual adverse effect of vegetation trampling/damage is **not expected to be significant**. The magnitude, geographic extent, duration of the activity, frequency and reversibility of the identified residual adverse environmental effect is expected to be negligible.

Some Wildlife Species May Still be Disturbed:

- Identified mitigation measures limit disturbance to a small number of individuals (i.e. non-target nesting colonial waterbirds).
- Identified mitigation measures ensure that timing of active management activities will be limited to periods of low disturbance.

- Identified mitigation measures limit additional projects on Middle Island during active management activities to essential projects only.
- The Area Closure ensures that other sources of disturbance to colonial waterbirds will be minimized.
- Residual effects to wildlife are not expected to threaten the integrity (abundance and/or distribution) of the populations of Middle Island wildlife species.
- Without active management activities a loss of non-target colonial waterbird nesting sites on Middle Island is predicted.
- Without active management activities a loss of habitat for most wildlife species that the island supports is predicted.

Therefore the residual adverse effect of disturbance to wildlife species (i.e. non-target colonial waterbirds) is **not expected to be significant**. The magnitude, geographic extent, duration of the activity, frequency and reversibility of the identified residual adverse environmental effect is expected to be negligible.

The Size of Double-Crested Cormorant Nesting Population Could be Reduced Regionally:

- Identified mitigation measures limit active management activities and the reduction of the double-crested cormorant nesting population on Middle Island to identified targets in order to meet the proposed ecological integrity goal and objectives. The goal is not to eliminate the nesting double-crested cormorant population on Middle Island, but to reach a sustainable number of nests.
- Reducing an island's nesting population without significantly reducing the regional or larger population is possible because double-crested cormorants show site fidelity, meaning they return to the same site to breed year after year and young double-crested cormorants often return to the colony sites where they hatched or to nearby areas to breed.
- Given that the project is specific to Middle Island and that the double-crested cormorant nesting population on Middle Island is hyperabundant, as well as where culling activities could occur in the western basin of Lake Erie, it is unlikely to have a significant impact on the larger Great Lakes nesting population. Work with other agencies to monitor double-crested cormorant nest numbers at other Lake Erie nesting colonies will aid in this determination.

Therefore the residual adverse effect to the regional size of the double-crested cormorant nesting population is **not expected to be significant**. The magnitude, geographic extent, duration of the activity, frequency and reversibility of the identified residual adverse environmental effect is expected to be negligible.

Some National Park Visitors May Have Their Visitor Experience Adversely Effected by Protests Launched by Persons or Groups Opposed to Active Management Activities, Particularly Culling of Double-Crested Cormorants:

- Identified mitigation measures address/minimize the loss to visitor experience.
- Mitigation measures would ensure decreased visitor experience due to protests would be dealt with effectively.

Therefore the residual adverse effect to visitor experience to the national park is **not expected to be significant**. The magnitude, geographic extent, duration of the activity, frequency and reversibility of the identified residual adverse environmental effect is expected to be minor or negligible.

IMPACT ON ECOLOGICAL INTEGRITY

The project is expected to have a positive effect on the Carolinian ecosystem on Middle Island and its biodiversity. The goal of the proposed *Middle Island Conservation 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*.

PUBLIC CONSULTATION

<input checked="" type="checkbox"/>	Public participation was sought
<input type="checkbox"/>	Public participation was not sought

Public participation on this environmental assessment is being sought. The public will be invited to submit written comments in their official language of choice. Public participation will begin on April 2nd, 2008 and continue for a three-week period, ending on April 23rd, 2008. **Public comments received by April 23rd, 2008 will be considered.** This public participation period will enable interested individuals and/or groups to comment on the scope of the environmental assessment and the environmental assessment report in relation to the outlined project.

Public, stakeholder and First Nations communications/consultations regarding the ecological integrity challenge on Middle Island were held in 2007 between the months of January and November. These public and stakeholder communications/consultations were undertaken 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.

SURVEILLANCE

<input type="checkbox"/>	Surveillance monitoring is not required
<input checked="" type="checkbox"/>	Surveillance monitoring is required

Surveillance monitoring is required to ensure mitigation measures are implemented. The Manager of Resource Conservation for Point Pelee National Park will be responsible for ensuring surveillance monitoring.

FOLLOW-UP

<input type="checkbox"/>	A follow-up program will not be conducted
<input checked="" type="checkbox"/>	A follow-up program will be conducted

To verify the accuracy of potential adverse environmental effects and to ensure recommended mitigations measures were effective a follow-up program is required. The proposed *Middle Island Conservation Plan* will be subject to ongoing review, as part of the Point Pelee National Park Ecological Integrity Monitoring Program. Regular reviews, to assess the success of management approaches outlined in *The Plan* to meet the ecological integrity goal and objectives for Middle Island, and to identify modifications and/or changes as needed, will occur. This will aid in defining the required follow-up program. Evaluation methods would include: annual monitoring of changes in nest densities of double-crested cormorants in all zones, monitoring of disturbance during active management activities 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 3 (nest removal and/or use of deterrents to protect individual SARA-listed species at risk) 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. A report, after 2 years of implementation of *The Plan*, detailing these results will be required. Results of the follow-up program would be incorporated into future iterations of *The Plan* where appropriate.

SPECIES AT RISK MONITORING

<input type="checkbox"/>	Species at risk monitoring is not required
<input checked="" type="checkbox"/>	Species at risk monitoring is required and is compatible with the applicable recovery strategy or action plan

Mitigation measures have been proposed to protect the SARA-listed species at risk known to be present on Middle Island as a preventative measure. As part of the proposed *Middle Island Conservation Plan* SARA-listed species at risk populations would be inventoried, at a minimum, of twice during the life of *The Plan*.

EA DETERMINATION

<input type="checkbox"/>	Taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is not likely to cause significant adverse environmental effects. The responsible authority may exercise any power or perform any duty or function that would permit the project to be carried out in whole or in part.
<input type="checkbox"/>	Taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances. The responsible authority shall not exercise any power or perform any duty or function conferred on it by or under any Act of Parliament that would permit the project to be carried out in whole or in part.
<input type="checkbox"/>	Refer the project to the minister for a referral to a mediator or a review panel where <ul style="list-style-type: none"> ➤ it is uncertain whether the project, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, is likely to cause significant adverse environmental effects; ➤ the project, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, is likely to cause significant adverse environmental effects and paragraph (b) does not apply; or ➤ public concerns warrant a reference to a mediator or a review panel.

The EA determination is pending the results of the public participation period and the completion of this environmental assessment.

REFERENCES & EXPERTS CONSULTED

Experts Consulted During EA Process

Parks Canada – Marian Stranak, Superintendent	Consulted to discuss project details
Parks Canada – Tammy Dobbie, Park Ecologist	Consulted to discuss project details
Parks Canada – Dan Reive, Resource Conservation Manager	Consulted to discuss project details
Parks Canada – Steve Travis, Warden Operations Co-ordinator	Consulted to discuss project details
Parks Canada – Dr. Stephen Woodley, Chief Scientist	Consulted to discuss project details and assessment review
Parks Canada – Mark Yeates, Environmental Assessment Specialist, Ontario Service Centre	Consulted to discuss project in relation to the environmental assessment process and assessment review
Parks Canada – Ila Smith, Head, Environmental Assessment	Consulted to discuss project in relation to the environmental assessment process and assessment review
Parks Canada – Vicki McKay, Species at Risk Biologist	Consulted to discuss project in relation to potential impacts to species at risk
Parks Canada – Brian Ross, Project Archaeologist	Consulted to discuss project in relation to potential impacts to cultural resources
Environment Canada, Canadian Wildlife Service – Dave Moore	Consulted to discuss project in relation to potential impacts to colonial waterbirds
Environment Canada, Canadian Wildlife Service – Dr. D.V. Chip Weseloh, Advisor, Wildlife Toxicology	Consulted to discuss project in relation to potential impacts to colonial waterbirds
University of Minnesota, Department of Fisheries, Wildlife and Conservation Biology – Dr. Francesca J. Cuthbert, Professor	Consulted to discuss project in relation to potential impacts to colonial waterbirds
University of Windsor, Great Lakes Institute for Environmental Research – Dr. Ken Drouillard, Head Organic Analytical Lab, Assistant Professor, Biological Sciences	Consulted to discuss project in relation to contaminants/disease
University of Guelph, Ontario Region Canadian	Consulted to discuss project in relation to

Cooperative Wildlife Health Centre – Dr. Kate Welch	contaminants/disease
Environment Canada, National Water Research Institute – Dr. Allan Crowe, Research Hydrologist	Consulted to discuss project in relation to contaminants
Environment Canada, Environmental Protection Operations Division, Ontario – Sheila Allen, A/Head, EA Unit	Consulted to confirm agency as an expert authority
Ontario Ministry of the Environment – Ross Lashbrook, Project Officer, EA Project Coordination Section	Consulted to confirm provincial agencies/organizations environmental assessment responsibilities

References

- Bakowsky, W.D.** 1996. Natural heritage resources of Ontario: vegetation communities of southern Ontario. Ontario Ministry of Natural Resources, Natural Heritage Information Centre, Peterborough, Ontario
- Beaver, B.V.,** Reed, W., Leary, S., McKiernan, B., Bain, F., Schultz, R., Bennett, B.T., Pascoe, P., Shull, E., Cork, L.C., Franis-Floyd, R., Amass, K.D., Johnson, R., Schmidt, R.H., Underwood, W., Thorton, G.W. and B. Kohn. 2001. 2000 Report of the AVMA Panel on Euthanasia. *J. Am. Vet. Med. Assoc.* 218 (5): 669-696
- Boerner, R.E.J.** 1984. Forest composition on the Lake Erie Islands. *Am. Midl. Nat.* **111(1)**: 173-184
- Bostock, H. S.** 1970. Physiographic subdivisions of Canada. *Geology & Economic Minerals of Canada*. Ed. R.J.W. Douglas. Department of Energy, Minerals & Resources. Ottawa
- Celestino, M.** 2002. Wildflowers of the Canadian Erie Islands. Essex Country Field Naturalists Club, Windsor, Ontario
- Chapman, L. J.** and D. F. Putnam. 1966. *The Physiography of Southern Ontario*. Ontario Research Foundation. University of Toronto Press. Canada
- Christens, E.** and H. Blokpoel. 1991. Operational spraying of white mineral oil to prevent hatching of gull eggs. *Wildlife Society Bulletin* 19: 423-430
- Canadian Council on Animal Care (CCAC).** 2003. CCAC guidelines on: the care and use of wildlife. Ottawa, ON: CCAC. Online at: http://www.ccac.ca/en/CCAC_Programs/Guidelines_Policies/GDLINES/Wildlife/Wildlife.pdf
- COSEWIC.** 2007. Canadian species at risk. Committee on the Status of Endangered Wildlife in Canada. Online at: http://www.cosewic.gc.ca/eng/sct0/rtp/rtp_csar_e.cft [accessed in September 2007]
- Duffe, J. A.** 2006. Impacts of double-crested cormorants nesting on western Lake Erie islands. Carleton University. Ottawa, Ontario

- Dusi, R.T.** 1978. Stability of heron colonies in swamp and upland sites. Proceedings of Colonial Waterbirds 2: 38-40
- Fox, W. A.** 1984. An archaeological Survey of Middle Island, Ontario. Kewa **84(1)**:4-10
- Government of Canada.** 2000. Canada National Parks Act. S.C. 2000. C.32 (CNPA). Queen's Writer, Ottawa, Ontario <http://www.laws.justice.ca>, http://www.pc.gc.ca/docs/bib-lib/docs1a_e.asp#1
- Government of Canada.** 2002. Species at Risk Act. 2002. C29 (SARA). Queen's Writer, Ottawa, Ontario <http://www.laws.justice.ca>, <http://www.sararegistry.gc.ca>
- Hatch, J. J.** 1995. Changing populations of double-crested cormorants. Colonial Waterbirds 18 (Spec. Publ.): 8-24
- Hatch, J. J.** and D. V. Weseloh. 1999. Double-crested cormorant (*Phalacrocorax auritus*). In: The Birds of North America. No. 441 (Poole, A. and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania
- Hebert, C.E., Duffe, J.A., Weseloh, D.V., Senese, E.M.T., and G.D. Haffner.** 2005. Unique island habitats may be threatened by double-crested cormorants. Journal of Wildlife Management 69(1): 68-76
- Hobara, S., Osono, T., Koba, K., Tokuchi, N., Fujiwara, S., and K. Kameda.** 2001. Forest floor quality and N transformations in a temperate forest affected by avian-derived N deposition. Water, Air, and Soil Pollution 130: 679-684
- Kamstra, J., M.J. Oldham, and P.A. Woodliffe.** 1995. A life science inventory and evaluation of six natural area in the Erie Islands (Ontario): Fish Point Provincial Nature Reserve, Lighthouse Point Provincial Nature Reserve, Stone Road Complex, Middle Point, East Sister Island Provincial Nature Reserve, Middle Island. Aylmer District (Chatham area), Ontario Ministry of Natural Resources
- Kirk, D.A.** 2007. Impacts of double-crested cormorant (*Phalacrocorax auritus*) populations on the biodiversity of islands in western Lake Erie: Management recommendations. Unpublished report for Parks Canada
- Koh, S.** 2005. The effects of double-crested cormorants (*Phalacrocorax auritus*) on the forest habitats of East Sister Island, Lake Erie Canada: An assessment of damage and the construction of a preliminary carrying capacity model. TerraSystems Research
- Koh, S. and L.W. Carr.** 2003. Follow-up assessment of tree damage: effect of double-crested cormorants on the western forest, High Bluff Island, Presqu'ile Provincial Park. TerraSystems Research
- Koh, S., Tanenzapt, A., Moulant, G., Dobbie, T., Carr, L., Keitel, J., Hogsden, K., Harvey, G., and R. Thorndyke.** In review. Double-crested cormorants alter forest structure and increase damage indices of individual trees on island habitats in Lake Erie. Waterbirds. In review
- Korfanty, C., Miyasaki, W., and J. L. Harcus.** 1999. Review of the population status and management of double-crested cormorants in Ontario. In Symposium on double-crested cormorants: Population status and management issues in the Midwest (Tobin, M. E., ed.). United States Department of Agriculture Technical Bulletin No. 1879. pg. 131-146

- Lemmon, C.R., Bugbee, G., and G.R. Stephens.** 1994. Tree damage by nesting double-crested cormorants in Connecticut. *Connecticut Warbler* 14: 27-30
- Moore, D.J., Weseloh, D.V.C., and R. Joos.** 2005. The management of double-crested cormorants (*Phalacrocorax auritus*) and its effects on great blue heron (*Ardea herodias*) and great egrets (*Ardea albus*) at High Bluff Island (Lake Ontario) in 2005. (Final Draft, 24 January 2006)
- Mortimer, B.J.** 2003. Inventory and Assessment of Archaeological Assets and Surface Collections, Middle Island (132H), Point Pelee National Park of Canada. Ontario Service Center, Parks Canada. Cornwall, Ontario
- North-South Environmental Inc.** 2004. Vegetation communities and significant vascular plant species of Middle Island, Lake Erie. Campbellville, Ontario
- ODNR (Ohio Department of Natural Resources).** 2007. Impacts of double-crested cormorant management in Ohio. Division of Wildlife Research Report. Columbus, Ohio
- OMNR (Ontario Ministry of Natural Resources).** 2006. Review of the status and management of double-crested cormorants in Ontario. Fish and Wildlife Branch. Wildlife Section. Peterborough, Ontario
- Parks Canada.** 1994. Parks Canada Guiding Principles and Operational Policies. Ottawa, Ontario
- Parks Canada.** 1995. Point Pelee National Park Management Plan. Ottawa, Ontario
- Parks Canada.** 2005. Parks Canada Management Bulletin 2.2.8 Management bulletin on Animal Care Task Forces. Ottawa, Ontario
- Parks Canada.** 2007. Point Pelee National Park: 2006 State of the Park Report. Ottawa, Ontario
- Parks Canada.** 2007. Parks Canada Agency Management Directive 4.4.11: Management of hyperabundant wildlife populations in Canada's National Parks, December 2007 (replacing 4.4.11: Disposal of surplus wildlife dated September 1999) Ottawa, Ontario
- Parks Canada.** 2008. Parks Canada Animal Care Task Force: Hyperabundant Species Protocol Review Form.
- Parks Canada.** 2008. Middle Island Ecological Integrity Challenge: 2007 Public and Stakeholder Communications/Consultations Report. Point Pelee National Park.
- Postupalsky, S.** 1978. Toxic chemicals and cormorant populations in the Great Lakes. Canadian Wildlife Service Toxicology Division, Manuscript report No. 40, Ottawa, Ontario
- Rennie, F.** 1982. An assessment of the national significance of Middle Island. Parks Canada, Ottawa
- Ridout, R.** 2003. Middle Island Avifaunal Surveys 2002, Methodology & Results. Bird Studies Canada. Port Rowan, Ontario
- Ross, B. D.** 2000. A Preliminary Assessment of Visible Cultural Resources on Middle Island (132H), Point Pelee National Park. Parks Canada. Ontario

- Sherman, D.E. and R.D. Huffman.** In review. Impacts of Cormorant Removal on Nesting Colonial Waterbirds. Waterbirds. In review
- Shieldcastle, M. C., and L. Martin.** 1999. Colonial waterbird nesting on West Sister Island National wildlife refuge and the arrival of double-crested cormorants. *In* Symposium on double-crested cormorants: Population status and management issues in the Midwest (Tobin, M.E., ed.). United States Department of Agriculture Technical Bulletin No. 1879. pg 115-119
- Shonk, K.** 1998. The effect of oil spraying of double-crested cormorants, *Phalacrocorax auritus*, and other egg laying parameters. B.S. Thesis, Wilfred Laurier University, Waterloo, Ontario
- Sullivan K.L., Curtis, P.D., Chipman, R.B., and R.D. McCullough.** 2006. The double-crested cormorant: Issues and management. Department of Natural Resources, Cornell University, Ithaca, New York
- USDA-APHIS-WS (United States Department of Agriculture Animal and Plant Health Inspection Service, Wildlife Services).** 2006. Reducing double-crested cormorant damage in Ohio. Final Environmental Assessment. March 2006. Online at: <http://www.fws.gov/midwest/MidwestBird/cormorants.htm>
- USFWS (United States Fish and Wildlife Service)** 2003b. Final Environmental Impact Statement: double-crested cormorant management. U.S. Dept. of the Interior, USFWS, Div. of Migratory Bird Management, Arlington, Virginia. Online at: <http://migratorybirds.fws.gov/issues/cormorant/cormorant.html>
- Weseloh, D.V.C., Teeple, S.M., and M. Gilbertson.** 1983. Double-crested cormorants of the Great Lakes: Egg-laying parameters, reproductive failure and contaminant residues in eggs. Canadian Journal of Zoology 61: 427-436
- Weseloh, D.V.C. and P.J. Ewins.** 1994. Characteristics of a rapidly increasing colony of double-crested cormorants (*Phalacrocorax auritus*) in Lake Ontario: Population size, reproductive parameters and band recoveries. Journal of Great Lakes Research 20: 443-456
- Weseloh, D.V. and B. Collier.** 1995. The rise of the double-crested cormorant on the Great Lakes: Winning the war against contaminants. Great Lakes fact sheet. Canadian Wildlife Service, Environment Canada and Long Point Bird Observatory
- Weseloh, D.V., Ewins, P.J., Struger, J., Mineau, P., Bishop, C.A., Postupalsky, S., and J.P. Ludwig.** 1995. Double-crested cormorants of the Great Lakes: Changes in population size, breeding distribution and reproductive output between 1913 and 1991. Colonial Waterbirds (Spec. Publ.) 18:48-59
- Weseloh, D.V. and C. Pekarik.** 1999. Declining contaminant levels in herring gull eggs from Toronto Harbour, Lake Ontario, 1974-1998. Great Lakes Research Review 4(2): 23-27
- Weseloh, D.V.C., Havelka, T., Cuthbert, F., and S. Hanisch.** 2006. The 2005 Great Lakes-wide census of nesting double-crested cormorants. Draft Report of Results. Unpublished manuscript. Canadian Wildlife Service. Downsview, Ontario. January 13, 2006
- Wires, L.R., Cuthbert, F.J., Trexel, D.R., and A.R. Joshi.** 2001. Status of the double-crested cormorant (*Phalacrocorax auritus*) in North America. Final Report to the United States Fish and Wildlife Service

Wormington, A. 2006. The Breeding Birds of Point Pelee National Park, with an Emphasis on Species-at-Risk. Parks Canada. Leamington. Unpublished.

Tymstra, Y.R. 1992. Middle Island's hidden treasures. Seasons **32(3)**:16-21

Appendix 1 – Relevant Legislation and Policy

The development and implementation of the proposed *Middle Island Conservation Plan* is governed by legislation, policies, plans and strategies as found in the following:

Canada National Parks Act (2000)

Section 8(2) Maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority of the Minister when considering all aspects of the management of parks.

Section 16(1) The Governor in Council may make regulations respecting (c) the protection of fauna, the taking of specimens of fauna for scientific or propagation purposes, and the destruction or removal of dangerous or superabundant fauna.

National Parks Wildlife Regulations (2003)

Section 15(1) A superintendent may authorize (a) the removal, relocation or destruction of wildlife for scientific purposes or park management purposes.

Species at Risk Act (2002. C29)

The *Species at Risk Act* provides a framework for actions to ensure the survival of wildlife species and the protection of our natural heritage. It sets out how to decide which species are a priority for action and what to do to protect a species. It identifies ways governments, organizations and individuals can work together, and it establishes penalties for a failure to obey the law.

Under the *Species at Risk Act*, Parks Canada is responsible for the protection and recovery of listed species found in national parks, national marine conservation areas, national historic sites and other protected heritage areas administered by Parks Canada. Like the *Canada National Parks Act* and the *Canada National Marine Conservation Areas Act*, this legislation directs Parks Canada to:

- lead and participating in recovery teams;
- develop and support recovery strategies and priority actions;
- educate Canadians on species at risk;
- collect detailed information on species' distribution and population status; and
- assess how activities might affect species at risk within Parks Canada's protected heritage areas and monitoring these activities for their effects.

Parks Canada Guiding Principles and Operational Policies

Section 3.2.3

National park ecosystems will be managed with minimal interference to natural processes. However, active management may be allowed when the structure or function of an ecosystem has been seriously altered and manipulation is the only possible alternative available to restore ecological integrity.

Section 3.2.5

Where manipulation is necessary it will be based on scientific research, use techniques that duplicate natural processes as closely as possible, and be carefully monitored.

Parks Canada Agency Management Directive 4.4.11: Management of Hyperabundant Wildlife Populations in Canada's National Parks, December 2007 (replacing 4.4.11: Disposal of Surplus Wildlife dated September 1999)

A recommendation to actively manage a hyperabundant wildlife population must be based on at least one of the following conditions:

4.1 The size of the hyperabundant wildlife population must have exceeded the upper range of natural variability that is characteristic of the ecosystem, and there must be demonstrated impact on ecological integrity. In the case of a naturalized species, a population may be regarded as hyperabundant if there is demonstrable evidence that its size is directly responsible for loss of ecological integrity in a park.

4.2 Hyperabundance is as a result of alteration of the natural population regulation mechanisms.

4.3 The survival or condition of one or more native species in the park, in particular, rare or endangered species, is threatened or likely to be threatened by the size of the hyperabundant wildlife population unless mitigation is undertaken.

4.4 There is clear evidence that the ecosystem is experiencing impacts outside the historical or modeled range of variation as a result of the presence of the hyperabundant population.

Parks Canada Management Bulletin 2.2.8 Management Bulletin on Animal Care Task Forces (2005)

Section 6.1 Whenever an environmental assessment (EA) is required for a wildlife research project, the Animal Care Task Force (ACTF) will operate in close conjunction with the EA process while recognizing that the focus of the EA process is the overall impact of the project on the species/or area from a ecological/biological perspective and that the animal care process addresses procedures during research or management that cause distress to wildlife and addresses the ethical and humane treatment of wildlife in these instances: - Parks Canada ACTF approval or approval from another ACTF affiliated with a University or provincial or federal agency will be mandatory for protocols involving any handling and or manipulation of wildlife.

Point Pelee National Park: 2006 State of the Park Report (2007)

Section 6 State of Ecosystems

Indicator: Forest Ecosystem; Measure: Hyper-abundant Double-crested Cormorants

The double-crested cormorant measure is assessed to be in poor condition and declining due to the current high number of nesting double-crested cormorants on Middle Island and the corresponding impacts on vegetation communities and island fauna.

Appendix 2 – Potential Interaction with VEC's and Required Mitigations

VEC	Potential Interaction with VEC	Required Mitigation
Air Quality	Slight reduction in air quality due to boat engine emissions	<ul style="list-style-type: none"> No mitigations required
Noise Exposure	Noise exposure from culling activities is minimal	<ul style="list-style-type: none"> No mitigations required
Soil/Water Quality	Potential soil/water contamination due to accidental fuel spill	<ul style="list-style-type: none"> Environmental emergency response procedures must be initiated immediately in the event of a spill Any fuel, oil, or hazardous material spill must be immediately reported to a Parks Canada official and the Ministry of the Environment – Spills Action Centre (416-325-3000 or 1-800-268-6060) All boats must be maintained in good working order. Boats and additional fuel containers will only be fuelled at local marinas by marina staff
	Potential mercury and lead contamination due to double-crested cormorant carcasses and expelled lead bullets	<ul style="list-style-type: none"> Carcasses will be tested for mercury levels to determine if levels are higher than other sites Non-toxic ammunition will be used as it becomes available for .17 calibre rifles used in active management activities Non-toxic ammunition will be use in 12 gauge shotguns used to dispatch wounded birds in the lake
	Potential water contamination from wastes associated with active management activities (e.g. garbage, human waste, etc.)	<ul style="list-style-type: none"> All wastes must be collected and brought back from Middle Island, sorted, and disposed of properly in accordance with provincial regulations If concentrated areas of brass casings are observed (due to stationary shooters in an area for an extended period of time) efforts will be made to collect casings Wastes shall not be burned or buried on site Human waste shall be collected in portable units and removed from the island

VEC	Potential Interaction with VEC	Required Mitigation
Flora, Fauna & Habitat (Land)	Some vegetation (including species at risk) may be trampled during active management activities	<ul style="list-style-type: none"> ▪ All personnel, media and observers will walk along/use paths that will cause the least amount of disturbance wherever possible ▪ Areas of vegetation representative of healthy Carolinian forest understory will be avoided whenever possible ▪ Personnel on Middle Island will know location of species at risk, including SARA-listed and provincially significant species ▪ Assistants will be able to identify species at risk ▪ Media and observers granted access to the island will be aware of mitigation protocols and under direct supervision of Parks Canada personnel at all times to avoid damage to species at risk and minimize disturbance ▪ Only those carcasses necessary for research will be removed from vegetated areas. Carcasses that fall in significant areas of healthy Carolinian forest understory or near species at risk, will be left where they lie ▪ To avoid increased vegetation damage, plastic bags used in carcass removal will not be dragged on the ground <p>Cumulative mitigations:</p> <ul style="list-style-type: none"> ▪ Additional projects on Middle Island during active management activities will be reduced to essential projects only ▪ Additional projects or personnel will not occur on active management days and, where possible, will leave “buffer” days in between active management activities and any additional projects ▪ Locations of plant species at risk will be avoided whenever possible.
	Some vegetation (specifically species at risk) may be damaged by forestry poles during nest removals and installation of deterrents	<ul style="list-style-type: none"> ▪ Only nests impacting individual SARA-listed species at risk will be removed ▪ Particular care around mature SARA-listed species at risk individuals will be taken (specifically red mulberry, Kentucky coffee tree and blue ash) ▪ Practice of forestry pole use, to avoid unnecessary damage, will occur prior to nest removal ▪ A maximum length of 7 forestry pole sections will be observed ▪ Control will be maintained at all times over forestry poles
	Some vegetation may be trampled due to temporary base camp (i.e. tent)	<ul style="list-style-type: none"> ▪ Base camp will be installed in an area where there are no species at risk ▪ Base camp will be in an area where there is no significant representation of healthy Carolinian forest understory

VEC	Potential Interaction with VEC	Required Mitigation
	<p>Some wildlife may be disturbed by active management activities (including Lake Erie Watersnake and other colonial waterbirds)</p>	<ul style="list-style-type: none"> ▪ Any birds or wildlife encountered that are not involved with the active management activities shall not be touched, harassed, or harmed in any way ▪ If high sensitivity to disturbance of nesting colonial waterbirds is observed in the early phases of active management activities (early April), timing of active management activities will be adjusted ▪ Personnel will be aware of the location of species at risk and existing protocols to minimize disturbance will be followed (particularly Lake Erie watersnake mitigations: e.g. no stepping on loose rocks on the shoreline) ▪ Personnel will be aware of location of nesting non-target colonial waterbirds ▪ Media and observers granted access to the island will be aware of mitigation protocols and under direct supervision of Parks Canada personnel at all times to avoid damage to species at risk and minimize disturbance ▪ Media and observers granted access to the island will be limited to areas that cause the least amount of disturbance to non-target colonial waterbirds wherever possible ▪ Range of disturbance/reaction distances will be taken and observed ▪ Personnel will only be in disturbance range of non-target species when active management dictates (noise levels and movement will be kept to a minimum in these areas) ▪ Culling activities will not occur in a given area for more than 45 minutes in order to minimize disturbance to non-target colonial waterbirds ▪ If disturbance occurs, “buffer” days in between active management activities and/or media/observer presence events will be implemented ▪ Methods of culling activities (stationary vs. quick moving shooters) will be tested and the method with the least amount of disturbance will be chosen ▪ Exposure of eggs of non-target colonial waterbirds will be minimized (disturbance on very cold and very warm days will be avoided, time birds are off nest will be recorded and minimized) ▪ Assistants on the island and personnel on boats will watch for potential predation of unattended nests (through disturbance) by herring gulls or crows. If predation occurs, active management activities will allow non-target colonial waterbirds to return to their nests, and activities causing disturbance will be reassessed ▪ Carcasses along shoreline and those removed from the lake will be placed into vegetated areas on the island to prevent scavenging by gulls (mitigating for any lead contamination through scavenging) <p>Cumulative mitigation:</p>
<p>Point Pelee National Park April 2nd, 2008</p>		<ul style="list-style-type: none"> ▪ Additional projects on Middle Island during active management activities will be reduced to essential projects only ▪ Additional projects or personnel will not occur on active management days and, where possible, will leave “buffer”

VEC	Potential Interaction with VEC	Required Mitigation
	Culling may alter the number and gender/age composition of the nesting double-crested cormorant population	<ul style="list-style-type: none"> ▪ Nesting double-crested cormorant numbers will be reduced only to targets necessary for ecological integrity recovery ▪ If culling activities become more effective as the nesting colony becomes smaller, targets will be adjusted accordingly ▪ No eggs greater than 50% gestation or young will be removed ▪ Both adult double-crested cormorants associated with an individual nest will be removed
Flora, Fauna & Habitat (Land)	Shots fired may not kill double-crested cormorants quickly or only wound them, resulting in distress and possible fleeing from the island into the lake	<ul style="list-style-type: none"> ▪ Only qualified and experienced Parks Canada personnel will undertake all culling activities ▪ Parks Canada personnel undertaking all culling activities must be able (and tested) to consistently hit a 3 cm target ▪ Only stationary birds at which the shooter has a clear, safe shot will be culled ▪ No free standing shots will be made ▪ Only shots to the base of the neck, ensuring cervical separation and humane killing, will be made ▪ Protocols for wounded birds will be strictly followed (including 20 minute intervals, radio calls to boats on lake of any wounded birds) ▪ Wounded double-crested cormorants that land on the island in vegetated areas will be dispatched immediately or as soon as safe to do so if the bird lands out of sight ▪ Wounded double-crested cormorants that fly out onto the lake will be identified by observers on Parks Canada boats and dispatched immediately or as soon as safe to do so
	Birds other than double-crested cormorants may accidentally be wounded	<ul style="list-style-type: none"> ▪ Only stationary double-crested cormorants at which the shooter has a clear, safe shot will be culled ▪ Shooting in poor light conditions will not occur ▪ Shooting towards known concentrations of non-target species will be avoided where possible to minimize chance of ricochet and wounding of non-target species ▪ Nests of non-target species will not be in direct line of fire
Flora, Fauna & Habitat (Land & Aquatic)	Accidental fuel spill from motorboats may be hazardous to flora and fauna	<ul style="list-style-type: none"> ▪ Environmental emergency response procedures must be initiated immediately in the event of a spill ▪ Any fuel, oil, or hazardous material spill must be immediately reported to a Parks Canada official and the Ministry of the Environment – Spills Action Centre ▪ All boats must be maintained in good working order ▪ Boats and additional fuel containers will only be fuelled at local marinas by marina staff
Flora, Fauna & Habitat (Aquatic)	Potential water contamination from wastes associated with active management activities may harm aquatic species	<ul style="list-style-type: none"> ▪ All wastes must be collected and brought back from Middle Island, sorted, and disposed of properly in accordance with provincial regulations ▪ Wastes shall not be burned or buried on site ▪ Human waste shall be collected in portable units and removed from site

VEC	Potential Interaction with VEC	Required Mitigation
Visitor Experience	Some national park visitors may have their visitor experience adversely effected by protests launched by persons or groups opposed to active management activities, particularly culling of double-crested cormorants	<ul style="list-style-type: none"> ▪ Visitors to Point Pelee National Park will be informed of active management activities occurring within the national park ▪ Visitors will be provided with opportunities to express their views on the project (e.g. comments/feedback forms). ▪ Any complaints in a loss of visitor experience will be documented and addressed ▪ Protocols for dealing with protests and protestors will be developed and followed in order to mitigate for loss of visitor experience
Public Health and Safety	Risk of disease associated with close contact with wildlife	<ul style="list-style-type: none"> ▪ Carcasses will be removed from the shoreline and placed within vegetated areas ▪ Only Parks Canada personnel will handle carcasses ▪ Parks Canada personnel will wear rubber gloves when handling carcasses ▪ Safe work practices must be in place prior to beginning the active management activities <p>Parks Canada will follow direction provided in the <i>Strategy For Management of Highly Pathogenic Avian Influenza</i></p>
Public Health and Safety	Increased safety risk associated with active management activities	<ul style="list-style-type: none"> ▪ All non-park Parks Canada personnel (media and observers) on Middle Island must have written permission of the Superintendent of PPNP to access the island ▪ To reduce the risk to public safety, media and observer presence on the island will not occur during culling activities ▪ To reduce the risk to public safety all media and observers granted access to the island will adhere to safety protocols ▪ Personnel are required to indicate when they have safely returned from the island each day ▪ A minimum of two people will be present on the island during the active management activities
Historical and Archaeological Resources	Risk of inadvertent Level II cultural resource destruction from active management activities on the island	<ul style="list-style-type: none"> ▪ All personnel on the island will be aware of locations of cultural resource and avoid disturbing these areas, where possible ▪ Base camp will not be erected in close proximity to any existing cultural resources