SECTION I - ITEMS FOR AUTHORITY ACTION

RES.#A22/09 - DOUBLE-CRESTED CORMORANTS MANAGEMENT STRATEGY FOR 2009.
Management of Double-crested Cormorants at Tommy Thompson Park.

Moved by: Bryan Bertie
Seconded by: Gay Cowbourne

THAT staff be directed to continue to work with the Cormorant Advisory Group to assist Toronto and Region Conservation Authority (TRCA) in addressing management concerns regarding colonial waterbirds at Tommy Thompson Park (TTP);

THAT staff be directed to work with any required regulatory agency to seek approval for the 2009 management strategy for colonial waterbirds at TTP;

THAT staff be directed to implement the proposed management strategy for 2009;

THAT staff be directed to continue to actively participate in local, regional and binational committees/working groups addressing the management and protection of colonial waterbirds;

AND FURTHER THAT staff report back to the Authority annually regarding the management of Double-crested Cormorants at Tommy Thompson Park.

CARRIED

BACKGROUND

In 1959, the Toronto Harbour Commissioners (now known as the Toronto Port Authority) began construction of a spit of land at the base of Leslie Street in the City of Toronto. From 1959 until present day, a combination of lakefilling and dredging activities has created the current configuration of TTP. Tommy Thompson Park extends 5 kilometres into Lake Ontario and occupies an area of approximately 260 hectares of combined land and water.

Tommy Thompson Park has evolved into a significant feature along the shore of Lake Ontario. It is home to diverse bird, fish, reptile, amphibian, mammal and vegetation communities, which has resulted in TTP being formally designated as a Globally Significant Important Bird Area (IBA) and an Environmentally Significant Area (ESA #120). The international IBA designation demonstrates the significance of TTP both nationally and globally. As an ESA, TTP is recognized as supporting an unusually high diversity of biological communities.

Double-crested Cormorant (DCCO) populations in the Great Lakes declined dramatically in the 1960s and 70s, primarily because of toxic contaminants such as DDT, which caused thinning of eggshells and other health problems, leading to reproductive failure. Due to new regulations, increased enforcement and public awareness, toxic contaminants were significantly reduced by the 1980s, and cormorant populations have made a dramatic and successful recovery.

Double-crested Cormorants began colonizing Tommy Thompson Park in 1990 when six nests were built in cottonwood trees at the end of Peninsula B (Attachment 1). In 2008, there were 7,038 nesting pairs, representing a population of about 27,450 individuals including chicks, on Peninsulas A, B and C.

The DCCO colony at TTP is now the largest known colony of cormorants on the Great Lakes, and represents 31% of the total population nesting in the Lake Ontario basin. The colonies of Double-crested Cormorants and other waterbirds, including Black-crowned Night-Herons (BCNH), Ring-billed Gulls and Common Terns, are one of the reasons it is celebrated as an important ecological site of global significance.

The annual monitoring program data shows a reduction of overall cormorant nests from 7,240 nests in 2007 to 7,038 nests in 2008. Despite the overall nest reduction, the number of nests on Peninsula C continues to rise from 4,699 nests in 2007 to 4,906 in 2008. Attachment 2 illustrates the continued decline of tree health on Peninsula C. In 2006 approximately half the nest trees on Peninsula C were classified as healthy or in decline; in 2008 the health of most nest trees declined further and are now classified as dead or dying. There are areas of healthy forest within the colonies on Peninsula B and C, specifically the base of Peninsula B and the base and tip of Peninsula C, which TRCA wishes to retain and improve where possible. Black-crowned Night-Heron nests declined from 876 nests in 2007 to 536 nests in 2008, which represents a 14 year low.

In November 2007 TRCA embarked on a process to involve stakeholders and the public in assessing the need for management of cormorant populations at TTP. TRCA's first step was to establish a Cormorant Advisory Group comprised of stakeholders and experts, including conservationists, academics and interest groups from across the spectrum to provide advice and input.

The advisory group's mandate is to:
- provide input and advice;
- ensure that all perspectives are considered; and
- provide linkages with other stakeholders.

Many of the members of the advisory group have considerable experience with various aspects of research, management and protection of colonial waterbirds and associated issues. They bring a range of expertise, knowledge and perspectives to the process. The committee will develop consensus where possible, and formally acknowledge dissenting views.

Members of the advisory group include:

TRCA
Restoration Services Division

Federal/Provincial
Canadian Wildlife Service
Ontario Ministry of Natural Resources
Toronto Port Authority
Transport Canada

City of Toronto
Parks, Forestry and Recreation

Interest Groups / Stakeholders
Aquatic Park Sailing Club
Cormorant Defenders International:
- Animal Alliance of Canada
- Canadians for Snow Geese
- Earthroots
- Zoocheck Canada Inc.

Friends of the Spit
Ontario Nature
Toronto Island Residents
Toronto Ornithological Club
Local Experts

Academia
University of Toronto
York University

In 2008, with advice from the advisory group, TRCA developed a strategic approach and consultation framework to address concerns of the growing DCCO colony at TTP. The following timeline (Table 1) is a summary of the 2008 public consultation process and includes a description of the topics covered.

Table 1. 2008 Consultation

Meeting/Event	Date	Discussion Topics/Agenda
Advisory Group Meeting #1	January 24, 2008	● Values and interests of TTP ● Conditions and concerns of DCCO colony ● Need for management ● Strategies to address concerns
Advisory Group Meeting #2	February 19, 2008	● Evaluate management options ● Propose alternative approaches
Cormorant Webpage launched www.trca.on.ca /cormorants	March 3, 2008	● Includes background materials, advisory group meeting notes and presentations, public meeting workbook and meeting notes, relevant links
Public Meeting	April 3, 2008	● Advertised in Toronto Star, The Mirror, TRCA website, TTP information board, TRCA distribution lists, some advisory group member websites ● Canada Newswire press release, Global TV coverage ● Presentations, facilitated round table discussion, individual workbooks for commenting
Advisory Group Meeting #3	April 23, 2008	● Review public response ● Discuss 2008 strategy
TTP Spring Bird Festival	May 10, 2008	● Guided tours of cormorant colony ● Public survey on TTP cormorants
Authority Board	May 23, 2008	● Present 2008 strategy for Authority action

A cormorant web page was developed to help disseminate information on the cormorant management process and included advisory group meeting notes, the public meeting presentation and links to relevant resources.

Throughout the process an extremely high level of concern was expressed regarding DCCO populations and their management. Concerns have been raised from both sides of the issue, on the one hand calling for management, and on the other hand for protection of the birds and their nesting colonies.

Generally, throughout the 2008 process there was agreement that some form of management is necessary and appropriate, providing that the methods are humane to cormorants and do not affect other wildlife. TRCA staff strived to achieve consensus among advisory group members, and the public on a number of matters, however complete consensus was not achieved on all issues. Dissenting views were in all cases documented and considered in the formulation of the final Strategic Approach of 2008.

The Strategy Approach for 2008 was completed in April 2008 (Table 2), and adopted by the Authority on May 23, 2008 as part of Resolution # A110/08. Ten delegations and fifteen correspondence items were received by the board.

The goal of the 2008 management strategy was to achieve a balance between the continued existence of a healthy, thriving cormorant colony and the other ecological, educational, scientific and recreational values of Tommy Thompson Park. The specific objectives of the strategy were to:

a) Increase public knowledge, awareness and appreciation of colonial waterbirds.
b) Deter cormorants from nesting on Peninsula D.
c) Limit further loss of tree canopy on the Peninsulas beyond the existing cormorant colonies.
d) Continue research on colonial waterbirds in an urban wilderness context.

Due to the timing of the approval, only a portion of the 2008 Management Strategy was implemented for the 2008 breeding season. This included pre-nesting and post-breeding deterrents on Peninsula D; the York University's egg oiling study on Peninsula B; and some habitat restoration activities. The remainder of the habitat restoration initiatives, and ground nesting enhancements were implemented at the end of the 2008 breeding season.

Table 2. 2008 Strategic Approach Matrix

Method	Peninsula A	Peninsula B	Peninsula C	Peninsula D
Pre-nesting Deterrents				*
Post-Breeding Deterrents			*	*
Enhanced Ground Nesting	*	*		
Egg Oiling Research		*		
Habitat Restoration	*	*	*	*

Human presence (researchers and the public) on Peninsula D was successful at deterring DCCO from nesting on the Peninsula during the breeding season. Escalating the level of deterrence beyond human presence was not needed. Cormorants were documented on Peninsula D a total of nine times during spring 2008, but no nesting attempts were witnessed.

The Tommy Thompson Bird Research Station on Peninsula D was operated at a reduced level during fall 2008 with less staff and volunteer presence. Cormorants were only documented roosting on Peninsula D once, and again simple human presence was adequate to discourage roosting. Cormorants did roost on Peninsula C, however direct post-breeding deterrents were not used on Peninsula C.

Due to colony activity during spring and summer, ground nest enhancements were not started until fall 2008 and continued throughout the winter of 2008-2009 in preparation for the 2009 breeding season.

York University conducted a successful egg oiling study to examine nest desertion, behavioural effects and disturbance effects on ground nesting cormorants. The experimental design had three groups of 30 nests each:

- control (eggs not handled);
- treatment (eggs handled and sprayed with mineral oil);
- sham (eggs handled and sprayed with water).

The study was conducted at night to reduce gull predation on cormorant eggs. York University researchers have already presented the data at one conference and are currently in the process of completing the report for peer reviewed scientific publication.

The preliminary findings indicated that egg oiling at night did not cause immediate abandonment of nests in the treatment group. Pre-chick comparisons for some nesting behaviours revealed little differences between the groups, indicating that nesting birds did not alter their behaviours as a result of the experimental oiling. The treatment birds did finally abandon their nests at a time which corresponds to when all other birds had chicks, therefore treatment birds were using cues from their neighbors on when to abandon their breeding attempt. The monitoring portion of this project will be concluded in the 2009 breeding season to determine if there is any difference in the timing of nest occupancy of the 2008 treatment nests. This study has also produced a variety of valuable biological data including, productivity, fledging success, nest attendance, hatching dates and social behaviours on the TTP DCCO colony. This data will enable TRCA staff to better manage and understand the TTP DCCO colony and provides a better understanding of the effects of disturbance on nesting attempts and success.

Since restoration activities are better implemented in early spring at this site, the majority of the planned 2008 planting and soil enhancement work will occur in spring 2009. There were, however, some trees and shrubs planted in 2008 at the bases of Peninsulas A and B to help delineate colony boundaries and buffer the colony from human activities. Herbaceous plantings were also undertaken near the base of Peninsula C to improve overall habitat. Trees and shrubs were also planted in selected areas of Peninsula D to increase forest cover and enhance the shrub layer.

In December 2008, the advisory group was reconvened to work with TRCA staff. The following timeline and meeting schedule (Table 3) was developed to assist TRCA in assessing the results of the 2008 Strategy and to advise staff for the development of a 2009 Strategic Approach. The timeline and discussion topics are as follows:

Table 3. 2009 Consultation

Meeting	Date	Discussion Topics/Agenda
Advisory Group Meeting #4	December 10, 2008	• Review the 2008 population data, and monitoring program • Review 2008 strategy and preliminary research results • Review the completion of the 2008 Cormorant Management Strategy • Begin discussions on a strategic approach for 2009
Advisory Group Meeting #5	February 4, 2009	• Develop the 2009 Strategy
TRCA Authority Meeting	March 27, 2009	• Present the 2009 Strategy for TRCA Authority action
Advisory Group Meeting #6	November 2009	• Review the 2009 population data, and monitoring program • Review 2009 strategy and preliminary research results • Begin discussions on a strategic approach for 2010

In December 2008, TRCA staff met with the advisory group to discuss the 2008 monitoring program, the results from the 2008 Strategy, and the timeline for the development of a strategic approach for 2009. The group discussed the decline in Black-crowned Night-Heron nesting, York University research preliminary results, colony disturbances, raccoon predation and the direction of the 2009 Strategy. The group was interested in the results from the York University study and how TRCA and other wildlife management agencies can apply the research.

The advisory group met again in February 2009 to review additional 2008 data and discuss the 2009 Strategic Approach. Georeferenced data was used to illustrate the expansion of the cormorant colony, the shift of night-herons to marginal nest areas and the decline of tree health across the Peninsulas. The group discussed the proposed 2009 Strategic Approach focused mainly on pre-nesting deterrents and how to successfully apply deterrents and maintain the night-heron and egret colonies. There was general agreement within the group to proceed with the development of the 2009 strategy; however two members expressed serious concern about the use of pre-nesting deterrents in already colonized areas. There was not complete agreement by the group to use deterrent techniques on the tip and the base of Peninsula C. Concern was also raised regarding the techniques used for deterrents and their impact on other species nesting on the peninsula. In all cases, the concerns were documented in the meeting notes, and considered when the final strategy was developed. Subsequent to the February meeting an additional concern was brought forward regarding the use of the term “consensus”. This concern, and the deterrent concerns, have been attached to the February 4th meeting notes as an addendum and are available for review on the TRCA cormorant webpage. Staff met with concerned individuals to address their specific concerns and will clarify the advisory group's mandate regarding consensus at the next advisory group meeting.

RATIONALE

An extremely high level of concern has been expressed regarding DCCO populations and their management. Concerns have been raised from both sides, on the one hand calling for management and the preservation of forest canopy, and on the other hand for protection of the birds and their nesting colonies. TRCA has an obligation to manage Tommy Thompson Park as directed by the Master Plan for Tommy Thompson Park and as approved under the Environmental Assessment Act. To meet the intent of the master plan, TRCA staff feel that there is a strong rationale for undertaking a strategic approach to the management of Double-crested Cormorants at Tommy Thompson Park.

Since November 2007, TRCA has involved stakeholders and the public in assessing the need for management and developing a strategy for cormorants at TTP. Generally, throughout the process there has been agreement that some form of management is appropriate, providing that the methods are humane to cormorants and do not affect other wildlife. Some members of the advisory group have expressed concerns regarding the use of deterrents on Peninsula C in areas already colonized by DCCO. Some members also continue to raise concerns that nest removal and egg oiling are not supported techniques. Other members of the advisory group are concerned that the proposed approach is inadequate in terms of preserving forest canopy and the species associated with it. They feel that a more aggressive approach should be taken.

While overall populations of DCCO have decreased slightly at the site, the population of DCCO on Peninsula C is still increasing. Peninsula C is also home to the majority of the BCNH colony and is part of the park's largest forest block. This area has also seen a further reduction in forest health since 2007. TRCA has therefore developed the following strategic approach to the management of cormorants at TTP for the 2009 season.

DETAILS OF WORK TO BE DONE

Goal and Objectives

The goal of the 2009 management strategy has not changed from 2008. It is to achieve a balance between the continued existence of a healthy, thriving cormorant colony and the other ecological, educational, scientific and recreational values of Tommy Thompson Park. The specific objectives of the strategy are to:

a) Increase public knowledge, awareness and appreciation of colonial waterbirds.
b) Deter cormorants from nesting on Peninsula D.
c) Limit further loss of tree canopy on the peninsulas beyond the existing cormorant colonies.
d) Continue research on colonial waterbirds in an urban wilderness context.

Increasing Public Knowledge, Awareness and Appreciation

TRCA will seek all opportunities to increase public awareness and appreciation of Double-crested Cormorants and other colonial waterbirds at TTP. A varied approach will be used including, but not limited to:

- public meetings;
- TRCA website;
- annual Spring Bird Festival (May 23, 2009);
- development of interpretive signage;
- improving opportunities to view colonial waterbirds, including cormorants using viewing blinds and platforms;
- conducting tours with schools and interest groups;
- presenting information at conferences and forums;

- participation in working groups on colonial waterbirds.

Informational signs at strategic locations that request people to refrain from entering the colonial waterbird colonies during the nesting season are already in place to discourage the public from disturbing the bird colonies. Additional interpretive signs will be installed to educate park visitors on colonial waterbirds and their habitats. Researcher disturbance associated with TRCA and partner research programs will be controlled to reduce overall disruption.

In order to solicit more input from the public about the cormorant colonies at TTP, staff will prepare fact and comment sheets targeting park users at the Spring Bird Festival on May 23, 2009. Park users will have the opportunity to view the cormorant colonies and learn more about cormorants at TTP from TRCA staff. Anyone interested will be given the opportunity to express their views via the comment sheet and the results of the survey will be summarized for inclusion into the summary report for the 2009 season.

Proposed 2009 Strategic Approach

As with the 2008 strategy, TRCA proposes to utilize a variety of techniques in an integrated adaptive management approach to achieve the goals and objectives for the 2009 strategy. The following matrix (Table 4) outlines the techniques and strategies at specific locations of the site, and will help provide insight regarding the interactions of the different techniques. Management techniques do not include lethal culling. Egg oiling will not be undertaken in 2009; however York University researchers will continue observations of nest attendance at the study nests to help determine if egg oiling influences future breeding sites.

Table 4. 2009 Strategic Approach Matrix

Method	Peninsula A	Peninsula B	Peninsula C	Peninsula D
Pre-nesting Deterrents		*	*	*
Post-Breeding Deterrents			*	*
Enhanced Ground Nesting	*	*		
Egg Oiling Research (follow-up on nest attendance)		*		
Habitat Restoration	*	*	*	*

The TTP cormorant colony currently occupies three of the four forested peninsulas of the park comprising three cormorant sub-colonies (Attachment 1). Peninsula A and the current nesting area of Peninsula B are considered Cormorant Conservation Zones where cormorant nesting and roosting are encouraged. Within the Cormorant Conservation Zones efforts will be made to minimize disturbances so that cormorants will continue to use these areas and nesting remains productive.

Peninsula C is the most recently colonized area containing the largest cormorant sub-colony and the largest Black-crowned Night-Heron population. Peninsula D is the only forested peninsula not occupied by colonial waterbird species.

The 2009 Strategic Approach will focus on pre-nesting deterrents in the unoccupied forested areas of Peninsulas B, C and D to reduce stress on the trees and encourage ground nesting in other areas. Post-breeding deterrents in the forested area of Peninsulas C and D will be used to reduce stress on living trees, and ground nest enhancements on Peninsulas A and B will encourage cormorants to nest on the ground instead of in trees. Habitat restoration will be used to delineate and buffer the colonies from other park uses as well as provide habitat for other bird and wildlife species. Finally continued research will be encouraged, and will focus on raccoon predation on cormorant and night-heron nests; nest re-occupancy of nests oiled in 2008; and the use of social attraction techniques to persuade cormorants to nest on the ground.

Pre-Nesting Deterrents

Pre-nesting deterrents will occur in areas of the colony that currently do not have cormorant nesting, or have only limited nesting in areas of healthy forest. Pre-nesting deterrents will not occur in areas that would negatively impact BCNH population. By discouraging cormorants from nesting in these areas, stress on the forest and understory vegetation will be reduced and forest canopy will be preserved. Deterrence will also work synergistically with the ground nesting enhancement areas in the Cormorant Conservation Zones. These areas will be more attractive to the birds displaced by the deterrent techniques, and can provided safe nesting for colony birds looking for new nesting sites. Cormorants may be discouraged from nesting in trees at the base of Peninsula B (approximate area 0.3 ha), the tip of Peninsula C (approximate area 1.4 ha) and base of Peninsula C (approximate area 0.9 ha), and on Peninsula D (approximate area 4 ha) (Attachment 3). Daily inspections of these areas will be undertaken, and deterrence will only occur if nesting attempts by cormorants are documented. If it is determined that deterrent activities are required, deterrence will occur to prevent nesting in these targeted areas. Deterrence will not occur on Peninsula A, in the current nesting areas of Peninsulas B, or in the core colony of Peninsula C. To help achieve this, disturbance to these areas will be minimized and closely monitored by staff. Displaced tree nesting cormorants will be encouraged to ground nest on Peninsulas A and B.

Pre-nesting Deterrent Methods

Techniques that limit disturbance to small, localized areas are preferred over other methods. Staff will use targeted techniques that are humane for cormorants and minimize disturbance to other wildlife. The techniques utilized will be employed on an increasing scale of activity, with preference given to the least intrusive means needed (Attachment 4). Deterrence techniques will begin with human presence and will only progress to the next level should staff determine that cormorants are not leaving the area using that given technique. Progression to the next level will occur based on documentation that at least two attempts in one day with a given technique fails to flush cormorants. Staff will note the dates, times, method and duration of deterrent activities. Only the minimum number of staff required to complete the deterrence task will be present in the colonies in order to minimize disturbance. When feasible, staff will enter the colonies via water or along the shoreline to minimize disturbance.

Spring Deterrent Monitoring

Staff will undertake pre-deterrent observations of non-target species (Black-crowned Night-Herons, Great Egrets and any other species in the area) and cormorants to document the locations and densities of these species. These observations, combined with nesting location data from recent years, will provide a baseline to help quantify targeted cormorant movement and non-targeted species activity. Staff will also conduct observations during deterrent activities and after deterrent activities have ended. These observations will help determine if night-herons and egrets are displaced from their nests for an extended period of time as a result of deterrent activities and/or if cormorants move into traditional night-heron and egret nesting locations during deterrent activities or after deterrent activities have ended.

Nest attendance and behaviour of night-herons and egrets will be quantified using standardized focal observations during pre-deterrent, deterrent and post-deterrent activities (30 minute observations/nest/activity). Observers will be equipped with binoculars (minimum 7x42) and/or spotting scopes and will have two-way radios to communicate with each other. Observers will also note dates, times and duration of monitoring activities and will also record species, location, number of individuals and behaviour including:

- presence of a bird at the nest site;
- presence of a mate;
- intensity, duration and outcome of interactions between focal birds and either conspecifics, other night-herons/egrets and/or cormorants;
- behaviour of the bird at the nest site:
    - courtship displays and nest building;
    - standing in the nest while preening or interacting with a mate;
    - incubating/brooding;
    - standing in the nest in an 'alert' posture;
    - perched near the nest;
    - flight away from deterrent activities.

Observers will be stationed near the night-heron colonies, within view of the ground nesting areas on Peninsulas A and B, on Peninsula D and, when feasible, in boats near Peninsulas A and B to determine where the disturbed cormorants go and to monitor behaviours of non-target species, specifically night-herons and egrets (Attachment 5). Only the minimum number of staff required to undertake the monitoring will be present in the colonies in order to minimize disturbance. Should staff determine that deterrence activities cause an increase of cormorants moving into night-heron nesting locations or cause non-target species displacement, deterrent activities will stop. Pre-nesting deterrence activities will also stop once cormorants refuse to leave a nest or once eggs have been laid.

Post-breeding Deterrents

Cormorants will be deterred from roosting in healthy trees on Peninsulas C and D. By discouraging roosting activity, the impact of guano on trees is reduced and prospecting for future nest sites in these areas by younger birds is decreased. After the nesting season has ended and fledgling cormorants, night-herons and egrets are feeding independently, post-breeding deterrents will be employed on the tip of Peninsula C (approximate area 1.4 ha) and on Peninsula D (approximate area 4 ha). Daily inspections of these areas will be undertaken to support the need for deterrence and will only occur if roosting attempts by cormorants are documented. Deterrents will not be used on Peninsulas A and B. Displaced cormorants will be encouraged to loaf in the Conservation Zones of Peninsulas A and B.

To help achieve this, disturbance to Peninsulas A and B will be minimized and closely monitored by staff. Since these areas already support cormorant colonies, and field data indicates large loafing areas are currently available, staff anticipate that cormorants will readily use these peninsulas for post-breeding loafing.

Post-Breeding Deterrent Methods

Refer to Pre-Nesting Deterrent Methods. Note that the technique of nest material removal does not apply.

Fall Deterrent Monitoring

Staff will undertake pre-deterrent observations of non-target species (Black-crowned Night-Herons, Great Egrets, and any other species in the area) and cormorants to document the locations and densities of these species. Staff will also conduct observations during deterrent activities and after deterrent activities have ended. These observations will help determine if night-herons and egrets are displaced from their roosting areas for extended periods of time as a result of deterrent activities and/or if cormorants move into areas with healthy forest during deterrent activities or after deterrent activities have ended.

The behaviour of night-herons, egrets and any other species present will be quantified using standardized focal observations during pre-deterrent, deterrent and post-deterrent activities (30 minute observations/nest/activity). Observers will be equipped as in the Pre-nesting deterrent monitoring. Observers will also note dates, times and duration of monitoring activities and will also record species, location, number of individuals and behaviour including:

- presence of a bird at the roosting site;
- intensity, duration and outcome of interactions between focal birds and either conspecifics, other night-herons/egrets and/or cormorants;
- behaviour of the bird at the roosting site:
    - preening or interacting with a mate or chicks;
    - standing in an 'alert' posture;
    - flight away from deterrent activities.

Observers will be stationed near the base of Peninsula C; within view of the ground nesting areas on Peninsulas A and B; on Peninsula D; and when feasible, in boats near Peninsulas A and B to determine where the disturbed cormorants go and to monitor activities of non-target species (Attachment 5). Only the minimum number of staff required to undertake the monitoring will be present in the colonies in order to minimize disturbance. Should staff determine that deterrence activities cause an increase of cormorants moving into areas with healthy forest or cause non-target species disturbance, deterrence activities will stop.

Enhanced Ground Nesting

In addition to encouraging post-breeding loafing on Peninsulas A and B, these areas will also be targeted for enhanced ground nesting for the 2009 breeding season. Disturbance to the ground nest areas will be minimized throughout the season with careful access via water only when necessary. Nest counts will be conducted at night to reduce disturbance and minimize predation of ground nests.

There are two discreet ground nesting areas currently used on Peninsula B. The 2009 strategic approach will include the expansion of these ground nesting areas through structural enhancement. Proven ground nest enhancement techniques employed at cormorant colonies in other areas will be used on Peninsula B. Staff will create nesting areas using rubber tires (Attachment 6), covered with natural material including naturally downed cormorant nests and other nesting materials. Additional natural structure, fallen trees, will be used to simulate natural ground nest areas between the two existing ground nest areas. Additional woody nest material will be provided adjacent to the ground nest areas to provide easy access to nest building materials and reduce branch stripping from forested areas of the park.

Peninsula A does not currently support cormorant ground nesting, however cormorants have ground nested there in the past. A variety of techniques will be used on Peninsula A to observe the success of the differing methods to aid future ground nest enhancements. Fallen trees will be placed throughout the enhancement area to simulate natural ground nest areas. Naturally downed nests and woody nest material will be placed throughout the fallen trees. Staff will also provide vertical structure and wooden stakes with old nest material placed at the bases, as these have been successful in attracting cormorants to ground nest at Presqu'ile Provincial Park. Additional woody nest material will be provided adjacent to the ground nest areas to provide easy access to nest building materials and reduce branch stripping from forested areas of the park. Cormorant decoys will be used throughout the Peninsula A ground nest enhancement area to suggest an existing ground nesting colony. The decoy technique was successfully applied to colonies in other areas of the continent.

York University has proposed a study to examine the use of social techniques (decoys) to attract cormorants to nest on the ground. The study will focus on a discreet ground nest enhancement area on Peninsula A. Researchers will access the Peninsula via water and enter a tunnel-blind system to conduct observations of the decoy enhancement areas. Using this system cormorants cannot see movement or detect activity, and are therefore not disturbed from the site. Researchers can conduct observations from within the colony without large scale disturbance and quantify the use of decoys to attract cormorants.

Habitat Restoration

Habitat restoration activities will occur in areas of the peninsulas that are not currently occupied by colonial nesting waterbirds. The base of the peninsulas, and areas within the peninsulas that are not occupied by colonial birds, will be restored using site appropriate vegetation and soil amendments where necessary. Vegetation nodes will be planted with a variety of species and monitored to assess the efficacy of the restoration and improve future endeavours. Habitat restoration and enhancement activities will also help delineate the extent of the current cormorant colonies and buffer the colonies from disturbance. Newly planted trees and shrubs will also provide future colonial waterbird nesting habitat. Targeted improvements include the addition of native shrubs at the base of Peninsula B and along the Embayment B back shoreline area to encourage Black-crowned Night-Heron nesting. Plantings of willow fascines and appropriate shrubs will occur along portions of the shoreline to provide additional shoreline stability. Habitat restoration activities will occur in early spring 2009, so the bird colonies are not disturbed.

Monitoring, Research, and Reporting

Annual nest census data for cormorants, night-herons and other colonial waterbirds will be undertaken in late May using a combination of staff and volunteers. As in past years, the census will identify the nesting populations of cormorants and other waterbirds, as well as their spatial nesting distribution within the peninsulas at Tommy Thompson Park. The nest census for ground nesting locations will be undertaken at night to reduce the effects of disturbance.

Annual tree health surveys will be undertaken in late August/early September to document changes in the health and condition of nest trees within the three peninsulas at TTP.

An annual summary report of all components of the strategic approach will be completed and circulated to all regulatory agencies and the Advisory Group, and will be posted for public review upon completion of the 2009 season. This report will outline all approaches employed in the 2009 season including the methods used, their relative effectiveness, and the results of the annual monitoring program. This information will provide a basis for the development of the 2010 strategy using an integrated adaptive management approach.

The next meeting of the Cormorant Advisory Group will be held in fall 2009, after the completion of the 2009 summary report. This meeting will provide an opportunity to review the results of the 2009 season and discuss whether any changes are needed for 2010. The public will also be informed and consulted before the 2010 season.

FINANCIAL DETAILS

Funds are identified in the Tommy Thompson Park Interim Management account 210-19 and the Tommy Thompson Park Double-crested Cormorant account 210-25 in the 2009 City of Toronto Preliminary Capital Budget.

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Attachment 1

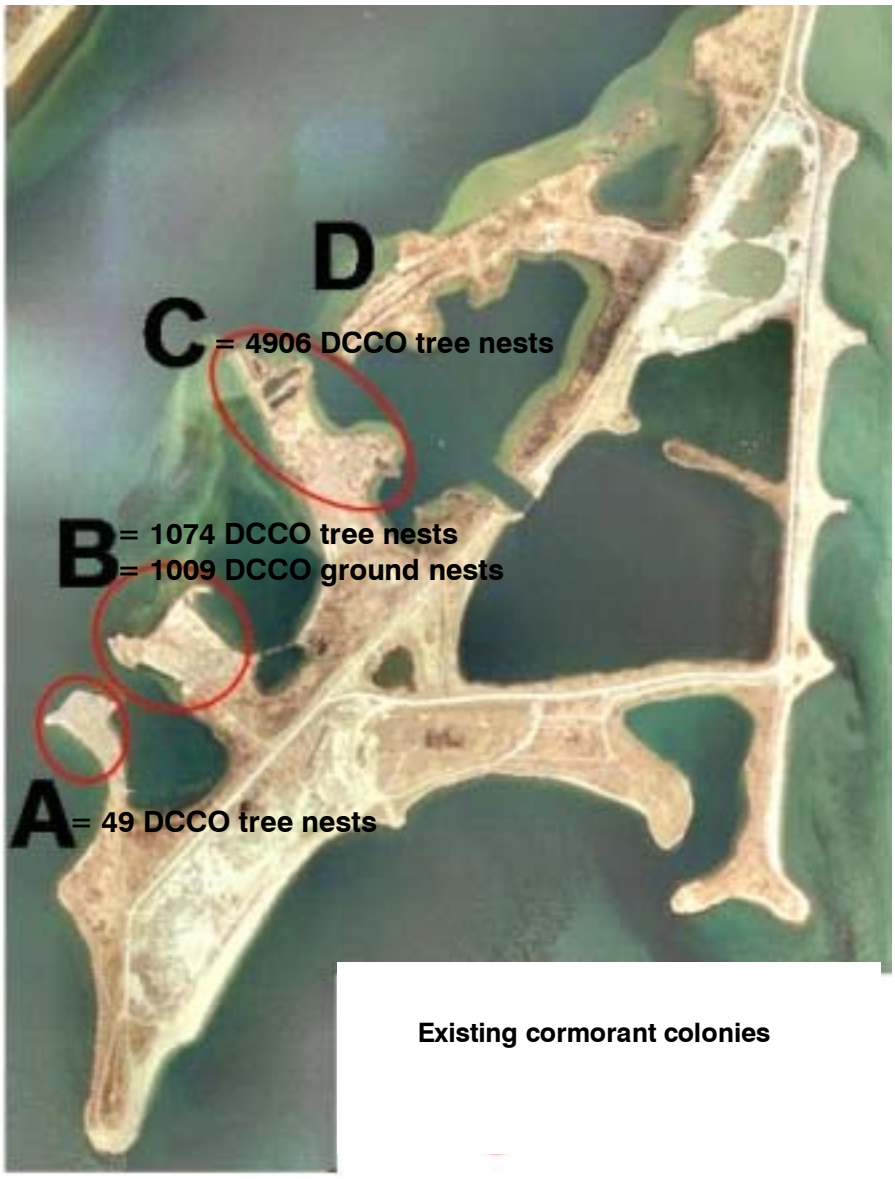
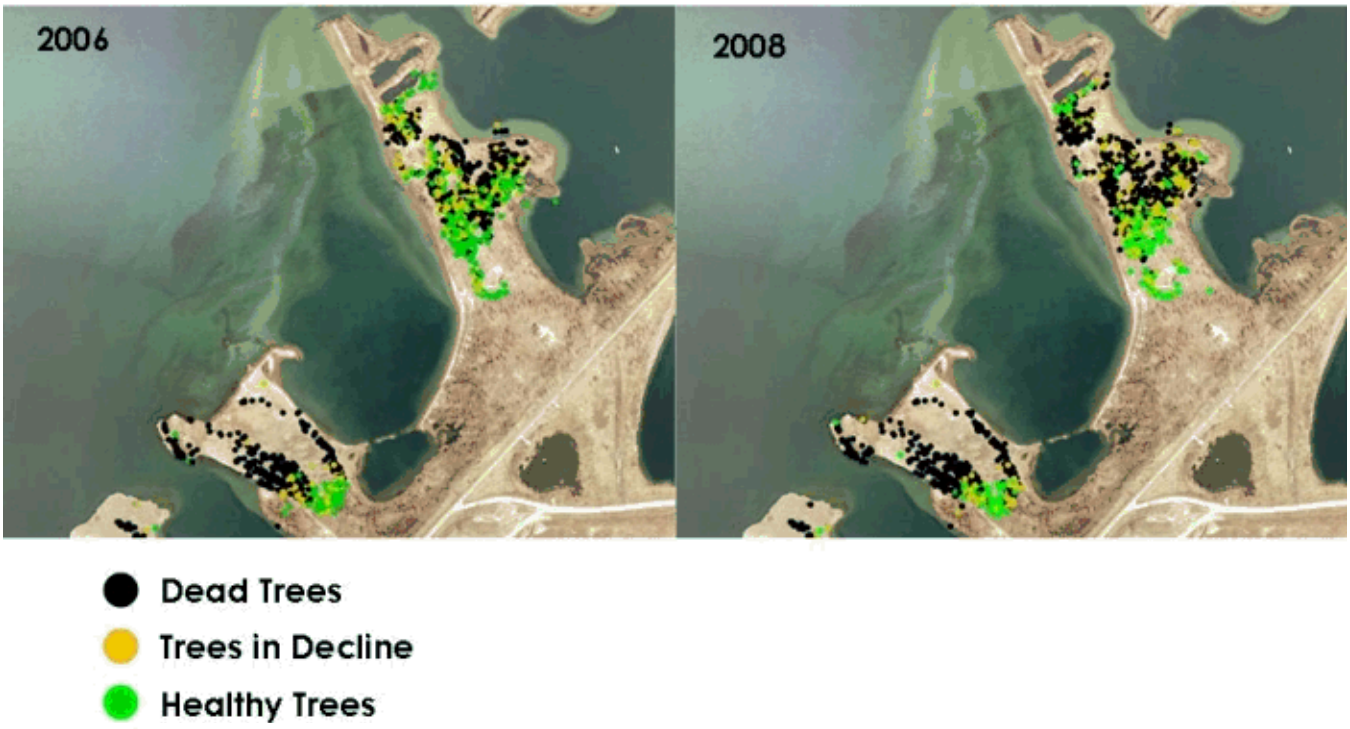


Figure 1. TTP Peninsulas and Cormorant Colonies

Attachment 2

Change in Tree Health between 2006 and 2008

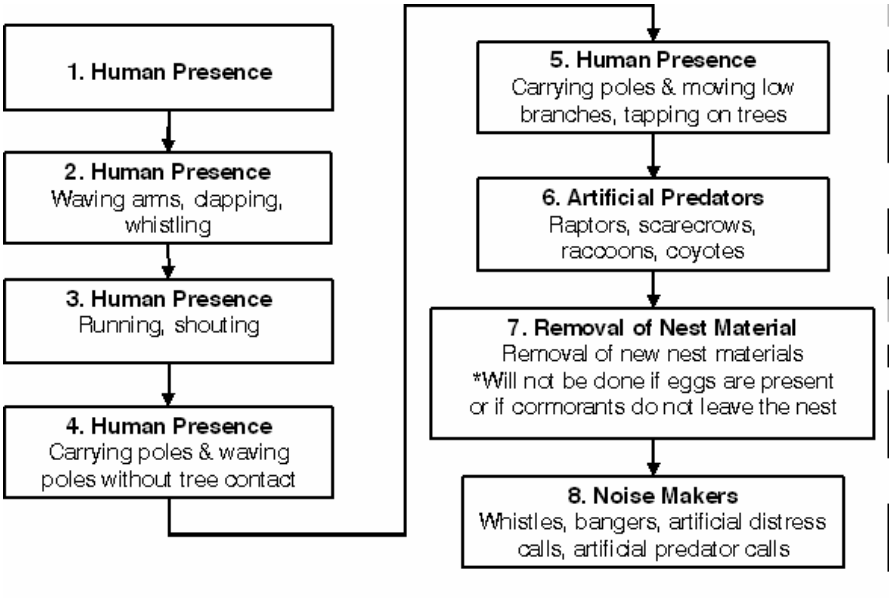


Attachment 3

Pre-Nesting Deterrent Locations

Attachment 4

Deterrence Technique Escalation



Attachment 5

Deterrent Monitoring Locations

Attachment 6

Ground nesting cormorant colony enhancements in the Columbia River Estuary, Oregon