

**MANAGEMENT OF DOUBLE-CRESTED CORMORANTS
AT
TOMMY THOMPSON PARK**

2012 SUMMARY REPORT

**Restoration Services
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1.0 BACKGROUND

Tommy Thompson Park (TTP) is located on the Leslie Street Spit, a 5 km long human-made peninsula in Lake Ontario in Toronto, Ontario (Figure 1). Construction of the peninsula began in the 1950s for port-related facilities, but through natural succession and habitat enhancement efforts by the Toronto and Region Conservation Authority (TRCA), it has become the largest area of natural habitat on the Toronto waterfront. The final size of the Spit is complete at approximately 500 ha, including the associated water lots; however the Toronto Port Authority continues to run a lake filling operation in shoreline erosion areas.

The site was designated as an Important Bird Area (IBA) in 2000 due to the globally significant numbers of colonial waterbirds under the general congregatory threshold, and nationally significant numbers of waterfowl during spring and fall migration as well as during winter depending on ice conditions (Wilson & Cheskey, 2001). Six species of colonial waterbirds breed regularly at Tommy Thompson Park (Figure 2). Three species are predominately tree-nesters, Double-crested Cormorant (*Phalacrocorax auritus*), Black-crowned Night-Heron (*Nycticorax nycticorax*) and Great Egret (*Ardea alba*); and three species are ground-nesters, Ring-billed Gull (*Larus delawarensis*), Herring Gull (*Larus argentatus*) and Common Tern (*Sterna hirundo*). In 2012 Caspian Terns (*Hydroprogne caspia*) nested at TTP for the first time since 2004.

Double-crested Cormorants began nesting on Peninsula B in 1990 (Wilson & Cheskey, 2001) and expanded to Peninsula A the following year. The population steadily increased and expanded onto Peninsula C in 2000, followed by ground-nesting on Peninsula B in 2002, likely in response to the loss of tree nesting habitat due to their nesting activities on Peninsulas A and B; as well as an increase in the overall Great Lakes population (Weseloh, et al., 1995). Today, cormorants nest on three of the four peninsulas at the park, Peninsulas A, B and C (Figure 2). In 2008, TRCA developed the Double-crested Cormorant Management Strategy in response to the significant decline and loss of forest habitat on



Figure 1. Tommy Thompson Park / Leslie Street Spit (TRCA, 2006)

the peninsulas and concerns expressed by the public about the loss of forest habitat (Toronto and

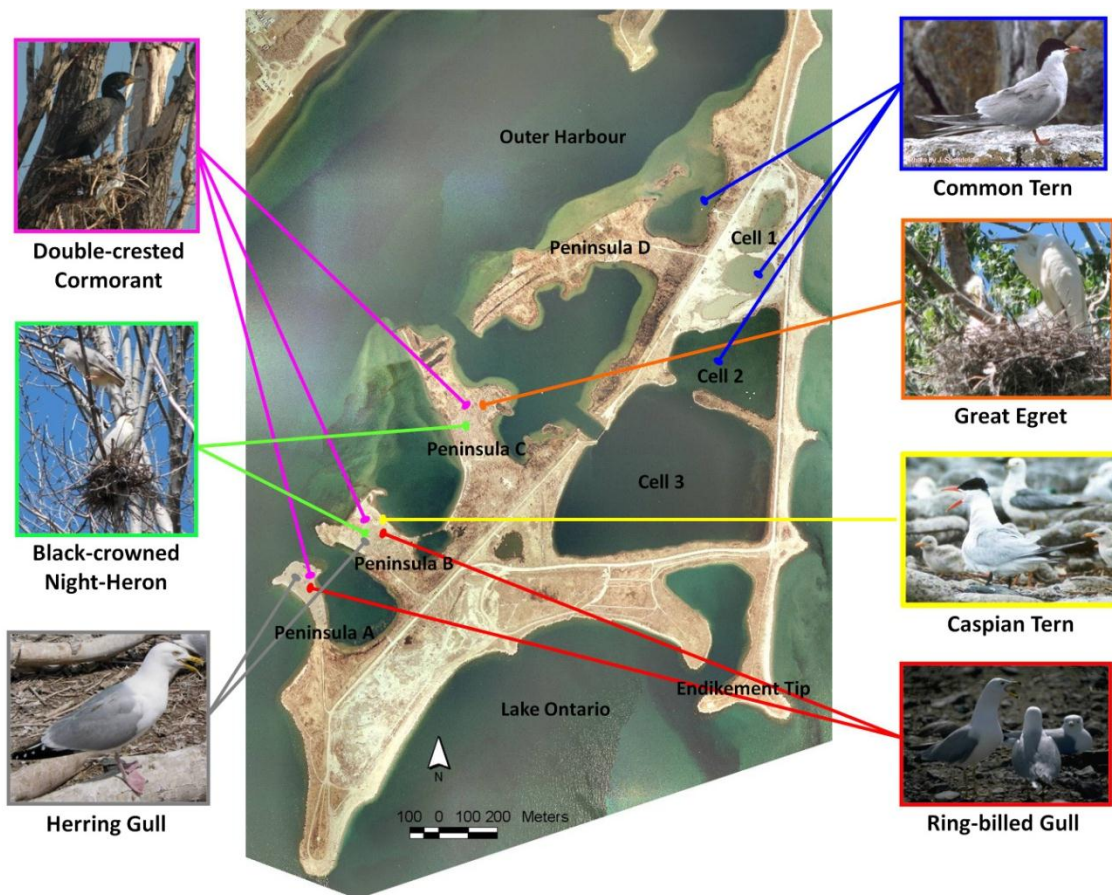


Figure 2. Colonial waterbird nesting locations in 2012 (First Base Solutions 2005)

Region Conservation Authority, 2008, 2009, 2010, 2011).

The development of the strategy involved founding a Cormorant Advisory Group of stakeholders and experts, including conservationists, academics and interest groups from across the spectrum to provide advice and input on the management plan. The inaugural meeting was in late 2007 and the group continues to meet annually to review management results and provide input on proposed management scenarios (Toronto and Region Conservation Authority, 2008, 2009, 2010, 2011, 2012).

The overall goal of the Double-crested Cormorant Management Strategy, as established by the Cormorant Advisory Group in 2008, 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 (TTP). The objectives of the Strategic Approach are to:

- a) Increase public knowledge, awareness, and appreciation of colonial waterbirds;
- b) Deter cormorant expansion to Peninsula D;
- c) Limit further loss of tree canopy on Peninsulas A, B and C; and
- d) Continue research on colonial waterbirds in an urban wilderness context (Toronto and

Region Conservation Authority, 2008, 2009, 2010, 2011, 2012).

The TTP cormorant colony currently comprises three sub-colonies. Peninsula A and the current ground nesting area of Peninsula B are considered Cormorant Conservation Zones where cormorant nesting and roosting is encouraged and enhanced. Peninsula C is the most recently colonized area containing the largest tree nesting cormorant sub-colony (Figure 3). Management of tree nesting cormorants on Peninsulas B and C is complicated by the presence of nesting Black-crowned Night Herons and Great Egrets; the night heron colony is thought to be one of the largest in Canada and during its peak in 2000 represented 30 per cent of the national breeding population (Wilson & Cheskey, 2001). To date, deterrent efforts on Peninsula C have focused on the cormorant tree nesting areas with the healthiest trees in an attempt to reduce the rate of tree health decline, and in unoccupied areas to prevent tree nesting expansion (Figure 3). Deterrents on Peninsula C include human presence, use of long poles, artificial predators, noise bangers and nest removal. TRCA takes precautions to ensure management efforts do not adversely impact non-target species through monitoring bird movements and behaviours. Peninsula D is the only forested peninsula not occupied by colonial waterbird species. To date, simple human presence has been sufficient to deter cormorants from nesting and loafing in this location.



Figure 3. 2012 Cormorant management areas

2.0 2012 POPULATION & TREE HEALTH SUMMARY

Cormorants began to arrive at TTP from their wintering grounds on 12 March 2012. The nesting population at TTP continued to rise in 2012 with 11,741 cormorant nests counted at peak nesting during the last week of May (Table 1, Figure 4). The increase in nest numbers was mainly due to ground nesting on Peninsula B increasing from 4,547 to 5,812 nests in 2012, a 28 per cent increase from 2011. Overall the ground nest population has increased 476 per cent since management efforts began in 2008. This is a positive trend showing that ground nest enhancements are working to help achieve the goal of the continued existence of a healthy, thriving cormorant colony. The significant increase in the number of ground nests means that 50 per cent of the TTP cormorant colony now nests on the ground, so their nests are not affecting the tree health.

Table 1. TTP cormorant population, 2002-2012

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Pen A	730	779	557	311	228	101	49	22	39	19	13
Pen B	1844	1582	1241	1763	1535	1072	1050	917	781	1262	982
Ground	344	948	809	872	868	1302	1009	1957	3310	4547	5812
Pen C	625	633	2439	2728	3494	4584	4609	4668	5304	5546	4934
Total	3543	3942	5046	5674	6125	7059	6717	7564	9434	11,374	11,741

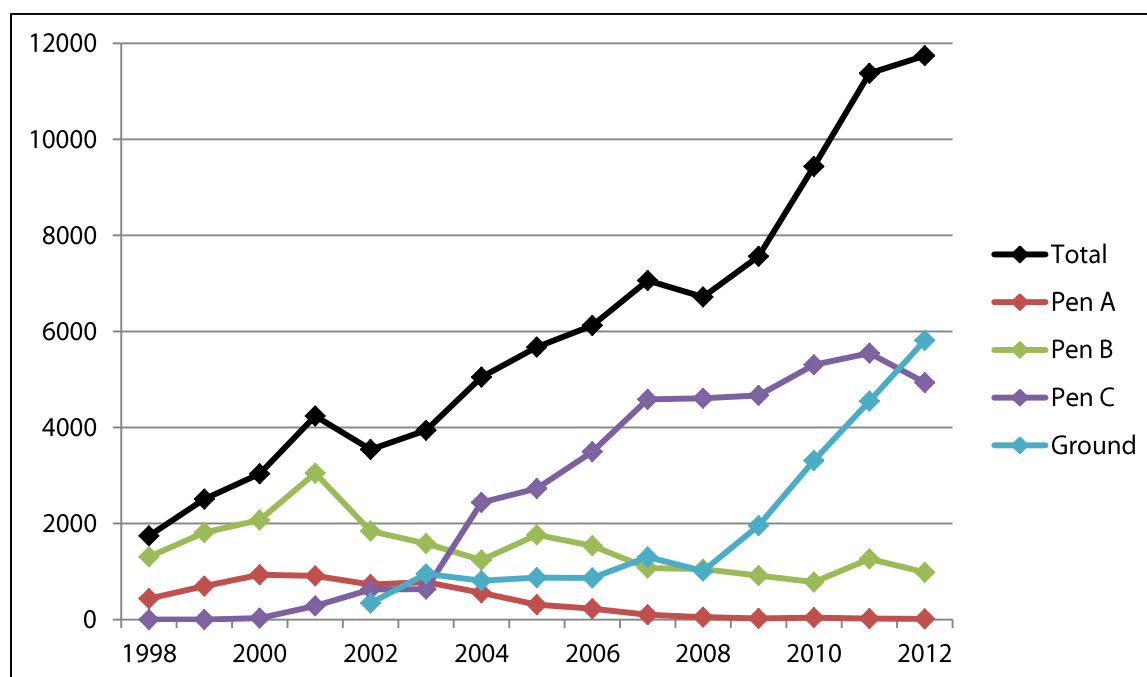


Figure 4. TTP Cormorant Population, 1998-2012

Under TRCA's Scientific Permit to Capture and Band Migratory Birds from Environment Canada (#10716) and MNR permit #1057623, Dr. Gail Fraser, Nigel Shaw and TTP Bird Research Station volunteers banded a total of 41 cormorant chicks on the evening of 14 June 2012. In 2011 unique colour bands, white letters on a black band, were obtained for use strictly at TTP. These unique bands

will help monitor the movements and behaviours of individuals as they mature and breed.

In 2012, cormorant tree nesting decreased by 11 per cent with only 36 new nest trees occupied within the current nesting areas. Tree nests decreased by 6 on Peninsula A, 280 on Peninsula B, and 612 on Peninsula C. The average number of nests per tree was 13 on Peninsula A (just one nest tree), 5.99 on Peninsula B and 6.2 on Peninsula C, a decrease in nest density in all tree nesting locations. Tree nesting appears to be declining, with population decreases in 2012 as indicated in Table 1.

The health of trees in the nest areas is evaluated annually through a qualitative ranking system that scores the tree based on the degree of impact from 1 being no impact to 5 being a severely damaged or standing dead tree (Figure 5). This survey has been completed in late August to early September since the 1990s. With over 20 years of data showing a clear decline in forest health due to cormorant nesting, tree health surveys were modified in 2012 and were only completed on Peninsula C in target deterrent areas, as well as the control area on Peninsula D.

Results from these surveys indicate that tree health in the deterrent areas on Peninsula C has an average rating of 3.2. The control plot of 20 non-nest trees established on Peninsula D has a rating of 1.

3.0 2012 MANAGEMENT REVIEW

To achieve the goals and objectives of the Double-crested Cormorant Management Strategy, TRCA employed a suite of management techniques between 2009 and 2011 which included inactive nest removals, pre-nesting deterrents, active nest removals, habitat enhancements and post-nesting deterrents. Results from annual population counts during this timeframe showed an increase in the ground nesting colony and a leveling off in the tree nesting colonies. These data suggested that the pre- and post-nesting deterrents had been successful in changing the nesting behaviour of DCCO; however, since there was no control area in the colony the hypothesis could not be refuted or accepted. As such, TRCA developed an adaptive Strategic Approach for 2012 (Table 2), as approved by the TRCA Board in Resolution #A19/12 (Toronto and Region Conservation Authority, 2012), where pre-nesting deterrents were only implemented as required in specific target areas within the tree nesting colonies. The goal for this adaptive approach was to inform staff if deterrents are necessary to achieve continued growth in the ground nesting colony, or if ground nest enhancements are adequate to achieve a continued increase. This section summarizes the management actions employed during 2012.

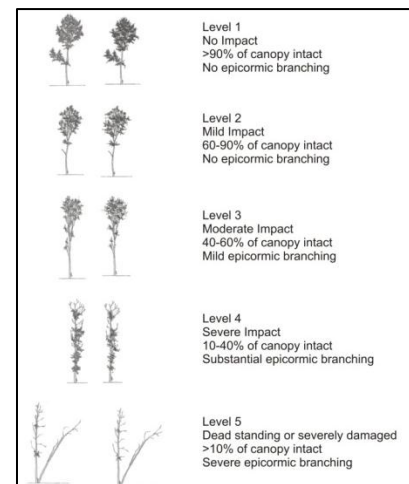


Figure 5. Tree health rating system

Table 2. 2012 Strategic Approach

	Peninsula A	Peninsula B	Peninsula C	Peninsula D
Inactive Nest Removal (prior to 2012 breeding season)		*	*	
Enhanced Ground Nesting	*	*		
Pre-Nesting Deterrents		*	*	*
Post-Breeding Deterrents			*	*

3.1 Increasing Public Knowledge, Awareness and Appreciation

Increasing public knowledge and fostering an appreciation for Double-crested Cormorants is an important aspect of the management plan at Tommy Thompson Park. For a second year, TRCA installed a remote camera in the ground nesting colony on Peninsula B that transmitted still images of the colony to the website (www.trca.on.ca/birdcam) every 10 minutes. The camera was installed in early March, prior to the return of the cormorants to the ground nesting area to limit the disturbance in this conservation zone. Photos taken between March and early May show how the colony progresses through the season, from first arrivals, nest building, courtship displays (Figure 6), first night spent on the nest, and egg laying. Unfortunately, due to the amount of photos transmitted and the size of each file, many technical glitches occurred and the website did not function as anticipated. Photos beyond the egg incubation period were not transmitted to the website due to these technical difficulties. However, a presentation with interpretation of images from the duration of the breeding season has been uploaded to the website and provides an opportunity for the public to follow specific nests and appreciate cormorants on an individual basis.

As in 2011, a viewing blind was installed at the edge of the colony on Peninsula C to allow the public good views of the tree nesting areas without disturbing the birds. The blind was well received and park visitors had excellent views of Double-crested Cormorant, Black-crowned Night-Heron and Great Egret nests. Many guided walks, including several at the TTP Spring Bird Festival on 12 May 2012 visited the viewing blind where the colony was interpreted. Visitors enjoy the views of the three nesting species so much that it was often difficult to guide them away to continue the walk! Furthermore, TRCA staff interpreted the colony for various corporate, academic and naturalist groups throughout the year.



Figure 6. Remote web camera image of Peninsula B ground nesting colony and courtship display, 2012

3.2 Inactive Nest Removal

Inactive nest removal was completed by staff in strategic areas on Peninsulas B and C outside the breeding season. Removals were based on the height of nests in the canopy, nest density and proximity to Black-crowned Night-Heron and Great Egret nests. A total of 183 inactive cormorant nests were removed in the months of January to March 2012. The methods used for nest removal were not unlike previous years. Poking nests off the branches with arborist poles and roping and shaking trees prove to be the most successful and efficient methods of safe nest removal.

3.3 Enhanced Ground Nesting

Ground nest enhancements occurred during the early months of 2012, prior to the return of cormorants in the conservation zones on Peninsulas A and B (Figure 3). The ground nest enhancement area on Peninsula A received a variety of alterations throughout. A portion of this enhancement area is included in the York University conspecific attraction study.

Following three breeding seasons under similar methodologies for cormorant attraction with inadequate positive results, minor changes were made to the configuration of the attraction site. All tires and stakes from previous seasons were removed and a lesser density of nests and cormorant decoys were placed in the area. A total of 36 nests (collected during the inactive nest removal activities) and 18 decoys were arranged in a circle formation directly underneath the lone nesting tree. Nest materials consisting of unbroken bales of straw were placed, and cormorant attraction calls were played using audio equipment. The audio equipment was moved directly into, or immediately adjacent to, the decoy site to improve the potential for auditory attraction throughout the breeding season. Sections of the researcher access tunnel closest to the attraction site were removed and a large portion of herbaceous vegetation was cut from this site in an effort to improve cormorant sightlines to the water. To ensure the integrity of the enhancement and attraction area, and to limit human disturbance to the active gull and cormorant nesting colonies, the researcher tunnel blind structure was shortened and outfitted with plywood siding. This improved the structural reliability and is more economical as it requires less seasonal maintenance by staff. Although there was a lot of activity observed around and in the circle formations at the beginning of the season, no cormorants nested in the ground areas of Peninsula A. The straw from the bales was used for nesting materials on Peninsulas B and C.

The successful ground nesting habitat on Peninsula B was also enhanced. To date, this ground nesting colony consists of two separate sub-colonies. In an effort to join the two sub-colonies, structural materials including woody debris and 40 nests collected from the inactive nest removal efforts were laid out between the two colonies, to act as a bridge to entice nesting cormorants to utilize the gap area. These enhancements were successful with cormorants nesting in many of the nests. Although the two sub-colonies remain separate, the distance between them has been significantly reduced. In 2005 the ground nesting area totaled 319m² with 872 nests. In 2012 the ground nesting area totaled 4,319 m² with 5,812 nests (Figure 7).



Figure 7. Ground nest colony expansion 2007 to 2012

3.4 Pre-Nesting and Active Deterrents

Although deterrents were identified as a management option for tree nesting cormorants on Peninsulas B and C, they were not undertaken during the 2012 breeding season to allow staff the opportunity to evaluate whether pre-nesting and active deterrents in previous years have been the driving factor of ground nest expansion on Peninsula B. There was a human presence into the early stages of nesting in the tree colonies due to active nest removal efforts in strategic areas on Peninsulas B and C as described below.

Pre-nesting and active deterrents were not required on Peninsula D as human presence from the Aquatic Park Sailing Club, the Tommy Thompson Park Bird Research Station staff and volunteers and park visitors was sufficient to prevent cormorants from nesting.

3.5 Active Nest Removal

Active nest removals were carried out in strategic areas of Peninsula B and Peninsula C to prevent the expansion of nesting cormorants into previously nest free areas. Depending on the location within the colony, either individual trees or large areas were monitored and managed using active nest removals. Nests were closely monitored to keep track of the age of eggs. No nests were removed containing eggs of an age greater than 10 days old; the 10 day incubation threshold followed is a conservative estimate based on current scientific literature on embryo development for altricial waterbirds (Humane Society of United States). In the event that eggs older than 10 days or nestlings

were discovered, deterrent activities focusing on that nest ceased and further monitoring occurred (Figure 8). A total of 145 active nests and 124 eggs were removed. Of those, 99 nests and 85 eggs were removed from Peninsula C; and 46 nests and 39 eggs were removed from Peninsula B. When possible, undamaged eggs were collected and float tested to confirm the incubation stage. These efforts began on 7 May 2012 and continued until 8 June 2012.

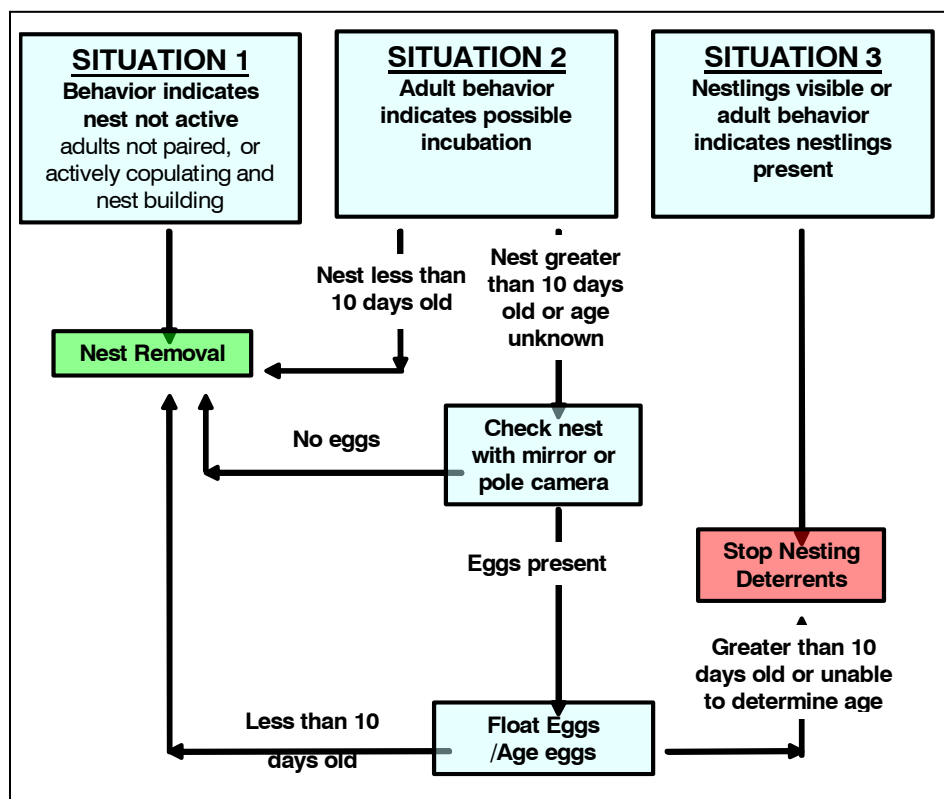


Figure 8. Active nest removal situation and action flow chart

3.6 Post Breeding Deterrents

Post breeding deterrents were identified for Peninsulas C and D but were not required as cormorants did not roost in the trees.

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