

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

2015 SUMMARY REPORT

**Restoration & Infrastructure
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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*). Although there was no nesting from 2004 to 2011, Caspian Terns (*Hydroprogne caspia*) have been nesting on the ground at TTP since 2012.

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 the peninsulas and concerns expressed by the public about the loss of forest habitat (Toronto and Region Conservation Authority, 2008, 2009, 2010, 2012, 2013, 2014).



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

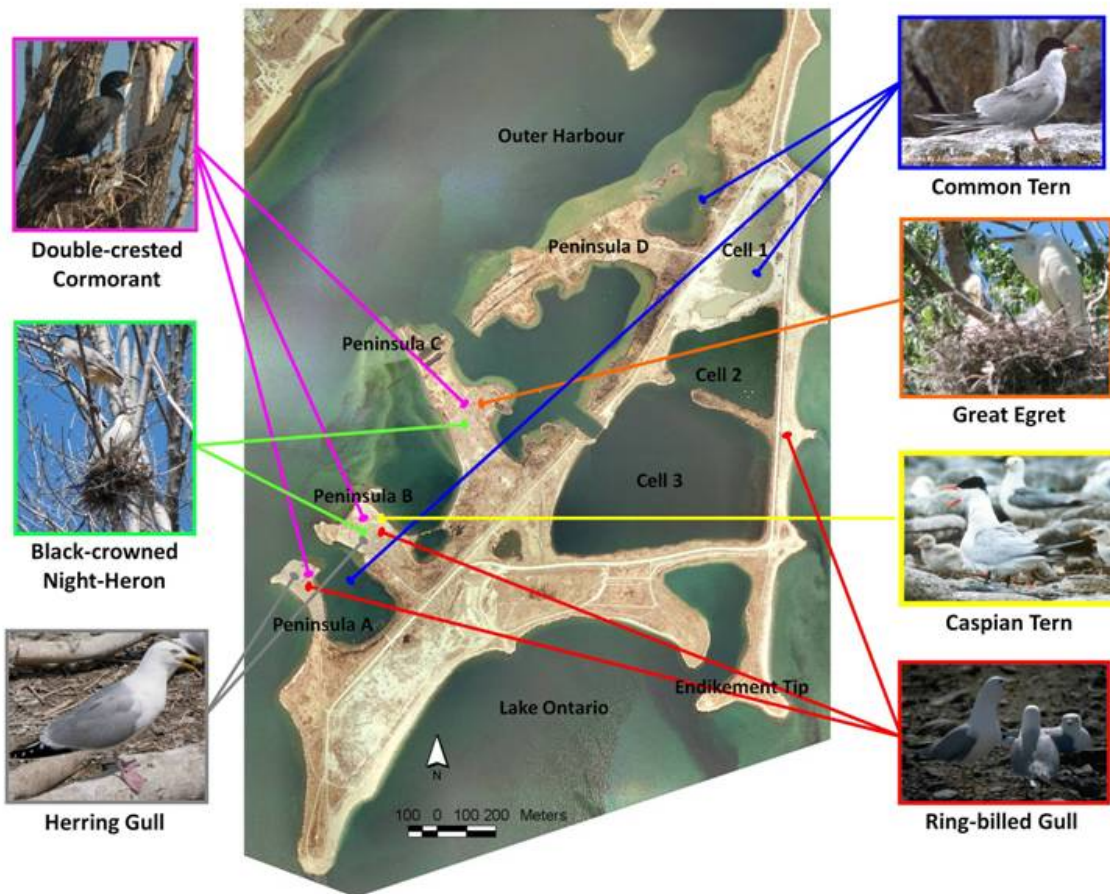


Figure 2. Colonial waterbird nesting locations in 2015 (First Base Solutions 2005)

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, 2013, 2014).

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, 2013, 2014).

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 techniques had been successful in changing the nesting behaviour of cormorants. In 2012, TRCA slightly modified the strategy to reduce pre-nesting deterrents to assess whether a reduced level of intensity would be effective. Results from the 2012 season confirmed reduced pre-nesting deterrents remained as effective.

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. 2015 Cormorant management areas

2.0 2015 POPULATION & TREE HEALTH SUMMARY

Cormorants began to arrive at TTP from their wintering grounds on 1 April 2015. The nesting population at TTP decreased slightly in 2015 with 11,908 cormorant nests counted at peak nesting in mid-June (Table 1, Figure 4). The decrease in nest numbers was due to a 22 per cent decline in tree nesting on Peninsula C, a 10 per cent decline in tree nesting on Peninsula B and a slight 2 per cent decline in ground nesting on Peninsula B, balanced by the growth of the ground nest colony on Peninsula A from 10 nests in 2014 to 541 in 2015. Overall the ground nest population has increased 708 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 68 per cent of the TTP cormorant colony nests on the ground, so their nests are not affecting the tree health.

Table 1. TTP cormorant population, 2005-2015

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pen A	311	228	101	49	22	39	19	13	5	14	14
Pen A ground										10	541
Pen B	1763	1535	1072	1050	917	781	1262	982	1310	1316	1184
Pen B ground	872	868	1302	1009	1957	3310	4547	5812	6986	7799	7608
Pen C	2728	3494	4584	4609	4668	5304	5546	4934	3689	3270	2561
Total	5674	6125	7059	6717	7564	9434	11374	11741	11990	12409	11908

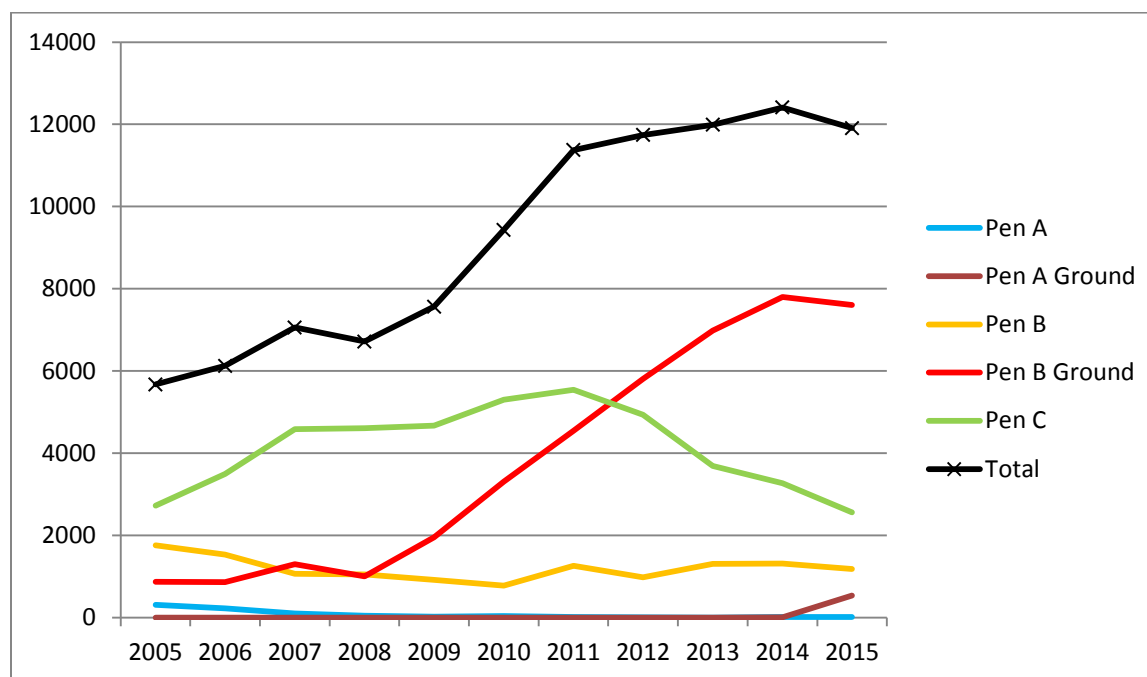


Figure 4. TTP Cormorant Population, 2005-2015

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 17 cormorant chicks on the evening of 24 July 2015. 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 2015, cormorant tree nesting decreased by 18 per cent with 42 new nest trees occupied within the current nesting areas. Tree nests decreased by 132 on Peninsula B and 709 on Peninsula C; there was no change on Peninsula A. The average number of nests per tree was 7 on Peninsula A, 8.05 on Peninsula B and 6.03 on Peninsula C, a decrease in nest density on Peninsulas A and C, an increase on Peninsula B.

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 to sample the target deterrent areas on Peninsula C, as well as the control area on Peninsula D.

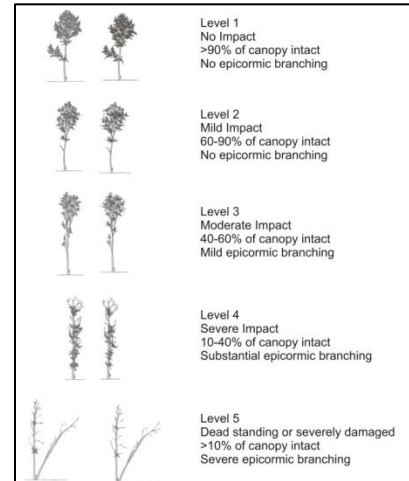


Figure 5. Tree health rating system

Results from these surveys indicate that tree health in the deterrent areas on Peninsula C (n=20) has an average rating of 4.55 and a mode of 5. The control plot of non-nest trees established on Peninsula D (n=14) has a rating of 1.6 and a mode of 1. The colony of Black-crowned Night Herons nest trees at the base of Peninsula C (n=20) has an average rating of 1.25 and a mode of 1.

3.0 2015 MANAGEMENT REVIEW

Cormorant management in 2015 followed the adaptive Strategic Approach for 2015 (Table 2). This Strategic Approach included inactive nest removals, pre-nesting deterrents, active nest removals, habitat enhancements and post-nesting deterrents, all to be implemented as required within target areas in the cormorant colonies.

Table 2. 2015 Strategic Approach

	Peninsula A	Peninsula B	Peninsula C	Peninsula D
Inactive Nest Removal (prior to 2015 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. As in previous years, 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 colony was highlighted at the Spring Bird Festival on 9 May 2015 with two well attended hikes. Participants enjoyed views and learned about the colony from various lookouts. TRCA staff interpreted the colony for numerous corporate, academic and naturalist groups throughout the year. Furthermore, the colony was featured in a Bell Media documentary '*The Spit*' that will air in 2016 and on the Reuters Earthprints series that was available in print and video.

The TTP colony was also presented at two academic conferences in 2015. '*Twenty-four years of cormorant monitoring at Tommy Thompson Park: What have we learned?*' was presented at the International Association of Great Lakes Research, and '*Non-traditional management of the largest Great Lakes cormorant colony in Toronto, Canada*' was presented at the Waterbird Society.

3.2 Inactive Nest Removal

Inactive nest removal took place in the month of March 2015 on Peninsulas B and C. A total of 67 inactive cormorant nests were removed. Nests were targeted based on the height and accessibility of the nests in the trees, as well as their location in relation to the Black-crowned Night Heron and Great Egret nesting sites. Trees that were not entirely dead were also targeted. Discouraging nesting in healthy trees is important to maintain overall forest health. The method used to remove the cormorant nests was the same as previous years. Trained staff used arborist poles to safely poke nests off of the branches.

3.3 Enhanced Ground Nesting

Ground nest enhancements remained minimal in 2015 and only took place on Peninsula A with the placement of straw bales to provide nesting material. Ground nesting expanded exponentially on Peninsula A, from 10 nests in 2014 to 541 nests in 2015! The ground nesting area on Peninsula B was not enhanced in 2015, and the area contracted to 7,154 m² with 7,608 nests (Figure 6).



Figure 6. Ground nest colony expansion 2005 to 2015

3.4 Pre-Nesting and Active Deterrents

Pre-nesting deterrents commenced on 14 April 2015 and were utilized on Peninsula C prior to Black-crown Night-Heron arrival. Cormorants quickly became desensitized to the progressing level of deterrents and were aggressively attempting to expand their nesting range. This resulted in a series of night deterrents from mid-May to early-June.

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 7). A total of 1082 active nests and 481 eggs were removed. Of those, 793 nests and 288 eggs were removed from Peninsula C; and 289 nests and 193 eggs were removed from Peninsula B. When possible, undamaged eggs were collected and float tested to confirm the incubation stage. These efforts began on 15 April 2015 and continued until 12 June 2015, with a further increase in effort over 2014 during the last weeks of May and first week of June.

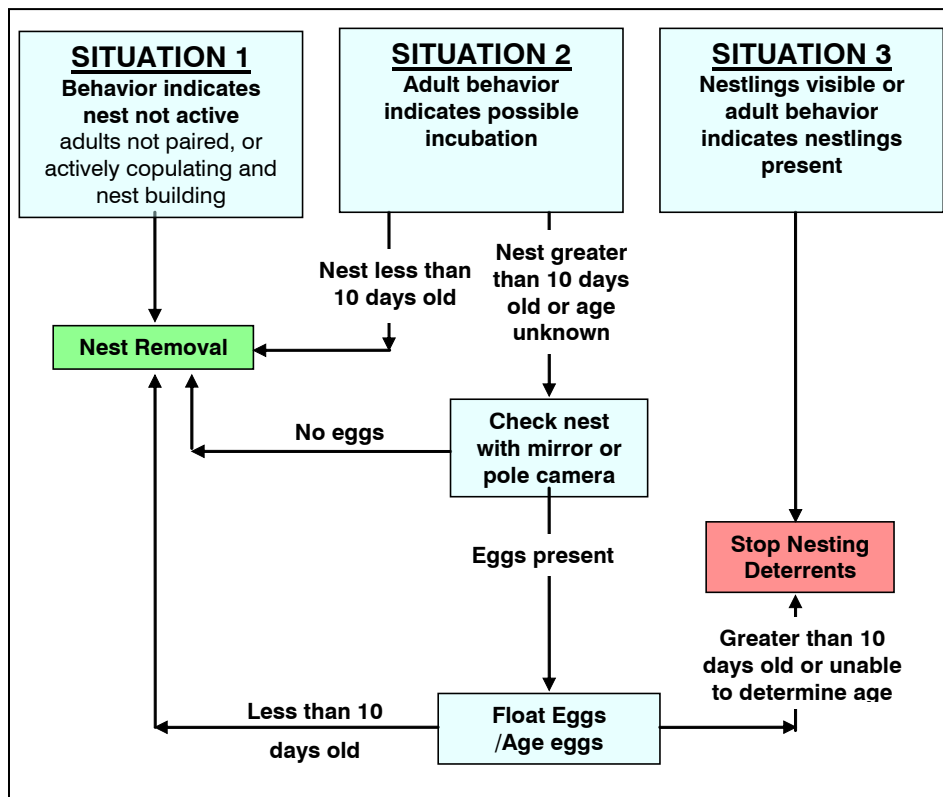


Figure 7. Active nest removal situation and action flow chart

3.3 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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