MANAGEMENT OF DOUBLE-CRESTED CORMORANTS AT TOMMY THOMPSON PARK

2017 SUMMARY REPORT

Restoration & Infrastructure
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TRCA
5 Shoreham Drive
Toronto, On M3N 1S4
416-661-6600
www.trca.on.ca

Tommy Thompson Park
Toronto's Urban Wilderness

Toronto and Region Conservation
for The Living City

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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.

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

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). Two species are predominately tree-nesters: Black-crowned Night-Heron (*Nycticorax nycticorax*) and Great Egret (*Ardea alba*); and four species are ground-nesters: Double-crested Cormorant (*Phalacrocorax auritus*), Ring-billed Gull (*Larus delawarensis*), Herring Gull (*Larus argentatus*) and Common Tern (*Sterna hirundo*). Double-crested Cormorant was historically predominantly a tree nester at TTP, however, since 2013 the majority of nests have been on the ground. Although there was no nesting from 2004 to 2011, Caspian Terns (*Hydroprogne caspia*) have attempted nesting on the ground with varying success 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 2. Colonial waterbird nesting locations in 2017 (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 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. However; since 2014 there has been an annual increase in the pre-nesting deterrents required to prevent cormorants from expanding their tree nesting range into new areas.

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; and Peninsula C which 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 was 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 forestry poles, 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. 2017 Cormorant management areas

2.0 2017 POPULATION & TREE HEALTH SUMMARY

Cormorants began to arrive at TTP from their wintering grounds on 27 March 2017. The nesting population at TTP decreased in 2017 with 12,841 cormorant nests counted at peak nesting in mid-June (Table 1, Figure 4). The decrease in population is attributed to severe flooding in the ground nest colony throughout the duration of breeding season due to a record-high water level in Lake Ontario. This also resulted in increased nesting attempts in the tree colony. With decreased ground nesting availability and an increase in tree nesting, the percent of the overall colony represented by ground-nesting declined to 60% compared to 76% in 2016. This is the first year since management began that this percentage has decreased.

Table 1. TTP cormorant population, 2007-2017

	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Pen A	101	49	22	39	19	13	5	14	14	4	0
Pen A ground								10	541	1525	1821
Pen B	1072	1050	917	781	1262	982	1310	1316	1184	1007	2474
Pen B ground	1302	1009	1957	3310	4547	5812	6986	7799	7608	8555	5836
Pen C	4584	4609	4668	5304	5546	4934	3689	3270	2561	2184	2710
Total	**7059**	**6717**	**7564**	**9434**	**11374**	**11741**	**11990**	**12409**	**11908**	**13275**	**12841**

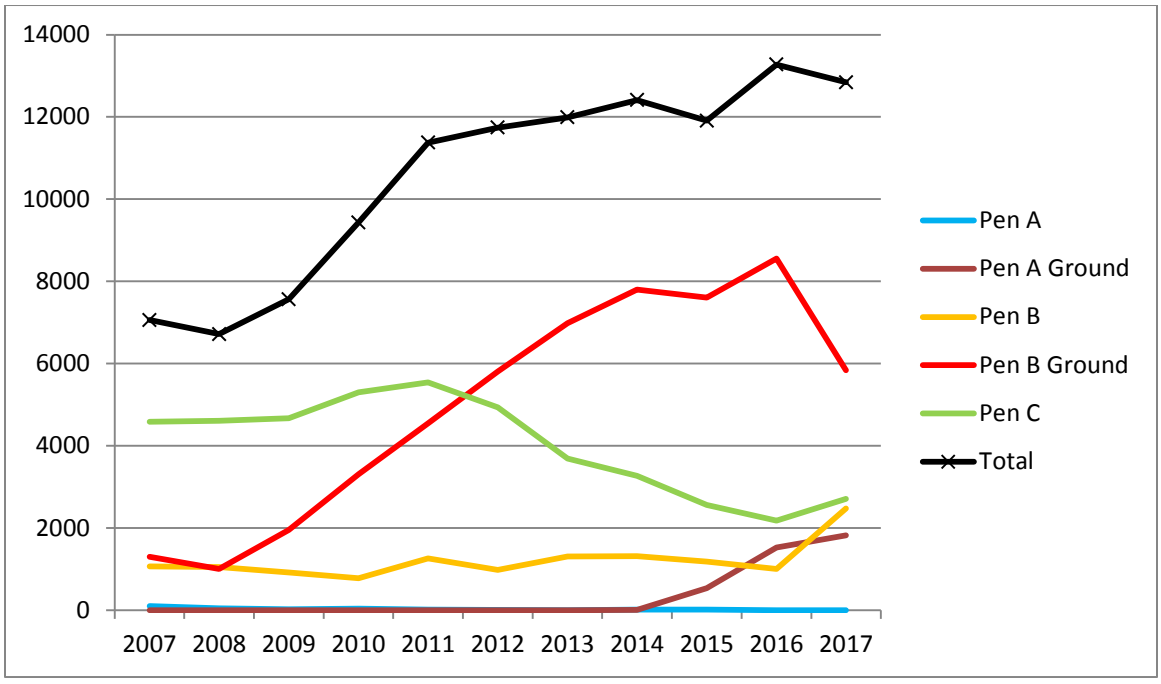

Figure 4. TTP Cormorant Population, 2007-2017

As described above, the record high Lake Ontario water levels resulted in increased nesting attempts in healthy trees within the Peninsula B and C Deterrent Zones. Despite staff efforts to restrict colony expansion, cormorant tree nesting increased by 54 per cent from the 2016 totals. Tree nests increased by 1,467 nests on Peninsula B and 526 on Peninsula C. The average number of nests per tree was 9.8 on Peninsula B and 6.0 on Peninsula C.

Although TRCA has a Scientific Permit to Capture and Band Migratory Birds from Environmental Canada (#10716) and MNR permit #1057623, banding was not attempted in 2017 due to staffing limitations.

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.

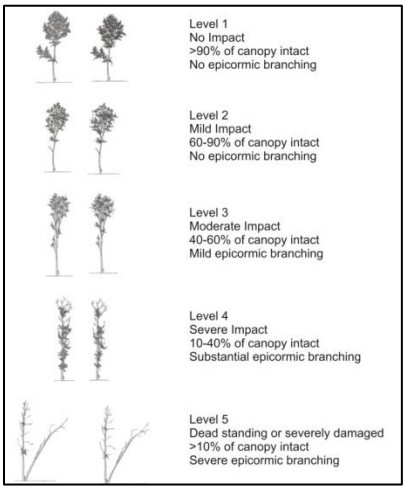

Figure 5. Tree health rating system

Results from these surveys indicate that tree health in the deterrent areas on Peninsula C (n=10) has an average rating of 4.8 and a mode of 5. The control plot of non-nest trees established on Peninsula D (n=10) has a rating of 1.7 and a mode of 2. The colony of Black-crowned Night Herons nest trees at the base of Peninsula C (n=10) has an average rating of 2.3 and a mode of 3.

3.0 2017 MANAGEMENT REVIEW

Cormorant management in 2017 followed the adaptive Strategic Approach for 2017 (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. 2017 Strategic Approach

	Peninsula A	Peninsula B	Peninsula C	Peninsula D
Inactive Nest Removal (prior to 2017 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 13 May 2017 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.

3.2 Inactive Nest Removal

Inactive nest removal took place in the month of March 2017 on Peninsulas B and C. A total of 36 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 2017 and only took place on Peninsula A with the placement of straw bales to provide nesting material. Though impacted by high Lake Ontario water levels, ground-nesting continued to expand on Peninsula A, seeing a growth of 296 nests. The ground-nesting area on Peninsula C was not enhanced in 2017, and the area was significantly impacted by the high water levels.

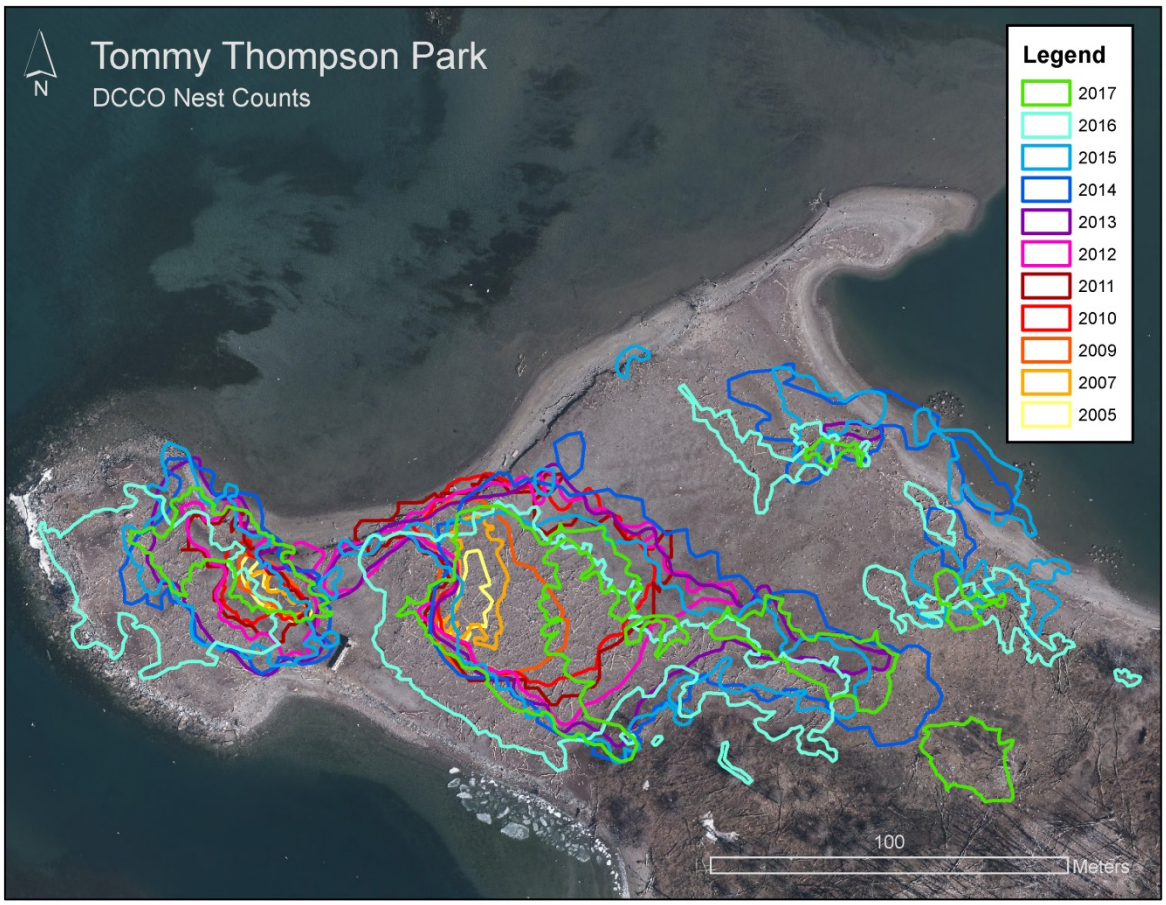

Figure 6. Ground nest colony expansion 2005 to 2017

3.4 Pre-Nesting and Active Deterrents

Pre-nesting deterrents commenced on 11 April 2017 and were utilized on Peninsulas B and C. Cormorants quickly became desensitized to the progressing level of deterrents and were aggressively attempting to expand their nesting range, especially as Lake Ontario water levels increased through April and May. From late-April to mid-June deterrents were undertaken from dawn to dusk, the periods when cormorants were most sensitive to disturbance. The increased presence and use of deterrence throughout the day had positive results, however, with limited ground-nesting area available due to flooding, cormorants persistently built and rebuilt nests in the Deterrent Area. Staff were subjected to chest-deep water and rainy conditions for much of the season. They noted that cormorants would rebuild nests within hours of a nest having been knocked down.

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 altrical waterbirds (Humane Society of United States). In the event that eggs older than 10 days or nestlings were discovered, or a nest was known to be at least 10 days old, deterrent activities focusing on that nest ceased (Figure 7). A total of 1,763 active nests and 1,593 eggs were removed. Of those, 1,319 nests and 1,104 eggs were removed from Peninsula C; and 442 nests and 489 eggs were removed from Peninsula B. When possible, undamaged eggs were collected and float tested to confirm the incubation stage. These efforts began on 13 April and continued until 30 June 2017.

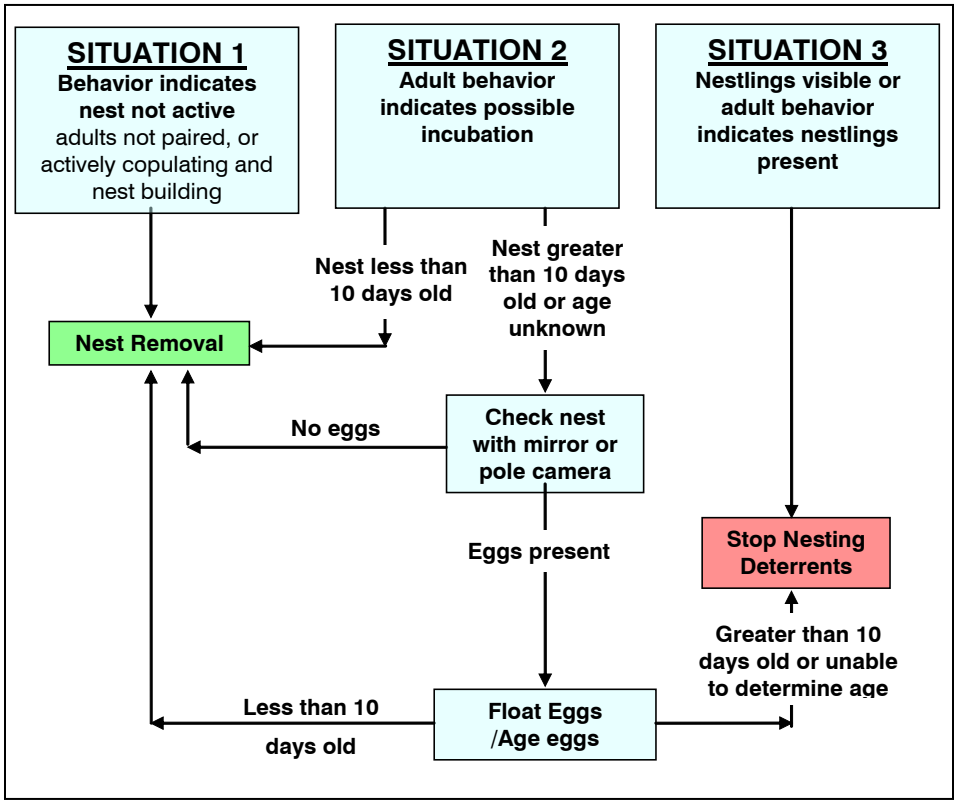

Figure 7. Active nest removal situation and action flow chart

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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