

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

2014 SUMMARY REPORT

**Restoration Services
December 2014**

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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).



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

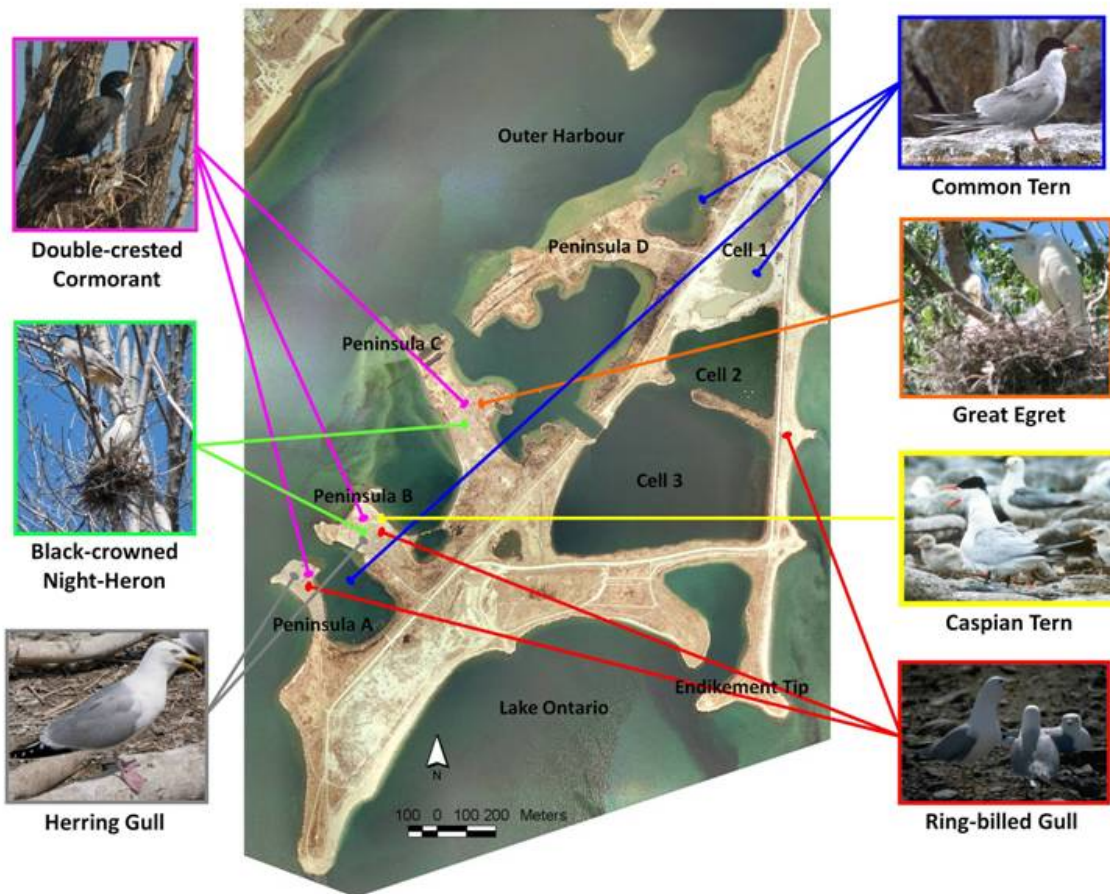


Figure 2. Colonial waterbird nesting locations in 2014 (First Base Solutions 2005)

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. 2014 Cormorant management areas

2.0 2014 POPULATION & TREE HEALTH SUMMARY

Cormorants began to arrive at TTP from their wintering grounds on 1 April 2014, consistent with their arrival date in 2013. The nesting population at TTP continued to rise in 2014 with 12,409 cormorant nests counted at peak nesting during the first week of June (Table 1, Figure 4). The increase in nest numbers was mainly due to ground nesting on Peninsula B increasing from 6,986 to 7,799 nests in 2014, a 12 per cent increase from 2013. Overall the ground nest population has increased 673 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 63 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, 2004-2014

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Pen A	81	311	228	101	49	22	39	19	13	5	14
Pen A ground											10
Pen B	1241	1763	1535	1072	1050	917	781	1262	982	1310	1316
Pen B ground	809	872	868	1302	1009	1957	3310	4547	5812	6986	7799
Pen C	0	2728	3494	4584	4609	4668	5304	5546	4934	3689	3270
Total	5046	5674	6125	7059	6717	7564	9434	11374	11741	11990	12409

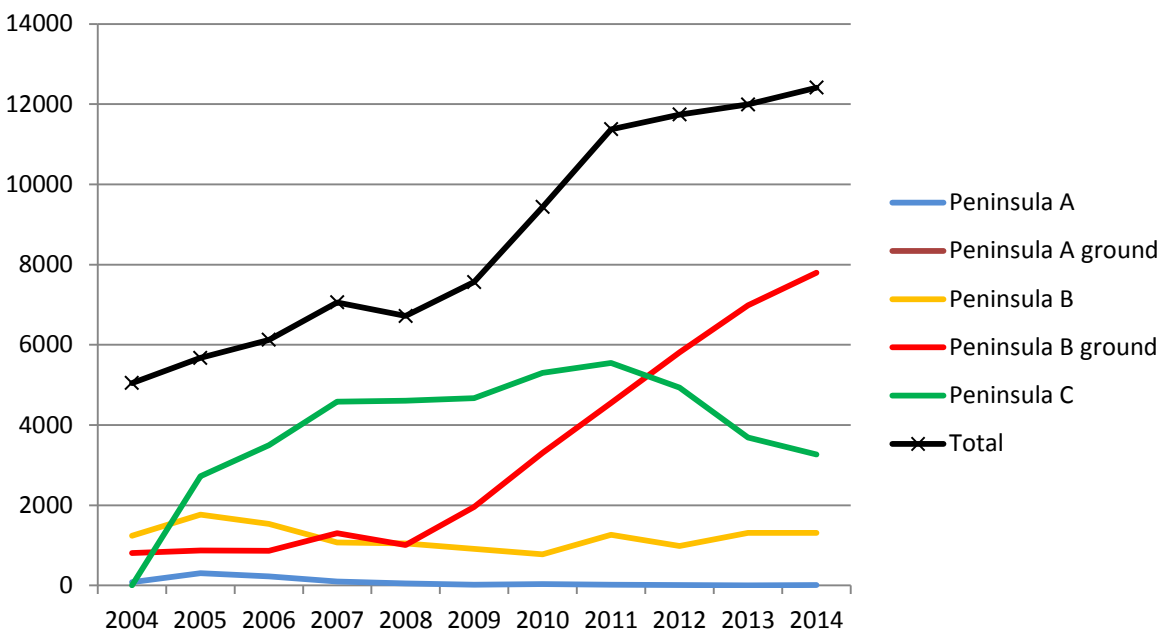


Figure 4. TTP Cormorant Population, 2004-2014

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 84 cormorant chicks on the evenings of 26 June and 10 July 2014. 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 2014, cormorant tree nesting decreased by 8 per cent with 88 new nest trees occupied within the current nesting areas. Tree nests increased by 9 on Peninsula A and 6 on Peninsula B. Nests decreased on Peninsula C by 419. The average number of nests per tree was 14 on Peninsula A (just one nest tree), 7.15 on Peninsula B and 6.31 on Peninsula C, an increase in nest density on Peninsulas A and C, a decrease 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.

Results from these surveys indicate that tree health in the deterrent areas on Peninsula C (n=20) has an average rating of 3.45 and a mode of 5. The control plot of non-nest trees established on Peninsula D (n=14) has a rating of 1.8 and a mode of 1. A new colony of Black-crowned Night Herons nest trees at the base of Peninsula C (n=125) has an average rating of 1.2 and a mode of 1.

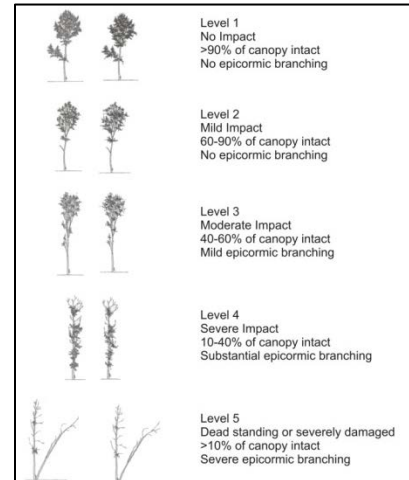


Figure 5. Tree health rating system

3.0 2014 MANAGEMENT REVIEW

Cormorant management in 2014 followed the adaptive Strategic Approach for 2014 (Table 2), as approved by the TRCA Board in Resolution #A227/13 (Toronto and Region Conservation Authority, 2014). 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. 2014 Strategic Approach

	Peninsula A	Peninsula B	Peninsula C	Peninsula D
Inactive Nest Removal (prior to 2014 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 2012 and 2013, 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 10 May 2014 with two well attended hikes and a presentation by author Linda Wires who was launching her new book *The Double-Crested Cormorant: Plight of a Feathered Pariah*, which includes a chapter on the TTP colony and management plan. Participants enjoyed views and learned about the colony from various lookouts. Furthermore, 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 2014 on Peninsula C. A total of 101 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 were minimized in 2014 and only took place on Peninsula A. As reported in 2013, due to the possibility that the undulating topography on Peninsula A is the limiting factor for ground nesting, soil was added in the late fall to the target ground nesting area to create a more uniform grade. In spring 2014, straw bales were placed in the area to provide nesting material. These enhancements were successful, and for the first time 10 cormorants nested on the ground on Peninsula A!

The ground nesting area on Peninsula B was not enhanced in 2014, but the area continued to expand, totaling 9,265 m² with 7,799 nests (Figure 6). The bridge between the two original subcolonies that

formed in 2012 and 2013 was not utilized in 2014, so the two distinct colonies were present, with the addition and expansion of three further subcolonies on the east side of the peninsula.

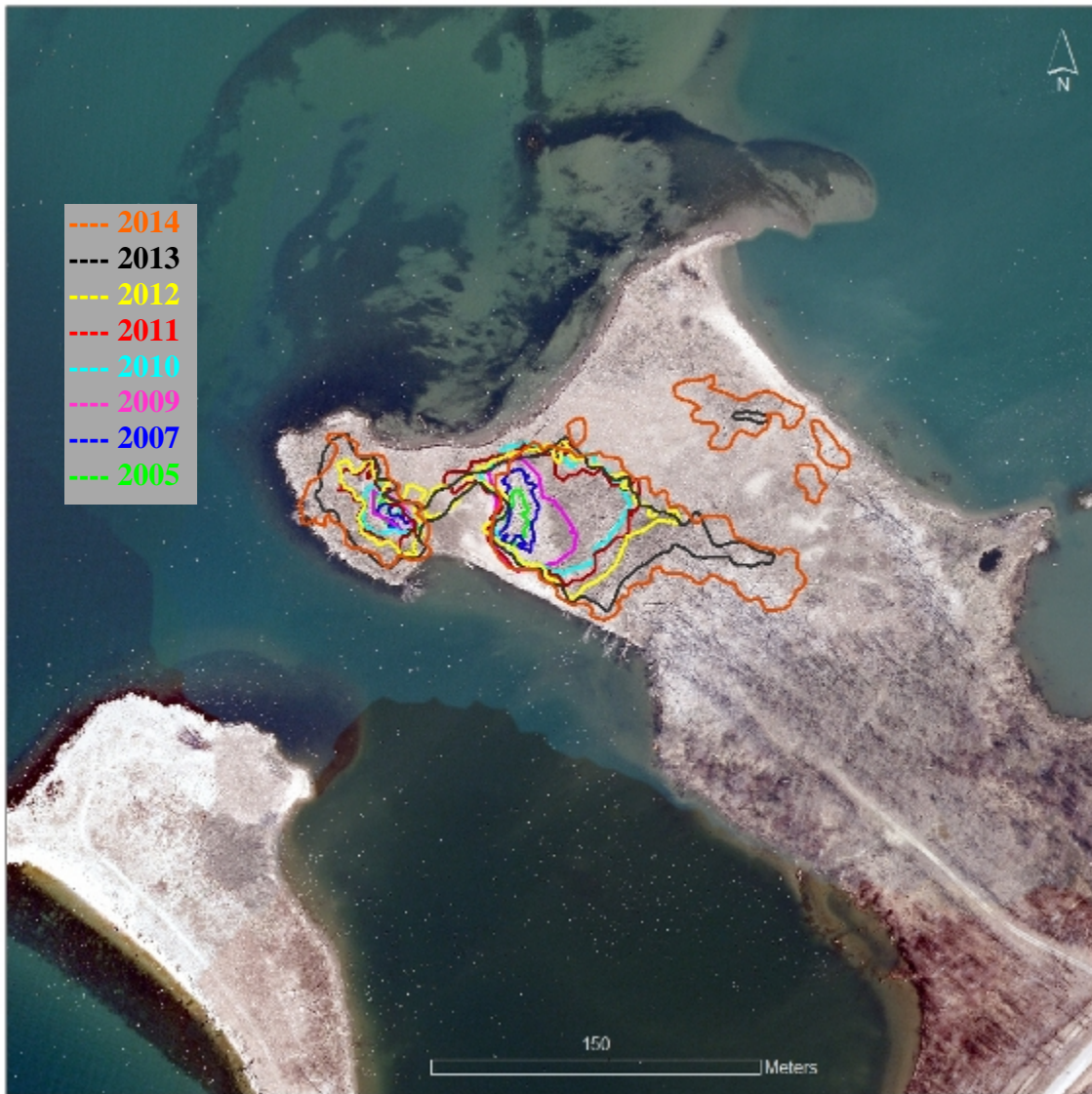


Figure 6. Ground nest colony expansion 2005 to 2014

3.4 Pre-Nesting and Active Deterrents

Pre-nesting and active deterrents were utilized as required in 2014, and predominantly took place on Peninsula C, later in the season when cormorants were expanding into new areas at the base of the peninsula. Pre-nesting deterrents began on 14 April 2014, and cormorants quickly became desensitized to the progressing level of deterrents employed, from human presence to noise makers. A series of day and night deterrents took place at the end of May when the cormorants were

aggressively expanding.

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 565 active nests and 154 eggs were removed. Of those, 335 nests and 112 eggs were removed from Peninsula C; and 230 nests and 42 eggs were removed from Peninsula B. When possible, undamaged eggs were collected and float tested to confirm the incubation stage. These efforts began on 28 April 2014 and continued until 10 June 2014, with an increase in effort from previous years during the last weeks of May and first week of June.

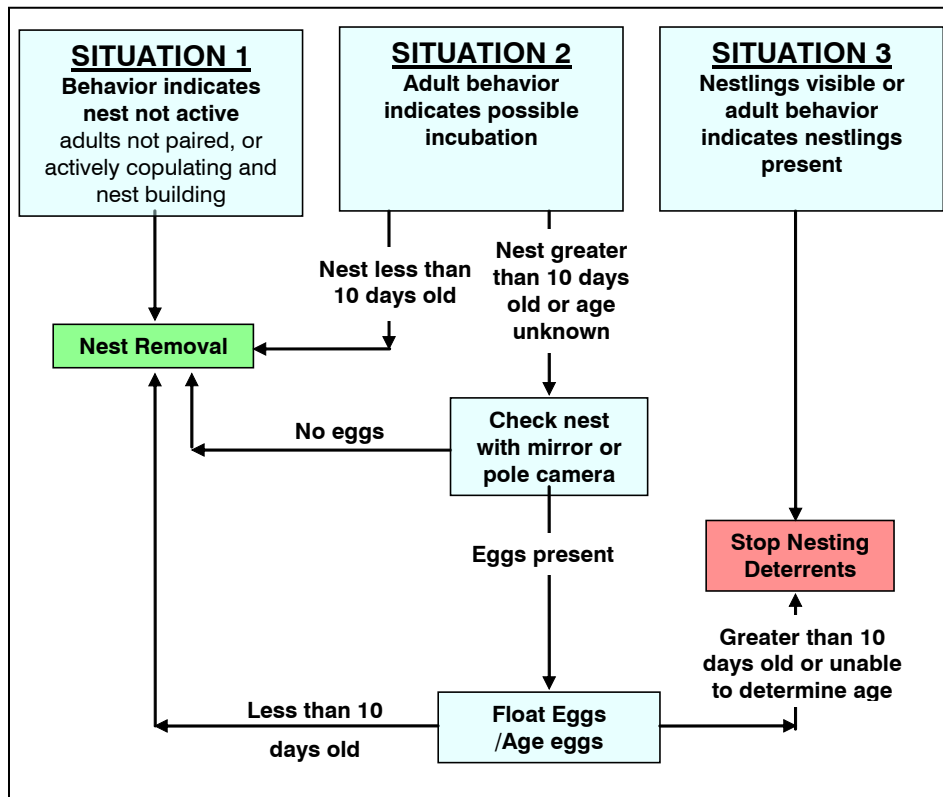


Figure 7. Active nest removal situation and action flow chart

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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