The Breeding Birds of

Tommy Thompson Park

2016

Black-billed Cuckoo on Nest (P. Robillard)

Toronto and Region Conservation

Toronto and Region Conservation for The Living City

Tommy Thompson Park
Toronto's Urban Wilderness

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1. Introduction

1.1 Study Area

TTP Aerial View (TRCA, 2014)

Tommy Thompson Park is located on the Leslie Street Spit, a man-made landform that extends five kilometres into Lake Ontario in Toronto. When construction of the Spit began in 1959 by the Toronto Port Authority (now Ports Toronto), the intention was to create new lands for port related facilities. However, for a variety of reasons port related expansion did not occur and natural succession was allowed to progress. As such, the Province of Ontario awarded Toronto and Region Conservation Authority (TRCA) the responsibility of creating a Master Plan for a public park. Although construction of the landform continues to the present day by Ports Toronto to mitigate shoreline erosion, the final size of the Spit (including the waterlots) is complete at approximately 500 hectares.

Over the years, the Spit evolved into the largest area of natural habitat on the Toronto waterfront, both through natural succession and habitat enhancement projects by the TRCA. A range of vegetation communities, including successional forests, meadows, coastal wetlands and sand dunes, provide diverse habitats for a wide range of species. A number of regionally rare plants have earned TTP the designation of an *Environmentally Significant Area*. The geographical location of the Spit is also significant for migrating wildlife; it is the first/last natural area for wildlife as they migrate across the lake or through Toronto. Additionally, the Spit is within close proximity to the Don River valley which provides a corridor of natural vegetation through the city, to larger green spaces, including the Oak Ridges Moraine.

The diverse habitats on the park, along with the geographical position have made it a critical site for birds throughout the year. To date, 320 species have been recorded at the park, and in 2000, the Leslie Street Spit/TTP was named an *Important Bird Area* by BirdLife International. This designation is due to the globally significant number of nesting colonial waterbirds, the nationally significant number of waterfowl during migration and over winter, and the large concentrations of songbirds during migration.

2. Colonial Waterbirds

2.1 Project Background

Juvenile Great Egrets on Nest (D. Johnston)

Colonial waterbirds have a long history at Tommy Thompson Park and are one of the reasons the park was designated a globally significant *Important Bird Area* in 2000 (Wilson et al., 2001). This year seven species of colonial waterbirds nested at Tommy Thompson Park: two species are tree nesters: Black-crowned Night-Heron and Great Egret; four species are ground nesters: Ring-billed Gull, Herring Gull, Caspian Tern and Common Tern; and Double-crested Cormorants nest in trees and on the ground.

2.2 Population Estimate Methodology

Population estimates for tree nesting waterbirds, Double-crested Cormorants and Common Terns are conducted annually, while population estimates for Ringed-billed Gulls typically occur every 5 to 10 years with the 10 year survey coinciding with the Canadian Wildlife Service (CWS) decadal census. Individual Herring Gull nests are monitored by the CWS for ongoing contaminant research, and TRCA does not usually undertake a population census for this species. Caspian Terns are typically counted each year; however they were absent from 2004 to 2011 and were not counted in 2012 due to their proximity to the ground nesting cormorant colony. Since 2014 Caspian Terns are counted following the Ground Nest Survey Methodology. Population estimates for any species may also be undertaken more frequently in relation to other projects/studies or to address a population concern. All estimates and analysis are conducted by trained TRCA staff and researchers, using in-field techniques. Upon completion of the survey Microsoft Excel is used to store and analyze the population data.

2.2.1 Tree Nest Survey Methodology

Each spring an annual census is conducted during the last week of May, at the peak nesting period, to determine the number of breeding Double-crested Cormorant, Black-crowned Night-Heron and Great Egret pairs and their nest distribution. Active nests of these species are counted by a team of observers who move systematically through the colony recording the tree number, tree species and number of nests of each bird species. As noted in Jarvie et al. (1999), each tree containing a nest is marked with a circular 2.5 cm metal tag bearing a unique number (National Band and Tag #85, 0.050 mm thick) attached with a single 5 cm galvanized roofing nail which is left out approximately 2.5 cm to allow for the growth of the tree without damage. Coordinates of each tree are recorded by GPS. All new nest trees are tagged and coordinates recorded. Every tree evaluated is marked with tree marking paint to identify that it has been counted. The tree coordinates and associated nest data are mapped with ArcView GIS software. Additionally, a sample of nest trees are evaluated post-breeding, in the late summer, to assess their health.

2.2.2 Ground Nest Survey Methodology

The census for Common Tern and Ring-billed Gull is conducted at the peak nesting period, typically the last week of May or the first week of June to determine their breeding population. The Common Tern colonies nest on three floating reef-rafts and one artificial island. The colonies can be subject to predation/disturbance pressures that can result in asynchronous nesting, making it difficult to obtain a reliable estimate of the breeding population. Therefore, depending on the circumstances of the sub-colony, multiple population counts may be conducted throughout the breeding season. The reef-rafts are approximately 24 m^2, so all nests can be counted, noting the nest contents, by walking or canoeing the periphery of the raft. The artificially created tern island in the Cell One wetland is approximately 120 m^2, and is more challenging to count because of its size and tall vegetation. Observers carefully walk the island in a grid pattern and note nests and nest contents.

Ring-billed Gulls are surveyed at least every 10 years with the CWS decadal surveys, however CWS also monitors individual Herring Gull nests annually. Because of the large nesting area, the colony is divided into smaller, discrete sections, and all active nests are counted by section using the rope transect method. Ropes are used to delineate 1m wide transects and observers carefully walk the transect counting all active nests with a manual handheld tally counter and marking each nest with survey paint to identify that it has been counted. Herring Gull nests are recorded on a field data sheet and not included in the tally counter. The ropes are then moved to the next transect line until all active nests within the colony are counted. In years where individual nests are not counted, trained staff undertake population estimates of the Ring-billed Gull nesting area.

Double-crested Cormorant ground nest estimates occur once management has largely stopped to account for birds that may have attempted to tree nest and instead ground nested. Nest counts for both cormorants and Caspian Terns are undertaken at the peak nesting period using aerial photography from a helicopter. This method minimizes disturbance to the ground nesting colonies. Individual nests can be seen in the images and are counted using GIS software by placing a dot on each nest.

2.3 Results

In 2016, Double-crested Cormorants nested in trees on Peninsulas A, B and C, as well as on the ground on Peninsulas A and B. Black-crown Night-Herons nested on Peninsulas B and C. Great Egrets nested on Peninsula

C. Ring-billed Gulls and Herring Gulls nested on the ground on Peninsulas A and B, with Ring-billed Gulls also using the Endikement. Caspian Terns attempted to nest on the ground on Peninsula B. Common Terns attempted nesting on two artificial reef-rafts in Embayment A, another in Embayment D, and a man-made island in Cell One (Figure 2.A).

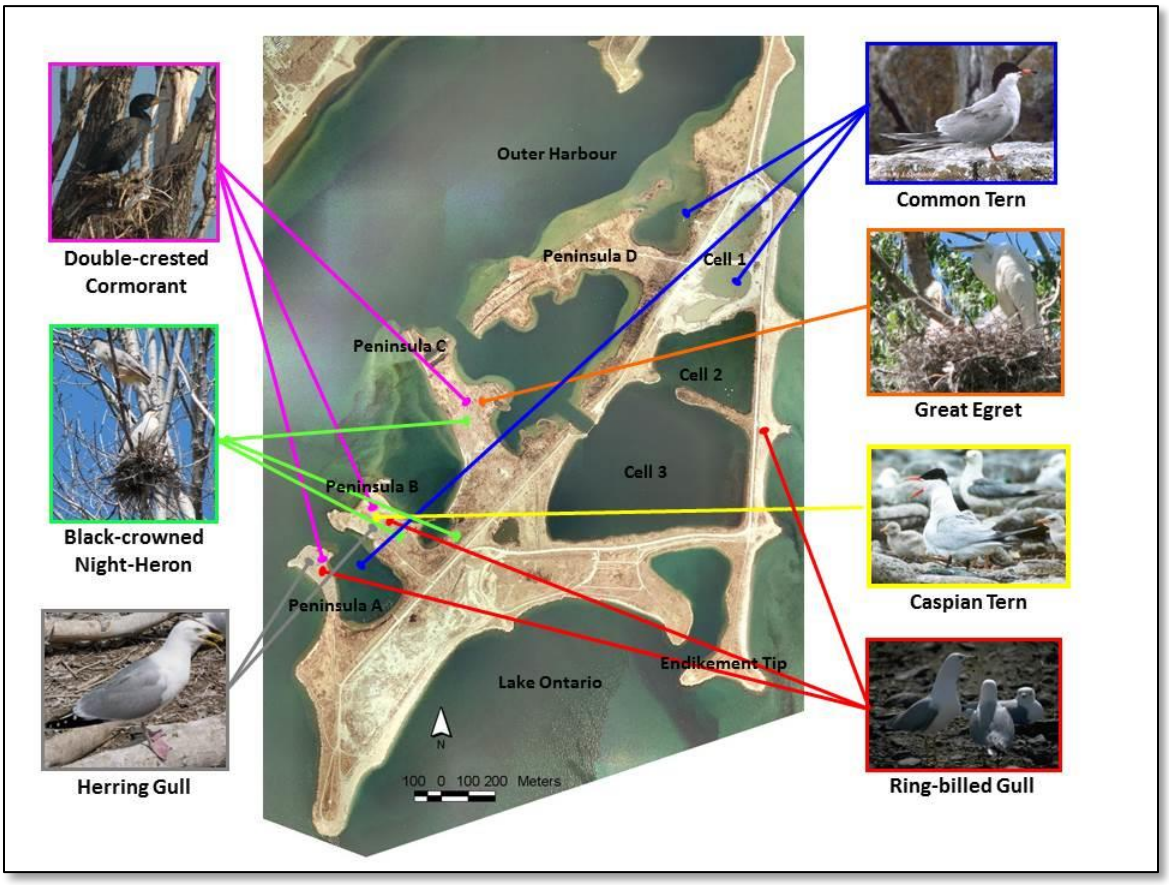

Figure 2.A. Colonial Waterbird Nesting Areas, 2016

Cormorant nests numbered 13,275, including 10,080 ground nests (Figure 2.B). The overall population increased 11 percent; while the ground nesting population increased 24 percent over the previous year. As indicated in Figure 2.B, 76 percent of the TTP cormorant colony nested on the ground in 2016, with 1,525 nests on Peninsula A, a significant increase from 2015. Ground nesting is a target of the Double-crested Cormorant Management Strategy, which aims to achieve a balance between a healthy, thriving cormorant colony and the other ecological, educational, scientific and recreational values at the park (TRCA, 2008). Tree nesting decreased by a total of 15 percent as observed on both Peninsulas B and C in 2016 (Figure 2.B).

Double-crested Cormorant Ground Nest (left) and Tree Nests (right) (D. Johnston)

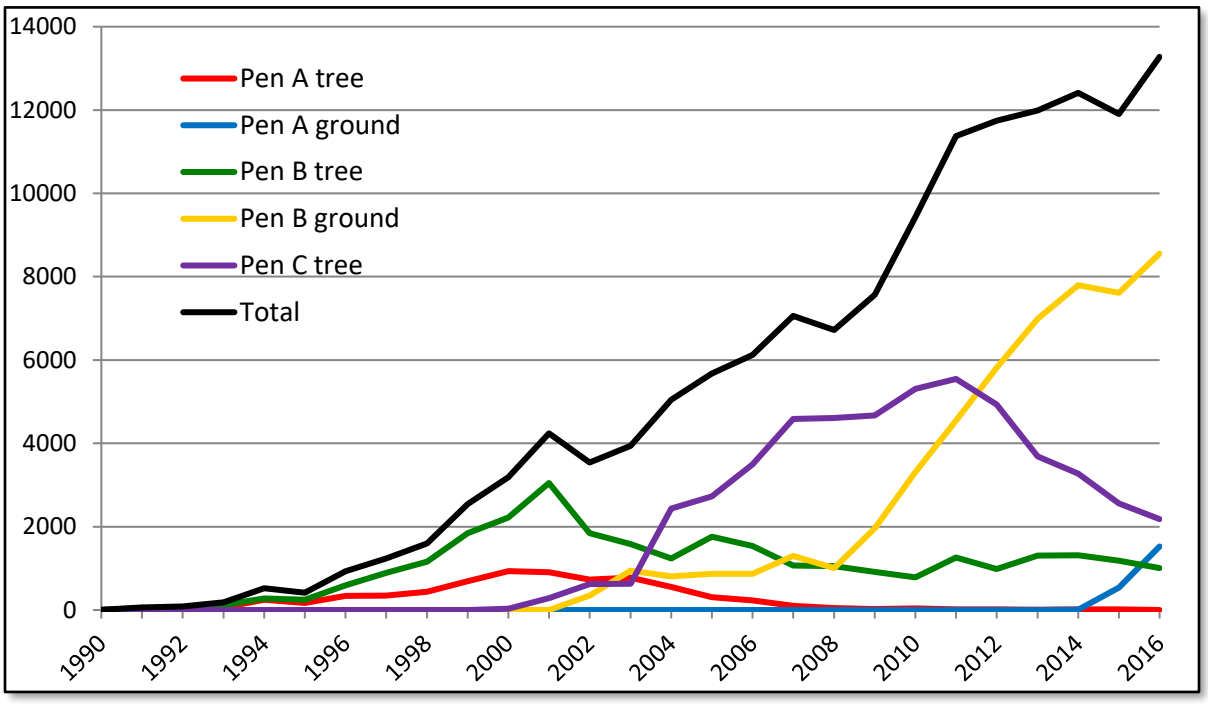

Figure 2.B. Double-crested Cormorant Nests at TTP by Location, 1990 - 2016

Black-crowned Night-Heron nests numbered 335, an increase of 73 percent from the previous year (Table 2.1). Most night-heron nesting occurred on Peninsula C and the back area of Embayment B where they appear to be selecting healthier nest trees than in their traditional nest areas that have been affected by cormorant nesting.

Caspian Tern nests on Peninsula B were counted using aerial photography. 56 nests were recorded, however, observations of the colony indicated that they had little nest success possibly due to interspecific competition from cormorants. Efforts were made in 2016 to improve Caspian Tern habitat by creating a nesting mound, though terns nested on the ground adjacent to the mound.

Table 2.1. Colonial Waterbird Nests at TTP, 2006 - 2016

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
DCCO	6,125	7,059	6,717	7,564	9,434	11,374	11,741	11,990	12,409	11,908	13,275
BCNH	504	730	455	546[a]	431	423	410	297	397	194	335
GREG	3	5	5	7	5	7	8	4	6	6	6
RBGU	35,000*	33,000*	30,000	30,000*	28,000*	32,000*	32,000*	35,000*	35,000*	35,000*	35,000*
HERG	NC	45	30	NC	<20*	NC	NC	NC	NC	NC	NC
COTE	NC	367	310	354	231	54	24*	0	179	176	42
CATE	0	0	0	0	0	0	5*	98	263	NC	56[a]

a - Nesting attempts failed
*- Estimate
NC – no count

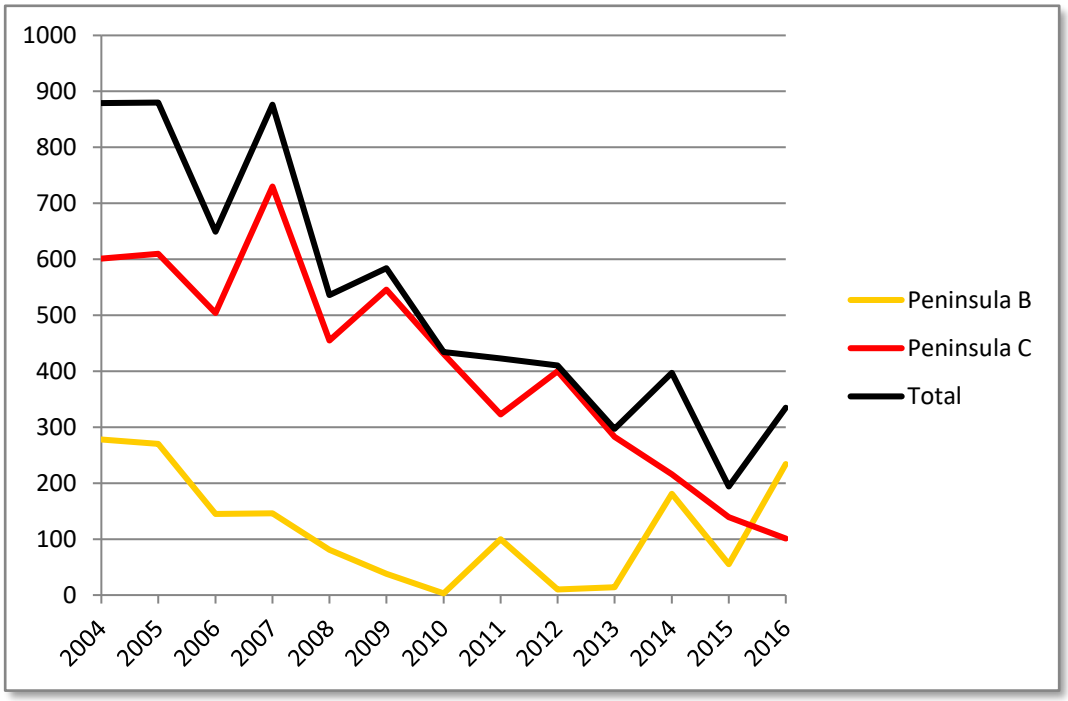

Figure 2.C. Black-crowned Night-Heron Nests at TTP by location, 2004-2016

Common Terns had a moderately successful season at TTP in 2016. Three nesting rafts, two in Embayment A and one in Embayment D plus the Cell 1 island were available for nesting, and a cormorant barrier was installed on the Embayment A rafts to prevent roosting activities that occurred in 2015. Common Tern nesting was only successful on the raft in Embayment D, with 142 recorded nests. Nest counts were conducted using aerial photography to reduce stress on the terns.

Gull population estimates were not undertaken in 2016, although anecdotal evidence suggests Ringed-billed Gull nests may be above the last official count in 2008 of 30,000 nests (Table 2.1). Ring-billed Gulls nested on Peninsulas A and B as in previous years, and on the Endikement for a third consecutive year. As per the Ring-billed Gull Management Plan the eggs laid on the Endikement were oiled to control the population. Herring Gulls nest among the Ring-billed Gulls in much lower numbers. TRCA does not undertake a Herring Gull census due to their low numbers and the involvement of the Canadian Wildlife Service in individual nest monitoring for containment research.

2.3.1 Canada Geese and Mute Swans

Canada Geese and Mute Swans regularly nest at TTP and are monitored and managed by TRCA. The Mute Swan is an introduced invasive species and all nests encountered are managed to eliminate reproduction. Canada Goose nests are also managed due to the high number of human-wildlife conflicts on the Toronto waterfront. Management includes the application of food grade mineral oil to eggs to eliminate or reduce reproduction. In 2015 there were a total of 23 Canada Goose nests and three Mute Swan nests at TTP.

3. Landbirds and Non-colonial Waterbirds

3.1 Project Background

Until 2005, comparatively little effort had been put toward TTP's nesting bird species other than the colonial waterbirds of the previous section. The project detailed in this section of the report was initiated in 2005 as a method of monitoring and documenting landbirds and non-colonial waterbirds for the site.

3.1.1 Rationale

The project is organized around monitoring of breeding landbird and non-colonial waterbird density and diversity in response to habitat succession and restoration. Regular surveys of breeding landbird and non-colonial waterbird species at TTP provide the following:

* Relative abundance data
* Detailed and accurate nest records
* A measurement of breeding bird abundance and diversity in relation to landscape level change
* Assessment of nesting success including parasitism and predation rates
* Data that can help steer habitat restoration work

This project is appropriate for TRCA because the labour and material cost is low, and the expertise is both readily available and able to provide monitoring of avian response to habitat restoration efforts. TRCA volunteers, with some staff support, have carried out the project annually in spring and summer since 2005.

3.1.2 Change in Data Reporting

Commencing with the 2016 Breeding Bird Report, project data will be presented on a rolling 10-year basis. (Data from earlier years, commencing with 2005, the first year of the project, are available in earlier annual reports.)

Red-winged Blackbird Nest With One Hatchling (M. Dupuis-Desormeau)

3.2 Methodology

Starting in 2005, a combination of variable circular plot (VCP) counts, nest searching and casual observations was employed from April – August each year (VCP counts restricted to June and July). Variable circular plot counts are the most recognized method for assessing breeding bird density and were employed for the Ontario Breeding Bird Atlas (OBBA). Nest searching and monitoring are also employed to provide valuable data on breeding success, nesting ecology and relative density of nesting attempts. Casual observations were recorded to augment the monitoring.

3.2.1 Variable Circular Plot (VCP) Protocol

The VCP counting method has been widely promoted by biologists over the more popular point count method, as it is much more applicable to analysis and has less bias. Nine station locations were initially set up based on the proportion of individual habitat types within the entire land area, and these locations have remained constant.

Between approximately June 15 and July 8, each of the nine stations is visited six times on a rotational schedule such that time of day is equally represented at all stations. All counts are conducted between 7:00 am and 10:00 am and last 5 minutes at each station. The protocol involves recording start time, finish time, date and visit number for each of the stations. Temperature, percentage cloud cover and wind speed are also recorded. Counts are completed on days with fair weather conditions such that visibility is high, wind speed is low to moderate (0-15 kph) and precipitation is absent. All birds detected are estimated to the following distance parameters: <10 m, 10-20 m, 20-30 m, 30-40 m, 40-50 m, 50-75 m, 75-100 m and >100 m. Any flyovers and any birds detected beyond 100 m are recorded in separate columns. The circumstances of each detection are also noted (e.g., observed, singing, territorial dispute, family group).

Station locations are distributed in the following manner: four in forest habitats, four in meadow communities (wet and dry) and a single station was placed in an extensive shrub thicket (termed "shrubland") which is bordered by forest. A summary of station information is presented below in Table 3.1. The location of each station is shown on Appendix A, an annotated map of Tommy Thompson Park.

Table 3.1. VCP Station Information

Station	UTM Zone	Easting	Northing	Location	Habitat Type
1	17	635198	4834430	Baselands	Wet Thicket
2	17	635206	4834217	Baselands	Forest
3	17	634930	4834149	Baselands	Dry Meadow
4	17	635300	4833940	Baselands	Dry Meadow
5	17	635101	4832683	Neck	Shrubland
6	17	634360	4832165	Peninsula D	Forest
7	17	634726	4831138	Flats	Wet Meadow
8	17	634220	4831453	Peninsula C	Forest
9	17	634215	4831680	Peninsula C	Forest

3.2.1.1 VCP Station Vegetation Protocol

The habitats at the study area are relatively young in age and may be altered or enhanced through TRCA's habitat restoration efforts, as well as natural succession. Changes in the habitats over time will also lead to changes in the bird communities and should be documented to help understand and interpret these data. Descriptions of the habitats for each of the VCP stations were initiated in 2010, repeated in 2013 and 2016, and should continue to be repeated every three years to help quantify changes in the vegetation communities.

In any year in which the vegetation analysis is completed, stations are surveyed once during the nesting season (June or July) to record the dominant habitat (meadow, thicket, deciduous forest, mixed forest, wetland, sand dune/sand barren, roads/trails and Lake Ontario/open water), as well as the dominant group of vegetation. Surveyors estimate major type of habitat by percentage via a field visit and orthophoto interpretation. Habitat types must sum to 100% per station. The dominant habitat types are sketched out from a bird's-eye perspective. Dominant groups of vegetation communities are estimated for each station, but do not necessarily need to sum to 100%, as vegetation that is sub-dominant or areas without vegetation are not included in this total.

3.2.2 Nest Searching and Monitoring Protocol

The nest searching survey method is valuable to bird conservation because it provides indicators of breeding success and parasitism/predation rates. As shown in Appendix C, the entire land area encompassing Tommy Thompson Park/Leslie Street Spit was divided into six survey zones (i.e., A – F). Participants are assigned zones to avoid overlap in data collection, and effort is recorded separately for each zone. Table 3.2 describes the primary habitat for each zone.

Table 3.2. Primary Habitat Type by Zone

Zone	Primary Habitat Type
A	forest, meadow
B	meadow, shrubland, forest
C	forest
D	meadow, shrubland, barrens (lakefill)
E	Meadow, barrens (lakefill)
F	meadow, forest

The zones (excluding colonial waterbird nesting areas) are searched carefully for evidence of nesting, focusing primarily on the woodland and shrubland edges favoured by species nesting at TTP. Once the nest of any landbird or non-colonial waterbird is discovered, the UTM co-ordinates are determined by GPS and recorded in field notebooks, along with a description of the nest and the habitat. Following discovery of a nest, and to the extent that time and personnel are available, the nest is monitored to determine the outcome, as well as any incidence of parasitism.

Commencing in 2012, a change in protocol was adopted with regard to ground-nesting birds. In order to avoid providing a trail which would lead predators to ground nests, project participants no longer actively seek such nests. As a result, only ground nests found accidentally are recorded, and no follow-up monitoring to determine nest outcome is conducted. Species affected by this change include American Woodcock, Belted Kingfisher, Eastern Meadowlark, Gadwall, Killdeer, Mallard, Savannah Sparrow, Song Sparrow and Spotted Sandpiper. These species represented 5.0% of nests found from 2006 to 2014, inclusive, and 2.1% of nests found in 2014, so there have never been many such nests found, and the change in protocol does not appear to have had a major impact on the number of such nests found, as they have always been notoriously difficult to locate.

While most nest records gathered are submitted to Project NestWatch at Bird Studies Canada, nests discovered after nesting is complete are typically not. Researchers are able to access Project NestWatch data via BSC's NatureCounts tool. Past Breeding Bird Reports are available at www.ttpbrs.ca.

3.3 Results

3.3.1 Variable Circle Plot Point Count Results

3.3.1.1 VCP Station Vegetation Survey

Table 3.3 below depicts the result of vegetation surveys conducted in 2010 and 2016 for each station. In addition, Appendix B contains a habitat sketch and photographs for each station in 2016. (The habitat sketches and photographs from 2010 can be found in the Breeding Bird Reports of 2010 – 2012, while the sketches and photographs from 2013 can be found in the reports of 2013 - 2015.)

As can be seen from Table 3.3, several changes in habitat have occurred over the past six years. This is not surprising, however, since most of TTP is intentionally left to naturally succeed on its own. Changes of note include:

Station 1: The wetland increase has resulted largely from the spread of phragmites.

Station 2: The meadow areas observed in 2010 have been completely overtaken by dogwood and willow.

Station 3: Some meadow has been replaced by thicket and forest.

Station 4: A portion of the meadow has been overtaken by phragmites, shrub willows and goldenrod.

Station 5: The area along the shoreline has been largely rebuilt, resulting in less shoreline and water, and more reeds. The dogwood and forest have also increased significantly.

Station 6: The sand barren has been overgrown by the vegetation.

Station 7: The increase in non-vegetation area reflects significant lake-filling in the last two years.

Station 9: Station 9 is located within the cormorant colony, and the effect of the nesting behaviours from these birds has been the loss of many trees and other vegetation.

Table 3.3. 2010 - 2016 VCP Station Vegetation Analysis

2010 OBSERVATIONS									
	VCP Station								
	1	2	3	4	5	6	7	8	9
% of Major Habitats Within 100 m Radius of Each VCP Station									
Meadow (tree cover ≤ 25%; shrub cover ≤ 25%)	55	40	70	95	10		85	5	5
Thicket (tree cover ≤ 25%; shrub cover ≥ 25%)	15	20	20		65	20		20	20
Deciduous Forest (tree cover ≥ 60%)	25	40	5		10	50		65	60
Mixed Forest (tree cover ≥ 60%; conifers ≥ 25%)									
Wetland (permanently saturated; water ≤ 2 m)	5								
Vegetation Sub-total (see detail below)	100	100	95	95	85	70	85	90	85
Sand Dune/Sand Barren (incl active shorelines)						5			
Roads/Trails			5	5	5		10		
Lake Ontario Shoreline (open water)					10	25	5	10	15
Non-vegetation Sub-total			5	5	15	30	15	10	15
Total of All Habitats	100	100	100	100	100	100	100	100	100
Dominant Vegetation Within 100 m of Each VCP Station									
Poplars (e.g., Eastern Cottonwood)	20	35	5	5	10	40	5	55	45
Dogwoods (e.g., Red-osier Dogwood)	10	15	10		20	15		5	15
Honeysuckles						10			
Shrub Willows	10	5	5	5	30	5	5	5	
Grasses and Sedges	55	40	65	60	15		45	20	10
Goldenrods and Asters		5	10	20	10		20		5
Reeds (e.g., Cattails, Bulrushes)	5			5				5	
Miscellaneous Herbs (e.g., Vetch, Nettles, etc.)							10		10
Vegetation Sub-total	100	100	95	95	85	70	80	90	85
2016 OBSERVATIONS									
	VCP Station								
	1	2	3	4	5	6	7	8	9
% of Major Habitats Within 100 m Radius of Each VCP Station									
Meadow (tree cover ≤ 25%; shrub cover ≤ 25%)	52		59	85	6	3	78	6	12
Thicket (tree cover ≤ 25%; shrub cover ≥ 25%)	7	59	23	1	66	23		14	21
Deciduous Forest (tree cover ≥ 60%)	20	41	10		18	51		70	19
Dead Deciduous Forest									30
Mixed Forest (tree cover ≥ 60%; conifers ≥ 25%)									
Wetland (permanently saturated; water ≤ 2 m)	18			8	5		2		
Vegetation Sub-total (see detail below)	95	100	92	94	95	77	80	90	82
Sand Dune/Sand Barren (incl active shorelines)								2	3
Roads, Trails and other man-made areas	3		7	6	3		20		
Lake Ontario Shoreline (open water)			1		2	23		8	15
Non-vegetation Sub-total	5		8	6	5	23	20	10	18
Total of All Habitats	100	100	100	100	100	100	100	100	100
Dominant Vegetation Within 100 m of Each VCP Station									
Poplars (e.g., Eastern Cottonwood)	25	35	5	5	15	40	5	60	30
Dogwoods (e.g., Red-osier Dogwood)	15	40	15		50	15		5	20
Honeysuckles						12			
Shrub Willows		5	5	5	20	5	5	5	
Grasses and Sedges	35	20	35	45	5	5	40	15	10
Goldenrods and Asters			5	30			10		5
Reeds (e.g., Cattails, Bulrushes, Phragmites)	20			8	5		5	5	
Miscellaneous Herbs (e.g., Vetch, Nettles, etc.)			27	1			15		17
Vegetation Sub-total	95	100	92	94	95	77	80	90	82

While some VCP locations have not seen a major change in vegetation over the course of the project, others have demonstrated significant change. The following photographs demonstrate one station (4) which is an example of the former and two stations (2 and 9) which are examples of the latter.

The south view at Station 4 (dry meadow) has seen little change over the life of the project other than changes in the make-up of the ground cover.



2010 2013 2016

Station 2 (forest – north view) exhibits little change between 2010 and 2013, but very noticeable additional shrub growth between 2013 and 2016.



2010 2013 2016

Station 9 (forest – north view) is located within the Double-crested Cormorant colony, and the effect of the birds' excrement on both the trees and the ground-level vegetation can be seen from 2010 to 2013 to 2016.



2010 2013 2016

3.3.1.2 VCP Observations

Analysis of VCP count data presented here is a basic summation of results. More sophisticated analysis will require the use of software such as DISTANCE (a software package that allows users to estimate the size or density of biological populations).

Table 3.4. VCP Species Lists and Total Birds Detected by Species Within 100 Metres

Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG
ALFL					1						0
AMGO	15	10	8	22	35	8	14	19	7	37	18
AMRO	25	31	26	34	41	40	22	15	25	23	28
AMWO			1				1				0
BANS	104	2	5	4	14	35	7	22	4	106	30
BAEA							*				0
BAOR	29	22	23	13	28	22	26	21	25	15	22
BARS	31	3	11	8	32	31	22	15	55	48	26
BCCH	1	3	2	4	3	1	3		5	7	3
BEKI			2	1				1			0
BGGN	3	2	8					3	2	3	2
BHCO	22	11	19	19	10	17	12	5	3	6	12
BLJA		3	1	1		1					1
BLPW			1								0
BOBO	3										0
BRTH	4						1	3	1		1
CANG				*				*			0
CEDW	12	11	39	19	31	47	17	16	12	18	22
CHSW	*	2	*		2		3	2	2		1
COGR	12	11	9	17	23	8	12	5	17	5	12
COHA									1		0
COYE	2	1		2	2			4			1
DOWO					2	1	1	1			1
EAKI	18	25	12	20	18	12	7	2	9	3	13
EAME	2	5									1
EAWP	1	1	3	1	8	6	8	6	9	7	5
EUST	21	35	116	41	52	39	8	44	9	46	41
FISP	3										0
GADW		3	*	1	16		*	2			2
GCFL	2		3							1	1
GRCA	24	19	17	38	16	21	16	21	12	18	20
HOFI	*				1						0
HOSP		2									0
HOWR							2	1		1	0
KILL	1	7	8	3		2	5	4	5	2	4
LEFL	17	6	7	11	11	8	10	4	5	1	8
MALL		*	4			*	*	2			1
MAWA			1								0
MODO	6	1		*			3			1	1
NOCA	3		4	3	1	2	5	3	3	10	3
NOFL	1	1	2		2						1
NOMO				*				1	1		0
NRWS	22	7	8	5	14	*	4	*	9	10	8
ORORR						1	1	1		2	1
RBNU										1	0
REVI								1			0
ROPI	*	*									0
RWBL	154	203	312	199	244	295	265	276	247	192	239
SAVS	2		1							1	0
SOSP	72	68	81	55	46	50	66	47	51	59	60
SPSA	7	9	6	3	4	2	1	5	7	2	5
TEWA										1	0
TRES	8	15	9	16	24	11	25	30	52	41	23
TRFL		1		1				2			0
VEER	1										0
WAVI	31	22	41	30	39	50	53	46	32	46	39
WIFL	27	17	26	14	25	16	17	20	18	16	20
YEWA	118	109	134	100	168	136	146	166	155	169	140
Birds	**804**	**668**	**950**	**685**	**913**	**862**	**783**	816	783	898	816
Species	**38**	**35**	**37**	**32**	**30**	**28**	**34**	37	29	32	33

* Species observed beyond 100 metres and/or flying over

Species recording a new high VCP count for the last ten years, or matching the previous high, were American Goldfinch, Bank Swallow, Black-capped Chickadee, Northern Cardinal and Yellow Warbler.

Prior to 2015, swallows were recorded differently by different project participants during the VCP counts, with the result that swallow numbers in Table 3.4 are somewhat understated for the years 2006 – 2014.

A summary of abundance per species detected by VCP counts (<100 meters) is presented in Table 3.4. Some of the unusually high numbers (e.g., 116 EUST in 2009, 104 BANS, 31 BARS and 22 NRWS in 2007, 92 EUST in 2006, 106 BANS in 2016) are attributable to one or a few large flocks recorded in one or more of the visits.

As shown in Table 3.4, a total of 32 species was detected for all counts in 2016, including two new species for VCP counts, viz., Red-breasted Nuthatch and Tennessee Warbler. The total of 32 species is close to the ten-year average of 33.

Although the number of Brown-headed Cowbirds observed was more than in the preceding two years, it remains much lower than the numbers observed in earlier years of the project. Points worth noting include: (i) American Goldfinch VCP numbers were the highest of the past ten years, after having been the lowest of the past ten years in 2015; (ii) the high Bank Swallow count included a flock of 75 birds; (iii) Baltimore Oriole VCP numbers were below average, but the number of nests was above average (Table 3.5); (iv) Barn Swallow VCP numbers have increased significantly over the past few years as the number of nests has increased, as would be expected; (v) Cedar Waxwing and Gray Catbird VCP numbers did not increase in line with the significant increase in nests; (vi) the high European Starling VCP number included three large flocks; (vii) Red-winged Blackbird VCP sightings decreased along with the number of nests; and (viii) Yellow Warbler VCP numbers were largely in line with recent years, while the number of nests increased significantly. What these points indicate is that the number of birds recorded each year on VCP counts for many of the species is largely a matter of chance. (Note that the sequence of stations visited is intentionally different for each of the six VCP counts, so that the possibility of observing, or not observing, certain species at certain times is minimized.)

As can be seen in Figure 3.A, two VCP stations experienced total bird abundance in 2016 that was much higher than the 10-year average, viz., Stations 4 (dry meadow) and 7 (wet meadow). The other stations were all within 10% of the 10-year average for the station. Total abundance for all stations in 2016 (898 birds) was noticeably higher than the 10-year average (820 birds).

Stations 8 (forest) and 9 (forest) consistently reflect the lowest bird abundance of the nine stations. While the habitat for both stations is described as forest, they exhibit very different characteristics. The trees around Station 8 are quite mature and dense, and now house a portion of the Black-crowned Night-Heron colony. Station 9 is surrounded by the Double-crested Cormorant colony, with the excretions from the birds having largely defoliated the trees and other vegetation, resulting in very limited biodiversity. See Appendix A for station locations,

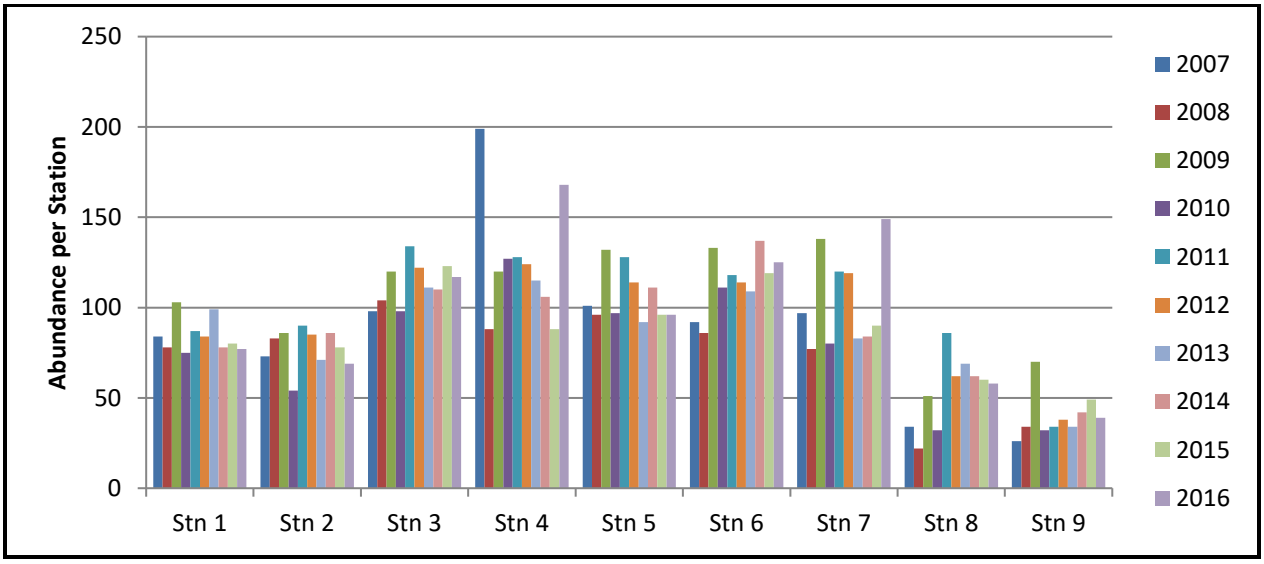

Figure 3.A. Total Bird Abundance per VCP Station

Species richness, or diversity, is shown in Figure 3.B. In 2016, Station 8 (forest) experienced a spike in species diversity, similar to 2007 and 2011. Station 1 (wet thicket) was significantly below the 10-year average and continued a downward trend in diversity for that station which started in 2013, perhaps reflecting the increasing density of the willow thicket surrounding that station. Stations 3 (dry meadow) and 7 (wet meadow) experienced bird diversity down by about 15% from their 10-year averages. The remaining stations experienced species richness within 10% of their 10-year averages.

As with bird abundance, species diversity at Stations 8 and 9 suffers in comparison to the other stations due to the dense vegetation and Black-crowned Night-Herons at Station 8 and the lack of biodiversity caused by the Double-crested Cormorants at Station 9.

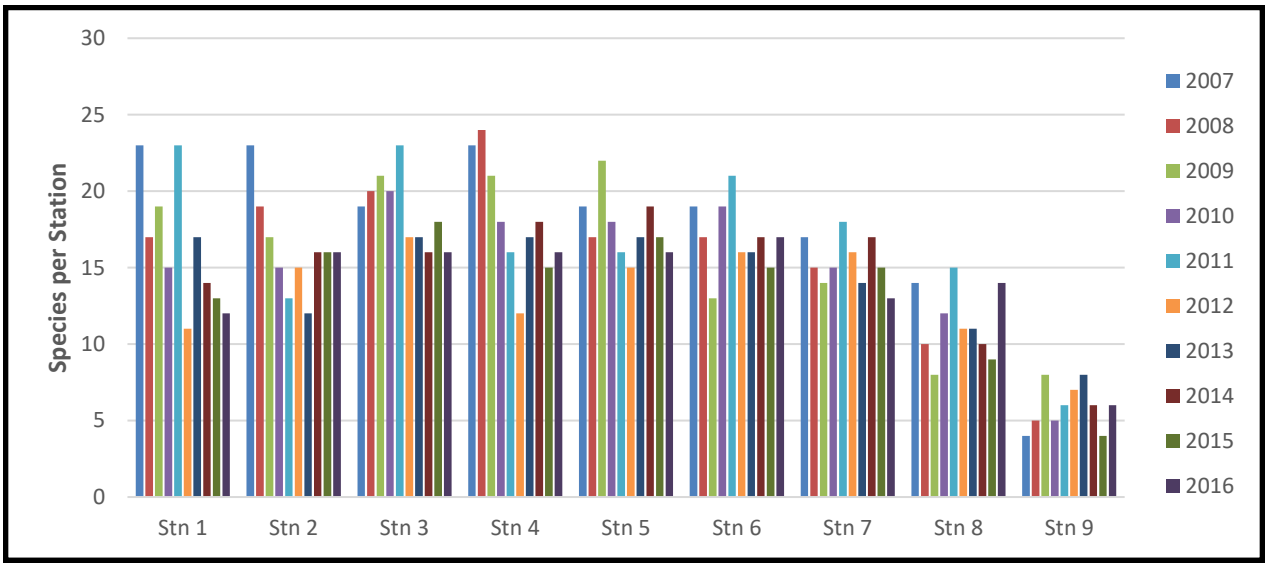

Figure 3.B. Species Richness per VCP Station

3.3.2 Nest Searching and Monitoring Results

In 2016, seven volunteers contributed a total of 618 hours to the project. This is 14% (or 76 hours) greater than the previous highest level of participation, and the effort expended undoubtedly contributed significantly to the number of nests found being 10% (or 92 nests) more than the previous high. Figure 3.C shows the breakdown of effort per zone. The higher number of hours expended in Zone C in 2016 is the result of additional volunteer staff and a greater number of nests to monitor. Zone D continues to experience the fewest number of nests, due to lack of suitable habitat and the ongoing lakefilling activities, so that limited monitoring time is required in that zone.

See Appendix C for a map of the TTP breeding bird survey zones.

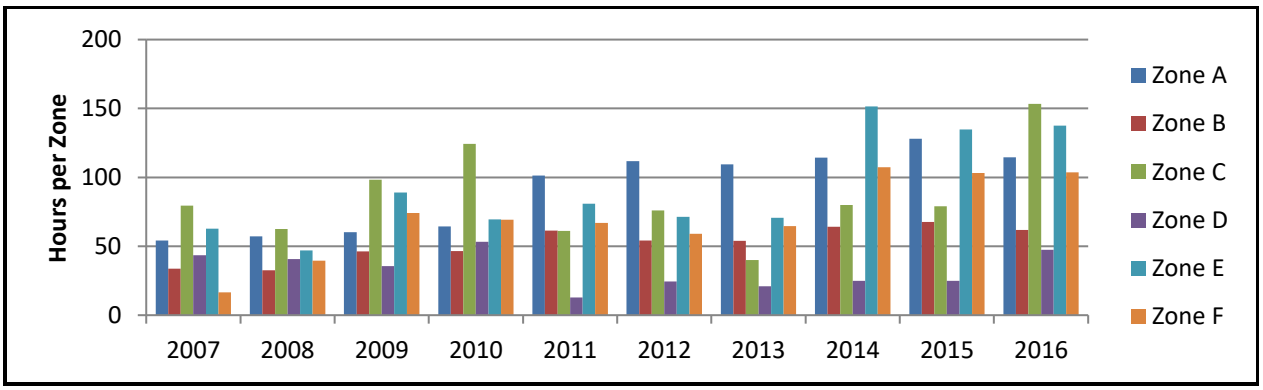

Figure 3.C. Nest Searching Effort per Zone from 2007 to 2016 (hours)

The use of standard nest searching data forms, along with greater nest searching and monitoring effort, combined with experience gained in previous years, have proved to be very successful in increasing the number of nests found in the most recent years of the project. In 2016, a total of 1,018 nests was discovered, 92 nests higher than the previous high, and 702 of these nests were monitored (see Tables 3.5 and 3.6), excluding ground nests. Excluding the seven colonial waterbird species, Canada Goose and Mute Swan, nests of 30 species were found in 2016, including Brown-headed Cowbird. When the seven confirmed colonial waterbird nesters (i.e., Black-crowned Night-Heron, Caspian Tern, Common Tern, Double-crested Cormorant, Great Egret, Herring Gull and Ring-billed Gull), as well as Canada Goose and Mute Swan, are added, the total becomes 39 species nesting at TTP in 2016.

Table 3.5. Total Nests by Species from 2007 to 2016

Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG
AMGO	19	25	44	33	23	13	17	18	16	23	23
AMRO	26	51	93	69	115	93	93	89	78	113	82
AMWO				3	1	1			1		1
BANS			4	2	1					15	2
BAOR	12	9	9	10	17	16	15	35	17	18	16
BARS	5	3	3	2	4	11	26	31	24	29	14
BBCU								1		1	-
BCCH		1	2			1	2	1		2	1
BEKI	1	2						1			26
BGGN	1	1	3			2	4	6	7	6	3
BRTH	1	3	4	2		2	1	2	2		2
CANV								1			-
CEDW	7	14	40	14	21	23	19	37	40	49	26
COGR	2	1		4	4	2	3	2	5	5	3
DOWO	1			1	1	1	1		1	2	1
EAKI	17	26	22	14	12	27	21	20	27	24	21
EAME				1							-
EAWP	1			1	1	1		1			1
EUST	2	5	7	12	4	5	8	4	5	3	6
GADW	4	3	3	1	3	4	1	2	1	1	2
GRCA	9	11	23	11	16	21	24	34	30	46	23
HOFI	1										-
HOSP											-
HOWR		2	2	2	1						1
KILL	2	5	8	13	2	4	3	4	3	4	5
LEFL	2		3	1				3	2		1
MALL	7	9	12	12	6	9	8	5	5	8	8
MODO	4		3			1				1	1
NOCA	6	2	4	1		1	1	3	2	4	2
NOFL		1		3	3			1		1	1
NRWS	1		2		1			1	2		1
OROR	2	1		2	1	2	3	2	1	2	2
RWBL	58	82	130	167	232	268	310	361	404	356	237
SOSP	5	1	7	8	2	3	2	8	10	7	5
SPSA	6	3	5	8	4	5	6	3	6	3	5
TRES	6	9	9	9	5	5	12	13	20	20	11
TRUS								1	1	1	-
WAVI	4	7	7	9	15	12	13	31	12	18	13
WIFL	21	15	25	15	12	14	13	18	15	19	17
YEWA	71	71	75	82	88	86	127	164	189	237	119
Total	**304**	**363**	**549**	**512**	**595**	**633**	**733**	**903**	**926**	**1,018**	**654**
Total Effort (hours)	**289**	**280**	**404**	**427**	**385**	**397**	**360**	**542**	**538**	**618**	**424**
Efficiency (nests/hour)	**1.05**	**1.3**	**1.36**	**1.2**	**1.54**	**1.59**	**2.04**	**1.67**	**1.72**	**1.65**	**1.70**

Note: A Trumpeter Swan nest was observed in 2014, but not included in the 2014 report. As another nest was observed in 2015 and reported to ONRS, it was decided to include the unreported 2014 nest in subsequent reports for completeness.

The 1,018 total nests located in 2016 represent an increase of 10% over the previous high in 2014 and a remarkable 71% increase over the last five years (from 595 in 2011 to 1,018 in 2016). This continued annual increase naturally raises the question as to why the project has seen such increases. The spread and maturation of appropriate breeding habitat in some areas, particularly dogwood and honeysuckle, have certainly contributed to the increase, but examination of nest locations over the years (see Appendix F in this and prior years' reports) shows that the additional nests are largely scattered throughout TTP, rather than being concentrated in one or two locations. The increase can further be explained by: (a) the ever-increasing nest-searching skills in the project participants; (b) the availability of significantly more volunteer time (the hours in 2016 being 14% higher than the previous high); and (c) the previous discovery of areas rich in nests that had not been explored until recent years due to high water conditions in the Spring.

New highs for the number of nests were established for the most recent ten years of the project for Bank Swallow (up 375% from the previous high [as a result of locating an extensive colony]), Cedar Waxwing (up 23%), Downy Woodpecker (up 100% [from one nest to two]), Gray Catbird (up 35%), and Yellow Warbler (up 25%). Other species matching previous highs were Common Grackle, Tree Swallow and Trumpeter Swan. Unexpectedly, the number of Red-winged Blackbird nests declined for the first time in the project. No explanation for this decrease is evident, and it will be interesting to see what happens in future years. Red-winged Blackbirds and Yellow Warblers, the most prolific non-waterbird nesters, are the species which are particularly taking advantage of the increasing number and densification of dogwood, honeysuckle and reeds.

The number of Barn Swallow nests rebounded somewhat from the decrease in 2015. The dramatic increase in Barn Swallow nests in the past five years (from four in 2011 to 29 in 2016), is undoubtedly attributable to the nesting sites created by the new buildings erected by TRCA, and this growth in nests is significant and encouraging since this species is a provincially-listed Species at Risk.

Single nests were confirmed for Black-billed Cuckoo, Gadwall, Mourning Dove, Northern Flicker and Trumpeter Swan, species which are relatively rare at TTP and/or whose nests can be difficult to locate.

Male Northern Flicker at Nest in Birch Tree (P. Robillard)

Nest-searching efficiency figures (Table 3.5) can be misleading, as they are highly dependent on an area's vegetation (e.g., forest versus shrubland), the species found in the dominant habitat (e.g., shrub nesters versus high tree nesters) and the time spent on monitoring as opposed to finding nests. The efficiency realized in 2016 continues the improved experience of the last few years and points to the ability of the project participants to make effective use of their time in the field.

3.3.2.1 Nest Productivity

A total of 702 nests was recorded online with the Ontario Nest Record Scheme (ONRS) in 2016 (Table 3.6). In terms of nest productivity, 103 (i.e., 21%) of 491 nests with known outcomes failed, while 388 were successful in fledging young. The remaining 211 monitored nests had unknown outcomes, with the 2016 ratio of unknown

outcomes to nests monitored (i.e., 30%) being the lowest of the past ten years. That is, 2016 was particularly successful in being able to determine nest outcomes. (The nests with unknown outcomes included all ground nests from Gadwall, Killdeer, Mallard, Song Sparrow and Spotted Sandpiper, which, commencing in 2012, were not monitored once found.)

As can be seen in Table 3.6, the 2016 nest failure rate of 21% is the lowest of the last ten years. Nest predation continues to be the most common cause of nest failure. Possible predators at TTP include raccoons, gartersnakes, mink and coyotes, as well as other bird species. Of the 103 failures, 26 occurred at the egg stage, 9 at young stage and 68 at either egg or young stage.

Table 3.6. Nest Productivity from 2007 to 2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG
Nests discovered	304	363	549	512	593	633	733	903	926	1,018	653
Species	30	27	27	34	27	28	25	32	28	30	29
Nests monitored & reported to ONRS	236	297	456	440	430	464	549	690	657	702	492
- Unknown outcome	160	148	170	213	155	213	266	232	226	211	199
- Known outcome	144	149	286	227	275	251	283	458	431	491	300
- Successful	77	97	162	144	177	171	186	338	323	388	206
- Failed	67	52	124	83	98	80	97	120	108	103	93
- **Failure rate**	**47%**	**35%**	**43%**	**37%**	**36%**	**32%**	**34%**	**26%**	**25%**	**21%**	**31%**

Northern Cardinal Nest (P. Robillard)

Figure 3.D demonstrates how the known nest failure rate has been trending down. One can speculate on the reasons for this, but confirming them is beyond the scope of the current project.

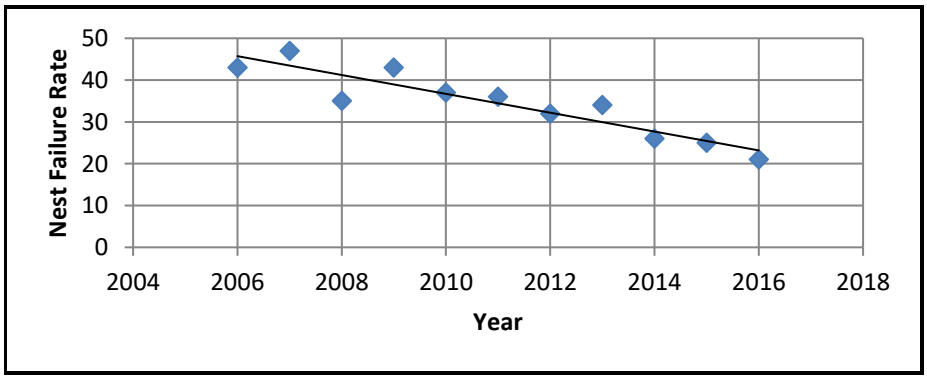

Figure 3.D Known Nest Failure Rate Trend

As can be seen in Table 3.7, the 39 confirmed breeders in 2016 matched the ten-year average, while the 70 total species detected during all surveys was slightly below the 10-year average. The sharp increase in total species observed in 2012 was an anomaly resulting from an unusual number of late migrants being observed.

Table 3.7. Summary of Species Detected Through All Studies

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG
Confirmed Breeding Species	43	34	37	40	36	40	40	44	39	39	39
Probable Breeding Species	7	9	11	2	4	3	5	5	3	4	5
Possible Breeding Species	10	15	14	8	3	6	4	8	14	11	9
Other Species Observed	13	16	20	17	21	36	22	12	17	16	19
Total Species	**73**	**74**	**82**	**67**	**64**	**85**	**71**	**69**	**73**	**70**	**73**

Looking at the past ten years of data, some conclusions and trends continue to emerge. As noted previously, Bobolink, Eastern Meadowlark and Savannah Sparrow have virtually disappeared from both the VCP counts and confirmed nests, although there has actually never been a confirmed Bobolink nest at TTP. Herbaceous vegetation at TTP is becoming denser, which may be having an adverse effect on nesting suitability for such species. At the same time, the spread of dogwood, honeysuckle and reeds, as well as tree planting by TRCA, has created more nesting opportunities for species such as Red-winged Blackbirds, American Robins and Yellow Warblers. More study is required.

3.3.2.2 Parasitism by Brown-headed Cowbirds

Brown-headed Cowbird parasitism is a major issue for small landbird populations in more open habitats and forest fragments. In 2016, a total of 56 nests of four species were parasitized by Brown-headed Cowbirds (Table 3.8). (For purposes of this report, a nest was considered parasitized if a cowbird egg was observed, regardless of what happened to that egg.) The parasitism rates in Table 3.8 were calculated as the ratio of parasitized nests to the total parasitized and non-parasitized nests. (Note that nests of parasitized species were not included in this table unless evidence of parasitism, or lack thereof, could be confirmed.)

In order to deal with an unwanted cowbird egg, some birds will eject a cowbird egg from the nest or build over top of it and the Yellow Warbler nest in the accompanying photograph provides an example of the latter. According to the Atlas of Breeding Birds of Ontario (p. 370), Yellow Warblers frequently abandon a nest with a cowbird egg or build a second storey; Harrison (p. 183) cites an example of a Yellow Warbler nest with six storeys, each containing a cowbird egg.

In the case of the nest in the photograph, the warblers have rebuilt their nest twice over the original nest in order to bury cowbird eggs. When the nest was dissected after the breeding season, an apparent cowbird egg was found on the lowest level, and another cowbird egg was found on the second level. This nest was approximately 23 cm (9 inches) in height, as opposed to the normal 5 – 13 cm (2 – 5 inches). In the end, the warblers' persistence paid off, as the top (third) level supported a successful Yellow Warbler nest.

Triple Level Yellow Warbler Nest (P. Xamin)

The overall rate of parasitism in 2016 of 17% represented the first increase in parasitism since 2012. The two species with the most parasitized nests, Red-winged Blackbirds and Yellow warblers, both experienced an increase in parasitism after two successive years of decreasing parasitism.

Yellow Warblers continue to be the most heavily parasitized species by Brown-headed Cowbirds over the past ten years at an average rate of 28% per year of observable nests, followed by Red-winged Blackbirds at 23% average per year (see Table 3.8).

Table 3.8. **Brown-headed Cowbird Parasitism Data and Rates from 2007 to 2016**.

	Brown-headed Cowbird Parasitism								
		American Goldfinch	American Robin	Gray Catbird	Red-winged Blackbird	Song Sparrow	Willow Flycatcher	Yellow Warbler	Totals
2007	Total nests *	8	0	9	38	5	17	56	134
	Nests parasitized	2	3	0	8	0	4	29	43
	% parasitized	**25%**	**0%**	**0%**	**22%**	**0%**	**24%**	**52%**	**32%**
2008	Total nests *	15	28	11	45	0	15	51	165
	Nests parasitized	1	1	0	18	0	4	21	45
	% parasitized	**7%**	**4%**	**0%**	**40%**	**0%**	**27%**	**41%**	**27%**
2009	Total nests *	21	44	23	112	4	24	68	296
	Nests parasitized	5	0	0	32	2	4	34	77
	% parasitized	**24%**	**0%**	**0%**	**29%**	**50%**	**17%**	**50%**	**26%**
2010	Total nests *	19	28	11	110	4	11	66	249
	Nests parasitized	0	0	0	27	1	2	21	51
	% parasitized	**0%**	**0%**	**0%**	**25%**	**25%**	**18%**	**32%**	**20%**
2011	Total nests *	13	26	16	81	2	11	36	185
	Nests parasitized	2	0	0	18	0	0	10	30
	% parasitized	**15%**	**0%**	**0%**	**22%**	**0%**	**0%**	**29%**	**16%**
2012	Total nests *	8	17	19	77	2	8	33	164
	Nests parasitized	0	0	0	30	0	2	7	39
	% parasitized	**0%**	**0%**	**0%**	**39%**	**0%**	**25%**	**21%**	**24%**
2013	Total nests *	9	26	20	145	2	11	75	288
	Nests parasitized	1	1	0	33	0	1	22	58
	% parasitized	**11%**	**4%**	**0%**	**23%**	**0%**	**9%**	**29%**	**20%**
2014	Total nests *	10	27	27	134	6	13	96	313
	Nests parasitized	0	0	0	22	0	2	11	35
	% parasitized	**0%**	**0%**	**0%**	**16%**	**0%**	**15%**	**12%**	**11%**
2015	Total nests *	5	18	21	181	7	7	82	321
	Nests parasitized	0	0	1	27	1	0	8	37
	% parasitized	**0%**	**0%**	**5%**	**15%**	**14%**	**0%**	**10%**	**12%**
2016	Total nests *	7	38	18	133	3	12	123	334
	Nests parasitized	0	0	1	26	0	1	28	56
	% parasitized	0%	0%	6%	20%	0%	8%	23%	17%
AVG	Avg total nests *	11.5	25.2	17.5	105.6	3.5	12.9	68.6	244.8
	Avg parasitized	1.1	0.5	0.2	24.1	0.4	2	19.1	47.4
	% parasitized	**9.6%**	**2.0%**	**1.1%**	**22.8%**	**11.4%**	**15.5%**	**27.8%**	**19.4%**

* Total nests includes only those nests where parasitism could be observed and/or monitored; therefore not all nests on site are included in this total

While the overall parasitism rate in 2016 increased slightly from the past two years, the ten-year trend continued to decrease, as demonstrated in Figure 3.E. The number of cowbirds observed in the VCP counts also increased slightly in 2016 over the number recorded in the past two years, but still remained below that observed in the years of the project prior to 2014. As mentioned in earlier reports, possible explanations for this downward trend include (i) a reduction in the cowbirds' preferred foraging habitat at TTP due to the increase in tall herbaceous vegetation, and (ii) an overall decline in cowbird populations in Ontario, with the exception of the Carolinian region, as noted in the Atlas of the Breeding Birds of Ontario, 2001-2005 (p. 602).

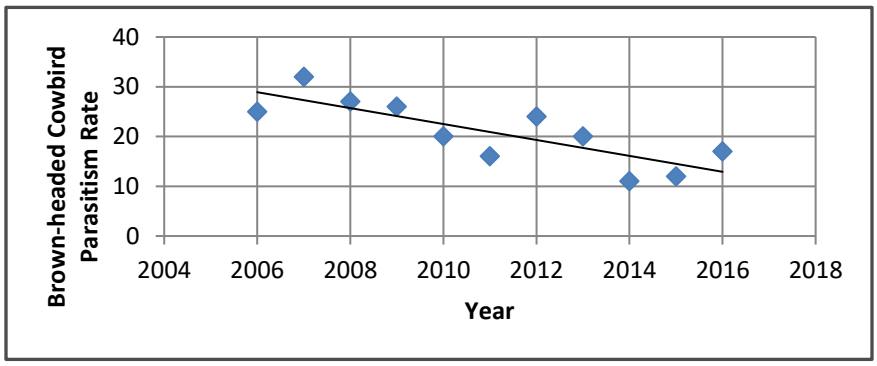

Figure 3.E Brown-headed Cowbird Parasitism Rate Trend

3.3.2.3 Landbird Density and Colonies at TTP

Section 2 of this report describes TTP experience with colonial waterbirds. Harrison points out that some landbirds also nest in colonies, including Bank Swalllow (p. 130), Cedar Waxwing (p. 166), Red-winged Blackbird (p. 214) and Yellow Warbler (p. 183), all species found at TTP. Unfortunately, there is no definition of how close a species' nests must be to form a colony, but there was certainly evidence in 2016 to support the existence of colonies of these species at TTP.

Bank Swallow: Bank Swallows nest in burrows in dense colonies in banks, as their name suggests. In 2015, such a colony was discovered at TTP after the breeding season. At that time, up to 100 burrows were counted in the bank. By spring of 2016, part of the bank had been destroyed and about half of the burrows had been lost. Nevertheless, nesting was confirmed in at least 15 burrows, although more may have been in use as well.

Cedar Waxwing: The Atlas of the Breeding Birds of Ontario, 2001 - 2005 (p. 338) points out that Cedar Waxwings may guard a small area around the nest initially, but that they do not defend a true territory. This results in occasional colonial nestings (Harrison P. 166). Harrison cites two examples of such colonies: 17 nests within a radius of 137.2 m. and 11 nests within a radius of 7.6 m. While Cedar Waxwing colonies at TTP in 2016 did not match these densities, two examples did exist of clusters of nine nests and seven nests, each cluster being contained within a radius of 137 m.

Red-winged Blackbird: A number of colonies of Red-winged Blackbirds existed at TTP in 2016, with the largest example being an unbroken line of 58 nests along a 400 m stretch of the shore of Embayment D, an average of seven metres between nests. Other examples included clusters of 17, 14, 12 and 11 nests, each cluster being within a radius of 50 m. All of these colonies were found in reed beds.

As indicated in The Atlas of the Breeding Birds of Ontario, 2001 - 2005 (p. 468), 92% of southern Ontario contained a maximum density of approximately one breeding pair of Red-winged Blackbirds per hectare. Such a density applied to TTP's 500 hectares would produce 500 nests, whereas the last three years of the TTP project have found 356 – 404 Red-winged Blackbird nests. While less than what the maximum density would produce, the TTP experience is clearly in the higher density range of southern Ontario. It would not be unreasonable to claim that the whole of TTP represents one large colony of Red-winged Blackbirds (see map of 2016 Red-winged Blackbird nest locations in Appendix F).

Yellow Warbler: Harrison (p. 183) estimates a Yellow Warbler territory to be as small as 0.16 hectare, which equates to a radius of about 22.5 m. One example of a 2016 colony at TTP had ten Yellow Warbler nests within a radius of 50 m, which equates to an average territory of 0.08 hectare, half the size of the smallest size estimated by Harrison. Other clusters of nine, seven and five nests were also found within a radius of 50 m.

As indicated in The Atlas of the Breeding Birds of Ontario, 2001 - 2005 (p. 371), approximately 75% of southern Ontario contained a maximum density of approximately one breeding pair of Yellow Warblers per 10 hectares. In 2016, TTP experienced approximately one breeding pair per five hectares, i.e., at least twice the density found in the majority of southern Ontario. As with the Red-winged Blackbirds, a case can be made for suggesting that the whole of TTP represents a single colony of Yellow Warblers (see map of 2016 Yellow Warbler nest locations in Appendix F).

3.4 The Overall Picture in 2016

The most valuable aspect of this project will be its ability to reveal changes in breeding bird abundance and diversity over time at the VCP station, habitat and total area level. Breeding avifauna will respond to changes in habitat distribution, composition and structure due to natural succession and habitat creation. At present, the breeding bird communities (i.e., non-colonial waterbirds and landbirds) are typical of early successional environments. Dominant species in the past ten years of VCP counts include Red-winged Blackbird, Yellow Warbler, Song Sparrow, European Starling and Warbling Vireo, all of which require basic habitat conditions with a few fundamental components to thrive.

Although there were no new breeding species found in 2016, there have been 44 nesters confirmed since the current project commenced. This total includes the 40 species listed in Table 3.5, plus Brown-headed Cowbird, Wood Duck (nesting confirmed in 2012 and 2015 by the presence of recently-hatched young), Canada Goose and Mute Swan, with the latter two species not being monitored as part of the project. In addition, the seven colonial waterbirds described in Section 2 of this report have also been confirmed as nesters: Black-crowned Night-Heron, Caspian Tern, Common Tern, Double-crested Cormorant, Great Egret, Herring Gull and Ring-billed Gull.

When all species and historical records are included, there are now 69 species confirmed to have bred at Tommy Thompson Park. Some rare and isolated breeding records are unlikely to recur with any regularity, if at all, (e.g., Wilson's Phalarope). A complete historical breeding bird species list is presented in Appendix D, Species Accounts.

Current habitat conditions remain appropriate for nesting by some additional species, so it is anticipated that the list of known breeding species may well grow in the future. Natural change, along with the habitat creation and restoration projects carried out by TRCA throughout TTP, such as the changes to Cell 2 to create a new marsh similar to Cell 1 (which are now largely complete), are also expected to increase the variety of habitats suitable for species not yet on the confirmed breeders list.

It is always interesting to note the species detected during VCP counts, but for which no nest was located, versus those species not detected during VCP counts, but for which a nest was found (Table 3.9). A variety of reasons exist to explain why a species could be recorded by one method, but not the other: (i) low abundance at TTP (e.g., Trumpeter Swan), (ii) secretive habits (e.g., Black-billed Cuckoo), (iii) well-hidden nests (e.g., Least Flycatcher), (iv) nests or normal habitat not located near VCP stations, and (v) nests not located at TTP
.

Table 3.9 Species Recorded Only by VCP Counts Versus Species Recorded Only By Nest

VCP-recorded Species With No Nest Located	Species With Nest But Not Recorded During VCP
Eastern Wood-Pewee	Black-billed Cuckoo
Great Crested Flycatcher	Downy Woodpecker
House Wren	Gadwall
Least Flycatcher	Mallard
Northern Rough-winged Swallow	Northern Flicker
Red-breasted Nuthatch	Trumpeter Swan

4. Acknowledgements

The colonial waterbird data were collected and presented by TRCA staff, who also produced most of the maps in the Appendices and provided valuable assistance in editing the report.

The landbird and non-colonial waterbird section of this report is the result of the ongoing efforts of several dedicated volunteers. The 2016 VCP observations were collected by Ian Sturdee and Don Johnston, and the volunteer contributions to the nest searching phase of the project in 2016 are enumerated in Table 3.10. Pierre Robillard created maps of the nests to help in monitoring during the breeding season and also in the preparation of this report.

Two people who contributed significantly in the past to the Breeding Bird Survey project are Dan Derbyshire and Andrew Jano. Dan Derbyshire, former TTPBRS coordinator, established the VCP point count and nest searching protocols for the landbirds and non-colonial waterbirds, as well as participating in the annual surveys and writing the reports until his departure in 2008. Andrew Jano, another active participant in the annual surveys until his untimely death early in 2012, created the initial detailed maps and vegetation graphics in the annual reports, and also helped write several of the reports.

Table 3.10 2016 Effort by Nest Searching Project Participants

Name	Total Hours
Marc Dupuis-Desormeaux	8
Lynne Freeman	58
Don Johnston	109
Jan McDonald	49
Pierre Robillard	83
Ian Sturdee	168
Paul Xamin	143
Total	**618**

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Appendices

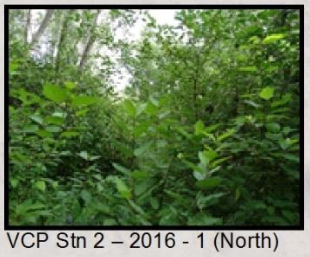
Appendix A: Annotated Map of TommyThompson Park with VCP Stations

Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 1

Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 2

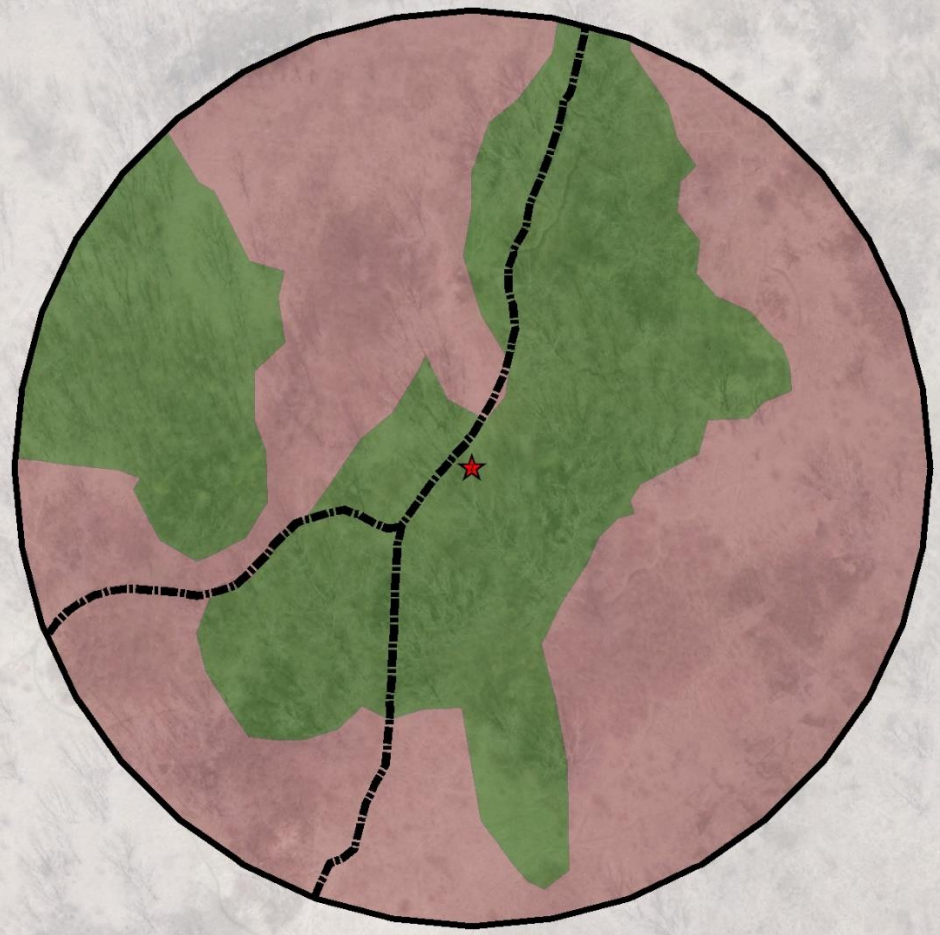


VCP Stn 2 – 2016 - 1 (North)

VCP Stn 2 – 2016 – 2 (East)

VCP Stn 2 – 2016 – 3 (South)

VCP Stn 2 - 2016 - 4 (West)



Metres

0 15 30 60

Created by: T.R.C.A. Information Management
Orthophoto: City of Toronto, Spring 2016
Date: May 26, 2017

N

LEGEND

100 m Radius Circular Plot

VCP Station 2

Trail

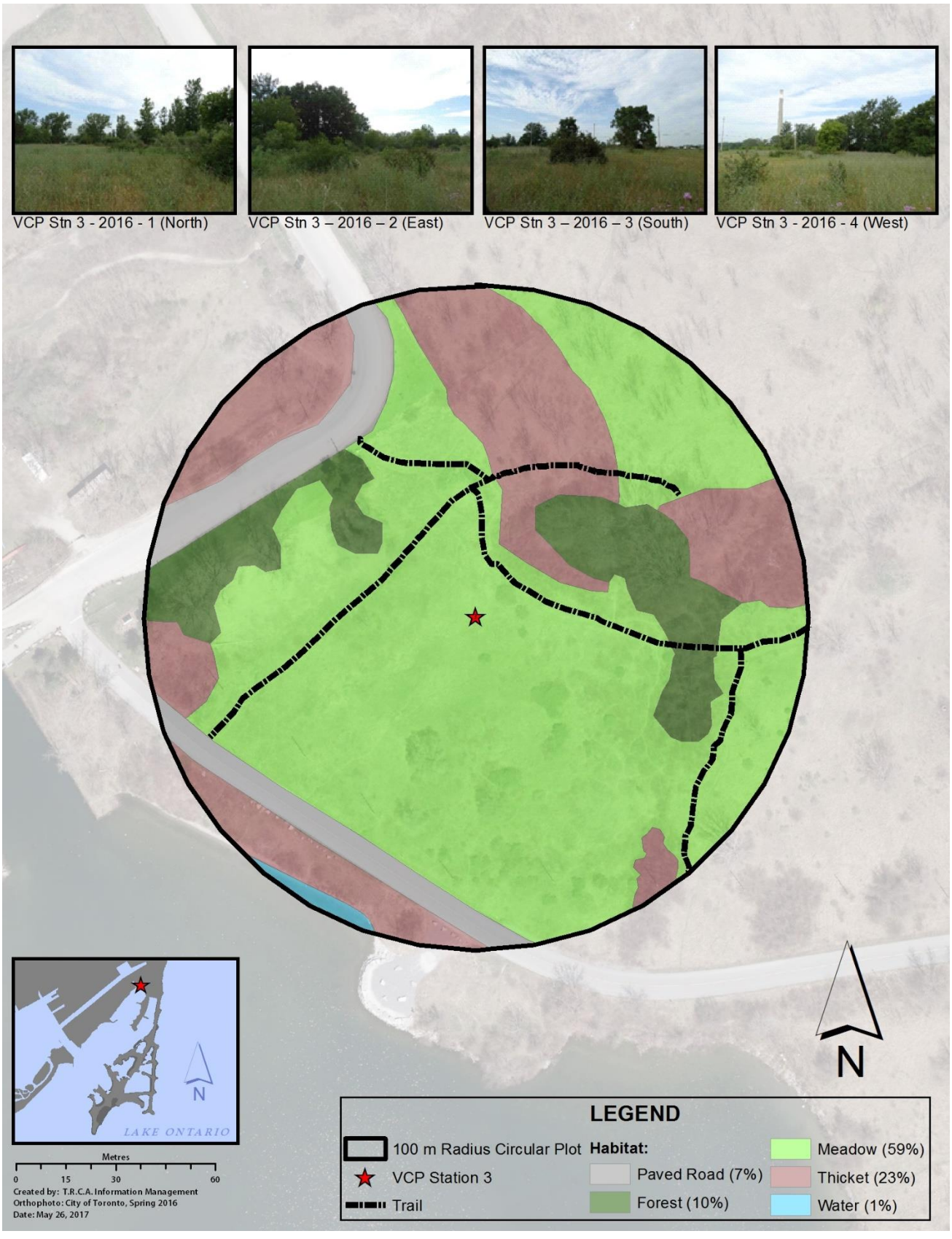
Habitat:

Forest (41%)

Thicket (59%)

Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 3



Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 4

Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

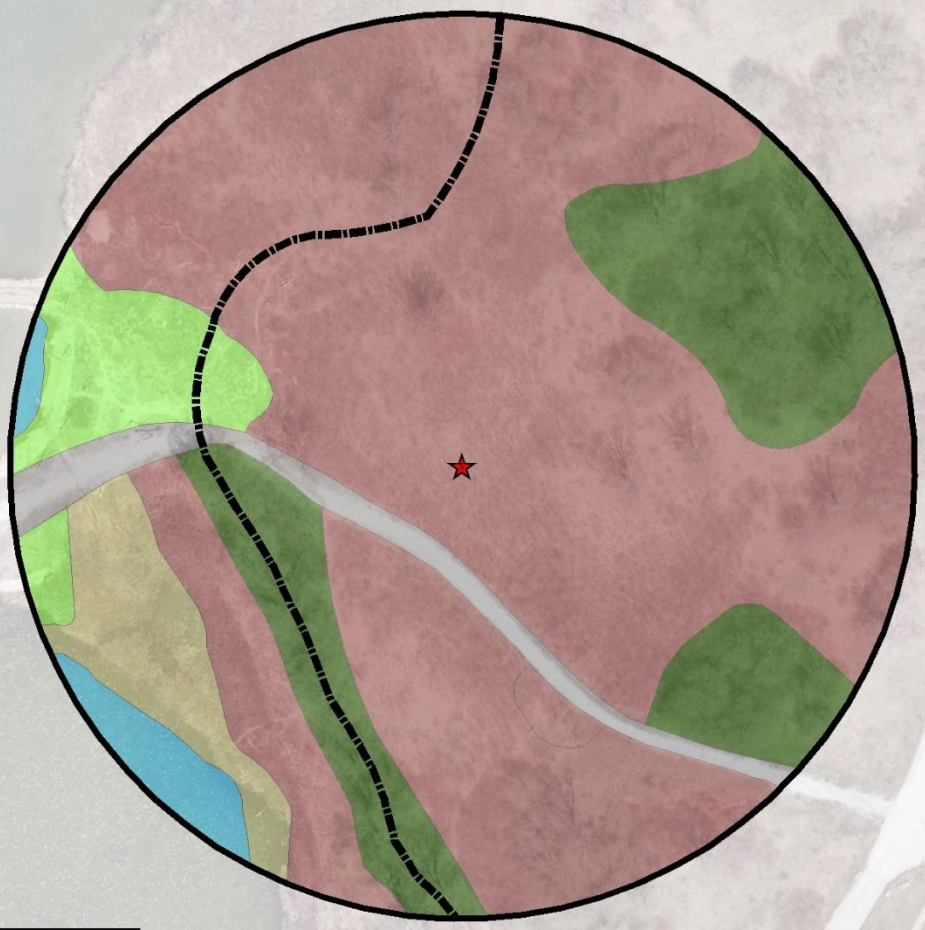
Station 5

VCP Stn 5 - 2016 - 1 (North)

VCP Stn 5 – 2016 – 2 (East)

VCP Stn 5 – 2016 – 3 (South)

VCP Stn 5 - 2016 - 4 (West)



Metres

0 15 30 60

Created by: T.R.C.A. Information Management
Orthophoto: City of Toronto, Spring 2016
Date: May 26, 2017

N

LEGEND

100 m Radius Circular Plot

VCP Station 5

Trail

Habitat:

Dirt Road (4%)

Forest (18%)

Meadow (6%)

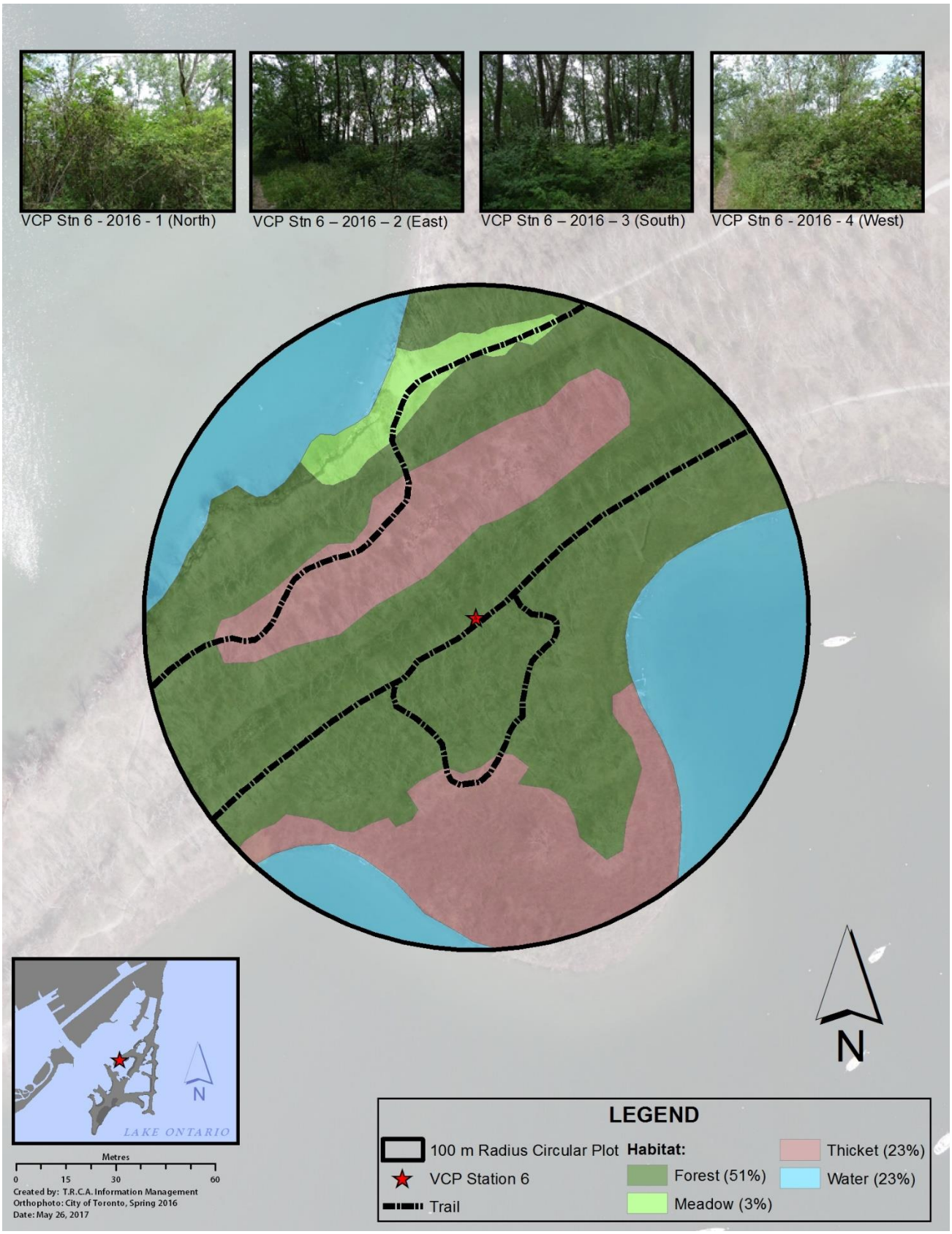
Reeds (5%)

Thicket (66%)

Water (2%)

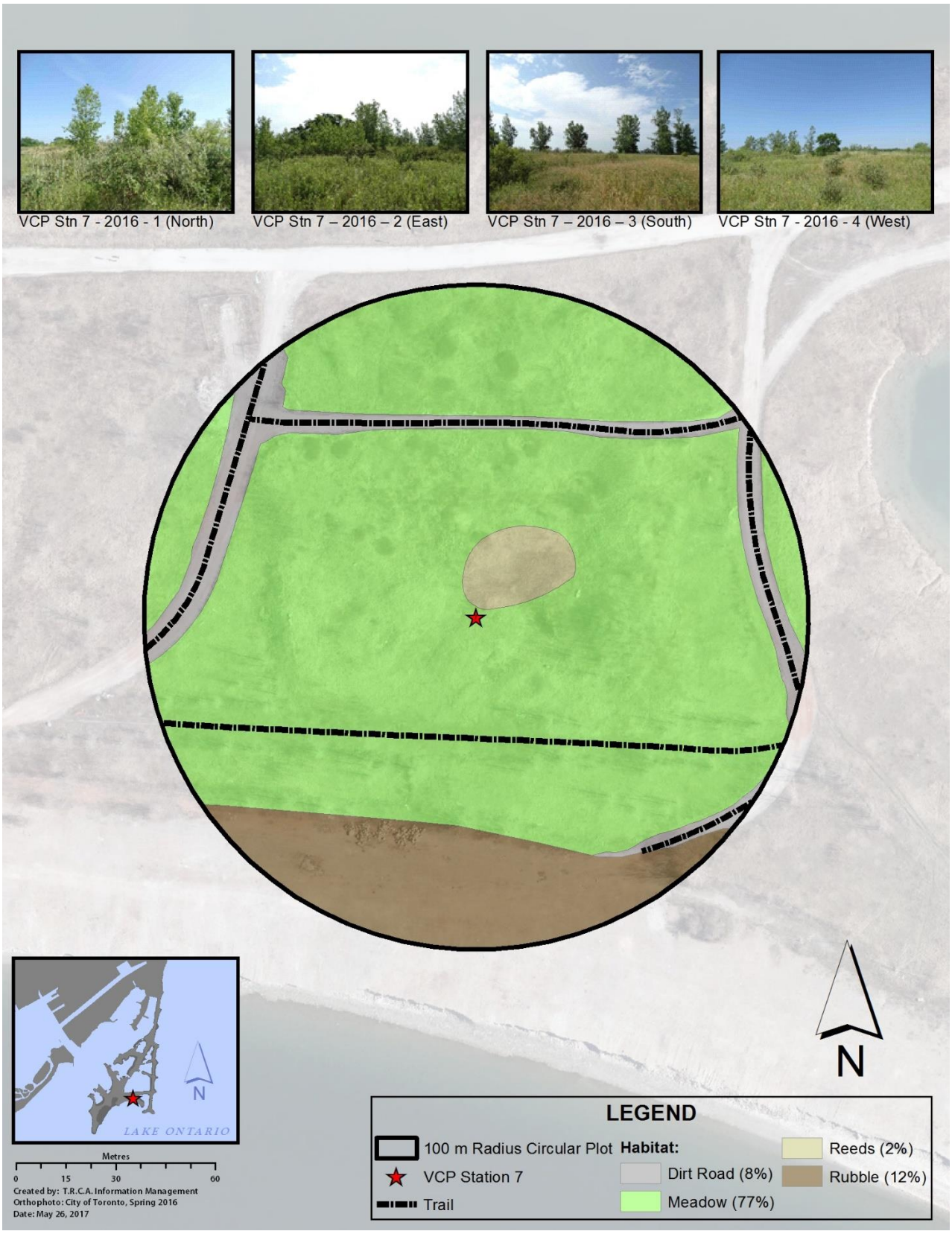
Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 6



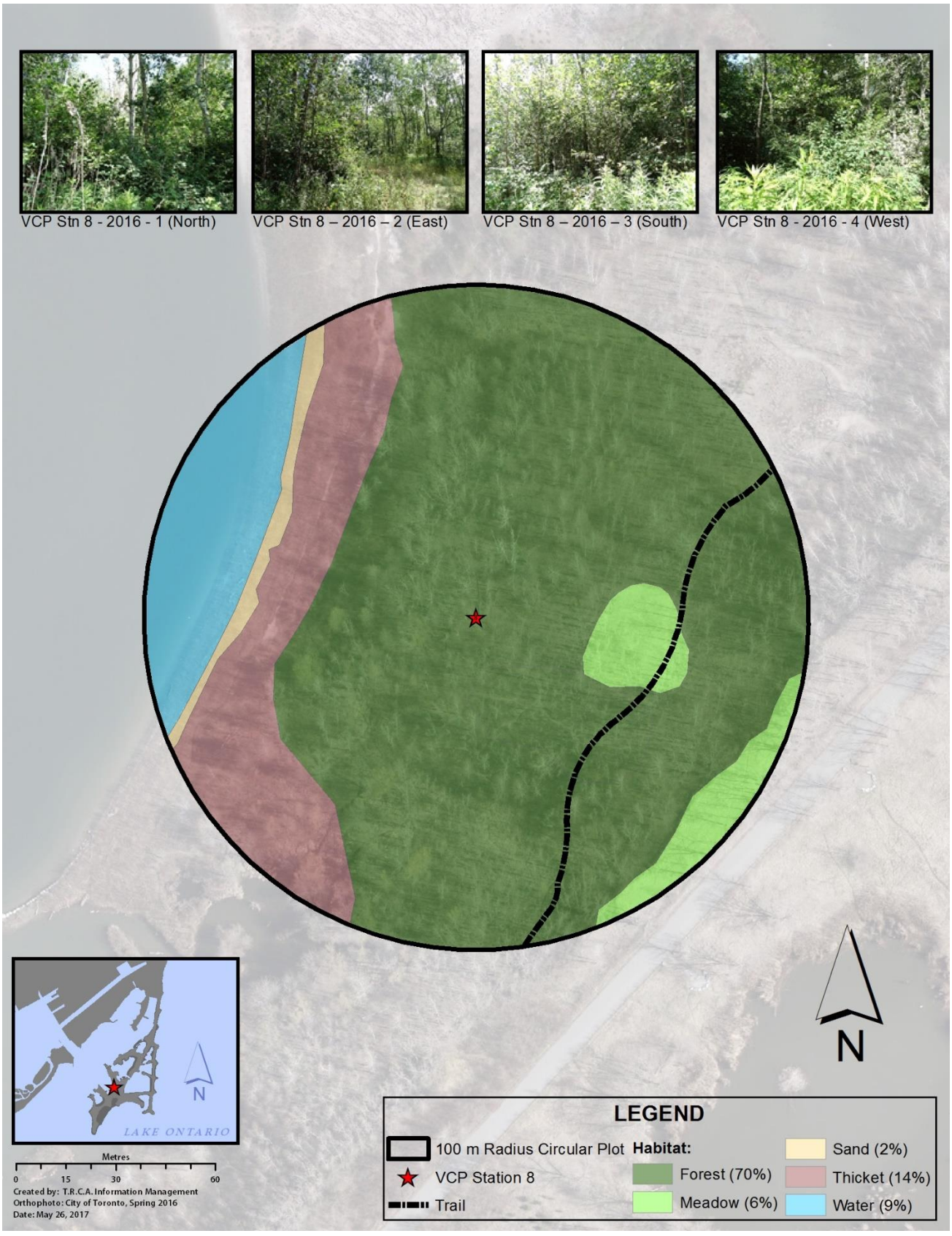
Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 7



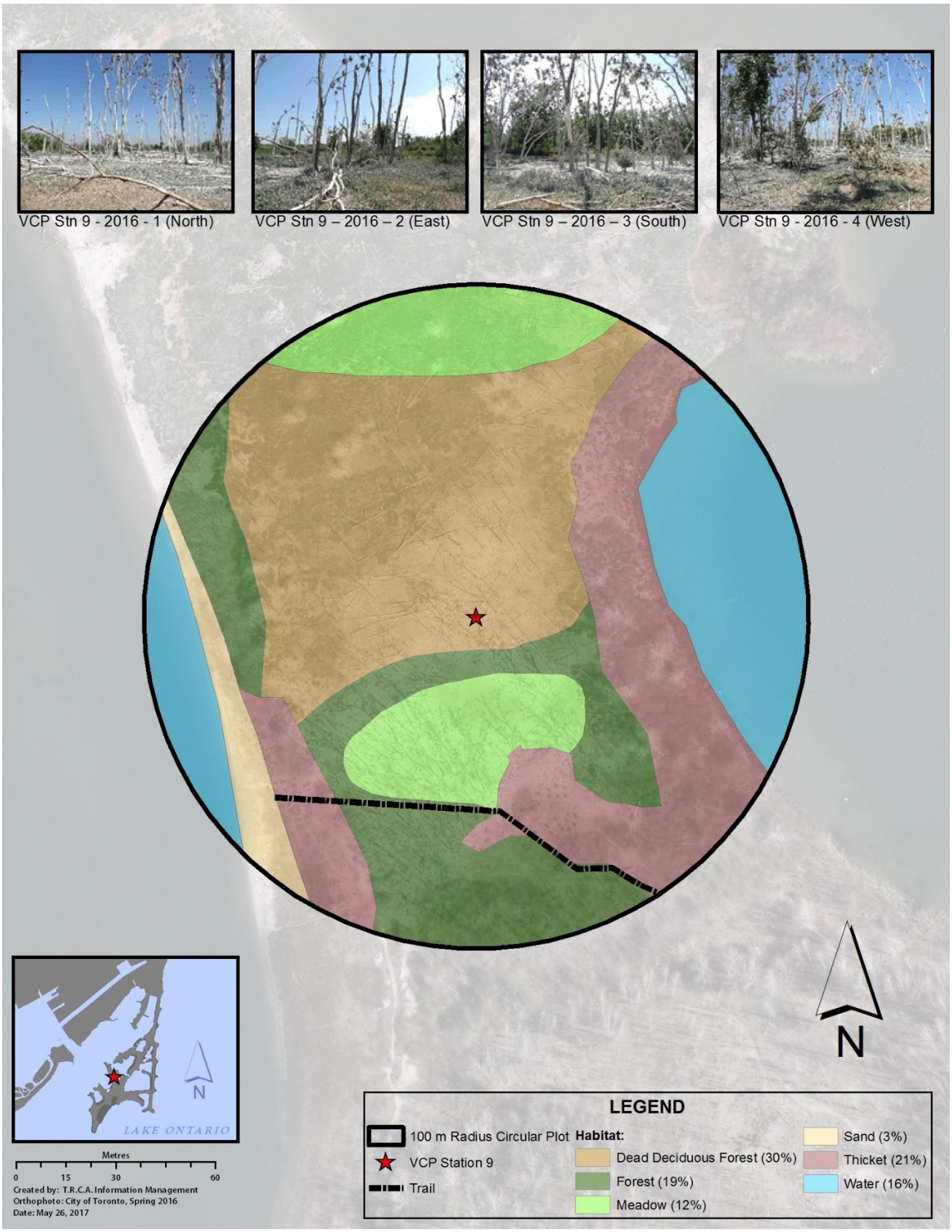
Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 8

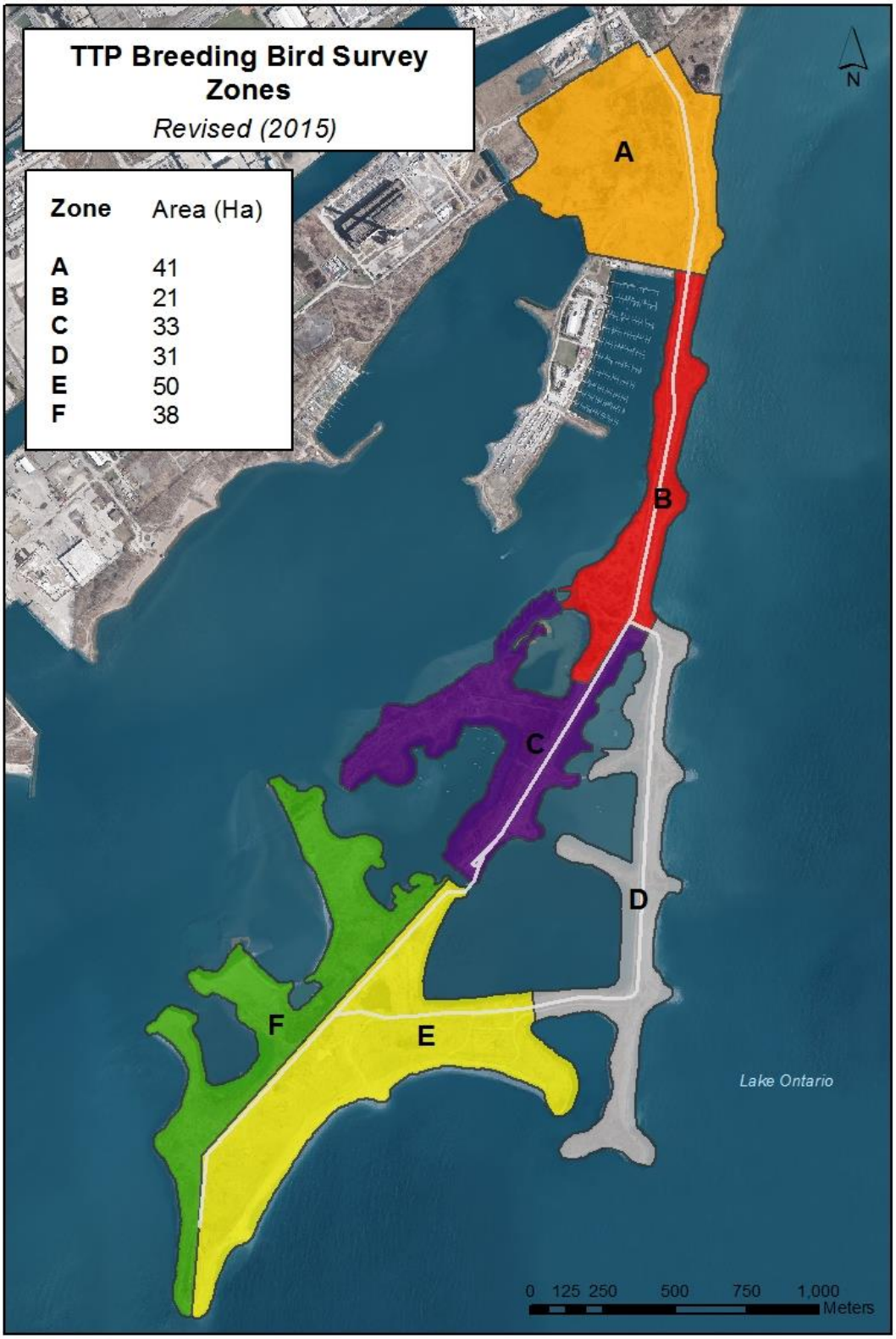


Appendix B: Description of VCP Stations (Habitat Pictures and Sketches)

Station 9



Appendix C: Map of TTP Breeding Bird Survey Zones



This map has been redone to reflect a minor change in zone alignment; changes in the TTP land base due to lake-filling activities; and mapping tool refinements. This has resulted in area increases to every zone except Zone B and an overall area increase of 11.5%. The land base at TTP is expected to continue to change as habitat creation and enhancement work continues.

Appendix D: Species Accounts

The following accounts include species that were listed as observed, or as possible, probable or confirmed breeders in 2016, as well as historically confirmed breeders. Species highlighted in red were detected in 2016 during the breeding bird survey, but have not yet been classified as confirmed breeders at Tommy Thompson Park. Species observed, but clearly out of their breeding range (shorebirds, e.g.) are not included here. For TTP locations specified in the following section, please consult Appendix A, an annotated map of the park.

Alder Flycatcher (2016 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2016 was presumably a late migrant.

American Black Duck (2016 - absent) Known to have bred historically at TTP.

American Crow (2016 - observed) Known to have bred historically at TTP, but not in recent years. In 2016, birds were observed at various locations at TTP during the breeding season.

American Goldfinch (2016 - confirmed) This species is a regular late nester at TTP. In 2016, 23 nests were discovered, which is the same as the 10-year average.

American Kestrel (2016 – absent) Known to have bred historically at TTP.

American Robin (2016 - confirmed) Common nesting species in forested areas throughout TTP. In 2016, 113 nests were recorded, just below the high for the project.

American Redstart (2016 - observed) This species has never been confirmed as a breeder at TTP. In 2016, singing males were observed at various locations at TTP during the breeding season.

American Woodcock (2016 - probable) While no nests were found in 2016, this species was observed singing during the breeding season, and is found regularly throughout much of TTP during the spring and summer. The 2012 change in protocol with regard to ground-nesting birds makes locating nests much less likely.

Bald Eagle (2016 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2016 was presumably a late migrant or visiting from a nest in the area.

Baltimore Oriole (2016 - confirmed) Common nesting species in forest areas of TTP. A total of 18 nests was recorded in 2016, the second highest total of the past ten years.

Bank Swallow (2016 - confirmed) A probable nesting site discovered in 2015 was confirmed in 2016 with at least 15 active nests. Attempts to nest along the southern shoreline have undoubtedly been restricted by recent lakefilling operations to prevent shoreline erosion.

Barn Swallow (2016 - confirmed) Barn Swallows are regular nesters at TTP under the eaves of buildings. In 2016, 29 nests were discovered at TTP. This species, listed provincially as a Species at Risk, continues to take advantage of three buildings constructed by TRCA in 2011/2012.

Belted Kingfisher (2016 - observed) This species was confirmed for the first time in 2003 based on observations of fledged young. In 2016, birds were observed at various locations at TTP during the breeding season.

Black-billed Cuckoo (2016 – confirmed) A nest was found on the Toplands in 2016, although it was subsequently abandoned. This is the second nest of this species of the project, the first having been found in 2014.

Blackburnian Warbler (2016 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2016 was presumably a late migrant.

Black-capped Chickadee (2016 - confirmed) A regular but uncommon nester at TTP. In 2016, two nests were located.

Black-crowned Night-Heron (2016 - confirmed) While the population of this species at TTP has significantly declined in recent years, a significant rebound occurred in 2016. At their peak in 2000, an estimated 30% of the Canada-wide population of Black-crowned Night-Herons were breeding at TTP.

Blue-gray Gnatcatcher (2016 - confirmed) In 2016, six nests were found, just below the high of seven recorded in 2015.

Blue Jay (2016 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2016 was presumably a late migrant.

Blue-winged Teal (2016 – absent) Known to have bred historically at TTP, although not in recent years.

Bobolink (2016 - absent) This species has never been confirmed as a breeder at TTP. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Brown-headed Cowbird (2016 - confirmed) In 2016, a total of 56 nests of Gray Catbird (1), Red-winged Blackbird (26), Willow Flycatcher (1) and Yellow Warbler (28), were found to have been parasitized by cowbirds. This is an increase over the preceding two years, but still below the average of the past ten years.

Brown Thrasher (2016 - probable) Brown Thrasher is a regular but uncommon nester at TTP. In 2016, a pair was observed in suitable habitat on the Neck during the breeding season, and were also heard singing, appearing to establish a territory.

California Gull (2016 – absent) Known to have bred historically at TTP, but not detected in recent years.

Canada Goose (2016 - confirmed) Canada Goose is a regular breeder at TTP along shoreline edges of embayments and containment cells.

Canvasback (2016 - absent) Canvasback has bred almost annually in recent years in the Triangle Pond area at TTP. In 2016, however, no birds were observed during the breeding season.

Caspian Tern (2016 - confirmed) This species is a regular ground-nester at TTP most years. None of this species' nests were successful in 2016.

Cedar Waxwing (2016 - confirmed) A common late nester at TTP; 49 nests were found in 2016, representing a new high for the project.

Chestnut-sided Warbler (2016 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2016 was presumably a late migrant.

Chimney Swift (2016 - observed) This species has never been confirmed as a breeder at TTP. Several birds which were observed in 2016 in many areas of TTP were presumably foraging from the city. There is no suitable nest habitat at TTP, i.e., no chimneys or hollow large-diameter trees.

Cliff Swallow (2016 - observed) This species has never been confirmed as a breeder at TTP. A number of birds which were observed in 2016 in various parts of TTP were presumably foraging from elsewhere in the area.

Common Grackle (2016 - confirmed) Common Grackle is a regular nester at TTP. In 2016, five nests (matching the high established in 2015) were found around Triangle Pond, and, given the presence of birds elsewhere in the park, further nesting was deemed probable.

Common Raven (2016 – observed) This species has never been confirmed as a breeder at TTP, although a pair nested immediately north of TTP in 2016 and were seen regularly throughout TTP.

Common Tern (2016 – confirmed) The introduction in 2015 of new nesting rafts designed to repel predators, as well as further improvements in 2016, resulted in continued successful nesting for this species.

Common Yellowthroat (2016 - possible) Known to have bred historically at TTP. In 2016, singing males were observed at various locations at TTP during the breeding season.

Double-crested Cormorant (2016 - confirmed) TTP has the largest colony in North America. Well over half of the colony now nests on the ground as a result of TRCA efforts to limit damage to trees.

Downy Woodpecker (2016 - confirmed) Two nests were found in 2016. A regular nester at TTP, although this was the first year that more than one nest was found.

Eastern Kingbird (2016 - confirmed) A regular breeder at TTP along forest edges where meadow and shrubs are present. In 2016, a total of 24 nests was found, slightly higher than the average for the past ten years.

Eastern Meadowlark (2016 - absent) In 2010, a nest was found in the Baselands meadow habitat, although it was not successful. Previously, the only indication of breeding obtained was that of a partially constructed nest in 2007. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Eastern Wood-Pewee (2016 – probable) In 2016, a pair was observed in suitable habitat during the breeding season on Peninsula D. The nest of this species is always difficult to find, although the existence of singing adults in apparent territories during the breeding season suggests that nesting has probably been more common during the project than confirmed.

European Starling (2016 - confirmed) Starlings are an abundant species at TTP although their breeding density is difficult to estimate. The species is known to nest in man-made structures and natural cavities throughout the area. Three nests were documented in 2016.

Gadwall (2016 - confirmed) Gadwall is a regular ground-nesting species at TTP, although in 2016, only one nest was confirmed. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Gray Catbird (2016 - confirmed) Gray Catbird is a regular nester at TTP, preferring dense shrubs with some tree cover. A total of 46 nests was found in 2016, a new high for the project.

Great black-backed Gull (2016 - absent) Known to have bred historically at TTP.

Great-crested Flycatcher (2016 - probable) This species has never been confirmed as a breeder at TTP, but a pair was observed in 2016 during the breeding season on Peninsula C.

Great Egret (2016 - confirmed) Regular nester in small numbers on Peninsula C.

Great Blue Heron (2016 - absent) Known to have bred historically at TTP.

Green Heron (2016 - possible) Known to have nested historically at TTP, but no nests have been detected during the project. A bird was observed in 2016 at Triangle Pond during the breeding season.

Herring Gull (2016 – confirmed) Usually an annual ground-nesting colonial waterbird species at TTP.

Horned Lark (2016 - observed) Known to have bred historically at TTP. A juvenile was observed in Cell 2 during the breeding season.

House Finch (2016 - possible) Known to have bred historically at TTP. In 2016, birds were observed during the breeding season in the Baselands.

House Sparrow (2016 - possible) Known to have bred historically at TTP. In 2016, birds were observed during the breeding season in the Baselands and around the lakefilling activities in Cell 2.

House Wren (2016 - possible) A regular nester at TTP, but in low numbers. In 2016, singing males were observed during the breeding season in various areas in TTP.

Killdeer (2016 - confirmed) Killdeer is a common ground-nesting species at TTP in open areas with low vegetation. Four nests were found in 2016, and observations of juveniles along roadways were frequent. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Least Flycatcher (2016 - possible) A regular but uncommon breeder at TTP. In 2016, singing males were observed at various locations at TTP during the breeding season.

Magnolia Warbler (2016 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2016 was presumably a late migrant.

Mallard (2016 - confirmed) Mallard is a regular ground-nester at TTP. Eight nests were documented in 2016, matching the average for the past ten years. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Mourning Dove (2016 - confirmed) One nest was found in 2016. Mourning Dove nests have been scarce at TTP in recent years.

Mute Swan (2016 - confirmed) Mute Swan is a regular nesting species along TTP shorelines.

Northern Bobwhite A known escapee may have bred at TTP in 1980, but the species has not otherwise been recorded in the park. This species is listed here for the sake of completeness, but is not included in the total of known breeding species at TTP.

Northern Cardinal (2016 - confirmed) Northern Cardinal is an uncommon but usually an annually-nesting species at TTP. In 2016, four nests were found, above average for the project.

Northern Flicker (2016 - confirmed) Northern Flicker is an uncommon but regular nesting species at TTP. One nest was found in 2016 on Peninsula C.

Northern Mockingbird (2016 - possible) This species has never been confirmed as a breeder at TTP, although it is known to breed in the vicinity of TTP. The species was observed in 2016 during its breeding season in suitable nesting habitat in various areas at TTP.

Northern Rough-winged Swallow (2016 - observed) An uncommon nester at TTP, no nests were found in 2016.

Orchard Oriole (2016 - confirmed) One or two nests of this species have been found in most years of the project, and in 2016, two nests were found.

Red-breasted Nuthatch (2016 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2016 was presumably a late migrant.

Red-eyed Vireo (2016 - observed) This species has never been confirmed as a breeder at TTP. In 2016, birds were observed in various locations in TTP during the breeding season, presumable late migrants.

Redhead (2016 - absent) Known to have bred historically at TTP.

Red-winged Blackbird (2016 - confirmed) The most abundant nesting species at TTP (excluding waterbirds), found throughout the TTP area. In 2016, 356 nests were found, the first decrease from previous years of the project.

Ring-billed Gull (2016 - confirmed) An abundant nesting colonial waterbird species at TTP.

Ring-necked Pheasant (2016 - absent) Known to have bred historically at TTP, but not detected in many years.

Rock Pigeon (2016 - observed) Known to have bred historically at TTP. Observed in 2016, but no nest was found.

Savannah Sparrow (2016 - possible) Prior to the start of the project, Savannah Sparrow was a common ground nester in open areas of TTP with substantial ground cover, particularly in the Baselands, along the Neck and in some areas of the Flats and Toplands. No nests have been found during the project, but a singing male was observed in 2016 on the Flats near East Cove during the breeding season. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Song Sparrow (2016 - confirmed) Song Sparrow is one of the most abundant nesting species at TTP, although few of its well-concealed nests are ever found. In 2016, seven nests were found in a variety of habitats, slightly above average for the project. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely, although not all Song Sparrow nests are on the ground.

Sora (2016 - absent) Known to have bred historically at TTP, but not detected in recent years.

Spotted Sandpiper (2016 - confirmed) A common ground nester at TTP in open areas near water. Three nests were found in 2016, slightly below average. The 2012 change in protocol with regard to ground-nesting birds making locating nests less likely.

Swainson's Thrush (2016 - absent) Known to have bred historically at TTP, but not detected in recent years.

Tree Swallow (2016 - confirmed) Tree Swallow is a common breeder at TTP. There are several nest boxes occupied around Cell 1 which are not monitored as part of the project, but 20 nests in other nest boxes and natural cavities around TTP were documented and monitored in 2016.

Trumpeter Swan (2016 - confirmed) This species was confirmed as a breeder at TTP for the first time in 2013. This is the fourth successive year of nesting by the original pair in Triangle Pond, producing seven cygnets in 2016, all of which survived.

Virginia Rail (2016 - absent) Known to have bred historically at TTP.

Warbling Vireo (2016 - confirmed) A common nesting species in forested areas of TTP. In 2016, 18 nests were found, well above average for the project.

White-breasted Nuthatch (2016 - observed) This species has never been confirmed as a breeder at TTP. In 2016, a calling bird was observed during its breeding season in suitable nesting habitat in the Baselands.

Willow Flycatcher (2016 - confirmed) Willow Flycatcher is a common nesting species in more open areas with dense shrubs. In 2016, 19 nests were found, slightly above average for the project.

Wilson's Phalarope (2016 - absent) Known to have bred historically at TTP, but not detected in recent years.

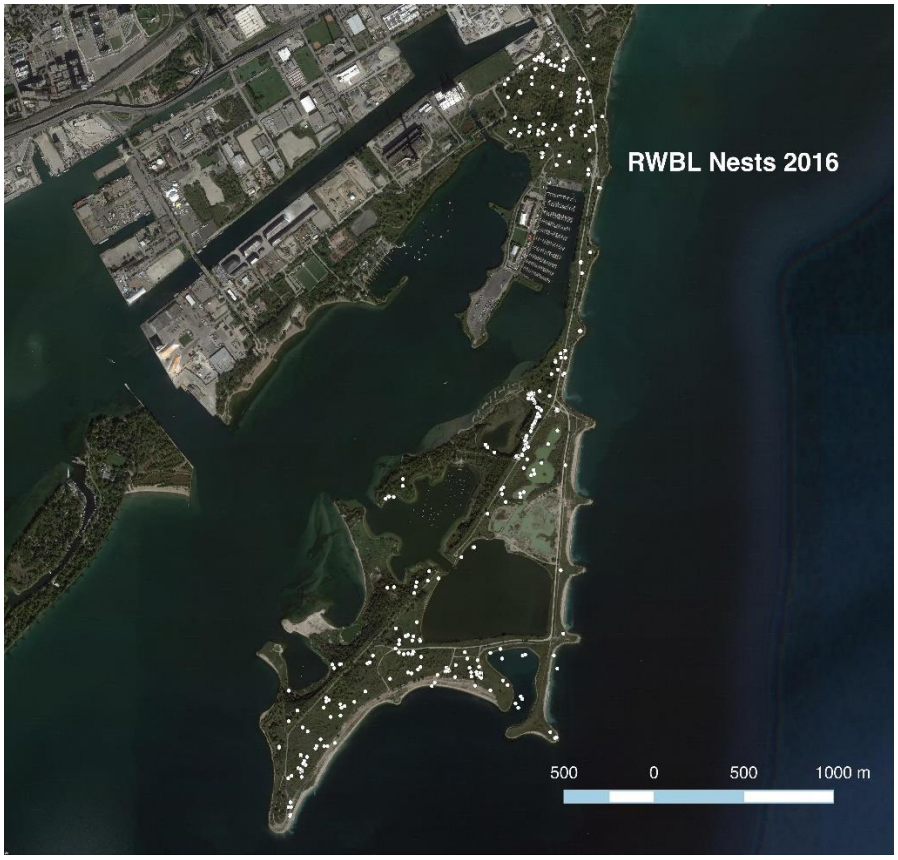
Wood Duck (2016 - possible) This species was confirmed in 2012 as a breeder at TTP for the first time. In 2016, birds were observed in suitable breeding habitat in the breeding season.

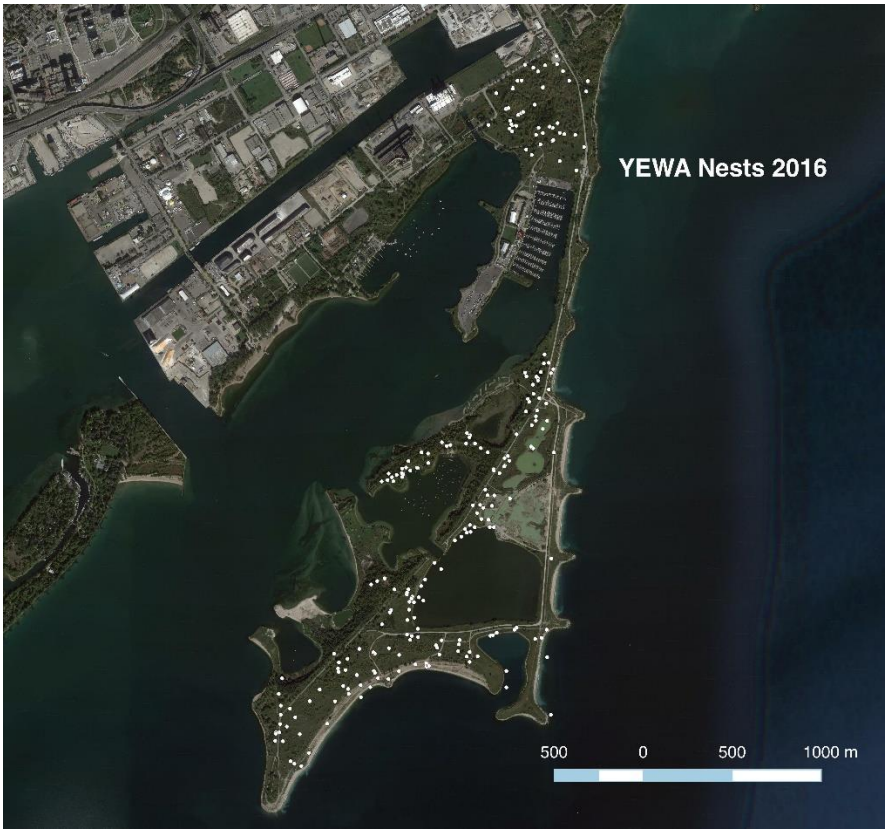
Yellow Warbler (2016 - confirmed) Yellow Warblers are common to abundant through much of TTP, usually nesting in dogwoods and honeysuckle. A total of 237 nests were found in 2016, by far the highest total for the project. The number of Yellow Warbler nests has increased almost every year of the project. This species continues to show the highest rate of parasitism by Brown-headed Cowbirds at TTP.

Appendix E: Map of 2016 Landbird Nest Locations *

* Excludes colonial waterbird, Canada Goose and Mute Swan nests

Appendix F: Maps of 2016 Red-winged Blackbird and Yellow Warbler Nest Locations





Appendix G: Breeding Status Codes for Each Species Detected In 2016

OBSERVED	POSSIBLE	PROBABLE	CONFIRMED
American Crow	Alder Flycatcher	American Woodcock	American Goldfinch
American Redstart	Common Yellowthroat	Brown Thrasher	American Robin
Bald Eagle	Green Heron	Eastern Wood-Pewee	Baltimore Oriole
Belted Kingfisher	House Finch	Great Crested Flycatcher	Bank Swallow
Blackburnian Warbler	House Sparrow		Barn Swallow
Blue Jay	House Wren		Black-billed Cuckoo
Chestnut-sided Warbler	Least Flycatcher		Black-capped Chickadee
Chimney Swift	Northern Mockingbird		Black-crowned Night-Heron
Cliff Swallow	Savannah Sparrow		Blue-gray Gnatcatcher
Common Raven	White-breasted Nuthatch		Brown-headed Cowbird
Horned Lark	Wood Duck		Canada Goose
Magnolia Warbler			Caspian Tern
N. Rough-winged Swallow			Cedar Waxwing
Red-breasted Nuthatch			Common Grackle
Red-eyed Vireo			Common Tern
Rock Pigeon			Double Crested Cormorant
			Downy Woodpecker
			Eastern Kingbird
			European Starling
			Gadwall
			Gray Catbird
			Great Egret
			Herring Gull
			Killdeer
			Mallard
			Mourning Dove
			Mute Swan
			Northern Cardinal
			Northern Flicker
			Orchard Oriole
			Red-winged Blackbird
			Ring-billed Gull
			Song Sparrow
			Spotted Sandpiper
			Tree Swallow
			Trumpeter Swan
			Warbling Vireo
			Willow Flycatcher
			Yellow Warbler

Note: This table does not include colonial waterbirds.

Observed	Species observed in its breeding season (no evidence of breeding)
Possible Status	Singing male present or breeding calls heard in breeding season in suitable nesting habitat
	Species observed in breeding season in suitable nesting habitat
Probable Status	Nest building or excavation of nest hole
	Pair observed in their breeding season in suitable nesting habitat
	Permanent territory presumed through registration of territorial song on at least 2 days, one week or more apart at the same place
Confirmed Status	Adults leaving or entering nest site in circumstances indicating occupied nest
	Adult carrying food for young
	Recently fledged young or downy young
	Nest containing eggs
	Nest with young seen or heard