

The Breeding Birds of Tommy Thompson Park

2011



Great Egrets on Nest (A. Gray)

Toronto and Region Conservation



Prepared by
Andrew Jano and Don Johnston

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1. Introduction

1.1 Study Area



TTP Aerial View (TRCA)

Tommy Thompson Park (TTP) is the largest area of existing natural habitat on the central Toronto waterfront. From the late 1950's until present day, a combination of lake-filling and dredging activities created the current configuration of the park. Through natural succession, as well as habitat creation and enhancement efforts, the spit has been colonized by an impressive variety of plant and animal communities. Tommy Thompson Park has been designated as an Environmentally Significant Area (ESA), and in 2000 was designated a globally significant Important Bird Area (IBA) by Birdlife International for its concentration of nesting colonial waterbirds and migratory value. Considerable effort by all three levels of government is being focused on the revitalization of Toronto's waterfront.

The implementation of the Tommy Thompson Park Master Plan is a key piece of the proposed Lake Ontario Park, which will be a major part of the city's plan for a green waterfront. The geographical location of the park and its natural features make it very attractive for large numbers of migrating birds, butterflies and nesting waterbirds.

2. Colonial Waterbirds

2.1 Project Background



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., 2000). Six species of colonial waterbirds currently breed at Tommy Thompson Park; three species are predominately tree nesters: Double-crested Cormorant, Black-crowned Night-Heron and Great Egret, and three species are ground nesters: Ring-billed Gull, Herring Gull and Common Tern.

Juvenile Black-crowned Night-Heron (D. Johnston)

2.2 Population Estimate Methodology

Population estimates for tree nesting waterbirds 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. 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 general 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 (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 each year. 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. Additionally, all 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 four 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 m², 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 m², 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.

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 1 m wide transects, and observers carefully walk the transect counting all active nests with a manual handheld tally counter, 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.

Cormorant ground nest estimates occur during the last week of May, at peak nesting period. Nest counts are conducted at night, using minimal light, in order to minimize disturbance and nest predation by Ring-billed Gulls. A minimal number of observers move quickly and systemically through the ground nesting area and place a coloured popsicle stick in the nest to mark it as counted.

2.3 Results

In 2011 Double-crested Cormorants nested in trees on Peninsulas A, B and C, as well as on the ground on Peninsula B. Black-crowned Night-Herons nested in trees on Peninsulas B and C. Great Egrets nested on Peninsula C. Ringed-billed Gulls and Herring Gulls nested on the ground on Peninsulas A and B. Common Terns attempted nesting on 3 artificial reef rafts in Cell Two, one artificial reef raft in Embayment D, and a man-made island in Cell One (Figure 2.A).

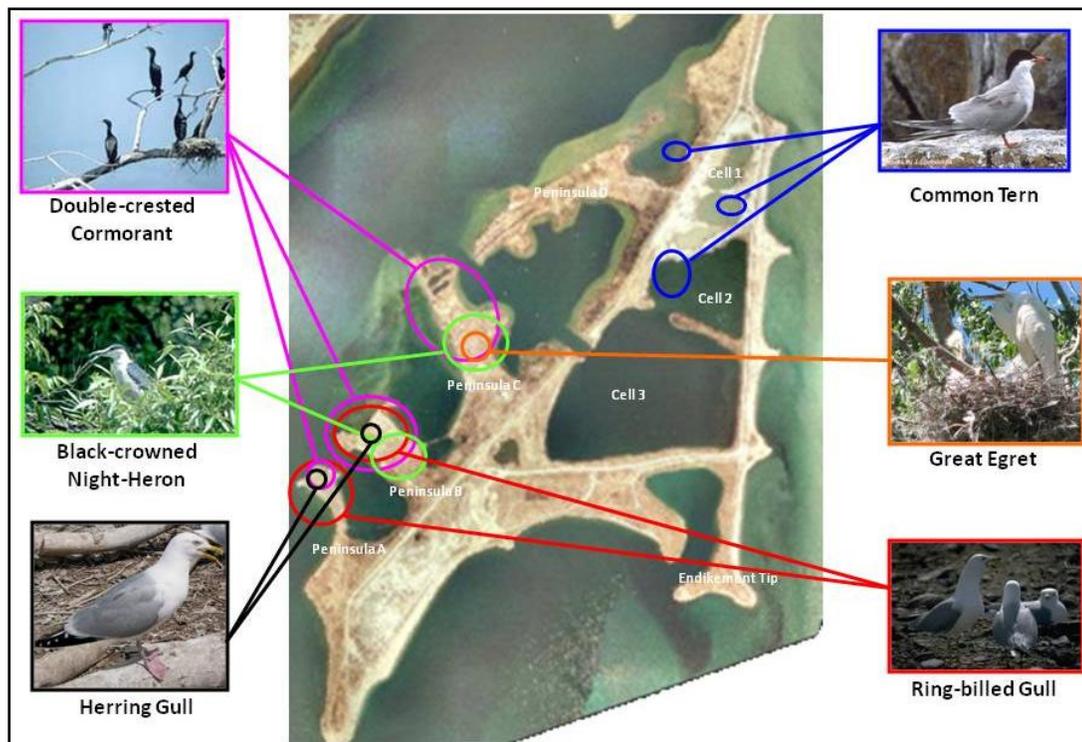


Figure 2.A. Colonial Waterbird Nesting Areas, 2010

Cormorant nests numbered 11,374 in 2011, including 4,574 ground nests (Table 2.1). The overall population increased 21 percent, while the ground nesting population increased 37 percent over the previous year (Figure 2.B). As indicated in Figure 2.B, 40 percent of the TTP cormorant colony nested on the ground in 2011. 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). Tee nesting also increased at the site, with Peninsula B seeing the most significant increase, reversing a 5-year trend for cormorant tree nests on that peninsula (Figure 2.B).

Table 2.1. Colonial Waterbird Nests at TTP, 1999 - 2011

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
DCCO	2,509	3,034	4,237	3,543	3,942	5,046	5,674	6,125	7,059	6,717	7,564	9,434	11,374
BCNH	988	1235	762	1,040	904	601	610	504	730	455	546 ^a	431	423
GREG	0	0	0	0	0	1	4	3	5	5	7	5	7
RBGU	59,453	58,000*	58,000*	58,000*	56,151	45,000*	40,000*	35,000*	33,000*	30,000	30,000*	28,000*	32,000*
HERG	111*	NC	NC	NC	48	79	NC	NC	45	30	NC	<20*	NC
COTE	325	242	NC	445	420	433	448	NC	367	310	354	231	54

a - Nesting failed by June 30
 *- Estimate

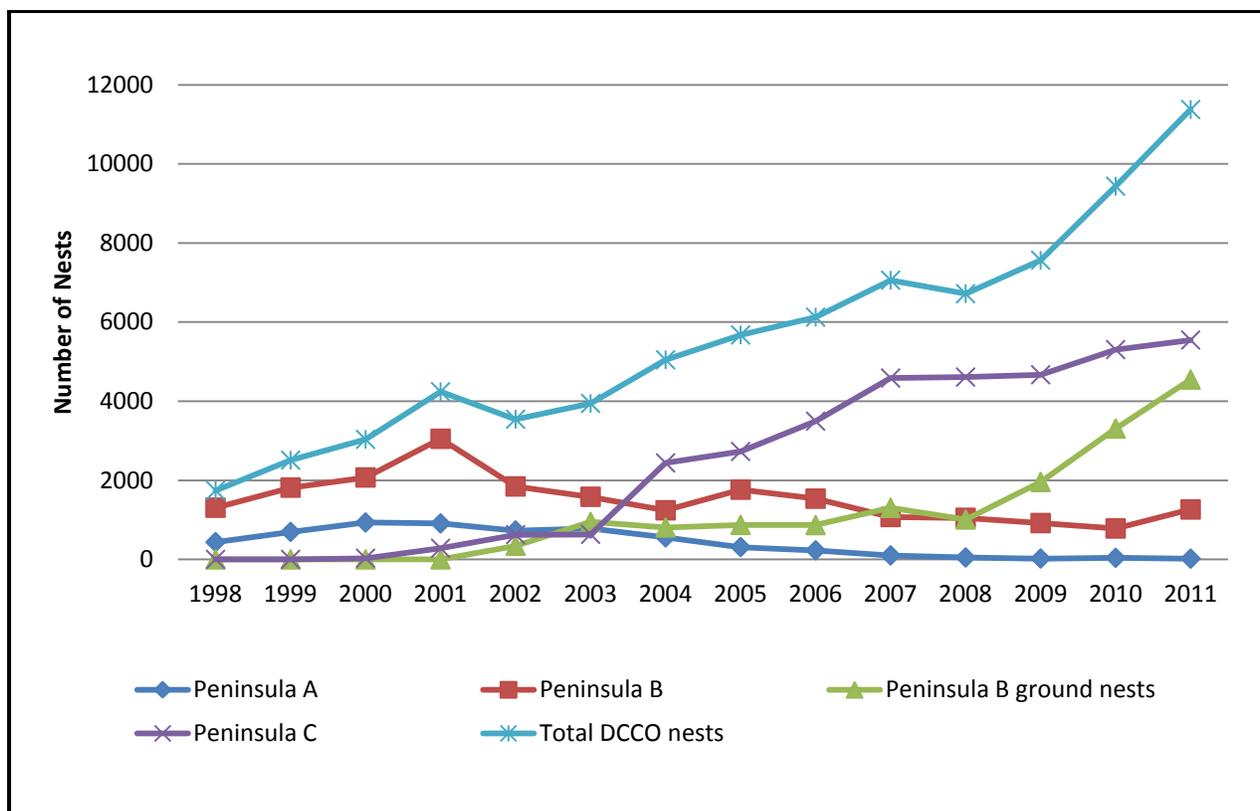


Figure 2.B. Double-crested Cormorant Nests at TTP by Location, 1998 - 2011

Black-crowned Night-Heron nests numbered 423, a slight decline from 2010 (Table 2.1). Interestingly, nests on Peninsula B increased by 32 percent, while nests on Peninsula C decreased by 25 percent (Figure 3). The nest numbers of night-herons at TTP has always been stochastic, however the downward trend in the number of nests is clearly evident in Figure 2.C. Variables that appear to influence night-heron nesting at TTP include intraspecific competition and interspecific competition with cormorants and egrets for nests, as well as an increased vulnerability to human disturbance, weather events and mammalian predators due to their nesting location at the edge of the colony - a location that is influenced by competition.

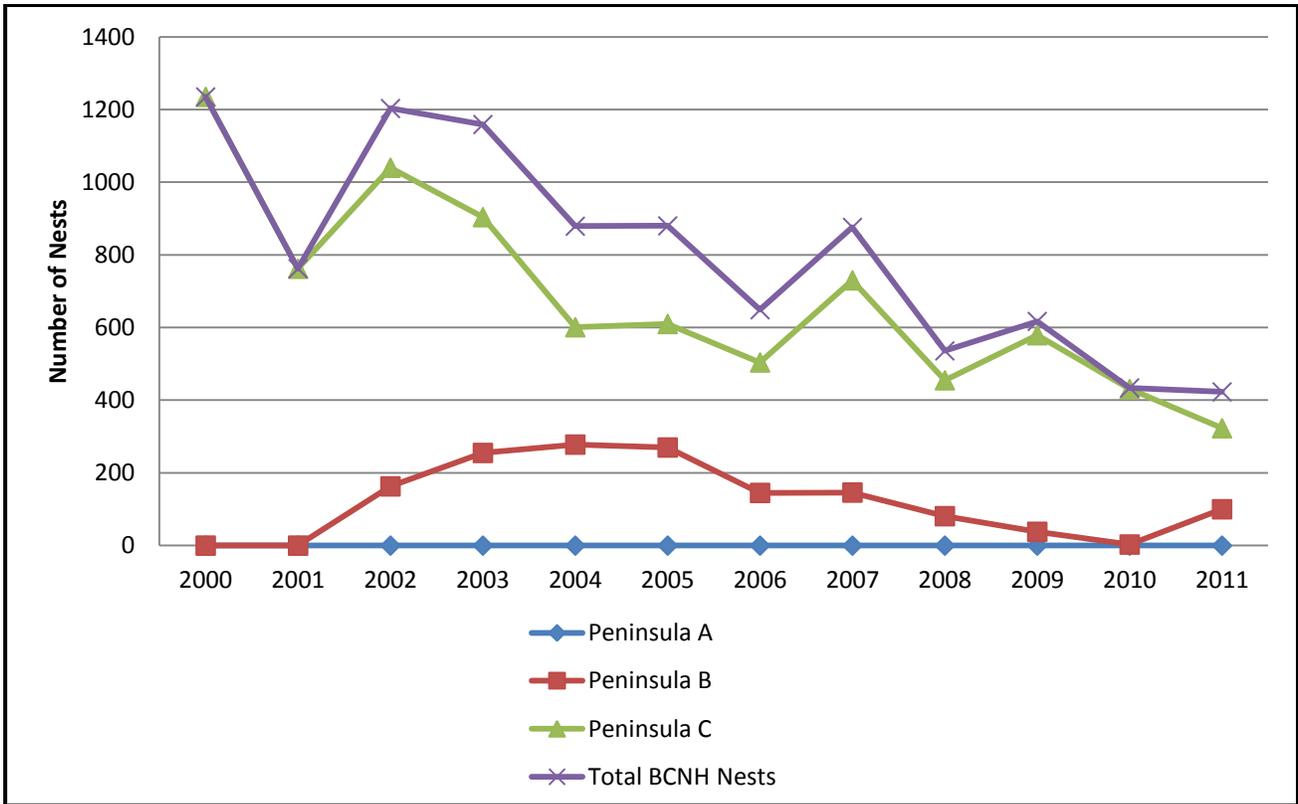


Figure 2.C. Black-crowned Night-Heron Nests at TTP by Location, 2000 - 2011

Great Egrets had 7 nests, including one nest where an egret incubated and raised a Black-crowned Night-Heron chick (Figure 2.D). It presumably fledged.



Figure 2.D. Black-crowned Night-Heron chick in Great Egret nest with egret chick and adult (A. Gray)

Nesting Common Terns did not have a good year at TTP. Nesting was attempted on all the reef rafts and the Cell One island (Figure 1), however was unsuccessful in all locations except for the Embayment D reef raft, where nests totalled 54 (Table 1). Record high water levels in Lake Ontario submerged the Cell One island by mid-May and terns abandoned the site. The three reef rafts in Cell Two were persistently depredated by American mink at the egg and early chick stages. Terns abandoned nesting attempts in Cell Two by mid-June. Although predators are intrinsic to the ecosystem, the reef rafts are man-made habitat and require management to avoid becoming population sinks. TRCA will undertake improvements to the reef rafts in 2012 to minimize access by mammalian predators.

Gull population estimates were not undertaken in 2010, although anecdotal evidence suggests Ringed-billed Gulls may be slightly below the last official count in 2008 of 30,000 nests (Table 2.1). Ring-billed Gulls currently nest on Peninsulas A and B. 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 CWS in individual nest monitoring for containment research.

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. The Tommy Thompson Park Bird Research Station (TTPBRS), through volunteers and some staff support, has carried out the project annually in spring and summer since 2005.

3.2 Methodology



American Goldfinch Nest (I. Sturdee)

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. While most nest records gathered are submitted to the Ontario Nest Records Scheme (ONRS), nests discovered after nesting is complete are typically not.

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 and should be repeated every three years to help quantify changes in the vegetation communities.

To complete the vegetation analysis, 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.

All nesting data are submitted to ONRS online, and these data are available through inquiry to the TTPBRS at ttpbrs@trca.on.ca.

3.3 Results

3.3.1 Variable Circle Plot Point Count Results

3.3.1.1 VCP Station Vegetation Survey

In 2010, a vegetation survey was completed for each station, resulting in the vegetation descriptions found in Table 3.3. In addition, Appendix B contains a habitat sketch and photographs for each station. The habitat sketches are based on 2007 satellite digital imagery and current field observations.

Table 3.3. 2010 VCP Station Vegetation Analysis

	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
Total of All Habitats	100	100	100	100	100	100	100	100	100
Dominant Vegetation Within 100 m of Each VCP Station									
Poplars (i.e., Eastern Cottonwood)	20	35	5	5	10	40	5	55	45
Dogwoods (i.e., 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
Aquatic Vegetation (i.e., Cattails, Bulrushes)	5			5				5	
Miscellaneous Herbs (i.e., Vetch, Nettles, etc.)							10		10
Vegetation Total	100	100	95	95	85	70	85	90	85

3.3.1.2 VCP Observations

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

Species	2005	2006	2007	2008	2009	2010	2011	AVG
ALFL							1	0.1
AMGO	19	22	15	10	8	22	35	18.7
AMKE	1							0.1
AMRO	27	14	25	31	26	34	41	28.3
AMWO					1			0.1
BANS	*	*	104	2	5	4	14	18.4
BAOR	30	21	29	22	23	13	28	23.7
BARS	2	1	31	3	11	8	32	12.6
BCCH	1	3	1	3	2	4	3	2.4
BEKI	1	3			2	1		1.0
BGGN		3	3	2	8			2.3
BHCO	16	15	22	11	19	19	10	16.0
BLJA				3	1	1		0.7
BLPW					1			0.1
BOBO		*	3					0.4
BRTH	5		4					1.3
CANG		*				*		0.0
CEDW	9	12	12	11	39	19	31	19.0
CHSW		*	*	2	*		2	0.6
CLSW	*							0.0
COGR	18	21	12	11	9	17	23	15.9
COYE	2	1	2	1		2	2	1.4
DOWO							2	0.3
EAKI	15	12	18	25	12	20	18	17.1
EAME		1	2	5				1.1
EAWP	1		1	1	3	1	8	2.1
EUST	92	24	21	35	116	41	52	54.4
FISP			3					0.4
GADW				3	*	1		0.6
GCFL			2		3			0.7
GRCA	22	26	24	19	17	38	16	23.1
HOFI	*	1	*				1	0.3
HOSP		3		2				0.7
KILL	5	3	1	7	8	3		3.9
LEFL		5	17	6	7	11	11	8.1
MALL		*		*	4			0.6
MAWA					1			0.1
MODO	*	1	6	1		*		1.1
NOCA	2	2	3		4	3	1	2.1
NOFL	3	2	1	1	2		2	1.6
NOMO						*		0.0
NRWS	*	*	22	7	8	5	14	8.0
ROPI		*	*	*				0.0
RWBL	151	167	154	203	312	199	244	204.3
SAVS	13	12	2		1			4.0
SOSP	98	74	72	68	81	55	46	70.6
SPSA	7	6	7	9	6	3	4	6.0
TRES	5	*	8	15	9	16	24	11.0
TRFL				1		1		0.3
VEER			1					0.1
WAVI	34	25	31	22	41	30	39	31.7
WIFL	35	23	27	17	26	14	25	23.9
YWAR	127	105	118	109	134	100	168	123.0
Birds	741	608	804	668	950	695	925	770.1
Species	32	37	38	35	37	32	29	34.6

* Species observed beyond 100 metres and/or flying over

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) are attributable to one or a few large flocks recorded in one or a few of the visits.

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 design and analyze distance sampling surveys of wildlife populations).

As shown in Table 3.4, a total of 29 species was detected for all counts in 2011, including one new species for the VCP counts, i.e., Alder Flycatcher. The total of 29 species is on the low end of the total species seen each year during the project. Several species were recorded on counts in earlier years, but not in 2011, although they were detected during other surveys. Since some species are present at TTP in relatively low numbers, the frequency of detection for these species is low, and therefore we can expect year-to-year fluctuations in representation by VCP counts.

In 2011, total bird abundance (Figure 3.A) and species richness (Figure 3.B) per station generally followed the same pattern as earlier years, although at the higher end of experience for most stations.

In terms of total station bird abundance (within 100 m), Station 3 (dry meadow), 4 (dry meadow), 5 (shrubland), 6 (forest) and 7 (wet meadow) were very similar to each other with totals of 118 – 134 birds per station, followed closely by Stations 1 (wet thicket), 2 (forest) and 8 (forest) with totals of 86 – 90 birds per station. See Appendix A for station locations.

Station 9 (forest) continued to reflect the lowest abundance, presumably due to its location in the Double-crested Cormorant colony and its limited biodiversity. Overall abundance from VCP counts in 2011 was at the high end of the range recorded in previous years for all stations.

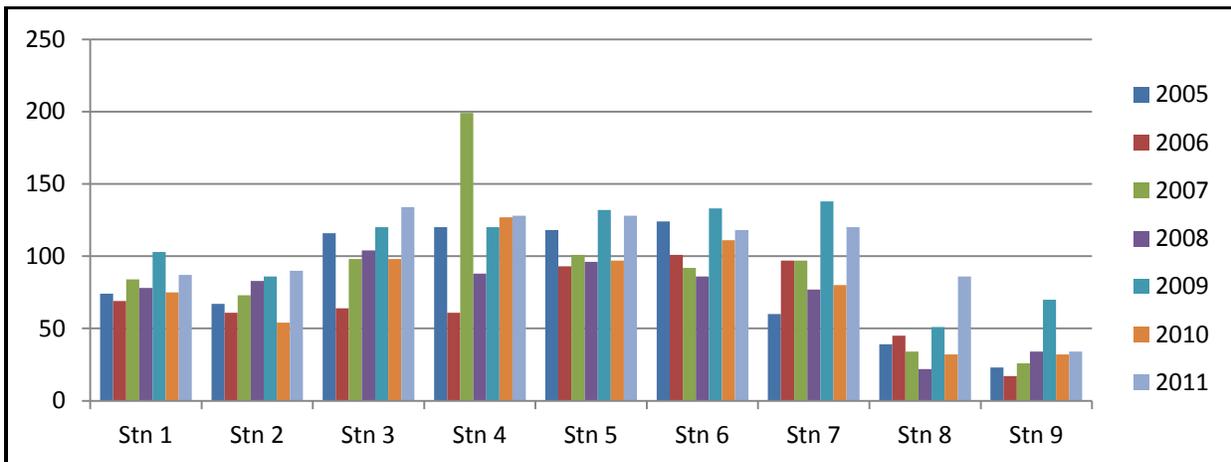


Figure 3.A. Total Bird Abundance per VCP Station

The stations with the highest overall diversity (i.e., species richness) in 2011 were Stations 1, 3 and 6, each with 21 – 23 species recorded. As in previous years, the weakest station was Station 9, located on Peninsula C within the large Double-crested Cormorant colony and in an area with limited biodiversity.

It is noteworthy that Station 8, within the Black-crowned Night-Heron colony and also on Peninsula C, experienced a sudden burst in both abundance and richness. While there have been occasional bursts in abundance in the past (e.g., Station 4 in 2007), they weren't usually accompanied by a similar increase in richness (that is, the increase in abundance in 2007 was due to an unusually high number of swallows, particularly Bank Swallows). It will be necessary to monitor Station 8 in future years to determine whether 2011 was an anomaly or not.

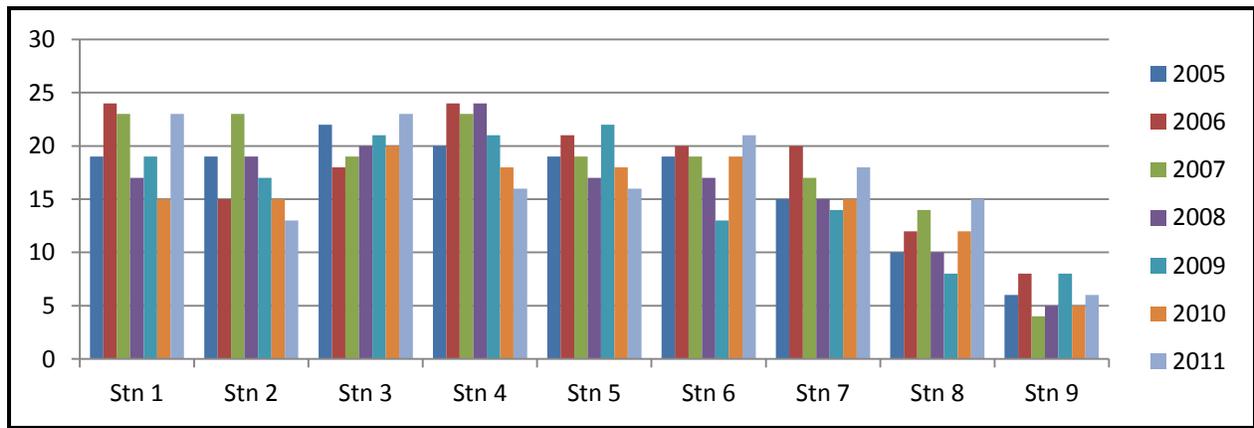


Figure 3.B. Species Richness per VCP Station

The highest VCP count of the seven years of the project was recorded in 2011 for several species, including American Goldfinch, American Robin, Barn Swallow, Common Grackle, Tree Swallow, Warbling Vireo and Yellow Warbler. These high counts represent a very encouraging sign for the development of suitable habitat at TTP for these species, particularly the two swallow species, which have been generally declining in the province along with the other swallow species.

3.3.2 Nest Searching and Monitoring Results



American Robin Nest (D. Johnston)

In 2011, a total of 384 hours was logged by six participants. Figure 3.C shows the breakdown of effort per zone. The increased effort in Zone A reflects the addition of additional volunteer time, as well as the discovery of nests in a section not previously extensively examined due to high water levels in early spring. The decreased effort in Zones C and D is primarily a result of fewer nests being located in those zones, thereby requiring less monitoring time.

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

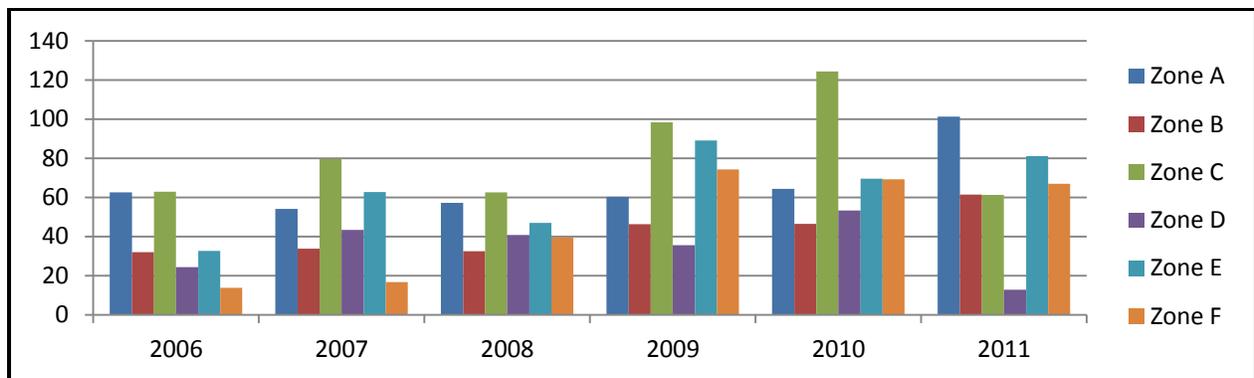


Figure 3.C. Nest Searching Effort per Zone from 2006 to 2011 (hours)

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 2011, a total of 593 nests was discovered, and 430 of these nests were monitored (see Table 3.5). Nests of 27 species were found in 2011.

Table 3.5. Total Nests by Species from 2005 to 2011

Species	2005	2006	2007	2008	2009	2010	2011	AVG*
AMGO		1	19	25	44	33	23	24.2
AMRO	3	12	26	51	93	69	115	61.0
AMWO						3	1	0.7
BANS	15	2			4	2	1	1.5
BAOR	5	13	12	9	9	10	17	11.7
BARS	7	5	5	3	3	2	4	3.7
BCCH	2			1	2			0.5
BEKI		1	1	2				0.7
BGGN		1	1	1	3			1.0
BRTH	1	1	1	3	4	2		1.8
CANG		1						0.2
CEDW		3	7	14	40	14	21	16.5
COGR		3	2	1		4	4	2.3
DOWO			1			1	1	0.5
EAKI	3	11	17	26	22	14	12	17.0
EAME		1				1		0.3
EAWP			1			1	1	0.5
EUST		5	2	5	7	12	4	5.8
GADW	5	1	4	3	3	1	3	2.5
GRCA	3	12	9	11	23	11	16	13.7
HOFI			1					0.2
HOSP	1	1						0.2
HOWR		1		2	2	2	1	1.3
KILL		3	2	5	8	13	2	5.5
LEFL		1	2		3	1		1.2
MALL	1	6	7	9	12	12	6	8.7
MODO		4	4		3			1.8
NOCA	2	1	6	2	4	1		2.3
NOFL	2	4		1		3	3	1.8
NRWS		1	1		2		1	0.8
OROR		1	2	1		2	1	1.2
RWBL	5	45	58	82	130	167	232	119.0
SOSP	1	6	5	1	7	8	2	4.8
SPSA	2	5	6	3	5	8	4	5.2
TRES	4	7	6	9	9	9	5	7.5
WAVI	1	8	4	7	7	9	15	8.3
WIFL	2	13	21	15	25	15	12	16.8
YWAR	8	34	71	71	75	82	88	70.2
Total	73	214	304	363	549	512	593	422.5
Total Effort (hours)		228.0	289.2	279.5	403.7	427.0	384.6	335.3
Efficiency (nests/hr)		0.94	1.05	1.30	1.36	1.20	1.54	1.30

* Averages exclude 2005 nests

Nest-searching efficiency figures (Table 3.5) are somewhat misleading, as they are highly dependent on the vegetation type of the area (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 improved significantly in 2011, as volunteers became accustomed to new zones that were assigned in 2010. Also, several nests were not able to be monitored extensively due to the number of nests and the limited availability of volunteers.

No new species were added to the TTP breeding species list in 2011 (Table 3.5). However, single nests were discovered for American Woodcock, Eastern Wood Pewee and Downy Woodpecker, all species whose nests are difficult to locate.

As in 2009 and 2010, the increase in the number of Red-winged Blackbird nests located in 2011 is partially a result of extending the search period, but also a result of the volunteers becoming more experienced in searching the habitat favoured by early-nesting Red-winged Blackbirds. The same is true of American Robins in 2011. (Prior to 2009, the nest searching period was approximately May 1 – August 30, but this was extended in 2009 to approximately April 1 – September 15 in order to include more early and late nesters.)

The total number of nests located in 2011 (593) was the highest total yet. It appears that such numbers are the result of the longer nest searching period adopted in 2009, combined with the ever increasing nest searching skills and habitat familiarity on the part of the project volunteers.

3.3.2.1 Nest Productivity

A total of 430 nests was recorded online with ONRS in 2011 (Table 3.6). In terms of nest productivity, 98 of 275 nests with known outcomes failed, while 177 were successful in fledging young. The remaining 155 nests had unknown outcomes, with the ratio of unknown outcomes to nests monitored being roughly in line with most previous years.

As can be seen in Table 3.6, the 2011 nest failure rate of 36% is on the low end of the range experienced since 2005. The larger sample sizes after 2005 are more significant as the results in 2005 were based on only 28 nests with known outcomes. Nest predation was the most common cause of nest failure again in 2011. Possible predators at TTP include raccoons, gartersnakes, mink and coyotes, as well as other bird species. Of the 98 failures, 23 occurred at the egg stage, 10 at young stage and 65 at either egg or young stage.

Table 3.6. Nest Productivity from 2005 to 2011

	2005	2006	2007	2008	2009	2010	2011	AVG
Nests discovered	73	214	304	363	549	512	593	372.6
Species	20	33	30	27	27	34	27	28.3
Nests monitored & reported to ONRS	73	214	236	297	456	440	430	306.6
Unknown outcome	45	71	160	148	170	213	155	137.4
Known outcome	28	143	144	149	286	227	275	178.9
- Successful nests	12	82	77	97	162	144	177	107.3
- Failed nests	16	61	67	52	124	83	98	71.6
- Failure rate	57%	43%	47%	35%	43%	37%	36%	40.0%

3.3.2.2 Parasitism by Brown-headed Cowbirds



Cowbird Egg in Goldfinch Nest (M. Dupuis-Desormeaux)

Brown-headed Cowbird parasitism is a major issue for small landbird populations in more open habitats and forest fragments. In 2011, a total of 29 nests of three species were found with Cowbird eggs. The most heavily parasitized species were Yellow Warbler (9 nests) and Red-winged Blackbird (18 nests). American Goldfinch (2) was also parasitized.

The rate of parasitism among known host species at TTP is shown in Table 3.7. (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 were calculated as the ratio of parasitized nests to the 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.)

Table 3.7. Brown-headed Cowbird Parasitism Data and Rates from 2005 to 2011.

Brown-headed Cowbird Parasitism								
		American Goldfinch	American Robin	Red-winged Blackbird	Song Sparrow	Willow Flycatcher	Yellow Warbler	Totals
2005	Total nests *			5	1	2	7	15
	Nests parasitized			1	1	1	2	5
	- %			20.0	100.0	50.0	28.6	33.3
2006	Total nests *	1	5	41	6	13	30	96
	Nests parasitized	1	0	12	2	3	9	27
	- %	100.0	0.0	29.3	33.3	23.1	30.0	28.1
2007	Total nests *	8	3	36	5	17	56	125
	Nests parasitized	2	0	8	0	4	29	43
	- %	25.0	0.0	22.2	0.0	23.5	51.8	34.4
2008	Total nests *	15	28	45		15	51	154
	Nests parasitized	1	1	18		4	21	45
	- %	6.7	3.6	40.0		26.7	41.2	29.2
2009	Total nests *	21	44	112	4	24	68	273
	Nests parasitized	5	0	32	2	4	34	77
	- %	23.8	0.0	28.6	50.0	16.7	50.0	28.2
2010	Total nests *	19	28	110	4	11	66	238
	Nests parasitized	0	0	27	1	2	21	51
	- %	0.0	0.0	24.5	25.0	18.2	31.8	21.4
2011	Total nests *	13	26	81	2	11	36	169
	Nests parasitized	2	0	18	0	0	10	30
	- %	15.4	0.0	22.2	0.0	0.0	27.8	17.8
Avg	Average total nests *	11.0	19.1	61.4	3.1	13.3	44.9	152.9
	Average parasitized	1.6	0.1	16.6	0.9	2.6	18	39.7
	- %	14.3	0.9	27.0	27.3	19.4	40.1	26.0

* 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

3.4 The Overall Picture in 2011

Historically, a total of 66 species has bred at Tommy Thompson Park. Some rare and isolated breeding records are unlikely to recur with any regularity (e.g., Wilson’s Phalarope or Northern Bobwhite). A complete historical breeding bird species list is presented in Appendix D, Species Accounts.

During the summer of 2011, 64 species were detected at Tommy Thompson Park through VCP counts, nest searching and casual observations. Of these, three were classified as possible breeders, four as probable and 36 species (including colonial waterbirds) were confirmed breeders (see Appendix F for a list of the species in each category, as well as a definition of each category). An additional 21 species were observed and classified as non-breeders (habitat and/or range unsuitable for breeding).

Table 3.8 Species Recorded Only by VCP Counts Versus Species Recorded Only By Nest

Species Recorded Only Through VCP Counts	Species Recorded Only Through Nest Discovery
Alder Flycatcher	American Woodcock
Black-capped Chickadee	Gadwall
Brown-headed Cowbird	House Wren
Chimney Swift	Mallard
Common Yellowthroat	Orchard Oriole
House Finch	
Least Flycatcher	
Northern Cardinal	

It is interesting to note the species detected only by VCP counts versus those recorded only by nest discovery (Table 3.8). 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, (ii) secretive habits (e.g., woodcock), (iii) well-hidden nests (e.g., chickadee), (iv) nests not on TTP (e.g., swifts) or nests not located near VCP stations (e.g., Orchard Oriole).

3.5 Discussion

The most valuable aspect of this project will be its ability to reveal changes in breeding bird abundance and diversity over time at the 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 seven years of VCP counts include Red-winged Blackbird, Song Sparrow, European Starling and Yellow Warbler, all of which require basic habitat conditions with a few fundamental components to thrive.

As can be seen in Table 3.9, the 36 confirmed breeders in 2011 were lower than the average, but not the lowest of the seven years of the project. However, the 64 total species detected during all surveys represent the lowest total recorded thus far. This was the second low total in succession, and data from subsequent years will be required to determine whether the totals from these two years have any special significance.

Table 3.9. Summary of Species Detected Through VCP Counts and Nest Searching

	2005	2006	2007	2008	2009	2010	2011	AVG
Confirmed Breeding Species	35	45	43	34	37	40	36	38.6
Probable Breeding Species	10	4	7	9	11	2	4	6.7
Possible Breeding Species	22	19	10	15	14	8	3	13.0
Other Species Observed	0	7	13	16	20	17	21	13.4
Total Species	67	75	73	74	82	67	64	71.7

With seven years of data now available, some conclusions and trends are beginning to emerge:

- While the high totals of certain species experienced in 2011 were encouraging (see VCP counts in Table 3.4 for American Goldfinch, American Robin, Barn Swallow, Common Grackle, Tree Swallow, Warbling Vireo and Yellow Warbler totals), the same cannot be said for some other species. Bobolink, Eastern Meadowlark and Savannah Sparrow have virtually disappeared from both the VCP counts and confirmed nests. Herbaceous vegetation at TTP is becoming denser, which may be having an adverse effect on nesting suitability for such species. More study is required.
- As shown in Figure 3.D, the known nest failure rate has been trending down over the course of the project. Reasons for this apparent trend are unknown and require further study.

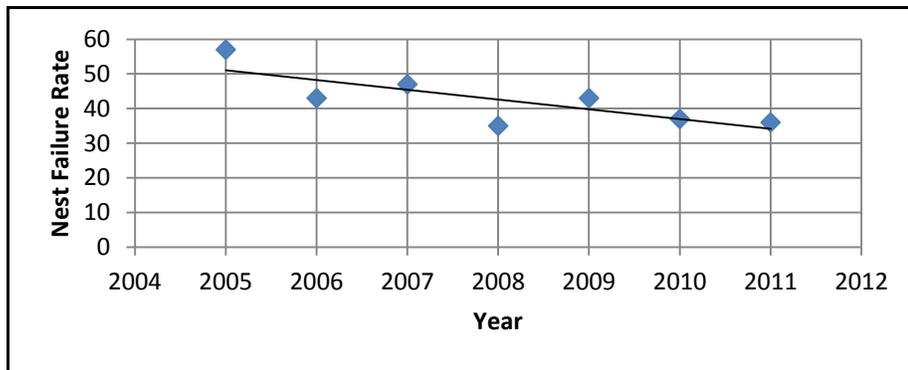


Figure 3.D Known Nest Failure Rate Trend

- As indicated in Table 3.7, it is apparent that Yellow Warblers have been the most heavily parasitized species by Brown-headed Cowbirds at an average rate of 40% per year of observable nests. Red-winged Blackbirds and Song Sparrows were both being parasitized at an average rate of 27%, followed closely by Willow Flycatchers (19%) and American Goldfinches (14%). Only one instance of an American Robin being parasitized has so far been detected, and no other species have been observed to be parasitized.
- While cowbird parasitism is still very much in evidence, Figure 3.E demonstrates that the overall parasitism rate has been trending down over the seven years, with 2011 experiencing the lowest overall rate at 17.8%. Possible explanations for this trend include (i) a reduction in the cowbirds' preferred foraging habitat at TTP due to the increase in 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 Breeding Birds

of Ontario, 2001-2005 (p. 602). It is also worth noting that the number of cowbirds recorded in the 2011 VCP counts was the lowest of the seven years.

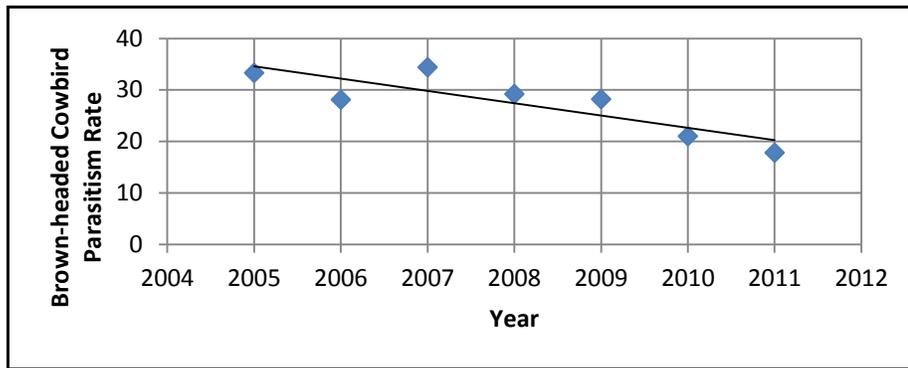


Figure 3.E Brown-headed Cowbird Parasitism Rate Trend

There have been 40 nesters confirmed during the seven years of surveys (excluding nine colonial waterbirds which have also been confirmed as nesters: Black-crowned Night-Heron, Canada Goose, Caspian Tern, Common Tern, Double-crested Cormorant, Great Egret, Herring Gull, Mute Swan and Ring-billed Gull). Refer to the Species Accounts in Appendix D for information on these records. Current habitat conditions remain appropriate for nesting by some additional species, so it is anticipated that the list of known breeding species will grow in the future. Natural change and habitat creation and restoration projects carried out by TRCA are also expected to increase the variety of habitats suitable for species not yet on the confirmed breeders list.

4. Acknowledgements

The colonial waterbird data were collected by TRCA staff.

The landbird and non-colonial waterbird section of this report is the result of the ongoing efforts of several dedicated volunteers. The 2011 VCP observations were collected by Ian Sturdee and Don Johnston, and the volunteer contributions to the nest searching phase of the project in 2011 are enumerated in Table 3.10.

Table 3.10 2011 Effort by Nest Searching Project Participants

Name	Total Hours
Marc Dupuis-Desormeaux	45:00
Don Johnston	91:45
Jan McDonald	35:30
Ian Sturdee	117:35
Bert Vanderzon	20:45
Paul Xamin	74:00
Total	384:35

Special thanks should go to Dan Derbyshire, former TTPBRS coordinator, who organized the landbird and non-colonial waterbird aspects of the Breeding Bird Survey project, set up the VCP point count and nest searching protocols, and contributed a significant effort to all phases of the project until his departure in 2008.

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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



VCP Stn 1 - 2010 - 1 (North)



VCP Stn 1 - 2010 - 2 (East)



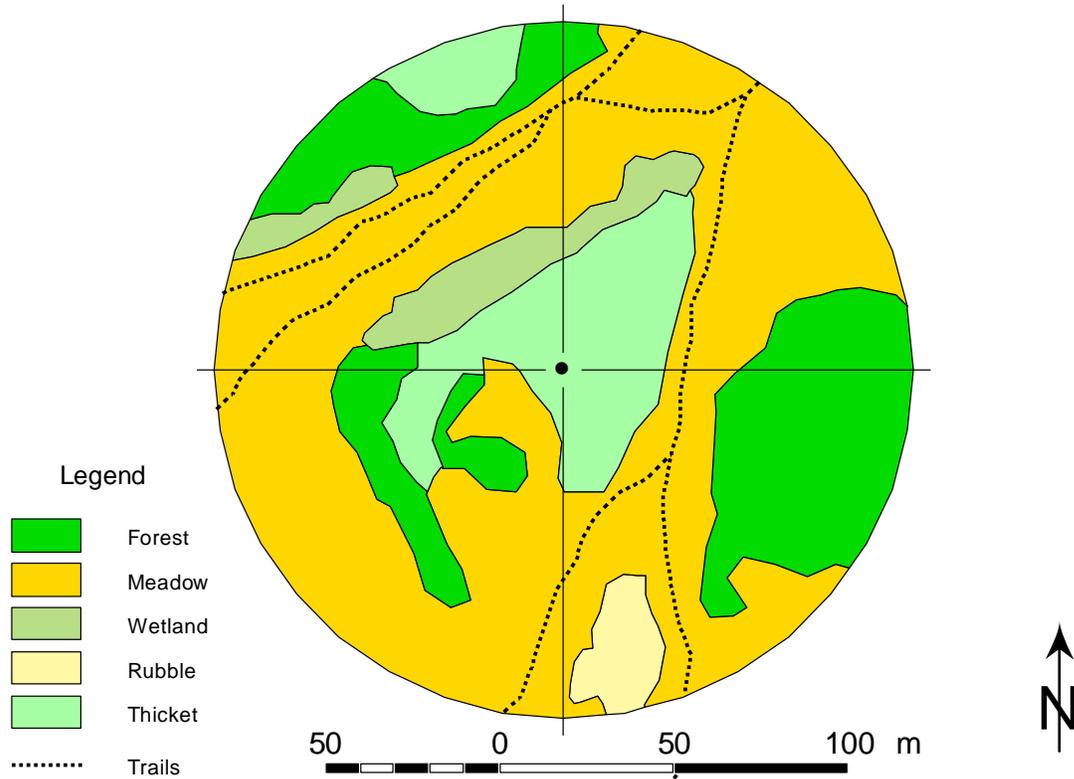
VCP Stn 1 - 2010 - 3 (South)



VCP Stn 1 - 2010 - 4 (West)

Sketch Map of Key Habitat Features

100 m radius circular plot



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

Station 2



VCP Stn 2 - 2010 - 1 (North)



VCP Stn 2 - 2010 - 2 (East)

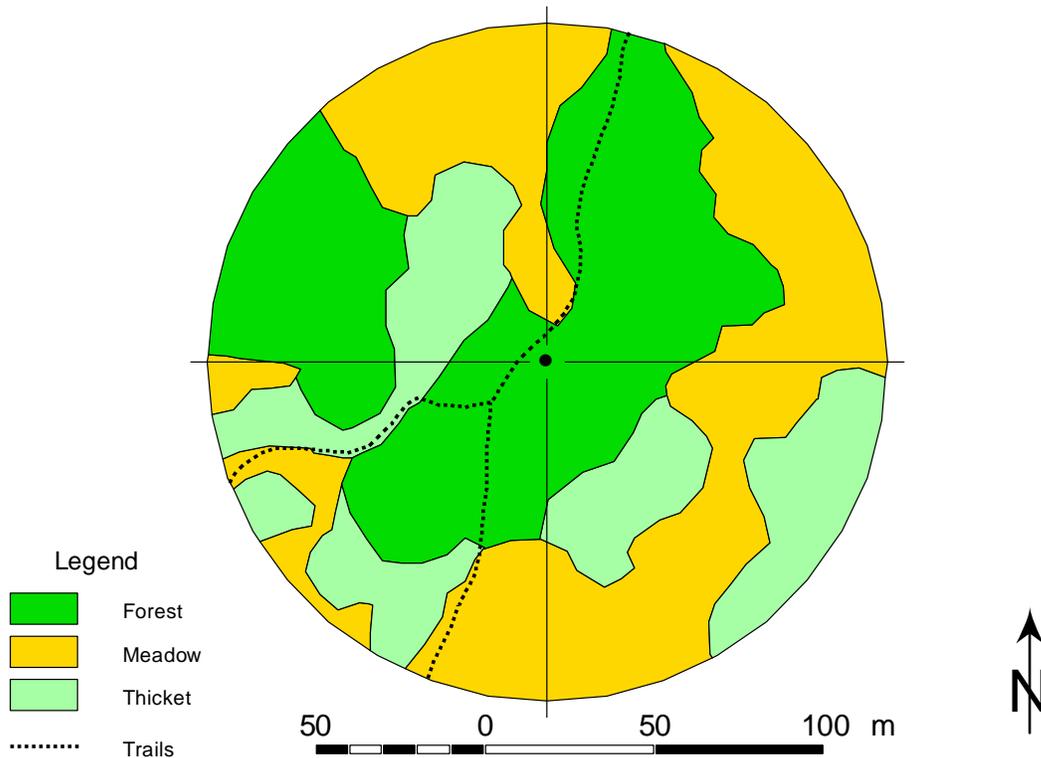


VCP Stn 2 - 2010 - 3 (South)



VCP Stn 2 - 2010 - 4 (West)

Sketch Map of Key Habitat Features 100 m radius circular plot



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

Station 3



VCP Stn 3 - 2010 - 1 (North)



VCP Stn 3 - 2010 - 2 (East)



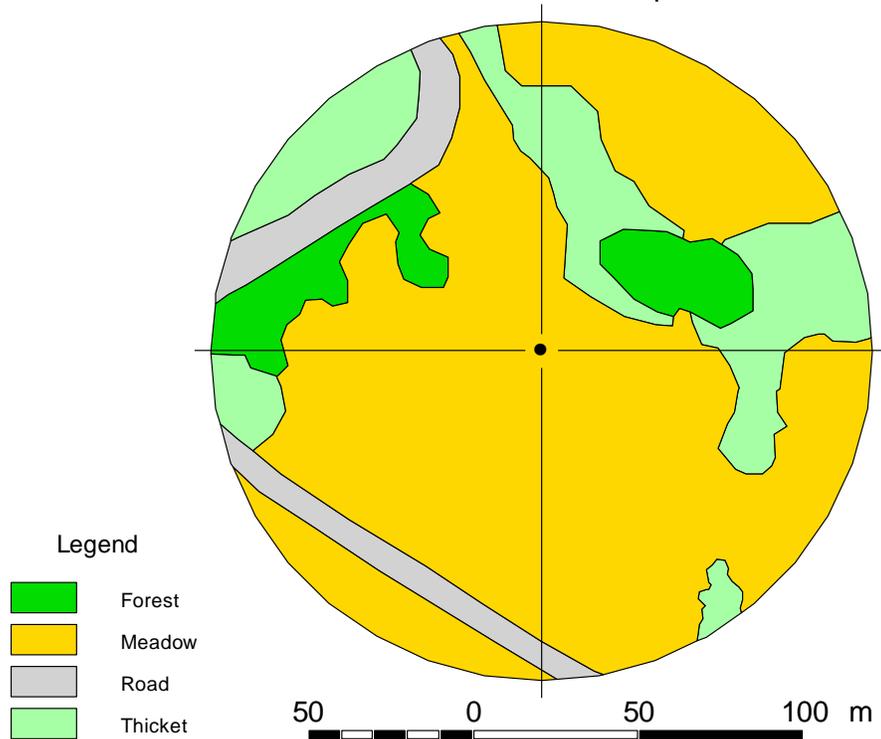
VCP Stn 3 - 2010 - 3 (South)



VCP Stn 3 - 2010 - 4 (West)

Sketch Map of Key Habitat Features

100 m radius circular plot



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

Station 4



VCP Stn 4 - 2010 - 1 (North)



VCP Stn 4 - 2010 - 2 (East)

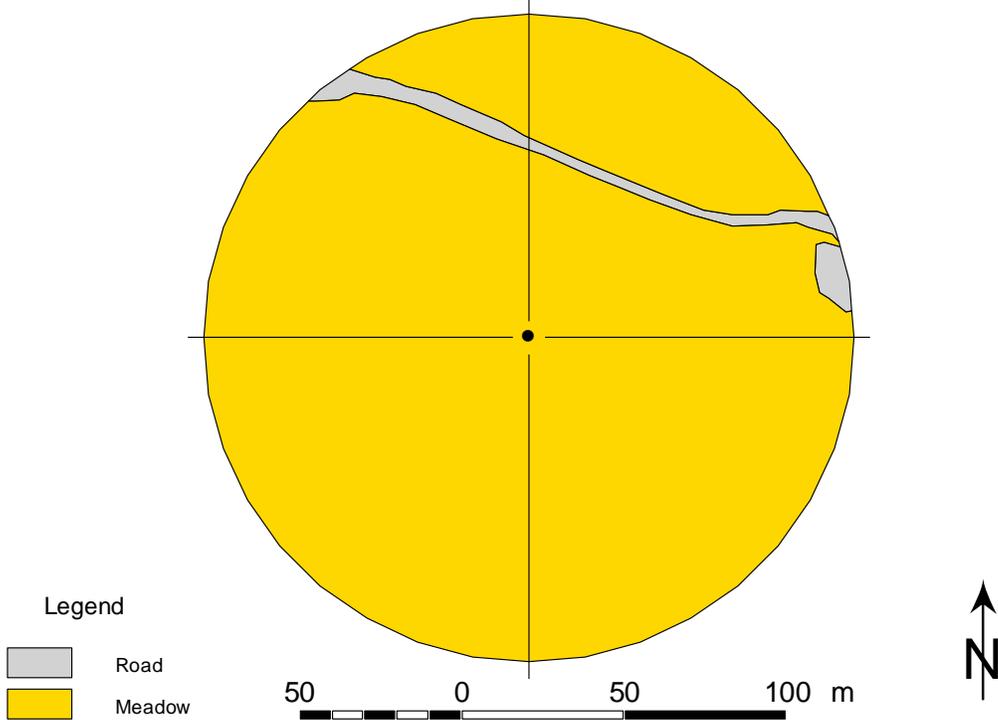


VCP Stn 4 - 2010 - 3 (South)



VCP Stn 4 - 2010 - 4 (West)

Sketch Map of Key Habitat Features 100 m radius circular plot



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

Station 5



VCP Stn 5 - 2010 - 1 (North)



VCP Stn 5 - 2010 - 2 (East)

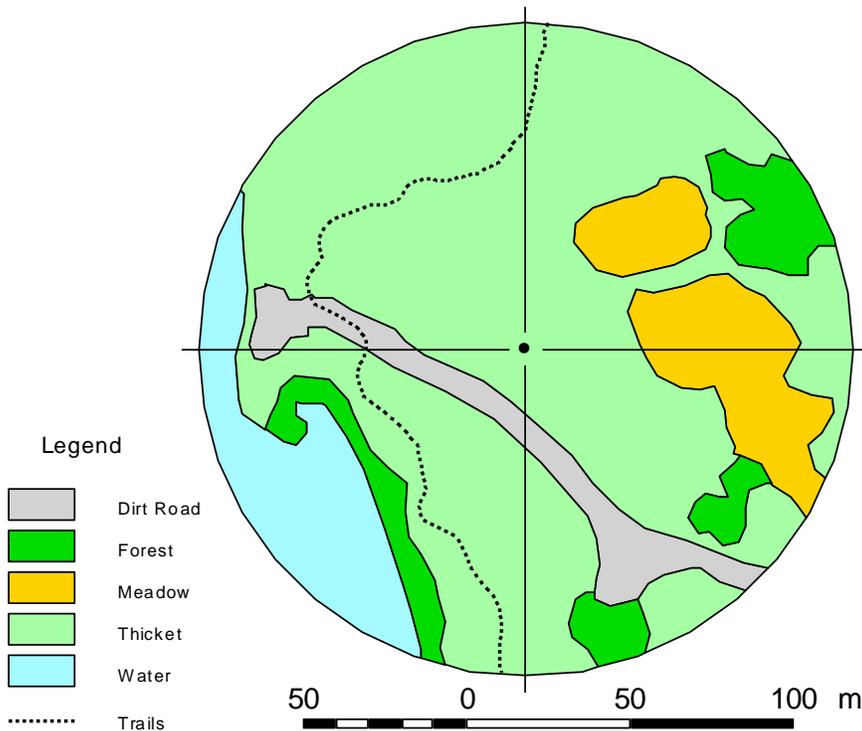


VCP Stn 5 - 2010 - 3 (South)



VCP Stn 5 - 2010 - 4 (West)

Sketch Map of Key Habitat Features
100 m radius circular plot



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

Station 6



VCP Stn 6 - 2010 - 1 (North)



VCP Stn 6 - 2010 - 2 (East)

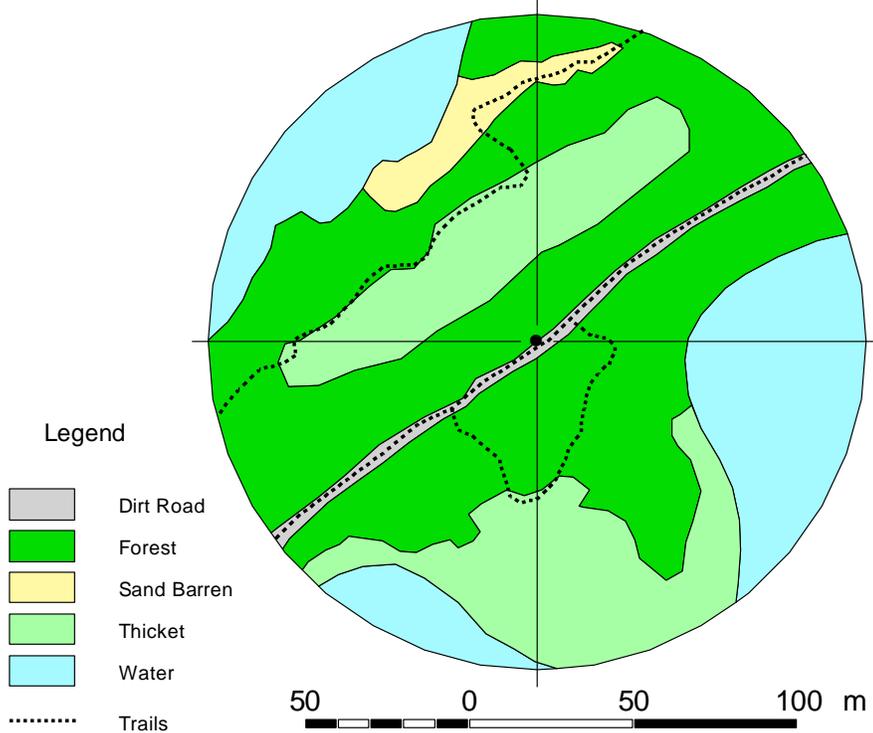


VCP Stn 6 - 2010 - 3 (South)



VCP Stn 6 - 2010 - 1 (West)

Sketch Map of Key Habitat Features 100 m radius circular plot



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

Station 7



VCP Stn 7 - 2010 - 1 (North)



VCP Stn 7 - 2010 - 2 (East)

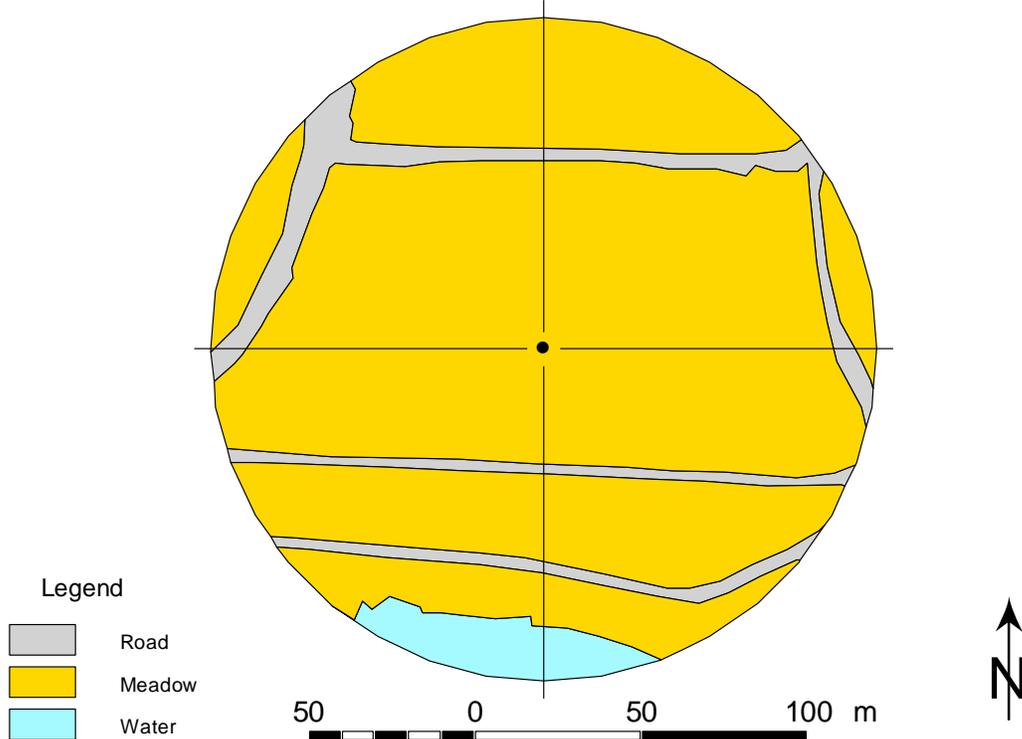


VCP Stn 7 - 2010 - 3 (South)



VCP Stn 7 - 2010 - 4 (West)

Sketch Map of Key Habitat Features 100 m radius circular plot



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

Station 8



VCP Stn 8 - 2010 - 1 (North)



VCP Stn 8 - 2010 - 2 (East)

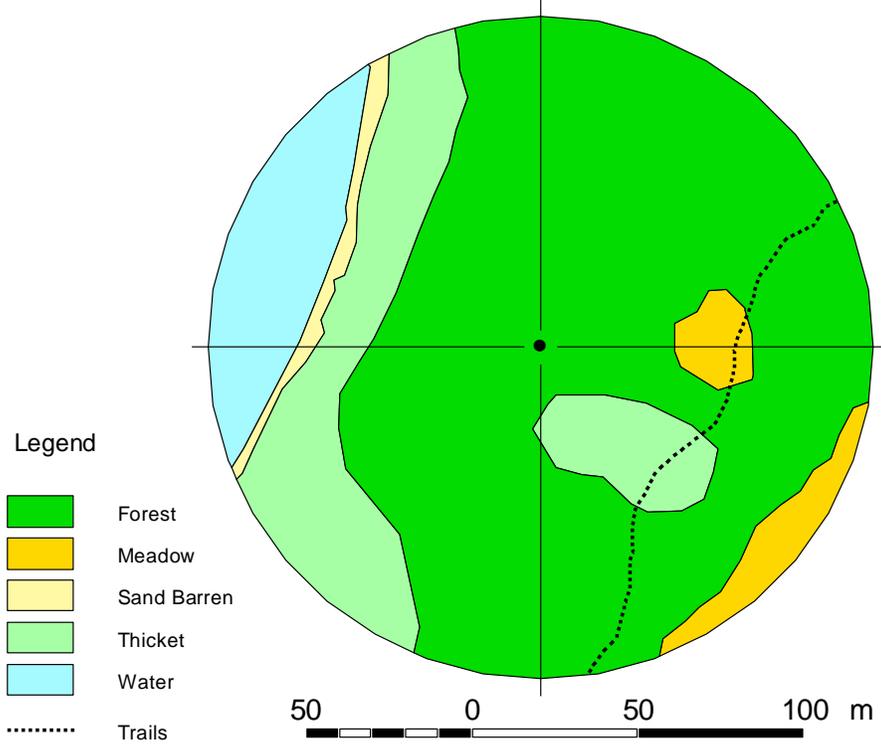


VCP Stn 8 - 2010 - 3 (South)



VCP Stn 8 - 2010 - 4 (West)

Sketch Map of Key Habitat Features 100 m radius circular plot



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

Station 9



VCP Stn 9 - 2010 - 1 (North)



VCP Stn 9 - 2010 - 2 (East)

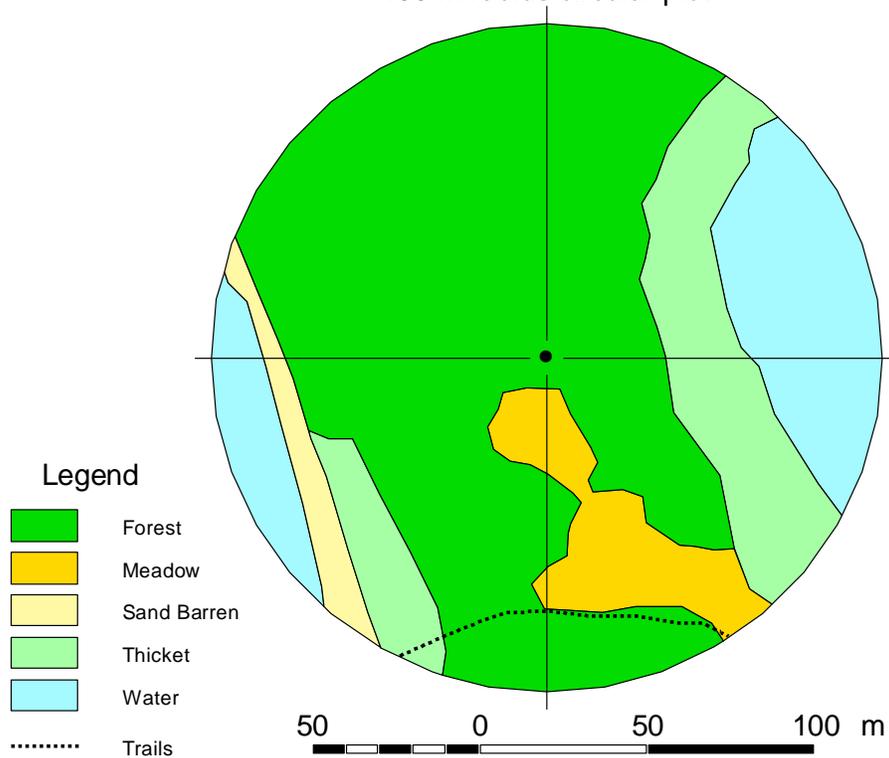


VCP Stn 9 - 2010 - 3 (South)

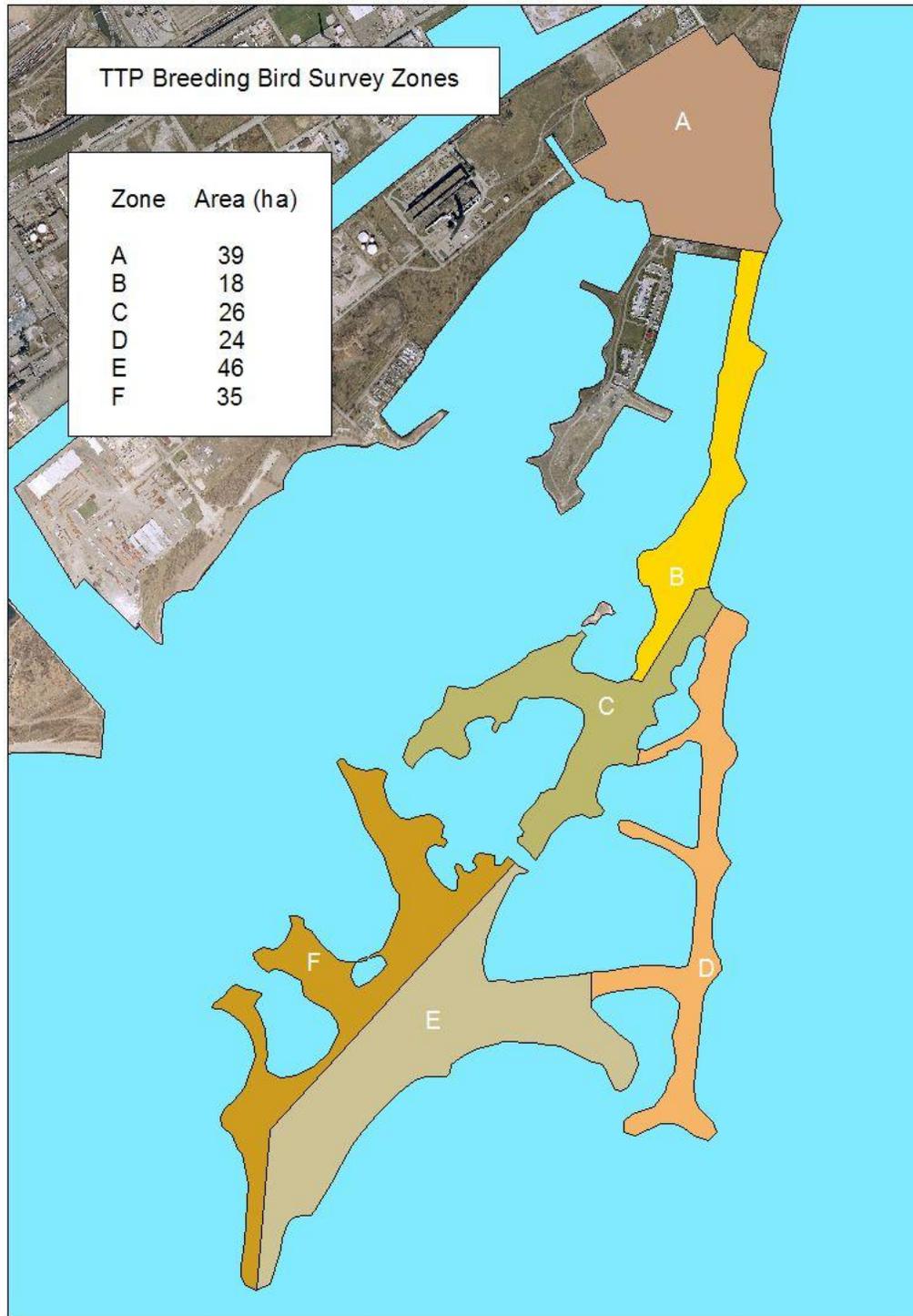


VCP Stn 9 - 2010 - 4 (West)

Sketch Map of Key Habitat Features 100 m radius circular plot



Appendix C: Map of TTP Breeding Bird Survey Zones



Appendix D: Species Accounts

The following accounts include species that were listed as observed, or as possible, probable or confirmed breeders in 2011, as well as historically confirmed breeders. Species highlighted in red were detected in 2011 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.

American Crow (2011 - absent) Known to have bred historically at TTP.

American Goldfinch (2011 - confirmed) This species is a regular nester at TTP. In 2010, 33 nests were discovered.

American Kestrel (2011 - absent) Known to have bred historically at TTP.

American Redstart (2011 - observed) This species has never been confirmed as a breeder at TTP, but has been observed regularly at TTP during breeding season the last few years.

American Robin (2011 - confirmed) Common nesting species in forested areas throughout TTP. 69 nests were recorded in 2010 in nearly all zones at TTP.

American Woodcock (2011 - confirmed) Three nests were confirmed in 2010, with at least one successful. Additionally, one nest found on May 19 (with eggs) was presumably a second nest, as this species is an early nester (April). One nest was in the Baselands, one in the Toplands, and the third near the main road opposite Peninsula C.

American Black Duck (2011 - absent) Known to have bred historically at TTP.

Baltimore Oriole (2011 - confirmed) Common nesting species in forest areas of TTP. A total of 10 nests were recorded in 2010.

Bank Swallow (2011 - confirmed) Small nesting colonies were discovered in both the meadows and southern shoreline of the Toplands area in earlier years. Two nest sites were found in 2010, each comprised of multiple nest holes and located on the Lake Ontario shoreline bank at the south end of the Flats and Toplands.

Barn Swallow (2011 - confirmed) Barn Swallows are regular nesters at TTP under the eaves of buildings, particularly the garage located near the Port Authority booth. Two nests were discovered here in 2010.

Bay-breasted Warbler (2011 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2010 during the breeding season was presumably a late migrant.

Belted Kingfisher (2011 - observed) This species was confirmed for the first time in 2003 based on observations of fledged young. No nests were found in 2011.

Black-billed Cuckoo (2011 - probable) Known to have bred historically at TTP. In 2011, a recently-fledged birds were observed, although the nest was not located. Since the bird could have come from outside TTP, it was not counted as a confirmed breeder.

Black-capped Chickadee (2011 - probable) A regular but uncommon nester at TTP. No nests were detected in 2011.

Black-crowned Night-Heron (2011 - confirmed) An abundant nesting colonial waterbird species at TTP. An estimated 30% of the Canada-wide population of Black-crowned Night-Herons breed here.

Black-throated Blue Warbler (2011 – observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Black-throated Green Warbler (2011 – observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Blue Jay (2011 - observed) This species has never been confirmed as a breeder at TTP. No nesting evidence was obtained in 2011 beyond observation of the species in suitable habitat during breeding season.

Blue-gray Gnatcatcher (2011 - observed) Known to have bred historically. In 2011, no nests were found.

Blue-winged Teal (2011 - absent) Known to have bred historically at TTP. In previous years the species has been observed in suitable habitat during the breeding season.

Brown Thrasher (2011 - absent) Brown Thrasher is a regular but uncommon nester at TTP, although no nests were discovered in 2011.

Brown-headed Cowbird (2011 - confirmed) Brown-headed Cowbird is a common species throughout TTP during summer, and in 2011, a total of 30 nests of American Goldfinch, Yellow Warbler and Red-winged Blackbird were found to have been parasitized by Cowbirds.

California Gull (2011 – absent) Known to have bred historically at TTP.

Canada Goose (2011 - confirmed) Canada Goose is a regular breeder at TTP along shoreline edges of embayments and containment cells.

Canada Warbler (2011 – observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Canvasback (2011 - probable) Canvasback has bred almost annually in recent years in the Triangle Pond area at TTP. In 2011, the species was observed in suitable habitat during the breeding season.

Caspian Tern (2011 - absent) Known to have bred in 2005-7 at TTP and is known to have bred in the area of TTP in 2011, but not at TTP.

Cedar Waxwing (2011 - confirmed) A common late nester at TTP; 21 nests were found in 2011.

Chestnut-sided Warbler (2011 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Cliff Swallow (2011 – observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 may have been nesting in the vicinity of TTP.

Common Grackle (2011 - confirmed) Common Grackle is a regular nester at TTP. In 2011, 4 nests were found.

Common Tern (2011 - confirmed) An abundant annual nesting colonial waterbird species at TTP.

Common Yellowthroat (2011 - observed) Known to have bred historically at TTP. Observed in 2011, but no nest was found.

Double-crested Cormorant (2011 - confirmed) An abundant annual nesting colonial waterbird species at TTP.

Downy Woodpecker (2011 - confirmed) In 2011, one nest was found. This was only the third nest confirmation since the project started in 2005.

Eastern Kingbird (2011 - confirmed) A regular breeder at TTP along forest edges where meadow and shrubs are present. In 2011, a total of 12 nests were found.

Eastern Meadowlark (2011 - 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.

Eastern Wood Pewee (2011 - confirmed) One nest was located in 2011 in the Wet Woods in the Baselands. This was only the third nest of the project.

European Starling (2011 - 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. Four nests were documented in 2011.

Gadwall (2011 - confirmed) Gadwall is a surprisingly common nesting species at TTP. Three nests were confirmed in 2011.

Gray Catbird (2011 - confirmed) Gray Catbird is a regular nester at TTP, preferring dense shrubs with some tree cover. A total of 16 nests were found in 2011.

Great black-backed Gull (2011 - absent) Known to have bred historically at TTP. A few individuals were observed in previous years.

Great Egret (2011 - confirmed) Regular nester on Peninsula C.

Great Blue Heron (2011 - absent) Known to have bred historically at TTP.

Green-winged Teal (2011 - absent) Known to have bred historically at TTP.

Herring Gull (2011 - confirmed) A common annual nesting colonial waterbird species at TTP.

Hooded Merganser (2011 - possible) This species has never been confirmed as a breeder at TTP. In 2011, several individuals and groups were seen in the waters around and on TTP in June and July. Hooded Merganser has been a common summer species in TTP aquatic areas. Observations of the species typically involve counts of multiple adults, usually females. These birds may be breeding at TTP, but are more likely breeders that have dispersed from other areas.

Horned Lark (2011 - absent) Known to have bred historically at TTP.

House Finch (2011 - observed) Known to have bred historically at TTP. Observed in 2011, but no nest was found.

House Sparrow (2011 - absent) Known to have bred historically at TTP.

House Wren (2011 - confirmed) A regular nester at TTP, but in low numbers. In 2011, one nest was found.

Indigo Bunting (2011 – observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Killdeer (2011 - confirmed) Killdeer is a common nesting species at TTP in open areas with low vegetation. Two nests were found in 2011.

Least Flycatcher (2011 - possible) A regular but uncommon breeder at TTP.

Magnolia Warbler (2011 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Mallard (2011 - confirmed) Mallard is a regular nester at TTP. Six nests were documented in 2011; mostly predated.

Mourning Dove (2011 - observed) Mourning Dove is a common breeder at TTP. Birds were observed in 2011, although no nests were found.

Mute Swan (2011 - confirmed) Mute Swan is a regular nesting species along TTP shorelines.

Nashville Warbler (2011 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Northern Bobwhite (2011 - absent) Known to have bred historically at TTP.

Northern Cardinal (2011 - observed) Northern Cardinal is an uncommon but usually an annually-nesting species at TTP. In 2011, no nest was found, although the species was observed.

Northern Flicker (2011 - confirmed) Northern Flicker is a regular nesting species at TTP. Three nests were found in 2011.

Northern Parula (2011 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Northern Rough-winged Swallow (2011 - confirmed) Known to have bred historically at TTP. One nest was found in 2011 in the bank along the south shore of TTP.

Northern Waterthrush (2011 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Orchard Oriole (2011 - confirmed) One or two nests of this species have been found in most years of the project. In 2011, one nest was found.

Redhead (2011 - absent) Known to have bred historically at TTP.

Red-winged Blackbird (2011 - confirmed) The most abundant nesting species at TTP (excluding waterbirds), found throughout the TTP area. A total of 232 nests was found in 2011.

Ring-billed Gull (2011 - confirmed) An abundant nesting colonial waterbird species at TTP.

Ring-necked Pheasant (2011 - absent) Known to have bred historically at TTP.

Rock Pigeon (2011 - observed) Known to have bred historically at TTP. Observed in 2011, but no nest was found.

Savannah Sparrow (2011 - probable) In the past, Savannah Sparrow has been a common 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 confirmed nesting evidence was obtained in 2011 beyond observation of singing individuals in suitable habitat on the Flats during the breeding season.

Song Sparrow (2011 - confirmed) Although Song Sparrow is one of the most abundant nesting species at TTP, finding its well-concealed nests has proved to be difficult. In 2011, two nests were found.

Sora (2011 - absent) Known to have bred historically at TTP.

Spotted Sandpiper (2011 - confirmed) A common nester at TTP in open areas near water. Four nests were found in 2011. Observations of juveniles along roadways are frequent.

Tennessee Warbler (2011 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2011 during the breeding season was presumably a late migrant.

Tree Swallow (2011 - confirmed) Tree Swallow is a common breeder at TTP. In 2011, several nest boxes were occupied, particularly around Cell 1, but only five nests were documented and monitored. In general, tree swallows using nest boxes are not monitored.

Virginia Rail (2011 - absent) Known to have bred historically at TTP.

Warbling Vireo (2011 - confirmed) A common nesting species in forested areas of TTP. In 2011, 15 nests were found.

Willow Flycatcher (2011 - confirmed) Willow Flycatcher is a common nesting species in more open areas with dense shrubs. In 2011, 12 nests were found.

Wilson's Phalarope (2011 - absent) Known to have bred historically at TTP; species not detected in recent years.

Yellow Warbler (2011 - confirmed) Yellow Warblers are common to abundant at TTP. Yellow Warbler colonies exist on Peninsula D, in the Baselands and in the shrubland areas of the Neck and around Cell 3. A total of 88 nests were found in 2011. This species has been observed to be the most frequently parasitized species by Brown-headed Cowbirds at TTP.

Appendix E: Map of 2011 Nest Locations



Appendix F: Breeding Status Codes for Each Species Detected In 2011

OBSERVED	POSSIBLE	PROBABLE	CONFIRMED
Bay-breasted Warbler	American Redstart	Black-billed Cuckoo	American Goldfinch
Belted Kingfisher	Hooded Merganser	Black-cap. Chickadee	American Robin
Black-thr. Blue Warbler	Least Flycatcher	Canvasback	American Woodcock
Black-thr. Green Warbler		Savannah Sparrow	Baltimore Oriole
Blue Jay			Bank Swallow
Blue-gray Gnatcatcher			Barn Swallow
Canada Warbler			Black-cr. Night-Heron
Caspian Tern			Brown-h. Cowbird
Chestnut-sided Warbler			Canada Goose
Cliff Swallow			Cedar Waxwing
Common Yellowthroat			Common Grackle
House Finch			Common Tern
Indigo Bunting			Double -Cr Cormorant
Magnolia Warbler			Downy Woodpecker
Mourning Dove			Eastern Kingbird
Nashville Warbler			East Wood Pewee
Northern Cardinal			European Starling
Northern Parula			Gadwall
Northern Waterthrush			Gray Catbird
Rock Pigeon			Great Egret
Tennessee Warbler			Herring Gull
			House Wren
			Killdeer
			Mallard
			Mute Swan
			Northern Flicker
			N.R-winged Swallow
			Orchard Oriole
			Red-winged Blackbird
			Ring-billed Gull
			Song Sparrow
			Spotted Sandpiper
			Tree Swallow
			Warbling Vireo
			Willow Flycatcher
			Yellow Warbler

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