

The Breeding Birds of Tommy Thompson Park

2012



Young Barn Swallows (P. Xamin)

Toronto and Region Conservation



Prepared by
Don Johnston and Ian Sturdee

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The 2012 report of the Breeding Birds of Tommy Thompson Park is dedicated to the memory of Andrew Jano, who passed away early in 2012. Until his untimely death, Andrew played a major role in all aspects of the breeding bird project, enthusiastically searching for nests throughout the spring and summer, and then helping with the preparation of the reports. In particular, the detailed maps and vegetation graphics contained in the Appendices were his creation.

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1. Introduction

1.1 Study Area



TTP Aerial View (Aerographic)

Tommy Thompson Park (TTP) is located on the Leslie Street Spit, a five km long human-made peninsula in Lake Ontario in Toronto, Ontario. Construction of the peninsula began in the 1950s for port-related facilities, but through natural succession and habitat enhancement efforts by its owner, the Toronto and Region Conservation Authority (TRCA), it has become the largest area of natural habitat on the Toronto waterfront. The final size of the Spit is complete at approximately 500 ha, including the associated water lots; however, the Toronto Port Authority continues to run a lake-filling operation in shoreline erosion areas.

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.

Reasons for the IBA designation include globally significant numbers of colonial waterbirds under the general congregatory threshold and nationally significant numbers of waterfowl during spring and fall migration, as well as, depending on ice conditions, during winter.

In addition to the nesting waterbirds, the geographical location of the park and its natural features make it very attractive for large numbers of migrating birds, butterflies and other nesting birds.

2. Colonial Waterbirds

2.1 Project Background



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 TTP; three species are predominately tree nesters: Double-crested Cormorant, Black-crowned Night-Heron and Great Egret; and four species are ground nesters: Ring-billed Gull, Herring Gull, Caspian Tern and Common Tern.

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. Caspian Terns are typically counted each year; however they have been absent from the site since 2004, and due

to their proximity to the cormorant ground nesting area, were not counted this year. 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 2.5cm 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 software. 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 24m², 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 120m², and is more challenging to count because of its size and tall vegetation. Observers carefully walk the island 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 1m wide transects and observers carefully walk the transect counting all active nests with a manual handheld tally counter and mark 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 staffs undertake population estimates of the Ring-billed Gull nesting area.

Cormorant ground nests 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 2012 Double-crested Cormorants nested in trees on Peninsulas A, B and C, as well as on the ground on Peninsula B. Black-crown 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. Caspian Terns nested on the ground on Peninsula B. Common Terns attempted nesting on three artificial reef rafts in Cell Two, one artificial reef raft in Embayment D and a man-made island in Cell One (Figure 2.A).

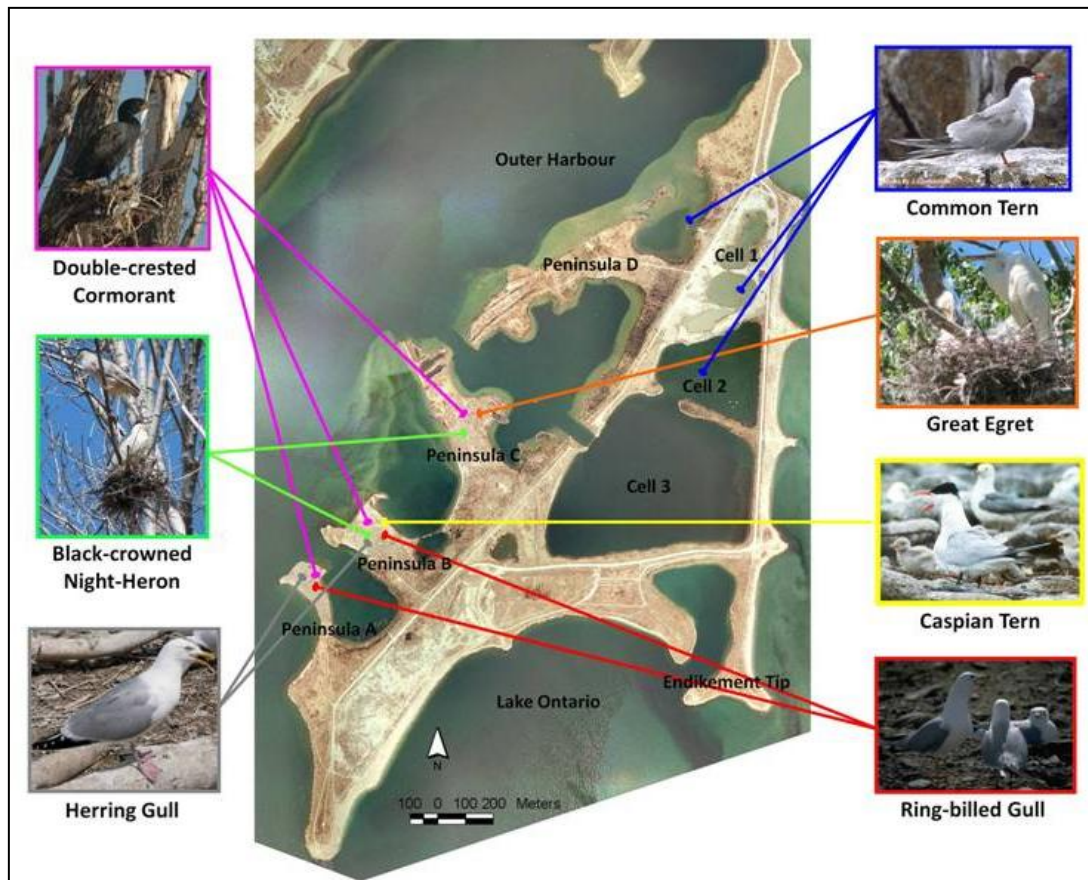


Figure 2.A. Colonial Waterbird Nesting Areas, 2012

Table 2.1. Colonial Waterbird Nests at TTP, 2002 - 2012

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
DCCO	3,543	3,942	5,046	5,674	6,125	7,059	6,717	7,564	9,434	11,374	11,741
BCNH	1,040	904	601	610	504	730	455	546 ^a	431	423	410
GREG	0	0	1	4	3	5	5	7	5	7	8
RBGU	58,000*	56,151	45,000*	40,000*	35,000*	33,000*	30,000	30,000*	28,000*	32,000*	32,000*
HERG	NC	48	79	NC	NC	45	30	NC	<20*	NC	NC
COTE	445	420	433	448	NC	367	310	354	231	54	24*
CATE	65	252	350*	0	0	0	0	0	0	0	5*

a - Nesting failed by June 30

*- Estimate

Cormorant nests numbered 11,741, including 5,812 ground nests (Figure 2.B). The overall population increased three percent, while the ground nesting population increased 28 percent over the previous year (Figure 2.B). As indicated in Figure 2.B, 50 percent of the TTP cormorant colony nested on the ground in 2012. 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 on all three Peninsulas for the first time since the management strategy commenced in 2009 (Figure 2.B).

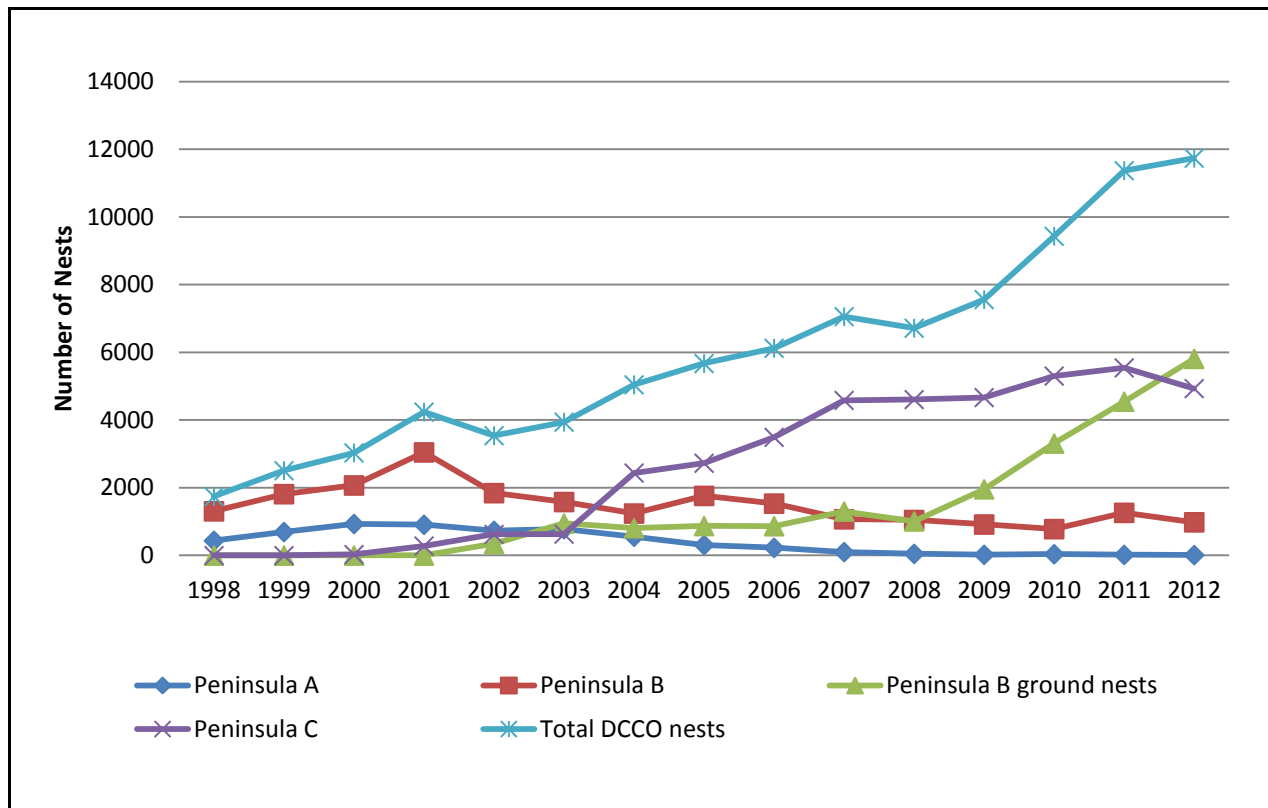


Figure 2. B. Double-crested Cormorant Nests at TTP by Location, 1998 - 2012



Breeding Double-crested Cormorant at TTP, May 2012. Photo courtesy of B. Van Bockstaele

Black-crowned Night-Heron nests numbered 410, a slight decline from 2011 (Table 2.1). Interestingly, nests on Peninsula B decreased by 90 percent, while nests on Peninsula C increased by 24 percent (Figure 2.C). The nest numbers of night-herons at TTP has always been stochastic, however the downward trend appears to be levelling off (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.

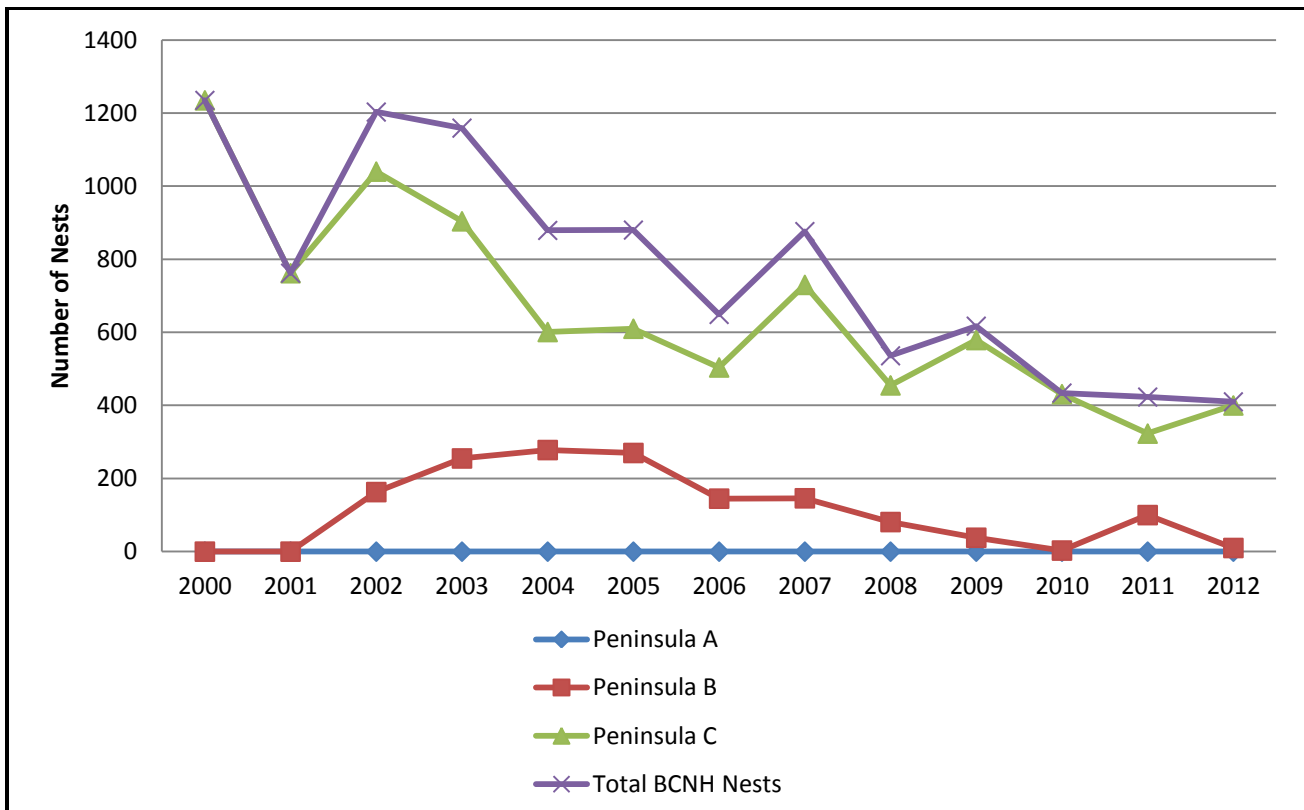


Figure 2.C. Black-crowned Night-Heron Nests at TTP by Location, 2000 - 2012

Great Egrets had 8 nests, representing an all-time high for nest numbers at TTP.

Caspian Terns nested on Peninsula B for the first time since 2004. Five pairs were observed on nests in May, but no nest count was undertaken due to the proximity to the cormorant ground nest area where disturbances (including human presence) are discouraged as per the management strategy.

For a second year, nesting Common Terns did not have a good breeding season at TTP. Colonization on the three rafts in Cell Two and on the Cell One island was slow and sparse due to failed nesting attempts in 2011 (mink predation in Cell Two, high water levels in Cell One that flooded the Tern Nesting Island). Precautions were taken in early 2012 to prevent future mink predation events by relocating the Cell Two rafts away from the shore, and one raft was wrapped in metal flashing to prevent mink from climbing aboard. In Embayment D, Common Terns abandoned their nests on June 16, at peak nesting, due to a devastating predation event by a raccoon that resulted in a complete loss of all eggs and chicks. After this predation event, some terns were observed re-nesting on the rafts in Cell Two and the Cell One Tern Island, however a full nest count was not conducted to avoid further disruption to the terns. There is evidence of some nesting success as fledglings were observed later in the season.

Gull population estimates were not undertaken in 2012, although anecdotal evidence suggests Ringed-billed Gull nests may be slightly above 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.

Eastern Kingbird Nest (D. Johnston)

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

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.

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 6.2% of nests found over the first seven years of surveys and 4.1% of nests found in 2012, 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.

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

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.

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

Species	2005	2006	2007	2008	2009	2010	2011	2012	AVG
ALFL							1		0.1
AMGO	19	22	15	10	8	22	35	8	17.4
AMKE	1								0.1
AMRO	27	14	25	31	26	34	41	40	29.8
AMWO					1				0.1
BANS	*	*	104	2	5	4	14	35	20.5
BAOR	30	21	29	22	23	13	28	22	23.5
BARS	2	1	31	3	11	8	32	31	14.9
BCCH	1	3	1	3	2	4	3	1	2.3
BEKI	1	3			2	1			0.9
BGGN		3	3	2	8				2.0
BHCO	16	15	22	11	19	19	10	17	16.1
BLJA				3	1	1		1	0.8
BLPW					1				0.1
BOBO		*	3						0.4
BRTH	5		4						1.1
CANG		*				*			-
CEDW	9	12	12	11	39	19	31	47	22.5
CHSW		*	*	2	*		2		0.5
CLSW	*								-
COGR	18	21	12	11	9	17	23	8	14.9
COYE	2	1	2	1		2	2		1.3
DOWO							2	1	0.4
EAKI	15	12	18	25	12	20	18	12	16.5
EAME		1	2	5					1.0
EAWP	1		1	1	3	1	8	6	2.6
EUST	92	24	21	35	116	41	52	39	52.5
FISP			3						0.4
GADW				3	*	1	16		2.5
GCFL			2		3				0.6
GRCA	22	26	24	19	17	38	16	21	22.9
HOFI	*	1	*				1		0.3
HOSP		3		2					0.6
KILL	5	3	1	7	8	3		2	3.6
LEFL		5	17	6	7	11	11	8	8.1
MALL		*		*	4			*	0.5
MAWA					1				0.1
MODO	*	1	6	1		*			1.0
NOCA	2	2	3		4	3	1	2	2.1
NOFL	3	2	1	1	2		2		1.4
NOMO						*			-
NRWS	*	*	22	7	8	5	14	*	7.0
OROR								1	0.1
ROPI		*	*	*					-
RWBL	151	167	154	203	312	199	244	295	215.6
SAVS	13	12	2		1				3.5
SOSP	98	74	72	68	81	55	46	50	68.0
SPSA	7	6	7	9	6	3	4	2	5.5
TRES	5	*	8	15	9	16	24	11	11.0
TRFL				1		1			0.3
VEER			1						0.1
WAVI	34	25	31	22	41	30	39	50	34.0
WIFL	35	23	27	17	26	14	25	16	22.9
YWAR	127	105	118	109	134	100	168	136	124.6
Birds	741	608	804	668	950	695	925	862	781.6
Species	32	37	38	35	37	32	29	26	33.3

* Species observed beyond 100 metres and/or flying over

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 26 species was detected for all counts in 2012, including one new species for the VCP counts, i.e., Orchard Oriole. The total of 26 species is the lowest total species seen during the project. Several species were recorded on counts in earlier years, but not in 2012, 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 2012, total bird abundance (Figure 3.A) per station generally followed the same pattern as earlier years, although at the higher end of experience for most stations. Species richness, or diversity, (Figure 3.B) for stations 1 – 5 was at the low end of project experience, but was average or at the high end of experience for stations 6 – 9.

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 114 - 124 birds per station, followed closely by Stations 1 (wet thicket) and 2 (forest) with totals of 84 – 85 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 2012 was at the high end of the range recorded in previous years for all stations.

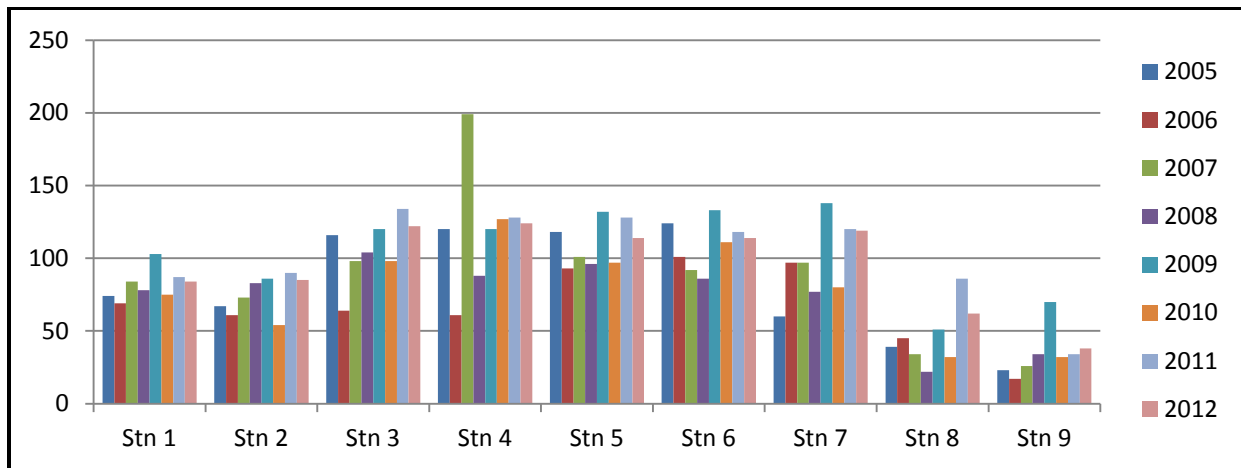


Figure 3.A. Total Bird Abundance per VCP Station

As mentioned above, 2012 diversity (i.e., species richness) was down at almost all stations when compared with previous years. The decline at Stations 1 and 5 can possibly be attributed to the significant intensification of shrub growth at these sites, but there is no obvious explanation for the decline at Stations 2, 3, 4 and 6 (although herbaceous vegetation has certainly become denser at Stations 3 and 4). The weakest station continues to be Station 9, located on Peninsula C within the large Double-crested Cormorant colony and in an area with limited biodiversity, although species richness has increased there modestly over the past two years.

It appears that the sudden increase in both abundance and richness experienced in 2011 at Station 8, within the Black-crowned Night-Heron colony and also on Peninsula C, may have been an anomaly, as the numbers returned to the levels of previous years.

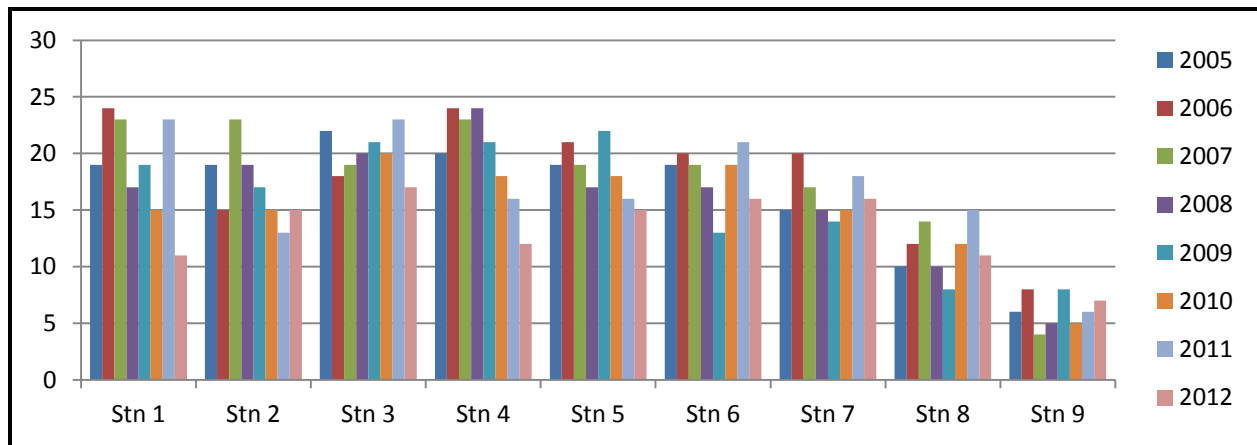


Figure 3.B. Species Richness per VCP Station

The total VCP count in 2012 was above average (i.e., 862 birds observed versus an eight-year average of 781.6). High counts for the eight years of the project were recorded in 2012 for Cedar Waxwing and Warbling Vireo. Three of the last four years of the project have seen above-average overall counts, and this continues to represent an encouraging sign for the development of suitable habitat at TTP for a variety of species.

3.3.2 Nest Searching and Monitoring Results

In 2012, a total of 397 hours was logged by seven participants. Figure 3.C shows the breakdown of effort per zone. As in 2011, the greater 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 lower effort in Zone D is primarily a result of fewer nests being located in this zone, thereby requiring less monitoring time.

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

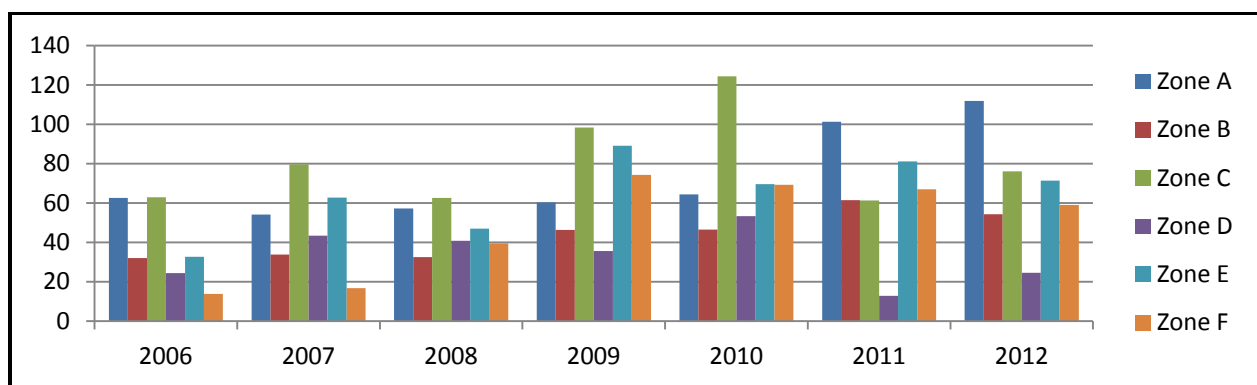


Figure 3.C. Nest Searching Effort per Zone from 2006 to 2012 (hours)

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 2012, a total of 633 nests was discovered, and 464 of these nests were monitored (see Table 3.5), excluding ground nests. Nests of 28 species were found in 2012.

Table 3. 5. Total Nests by Species from 2005 to 2012

Species	2005	2006	2007	2008	2009	2010	2011	2012	AVG*
AMGO		1	19	25	44	33	23	13	22.6
AMRO	3	12	26	51	93	69	115	93	65.6
AMWO						3	1	1	0.7
BANS	15	2			4	2	1		1.3
BAOR	5	13	12	9	9	10	17	16	12.3
BARS	7	5	5	3	3	2	4	11	4.7
BCCH	2			1	2			1	0.6
BEKI		1	1	2					0.6
BGGN		1	1	1	3			2	1.1
BRTH	1	1	1	3	4	2		2	1.9
CANG		1							0.1
CEDW		3	7	14	40	14	21	23	17.4
COGR		3	2	1		4	4	2	2.3
DOWO			1			1	1	1	0.6
EAKI	3	11	17	26	22	14	12	27	18.4
EAME		1				1			0.3
EAWP			1			1	1	1	0.6
EUST		5	2	5	7	12	4	5	5.7
GADW	5	1	4	3	3	1	3	4	2.7
GRCA	3	12	9	11	23	11	16	21	14.7
HOFI			1						0.1
HOSP	1	1							0.1
HOWR		1		2	2	2	1		1.1
KILL		3	2	5	8	13	2	4	5.3
LEFL		1	2		3	1			1.0
MALL	1	6	7	9	12	12	6	9	8.7
MODO		4	4		3			1	1.7
NOCA	2	1	6	2	4	1		1	2.1
NOFL	2	4		1		3	3		1.6
NRWS		1	1		2		1		0.7
OROR		1	2	1		2	1	2	1.3
RWBL	5	45	58	82	130	167	232	268	140.3
SOSP	1	6	5	1	7	8	2	3	4.6
SPSA	2	5	6	3	5	8	4	5	5.1
TRES	4	7	6	9	9	9	5	5	7.1
WAVI	1	8	4	7	7	9	15	12	8.9
WIFL	2	13	21	15	25	15	12	14	16.4
YWAR	8	34	71	71	75	82	88	86	72.4
Total	73	214	304	363	549	512	593	633	452.6
Total Effort (hours)		228.0	289.2	279.5	403.7	427.0	384.6	397.0	344.1
Efficiency (nests/hr)		0.94	1.05	1.30	1.36	1.20	1.54	1.59	1.32

* Averages exclude 2005 nests

The increase in Barn Swallow nests is significant in that this species is a provincially listed Species at Risk. (It is also worth noting that two of the Barn Swallow nests were on new buildings erected by TRCA.) As in the most recent years, the increase in the number of Red-winged Blackbird nests located in 2012 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 2012 total for Red-winged Blackbirds (268 nests) represents a new high for the eight years of the project.

Although the nest was not located, successful breeding by Wood Ducks was confirmed in 2012 by the presence of recently hatched young along with the adult female. This was the first confirmed nesting of Wood Ducks at TTP, although they had often been observed in suitable nesting habitat. In addition, single nests were discovered for Eastern Wood Pewee and Downy Woodpecker, species whose nests are difficult to locate.

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 continued to improve in 2012, as volunteers became further accustomed to new zones that were assigned in 2010. As in recent years, several nests were not able to be monitored extensively due to the number of nests and the limited availability of volunteers. Also, as mentioned previously, ground nests were not monitored once they were found.

The total number of nests located in 2012 (633) 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. (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.)

3.3.2.1 Nest Productivity

A total of 464 nests was recorded online with ONRS in 2012 (Table 3.6). In terms of nest productivity, 80 of 251 nests with known outcomes failed, while 171 were successful in fledging young. The remaining 213 nests had unknown outcomes, with the ratio of unknown outcomes to nests monitored being roughly in line with most previous years. The nests with unknown outcomes included all ground nests, which, commencing in 2012, were not monitored once found.

As can be seen in Table 3.6, the 2012 nest failure rate of 32% 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 2012. Possible predators at TTP include raccoons, gartersnakes, mink and coyotes, as well as other bird species. Of the 80 failures, 12 occurred at the egg stage, 12 at young stage and 56 at either egg or young stage.

Table 3.6. Nest Productivity from 2005 to 2012

	2005	2006	2007	2008	2009	2010	2011	2012	AVG
Nests discovered	73	214	304	363	549	512	593	633	405.1
Species	20	33	30	27	27	34	27	28	28.3
Nests monitored & reported to ONRS	73	214	236	297	456	440	430	464	326.3
Unknown outcome	45	71	160	148	170	213	155	213	146.9
Known outcome	28	143	144	149	286	227	275	251	187.9
- Successful nests	12	82	77	97	162	144	177	171	115.3
- Failed nests	16	61	67	52	124	83	98	80	72.6
- Failure rate	57%	43%	47%	35%	43%	37%	36%	32%	38.7%

As can be seen in Table 3.7, the 40 confirmed breeders in 2012 were slightly above the eight-year average. The 85 total species detected during all surveys is well above the eight-year average, reversing the trend of the previous two years, and results from a sharp increase in the number of species observed (i.e., 36). This latter number is attributable to the increased effort of the project participants in recording all species observed during the breeding season.

Table 3.7. Summary of Species Detected Through VCP Counts and Nest Searching

	2005	2006	2007	2008	2009	2010	2011	2012	AVG
Confirmed Breeding Species	35	45	43	34	37	40	36	40	38.6
Probable Breeding Species	10	4	7	9	11	2	4	3	6.4
Possible Breeding Species	22	19	10	15	14	8	3	6	12.3
Other Species Observed	0	7	13	16	20	17	21	36	15.4
Total Species	67	75	73	74	82	67	64	85	72.6

With eight years of data now available, some conclusions and trends continue to emerge.

As noted in 2011, 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. 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.

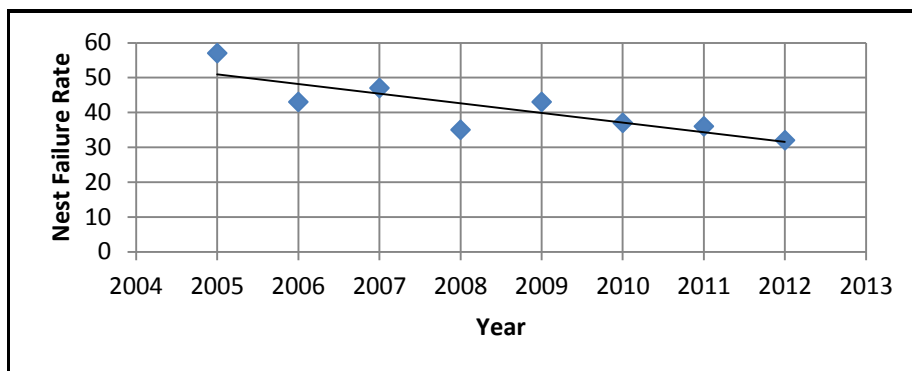


Figure 3.D Known Nest Failure Rate Trend

3.3.2.2 Parasitism by Brown-headed Cowbirds



Red-winged Blackbird Nest With Two Cowbird Eggs
(M. Dupuis-Desormeaux)

Brown-headed Cowbird parasitism is a major issue for small landbird populations in more open habitats and forest fragments. In 2012, a total of 39 nests of three species were found with cowbird eggs: Red-winged Blackbird (30 nests), Willow Flycatcher (2 nests) and Yellow Warbler (7 nests). This is the second year in a row that only three known species were parasitized.

The rate of parasitism among known host species at TTP is shown in 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 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.)

It is interesting to note that the rate of parasitism for Red-winged Blackbirds in 2012 was the highest recorded during the project to date, while that of Yellow Warblers was the lowest.

As indicated in Table 3.8, it is apparent that Yellow Warblers have been the most heavily parasitized species by Brown-headed Cowbirds at an average rate of 38.3% per year of observable nests. The other species which have been parasitized over the eight years of the project have been: Red-winged Blackbirds (28.8% average per year), Song Sparrows (25.0%), Willow Flycatchers (19.8%) and American Goldfinches (12.9%). Only one instance of an American Robin being parasitized has so far been detected, and no other species have been observed to be parasitized.

Table 3.8. Brown-headed Cowbird Parasitism Data and Rates from 2005 to 2012.

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
2012	Total nests *	8	17	77	2	8	33	145
	Nests parasitized	0	0	30	0	2	7	39
	- %	0.0	0.0	38.9	0.0	25.0	21.2	26.9
Avg	Average total nests *	10.6	18.9	63.4	3.0	12.6	43.4	151.9
	Average parasitized	1.4	0.1	18.3	0.8	2.5	16.6	39.6
	- %	12.9%	0.7%	28.8%	25.0%	19.8%	38.3%	26.1%

* 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

Despite an increase in the parasitism rate in 2012 over both 2010 and 2011, Figure 3.E demonstrates that the overall parasitism rate continues to trend downwards. Possible explanations for this 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 Breeding Birds of Ontario, 2001-2005 (p. 602). In addition to the jump in the parasitism rate in 2012, there was a similar increase in the number of cowbirds recorded in the 2012 VCP counts. It will be interesting to see what happens to these two measures in subsequent years.

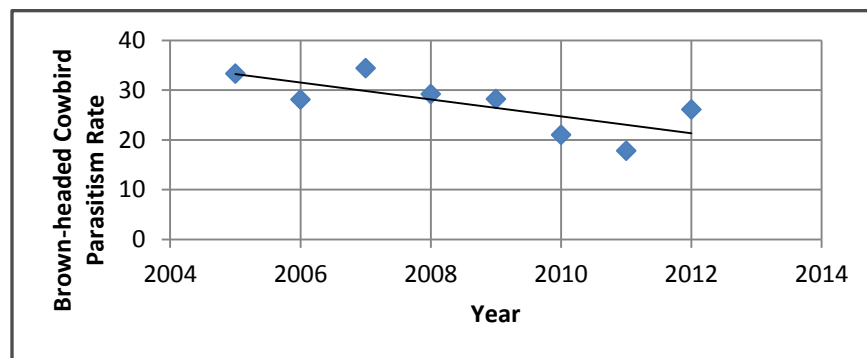


Figure 3.E Brown-headed Cowbird Parasitism Rate Trend

3.4 The Overall Picture in 2012

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 eight 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.

There have been 41 nesters confirmed during the eight 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.

It is interesting to note the species detected only by VCP counts versus those recorded only by nest discovery (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, (ii) secretive habits (e.g., woodcock), (iii) well-hidden nests (e.g., thrasher), (iv) nests or normal habitat not located near VCP stations (e.g., ducks).

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

Species Recorded Only Through VCP Counts	Species Recorded Only Through Nest Discovery
Bank Swallow	American Woodcock
Brown-headed Cowbird	Brown Thrasher
Blue Jay	Gadwall
Least Flycatcher	Mallard
	Mourning Dove

With the addition of Wood Duck in 2012, 67 species have now 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.

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 2012 VCP observations were collected by Ian Sturdee and Don Johnston, and the volunteer contributions to the nest searching phase of the project in 2012 are enumerated in Table 3.10.

Table 3.10 2011 Effort by Nest Searching Project Participants

Name	Total Hours
Marc Dupuis-Desormeaux	26.5
Don Johnston	96.3
Jan McDonald	18.3
Glenn Reed	13.0
Ian Sturdee	139.5
Bert Vanderzon	16.0
Paul Xamin	81.0
Total	390.5

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

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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)



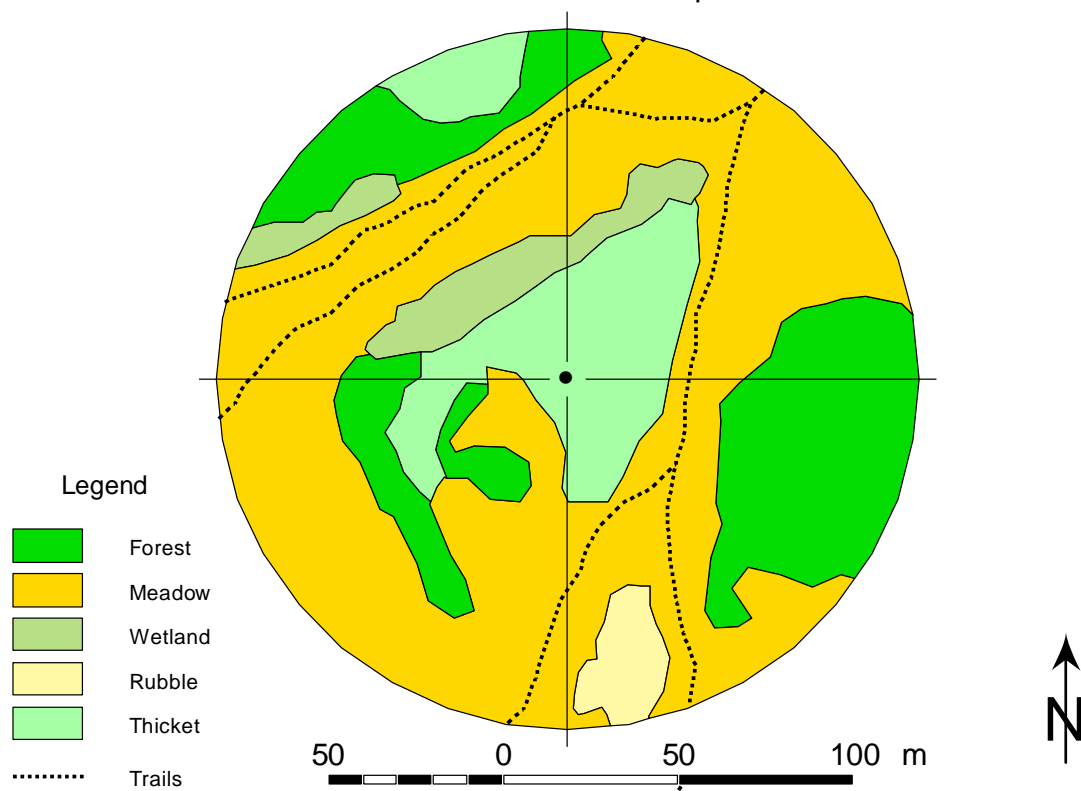
VCP Stn 1 – 2010 – 3 (South)



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



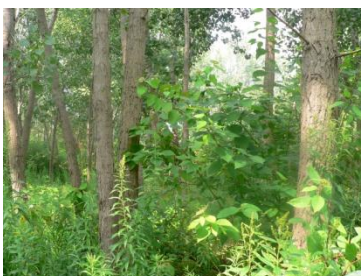
VCP Stn 2 – 2010 - 1 (North)



VCP Stn 2 – 2010 - 2 (East)

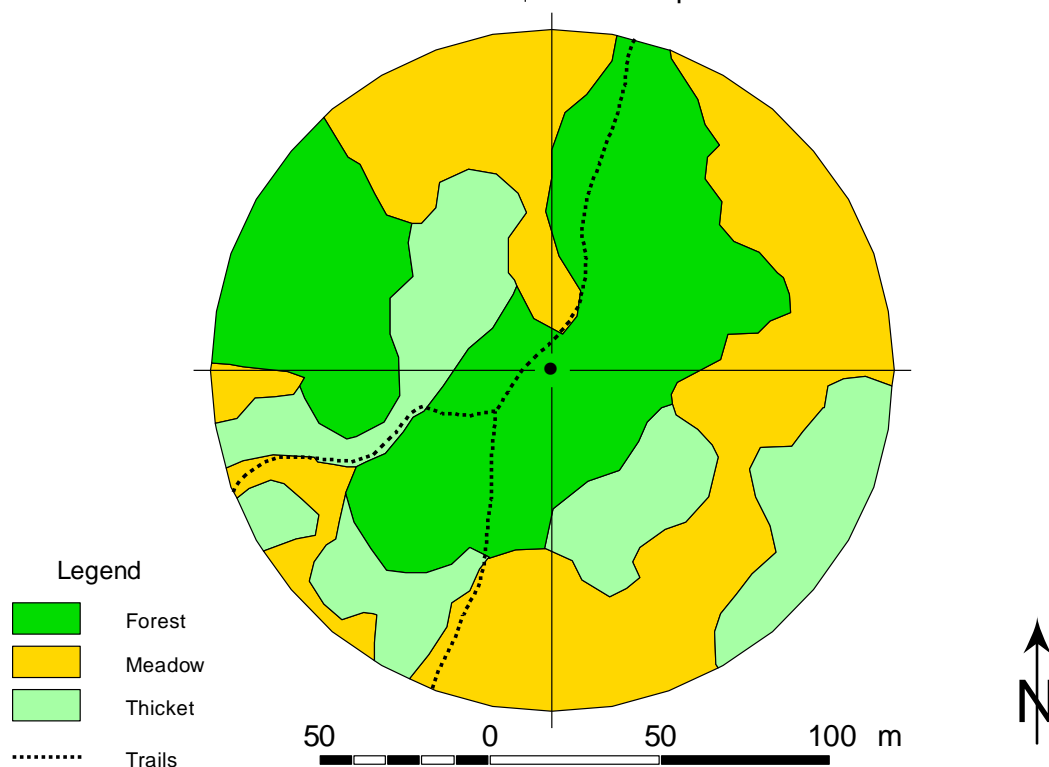


VCP Stn 2 – 2010 - 3 (South)



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)



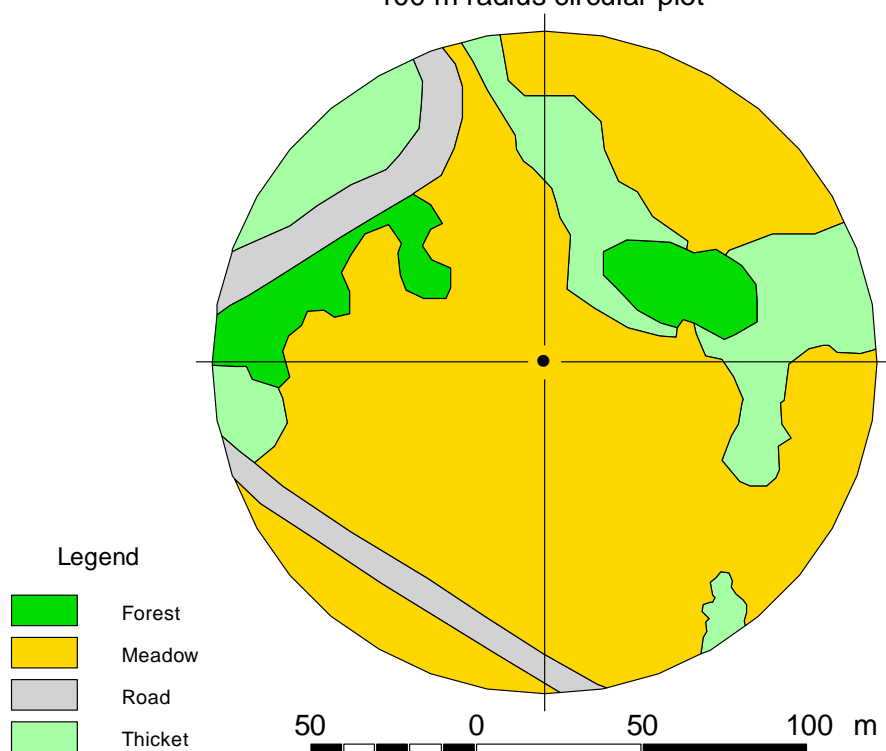
VCP Stn 3 - 2010 - 3 (South)



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)

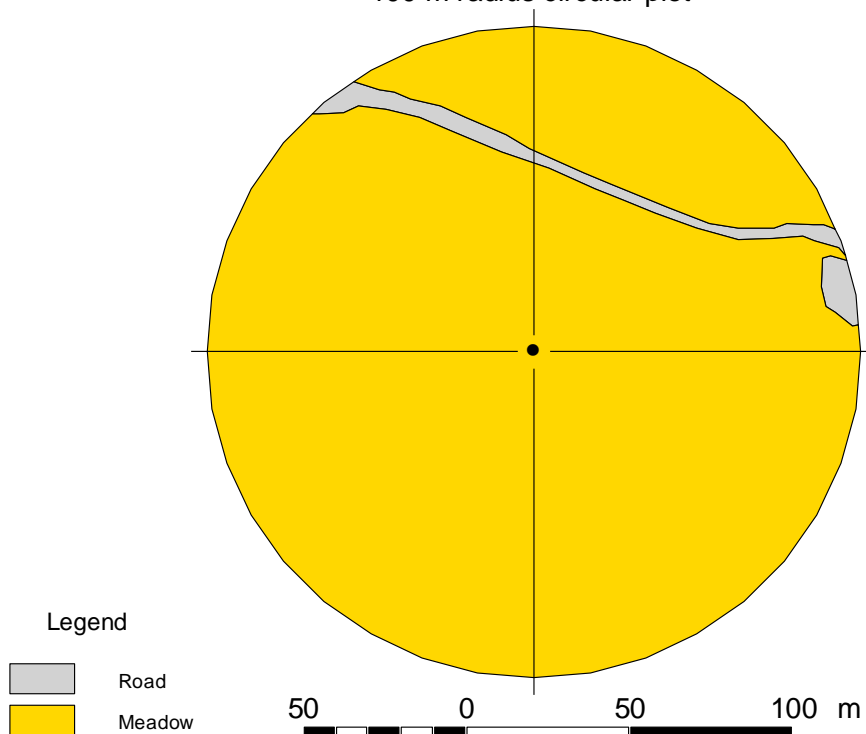


VCP Stn 4 - 2010 - 3 (South)



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)

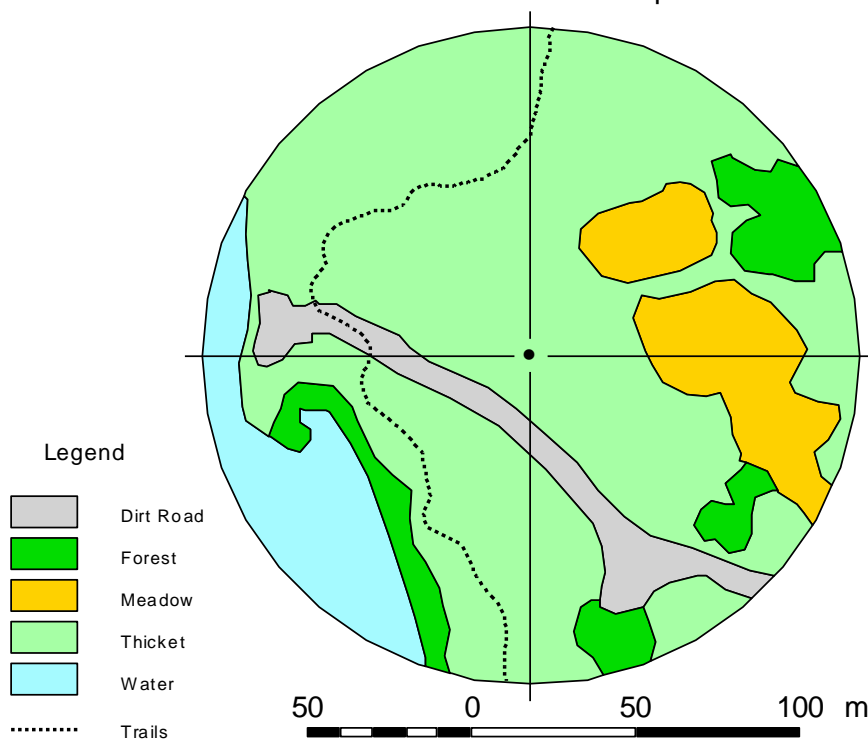


VCP Stn 5 - 2010 - 3 (South)



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)

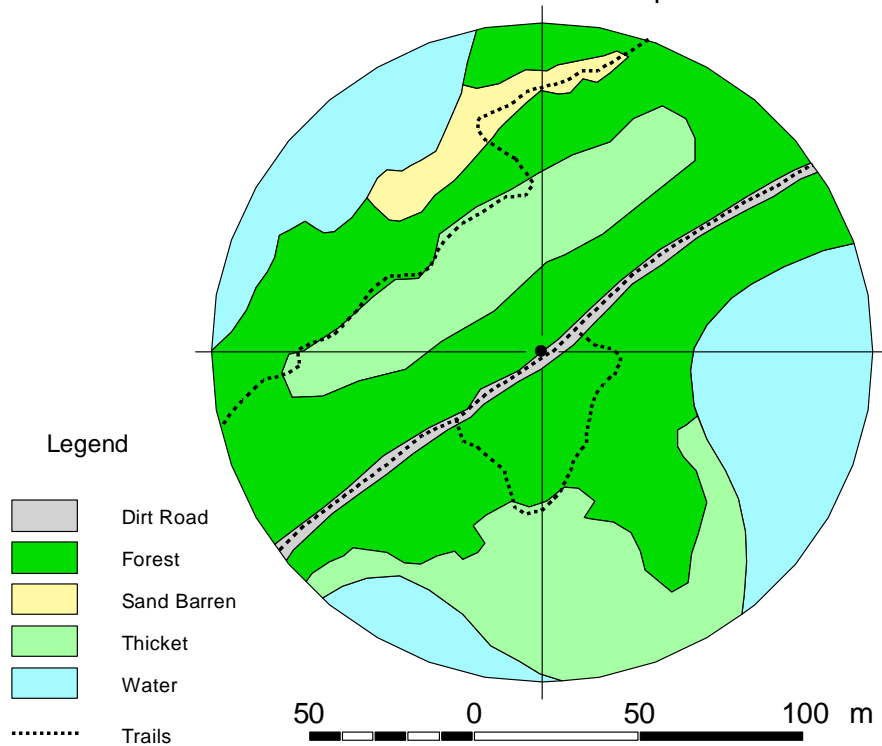


VCP Stn 6 - 2010 - 3 (South)



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)



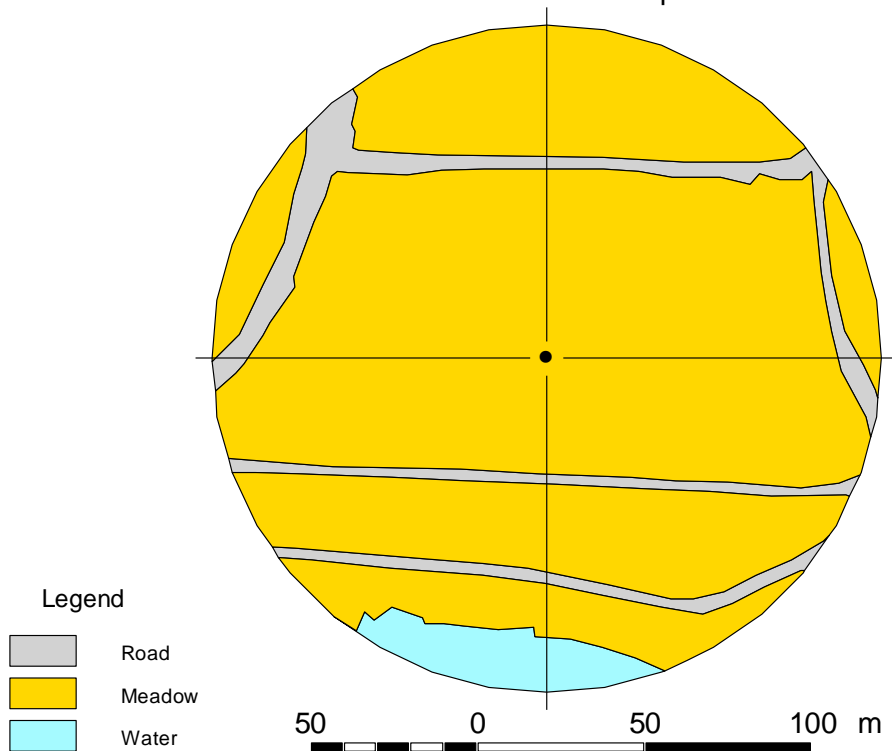
VCP Stn 7 - 2010 - 3 (South)



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)

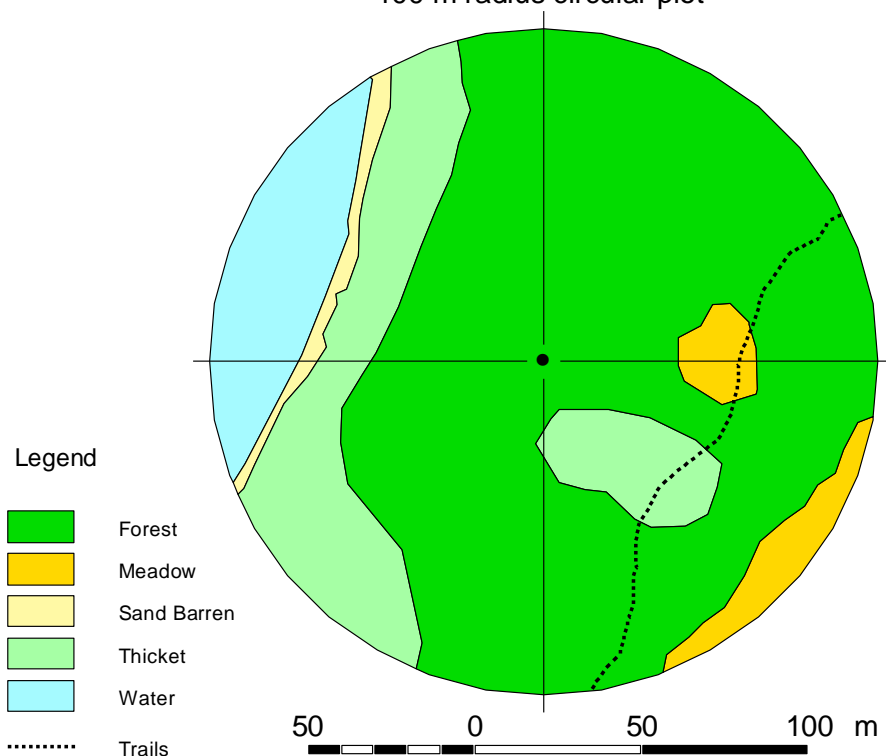


VCP Stn 8 - 2010 - 3 (South)



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)

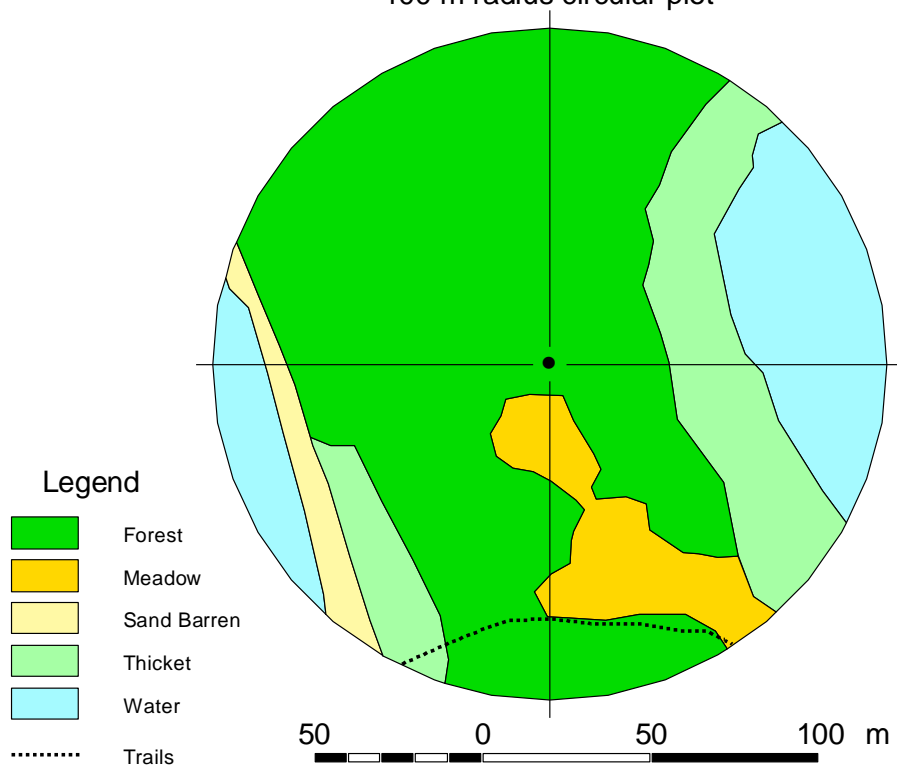


VCP Stn 9 - 2010 - 3 (South)

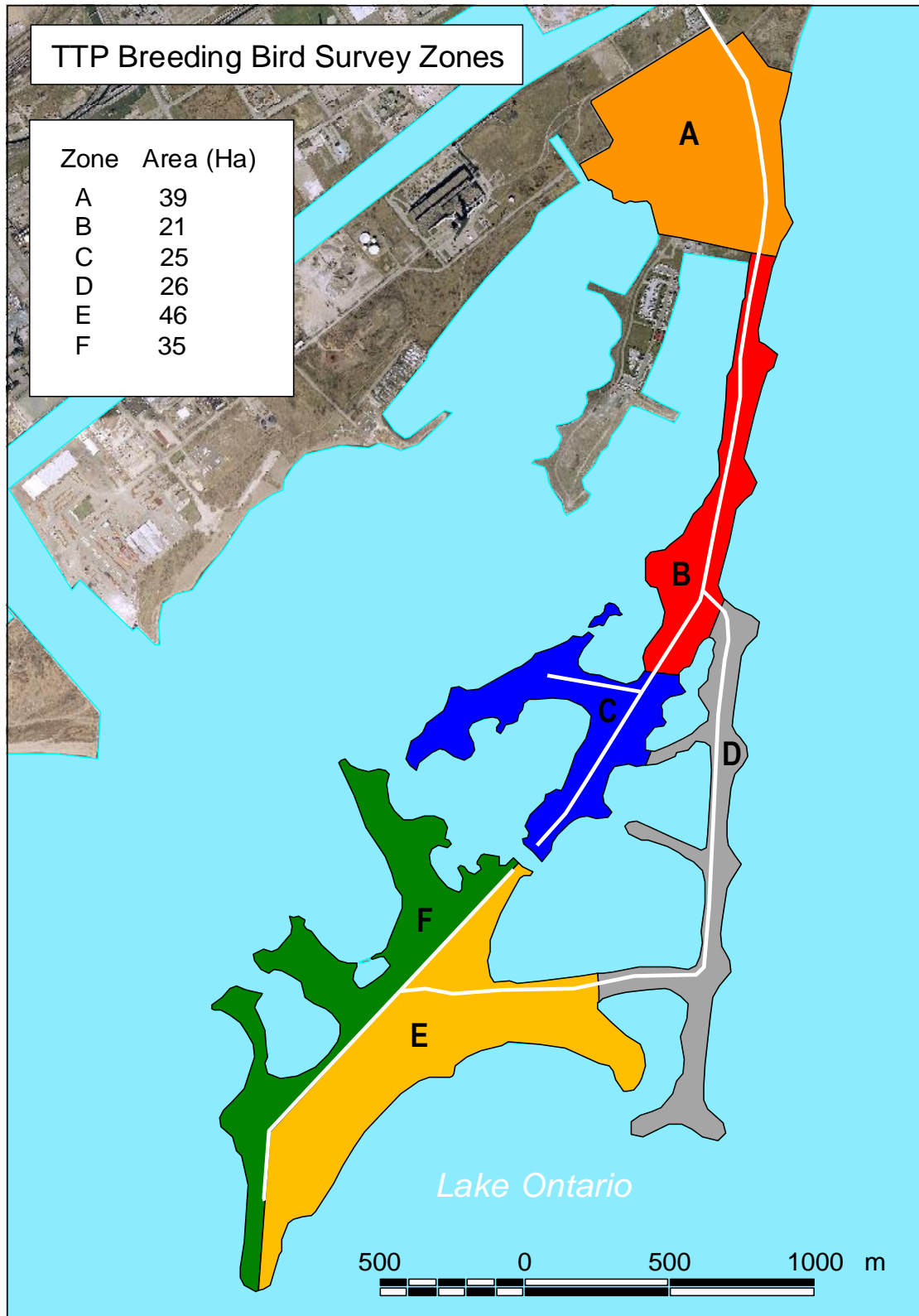


VCP Stn 9 - 2010 - 4 (West)

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 2012, as well as historically confirmed breeders. Species highlighted in red were detected in 2012 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 Coot (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

American Crow (2012 - absent) Known to have bred historically at TTP.

American Goldfinch (2012 - confirmed) This species is a regular nester at TTP. In 2012, 13 nests were discovered, down considerably from recent years.

American Green-winged Teal (2012 - absent) Known to have bred historically at TTP.

American Kestrel (2012 - absent) Known to have bred historically at TTP.

American Robin (2012 - confirmed) Common nesting species in forested areas throughout TTP. In 2012, 93 nests were recorded.

American Wigeon (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

American Woodcock (2012 - confirmed) One nest was found in the Baselands in 2012, although the presence of several individuals throughout TTP would suggest there may have been more nests. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

American Black Duck (2012 - absent) Known to have bred historically at TTP.

Bald Eagle (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Baltimore Oriole (2012 - confirmed) Common nesting species in forest areas of TTP. A total of 16 nests was recorded in 2012.

Bank Swallow (2012 - probable) Small nesting colonies were discovered in both the meadows and southern shoreline of the Toplands area in earlier years. Although lakefilling operations to prevent shoreline erosion made it difficult to confirm nesting, the existence of several Bank Swallows during the breeding season indicated probable nesting on the Lake Ontario shoreline bank at the south end of the Flats and Toplands, an area where they have nested in recent years.

Barn Swallow (2012 - confirmed) Barn Swallows are regular nesters at TTP under the eaves of buildings, particularly the garage located near the Port Authority booth. Eleven nests were discovered at TTP in 2012, a new high for the project.

Belted Kingfisher (2012 - confirmed) This species was confirmed for the first time in 2003 based on observations of fledged young. Nesting was confirmed in 2012 through the observation of young being fed.

Black-capped Chickadee (2012 - confirmed) A regular but uncommon nester at TTP. One nest was detected in 2012.

Black-crowned Night-Heron (2012 - confirmed) An abundant nesting colonial waterbird species at TTP. An estimated 30% of the Canada-wide population of Black-crowned Night-Herons breed here.

Blackpoll Warbler (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Black Scoter (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Black-throated Green Warbler (2012 – observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Blue-gray Gnatcatcher (2012 - confirmed) Known to have bred historically. In 2012, two nests were found and the existence of a third was evidenced by young being fed by adults.

Blue Jay (2012 - observed) This species has never been confirmed as a breeder at TTP. No nesting evidence was obtained in 2012 beyond observation of the species in suitable habitat during breeding season.

Bobolink (2012 - observed) This species has never been confirmed as a breeder at TTP. Three birds observed in 2012 during the breeding season were presumably late migrants.

Brown-headed Cowbird (2012 - confirmed) Brown-headed Cowbird is a common species throughout TTP during summer, and in 2012, a total of 39 nests of American Goldfinch, Yellow Warbler and Red-winged Blackbird were found to have been parasitized by Cowbirds.

Brown Thrasher (2012 - confirmed) Brown Thrasher is a regular but uncommon nester at TTP. Two nests were discovered in 2012

Bufflehead (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

California Gull (2012 – absent) Known to have bred historically at TTP.

Canada Goose (2012 - confirmed) Canada Goose is a regular breeder at TTP along shoreline edges of embayments and containment cells.

Canvasback (2012 - observed) Canvasback has bred almost annually in recent years in the Triangle Pond area at TTP, although in 2012, the species was only observed in the park.

Caspian Tern (2012 - confirmed) Five nests were located on Peninsula B in 2012, the first nests at TTP since 2004.

Cedar Waxwing (2012 - confirmed) A common late nester at TTP; 23 nests were found in 2012.

Cliff Swallow (2012 – observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 may have been nesting in the vicinity of TTP.

Common Grackle (2012 - confirmed) Common Grackle is a regular nester at TTP. In 2012, two nests were found.

Common Tern (2012 - confirmed) An abundant annual nesting colonial waterbird species at TTP.

Common Yellowthroat (2012 - absent) Known to have bred historically at TTP. Not observed in 2012 in the breeding season.

Dark-eyed Junco (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Double-crested Cormorant (2012 - confirmed) An abundant annual nesting colonial waterbird species at TTP.

Downy Woodpecker (2012 - confirmed) In 2012, one nest was found. This was only the fourth nest confirmation since the project started in 2005, although other nests have been suspected.

Eastern Kingbird (2012 - confirmed) A regular breeder at TTP along forest edges where meadow and shrubs are present. In 2012, a total of 27 nests was found, which represents a new high for the project.

Eastern Meadowlark (2012 - 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 Towhee (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Eastern Wood Pewee (2012 - confirmed) One nest was located in 2012. This was only the fourth nest located during the project, although singing adults in breeding season have suggested that there may have been others.

European Starling (2012 - 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. Five nests were documented in 2012.

Gadwall (2012 - confirmed) Gadwall is a surprisingly common nesting species at TTP. In 2012, four nests were confirmed. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Golden-crowned Kinglet (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Gray Catbird (2012 - confirmed) Gray Catbird is a regular nester at TTP, preferring dense shrubs with some tree cover. A total of 21 nests were found in 2012, close to the high for the project.

Great black-backed Gull (2012 - absent) Known to have bred historically at TTP. A few individuals were observed in previous years.

Great-crested Flycatcher (2012 - possible) This species has never been confirmed as a breeder at TTP, but was observed singing during the breeding season in 2012.

Great Egret (2012 - confirmed) Regular nester on Peninsula C.

Great Blue Heron (2012 - absent) Known to have bred historically at TTP.

Greater Scaup (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Green Heron (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant, although suitable habitat may be developing at TTP.

Hermit Thrush (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Herring Gull (2012 - confirmed) A common annual nesting colonial waterbird species at TTP.

Hooded Merganser (2012 - observed) This species has never been confirmed as a breeder at TTP. In 2012, as in previous years, several individuals were seen in the waters around and on TTP in June and July.

Horned Lark (2012 - absent) Known to have bred historically at TTP.

House Finch (2012 - possible) Known to have bred historically at TTP. Found singing in suitable nesting habitat in 2012, although no nest was found.

House Sparrow (2012 - absent) Known to have bred historically at TTP.

House Wren (2012 - possible) A regular nester at TTP, but in low numbers. In 2012, no nest was found, but an individual was recorded singing in suitable nesting habitat.

Killdeer (2012 - confirmed) Killdeer is a common nesting species at TTP in open areas with low vegetation. Four nests were found in 2012. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Least Bittern (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant, although suitable nesting habitat may be developing at TTP.

Least Flycatcher (2012 - probable) A regular but uncommon breeder at TTP. In 2012, a pair was observed in suitable nesting habitat.

Mallard (2012 - confirmed) Mallard is a regular nester at TTP. Nine nests were documented in 2012, mostly predated. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Mourning Dove (2012 - confirmed) Mourning Dove nests have been scarce at TTP in recent years. One nest was located in 2012, the first since 2009.

Mute Swan (2012 - confirmed) Mute Swan is a regular nesting species along TTP shorelines.

Myrtle Warbler (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Nashville Warbler (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Northern Bobwhite (2012 - absent) Known to have bred historically at TTP.

Northern Cardinal (2012 - confirmed) Northern Cardinal is an uncommon but usually an annually-nesting species at TTP. In 2012, one nest, which subsequently failed, was found.

Northern Flicker (2012 - probable) Northern Flicker is an uncommon but regular nesting species at TTP. No nests were found in 2012, although a pair was observed in suitable nesting habitat.

Northern Mockingbird (2012 - possible) This species has never been confirmed as a breeder at TTP, although it is known to breed in the vicinity of TTP. A bird was observed in 2012 singing during the breeding season.

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 (2012 - observed) Known to have bred historically at TTP. Birds were observed in 2012, although no nest was located.

Northern Shoveler (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Orchard Oriole (2012 - confirmed) One or two nests of this species have been found in most years of the project. In 2012, two nests were found.

Peregrine Falcon (2012 - observed) This species has never been confirmed as a breeder at TTP. As there is no suitable nesting habitat at TTP, the bird observed in 2012 during the breeding season was presumably a late migrant or nesting somewhere close to TTP.

Pied-billed Grebe (2012 - observed) This species has never been confirmed as a breeder at TTP.

Purple Martin (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably nesting near TTP.

Red-eyed Vireo (2012 - possible) This species has never been confirmed as a breeder at TTP, but was observed in suitable habitat during the breeding season in 2012.

Redhead (2012 - absent) Known to have bred historically at TTP.

Red-winged Blackbird (2012 - confirmed) The most abundant nesting species at TTP (excluding waterbirds), found throughout the TTP area. A total of 268 nests was found in 2012, a new high for the project.

Ring-billed Gull (2012 - confirmed) An abundant nesting colonial waterbird species at TTP.

Ring-necked Pheasant (2012 - absent) Known to have bred historically at TTP.

Rock Pigeon (2012 - observed) Known to have bred historically at TTP. Observed in 2012, but no nest was found.

Ruby-crowned Kinglet (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Savannah Sparrow (2012 - possible) 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 2012 beyond observation of singing individuals in suitable habitat on the Flats during the breeding season. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Scarlet Tanager (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Song Sparrow (2012 - confirmed) Song Sparrow is one of the most abundant nesting species at TTP, although few of its well-concealed nests are ever found. In 2012, three nests were found, and recently fledged birds being fed provided evidence of a fourth. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Sora (2012 - absent) Known to have bred historically at TTP.

Spotted Sandpiper (2012 - confirmed) A common nester at TTP in open areas near water. Five nests were found in 2012. Observations of juveniles along roadways are frequent. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Tennessee Warbler (2012 - 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 (2012 - confirmed) Tree Swallow is a common breeder at TTP. In 2012, 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.

Trumpeter Swan (2012 - observed) This species has never been confirmed as a breeder at TTP. A pair was observed displaying during breeding season in 2012, but no nesting took place.

Virginia Rail (2012 - absent) Known to have bred historically at TTP.

Warbling Vireo (2012 - confirmed) A common nesting species in forested areas of TTP. In 2012, 12 nests were found.

Western Palm Warbler (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

White-crowned Sparrow (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

White-throated Sparrow (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant.

Willow Flycatcher (2012 - confirmed) Willow Flycatcher is a common nesting species in more open areas with dense shrubs. In 2012, 14 nests were found.

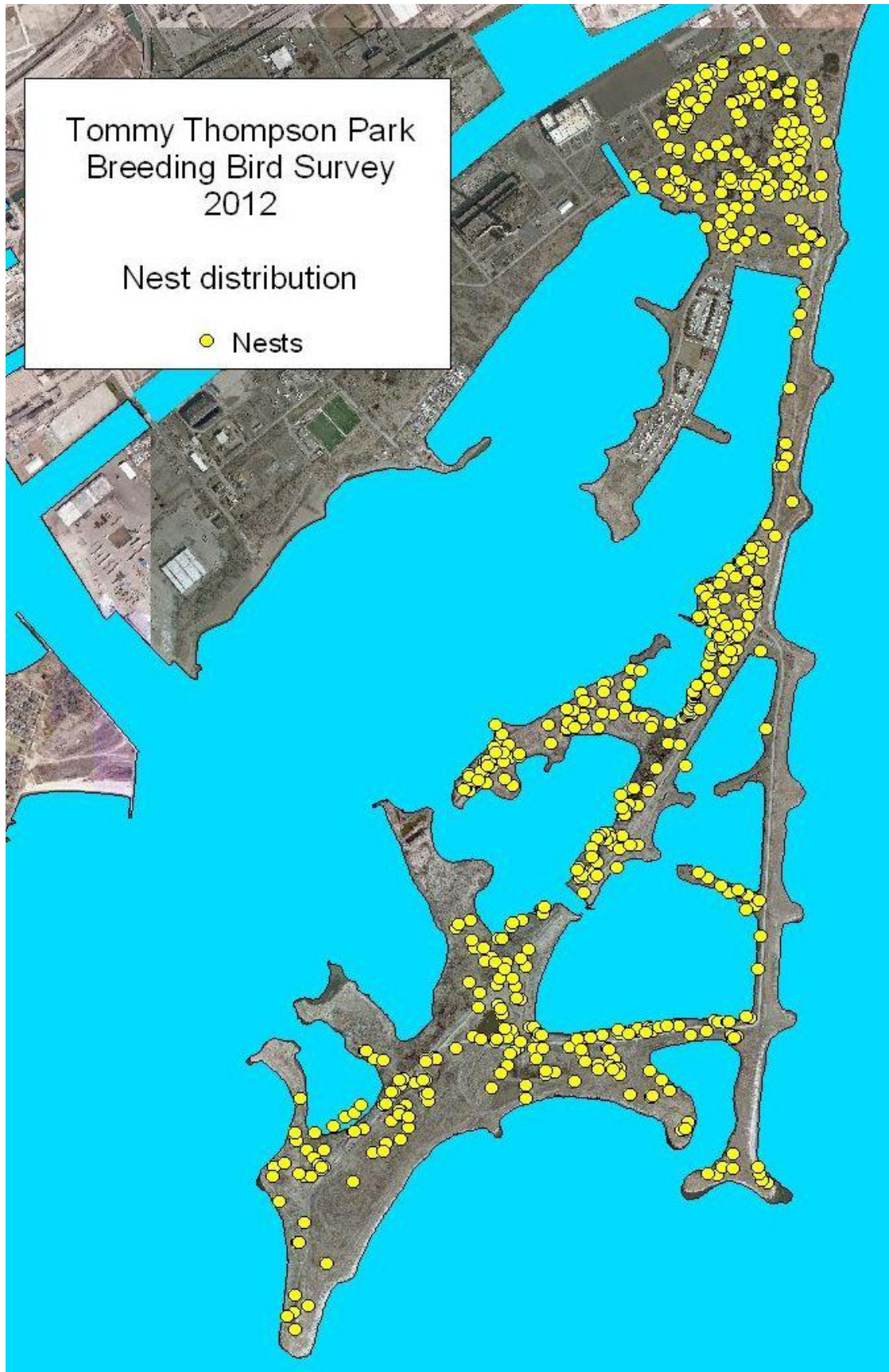
Wilson's Phalarope (2012 - absent) Known to have bred historically at TTP; species not detected in recent years.

Wood Duck (2012 - confirmed) This species was confirmed in 2012 as a breeder at TTP for the first time. Although the nest was not found, an adult female was observed in Cell 1 with recently hatched young.

Wilson's Snipe (2012 - observed) This species has never been confirmed as a breeder at TTP. The bird observed in 2012 during the breeding season was presumably a late migrant, although suitable nesting habitat is developing at TTP.

Yellow Warbler (2012 - 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 86 nests were found in 2012, close to the high for the project. This species has been observed to be the most frequently parasitized species by Brown-headed Cowbirds at TTP.

Appendix E: Map of 2012 Nest Locations



Appendix F: Breeding Status Codes for Each Species Detected In 2012

OBSERVED	POSSIBLE	PROBABLE	CONFIRMED
American Coot	Great-crested Flycatcher	Bank Swallow	American Goldfinch
American Wigeon	House Finch	Least Flycatcher	American Robin
Bald Eagle	House Wren	Northern Flicker	American Woodcock
Blackpoll Warbler	Northern Mockingbird		Baltimore Oriole
Black Scoter	Red-eyed Vireo		Barn Swallow
Black-thr. Green Warbler	Savannah Sparrow		Belted Kingfisher
Blue Jay			Black-capped Chickadee
Bobolink			Black-crowned Night-Heron
Bufflehead			Blue-gray Gnatcatcher
Canvasback			Brown-headed Cowbird
Cliff Swallow			Brown Thrasher
Dark-eyed Junco			Canada Goose
Eastern Towhee			Caspian Tern
Golden-crowned Kinglet			Cedar Waxwing
Greater Scaup			Common Grackle
Green Heron			Common Tern
Hermit Thrush			Double –Crested Cormorant
Hooded Merganser			Downy Woodpecker
Least Bittern			Eastern Kingbird
Myrtle Warbler			East Wood Pewee
Nashville Warbler			European Starling
Northern Parula			Gadwall
N.R-winged Swallow			Gray Catbird
Northern Shoveler			Great Egret
Peregrine Falcon			Herring Gull
Pied-billed Grebe			Killdeer
Purple Martin			Mallard
Rock Pigeon			Mourning Dove
Ruby-crowned Kinglet			Mute Swan
Scarlet Tanager			Northern Cardinal
Tennessee Warbler			Orchard Oriole
Trumpeter Swan			Red-winged Blackbird
Western Palm Warbler			Ring-billed Gull
White-crowned Sparrow			Song Sparrow
White-throated Sparrow			Spotted Sandpiper
Wilson's Snipe			Tree Swallow
			Warbling Vireo
			Willow Flycatcher
			Wood Duck
			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