The Breeding Birds of

Tommy Thompson Park

2019

Virginia Rail Nest (I. Sturdee)

Toronto and Region Conservation Authority

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1. Introduction

1.1 Study Area

TTP Aerial View (TRCA, 2014)

Tommy Thompson Park (TTP) is located on the Leslie Street Spit, a 471-ha, 5-km long man-made peninsula extending into Lake Ontario in Toronto. When construction of the Spit began in 1959 by the Toronto Harbour Commission (now Ports Toronto), the intention was to create new lands for port related facilities. However, for a variety of reasons port related expansion did not occur and natural succession was allowed to progress. As such, the Province of Ontario awarded Toronto and Region Conservation Authority (TRCA) the responsibility of creating a Master Plan for a public park. Landform construction was ongoing until 2015, and while the final size of the Spit (including waterlots) is complete, occasional works will be required into the future to maintain shoreline stability.

Over the years, the Spit evolved into the largest area of natural habitat on the Toronto waterfront, both through natural succession and habitat enhancement projects by TRCA. A variety of vegetation communities, including successional forests, meadows, coastal wetlands and sand dunes, provide diverse habitats for a wide range of species. Gulls and terns began nesting in the early 1970s, and continued nesting by these species and night-herons earned TTP the designation of an *Environmentally Significant Area* in 1982. Further, in 2015, this designation was extended to the entire Spit due to rare species and/or rare communities, and significant ecological functions.

The diverse habitats at the park, along with the geographical position have made it a critical site for birds throughout the year. To date, 323 species have been recorded at the park, and in 2000, the Leslie Street Spit/TTP was named an *Important Bird Area* by BirdLife International. This designation is due to the globally significant populations of nesting colonial waterbirds, the continentally significant numbers of overwintering waterfowl, and nationally significant numbers of migratory birds.

2. Colonial Waterbirds and Managed Waterfowl

2.1 Project Background

Great Egret on Nest (P. Robillard)

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).

In 2019, five species of colonial waterbirds nested at Tommy Thompson Park, namely two species of tree-nesters (Black-crowned Night-Heron and Great Egret), two species of ground-nesters (Common Tern and Ring-billed Gull), and one species which nests both in trees and on the ground (Double-crested Cormorant).

2.2 Results in 2019

In 2019 Double-crested Cormorants nested in trees on Peninsulas A, B and C, as well as on the ground on Peninsulas A and B. Black-crowned Night-Herons nested on Peninsulas B and C, and in the treed areas north of Goldfish Pond. Great Egrets nested on Peninsulas B and C. Ringed-billed Gulls nested on the ground on Peninsulas A and B, and on the Embayment A Common Tern nesting raft. The nesting areas of cormorants, night-herons, egrets and Ring-billed Gulls is illustrated in Figure 2.A. Common Terns nested on the artificial nesting raft in Embayment D, and one individual nest was found in the Cell 2 wetland. Caspian Tern and Herring Gull nesting attempts were not observed.

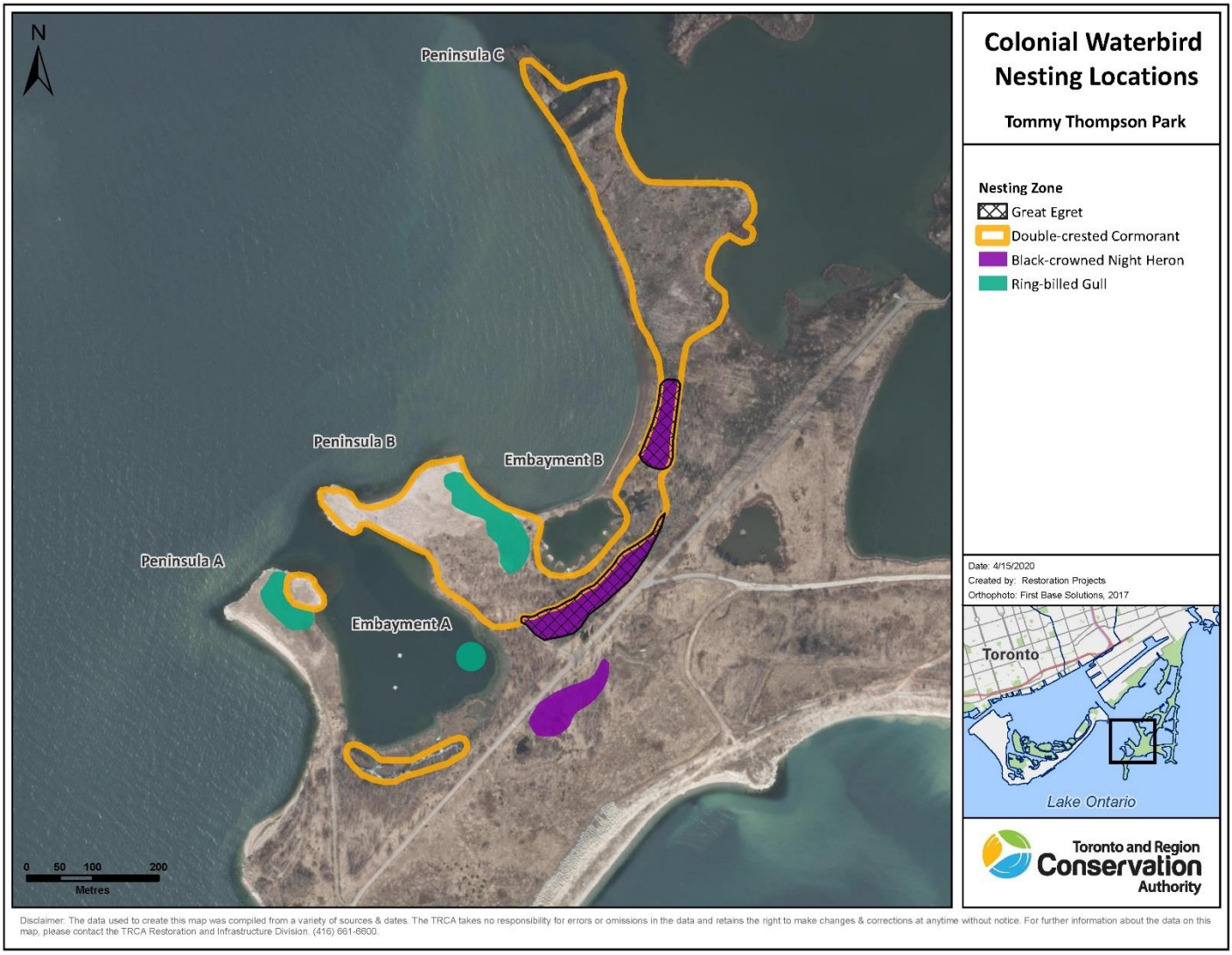

Figure 2.A. Colonial Waterbird Nesting Areas, 2019

Cormorant nests numbered 13,614, including 8,681 ground nests (Figure 2.B). The overall population decreased 6% from 2018 as a result of significant flooding from record high Lake Ontario water levels in the ground nest colonies. Tree nesting increased 23% and ground nesting population decreased by 17% over the previous year. As indicated in Figure 2.B, 64% of the TTP cormorant colony nested on the ground in 2019, compared to 72% in 2018. 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).

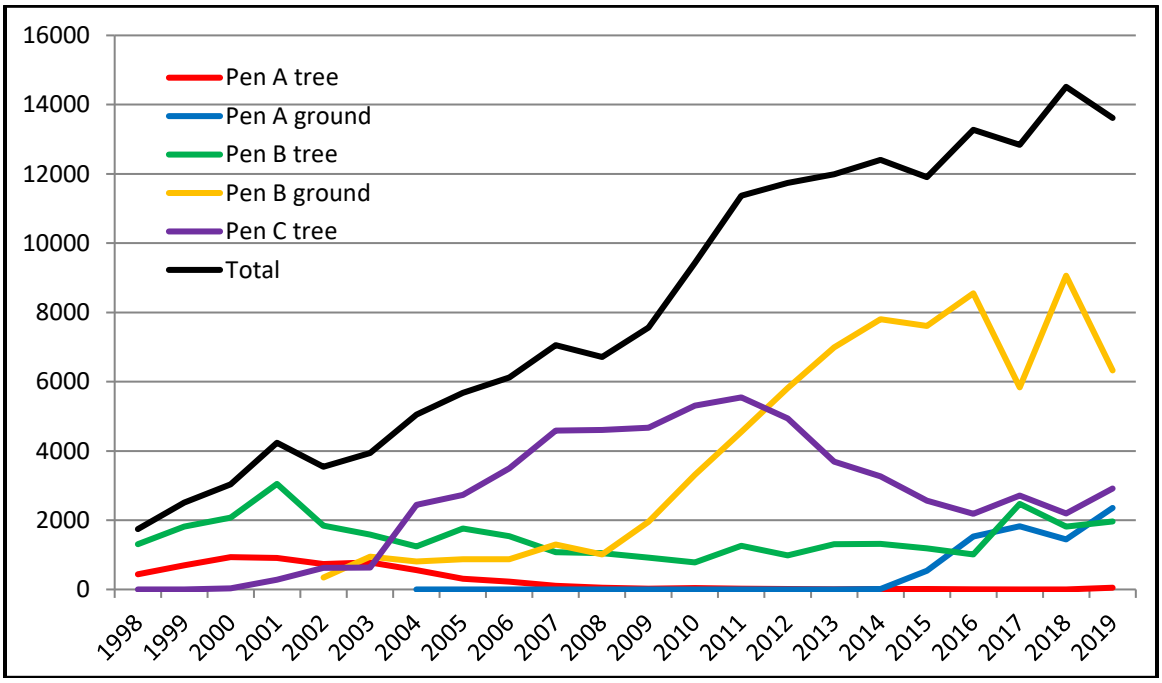

Figure 2.B. Double-crested Cormorant Nests at TTP by Sub-colony, 1998 - 2019

Black-crowned Night-Heron nests numbered 293, a decrease of 2% from the previous year (Table 2.1). Most night-heron nesting occurred at the base of Peninsula B, where they face less competition from cormorants.

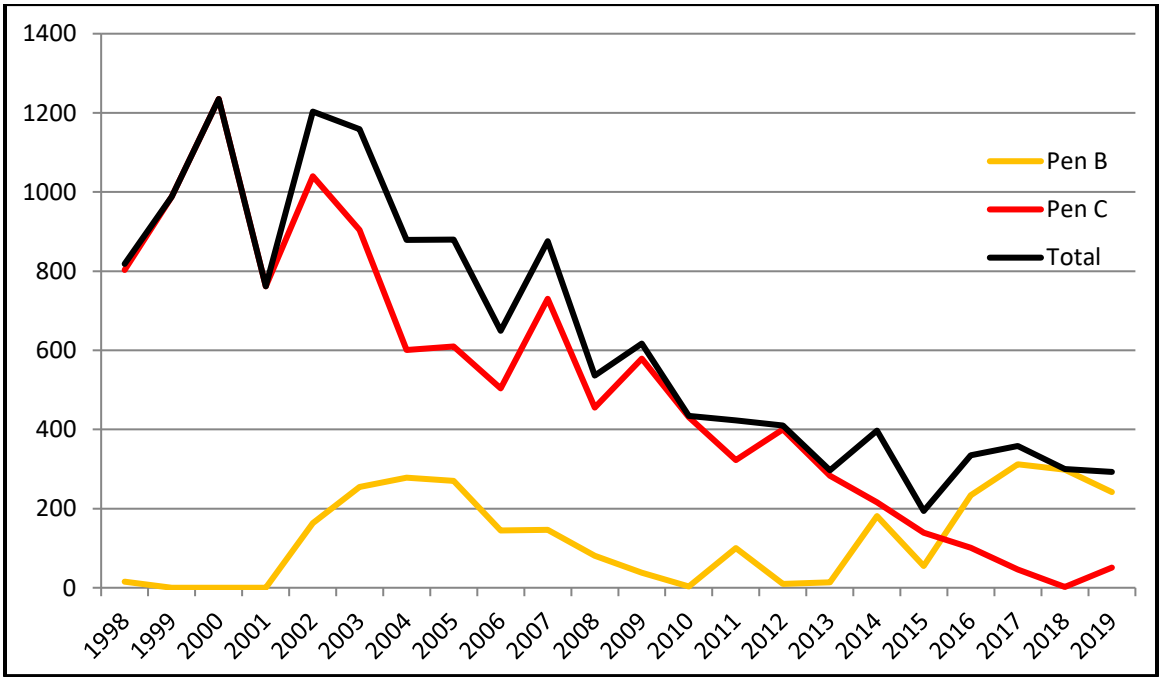

Figure 2.C. Black-crowned Night-Heron Nests at TTP by Sub-colony, 1998 - 2019

Double-crested Cormorant on Nest (P. Robillard)

Black-crowned Night-Heron (P. Robillard)

Table 2.1. Colonial Waterbird Nests at TTP, 2009 – 2019

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
DCCO	7564	9434	11374	11741	11990	12409	11908	13275	12,841	14,515	13,614
BCNH	617[a]	431	423	410	297	397	194	335	358	300	293
GREG	7	5	7	8	4	6	6	6	11	5	10
RBGU	30000*	28000*	32000*	32000*	35000*	35000*	35000*	35000*	NC	15,000*	NC
HEGU	NC	<20*	NC	NC	NC	NC	NC	NC	NC	NC	0
COTE	354	231	54	24*	0	179	176	142	142	70	90
CATE	0	0	0	5*	98	263	NC	56[a]	0	0	0

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

Common Tern Nest (I. Sturdee)

During 2019, apart from one nest in the Cell 2 wetland, Common Terns nested exclusively on the raft in Embayment D. Two other rafts were available, in Embayment C and Embayment A, but were unused, and the island in Cell 1 was flooded early in the breeding season which presumably discouraged colonization. In 2019, 90 nests were recorded.

Gull population counts were not undertaken in 2019. Ring-billed Gulls nested on Peninsula A and B, and on the Embayment A Common Tern nesting raft. Nesting was not observed on the Endikement this year. Herring Gulls typically nest among the Ring-billed Gulls in much lower numbers, however, none were observed in 2019. TRCA does not undertake a Herring Gull census due to their low numbers and the involvement of the Canadian Wildlife Service in individual nest monitoring for contaminant research.

2.2.1 Managed Waterfowl

Canada Geese and Mute Swans regularly nest at TTP and are monitored and managed by TRCA. The Mute Swan is an introduced species and all nests encountered are managed to eliminate reproduction. Canada Goose nests are also managed due to the high number of human-wildlife conflicts on the Toronto waterfront. Management includes egg addling by removal to eliminate or reduce reproduction. This technique mimics natural predation events, after which the adults typically leave the nest site and forgo nesting until the next breeding season. In 2019 there were a total of nine Canada Goose nests and one Mute Swan nest at TTP.

3. Landbirds and Non-colonial Waterbirds

3.1 Project Background

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

3.1.1 Rationale

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

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

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

3.1.2 Change in Data Reporting

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

3.2 Results in 2019

3.2.1 Variable Circle Plot Point Count Results

3.2.1.1 VCP Station Vegetation Survey

Table 3.1 below depicts the result of the triennial vegetation surveys conducted in 2010 and 2019 for each station. In addition, Appendix A contains a habitat map and photographs for each station in 2019. (The habitat maps and photographs from 2010 can be found in the Breeding Bird Reports of 2010 – 2012, those from 2013 can be found in the reports of 2013 – 2015, and those from 2016 can be found in the reports of 2016 – 2018.) See Appendix F for an explanation of variable circle plot point counts.

As can be seen from Table 3.1, several changes in habitat have occurred over the past nine years. This is not surprising, however, since most of TTP is intentionally left to naturally succeed on its own. Changes of note include:

Station 2: The meadow areas observed in 2010 have been completely overtaken by dogwood and willow.
Station 3: Some meadow has been replaced by the Martin Goodman Trail and the link trail.

Station 4: A portion of the meadow has been replaced by a wider link trail, as well as forest and thicket expansion.

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

Figure 3.A **Annotated Map of TommyThompson Park with VCP Stations**

Station 8: Some thicket has been replaced by forest growth and wetland.

Station 9: Station 9 is located within the previous tree-nesting cormorant colony, and the result of the birds' excrement has been the loss of many trees and other vegetation. As the trees were lost, the tree nests largely disappeared within the Station area, and the previously barren soil has started to show signs of regeneration.

Table 3.1. 2010 - 2019 VCP Station Vegetation Analysis

2010 OBSERVATIONS									
	VCP Station								
	1	2	3	4	5	6	7	8	9
% of Major Habitats Within 100 m Radius of Each VCP Station									
Meadow (tree cover ≤ 25%; shrub cover ≤ 25%)	55	40	70	95	10		85	5	5
Thicket (tree cover ≤ 25%; shrub cover ≥ 25%)	15	20	20		65	20		20	20
Deciduous Forest (tree cover ≥ 60%)	25	40	5		10	50		65	60
Mixed Forest (tree cover ≥ 60%; conifers ≥ 25%)									
Wetland (permanently saturated; water ≤ 2 m)	5								
Vegetation Sub-total (see detail below)	100	100	95	95	85	70	85	90	85
Sand Dune/Sand Barren (incl active shorelines)						5			
Roads/Trails			5	5	5		10		
Lake Ontario Shoreline (open water)					10	25	5	10	15
Non-vegetation Sub-total			5	5	15	30	15	10	15
Total of All Habitats	100	100	100	100	100	100	100	100	100
Dominant Vegetation Within 100 m of Each VCP Station									
Poplars (e.g., Eastern Cottonwood)	20	35	5	5	10	40	5	55	45
Dogwoods (e.g., Red-osier Dogwood)	10	15	10		20	15		5	15
Honeysuckles						10			
Shrub Willows	10	5	5	5	30	5	5	5	
Grasses and Sedges	55	40	65	60	15		45	20	10
Goldenrods and Asters		5	10	20	10		20		5
Reeds (e.g., Cattails, Bulrushes)	5			5				5	
Miscellaneous Herbs (e.g., Vetch, Nettles, etc.)							10		10
Vegetation Sub-total	100	100	95	95	85	70	80	90	85
2019 OBSERVATIONS									
	VCP Station								
	1	2	3	4	5	6	7	8	9
% of Major Habitats Within 100 m Radius of Each VCP Station									
Meadow (tree cover ≤ 25%; shrub cover ≤ 25%)	51		56	72	4	3	81	5	44
Thicket (tree cover ≤ 25%; shrub cover ≥ 25%)	7	59	22	2	67	23		9	20
Deciduous Forest (tree cover ≥ 60%)	22	41	9	6	18	51	3	70	16
Dead Deciduous Forest									1
Mixed Forest (tree cover ≥ 60%; conifers ≥ 25%)									
Wetland (permanently saturated; water ≤ 2 m)	18			9	5		2	5	
Vegetation Sub-total (see detail below)	98	100	87	89	94	77	86	89	81
Sand Dune/Sand Barren (incl active shorelines)								2	3
Roads, Trails and other man-made areas	2		13	11	4		14		
Lake Ontario Shoreline (open water)					2	23		9	16
Non-vegetation Sub-total	2		13	11	6	23	14	11	19
Total of All Habitats	100	100	100	100	100	100	100	100	100
Dominant Vegetation Within 100 m of Each VCP Station									
Trees (e.g., Eastern Cottonwood)	25	35	5	5	15	40	7	60	10
Dogwoods (e.g., Red-osier Dogwood)	18	40	13		50	15		3	20
Honeysuckles						12			
Shrub Willows		5	5	5	20	5	5	4	
Grasses and Sedges	25	20	32	40	4	5	44	15	6
Goldenrods and Asters	10		5	30			10		
Reeds (e.g., Cattails, Bulrushes, Phragmites)	20			8	5		5	7	
Miscellaneous Herbs (e.g., Vetch, Nettles, etc.)			27	1			15		45
Vegetation Sub-total	98	100	87	89	94	77	86	89	81

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

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



2010 2016 2019

Station 2 (forest – north view) showed significant shrub growth between 2010 and 2016 and has now become completely surrounded by tall shrubs.



2010 2016 2019

Station 9 (forest – north view) is located within the Double-crested Cormorant colony, and the effect of the birds' excrement on both the trees and the ground-level vegetation can be seen in 2016. In 2019, with the trees and nests almost gone in this view, excrement is no longer a problem, and ground cover is returning.



2010 2016 2019

3.2.1.2 VCP Observations

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

Table 3.2. VCP Species Lists and Total Birds Detected by Species Within 100 Metres

Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	AVG
ALFL		1									0
AMGO	22	35	8	14	19	7	37	36	19	19	22
AMKE								1			0
AMRE										2	0
AMRO	34	41	40	22	15	25	23	27	26	19	27
AMWO				1							0
BANS	4	14	35	7	22	4	106	7	9	3	21
BAEA				*							0
BAOR	13	28	22	26	21	25	15	23	19	9	20
BARS	8	32	31	22	15	55	48	41	68	76	40
BCCH	4	3	1	3		5	7	2	3		3
BEKI	1				1					1	0
BGGN					3	2	3	2			1
BHCO	19	10	17	12	5	3	6	7	3		8
BLJA	1		1					1		1	0
BLPW										1	0
BRTH				1	3	1				1	1
CANG	*				*			7		3	1
CEDW	19	31	47	17	16	12	18	12	1	12	19
CHSW		2		3	2	2				1	1
CLSW									*	1	0
COGR	17	23	8	12	5	17	5	11	14	6	12
COHA						1					0
COYE	2	2			4			1		3	1
DOWO		2	1	1	1			2	1	4	1
EAKI	20	18	12	7	2	9	3	6	8	2	9
EAWP	1	8	6	8	6	9	7	2	2		5
EUST	41	52	39	8	44	9	46	18	18	4	28
GADW	1	16		*	2			*	2	1	2
GBHE								*			0
GCFL							1		1		0
GRCA	38	16	21	16	21	12	18	22	18	33	22
HOFI		1									0
HOWR				2	1		1		1		1
KILL	3		2	5	4	5	2	7		2	3
LEFL	11	11	8	10	4	5	1	3	6	7	7
MALL			*	*	2			5	1	11	2
MODO	*			3			1	2	1		1
NOCA	3	1	2	5	3	3	10	21	17	4	7
NOFL		2						2	4		1
NOMO	*				1	1		1			0
NRWS	5	14	*	4	*	9	10	5	7	6	6
ORORR			1	1	1		2	2	5	1	1
RBNU							1				0
REVI					1						0
RWBL	199	244	295	265	276	247	192	214	316	215	246
SAVS							1				0
SOSP	55	46	50	66	47	51	59	57	102	93	63
SPSA	3	4	2	1	5	7	2	2	1	8	4
TEWA							1				0
TRES	16	24	11	25	30	52	41	54	37	47	34
TRFL	1				2			2		2	1
WAVI	30	39	50	53	46	32	46	27	44	40	41
WIFL	14	25	16	17	20	18	16	27	24	15	19
YEWA	100	168	136	146	166	155	169	181	201	177	160
Birds	**685**	**913**	**862**	**783**	**816**	**783**	**898**	**840**	**979**	830	**839**
Species	**32**	**30**	**28**	**34**	**37**	**29**	**32**	**38**	**32**	35	**33**

* Species observed beyond 100 metres and/or flying over

Species recording a new high VCP count for the most recent 10 years were Barn Swallow, Mallard and Spotted Sandpiper. In total, the number of birds recorded in all VCP counts was slightly below the average for the past ten years.

Prior to 2015, swallows were recorded differently by different project participants during the VCP counts, with the result that swallow numbers in Table 3.2 are somewhat understated for the years 2010 – 2014.

A summary of abundance per species detected by VCP counts (<100 meters) is presented in Table 3.2. Some of the unusually high numbers (e.g., 106 Bank Swallows in 2016, 68 Barn Swallows in 2018 and 78 Barn Swallows in 2019) are attributable to one or a few large flocks recorded in one or more of the visits. The higher than usual number of Mallards is a result of the area around Station #9 opening up and permitting a view of Embayment C.

As shown in Table 3.2, 35 species were detected for all counts in 2019, slightly above the average of 33 species for the past 10 years.

Points worth noting about the VCP observations include:

- Barn Swallow sightings have increased in recent years as the number of nests has increased, as would be expected.
- The number of Brown-headed Cowbirds observed continues to be much lower than the numbers observed in earlier years of the project, which corresponds to the lower rate of nest parasitism by these birds (see Section 3.2.2.6.).
- Since the nests of Song Sparrows are very difficult to find, this species is recorded much more frequently on VCP counts than the number of nests would suggest.
- Conversely to the previous point, Cedar Waxwing nests are generally more numerous than VCP sightings as the waxwings are late nesters and are not present in large numbers prior to nesting.
- Eastern Kingbird VCP sightings are always lower than the number of nests would suggest because very few VCP stations are close to kingbirds' preferred habitat. Similarly, VCP sightings of Red-winged Blackbirds and Yellow Warblers have become fewer than the number of their nests as the growth in the number of nests has largely occurred in areas separate from the VCP locations.

Unusual Yellow Warbler Nest (I. Sturdee)

It must be recognized that the number of birds recorded each year on VCP counts for many of the species is largely a matter of chance since only five minutes are spent at each station. (Note that the sequence of stations visited is intentionally different for each of the six VCP counts, so that the possibility of observing, or not observing, certain species at certain times is minimized.)

As can be seen in Figure 3.B below, with the exception of Station 9, the total number of birds recorded at each VCP station was close to or slightly below the average for that station.

In keeping with the significant change in vegetation at Station 9, the number of birds recorded there has increased dramatically the last two years (2019 being 179% of the most recent 10-year average).

See Figure 3.A and Appendix A for station locations.

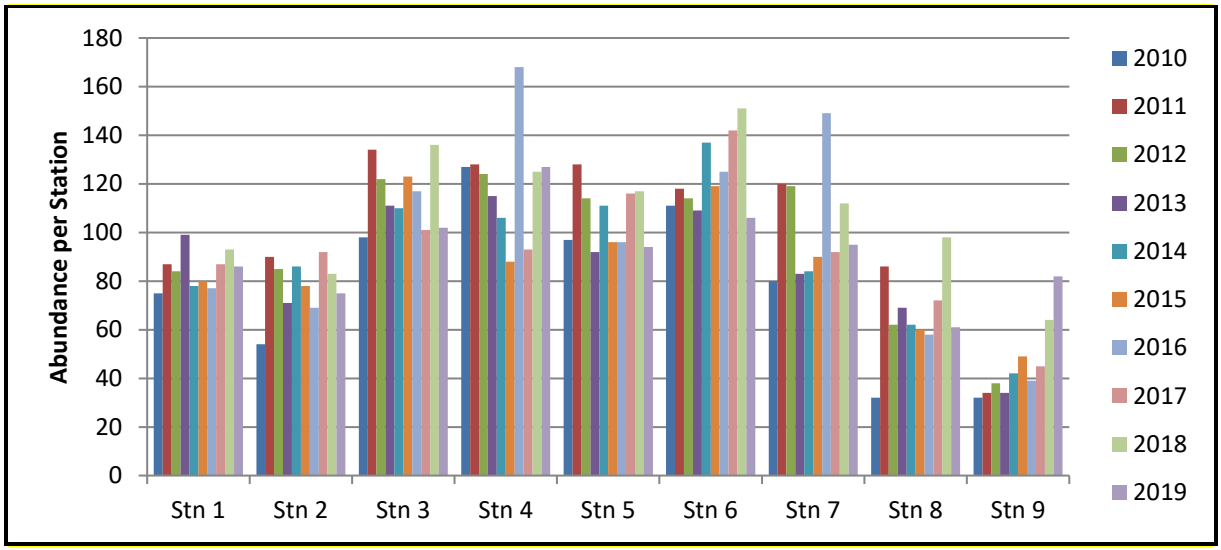

Figure 3.B. Total Bird Abundance per VCP Station

Species richness, or diversity, is shown in Figure 3.C below. In 2019, Stations 1 (meadow), 2 (thicket) and 6 (forest) experienced diversity that was significantly lower than the most recent 10-year average, while Station 9 (mixed) was considerably higher than its average. Stations 1, 2 and 6 have all experienced thicker vegetation around the centre of their areas (where the count is taken), which might help to account for the decrease in diversity, while the vegetation around Station 9 has become much more bird friendly. The other stations were all within about 10% of the 10-year average for the station.

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

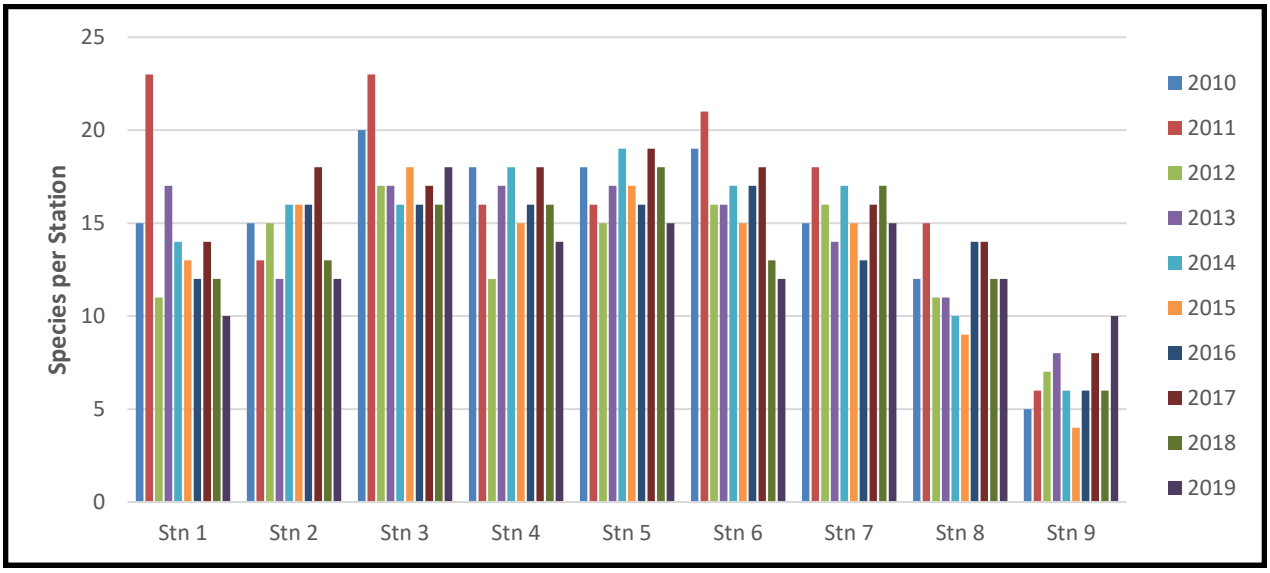

Figure 3.C. Species Richness per VCP Station

3.2.2 Nest Searching and Monitoring Results

In 2019, eight volunteers contributed a total of 669 hours to the project. This level of participation is a continuation of recent years' volunteer experience, which has been a major contributor to the number of nests which have been found over the past few years. Figure 3.D shows the breakdown of effort per zone. Due primarily to its lack of suitable habitat, Zone D continues to have the fewest number of nests by far, with the result that little monitoring time is required in that zone, as is reflected in the lowest level of effort expended.

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

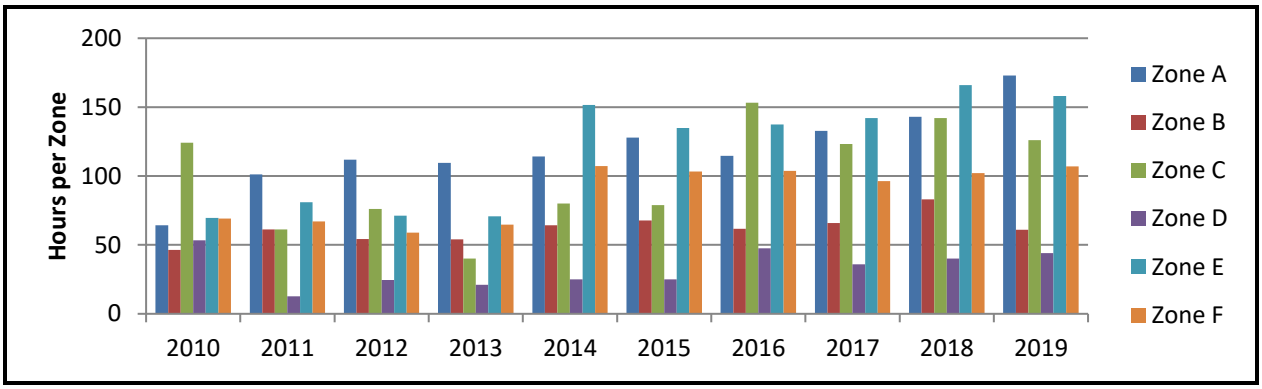

Figure 3.D. Nest Searching Effort per Zone from 2010 to 2019 (hours)

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 2019, 1,060 nests were discovered, significantly higher than the most recent 10-year average of 858. Of the total, 736 nests were monitored and reported to Project Nestwatch (see Tables 3.3 and 3.5).

Willow Flycatcher on Nest (J. Alvo)

Table 3.3. Total Nests by Species from 2010 to 2019

Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	AVG
AMGO	33	23	13	17	18	16	23	26	14	13	20
AMRO	69	115	93	93	89	78	113	125	104	122	100
AMWO	3	1	1			1		1			1
BANS	2	1					15	16		1	4
BAOR	10	17	16	15	35	17	18	24	16	13	18
BARS	2	4	11	26	31	24	29	49	51	51	28
BBCU					1		1				0
BCCH			1	2	1		2	2		2	1
BEKI					1						0
BGGN			2	4	6	7	6	4	4	4	4
BRTH	2		2	1	2	2		2	1		1
CANV					1						0
CEDW	14	21	23	19	37	40	49	33	35	18	29
CLSW									24	11	4
COGR	4	4	2	3	2	5	5	1	7	6	4
DOWO	1	1	1	1		1	2	3	1		1
EAKI	14	12	27	21	20	27	24	25	21	14	21
EAME	1										0
EAWP	1	1	1		1						0
EUST	12	4	5	8	4	5	3	1	2		4
GADW	1	3	4	1	2	1	1				1
GRCA	11	16	21	24	34	30	46	33	21	35	27
GWTE											0
HOFI									2	3	1
HOSP											0
HOWR	2	1						1	3	2	1
KILL	13	2	4	3	4	3	4	5	1		4
LEBI								2			0
LEFL	1				3	2			1		1
MALL	12	6	9	8	5	5	8	5	2	6	7
MODO			1				1	1	3		1
NOCA	1		1	1	3	2	4	14	12	5	4
NOFL	3	3			1		1	5	3	2	2
NOMO									2		0
NRWS		1			1	2		2		5	1
ORORO	2	1	2	3	2	1	2	1	3	4	2
RWBL	167	232	268	310	361	404	356	464	418	357	334
SOSP	8	2	3	2	8	10	7	4	10	4	6
SPSA	8	4	5	6	3	6	3	5	4	2	5
TRES	9	5	5	12	13	20	20	28	15	18	15
TRUS					1	1	1	1	2	2	1
VIRA										2	0
WAVI	9	15	12	13	31	12	18	21	18	19	17
WIFL	15	12	14	13	18	15	19	18	15	19	16
WODU									1		0
YEWA	82	88	86	127	164	189	237	253	211	320	176
Total	**512**	**595**	**633**	**733**	**902**	**926**	**1,018**	**1,175**	**1,027**	**1,060**	**858**

Total Effort (hours)	**427**	**385**	**397**	**360**	**542**	**538**	**618**	**596**	**676**	**669**	**520**
Efficiency (nests/hour)	**1.2**	**1.54**	**1.59**	**2.04**	**1.67**	**1.72**	**1.65**	**1.97**	**1.52**	**1.59**	**1.65**

Note: A Trumpeter Swan nest was observed in 2014, but not included in these reports until 2015 when another nest was observed and reported to NestWatch, The unreported 2014 nest has been included in subsequent reports for completeness. The Trumpeter Swan is the species of swan native to the Toronto region. Nearly

extirpated in the early-mid 1900s, recovery efforts in southern Ontario are seeing success. From 2013 through 2017, there has been one nest annually at TTP, fledging between five and seven cygnets. In 2018 and 2019, there were two successful nests.

In 2019, as in 2017, Lake Ontario water levels reached record levels, resulting in extreme flooding around the periphery of TTP, with many areas that are normally dry being covered with up to one metre of water. Nevertheless, the 1,060 nests located in 2019 represented the second highest total of the project. A possible partial explanation for 2017 and 2019 realizing the highest number of nests might be that the birds which normally nest on the periphery were forced to retreat to higher ground and a smaller overall area, making them easier to locate. Further, the extraordinary water levels in Lake Ontario would have resulted in higher than normal levels of insects for the birds to eat, which may have encouraged some species to have second (or more) broods. It will be interesting to see what future water levels will be.

The reasons for the continued high number of nests compared to the early years of the project include: (a) extensive tree and shrub planting by TRCA over recent years; (b) the natural spreading and maturation of appropriate breeding habitat in some areas, particularly dogwood, honeysuckle and reeds, which represent the most common hosts for Red-winged Blackbirds and Yellow Warblers, the most prolific non-colonial-waterbird nesters at TTP; (c) the ever-increasing nest-searching skills in the project participants; (d) the availability of more volunteer effort; and (e) the discovery of areas rich in nests that had not been explored until recent years.

Table 3.4 lists those species realizing new nest highs or matching previous highs for the project in 2019.

Table 3.4. Species Reaching New Nest Highs in 2019 or Matching Previous Highs

Species	Increase in Number of Nests over Previous High
Barn Swallow	Matched high of 2018
Black-capped Chickadee	Matched high of several years
House Finch	50%
Northern Rough-winged Swallow	150%
Orchard Oriole	33%
Trumpeter Swan	Matched high of 2018
Virginia Rail	New in 2019
Willow Flycatcher	Matched high of 2016
Yellow Warbler	26%

Five species nesting in 2019 deserve special mention.

Barn Swallow Nest (L. Freeman)

Virginia Rails nested at TTP for the first time during the project, although it is known to have nested at TTP historically. After hearing regular calling from the rails in the spring, two nests were found, although only one contained eggs.

Barn Swallows (listed as Threatened in Ontario) continued to take advantage of the buildings with appropriate overhangs to match the high nest count realized in 2018.

After its first nesting of the project in 2018, two House Finch nests were found in 2019.

Orchard Orioles, who announce themselves with their distinctive song, continue to build their presence at TTP. This is another species whose nests can be difficult to locate.

Yellow Warbler nests exploded in 2019, with the total number being 26% above the previous high and 82% above the most recent 10-year average.

Nest-searching efficiency figures (Table 3.3) can be misleading, as they are highly dependent on an area's vegetation (e.g., forest versus shrubland), the species found in the dominant habitat (e.g., shrub nesters versus high tree nesters) and the time spent on monitoring as opposed to finding nests. The efficiency realized in 2019 was below the 10-year average, but an increase from 2018 as new volunteers gain experience.

3.2.2.1 Changes in Nest Density for Each Zone

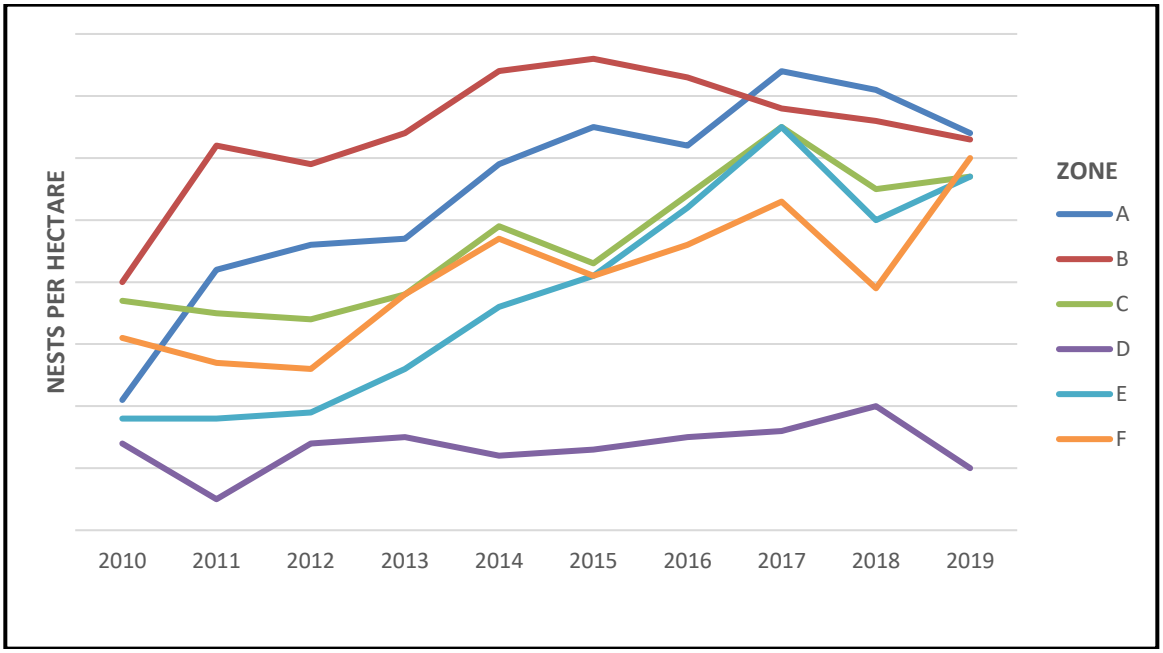

Figure 3.E **Nest Density by Zone**

In Figure 3.E, the nest density for each zone is determined by the number of nests per hectare. (In this chart, the number of hectares for Zone F has been reduced to eliminate the area occupied by the colonial waterbirds.) A map of the zones can be found in Appendix B.

- With the exception of Zone D, the nest density has increased in each zone over the most recent 10 years. This can be attributed to the same reasons given in the previous section for the increase in overall nest numbers in the last few years.
- There is, of course, a spike in nest density in 2017, which reflects the high number of nests found that year. It is interesting, however, that there was no spike in Zones B and D.
- Zones A and E have shown the greatest increase in nest density over the past 10 years, probably primarily because of the increase in nest-friendly shrubs in these zones. As they are the two largest zones, they have therefore contributed significantly to the overall increase in nest totals.
- Zone B, the smallest zone, levelled off after 2014 and had the highest nest density until 2017. Possible reasons for this and the lack of a spike in 2017 include (i) storm damage on the eastern side of the Neck, (ii) habitat rehabilitation on the western side of the Neck, and (iii) the shrubs in a major section becoming so dense in recent years as to restrict nesting opportunities.
- Zone D has shown little or no growth in nest density over the 10 years, and this and the lack of a spike in 2017 would have been due to (i) the considerable construction on the Endikement and in Cell 2 in recent years, and (ii) the lack of trees and shrubs in this zone, which means fewer nesting options and also less protection for the other vegetation.
- Starting in 2016, all the zones apart from Zone D appear to be have settled at a nest density range of 5 – 7 nests per hectare. It will be interesting to see whether this rate holds in future years as the vegetation continues to evolve.

3.2.2.2 Nest Productivity

In 2019, 736 nests were recorded online with Project NestWatch (Table 3.5). In terms of nest productivity, of the 493 nests which had known outcomes, 111 (or 23%) failed, while 382 (or 77%) were successful in fledging young. The remaining 243 nests which were monitored and reported to NestWatch, but had unknown outcomes, represented 33% of the nests reported to NestWatch. (The nests with unknown outcomes included all ground nests from Canvasback, Gadwall, Killdeer, Mallard, Song Sparrow and Spotted Sandpiper, which, commencing in 2012, were not monitored once found.)

As can be seen in Table 3.5, the 2019 nest failure rate of 23% is the highest since 2015, although still below the latest 10-year average. Of the 111 failures, 32 occurred at the egg stage, six at the young stage and 73 at either the egg or the young stage.

Table 3.5. Nest Productivity from 2010 to 2019

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	AVG
Nests discovered	512	595	633	733	902	926	1,018	1,175	1,027	1,060	858
Nests monitored & reported to NestWatch	440	430	464	549	690	657	702	801	663	736	613
• Unknown outcome	213	155	213	266	232	226	211	301	244	243	230
• Known outcome	227	275	251	283	458	431	491	500	421	493	383
➢ Successful	144	177	171	186	338	323	388	394	335	382	284
➢ Failed	83	98	80	97	120	108	103	106	86	111	99
➢ **Failure rate**	37%	36%	32%	34%	26%	25%	21%	21%	20%	23%	26%

Figure 3.F demonstrates how the known nest failure rate continues to trend lower, notwithstanding that the rate in 2019 was the highest of the last four years. However, the rate has been relatively constant at about 20% for the last four years, which could indicate that lower rates are unlikely in future.

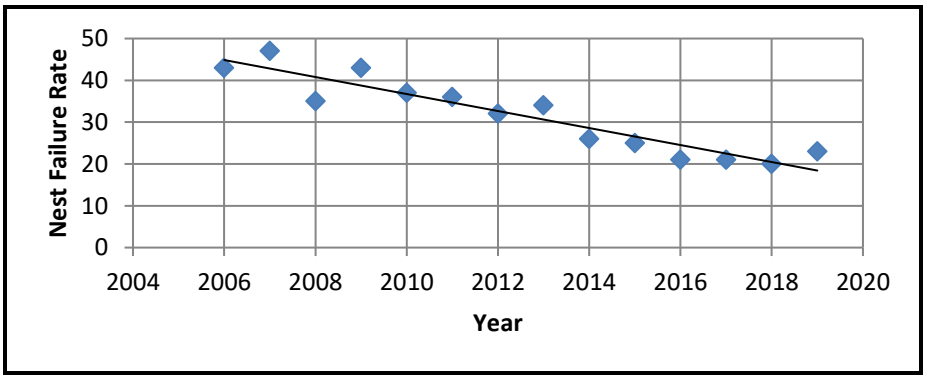

Figure 3.F Known Nest Failure Rate Trend

3.2.2.3 Nest Predation in 2019

Nest predation continues to be the most common cause of nest failure. Possible predators at TTP, in addition to other bird species, include raccoons, gartersnakes, mink, coyotes and, rarely, squirrels. Of the 111 failed nests noted in Table 3.5, a total of 74 nests were predated, representing 15% of nests with a known outcome. Nine species had at least one nest predated in 2019, with the most common being Yellow Warbler at 22% of nests with a known outcome, Willow Flycatcher at 21%, Red-winged Blackbird at 19% and American Robin at 15%.

3.2.2.4 Species Detected During the Breeding Season from all Studies

As can be seen in Table 3.6, the 40 confirmed breeders are exactly the same as the 10-year average, while the 79 total species detected in 2019 are highest of the last 10 years.

The first section of Table 3.6 provides a breakdown of the 40 confirmed breeders in 2019. Nests of 29 species of landbirds, including Brown-headed Cowbird, were found in 2019. To this were added four other species confirmed as breeders by the presence of recently fledged young or adults carrying food: Downy Woodpecker, European Starling, Killdeer and Wood Duck. When the five confirmed colonial waterbird nesters (i.e., Black-crowned Night-Heron, Common Tern, Double-crested Cormorant, Great Egret and Ring-billed Gull), as well as Canada Goose and Mute Swan, are added, the total becomes 40 species nesting at TTP in 2019.

Table 3.6. Summary of Species Detected During Breeding Season from All Studies

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	AVG
Breeding Species:											
Colonial Waterbirds	6	6	7	7	7	5	7	5	6	5	6
Managed Waterfowl	2	2	2	2	2	2	2	2	2	2	2
Sub-total	8	8	9	9	9	7	9	7	8	7	8
Landbirds	31	28	29	26	32	29	30	33	33	29	30
Nests confirmed by young	1	0	2	5	2	3	0	1	3	4	2
Sub-total	32	28	31	31	34	32	30	34	36	33	32
Confirmed Breeding Species (total of above)	40	36	40	40	43	39	39	41	44	40	40
Probable Breeding Species	2	4	3	5	5	3	4	3	2	6	4
Possible Breeding Species	8	3	6	4	8	14	11	8	5	4	7
Other Species Observed	11	14	17	11	8	15	12	17	20	29	15
Total Species Detected	61	57	66	60	64	71	66	69	71	79	66

Looking at the past 10 years of data, some conclusions and trends continue to emerge. As noted previously, Bobolink, Eastern Meadowlark and Savannah Sparrow have virtually disappeared from both the VCP counts and confirmed nests, although there has actually never been a confirmed Bobolink nest at TTP. Herbaceous vegetation at TTP is becoming denser, which has an adverse effect on nesting suitability for these and other ground-nesting species. At the same time, the spread of dogwood, honeysuckle and reeds, as well as tree and shrub planting by TRCA, has created more nesting opportunities for species such as Red-winged Blackbirds, American Robins and Yellow Warblers.

3.2.2.5 Gray Catbird Recycling a Red-winged Blackbird Nest

An Example of Nest Recycling – Gray Catbird Eggs in a Red-winged Blackbird Nest (D. Johnston)

An unusual nest was located at TTP in 2019 – a Red-winged Blackbird nest containing Gray Catbird eggs. This is the second such discovery during the project. Mark Peck of the Royal Ontario Museum reported that “we don't have any record here of a catbird using another species nest but I did check Birds of North America online and it turns out they have reports of catbirds taking over a Northern Cardinal nest and a Brown Thrasher nest”. *(pers. comm.)* Cardinal and thrasher nests are similar to catbird nests in that all three make considerable use of small twigs, but the Red-winged Blackbird nest is quite different, relying on leaves and stems with a deeper cup.

3.2.2.6 Parasitism by Brown-headed Cowbirds

Brown-headed Cowbird parasitism is a major issue for small landbird populations in more open habitats and forest fragments. In 2019, a total of 19 nests of three species were parasitized by Brown-headed Cowbirds (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 in Table 3.7 were calculated as the ratio of parasitized nests to the total parasitized and non-parasitized nests. (Note that nests of parasitized species were not included in this table unless evidence of parasitism, or lack thereof, could be confirmed.)

Table 3.7. **Brown-headed Cowbird Parasitism Data and Rates from 2010 to 2019**.

	Brown-headed Cowbird Parasitism										
		American Goldfinch	American Robin	Gray Catbird	House Finch	Northern Cardinal	Red-winged Blackbird	Song Sparrow	Willow Flycatcher	Yellow Warbler	Totals
2010	Nests checked*	19	28	11	0	1	110	4	11	66	250
	No. parasitized	0	0	0	0	0	27	1	2	21	51
	% parasitized	**0%**	**0%**	**0%**	**0%**	**0%**	**25%**	**25%**	**18%**	**32%**	**20%**
2011	Nests checked*	13	26	16	0	0	81	2	11	36	185
	No. parasitized	2	0	0	0	0	18	0	0	10	30
	% parasitized	**15%**	**0%**	**0%**	**0%**	**0%**	**22%**	**0%**	**0%**	**28%**	**16%**
2012	Nests checked*	8	17	19	0	1	77	2	8	33	165
	No. parasitized	0	0	0	0	0	30	0	2	7	39
	% parasitized	**0%**	**0%**	**0%**	**0%**	**0%**	**39%**	**0%**	**25%**	**21%**	**24%**
2013	Nests checked*	9	26	20	0	1	145	2	11	75	289
	No. parasitized	1	1	0	0	0	33	0	1	22	58
	% parasitized	**11%**	**4%**	**0%**	**0%**	**0%**	**23%**	**0%**	**9%**	**29%**	**20%**
2014	Nests checked*	10	27	27	0	3	134	6	13	96	316
	No. parasitized	0	0	0	0	0	22	0	2	11	35
	% parasitized	**0%**	**0%**	**0%**	**0%**	**0%**	**16%**	**0%**	**15%**	**11%**	**11%**
2015	Nests checked*	5	18	21	0	2	181	7	7	82	323
	No. parasitized	0	0	1	0	0	27	1	0	8	37
	% parasitized	**0%**	**0%**	**5%**	**0%**	**0%**	**15%**	**14%**	**0%**	**10%**	**11%**
2016	Nests checked*	7	38	18	0	4	133	3	12	123	338
	No. parasitized	0	0	1	0	0	26	0	1	28	56
	% parasitized	**0%**	**0%**	**6%**	**0%**	**0%**	**20%**	**0%**	**8%**	**23%**	**17%**
2017	Nests checked*	12	45	20	0	7	182	4	12	128	410
	No. parasitized	1	0	0	0	1	24	1	1	12	40
	% parasitized	**8%**	**0%**	**0%**	**0%**	**14%**	**13%**	**25%**	**8%**	**9%**	**10%**
2018	Nests checked*	6	34	10	2	6	153	6	9	73	299
	No. parasitized	0	0	0	1	1	14	3	0	10	29
	% parasitized	**0%**	**0%**	**0%**	**50%**	**17%**	**9%**	**50%**	**0%**	**14%**	**10%**
2019	Nests checked*	5	38	17	1	4	135	3	13	135	351
	No. parasitized	0	0	0	0	0	14	0	1	4	19
	% parasitized	**0%**	**0%**	**0%**	**0%**	**0%**	**10%**	**0%**	**8%**	**3%**	**5%**
AVG	Avg nests checked *	9.4	29.7	17.9	0.3	2.9	133.1	3.9	10.7	84.7	292.6
	Avg parasitized	0.4	0.1	0.2	0.1	0.2	23.5	0.6	1	13.3	39.4
	Avg % parasitized	**4.3%**	**0.3%**	**1.1%**	**33.3%**	**6.9%**	**17.7%**	**15.4%**	**9.3%**	**15.7%**	**13.5%**

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

Brown-headed Cowbird Egg *(the large egg)* in Willow Flycatcher Nest (D. Johnston)

The overall rate of parasitism in 2019 of 5% was the lowest rate experienced during this project. Yellow Warblers, the second most heavily parasitized species at TTP in terms of total number of nests parasitized, reached its lowest rate of parasitism at 3% in 2019.

Based on the average rate of parasitism over the past 10 years, Red-winged Blackbirds and Yellow Warblers continue to be the most heavily parasitized species, although the rate of parasitism for 2017 - 2019 clearly shows a trend to lower rates (see Table 3.7). (House Finch shows a higher average rate, but this is based on only three nests.)

The overall parasitism rate in 2019 of 5% continued the 10-year downward trend, as demonstrated in Figure 3.G. In line with this, there was a complete absence of cowbirds observed in the VCP counts of 2019, continuing the downtrend trend which started in 2014. As mentioned in earlier reports, possible explanations for this downward trend include (i) a reduction in the cowbirds' preferred foraging habitat at TTP due to the increase in tall herbaceous vegetation, and (ii) an overall decline in cowbird populations in Ontario, with the exception of the Carolinian region, as noted in the Atlas of the Breeding Birds of Ontario, 2001-2005 (p. 602).

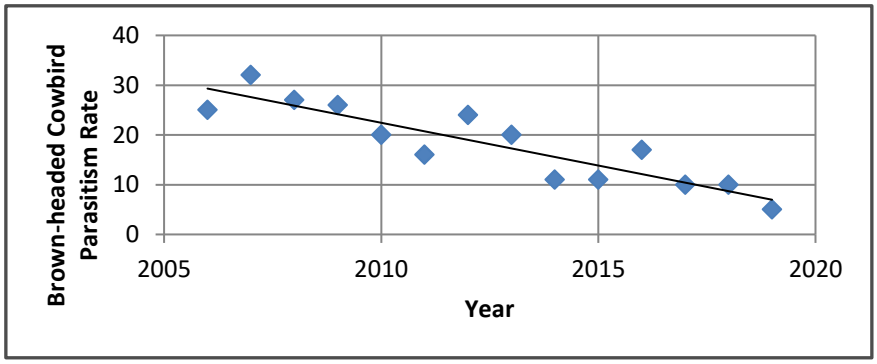

Figure 3.G Brown-headed Cowbird Parasitism Rate Trend

It should be noted that Table 3.7 above includes only the nine species where at least one instance of parasitism has been observed during the project. While it is not possible to monitor for parasitism in nests which are too high, no evidence of parasitism was confirmed for 12 additional species which represented a total of 82 nests.

3.3 The Overall Picture in 2019

The most valuable aspect of this project will be its ability to reveal changes in breeding bird abundance and diversity over time at TTP. Breeding avifauna will respond to changes in habitat distribution, composition and structure due to natural succession and habitat creation. Although the most recent years have seen a few unexpected nests (e.g., Least Bittern, Virginia Rail), the breeding bird communities (i.e., non-colonial waterbirds and landbirds) are largely typical of early successional environments. Dominant species in the past 10 years of VCP counts include Red-winged Blackbird, Yellow Warbler, Song Sparrow and European Starling, all of which require basic habitat conditions with a few fundamental components to thrive.

Commencing in 2014, the top three landbird nesters, Red-winged Blackbird, Yellow Warbler and American Robin, have respectively represented approximately 40%, 20% and 10% of the total nests each year. There have naturally been years when the percentage for one or more of the three has varied somewhat, such as Yellow Warbler in 2019, but overall these percentages have remained remarkably consistent. It will be interesting to see if 2019 was an anomaly for Yellow Warblers, or whether this species is about to establish a new level of nesting density.

With the addition of Virginia Rail in 2019, there have been 49 nesters confirmed since the current project commenced. This total includes the 46 species listed in Table 3.3, plus Brown-headed Cowbird, Canada Goose and Mute Swan, with the latter two species not being monitored as part of the project. In addition, the seven colonial waterbirds described in Section 2 of this report have also been confirmed as nesters: Black-crowned Night-Heron, Caspian Tern, Common Tern, Double-crested Cormorant, Great Egret, Herring Gull and Ring-billed Gull. When all species and historical records are included, there are now 71 species confirmed to have bred at Tommy Thompson Park. Some rare and isolated breeding records are unlikely to recur with any regularity, if at all, (e.g., Wilson's Phalarope). A complete historical breeding bird species list is presented in Appendix C, Species Accounts.

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

It is always interesting to note the species detected during VCP counts, but for which no nest was confirmed, versus those species not detected during VCP counts, but for which a nest was confirmed (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 (e.g., Trumpeter Swan), (ii) secretive habits (e.g., Black-billed Cuckoo), (iii) well-hidden nests (e.g., Least Flycatcher), (iv) nests or normal habitat not located near VCP stations, and (v) nests not normally located at TTP (e.g., Blue Jay).

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

VCP-recorded Species With No Nest Confirmed	Species With Nest But Not Recorded During VCP
American Redstart	Black-capped Chickadee
Belted Kingfisher	Blue-gray Gnatcatcher
Blue Jay	Brown-headed Cowbird
Blackpoll Warbler	House Finch
Brown Thrasher	House Wren
Common Yellowthroat	Northern Flicker
Gadwall	Trumpeter Swan
Least Flycatcher	Virginia Rail

4. Acknowledgements

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

The landbird and non-colonial waterbird section of this report is the result of the ongoing efforts of several dedicated volunteers. The 2019 VCP observations were collected by Don Johnston and Ian Sturdee, and the volunteer contributions to the nest searching phase of the project in 2019 are enumerated in Table 3.9.

Table 3.9 2019 Effort by Nest Searching Project Participants

Name	Total Hours
Jack Alvo	95
Marc Dupuis-Desormeaux	4
Lynne Freeman	52
Don Johnston	105
Jan McDonald	64
Pierre Robillard	96
Ian Sturdee	135
Paul Xamin	118
Total	**669**

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Appendices

Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

Station 1

VCP Stn 1 - 2019 - 1 (North)

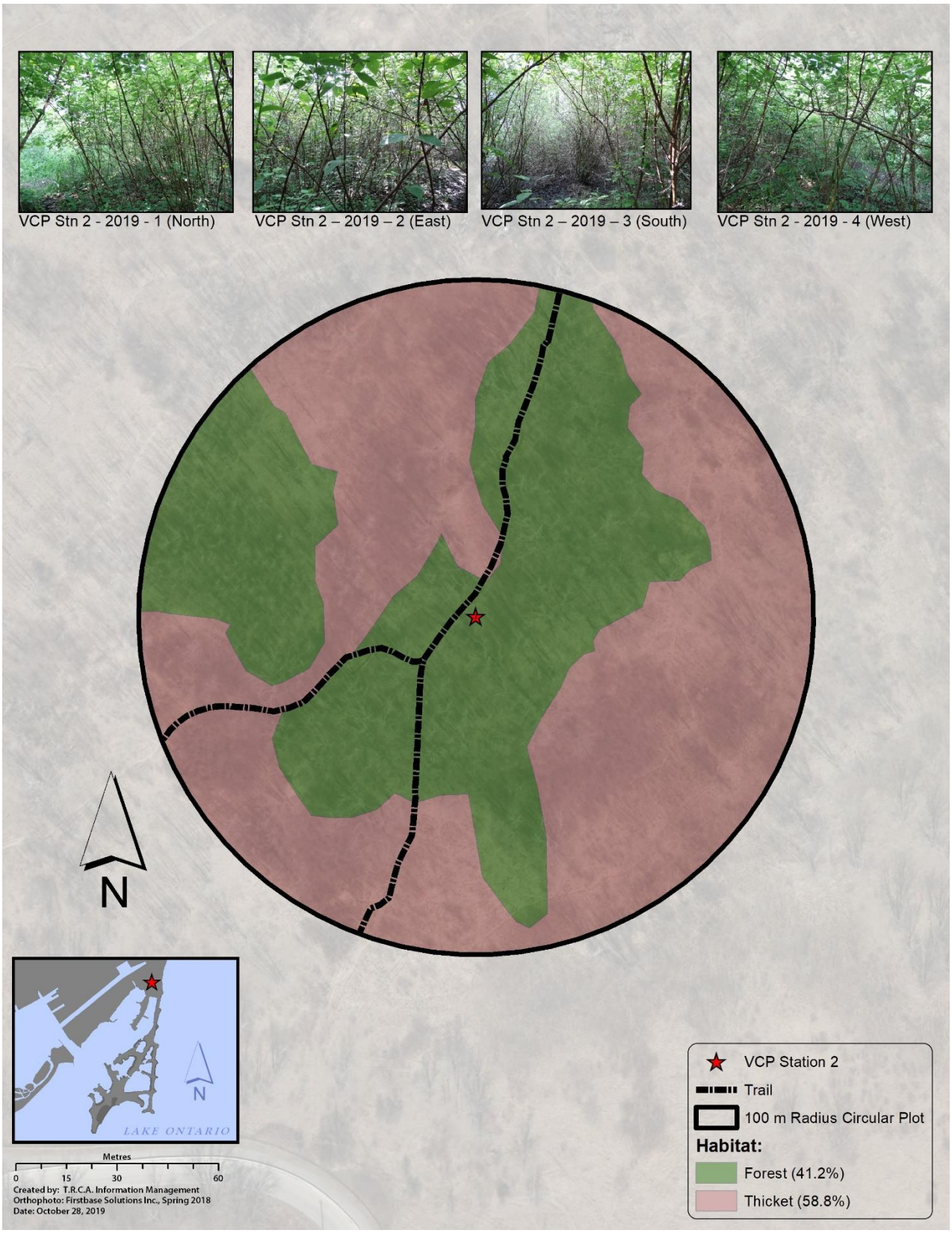
VCP Stn 1 – 2019 – 2 (East)

VCP Stn 1 – 2019 – 3 (South)

VCP Stn 1 - 2019 - 4 (West)

Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

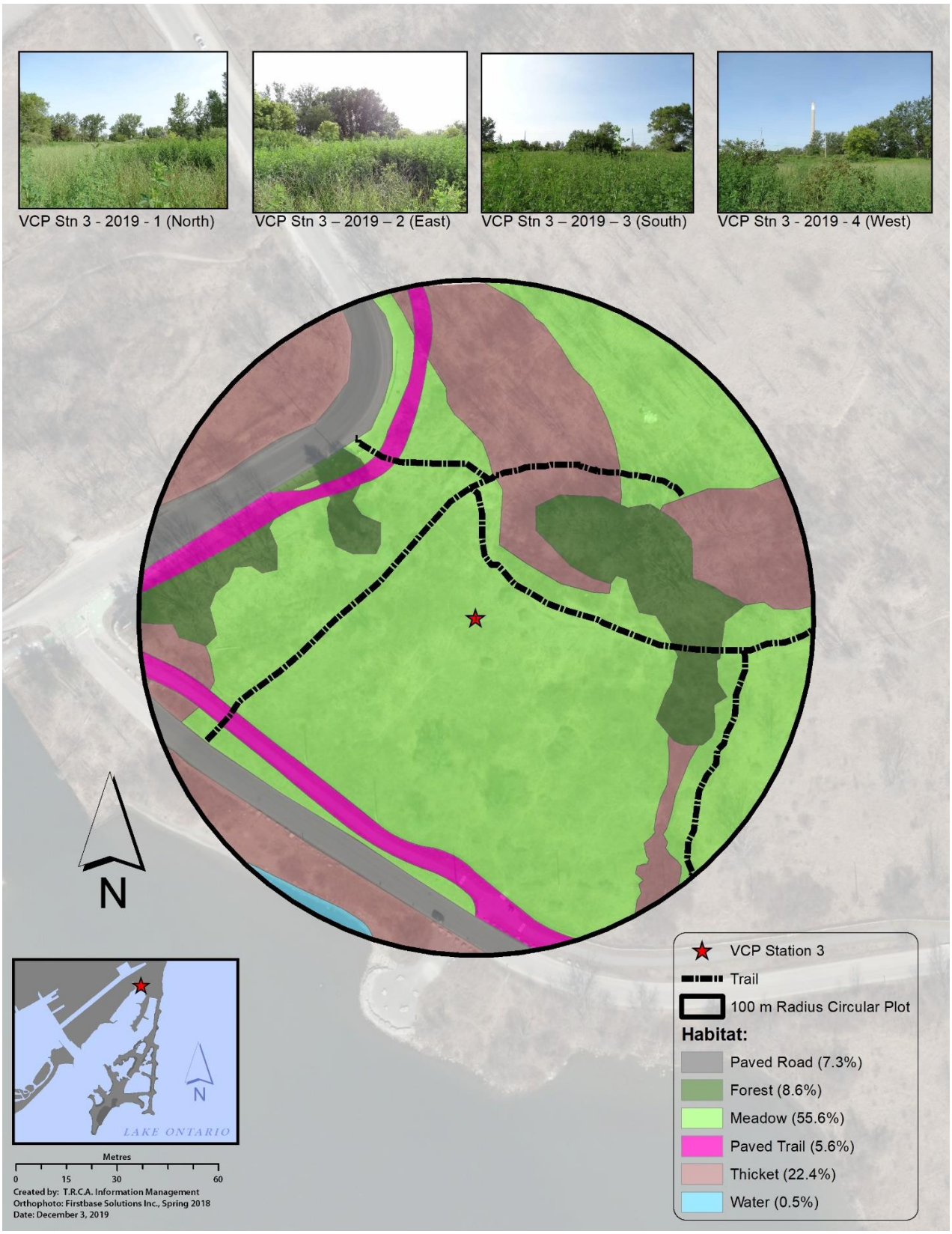
Station 2



Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

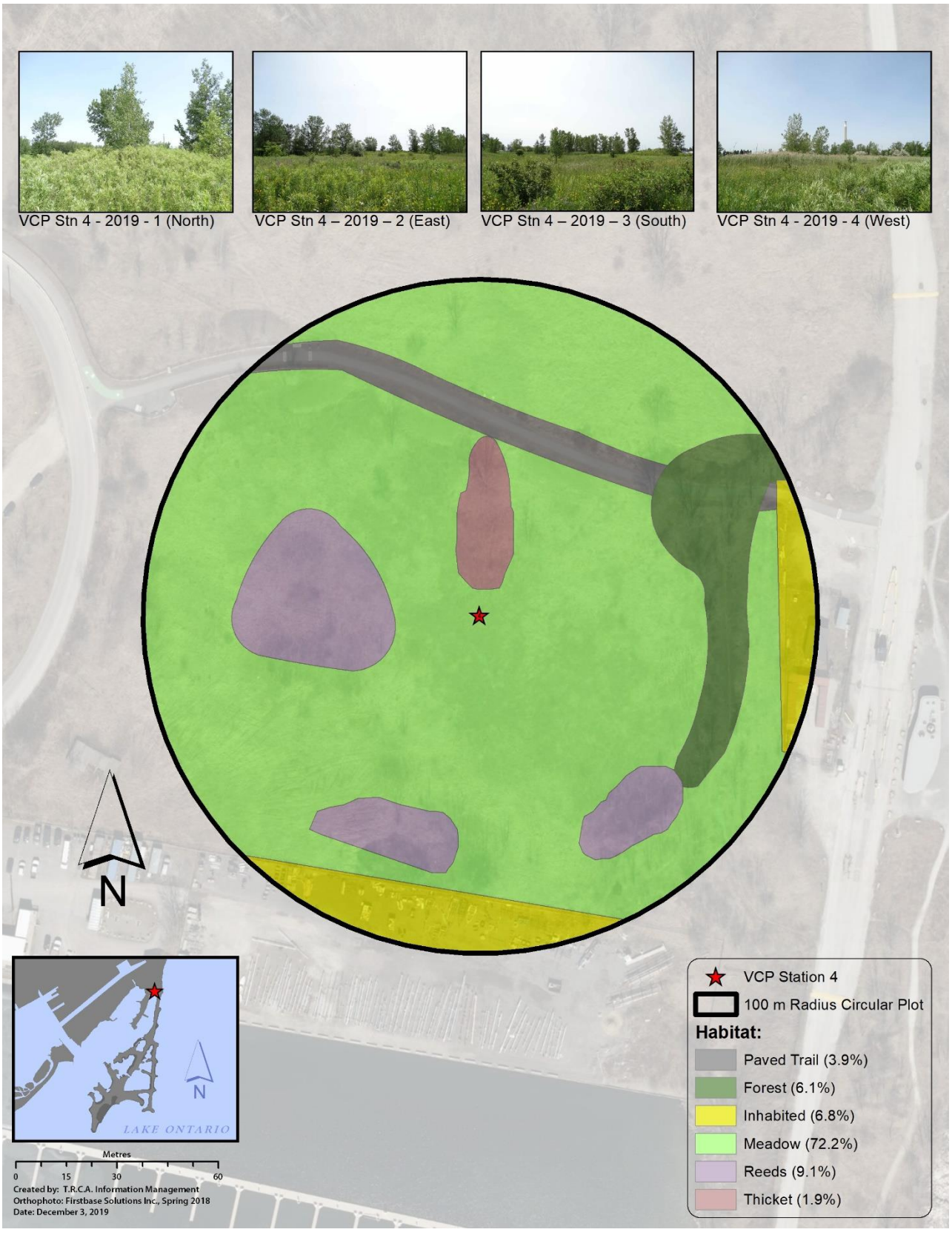
Station 3

VCP Stn 3 - 2019 - 1 (North) VCP Stn 3 – 2019 – 2 (East) VCP Stn 3 – 2019 – 3 (South) VCP Stn 3 - 2019 - 4 (West)



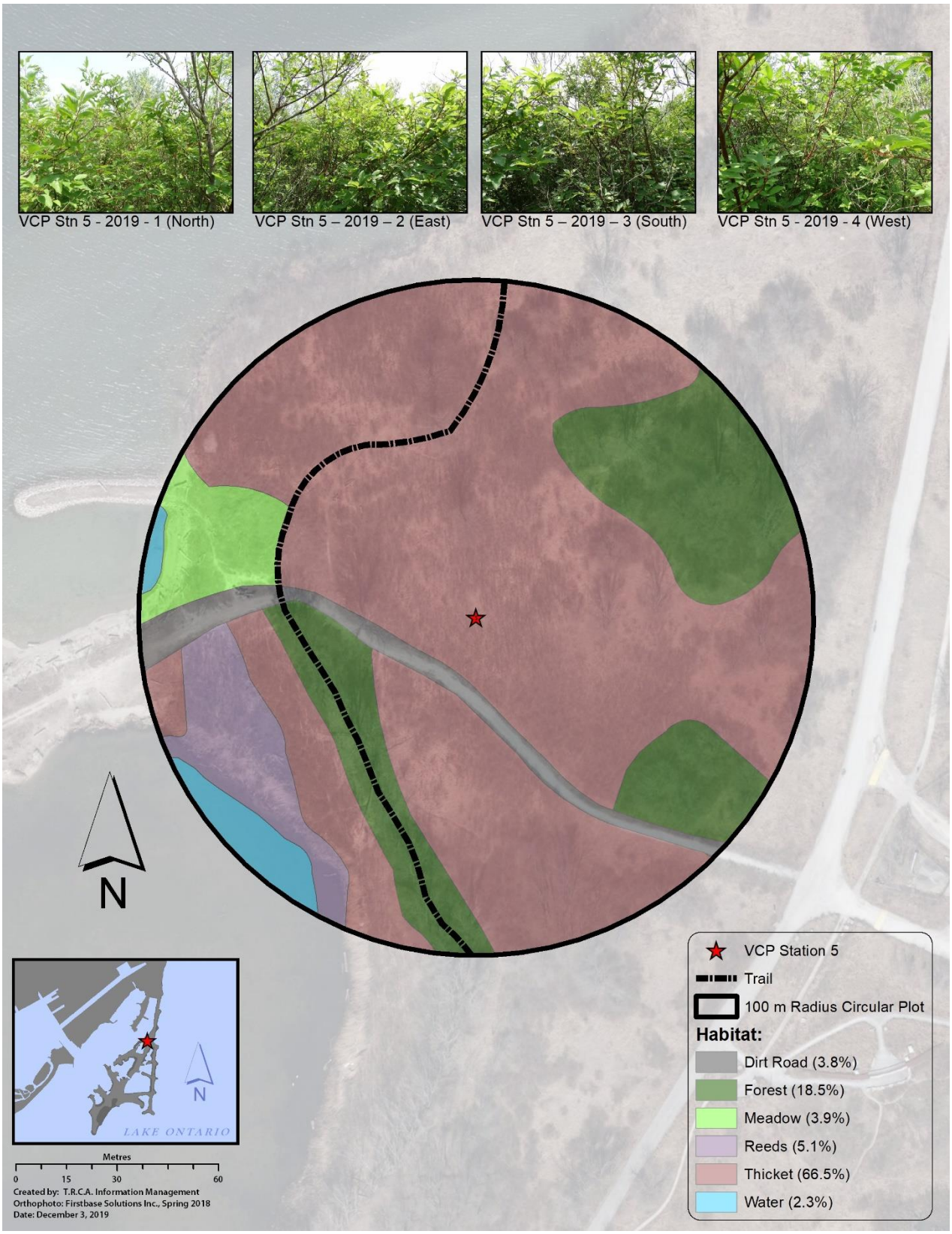
Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

Station 4



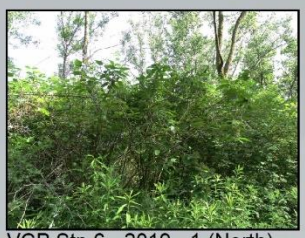
Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

Station 5



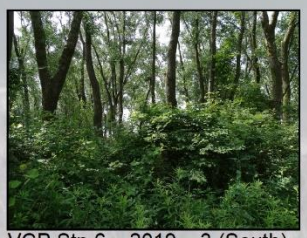
Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

Station 6

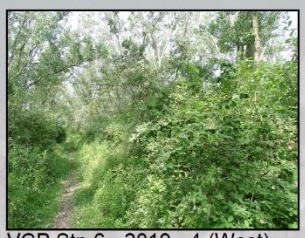


VCP Stn 6 - 2019 - 1 (North)

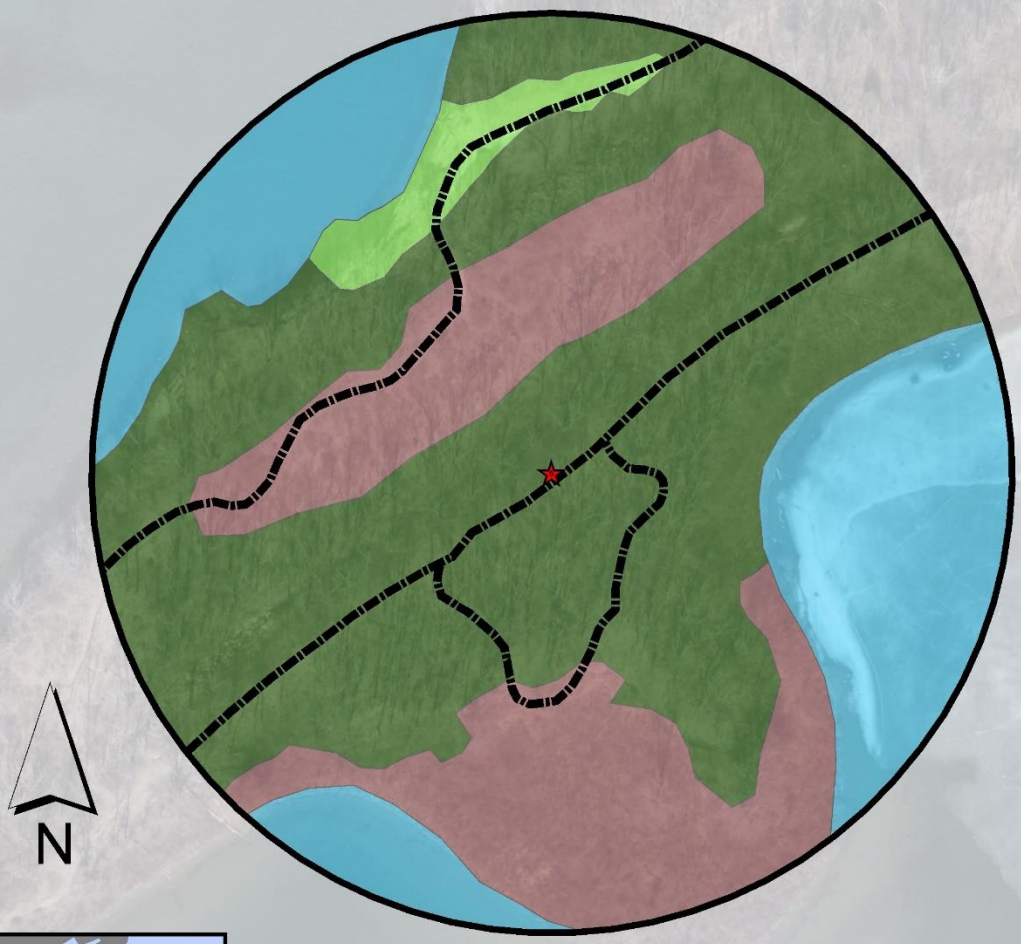
VCP Stn 6 – 2019 – 2 (East)



VCP Stn 6 – 2019 – 3 (South)



VCP Stn 6 - 2019 - 4 (West)



Metres

0 15 30 60

Created by: T.R.C.A. Information Management
Orthophoto: Firstbase Solutions Inc., Spring 2018
Date: December 3, 2019

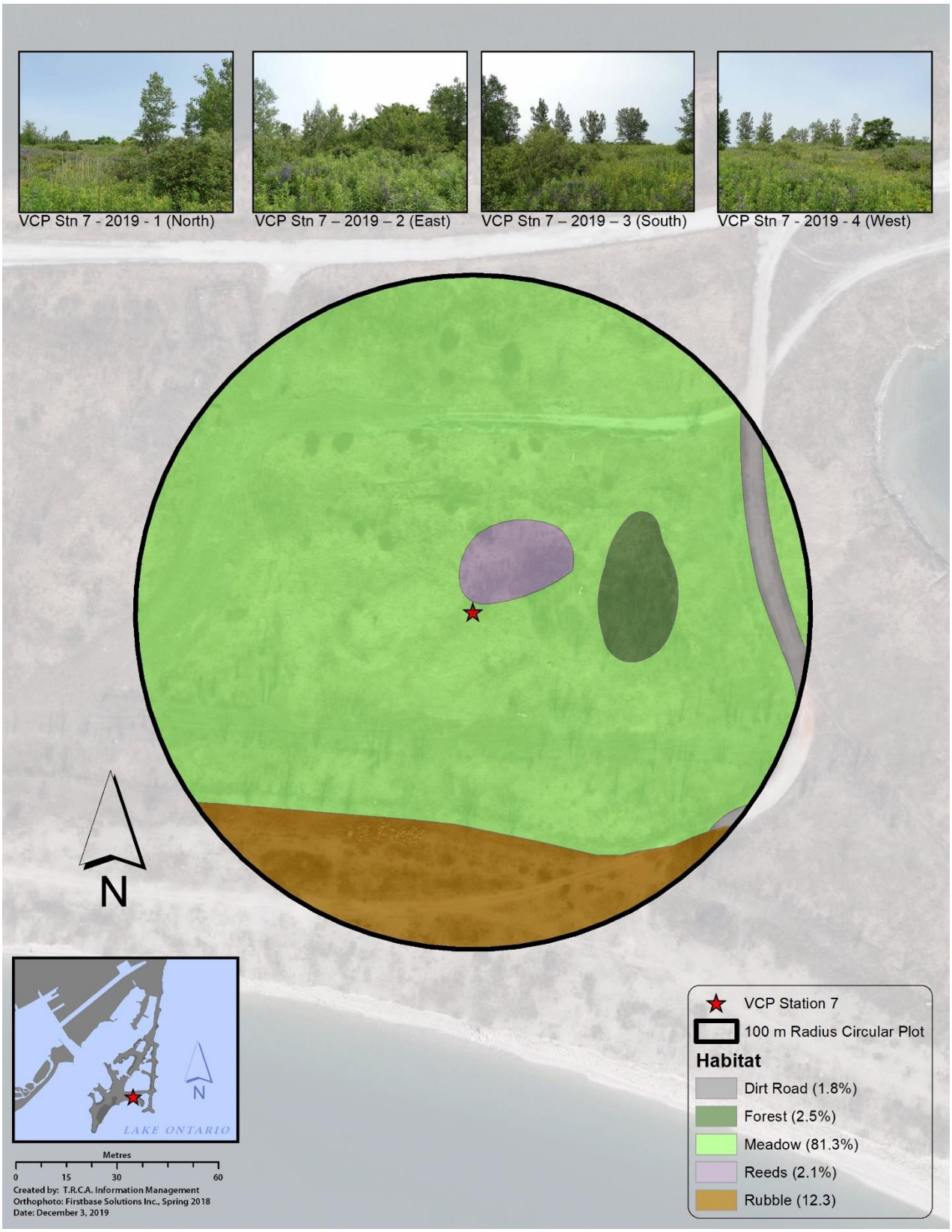
VCP Station 6
Trail
100 m Radius Circular Plot

Habitat:

Forest (50.7%)
Meadow (3.0%)
Thicket (23.1%)
Water (23.1%)

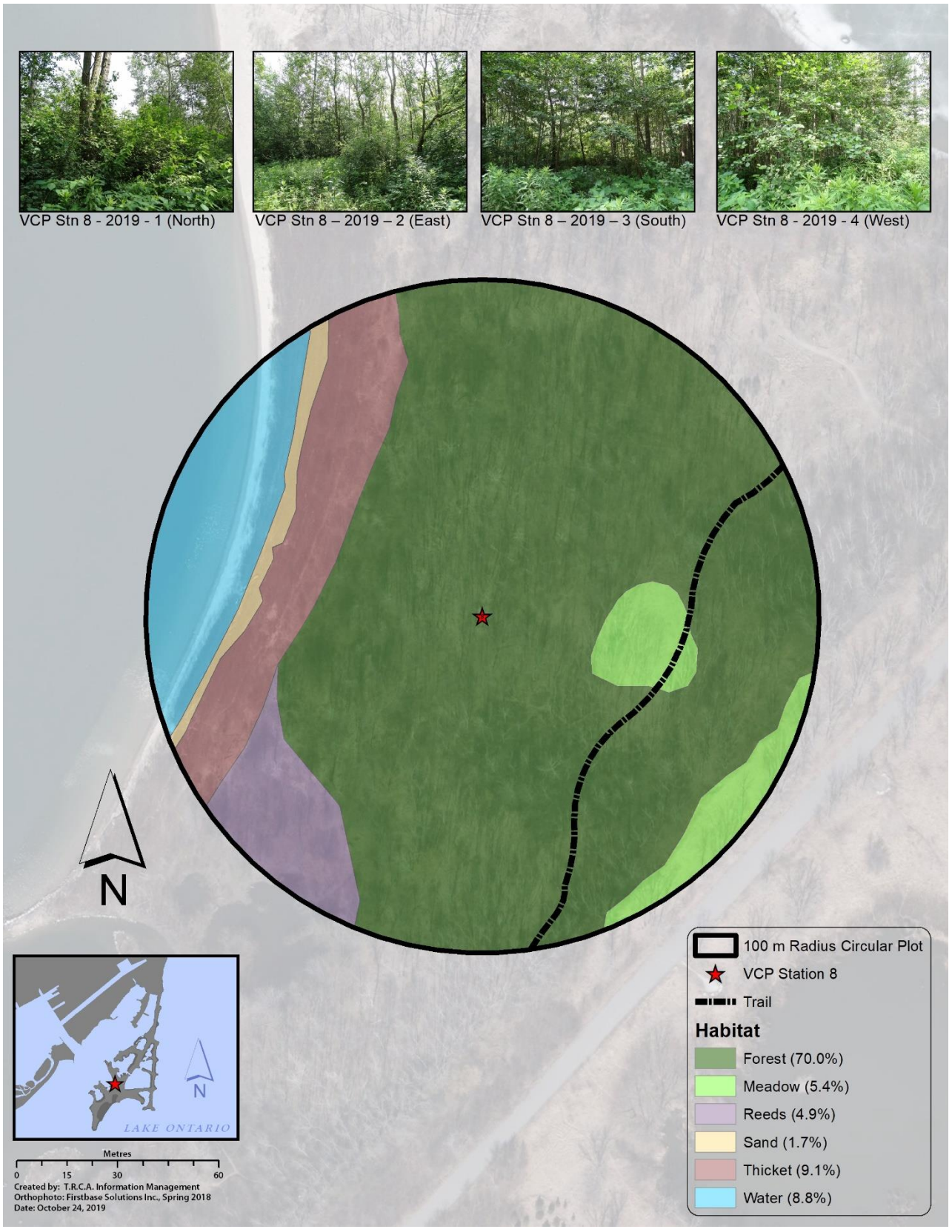
Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

Station 7



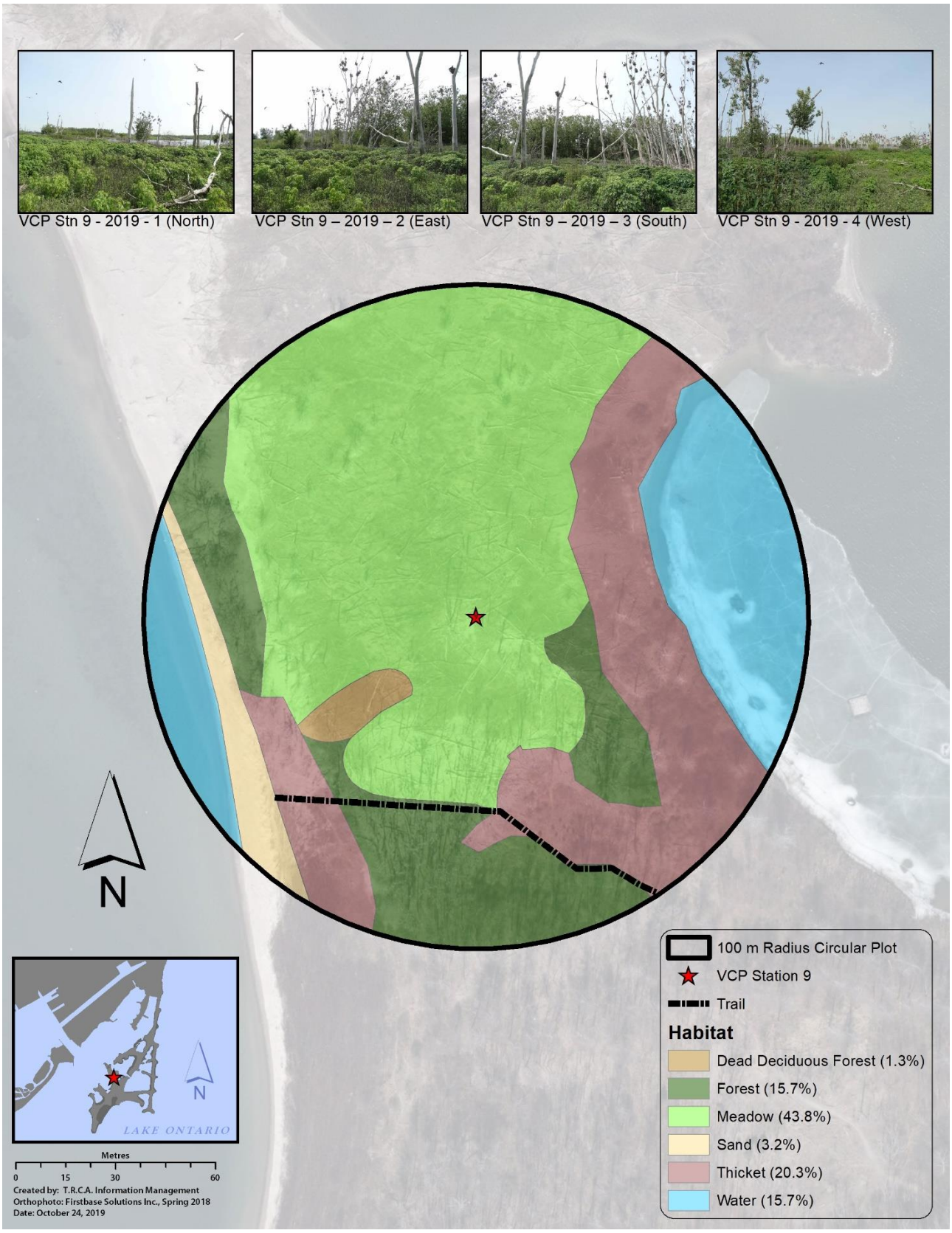
Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

Station 8

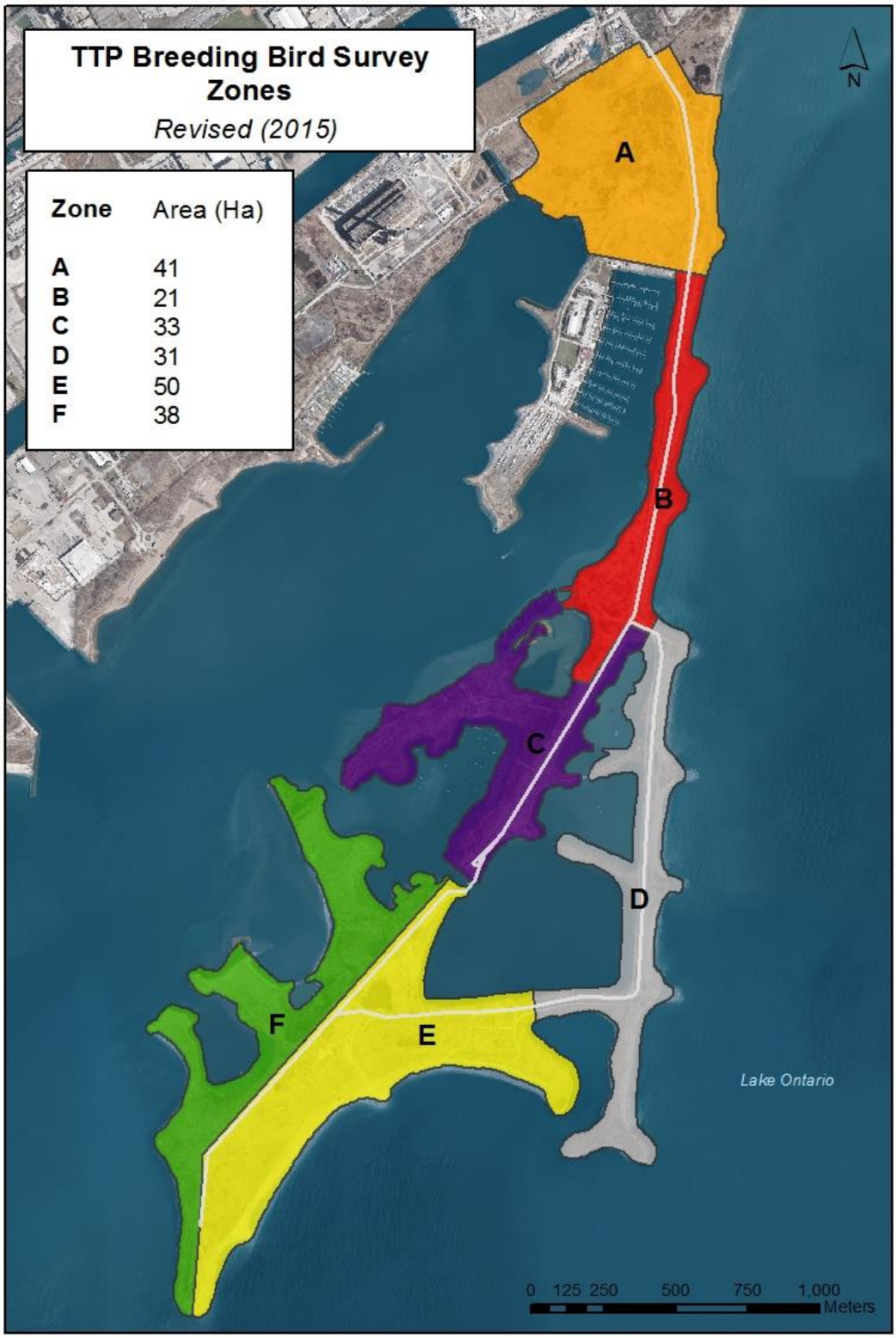


Appendix A: Description of VCP Stations (Habitat Pictures and Maps)

Station 9



Appendix B: Map of TTP Breeding Bird Survey Zones



This map was updated in 2015 to reflect a minor change in zone alignment; changes in the TTP land base due to lake-filling activities; and mapping tool refinements. This has resulted in area increases to every zone except Zone B and an overall area increase of 11.5%. The land base at TTP is expected to continue to change as habitat creation and enhancement work continues.

Appendix C: Species Accounts

The following accounts include species that were listed as observed during the breeding season, or as possible, probable or confirmed breeders in 2019, as well as historically confirmed breeders. Species highlighted in red were detected in 2019 during the breeding bird survey, but they 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 Figure 3.A, an annotated map of the park.

Alder Flycatcher (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed at various points in TTP were presumably late migrants.

American Black Duck (2019 - absent) Known to have bred historically at TTP.

American Crow (2019 - absent) Known to have bred historically at TTP, but not in recent years.

American Goldfinch (2019 - confirmed) This species is a regular late nester at TTP. In 2019, 13 nests were discovered, which is well below the most recent 10-year average.

American Kestrel (2019 – absent) Known to have bred historically at TTP.

American Redstart (2019 - probable) This species has never been confirmed as a breeder at TTP. Singing males have been present throughout the breeding season in most recent years, and in 2019, a pair was observed demonstrating agitated behavior which could indicate the presence of a nest.

American Robin (2019 - confirmed) Common nesting species in forested areas throughout TTP. In 2019, 122 nests were recorded, well above the most recent 10-year average.

American Woodcock (2019 - probable) This species is found regularly throughout much of TTP during the spring and summer. In 2019, birds were discovered displaying in several apparent territories at TTP and a pair was observed. The 2012 change in protocol with regard to ground-nesting birds makes locating nests much less likely.

Baltimore Oriole (2019 - confirmed) Common nesting species in forest areas of TTP. A total of 13 nests was recorded in 2019, below the average of the past 10 years of this project.

Bank Swallow (2019 - confirmed) In 2019, nesting was confirmed by the presence of recently fledged young.

Barn Swallow (2019 - confirmed) Barn Swallows are regular nesters at TTP under the eaves of buildings. In 2019, 51 nests were found, matching the high for the project which was achieved in 2018. This species, listed as Threatened on the Ontario Species at Risk, continues to take advantage of buildings constructed by TRCA in 2011/2012.

Bay-breasted Warbler (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed at various points in TTP were presumably late migrants.

Belted Kingfisher (2019 - possible) This species was confirmed for the first time in 2003 based on observations of fledged young. In 2019, a bird was observed twice in suitable nesting habitat during the breeding season.

Black-capped Chickadee (2019 - confirmed) A regular but uncommon nester at TTP. Two nests were found in 2019.

Black-crowned Night-Heron (2019 - confirmed) 293 nets were confirmed in 2019, which is 15% lower than the most recent 10-year average, but consistent with the last several years. At their peak in 2000, an estimated 30% of the Canada-wide population of Black-crowned Night-Herons were breeding at TTP.

Blackpoll Warbler (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed at various points in TTP were presumably late migrants.

Black-throated Green Warbler (2019 - observed) This species has never been confirmed as a breeder at TTP. Several birds that were observed at various points in TTP were presumably late migrants.

Blue-gray Gnatcatcher (2019 - confirmed) In 2019, four nests were found. These very small nests are always difficult to find and often moved if the birds feel the nest has been discovered.

Blue Jay (2019 - possible) This species has never been confirmed as a breeder at TTP. Several birds were observed in 2019 in suitable nesting habitat in May.

Blue-winged Teal (2019 – observed) Known to have bred historically at TTP, although not in recent years. A bird was observed in late April and early July in 2019.

Brown-headed Cowbird (2019 - confirmed) In 2019, a total of 19 nests of Red-winged Blackbird (14), Willow Flycatcher (1) and Yellow Warbler (4), were found to have been parasitized by cowbirds. This was the lowest total of the project.

Brown Thrasher (2019 - probable) Brown Thrasher is a regular but uncommon nester at TTP. In 2019, a pair was observed in suitable breeding habitat.

California Gull (2019 – absent) Known to have bred historically at TTP, but not detected in recent years.

Canada Goose (2019 - confirmed) Nine nests were confirmed in 2019 and were managed according to the TRCA Canada Goose Management Strategy.

Canada Warbler (2019 - observed) This species has never been confirmed as a breeder at TTP. The single bird observed in May was presumably a late migrant.

Canvasback (2019 - absent) Canvasback was known to have bred regularly in the Triangle Pond area at TTP in the years prior to the start of the current project, but nesting has only been confirmed in 2014 during the project.

Caspian Tern (2019 - observed) This species is an intermittent ground-nester at TTP, last confirmed in 2016. Adults were observed loafing in Cell 2 throughout the breeding season.

Cedar Waxwing (2019 - confirmed) A common late nester at TTP; 18 nests were found in 2019, down almost 40% from the most recent 10-year average for this project.

Chestnut-sided Warbler (2019 – observed) This species has never been confirmed as a breeder at TTP. Several birds were observed in 2019 in May in various parts of TTP and were presumably all late migrants.

Chimney Swift (2019 - observed) This species has never been confirmed as a breeder at TTP. Small flocks were observed foraging at TTP from nearby roosts.

Cliff Swallow (2019 - confirmed) In 2018, this species nested at TTP for the first time, building nests under the eaves of one of the structures erected by TRCA in 2011/2012 and another building. A total of 11 nests were built in 2019, less than half the total of 2018.

Common Grackle (2019 - confirmed) Common Grackle is a regular nester at TTP, although nests are often well hidden. In 2019, eight nests were found – the second year in a row that a new high for the project was achieved.

Common Raven (2019 – observed) This species has never been confirmed as a breeder at TTP, although a pair has nested immediately north of TTP in recent years. Single birds were seen from time to time foraging in TTP during the breeding season.

Common Tern (2019 – confirmed) In 2019, Common Terns nested exclusively on the Embayment D raft, apart from one nest in the Cell 2 wetland. There were 90 nests in total.

Common Yellowthroat (2019 - probable) Known to have bred historically at TTP. Singing males have been present throughout the breeding season in most recent years, and in 2019, a male was observed performing territorial songs in suitable nesting habitat during the breeding season.

Double-crested Cormorant (2019 - confirmed) 13,614 nests were confirmed in the tree and ground nest colonies at TTP in 2019. The overall population decreased 6% from 2018 as a result of the significant flooding from record high Lake Ontario water levels in the ground nest colonies. As a result of the flooding, tree nesting increased 23% and the ground nesting population decreased by 17% over the previous year. The birds at TTP represent the largest breeding colony of Double-crested Cormorants in North America. Cormorants are managed for spatial distribution, where ground nesting is encouraged and tree nesting is discouraged, following the Tommy Thompson Park Double-crested Cormorant Management Strategy.

Downy Woodpecker (2019 - confirmed) A regular breeder at TTP, but in very low numbers. In 2019, nesting was confirmed by the presence of recently fledged young.

Eastern Kingbird (2019 - confirmed) A regular breeder at TTP along forest edges where meadow and shrubs are present. In 2019, a total of 14 nests was found, down 33% from the average for the most recent 10 years.

Eastern Meadowlark (2019 - absent) In 2010, a nest was found in the Baselands meadow habitat, although it was not successful. The change in protocol with regard to ground-nesting birds will make locating nests in future more difficult.

Eastern Wood-Pewee (2019 – possible) In 2019, singing males were observed in suitable nesting habitat during the breeding season.

European Starling (2019 - 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. In 2019, nesting was confirmed by the presence of adults carrying food for their young.

Gadwall (2019 - absent) Gadwall has been a regular ground-nesting species at TTP. In 2019, no nests were located. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Gray Catbird (2019 - confirmed) Gray Catbird is a regular nester at TTP, preferring dense shrubs with some tree cover. 35 nests were found in 2019, which was 30% above the 10-year average.

Great black-backed Gull (2019 - absent) Known to have bred historically at TTP.

Great Blue Heron (2019 - absent) Known to have bred historically at TTP

Great Egret (2019 - confirmed) Ten nests were confirmed on Peninsulas B and C, one short of the high achieved in 2017.

Green Heron (2019 - observed) Known to have nested historically at TTP, but no nests have been detected during this project. A bird was observed in 2019 in Triangle Pond during the breeding season.

Green-winged Teal (2019 – absent) In 2017, this species was confirmed as a breeding species at TTP for the first time. Not seen in 2019.

Herring Gull (2019 – observed) A breeder at TTP in small numbers in many recent years, but no nests were found in 2019. Herring Gull populations have been declining in recent years.

Hooded Merganser (2019 – observed) This species has never been confirmed as a breeder at TTP. A bird was observed in late April and early July in 2019.

Horned Lark (2019 - absent) Known to have bred historically at TTP.

House Finch (2019 - confirmed) A nest was found in 2018 for the first time since 2007, and in 2019, two nests were located.

House Sparrow (2019 - observed) Known to have bred historically at TTP. In 2019, the bird observed in the Baselands was presumably visiting from somewhere nearby.

House Wren (2019 - confirmed) Believed to be a regular nester at TTP, but in low numbers. In 2019, two nests were found under construction.

Indigo Bunting (2019 - observed) This species has never been confirmed as a breeder at TTP. Two birds observed in May were presumably late migrants.

Killdeer (2019 - confirmed) Killdeer is a regular ground-nesting species at TTP in open areas with low vegetation. In 2019, nesting was confirmed by the presence of recently fledged young. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Least Bittern (2019 – probable) In 2017, this Threatened species was confirmed as a breeding species at TTP for the first time. Probable breeding in 2019 was confirmed by the observation of an adult pair suitable breeding habitat.

Least Flycatcher (2019 - probable) A regular but uncommon breeder at TTP. In 2019, a male was observed performing territorial songs in suitable nesting habitat during the breeding season.

Magnolia Warbler (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed at various points in TTP were presumably late migrants.

Mallard (2019 - confirmed) Mallard is a regular ground-nester at TTP. Six nests were found in 2019, just below the average for the most recent 10 years of this project. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Mourning Dove (2019 - observed) No nests were found in 2019, although several birds were observed in May and June. Mourning Dove nests have been scarce at TTP in recent years.

Mute Swan (2019 - confirmed) One nest was confirmed and managed according to the TRCA Mute Swan Management Strategy.

Myrtle Warbler (2019 - observed) This species has never been confirmed as a breeder at TTP. Large numbers were observed at various points in TTP in May and were presumably all late migrants.

Nashville Warbler (2019 – observed) This species has never been confirmed as a breeder at TTP. Birds were observed frequently in May 2019 and were presumably late migrants.

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

Northern Cardinal (2019 - confirmed) Until 2017, Northern Cardinal had nested regularly at TTP in low numbers. In 2017, however, 14 nests were found, by far the highest total for this project, although only five nests were found in 2019. The nests of this species are usually well hidden in dense shrubs, and sometimes abandoned if the adults seem to feel they are being watched.

Northern Flicker (2019 - confirmed) Northern Flicker is an uncommon but regular nesting species at TTP. Two nests were found in 2019.

Northern Mockingbird (2019 - observed) After the first nests at TTP were found in 2018, no nests were found in 2019. However, they are known to nest nearby, so the birds observed in 2019 are presumably from those nests.

Northern Parula (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed at various points in TTP were presumably late migrants.

Northern Rough-winged Swallow (2019 - confirmed) An uncommon nester at TTP. Five nests were found in 2019 in the bank along the south shore of TTP, by far the highest total of the project.

Northern Waterthrush (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed frequently in May were presumably late migrants.

Orchard Oriole (2019 - confirmed) Four nests were found in 2019, a new high for the project.

Pied-billed Grebe (2019 – possible) In 2019, a calling male was observed in Triangle Pond over an extended period, but there was no confirmation of a female being present.

Red-bellied Woodpecker (2019 - observed) This species has never been confirmed as a breeder at TTP. This species is known to breed in the area, so the bird observed in May could have been either a late migrant or visiting from a nearby nesting site..

Red-breasted Nuthatch (2019 - observed) This species has never been confirmed as a breeder at TTP. There were several sightings various points in TTP, and the birds were presumably all late migrants.

Red-eyed Vireo (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed in 2019 were presumably all late migrants.

Redhead (2019 - absent) Known to have bred historically at TTP.

Red-winged Blackbird (2019 - confirmed) The most abundant nesting species at TTP (excluding colonial waterbirds), found throughout TTP. In 2019, 357 nests were found, down from the previous two years, but 7% above the most recent 10-year average. Along with Yellow Warblers, this species continues to show the highest rate of parasitism by Brown-headed Cowbirds at TTP.

Ring-billed Gull (2019 - confirmed) Confirmed nesting with an estimated 15,000 nests.

Ring-necked Pheasant (2019 - absent) Known to have bred historically at TTP, but not detected in many years.

Rock Pigeon (2019 - observed) Known to have bred historically at TTP. Observed in 2019, but no nest was found.

Rose-breasted Grosbeak (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed in May at various points in TTP were presumably late migrants.

Savannah Sparrow (2019 - absent) Prior to the start of this project, Savannah Sparrow was a common ground nester in open areas of TTP with substantial ground cover, particularly in the Baselands, along the Neck and in some areas of the Flats and Toplands. No nests have been found during the project. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely.

Scarlet Tanager (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed at various points in TTP in 2019 were presumably late migrants.

Song Sparrow (2019 - confirmed) Song Sparrow is one of the most abundant nesting species at TTP, although few of its well-concealed nests are ever found. In 2019, four nests were found in a variety of habitats, down from recent experience. The 2012 change in protocol with regard to ground-nesting birds makes locating nests less likely, although not all Song Sparrow nests are on the ground.

Sora (2019 - absent) Known to have bred historically at TTP, but not detected in recent years.

Spotted Sandpiper (2019 - confirmed) A common ground nester at TTP in open areas near water. Only two nests were found in 2019, well below the most recent 10-year average of this project. The 2012 change in protocol with regard to ground-nesting birds making locating nests less likely.

Tree Swallow (2019 - confirmed) Tree Swallow is a common breeder at TTP. In 2019, 18 nests were found in nest boxes and natural cavities around TTP, slightly above the most recent 10-year average.

Trumpeter Swan (2019 - confirmed) This species was confirmed as a breeder at TTP for the first time in 2013. Two nests were located in 2019.

Virginia Rail (2019 - confirmed) Although known to have bred historically at TTP, no nest had been found during the project until 2019, when one active nest and one unused nest were found in the Baselands. The high water levels presumably played a role in creating suitable habitat.

Warbling Vireo (2019 - confirmed) A common nesting species in forested areas in TTP, usually high in the trees, where the nest can often be found by hearing the male singing on the nest. In 2019, 19 nests were found, slightly above average for this project.

Western Palm Warbler (2019 - observed) This species has never been confirmed as a breeder at TTP. The birds observed at various points in TTP were presumably late migrants.

Willow Flycatcher (2019 - confirmed) Willow Flycatcher is a common nesting species in more open areas with dense shrubs. Little variation in the number of nests at TTP has been seen from year to year during the project, and in 2019, 19 nests were found, slightly above average for this project.

Wilson's Phalarope (2019 - absent) Known to have bred historically at TTP, but not detected in recent years.

Wood Duck (2019 - confirmed) This species was confirmed in 2012 as a breeder at TTP for the first time, and nesting in 2019 was confirmed by the presence of recently fledged young.

Yellow Warbler (2019 - confirmed) Yellow Warblers are common to abundant through much of TTP, usually nesting in dogwoods and honeysuckle. The number of nests that have been found has been increasing rapidly over the last few years, and a total of 320 nests was found in 2019, by far the highest total during this project and an amazing 82% above the most recent 10-year average for this project. Along with Red-winged Blackbirds, this species continues to show the highest rate of parasitism by Brown-headed Cowbirds at TTP.

Appendix D: Map of 2019 Landbird Nest Locations *

* Excludes colonial waterbirds, Canada Goose and Mute Swan nests

Appendix E: Breeding Status Codes for Each Species Detected In 2019

OBSERVED	POSSIBLE	PROBABLE	CONFIRMED
Alder Flycatcher	Belted Kingfisher	American Redstart	American Goldfinch
Bay-breasted Warbler	Blue Jay	American Woodcock	American Robin
Blackpoll Warbler	Eastern Wood-Pewee	Brown Thrasher	Baltimore Oriole
Black-throated Green Warbler	Pied-billed Grebe	Common Yellowthroat	Bank Swallow
Blue-winged Teal		Least Bittern	Barn Swallow
Caspian Tern		Least Flycatcher	Black-capped Chickadee
Canada Warbler			Black-crowned Night-Heron
Chestnut-sided Warbler			Blue-gray Gnatcatcher
Chimney Swift			Brown-headed Cowbird
Common Raven			Canada Goose
Green Heron			Cedar Waxwing
Herring Gull			Cliff Swallow
Hooded Merganser			Common Grackle
House Sparrow			Common Tern
Indigo Bunting			Double Crested Cormorant
Magnolia Warbler			Downy Woodpecker
Mourning Dove			Eastern Kingbird
Myrtle Warbler			European Starling
Nashville Warbler			Gray Catbird
Northern Mockingbird			Great Egret
Northern Parula			House Finch
Northern Waterthrush			House Wren
Red-bellied Woodpecker			Killdeer
Red-breasted Nuthatch			Mallard
Red-eyed Vireo			Mute Swan
Rock Pigeon			Northern Cardinal
Rose-breasted Grosbeak			Northern Flicker
Scarlet Tanager			N. Rough-winged Swallow
Western Palm Warbler			Orchard Oriole
			Red-winged Blackbird
			Ring-billed Gull
			Song Sparrow
			Spotted Sandpiper
			Tree Swallow
			Trumpeter Swan
			Virginia Rail
			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

Appendix F: Breeding Bird Report Methodologies and Protocols

1. Colonial Waterbird Population Estimate Methodology

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

1.1 Tree Nest Survey Methodology

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

1.2 Ground Nest Survey Methodology

The census for Common Tern and Ring-billed Gull is conducted at the peak nesting period, typically the last week of May or the first week of June to determine their breeding population. The Common Tern colonies nest on three floating reef-rafts and one artificial island. The colonies can be subject to predation/disturbance pressures that can result in asynchronous nesting, making it difficult to obtain a reliable estimate of the breeding population. Prior to 2016, depending on the circumstances of the sub-colony, multiple population counts might have been conducted throughout the breeding season. The reef-rafts are approximately 24m^2, so all nests could 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 120m^2 and was more challenging to count because of its size and tall vegetation. Observers carefully walked the island in a grid pattern and noted nests and nest contents. Since 2016, a single population count has been conducted for Common Tern colonies in mid-June by aerial photography from a helicopter. Individual nests can be seen in the images and are counted using GIS software by placing a dot on each nest.

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

Double-crested Cormorant ground nest estimates occur once management has largely stopped to account for birds that may have attempted to tree nest and instead ground nested. Nest counts for cormorants are undertaken at the peak nesting period using aerial photography from a helicopter. This method minimizes

disturbance to the ground nesting colonies. Individual nests can be seen in the images and are counted using GIS software by placing a dot on each nest.

2. Landbird and Non-colonial Waterbird 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.

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).

As a result of the vegetation analysis completed in 2019, it was determined that the dominant habitat has changed over time for Stations 1 (from Thicket to Meadow), 2 (from Forest to Thicket) and 9 (from Forest to Mixed). Much of the thicket at Station 1 has become wetland since 2010 as a result of the recent high-water levels and new growth of phragmites. Station locations are now distributed in the following manner: two in forest habitats, four in meadow communities, two in an extensive shrub thicket (termed “shrubland”) which is bordered by forest, and one with a mixed habitat (with no habitat dominating). A summary of station information is presented below in Table F.1. The location of each station is shown in Figure 3.A, an annotated map of Tommy Thompson Park, and in Appendix A.

Table F.1. VCP Station Information

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

2.2 VCP Station Vegetation Protocol

The habitats at the study area are relatively young in age and may be altered or enhanced through TRCA’s habitat restoration efforts, as well as natural succession. Changes in the habitats over time will also lead to changes in the bird communities and should be documented to help understand and interpret these

data. Descriptions of the habitats for each of the VCP stations were initiated in 2010, repeated in 2013, 2016 and 2019, and should continue to be repeated every three years to help quantify changes in the vegetation communities. See Table 3.1 of the report for the most recent station vegetation analysis.

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

2.3 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 B, 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 F.2 describes the primary habitat for each zone.

Table F.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

Starting in mid to late April and continuing until early September, 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 and monitor 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, Canvasback, Eastern Meadowlark, Gadwall, Killdeer, Mallard, Savannah Sparrow, Song Sparrow and Spotted Sandpiper. These species represented 7% of nests found from 2005 to 2011, inclusive, and 2% of nests found since 2011, so the change in protocol has had some effect, although these species have never represented a significant portion of the nests that are found each year.

While most nest records gathered are submitted to Project NestWatch at Birds Canada, nests with no breeding evidence detected during one or more visits are typically not. Researchers are able to access NestWatch data via Birds Canada's NatureCounts tool. Past Breeding Bird Reports are available at www.ttpbrs.ca.

Appendix G: Notes to Annual Breeding Bird Reports 2005 to 2019

These notes are meant to assist researchers to take into account changes that have occurred in protocols and treatment of data over the life of the project from 2005 to 2018.

ONRS stands for **Ontario Nest Record Scheme**, administered by the Royal Ontario Museum, where nests were reported in the early years of the project. Nest reporting has transitioned to **Project Nestwatch**, administered by Bird Studies Canada (BSC). Researchers are able to access Project NestWatch data via BSC's **NatureCounts** tool. As of 2019, Bird Studies Canada has changed its name to Birds Canada.

Past Breeding Bird Reports are available at **www.ttpbrs.ca**. Data spreadsheets which include nests not reported to Project Nestwatch can be obtained through TRCA (Toronto and Region Conservation Authority).

2005

Pages 1 to 3- detailed Tommy Thompson Park habitat overview; not repeated in subsequent reports.

The **Toronto Harbour Commission** changed its name to **The Toronto Port Authority** and then to **Ports Toronto** (see also 2016 Notes).

2006

Results Pages 5 and 6- an attempt to establish two smaller grids, C1 and E1 of similar habitat (the larger zones A to F are all mixed habitats) was:

> **"Splitting the study area into specific zones and recording time spent in each zone allows us to assess nesting density on a spatial scale and determine species distribution. This is taken one step further by establishing grids that delineate smaller areas with a relatively homogenous habitat type. The grid in zone C (peninsula D) is primarily mixed age poplar forest while the grid in zone E (toplands) is primarily meadow. These grids therefore provide samples of nesting density and species composition within primary habitats at Tommy Thompson Park. These standardized samples will be very powerful when compared to results ten or more years from now. A breakdown of nests per species for each zone/grid is presented below in Table 8."**

2008

Page 7- Nest Searching Protocol- proposal rejected:

> **"The nest searching survey method is valuable to bird conservation because it provides indicators of breeding success and parasitism/predation rates. The protocol used in 2008 essentially followed the 2007 protocol. It involved exhaustive area searches of as much of the TTP area as time and personnel permitted. To satisfy the requirement of standardizing effort, a suggestion was made to limit nest searching and monitoring effort to five specific periods during the breeding season. This suggestion was not accepted for practical reasons (weather, volunteer availability), but as a compromise, the date of each visit (detection and subsequent nest checks) was recorded. This way any subset of the database could be extracted if desirable for standardizing."**

Page 7- Nest Searching Protocol- change to method of recording data:

> **"From 2008 on, the use of ONRS nest cards was discontinued in favour of recording information in field notebooks and submitting the same to ONRS online. Consequently, no unique ONRS numbers appear in Appendix B listing the data submitted to ONRS. However, each submitted record can still be identified by a combination of unique codes, such as observer code, waypoint number or UTM coordinates. "**

Page 7- Nest Searching Protocol- use of subsets C1 and E1 discontinued:

"Starting in 2008, nests located in Grids C1 and E1 were no longer recorded separately from the rest of Zones C and E, respectively, as had been done in 2006 and 2007."

Page 11- New Table 9- Brown-headed Cowbird parasitism species data and rates from 2005 to 2008:

"The rate of parasitism among known host species at TTP is shown below in Table 9. (For purposes of this report, a nest was considered parasitized if a Cowbird egg was observed, regardless of what happened to that egg.) In previous reports only a total parasitism rate was presented. With the larger data sets available in 2007 and 2008, it is reasonable to present parasitism rates by individual species. The parasitism rates were calculated as the ratio of parasitized nests to the parasitized and not parasitized nests. Nests of the parasitized species where evidence of parasitism could not be determined were not considered in the calculation."

2009

Results Page 9- extension of nest searching period:

"The nest searching period covered 111 days in 2008 (April 30 to August 19), and in 2009 it was extended to 131 days (April 10 to August 19), an 18% increase."

2010

Section 2 Page 1- Colonial Waterbird Report was merged with the Breeding Bird Report:

"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 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"

Section 3.2.1.1 Page 6- introduced vegetation surveys in VCP count circles:

"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."

2011

Section 3.3.2 Page 12- extension of nest searching period- repeated statement from 2009 report and amended start and end dates, but date changes were not considered material (see 2009).

"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."

2012

Section 3.2.2 Page 8- ground nesting protocol change:

"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"

2014

Section 3.1.2 Page 6- change in Data Reporting- dropped earlier years from tables:

"Commencing with the 2013 Breeding Bird Report, data from 2005 will no longer be included. While the project effort in 2005 established the methodology and determined the viability of the project, the work was completed with minimum resources, with the result that the thoroughness of TTP coverage (and consequently the number of nests detected) was not comparable to subsequent years. (Data from 2005 are still available in all annual reports prior to 2013.)"

Section 3.3.1.1 Page 8- VCP Station Vegetation Survey- dropped 2010 Vegetation Survey from this report:

"In both 2010 and 2013, a vegetation survey was completed for each station, resulting in the vegetation descriptions found in Table 3.3 below. In addition, Appendix B contains a habitat sketch and photographs for each station in 2013. (The habitat sketches and photographs from 2010 can be found in the Breeding Bird Reports of 2010 – 2102.)"

2015

3.3.1.2 page 11- VCP count advisory:

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

Table 3.5 page 13- Trumpeter Swan Nest

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

2016

Section 1.1 Page 1 first paragraph- Toronto Port Authority changed name to Ports Toronto

"Although construction of the landform continues to the present day by *Ports Toronto* to mitigate shoreline erosion, the final size of the Spit (including the waterlots) is complete at approximately 500 hectares."

Section 2.2.2 Page 2 – change in Common Tern nest counting methodology

"Since 2016, a single population count has been conducted for Common Tern colonies in mid-June by aerial photography from a helicopter. Individual nests can be seen in the images and are counted using GIS software by placing a dot on each nest."

Section 3.1.2 Page 6- change data reporting to rolling 10-year basis:

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

Section 3.2.2 Page 8- ONRS and Project Nestwatch:

"While most nest records gathered are submitted to Project NestWatch at Bird Studies Canada, nests discovered after nesting is complete are typically not. Researchers are able to access Project NestWatch data via BSC's NatureCounts tool. Past Breeding Bird Reports are available at www.ttpbrs.ca." CHANGED from 2015 3.2 page 6 "While most nest records gathered are submitted

to the Ontario Nest Records Scheme (ONRS), nests discovered after nesting is complete are typically not."

2017

3.3.2 page 16- continued annual increases in number of nests:

"Additional reasons for the continued annual increase in nests include: (a) extensive tree and shrub planting by TRCA over recent years; (b) the natural spreading and maturation of appropriate breeding habitat in some areas, particularly dogwood, honeysuckle and reeds, which three represent the most common hosts for Redwinged Blackbirds and Yellow Warblers, the most prolific non-colonial-waterbird nesters at TTP; (c) the everincreasing nest-searching skills in the project participants; (d) the availability of more volunteer effort; and (e) the discovery of areas rich in nests that had not been explored until recent years."

2018

Table 8 Page 19- changed Other Species Observed

"In Table 3.8, all years of the project are shown because the "Other Species Observed" has been adjusted to eliminate species that would never breed at TTP, such as most shorebirds and north-nesting warblers. In previous reports, these northern breeders were included in the "Other Species Observed" tally. As can be seen in Table 3.8, the 44 confirmed breeders and 71 total species detected in 2018 are at the high end of the numbers recorded over the entire project to date. (In the first two years of the project, as is apparent in Table 3.8, species were more likely to be categorized as Possible Breeders rather than Other Species Observed, as has been the practice since 2007 when there is no evidence of breeding intent observed.)"

2019

Sections dealing with Colonial Waterbird and Managed Waterfowl Population Estimate Methodology and Landbird and Non-colonial Waterbird Methodology moved to new Appendix F – Breeding Bird Report Methodologies and Protocols

Appendix F, Section 2.3 (4th paragraph) – Bird Studies Canada changed its name to Birds Canada

"While most nest records gathered are submitted to Project NestWatch at Birds Canada, nests with no breeding evidence detected during one or more visits are typically not. Researchers are able to access NestWatch data via Birds Canada's NatureCounts tool."