City of Mississauga

Natural Areas Survey

2009 Update

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EXECUTIVE SUMMARY

The intent of updating the Natural Areas Survey is to review the current status of natural areas and update information on flora, fauna, impacts, boundary changes and management needs. The Natural Areas Survey for the City of Mississauga (Geomatics 1996) identified 144 sites that represented the best remaining natural features in the City. Of these 144 sites, 141 were classified as natural areas (Significant Natural Sites, Natural Sites, or Natural Green Spaces), and three were classified as Residential Woodlands. Also identified were 55 Special Management Areas and 40 Linkages. With the completion of the 2009 update, the third round of reviews of the City Wards continues. In 2009 natural areas in Wards 3, 4, and 7 were updated.

In 1996, the 141 natural areas comprised 7.10% of the total area of the City. The total number of natural areas decreased from 141 in 1996 to 136 in 2004, increased to 138 in 2008, and has since remained the same in 2009. This decrease in the number of natural areas and alterations to natural sites equates to a loss of almost 159.3 ha from 1996 to 2006, however, since 2006 there has been an increase of 51.5 ha in 2007, followed by a further increase of 89.6 ha in 2008. This increase can be attributed to the inclusion of additional areas into the natural areas system in 2008. In 2009, boundary revisions due to property boundary adjustments or minor changes in natural area boundaries have resulted in an overall increase of 14.16 ha. There has also been a reduction in the number of Special Management Areas and Linkages to 42 and 29, respectively. The natural areas in the City have been grouped into three major landform types (valleyland, tableland, and wetland). In 2006, 80.11% of the natural areas were associated with valleylands and this has increased slightly to 80.21% in 2009; overall, this proportion has increased from 78.3% in 1996. In contrast, tablelands only account for 15.05% of the natural areas in 2009. This represents a continued decrease from 16.4% in 1996. From a City-wide perspective, there were steady decreases from 1.16% in 1996 to 0.97% in 2002 of the land base represented in tableland natural areas. From 2002 until 2007 this proportion has remained relatively constant, however it increased to 1.07% in 2008, and remains the same in 2009. Tableland natural areas (which are mainly wooded) tend to be discrete islands that have limited connections to other remnant natural features. Valleylands are better connected by virtue of the linearity of the landform and because they have historically been better protected from development. This reinforces the need to place a high priority on the protection of the remaining tableland features present within the City, and an emphasis on their management to maintain or improve their quality. The proportion of natural areas associated with wetlands has remained more or less constant from 1996 with only a slight decrease from 5.0% to 4.75% in 2009. The proportion of the City that is classified as wetland decreased marginally from 0.36% in 1996 to 0.33% in 2002, remained constant from 2002 to 2007, increased to 0.34% in 2008, and remains the same in 2009.

Generally, the condition of natural areas within the City that were surveyed in 2009 continues to be in fair condition. Natural areas evaluated as in fair condition have moderate disturbances (few trails, limited dumping, some trampling, *etc*.) and an average number of non-native flora species typical of what can be expected in an urban natural area. The overall condition of the natural areas visited in 2009 remained largely unchanged from previous studies. As indicated in all the other survey updates, the most common disturbances within natural areas are those associated with an increase in uncontrolled human use of natural areas following development in adjacent

areas. Examples of these disturbances include: the creation of *ad hoc* trails, the use of mountain bikes (including the construction of some elaborate racing circuits), the presence of garbage, boundary encroachment, and vandalism (tree carving, tree cutting, spray paint). These disturbances are prevalent at almost all of the natural areas surveyed this year. Deterioration of the quality of Mississauga's natural areas can be expected to continue unless there is a substantial effort to manage natural areas through site specific Conservation Plans and community stewardship initiatives.

After over ten years of update surveys covering the entire City, two trends continue to emerge. There has been a decrease in the quality of vegetation and there has been a decrease in the amount of tableland (woodland and successional categories) and wetland habitats. Development between 1996 and 2006 resulted in the total loss of 159.26 ha. In 2007 there was an increase of 51.5 ha, followed by an increase of 89.6 ha in 2008 and an increase of 14.16 ha in 2009. There was no loss of area in 2009 due to development. Almost all of this increase was composed of valleylands, and in part the associated tablelands. Three valleyland communities, eleven woodland communities, four successional communities, five wetland vegetation communities, two anthropogenic communities, and three "other" communities are uncommon in the City, occupying less than 1% of the total area of the natural areas system. Of these, six of the woodland communities, one successional community, one anthropogenic community, and one "other" community are "at risk" in the City, occurring in only one natural area each. In addition, a longer-term conversion of vegetation community composition (from wetland pockets to old field) in some natural areas is also occurring. This is likely related to changes in hydrology resulting from development. These trends reinforce the urgent need to maintain and manage (and where possible restore) all of the remaining natural areas in the City. In particular, tableland natural areas (including woodlands, wetlands and successional vegetation communities) continue to be the most seriously threatened by development.

One positive trend is the naturalization projects undertaken by the City. The majority of naturalized areas observed during the fieldwork between 1996 and 2009 have involved leaving an area of un-mowed grass adjacent to a watercourse or woodlot feature to regenerate naturally. While this approach will increase the overall size of the natural area in question, this initiative could be enhanced by taking an approach that includes long-term management which will more likely result in a healthy natural area with a diversity of native plant and animal species such as at Jack Darling Park. In addition, storm water facilities such as Osprey Marsh Wetland off Osprey Boulevard have been constructed in such a way that they foster wildlife habitat, with gradually sloping edges, cattails plantings as well as other wetland plant species. The upland area surrounding the Osprey pond is being allowed to naturalize. This pond already sustains a higher diversity of fauna than that normally seen in storm water management ponds, and has the potential for more species as the vegetation becomes established.

1.0 INTRODUCTION

A Natural Areas Survey for the City of Mississauga was undertaken during 1995 and 1996 (Geomatics 1996) which identified 144 natural areas representing the best remaining natural features in the City. Of these natural areas, 141 were classified as Significant Natural Sites, Natural Sites, or Natural Green Spaces, and three were classified as Residential Woodlands. In 1996 the 141 natural areas comprised 7.10% of the total area of the City. Also identified were 55 Special Management Areas (SMAs) and 40 Linkages. Definitions for these classifications are given in Appendix 1.

Since the completion of the Natural Areas Survey (NAS) in 1996 many development projects have been initiated within or adjacent to the natural areas originally identified. In order to keep the Natural Areas Survey database current, updates have been undertaken on an annual basis which focused on the areas that may be affected by these developments. In addition, approximately one fourth of the natural areas are reviewed annually with respect to their condition, encroachments, disturbances, etc. Thus every four years all natural areas are reviewed at least once and with the completion of the 2001 work, the natural features in all Wards in the City had been updated once since the initial study in 1996. The second round of updates commenced in 2002 with natural areas in Wards 5 and 6. Wards 1 and 2 were updated in 2004, Wards 3, 4 and 7 were updated in 2005, and Wards 8, 9 and 10 were updated in 2006. In 2007, the third round of updates began with a review of natural areas within Wards 5, 6 and 11, and continued in 2008 with Wards 1 and 2. The third round of updates continued in 2009, comprising those natural areas in Wards 3, 4 and 7, and is reported herein.

Periodically, new candidate natural areas, linkages, or special management areas are evaluated as part of the annual reviews. Over the course of the natural areas survey and subsequent updates, 156 natural areas have been identified. However as of 2009, 13 sites have been removed from the natural areas survey (*i.e.* PC3, NE2, CM11, *etc.*), eight sites have been combined (MB8/ME8, CC1/MY1, CE12/SV12, and CL1/SD5), and two natural areas have been added (CM25 and ME13). Thus at present there are 138 natural areas and three residential woodlands.

The intent of updating the Natural Areas Survey is to review the current status of natural areas and update information on floristics, fauna, impacts, boundary changes and management needs on a yearly basis. The importance of the Natural Areas Survey is that it serves to identify natural areas in the City that should be protected. However, the NAS also serves to document changes to natural areas over time and thus provides the means to assess the cumulative impacts of development, the efficacy of mitigation measures and to identify those natural areas that are most at risk. This report documents the methods used and presents the data collected to evaluate the natural areas, summarizes any changes that have occurred, and provides recommendations for the mitigation of impacts and management considerations.

2.0 METHODS

2.1 Background Review

The primary focus of this update was the review of 29 natural areas located in Wards 3, 4, and 7, however, three additional sites outside of these Wards were also reviewed. Of the 32 sites visited in 2009, seven sites were visited in an attempt to locate individual butternut trees (*Juglans cinerea*) as part of the ongoing program to monitor their presence and health.

A background review was carried out comprising a careful analysis of 2008 digital aerial photographs and a review of reports (inventory reports, EIS, *etc*.) undertaken since the last update study that affected the natural areas reviewed for this survey. Field investigations were carried out at all 32 sites (Appendix 3).

2.2 Fieldwork

Field visits were made to 25 of the 32 sites included in the Natural Areas review for 2009. Natural areas CRR11, CV2, GT3, MB1, NE1, NE3, and RW1 did not receive a full field visit because permission to access these sites was not provided, however, these sites generally received a road side visit or were visited by walking along public areas adjacent to the natural areas (*e.g.,* along stream corridors). Landowner contact for natural areas in private ownership was undertaken by the City Planning and Building Department.

Appendix 3 lists the reasons for fieldwork, and the date when fieldwork was conducted for each of the natural areas. For those sites in Wards 3, 4, and 7 that are in public ownership or for which access was available, a two season field program was undertaken. This entailed a late spring visit to update information on spring ephemeral plant species and carry out breeding bird surveys, and a mid-summer visit to document summer flora, disturbances and any other changes. The following information was recorded on data sheets for each natural area that received a field visit:

- all flora and fauna species observed were recorded, and plant specimens collected where necessary;
- vegetation community descriptions were updated where necessary;
- evidence of disturbance, regeneration and management needs were noted; and
- the overall condition was qualitatively rated in comparison to other sites in the City.

Breeding bird surveys were conducted in the early morning hours (05:00 to 10:00) between June 1 and July 10, 2009 for all of the natural areas in Wards 3, 4, and 7 where access was available. These surveys followed the Breeding Bird Atlas protocol for collecting evidence of breeding birds. For most sites, the entire area was covered to detect bird species, but in sites where access was not granted, birds were recorded from as many nearby road access points as possible.

A review of the digital aerial photographs was also made to locate any potential amphibian breeding habitat. An additional visit was made to those sites in the early spring, after 20:00, to locate potential habitat and to look and listen for the presence of any amphibian species. Amphibian surveys followed the Canadian Wildlife Service Marsh Monitoring protocol.

Butternut surveys were conducted in seven natural areas where access was available. A maximum of 1 hour was spent in each natural area searching in appropriate vegetation communities (*e.g.*, floodplains, forest edges) to locate individual trees. If a butternut tree was found, it was accurately located in the field using a Global Positioning System (GPS). The condition of the individual tree was assessed, including a determination of whether the tree was infected with butternut canker (see discussion in section 4.2).

2.3 Analysis

The City of Mississauga database records and fact sheets for each natural area were updated based on the literature review and fieldwork carried out in 2009. Hard copies of species lists and field notes were provided under separate cover to the City. The provincial rarity ranks for floral and faunal species were also reviewed and updated where required. Provincial rarity status was based on Natural Heritage Information Centre (NHIC 2009) rankings and Species at Risk (Appendix 4). The natural areas summary table for the City has been updated with each survey to allow a comparison between natural areas in the City (see Table 1, page 6).

Floristic Quality Assessment

The Floristic Quality Assessment system allows for an objective, quantitative evaluation of an area based on the quality of its flora. It can be used to compare two or more areas at a single point in time or monitor sites on an ongoing basis. It is extremely useful for measuring the success of management and restoration programmes, especially in combination with other site characteristics and evaluation criteria.

The premise upon which the evaluation is based derives from the specific affinity of individual plant species for a specific habitat. Some plants exhibit conservative characteristics which restrict them to a relatively narrow range of conditions provided by specific habitats (*e.g.* prairie, wetlands, undisturbed woodland, *etc.*). Other species are not as restricted and are able to persist in a wide variety of habitats (woodland edges, abandoned fields, *etc*.). The former species are generally intolerant of human-caused disturbances because they will only persist in that narrow range of conditions provided by the native habitat. Species in the latter group are generally tolerant of disturbed conditions. For example, if the hydrological regime of a wetland is altered through stormwater management, any conservative species that occur there can be expected to be impacted, because the narrow range of conditions in which they can persist has been changed. Because of this, the FQA can be used to evaluate the degree of disturbance at a site and identify those habitats that are least disturbed.

Each native species in Ontario has been assigned a numerical value from 0 to 10 by a group of experts on the provincial flora (Oldham *et al*. 1995). This is referred to as the "coefficient of conservatism" (CC). Species ranked as 10 are the most restrictive or "conservative", and thus are most representative of high quality habitat. In order to evaluate a site, a species list is compiled, and the CC of all native plants are summed and divided by the total number of native plants to yield a mean CC for all the native plants in the site. A Floristic Quality Index (FQI) can then be calculated by multiplying the mean coefficient by the square root of the total number of native species recorded. Natural areas can then be compared using their mean CC and/or FQI.

Sites with higher CC and/or FQI are generally in better condition than those with lower CC and/or FQI.

During the floral inventory of a given area, the mean coefficient of conservatism tends to stabilize quite quickly as new plants are recorded and included in the total for the site. The mean CC thus serves as a reliable indicator of natural area quality even when only reconnaissance inventories are available. However, the FQI is more influenced by species richness; therefore areas that have complete inventories tend to have a higher FQI. Although the FQI is generally sensitive to the species richness of a site, it does not seem to be correlated to the size of a site.

Areas with incomplete inventories (generally defined as sites with fewer than 30 native species), or ones where just rare plants were surveyed, may provide biased results and the Floristic Quality Assessment was not used for such areas. However, heavily disturbed areas where an inventory of 30 or fewer native species represents a relatively complete inventory, were assessed. The mean coefficients and FQI have been categorized as high, medium and low values as follows:

Native mean coefficients -	high > 4.00;
	medium = 3.3 to 3.99;
	low < 3.3;
Floristic Quality Indices -	high > 40;
	medium = 30 to 39.99;
	low < 30).

The Floristic Quality Indices were updated for the natural areas where the floral inventory changed between 1996 and 2009.

Condition

Each site is ranked with respect to its current condition, based on observations during field reconnaissance. Overall disturbance at each site is noted, especially that associated with urban stresses such as litter, vandalism and unplanned trail networks. Non-native plants are recorded and expressed as a proportion (percentage) of the total known flora of the site. The provincial flora is approximately 27% non-native (Kaiser 1983) which provides context for evaluating the "nativeness" of the flora at a particular site. Sites are evaluated as excellent, good, fair or poor. A site in excellent condition has very little disturbance (*e.g.,* no trails, no dumping, limited cutting, no trampling, *etc.*), and few non-native floral species. A site in poor condition has many disturbances (*e.g.* trails, non-natives, garbage, *etc*.), and has a high percentage of non-native plants. A fair site is intermediate with respect to disturbance and has a medium ratio of native/non-native plants.

Recent disturbances, threats and management needs were noted where they changed from previous assessments. Recommendations for the mitigation of real or potential impacts that resulted from recent developments including naturalization projects are provided.

2.4 Mapping

Boundary changes were determined by using aerial photographs to compare the mapped boundaries of each natural area (from the original 1996 study and/or previous update) with boundaries resulting from any recent development. This was accomplished using colour 2008 aerial photographs overlaid with the existing natural area boundaries provided by the City. The boundaries were revised on the aerial photographs to reflect any encroachment from recent development and subsequently field checked, to the extent possible based on access. Boundary delineation followed the approach used in the Natural Areas Survey (Geomatics 1996). Refinements to the boundaries are considered minor changes to the natural area. Changes which are greater boundary refinements are considered to be major changes and constitute a potential addition to the natural area. Revisions were subsequently digitized by the City of Mississauga, Geographic Technology Services using MicroStation GeoGraphics format. Updated surficial areas (hectares and acres) for the natural areas and vegetation communities were determined using GIS and incorporated into the database. Updated UTM coordinates for the natural areas and vegetation communities were also incorporated into the database.

3.0 NATURAL AREAS FRAMEWORK

Table 1 (page 6) summarizes the current information available for each natural area in the City of Mississauga. This table updates Table 4 from Geomatics (1996) and summarizes the following information:

- the classification of each natural area;
- designation of natural areas as significant features (*e.g.*, ANSI, ESA, evaluated wetland);
- size of each natural area in hectares and acres;
- the number of floral species;
- the proportion of the flora that is non-native;
- the native FQI and native mean coefficient;
- the number of vegetation communities;
- the number of provincially and regionally significant floral and faunal species;
- the number of bird, mammal, amphibian and reptile species;
- the number of Credit Valley Conservation Species of Conservation Interest; and
- the condition of the natural areas.

Appendix 5 documents the changes that occurred in natural areas between 1996 and 2009 using the same categories. Some of the changes outlined in Appendix 5 are minor revisions while others are considered significant in the context of the natural areas program. Both major and minor changes are noted by increases (↑) or decreases (↓) for each of the above noted categories, from year to year. Significant changes are considered to be:

- a change in the classification of a natural area (*e.g.*, from Significant Natural Site to Natural Site);
- a change in the designation of a natural area (*e.g.*, the removal or addition of ANSI status);
- a change of more than 25% in the original size of a natural area;

- a change in the FQI or CC rank for a natural area (*e.g.*, a rank that goes from a high to medium category);
- the addition of rare floral or faunal species (provincial, local and CVC); or
- the addition or deletion of a vegetation community.

Figure 1 (page 17) shows the location of natural areas, Special Management Areas (SMA), Residential Woodlands (RW), and Linkages. Any additions to the natural areas are proposed based on a visual inspection of the digital aerial photographs from the City and cursory site checks. Upon City approval, a field investigation would be completed the following field season. Due to the scale of mapping, Significant Natural Sites (SNS), Natural Sites (NS) and Natural Green Space (NGS) are not discriminated on this map, and are all labelled as "natural area". However, Residential Woodlands, Special Management Areas, Linkages and any Proposed Additions, are identified.

Table 1: Summary of Natural Area Features, Significance and Condition.
This table represents an update of Table 4 in the Natural Areas Survey (Geomatics 1996). Native FQI and native mean CC are defined in section 2.3. Definitions for provincially significant species (prov. sig. species) and regionally significant species (reg. sig. species) are found in Appendix 4. Credit Valley Conservation (CVC) bird species of conservation interest are listed in Appendix 3. Condition is explained in section 2.3. Abbreviations used in this table are as follows: n/a = not available. (see Appendix 5 for a summary of the changes). One-hundred and fifty-six natural areas are documented within this table. However, 13 sites have been removed from the natural areas survey, eight sites have been combined (MB8/ME8, CC1/MY1, CE12/SV12, and CL1/SD5), and two natural areas have been added (CM25 and ME13). The result is 138 natural areas and three residential woodlands.

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
SD1	Significant Natural Site		19.80	48.93	199	84	42.21%	39.72	3.70	6	1	14	114	7	2		6	Fair
SD4	Natural Site		24.53	60.61	106	24	22.64%	31.69	3.50	6		2	13				2	Fair
SD5	Significant Natural Site		10.17	25.13	97	24	24.74%	35.23	4.12	3	1	5	16	3	1		2	Good
CL52	Natural Site		8.93	22.07	73	43	58.90%	14.61	2.67	1	1		25	1	2		3	Poor
CL1	Significant Natural Site		3.35	8.28	109	25	22.94%	37.21	4.06	1		9	16	1	1		2	Good
CL9	Significant Natural Site	ESA,ANSI,wetland	45.78	113.12	519	171	32.95%	81.93	4.39	13	1	143	203	29	21	3	14	Good
CL8	Significant Natural Site	wetland	12.26	30.29	108	33	30.56%	30.60	3.53	8	1	12	30	10	1		5	Good
CL15	Natural Site		0.77	1.90	54	9	16.67%	25.79	3.84	1		3	12	3			1	Fair
CL16	Significant Natural Site		15.20	37.56	189	53	28.04	48.30	4.29	6	1	29	47	17			6	Fair - Poor
CL17	Residential Woodland		32.09	79.30	125	36	28.80%	23.95	4.45	1		24	19	2	4			n/a
CL13	Natural Site		6.18	15.27	135	77	57.04%	20.71	2.72	3		5	16	6			1	Poor
CL43	Natural Site		4.19	10.35	162	48	29.63%	43.27	4.05	2		19	20	2			1	Fair - Poor
CL42	Natural Site		8.20	20.26	124	37	29.84%	37.74	4.05	3		12	22	1			4	Fair - Poor
CL21	Significant Natural Site	ESA,wetland	9.87	24.39	165	47	28.48%	46.49	4.28	3	1	25	21	3	2		3	Fair - Poor
CL39	Significant Natural Site		12.81	31.65	302	93	30.79%	60.11	4.16	3		48	39	6	8		7	Fair
CL22	Significant Natural Site	ESA,ANSI	17.85	44.12	147	50	34.01%	38.58	3.92	1	1	13	9	1	6			Good
CL30	Significant Natural Site	ESA,ANSI	0.06	0.15	83	33	39.76%	27.86	3.94	1	1	20	1					Fair

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
CL31	Significant Natural Site	ESA,ANSI	2.82	6.97	101	42	41.58%	26.30	3.42	1	1	2	10	1				Poor
CL24	Significant Natural Site	ESA,ANSI	8.08	19.97	257	69	26.85%	60.93	4.44	5	1	39	23	2	1		3	Good
CL26	Significant Natural Site		1.95	4.82	198	71	35.86%	38.78	3.44	1	1	21	21	7				Fair
PC1	Natural Site		1.07	2.64	143	71	49.65%	29.88	3.57	1	1	10	71	1			1	Poor
PC2	Natural Green Space		4.35	10.75	93	50	53.76%	18.74	3.31	1		6	11		1			Poor
PC3	Removed		0.00	0.00	11	3	27.27%	0.00	0.00	1								Removed
CRR9	Significant Natural Site	ESA,ANSI,wetland	26.10	64.49	50	18	36.00%	20.86	3.69	3		17	41	1	10	2	9	Fair
MI4	Residential Woodland		153.81	380.07	37	18	48.65%	9.45	3.57	1		1	13					Fair
MI1	Natural Site		6.83	16.88	68	42	61.76%	8.50	3.80	4			52	5			2	Fair
LV3	Natural Site		3.99	9.86	137	56	40.88%	33.22	3.69	5		6	37	3			4	Fair
LV4	Natural Site		3.09	7.64	111	60	54.05%	20.85	2.92	5		8	25	2			1	Poor
LV5	Natural Green Space		1.39	3.43	123	66	53.66%	24.27	3.21	1		11		2	2			Poor
LV2	Natural Site		2.14	5.29	40	13	32.50%	13.09	2.52	1			12	1			2	Poor
LV1	Significant Natural Site		15.41	38.08	127	48	37.80%	29.70	3.34	5	1	1	30	5			5	Fair
ETO8	Significant Natural Site		15.87	39.22	133	45	33.83%	37.09	3.95	4	1	7	32	6	1		5	Fair
LV14	Natural Site		2.34	5.78	51	24	47.06%	15.20	2.93	1			10				1	Poor
LV6	Natural Site		2.38	5.88	83	24	28.92%	29.94	3.90	1		5	9	1			1	Fair
LV7	Significant Natural Site	ESA,ANSI,wetland	21.84	53.97	339	110	32.45%	64.33	4.26	2	1	63	68	7	5	1	5	Good
ETO7	Significant Natural Site	ESA	31.09	76.82	145	53	36.55%	31.73	3.31	3		9	34	5	12	3	2	Fair
SP1	Natural Site		7.17	17.70	197	80	40.61%	39.57	3.66	5		17	42	8			4	Fair
SP3	Significant Natural Site		8.77	21.67	141	34	24.11%	40.99	3.96	5		11	16	2	1		2	Good
SH6	Natural Site		7.52	18.58	144	69	47.92%	29.33	3.39	4		4	13	3			1	Poor
CRR7	Significant Natural Site	ESA,ANSI	98.36	243.05	301	100	33.22%	62.12	4.38	5	2	40	53	9	8		3	Good

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
CRR8	Significant Natural Site	ESA,ANSI,wetland	111.68	275.97	297	93	31.31%	64.59	4.52	4	3	63	64	10	8	1	4	Good
ER6	Significant Natural Site		1.56	3.85	83	40	48.19%	20.59	3.14	1	1		15	1				Poor
CRR6	Significant Natural Site	ESA,ANSI	137.55	339.75	302	97	32.12%	66.11	4.62	4	2	73	74	8	18	1	16	Good
CV1	Natural Site		1.69	4.18	74	29	39.19%	20.27	3.02	2		1	15	1				Fair
CV2	Residential Woodland		49.48	122.27	156	49	31.41%	41.18	3.98	1	1	7	18	4			3	Fair
CV12	Significant Natural Site		8.16	20.16	260	122	46.92%	42.27	3.60	5	1	11	25	3	1		1	Fair
CV10	Natural Site		5.76	14.23	138	63	45.65%	28.29	3.27	3		5	25	3	1			Poor
CV8	Natural Site		8.97	22.16	132	59	44.70%	26.34	3.08	5		5	24	3				Poor
ETO6	Significant Natural Site		10.95	27.05	83	44	53.01%	16.90	2.78	4		1	24	1			1	Poor
AW1	Significant Natural Site		7.92	19.57	125	53	42.40%	30.12	3.55	3	1	2	25	4			2	Poor
WB1	Natural Site		3.90	9.62	72	18	25.00%	28.85	3.93	5		1	15	2	1		2	Good - Fair
EM30	Natural Site		5.23	12.93	93	19	20.43%	33.83	3.93	5		8	12	8				Good
EM6	Natural Site		1.03	2.55	70	20	28.57%	27.01	3.82	1		1	7	1				Fair
EM2	Significant Natural Site		4.78	11.81	85	15	17.65%	32.99	3.94	1	1	1	12	1				Fair
EM10	Natural Site		3.82	9.43	70	21	30.00%	24.43	3.49	3			9	2	1		1	Fair
EM14	Significant Natural Site		9.38	23.16	94	42	44.68%	21.22	2.94	5	1		15	3	1		1	Fair
EM4	Significant Natural Site	ESA,ANSI	46.43	114.73	258	76	29.46%	57.15	4.24	9	2	36	70	7	6		5	Good - Fair
EM5	Natural Site		4.89	12.09	61	19	31.15%	23.15	3.57	2			6				1	Fair
EM21	Natural Site		0.84	2.08	51	10	19.61%	22.18	3.46	1			2	1				Fair
CR1	Significant Natural Site	ESA	5.67	14.00	111	33	29.73%	35.89	4.06	2		11	12	1				Fair
FV1	Natural Site		2.17	5.36	73	16	21.92%	25.70	3.40	2		1	18	1			1	Fair
FV3	Natural Site		6.73	16.63	148	64	43.24%	31.97	3.49	4		1	22	2				Fair
CC1	Significant Natural Site		3.35	8.28	196	79	40.31%	40.65	3.77	2	1	5	21	3		1	3	Fair

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
MY1	Significant Natural Site		13.67	33.78	221	83	37.56%	44.25	3.77	6	1	7	25	4	2	1	1	Fair
MY3	Natural Green Space		2.63	6.50	95	59	62.11%	16.00	2.67	1	1	1	17	1				Poor
AW4	Natural Site		11.47	28.34	102	55	53.92%	21.59	3.15	2		2	17					Poor
AW3	Natural Green Space		8.05	19.89	91	50	54.95%	20.61	3.22	2		1	21	2			1	Poor
ETO5	Significant Natural Site		7.97	19.69	146	76	52.05%	27.65	3.30	6		5	23	2	1		2	Poor
ETO4	Significant Natural Site	ESA	53.69	136.67	274	97	35.40%	53.22	4.02	5	1	16	49	7	5		4	Fair
RW5	Natural Site		2.50	6.18	95	48	50.53%	17.84	2.63	2		1	17	1			1	Poor
RW6	Natural Site		6.75	16.68	101	53	52.48%	19.98	2.91	1		2	27	1			3	Poor
RW4	Natural Site		1.49	3.68	89	26	29.21%	30.24	3.81	2		1	16	1				Fair
RW1	Natural Site		2.16	5.34	77	18	23.38%	34.11	4.44	1		1	5	1				Fair
RW2	Natural Green Space		4.09	10.11	94	50	53.19%	21.71	3.27	1		1	17	2				Poor
CM7	Significant Natural Site		11.17	27.58	92	18	19.57%	35.57	4.14	3		3	22	3	5	1	2	Good
CM9	Natural Site		3.91	9.67	78	14	17.95%	31.00	3.88	4		5	13	2	3		1	Good
CM11	Removed		0.00	0.00	22	1	4.55%	18.33	4.00	1			1					Removed
CM12	Natural Site		6.05	14.95	87	17	19.54%	31.79	3.80	1		3	19	5	8		1	Good
CM17	Removed		0.00	0.00	25	4	16.00%	16.80	3.67	1			5					Removed
CM13	Removed		0.00	0.00	37	14	37.84%	16.26	3.39	1			1	1				Removed
CM25	Natural Green Space		0.70	1.72	24	11	45.83%	5.27	1.46	2		1	7		1		2	Fair - Poor
CE7	Significant Natural Site		9.33	23.04	109	33	30.28%	35.67	4.09	2	1	7	8	1	7			Good
CE9	Natural Site		5.04	12.44	96	28	29.17%	33.71	4.09	5		7	14	2				Fair
CE10	Significant Natural Site		18.68	46.14	132	28	21.21%	42.18	4.14	3	1	16	17	3	2			Good - Fair
CE5	Natural Green Space		4.27	10.55	34	19	55.88%	5.42	1.40	1			8					Poor
CE1	Natural Green Space		16.84	41.60	85	25	29.41%	23.85	4.15	3			13	1	5		2	Poor

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
CE12	Significant Natural Site		19.83	48.97	134	57	42.54%	29.06	3.31	2	1	9	24	6	1			Fair
CRR5	Significant Natural Site		28.27	69.86	82	35	42.68%	22.17	3.23	2	1	3	33	3	2	1	2	Fair
CRR4	Significant Natural Site	ESA,ANSI	23.63	58.39	94	41	43.62%	24.08	3.31	4		10	31	4	7	2	5	Good
SV12	Significant Natural Site		2.34	5.77	97	42	43.30%	22.52	3.04	1	1	1	14	3	1			Fair
SV10	Natural Green Space		4.24	10.47	65	29	44.62%	17.00	2.83	1			12		1			Poor
SV1	Significant Natural Site		5.67	14.00	117	31	26.50%	36.99	3.99	2	1	5	16	2				Fair
CRR3	Significant Natural Site		74.64	184.36	92	31	33.70%	27.86	3.57	4	1	3	41	5	8	1	7	Fair
CRR2	Significant Natural Site	ESA,ANSI	98.30	242.80	183	66	36.07%	40.19	3.72	12		14	52	9	11		11	Good
EC22	Natural Site		1.54	3.80	79	9	11.39%	31.67	3.79	1		6	10	2				Fair - Poor
EC10	Removed		0.00	0.00	46	10	21.74%	21.83	3.64	2			2					Removed
EC13	Significant Natural Site	wetland	4.85	11.98	194	35	18.04%	54.64	4.33	4		71	88	6	11		13	Excellent
EC1	Removed	ESA,wetland	0.00	0.00	10	4	40.00%	4.90	2.00	1			5		2			Removed
HO1	Natural Site		1.21	2.99	40	10	25.00%	20.08	3.67	1			8	1				Fair - Poor
HO2	Removed		0.00	0.00	24	3	12.50%	18.77	4.10	2			3					Removed
HO3	Natural Site		24.65	60.91	111	36	32.43%	30.83	3.56	3		7	29	4				Fair
HO6	Natural Green Space		14.75	36.45	73	37	50.68%	16.63	2.77	1		4	21	3				Poor
HO7	Natural Site		2.52	6.23	123	42	34.15%	33.78	3.75	2		7	18	1				Fair - Poor
HO9	Significant Natural Site	ESA	12.76	31.52	229	66	28.82%	52.57	4.12	1	1	26	19	2	1			Good - Fair
NE4	Significant Natural Site		12.94	31.97	164	39	23.78%	41.48	3.71	5		10	25	1			3	Excellent
NE3	Natural Green Space		3.04	7.51	118	59	50.00%	19.40	2.53	2		5	22	2	1		2	Poor
NE2	Removed		0.00	0.00	55	10	18.18%	28.17	4.20	1			5					Removed
NE1	Natural Green Space		1.07	2.65	81	31	38.27%	21.35	3.02	1		1	15	1			1	Fair
NE6	Significant Natural Site		1.42	3.51	101	33	32.67%	28.50	3.46	2	1	2	15	3				Good - Fair

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
NE5	Natural Green Space		12.95	31.99	47	27	57.45%	7.33	2.44	1			17				4	Poor
NE7	Natural Green Space		2.66	6.57	38	25	65.79%	6.93	1.92	1			5	2				Poor
ETO3	Significant Natural Site		97.14	240.04	403	165	40.94%	56.44	3.66	5	2	59	34	8	5		3	Fair - Poor
NE8	Natural Site		3.75	9.26	28	17	60.71%	6.93	2.09	1		3						Poor
NE10	Natural Site		9.01	22.25	55	29	52.73%	10.59	2.08	1		3	13					Poor
NE11	Natural Site		6.26	15.46	52	28	53.85%	11.02	2.25	1		6						Poor
NE12	Natural Site		7.05	17.41	59	26	44.07%	14.45	2.25	1		5	9					Poor
ETO2	Significant Natural Site		14.16	34.97	65	30	46.15%	14.27	2.41	1		5	9	1				Poor
ETO1	Significant Natural Site		11.18	27.61	94	41	43.62%	21.28	2.92	4		8	16	2				Fair - Poor
NE9	Significant Natural Site		51.09	126.25	227	88	38.77%	41.37	3.52	4	1	33	42	7	7		6	Fair
LS1	Significant Natural Site	wetland	26.39	65.17	145	59	40.69%	32.35	3.49	3		10	10	1			1	Good - Poor
LS2	Natural Site		1.03	2.55	59	17	28.81%	24.53	3.79	1			5	1				Poor
LS3	Natural Site		3.00	7.40	113	40	35.40%	29.38	3.44	3		4	6	1	2		1	Fair
ME10	Significant Natural Site		3.39	8.38	73	18	24.66%	27.91	3.76	1	1	3	7	1			1	Fair
ME12	Significant Natural Site		2.90	7.16	87	49	56.32%	16.60	2.73	1		1	15	2	7	1		Poor
ME11	Natural Green Space		4.36	10.78	83	45	54.22%	14.79	2.70	1		5	17	4	4		1	Fair - Poor
ME13	Natural Site		1.42	3.51	25	6	24.00%	18.58	4.26	1			3					Fair - Poor
ME9	Natural Site		2.26	5.58	64	15	23.44%	30.14	4.31	1		4	4	1				Good
ME8	Significant Natural Site		5.82	14.38	93	24	25.81%	32.02	3.86	1	1	4	15	3	4			Fair
MB9	Natural Site		6.60	16.31	88	42	47.73%	19.76	2.91	1		9	17	1	2			Poor
MB7	Natural Green Space		10.23	25.27	43	24	55.81%	7.99	1.83	1			12				1	Poor
MB8	Significant Natural Site		9.86	24.35	93	24	25.81%	32.02	3.86	2	1	4	15	3	4			Fair

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
MB3	Natural Green Space		5.38	13.28	34	19	55.88%	5.94	1.53	1			12	1	1		1	Fair
MB5	Removed		0.00	0.00	42	5	11.90%	23.67	3.89	1								Removed
MB4	Natural Site		1.77	4.36	40	11	27.50%	19.31	3.59	1			8				1	Poor
MB6	Significant Natural Site		23.56	58.20	141	39	27.66%	35.65	3.53	2		13	27	7	2		7	Good
MB2	Natural Site		1.34	3.31	50	6	12.00%	25.63	3.86	1		1	7				1	Poor
MB1	Natural Site		1.11	2.74	43	10	23.26%	24.54	4.27	1			3					Fair
MV19	Significant Natural Site		27.46	67.85	262	82	31.30%	54.93	4.09	6		41	37	6	5			Good
CRR1	Significant Natural Site	ESA, wetland	74.61	184.36	297	109	36.70%	51.77	3.78	10	1	42	53	10	8		4	Fair
MV18	Natural Site		2.84	7.01	39	13	33.33%	7.07	2.50	2		1	15				2	Fair
MV2	Significant Natural Site	ESA,ANSI	89.55	221.28	264	93	35.23%	52.00	3.98	5	1	32	70	15	5	1	14	Good - Fair
MV3	Removed		0.00	0.00	57	17	29.82%	23.40	3.70	1			6	2				Removed
MV12	Natural Site		8.18	20.20	148	46	31.08%	38.91	3.85	2		10	14	5	3			Fair
MV14	Removed		0.00	0.00				0.00	0.00	1								Removed
MV11	Natural Site		2.90	7.17	48	15	31.25%	22.28	3.88	1		5	7					Fair
MV15	Natural Site		9.67	23.88	77	35	45.45%	19.44	3.00	2		2	23	2				Poor
GT1	Removed		0.00	0.00	41	10	24.39%	18.50	3.32	1			2					Removed
GT2	Natural Site		6.80	16.80	76	12	15.79%	32.13	4.02	6		8	21	3	1			Good
GT3	Natural Site		1.81	4.47	75	26	34.67%	22.86	3.27	2		1	8					Fair
GT4	Removed		0.00	0.00	206	56	27.18%	51.03	4.17	1	1		22	4	1			Removed
MA1	Natural Site		31.70	78.33	106	55	51.89%	19.20	2.77	1		8	19	1				Poor
SD7	Significant Natural Site		3.81	9.41	136	74	54.41%	23.30	2.98	3	1	8	57	2			1	Poor
MI17	Significant Natural Site		6.24	15.42	167	54	32.34%	43.56	4.10	2		16	23	9	3		3	Fair

Site Code	Classification	Designation	Area		Flora								Fauna					Condition
			(ha)	(acres)	total	# non-native	% non-native	FQI	mean CC	# veg comm	prov. sig. species	local sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
MI7	Significant Natural Site		5.52	13.64	125	39	31.20%	39.90	4.30	2	1	7	18	4			2	Poor
CV6	Natural Site		2.76	6.82	96	26	27.08%	28.45	3.40	1		1	17	1			1	Fair
CRR10	Significant Natural Site	ESA,ANSI	61.78	152.60	384	131	34.11%	69.21	4.36	9	2	75	90	12	11	1	27	Good
CRR11	Significant Natural Site	ESA	32.16	79.44	159	49	30.82%	40.22	3.83	4	1	7	25	3	5		4	Good
ER7	Natural Site		3.29	8.13	107	44	41.12%	24.51	3.11	3		3	14	1			1	Poor

Table 2: Legend for Figure 1 Natural Areas System for the City of Mississauga (arranged by Planning District). Note several natural sites are listed more than once because they span two or more planning districts).

SOUTHDOWN
SD1
SD4
SD5 (Meadowwood)
SD7 (Lakeside)

CLARKSON-LORNE PARK
CL52 (Meadowwood)
CL1 (Meadowwood)
CL9 (Rattray Marsh)
CL8
CL15
CL16 (Jack Darling Park)
CL17 (Lorne Park Estates)
CL13
CL43
CL42
CL21 (Birch Glen)
CL39 (Whiteoaks)
CL22
CL30 (Lorne Park Prairie)
CL31 (Lornewood Creek Trail)
CL24 (Tecumseh)
CL26
CRR9 (Credit River Flats)

PORT CREDIT
PC1 (Rhododendron Gardens)
PC2 (Port Credit Memorial)

MINEOLA
CRR9 (Credit River Flats)
MI4
MI1
MI17 (Mary Fix)
M17

LAKEVIEW
LV3 (Adamson Estate)
LV4 (Helen Molasy Memorial)
LV5
LV2
LV1
ETO8
LV14 (Lakeview Golf Course)
LV6
LV7 (Cawthra Woods)
ETO7

SHERIDAN PARK
SP1
SP3

SHERIDAN
SH6
CRR7
CRR8

ERINDALE
CRR7
CRR8
ER6
CRR6
ER7

COOKSVILLE
CV1 (Iroquois Flats)
CV2
CV12 (Richard Jones)
CV10
CV8 (Camilla)
CV6 (Stillmeadow)

DIXIE
ETO7
ETO6
AW1 (Willowcreek)

WESTERN BUSINESS PARK
WB1 (Erin Mills Twin Arena)

ERIN MILLS
EM30 (Tom Chater Memorial)
EM6 (King's Masting)
EM2 (South Common)
EM10
EM14
EM4
EM5 (Glen Erin Trail)
EM21 (R.F.C. Mortensen)
CRR10

CREDITVIEW
CR1

FAIRVIEW
FV1
FV3

CITY CENTRE
CC1 (Bishopstoke Walk)

MISSISSAUGA VALLEY
MY1 (Mississauga Valley)
MY3 (Stonebrook)

APPLEWOOD
AW1 (Willowcreek)
AW4 (Applewood Hills)
AW3 (Applewood Hills)
ETO5
ETO6

Table 2 continued…

RATHWOOD
ETO4
RW5 (Applewood Hills)
RW6 (Applewood Hills)
RW4 (Rathwood District)
RW1
RW2 (Woodington Green)

CHURCHILL MEADOWS
CM7
CM9
CM12
CM25

CENTRAL ERIN MILLS
CE7 (Sugar Maple Woods)
CE9 (Quenippenon Meadows
CE10 (Erin Wood)
CE5
CE1 (Woodland Chase Trail)
CE12 (Bonnie Brae)
CRR5
CRR4
CRR11

STREETSVILLE
SV12 (Bonnie Brae)
SV10
CRR4
SV1 (Turney Woods)
CRR3
CRR2

EAST CREDIT
CRR5
CRR4
CRR3
CRR2
EC22
EC13
CRR11

HURONTARIO
HO1
HO3 (Staghorn Woods)
HO6
HO7
HO9 (Britannia Woods)

NORTHEAST
NE4
NE3
NE1
NE6
NE5
NE7
ETO4
ETO3
NE8
NE10
NE11
NE12
ETO2
ETO1
NE9 (Wildwood)

LISGAR
LS1 (Lisgar Meadow Brook)
LS2
LS3 (Trelawny Woods)

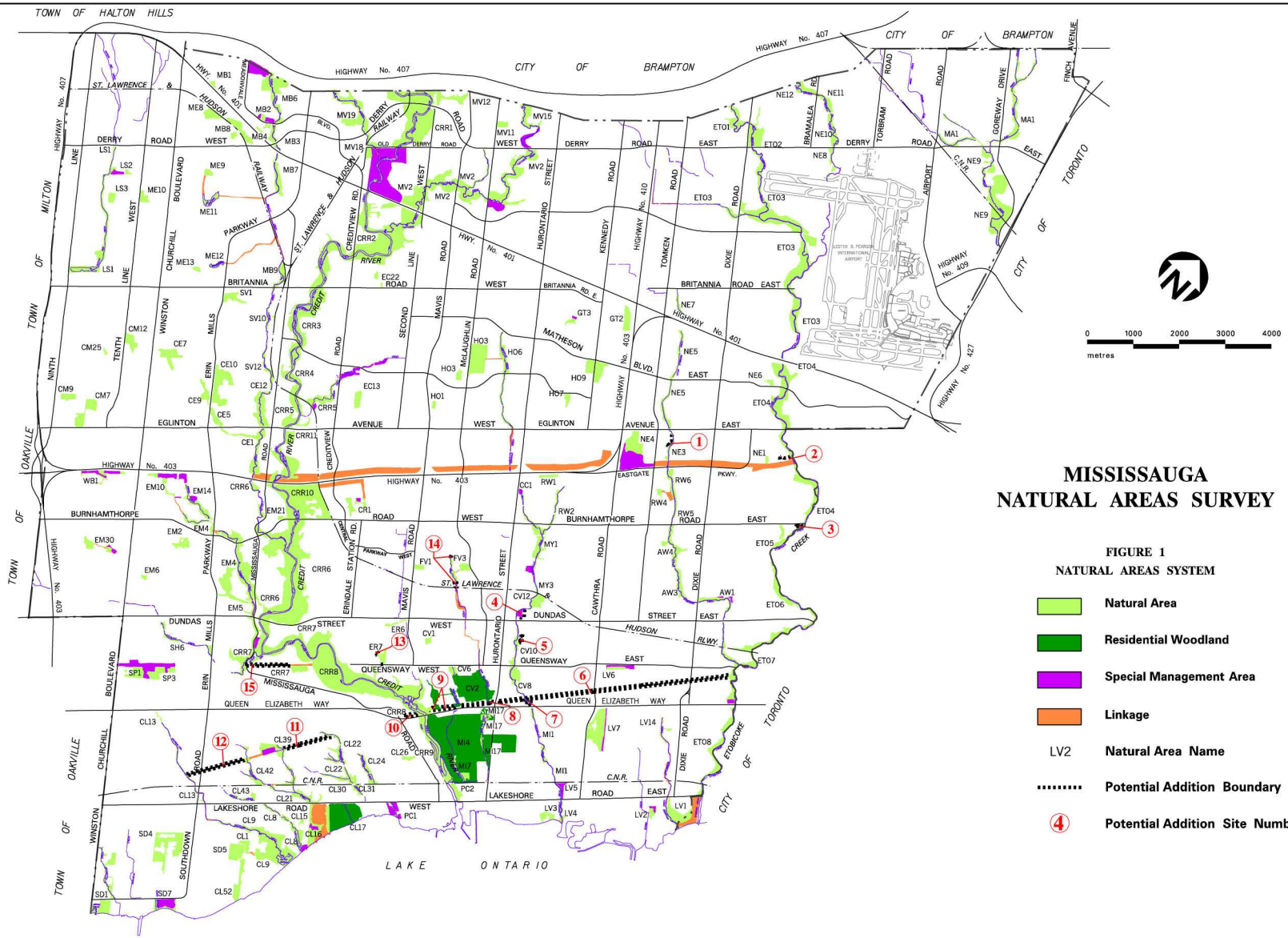
MEADOWVALE
ME10 (Eden Woods)
ME12 (Lake Wabukayne)
ME11 (Lake Aquitaine)
ME9 (Maplewood)
ME8 (Windrush Woods)
ME13

MEADOWVALE BUSINESS PARK
MB9
MB7 (Mullet Creek)
MB8
MB3
MB4
MB6 (Totoredaca)
MB2
MB1

MEADOWVALE VILLAGE
MV19
CRR1 (Meadowvale C.A.)
MV18
MV2
MV12
MV11
MV15
CRR2

GATEWAY
GT3
GT2

MALTON
MAI



MISSISSAUGA NATURAL AREAS SURVEY

FIGURE 1
NATURAL AREAS SYSTEM

- Natural Area
- Residential Woodland
- Special Management Area
- Linkage
- LV2 Natural Area Name
- Potential Addition Boundary
- 4 Potential Addition Site Number

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2009

3.1 Discussion of Proposed Additions

Eight proposed additions to existing natural areas, five proposed additions to SMAs, and seven proposed linkages are identified in this 2009 update. These proposed additions are considered to be major changes to the boundaries of natural areas or SMAs (refer to Section 2.4). The natural area classifications of the potential additions are the same as existing natural area it is proposed to be added. This is because they provide additional habitat similar to the habitat currently existing in the natural area. Table 3 is a summary of the category and classifications of the proposed additions.

Table 3: Proposed Additions to the Mississauga Natural Areas System.

[1] Suffix SMA at the end of natural area designations refers to the Special Management Area (SMA). The letter suffixes (*i.e*. C, E, J, and T) at the end of the natural area designations refers to the community type. Suffixes correlate to mapping notations on potential additions maps.

Proposed Addition	Natural Area	NAS Category	Natural Area Classification of Proposed Addition	Reason for Recommendation
LINK 21	CRR7	Linkage	N/A	Extension of current linkage towards the west to link two lower portions of CRR7.
CRR8SMA[1]	CRR8	Special Management Area	N/A	Additional habitat for species utilizing the Credit River corridor. Evidence of ad-hoc paths.
CV8J[1]	CV8	natural area	Natural Site	Continuous habitat of significant size and similar to existing natural area. Provides additional protection to Cooksville Creek.
CV10E	CV10	natural area	Natural Site	Continuous habitat of significant size and similar to existing natural area.
CV12SMA	CV12	Special Management Area	N/A	Continuous habitat similar to existing special management area.
ER7C	ER7	natural area	Natural Site	Continuous habitat similar to existing natural area.
ER7E	ER7	natural area	Natural Site	Continuous habitat similar to existing natural area.
ETO4SMA	ETO4	Special Management Area	N/A	Stormwater management pond with naturalized banks provides accessory habitat to the existing SMA and ETO4.
ETO5C	ETO5	natural area	Significant Natural Site	Habitat of significant size and similar to existing natural area.
ETO5T	ETO5	natural area	Significant Natural Site	Habitat of significant size and similar to existing natural area.

Proposed Addition	Natural Area	NAS Category	Natural Area Classification of Proposed Addition	Reason for Recommendation
FV3SMA	FV3	Special Management Area	N/A	Cultural meadow area with an abundance of Lepidoptera and clear history of anthropogenic influence. With time, this area could naturalize and act as accessory habitat to buffer impacts to Mary Fix Creek.
FV3E	FV3	natural area	Natural Site	An area previously part of a linkage, currently provides additional habitat for species utilizing the Mary Fix Creek corridor.
LINK3, 5, 6, 35, 36, and 37	N/A	Linkage	N/A	Provides an east-west linkage across Mississauga and links major north-south corridors including the Credit River, Cooksville Creek, and Etobicoke Creek.
NE3J	NE3	natural area	Natural Site	Continuous habitat similar to existing natural area.
NE3SMA	NE3	Special Management Area	N/A	Provides additional buffer area to Little Etobicoke Creek

3.2 Discussion of Proposed Linkages

As a result of the 2009 field work and aerial photo interpretation, two linkages have been proposed along hydro corridors. One corridor would extend from CRR8 to Etobicoke Creek. This corridor would provide a link between CRR8, CV2, CV8, and ETO7. This linkage would therefore create a connection between three main north-south corridors in Misssissauga: Credit River, Cooksville Creek, and Etobicoke Creek. The second linkage would extend from CL13 to CL22 and would provide a link across the northern portions of Sheridan Creek, Birchwood Creek, and Lornewood Creek. There is a similar existing hydro corridor linkage along the north side of Highway 403/Eastgate Parkway which links the Credit River, Little Etobicoke Creek, and Etobicoke Creek, however it does not link to Cooksville Creek. The major corridors in Mississauga are provided by the river/creek systems which run from north to south, towards Lake Ontario. However there are very few corridors which are oriented in an east-west direction. These proposed new linkages thus present an opportunity to increase connectivity in the NAS by providing east-west connections. In fragmented landscapes, it is important to maximize connection among natural features as it enables the movement and dispersal of flora and fauna, and may improve the species and genetic diversity within the City's natural areas system.

In addition, a smaller linkage has been proposed along a hydro corridor at the south end of CRR7. This linkage is a continuation of LINK 25 which continues to the west. This proposed linkage would link two southern portions of CRR7.

3.3 Summary of Changes

Overall, the number of natural areas decreased from 141 in 1996 to 136 in 2004. In 2008, the number of natural areas increased to 138 because of the addition of ME13 and CM25. CM25 was classified as a natural green space and ME13 a natural site. The total number of natural areas remains the same in 2009.

A detailed summary of the changes to natural area classifications between 1996 and 2009 is provided in Appendix 6. Overall, there has been a decline in the total proportion of the City identified as natural area from 7.10%[1] (2329.14 ha) in 1996 to 7.14% (2325.47 ha) in 2009. This decline occurred prior to 2009; for example the total proportion of the City identified as natural area decreased to a low of 6.61% (2169.88 ha) in 2006. In 2009, there has been an increase of 0.05% (14.16 ha) of natural area within the City from 2008. This change was due to small percentage increases (0.01-0.03%) in all three NAS categories (SNS, NS, and NGS) in 2009 (Section 3.1). These increases are related to refining natural area boundaries.

Between 1996 and 2002 there was a gradual decrease in the area of SNS, reaching a low of 1388.21 ha. However, since 2002 the area of SNS within the City has fluctuated, but has generally increased. Overall, the proportion of SNS in the City has increased from 5.23% (1530.17 ha) in 1996 to 5.67 (1660.0 ha) in 2009. Figure 2 illustrates the overall change between 1996 and 2009 in the proportion of the City occupied by the three types of natural area. The proportion of the City occupied by NS has decreased from 1.2% (349.92 ha) in 1996 to 1.12% (329.09 ha) in 2009; however, there was an increase of 0.08% (25.95 ha) from 2007 to 2008. This increase is related to the addition of ME13 as a NS as well as the addition of substantial additional area to HO3, HO7, MA1, and MV19 in 2008. The proportion of NS within the City has fluctuated over the last 12 years increasing to a high of 1.56% (456.57 ha) in 2000, but since then has decreased by 0.44% which equates to an overall loss of 127.48 ha within this classification. Presently, NGS constitutes 4.34% (101.0 ha) of the Natural Areas System, this is a decrease of 4.66% (96.05 ha) from 1996, and primarily reflects the transition of natural areas to other classifications (*e.g.*, 5 sites transitioned from NGS to NS in 2007). This change also reflects a decrease of 0.32% since 1996 in the proportion of the City identified as NGS (Figure 2; Appendix 6).

[1] For the purposes of calculating proportions the City of Mississauga encompasses 29,269.0 ha.

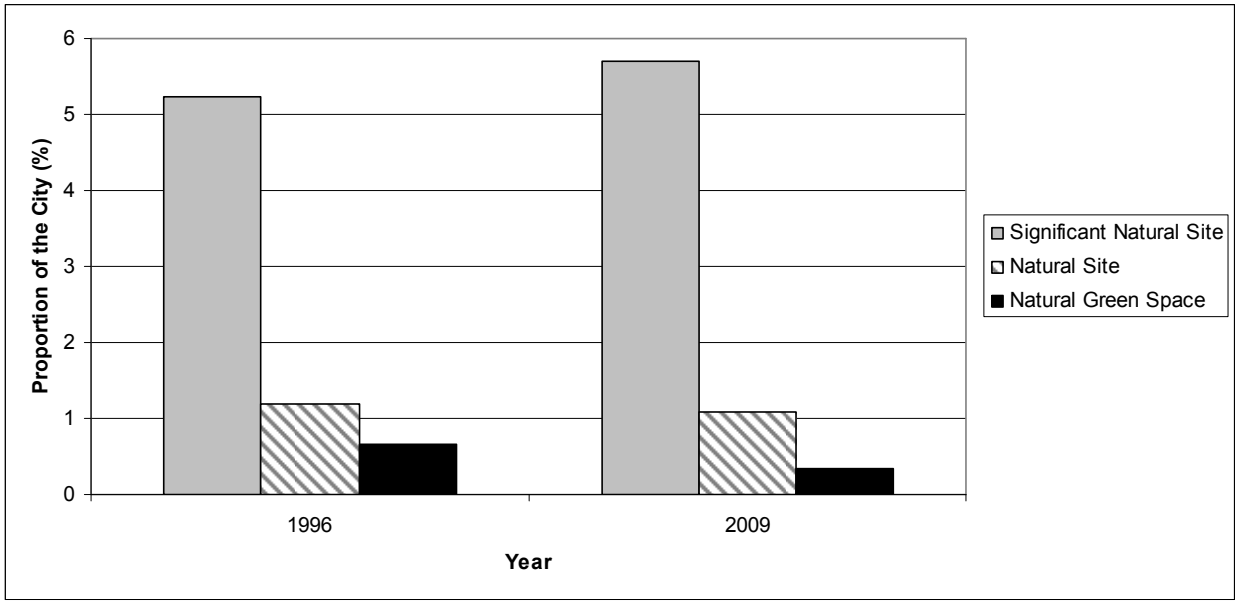

Figure 2: A comparison of the proportion of the City identified in each natural area classification in 1996 and 2009 (see Appendix 6 for a complete summary).

In 2009, 42 Special Management Areas were identified; this is a decrease of 13 SMAs from 1996. Eight of these 13 changes are due to re-classification of SMAs to natural areas and the other 5 are owing to development. The total number of Linkages has decreased to 29 and this is an overall decrease of 11 since 1996. Four Linkages were re-classified as natural areas and the other 7 were removed due to development.

The overall change to the three major landform types (valleyland, tableland, and wetland) in the NAS between 1996 and 2009 are presented in Figure 3 (also see Appendix 7). Figure 3 illustrates that the majority of the NAS in 2009, 80.21% (1670.56 ha), is still associated with valleylands. This proportion has increased by 1.91% (44.26 ha) since 1996. This is mainly due to an increase in the number of sites associated with valleylands which has increased by 7 since the inception of this study. In contrast, tablelands only account for 15.05% (313.40 ha) of the NAS in 2009 (Figure 3); a decrease from 16.40% (339.9 ha) in 1996. This is largely owing to a loss of 8 tableland sites from 1996 to 2002. However, three tableland sites were added in 2008. From a City-wide perspective, there were steady decreases in the proportion of tableland natural areas from 1.16% (339.9 ha) in 1996 to 0.97% (285.2 ha) in 2002. In 2006 this proportion had increased slightly to 0.98% (287.03 ha) and has increased further to 1.07% (313.40 ha) in 2009.

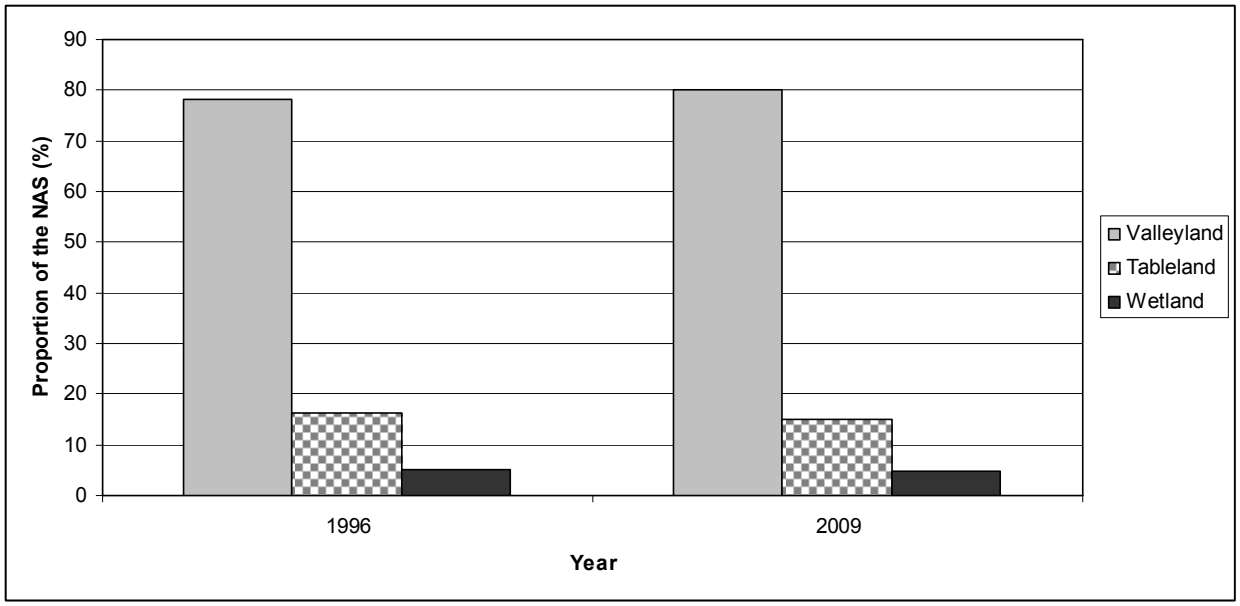

Figure 3: Comparison of the proportion of the Natural Areas System by landform type in 1996 and 2009 (see Appendix 7 for a complete summary).

Natural areas that occur on tableland (primarily wooded areas) tend to be discrete islands that have limited connections to other remnant natural features. Valleylands are better connected by virtue of the linearity of the landform and because they have historically been better protected from development. This reinforces the need to place a high priority on the protection of the remaining tableland features present within the City, and an emphasis on their management to maintain or improve their quality.

The proportion of the natural areas system associated with wetlands has declined slightly from 5.0% (103.7 ha) in 1996 to 4.75% (98.86 ha) in 2009 (Figure 3; Appendix 7). The proportion wetlands expressed as a proportion of the entire City also decreased marginally from 0.36% in 1996 to 0.34% in 2008 (Figure 3; Appendix 7).

The mean size of natural areas in all three landscape types has been decreasing since 1996 due to the incremental removal of portions of natural areas for development (Appendix 7). The exception to this is the mean size of wetlands which increased between 2001 and 2002 owing to the removal of EC1, which was smaller than the average wetland size. Currently the mean size of wetlands is 19.77 ha. Tableland natural areas are generally very small (mean size of 5.70 ha) when compared to the valleyland areas (mean size of 20.88 ha) in 2009.

4.0 NATURAL ENVIRONMENT OVERVIEW

4.1 Vegetation Communities

The 49 vegetation communities described for the City (Appendices 8 and 9) were compared between 1996 and 2009 (Figure 4). As the NAS study pre-dated the provincial ELC, the original

community classification did not conform to ELC standards. A list of vegetation communities in the City and their approximate corresponding ELC vegetation community classifications were provided by North-South Environmental (North-South Environmental 2000, Appendix 5). However, to facilitate the comparison of vegetation communities between the 1996 study and updates, the original City designations are used in this report. The reader is referred to the Geomatics (1996) report for a complete description of the vegetation classification.

The vegetation communities have been grouped into six broad categories: valleylands, woodlands, successional, wetlands, anthropogenic and other. The category "other" was used for three communities (tall-grass prairie, beach and unknown) that did not easily fit into any of the other five categories. The category "anthropogenic" refers to five communities that have been created and maintained through human intervention (manicured, urban lake, wooded residential, plantation, black walnut grove). The most prevalent vegetation communities within the City remain those in the valleyland category. The tall-grass prairie community is still considered the only provincially rare vegetation community within the City.

Appendices 8 and 9 summarize the changes within the vegetation community categories between 1996 and 2009. Between 1996 and 2009, there have been decreases in the proportion of valleylands in the City of 0.30% (81.83 ha), other communities of 0.09% (27.59 ha) and a decrease in anthropogenic communities of 0.07% (20.40 ha) (Figure 4). In contrast, there are increases in the proportion of woodlands of 0.01% (3.01 ha) and successional communities of 0.30% (87.65 ha) in the City between 1996 and 2009. The current proportion of wetlands within the City is the same as in 1996 at 0.25% (75.60 ha) (Appendix 9). Between 2008 and 2009 there were decreases in the proportion of the City occupied by valleylands (decreased by 0.04%) and woodlands (decreased by 0.05%). These increases are largely due to the inclusion of additional areas to existing natural areas. There were no changes in the proportion of wetland, successional habitat, anthropogenic and other within the City between 2008 and 2009.

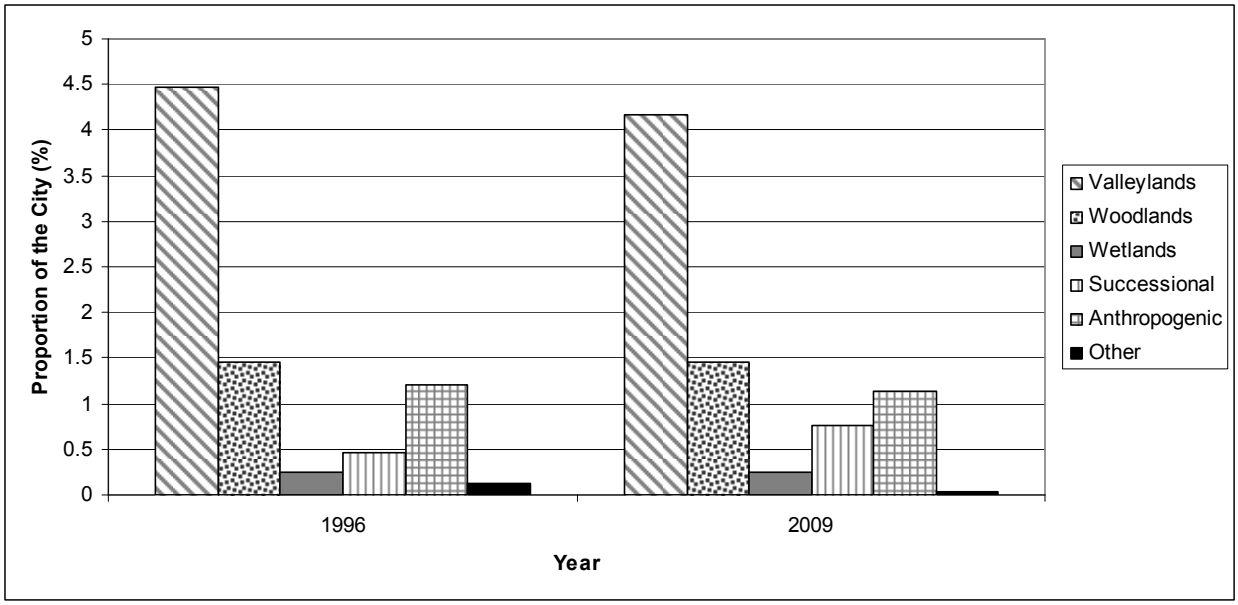

Figure 4: Comparison of NAS vegetation communities in the City between 1996 and 2009.

Valleylands

The Valleylands category includes ten vegetation communities, two of which, "open with wooded slopes" (M) and "manicured with wooded slopes" (O), no longer occur in the natural areas system as a result of naturalization programs initiated by the City (Appendix 8). In 2008, the valleylands category comprised 4.21% of the total City area (Figure 4). There was a decrease of 124.71 ha between 1996 and 2006, however, since then there has been an increase of 42.88 ha to a total of 1219.94 ha in 2009. Between 2008 and 2009 there was a decrease of 0.04% (11.24 ha) (Table 4). This reflects decreases in the following vegetation communities: floodplain (B), golf course (G), open with open slopes valleylands (K), wooded native valleylands (L), and open with manicured slopes valleylands (N) (Appendix 8). However, there were increases in three vegetation community categories: wooded slope (A), wooded non-native valleylands (J), and manicured with wooded slopes valleylands (O). Four of the vegetation communities in this category continue to be the most widespread in the City: wooded slope, floodplain, wooded non-native valleyland and open with open slopes. Three vegetation communities in this category, open with wooded slopes valleylands (M), open with manicured slopes valleylands (N), and manicured with wooded slopes valleylands (O) are considered uncommon in the City, occupying less than 1% of the total area of NAS.

Table 4: Changes to the area of vegetation communities 1996-2009.

Vegetation Community Category	(1996 – 2009)		(2008 – 2009)		Reason For Change (2008 - 2009)
	hectares	acres	hectares	acres	
Valleylands	-81.83	- 202.21	-11.24	-27.77	Boundary and community adjustments to natural areas: AW3, AW4, CRR8, CV10, ER7, ETO5, MY3, RW2, RW5, AND RW6.
Woodlands	+ 3.01	+ 7.44	- 11.69	- 28.89	Boundary and community adjustments to natural areas: CC1, CV8, CV10, CV12 NE1, NE4, and MY1.
Successional	+ 87.65	+ 216.58	- 0.29	-0.72	Boundary and community adjustments to natural areas: CV1, NE4, and RW6.
Wetland	-0.17	-0.42	+ 0.17	+ 0.42	Addition of natural areas, boundary and community adjustments to natural areas: NE4, RW2, and RW6.
Anthropogenic	- 20.40	- 50.41	+ 0.72	+ 1.78	Revision of community boundaries at several sites due to naturalization of plant community edges, and revisions based on property boundaries.
Other	- 27.59	- 68.18	0	0	None of the communities in this category are located within the sites visited in 2009 (within wards 3, 4, and 7); therefore no changes have been made.

Wooded slope (A) communities within valleylands decreased in area between 1996 and 2006 by 20.02 ha; however since then the total area has surpassed the 1996 value by 1.83 ha (Appendix 8). Lands identified as floodplain (B) decreased by 71.33 ha between 1996 and 2006, but increased by 18.79 ha between 2006 and 2009. There has been a steady increase in the amount of wooded non-native valleylands (J) from 1996 to 2009, with an increase of 31.36 ha. There has been a steady decline in the amount of open slopes valleylands (K) between 1996 and 2009

with the exception of a 15.61 ha between 2007 and 2008. The overall decrease between 1996 and 2009 totals 35.08 ha. These increases and decreases are primarily attributable to additions or subtractions of natural areas, revisions of natural area boundaries due to naturalization of plant community edges, and revisions based on property boundaries. Overall, there was a decrease in valleyland area between 2008 and 2009.

Woodlands

Woodlands include twenty vegetation communities, all of which occur outside of valleylands, although they may contain intermittent woodland streams. The bur oak - American beech forest (QQ) community no longer occurs in the natural areas system due to its removal as a result of development. The bur oak - black walnut forest (WW) community was thought to have been no longer present in Mississauga due to development, however, in 2008 several new, small bur oak – black walnut forests were identified in CRR2 and ETO1, totalling 3.27 ha (Appendix 8). Overall, there was an increase of 3.01 ha in woodland communities between 1996 and 2009. This reflects small and large (*e.g.*, 6.84 ha lost from sugar maple-white ash forest (EE)) decreases in four woodland communities and small increases in two of the 20 woodland communities between 2008 and 2009. Fourteen woodland communities had no changes in area between 2008 and 2009. The changes reflect boundary revisions due to the naturalization of plant community edges, and revisions based on property boundaries. Eleven of the vegetation communities in this category are considered uncommon in the City, each occupying less than 1% of the total area of NAS or containing an uncommon "working-group" (Krahn *et al.* 1995). Seven of these communities can also be considered "at risk" in the City, each being represented only in a single natural area. These communities are: sugar maple-eastern hemlock forest (GG); sugar maple-black cherry forest (II); sugar maple-American beech-eastern hemlock forest (LL); white pine-eastern hemlock-sugar maple forest (MM); American beech forest (PP); black cherry-eastern hemlock-white ash forest (VV); and bur oak-black walnut forest (WW). Three of these vegetation communities: GG, LL and MM are found only within natural area EM4 (Erin Mills). Vegetation community II is located at MB4 (Meadowvale Business Park), vegetation community PP is located at GT3 (Gateway), and vegetation community VV is found within natural area LV6 (Lakeview).

There is an emphasis on the protection and management of the remaining woodland vegetation communities (City of Mississauga 2007), and this has resulted in an increase of 3.01 ha of woodlands between 1996 and 2009. The pressures associated with development adjacent to natural areas will continue to stress the remaining vegetation communities (see section 5.0 for a discussion of disturbances related to development), and so efforts should be made to direct development away from natural areas and/or implement management plans to mitigate stresses.

Successional

The successional category is composed of six vegetation communities (Appendix 8). This category increased in size by 87.65 ha between 1996 and 2009 (Table 4). There was a significant increase of successional area between 2007 and 2008 (47.38 ha), which is consistent with this trend. Between 2008 and 2009 there was a minimal decrease of 0.29 ha which is due to minor boundary revisions. The overall increases are largely related to increases in the old field (C) communities. Even though successional vegetation communities continue to increase in

overall area, this category comprises only 0.76 % of the total City area (Figure 4). Four of the vegetation communities in this category remain uncommon in the City occupying approximately 1% of the total area of natural areas (Appendix 8). One of these four communities, birch forest (XX), can also be considered "at risk" in the City, as it is represented in only one natural area.

Overall, the small size of successional communities in the City continues to highlight the perception that these types of communities do not contribute to the biodiversity of the City and, therefore, are not important to retain. However, these communities perform a number of important ecological functions: they provide habitat for a number of plant and animal species (including birds), they act as a buffer between forests and adjacent development, they provide structural diversity to a site (variation in the height and spatial structure of plants provides a wider range of animal habitat), and they provide habitat for small mammals and insects, which in turn provide a prey base for other species higher up the food chain.

Wetland

The wetland category is composed of six vegetation communities (Appendices 8). Between 1996 and 2007 this category decreased in size by 5.91 ha, however, between 2007 and 2008 there was an increase of 5.57 ha. This increase is reflected in the addition of the natural area CM25 which includes a cattail marsh and open water, as well as boundary and community adjustments to natural areas: MV19, NE9, SP3, CL8, CL9, CL42, and CRR9. Between 2008 and 2009 there was a minor increase in this category of 0.17 ha. This increase is due to minor boundary revisions due to property boundaries or to changes in natural areas. Wetlands comprise only 0.25% (75.60 ha) of the total City area (Appendix 9; Figure 4). Five of the six vegetation communities in this category continue to be considered uncommon in the City occupying approximately 1% of the total area of natural areas, and vegetation community V (cattail marsh) represents only 1.25% of the total area of the NAS.

Despite their small size, wetland communities tend to contribute a disproportionately high amount of biodiversity to the City. A large number of plant and animal species are restricted to this habitat. In addition to the concern about outright removal of these communities for development, there is also the concern that even if a wetland is retained within a subdivision, alterations to the hydrological and/or hydrogeological regime from the development will result in reductions in biodiversity or even conversion of the vegetation community from wetland to upland. These areas are especially important for amphibian species which can be key indicators of habitat quality.

Anthropogenic

The anthropogenic category is composed of five vegetation communities (Appendices 8). This category decreased in area between 1996 and 2007 by 21.66 ha, however, there has since been a gradual increase of 1.26 ha between 2007 and 2009. Anthropogenic lands, as identified within the NAS, currently comprise 1.13% (332.61 ha) of the total City area (Table 4; Figure 4). Historic decreases in this category are primarily due to revisions to natural area boundaries related to the naturalization of plant community edges and revisions based on property boundaries. Overall, anthropogenic lands in the NAS still represent more than the amount of land occupied by wetlands (0.25%) and successional (0.76%) communities combined. Wooded residential (I) is still considered to be one of the largest communities in the City, though there

was a slight decrease of 1.71 ha between 2007 and 2008 due to development and a further decrease of 0.05 ha between 2008 and 2009 due to minor boundary revisions. The manicured (F) community generally continues to decrease in size with a minor increase between 2008 and 2009 of 0.25 ha. Two of the vegetation communities in this category (black walnut grove (UU) and urban lake (H)) remain uncommon in the City occupying approximately 1% of the total area of the NAS. Black walnut grove (UU) is also considered to be "at risk" in the City, as it is represented in only one natural area, LV3 (Adamson Estate).

Other

The "other" category is composed of three vegetation communities (Appendices 8): beach (R), tall grass prairie (S), and unknown (U). This category has had an overall decrease in area of 27.96 ha between 1996 and 2007, but there was a slight increase of 0.37 ha between 2007 and 2008, and has stayed the same between 2008 and 2009 (Table 4). The change reflects an increase of 0.36 ha in the unknown vegetation community. The "other" category still represents only 0.04 % of the total City area (Table 4; Figure 4) as it has since 2006. The communities identified in this category are only found in the following natural areas SD1, SD5, SD7, CL8, CL9, CL30, LV3, and LV4. All three community types within this category remain uncommon in the City, occupying approximately 1% of the total area of the NAS. The tall grass prairie (S) community is also considered to be "at risk" in the City as it is represented in only one natural area, CL30 (Lorne Park Prairie).

4.2 Flora

The total number of floral species in the City of Mississauga stands at 1152. There are 688 native species in Mississauga (60% of the flora) and non-natives number 464 (40% of the flora). Fourteen flora species were added to the plant list this year; seven native species and seven non-native species (Table 5). These species were located in the following natural areas: CC1, CRR7, CRR8, CV8, CV12, FV3, MY1, MY3, RW2, RW5, and RW6. Of the 688 native species recorded from the Mississauga flora, 29 (4%) are considered extirpated, 373 (54%) are rare (known from only 1 to 3 locations in the City) or uncommon (known from 4 to 10 locations in the City), and 286 (42%) are common (known from more than 10 locations in the City). There were no additional plants designated as provincially rare in 2009, thus the provincial status of species occurring in Mississauga remains unchanged from 2004 (Appendix 11).

Table 5: Species added to the City of Mississauga flora list in 2009

	Common Name	Latin Name	NAS Site
*	amur maple	*Acer ginnala*	AW3, CC1/MY1, CRR8, FV3, MY3, RW2, RW5, and RW6
*	autumn olive	*Elaeagnus umbellata*	CRR7 and MY3
*	black starthistle	*Centaurea nigra*	CRR7 and MY3
	Canada wild onion	*Allium canadense var. canadense*	CRR7
*	corkscrew willow	*Salix matsudana*	FV3
	cut-leaved anemone	*Anemone multifida var. multifida*	CRR7

Common Name		Latin Name	NAS Site
*	eastern purple coneflower	*Echinacea purpurea*	CRR7 and CV12
*	English oak	*Quercus robur*	MY1
	kalm's brome	*Bromus kalmii*	CRR8
	northern mountain ash	*Sorbus decora*	CV8
	Ontario aster	*Symphyotrichum ontarione*	CRR8
	prairie goldenrod	*Solidago rigida*	CRR8
	swamp doc	*Rumex verticillatus*	CRR7
*	wych elm	*Ulmus glabra*	CC1 and MY1

*** indicates a non-native species**

Butternut is currently designated as Endangered nationally by COSEWIC and provincially by Ontario Ministry of Natural Resources (OMNR). Species listed as Endangered in the province are afforded habitat protection under the Provincial Policy Statement and the Endangered Species Act. Butternut is listed as Endangered because it is rapidly declining throughout its entire North American range as a result of infections by a fungus, butternut canker (*Sirococcus clavigignenti-juglandacearum*). A number of the butternut records from the City's natural areas date prior to 1984 (are older than 20 years old). The current health and presence of some of these individual trees is unknown. In 2009, surveys for butternut were conducted at seven natural areas where access was available. A total of eight butternut trees were observed in five natural areas (Table 6, Appendix 10), including two sites (CV12 and CRR8) where there were no previous records of the species. Any butternut record prior to 1996 that does not a GPS coordinate has been removed from Appendix 10.

Table 6: Natural areas where butternut was located in Wards 3, 4, and 7 in 2009.

Site	Results of 2009 Survey	Condition
CC1/MY1	One tree located	Fair condition; some dead limbs and small amount of canker
CRR7	One tree located	Good condition
CRR8	Two young trees located	One tree 3 cm dbh, the other 5 cm dbh – both in fair condition some dead limbs noted
CV12	Two trees located	Both trees in excellent condition
ETO4	Two young trees (LL 21/08/09, SKM 05/07/09)	One infected with canker, the other in good condition with no canker

4.3 Floristic Quality Assessment

The Floristic Quality Index (FQI) and Coefficient of Conservatism (CC) were re-calculated for 32 natural areas based on field data collected in 2009. Table 1 (page 7) provides the FQIs and native mean coefficients for all natural areas that were assessed, and changes are summarized in Appendix 5 (some of the changes noted in this appendix are significant in the context of the natural areas program while others are considered minor). In 1996, 107 of the 144 natural sites were assessed using the FQA. FQIs ranged from 2.68 to 80.10 and the native mean coefficients ranged from 1.20 to 4.82. In 2009, a total of 138 natural areas and all three residential woodlands have been assessed using the FQA, based on data collected during a field visit or roadside visit. The current FQI values range from 4.90 to 83.66 and the native mean coefficients range from 1.40 to 4.62. High, medium and low values are defined in section 2.3 (page 3).

In 1996, the majority of natural areas fell in the medium range of native mean CC (3.3 to 3.99) and in the low range for the FQIs (< 30.00). In 2009, this is still the case for both the native mean CC and the FQI. In terms of the native mean CC, 62 natural areas have been assessed as having a medium mean CC, 43 as low, and 33 as high. In terms of the FQI, 76 natural areas are assessed as having low FQIs, 34 as medium and 28 with a high FQI. Lower native mean CC indicates an increase in the presence of species characteristic of disturbed environments, and a commensurate decrease in the proportion of plant species that indicate high quality habitat. Species with low mean CC tend to occur in a wide range of habitats and are less susceptible to disturbance. In contrast, plant species with high mean CC tend to be conservative in their habitat requirements (see section 2.3). The decrease in the mean CC value within the high category, from 4.82 in 1996 to 4.62 in 2009, suggests a slight increase in disturbance in at least some of Mississauga's natural areas. In addition, FQI values have increased at 32 sites in 2009. Overall, these increases were minor (with the exception of two sites, CRR7 and CRR8, which increased approximately 20 points) and the increase at 24 natural areas, ranging between 2 to 10 points, may be a result of more thorough inventory. This trend also occurred in 2007 at over 15 natural areas and in 2008 at 20 natural areas. This appears to be a positive trend; more species are generally being identified over the years as further inventory of natural areas occurs.

4.4 Fauna

Sixteen native fauna species were added to the wildlife list this year from the field surveys and the literature reviews (Table 7). The majority of these species were located in CL9, with only one species being located in CRR8. The 2009 breeding bird surveys conducted in natural areas in Wards 3, 4, and 7 continued to document the widespread use of most natural areas by habitat-generalist breeding bird species. Despite habitat becoming increasingly fragmented, a few habitat-specialists are still present in larger patches and patches with a high diversity of vegetation communities. Many of these species are significant (birds of conservation concern) in the Credit River Watershed (Credit Valley Conservation updated) (Appendix 12). Highlights included extensive riparian areas with connected table land forest, such as the Credit River (CRR7 and CRR8), Etobicoke Creek (ETO4, ETO5, and ETO6). These sites sustained the highest number of "possible" breeding bird species of any areas surveyed in 2009, with a high diversity of adaptable species tolerant of urban habitats (*e.g.*, American robin, northern cardinal

and song sparrow), as well as more habitat-specific, and area-sensitive species (for example, red-bellied woodpecker, pine warbler, wood thrush, and blue-gray gnatcatcher).

Table 7: Fauna species added to the City of Mississauga fauna list in 2009. With the exception of the red-bellied woodpecker, all species were documented in the Ministry of Natural Resources (OMNR 2009) survey of the Rattray Marsh wetland complex.

Common Name	NAS Site	Status
Northern bobwhite	CL9	migrant
Bald eagle	CL9	migrant
American golden plover	CL9	migrant
Cattle egret	CL9	migrant
Whimbrel	CL9	migrant
Hudsonian godwit	CL9	migrant
Red-necked phalarope	CL9	migrant
Whip-poor-will	CL9	migrant
White-eyed vireo	CL9	migrant
Tufted titmouse	CL9	migrant
Cerulean warbler	CL9	migrant
Hermit warbler	CL9	migrant
Snow bunting	CL9	migrant
Western meadowlark	CL9	migrant
Red-bellied woodpecker	CRR8, NE3	observed
Mink frog	CL9	observed

Species dependent on certain specific microhabitats (for example species that depend on high bluffs such as bank swallow, rough-winged swallow, cliff swallow) were typically found along the Credit River, Etobicoke Creek and larger creek valleys. The most common Credit Valley Conservation Species of Concern were the mid-to late-successional species (of shrubby cultural meadows and young forest): common grackle and gray catbird. This is not because there is abundant cultural meadow and young forest, but because of the narrow bands of riparian vegetation along the smaller creek valleys that contain many elements common to successional areas, such as shrubs and young trees. These communities likely persist because of the high level of disturbance and high light levels present there. Marsh area-sensitive species such as rails, pied-billed grebes and American coots are very rare in Mississauga (the only recent records are pied-billed grebe and American coot observed at CL9 n 2008, and Virginia rail in CRR9 in 2004 – there are no records within Wards 3, 4, or 7). Pine warbler and blue-gray gnatcatcher are considered forest area-sensitive by MNR, they were present in several sites with a high density of mature trees. These have also been noted in older, wooded neighbourhoods. Raptorial birds (hawks, falcons, *etc*.) are more common along the Credit River, Etobicoke Creek and larger creek valleys than in other parts of Mississauga, reflecting the larger number of open natural areas to support a forage base, however they are not uncommon in forest patches with open

communities adjacent. Red-tailed hawk was noted at ten forested sites in 2009: CRR7, CRR8, CV10, CV6, ETO4, GT3, HO3, MB1, NE1, and NE4. Older areas of the City still provide habitat for declining bird species that depend on human structures in older neighbourhoods. However, these species are also typically sensitive to development are not present in new residential areas. Such species include barn swallow, chimney swift, and cliff swallow. These species were documented from natural areas along the Credit River, Etobicoke Creek, and Cooksville Creek during the 2009 field season. These areas are typically surrounded by older residential neighbourhoods.

Provincial rarity ranks for some fauna species reported in the City of Mississauga have changed in 2009, as a result of status changes from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Natural Heritage Information Centre (Appendix 13). Four previously un-ranked faunal species now have greater rarity status according to COSEWIC: common nighthawk (threatened) rusty blackbird (special concern), Canada warbler (threatened), and common snapping turtle (special concern). Three faunal species have become more common, and therefore have been removed from the list of provincially rare species: short-billed dowitcher, stilt sandpiper, and dunlin. Common snapping turtle has been documented from thirteen natural areas in the City. Most provincially significant bird species noted in the City are migrants. However, the one provincially significant bird species considered a confirmed breeder is peregrine falcon, which nests on a building (the Mississauga Executive Centre complex) adjacent to CC1. This species has been monitored intensively during the breeding season since 2002. This species was not observed at CC1 during the 2009 field season, but the Peregrine Falcon Foundation monitoring site indicated that three fledglings survived in 2009 (www.peregrine-foundation.ca/tops/ missmec.html).

There has been no change to the status of Credit Valley Conservation species of conservation interest (Credit Valley Conservation updated). A complete list of bird species of conservation interest documented from natural areas is provided in Appendix 12. Currently, 95 bird species of conservation interest are documented, of which 26 species are possibly breeding, 23 probably breeding, and 7 confirmed breeding in natural areas. As described above, most of these species of conservation concern are habitat specialists, for which habitat is more likely to be eliminated as natural areas become isolated, fragmented and altered by surrounding development.

Amphibian surveys were conducted for the first time as part of the natural areas update in 2006 (Appendix 14). The surveys were focused on early forest breeding amphibians that require vernal pools: spring peepers and wood frogs. However, surveys for other amphibian species were conducted in conjunction with other faunal surveys whenever possible. Generally, very few sites provide habitat for forest breeding amphibians, which require “fishless” ponds near woodlands for breeding. These ponds are characteristically fed by snow melt, groundwater and/or rainfall, and are full in early spring and dry out slowly over the summer. However, the water in the ponds needs to persist long enough to allow amphibian larvae to transform into adults, generally around mid-July. This habitat is very rare in Mississauga. No woodland frog species were heard in Wards 3, 4 and 7 during the 2009 field surveys. The following sites, where habitat appeared potentially suitable for woodland frogs (from aerial photo review), were surveyed for amphibians in 2009: CRR7, CRR8, CV8, ETO5, FV3, and MY1. Green frogs were noted at natural areas: CRR7, CRR8, and ETO5.

Green frog, which is a much more adaptable species that can use storm water ponds for breeding, will likely persist in Mississauga. This species was heard at CRR7, CRR8, and ETO5 in 2009. American toads and leopard frogs are still extant in several locations, as they can use a number of upland and wetland habitats for foraging and breeding. American toads were not heard during the 2009 field season, however historical records exist at CRR7, CRR8, and ETO4 within Wards 4, 3, and 7. Leopard frogs have been heard in the past at CRR7 and ETO4 but none were heard in 2009. Bullfrogs require extensive emergent vegetation and deeper water, and this type of habitat is also rare in Mississauga, except in the marshes at the mouth of the Credit River. Bullfrogs were not heard in 2009.

4.5 Significant Features

There are no changes to Areas of Natural and Scientific Interest (ANSIs) since they were last updated by the MNR, as reported in the 1998 update report.

5.0 NATURAL AREA CLASSIFICATION SCHEME

In 2004, the criteria for classifying the natural areas were updated (section 3.2, North-South Environmental 2004). No updates to the classification scheme are proposed in 2009, and thus the 2004 criteria are considered up to date. These are provided in Appendix 1.

6.0 CONDITION OF NATURAL AREAS

6.1 Condition

Generally, the natural areas within the City that were surveyed in 2009 continue to be in fair condition (see Table 1 and Appendix 5). Natural areas evaluated as in fair condition have moderate disturbances (*e.g.*, few trails, limited dumping, some trampling, *etc*.) and an average number of non-native flora species typical of what can be expected in an urban natural area (see section 2.3 for definitions of "condition"). The overall condition of the natural areas visited in 2009 remained largely unchanged from previous studies.

Spring surveys in natural areas in Wards 3, 4, and 7 identified the presence of several spring ephemeral plant species primarily in areas in fair to good condition, and those areas with contiguous habitat (*e.g.*, the Credit River). Similar results were found in the spring of 2005, 2006, 2007, and 2008 in natural areas in Wards 3, 4 and 7, Wards 8, 9 and 10, Wards 5, 6, and 11, and Wards 1 and 2 respectively. This indicates that suitable conditions (*e.g.*, adequate moisture, soils that are not compacted, adequate nutrients, *etc*.) are present to support these plant species in many of the natural areas in the City.

6.2 Disturbances

As with all of the other survey updates, the most common disturbances within natural areas are those associated with an increase in the uncontrolled human use of natural areas following development in adjacent sites. Examples of these disturbances include: the creation of *ad hoc* trails, the use of mountain bikes (including the construction of some elaborate racing circuits), the presence of garbage, boundary encroachment, and vandalism (tree carving, tree cutting, spray paint). These disturbances have become more prevalent at all of the natural areas surveyed this year.

Observations at natural areas in Mississauga are consistent with reports from the literature that human use of natural areas results in the alteration of decomposition and nutrient cycles through: the loss of understory vegetation (particularly herbaceous species) (Friesen 1998, Matlock 1993), as well as the loss of leaf litter and humus, reduction of moss species, and soil compaction (Matlock 1993). Matlock (1993) also suggested that the recovery of soil and understory vegetation could take 10 to 20 years after the cessation of traffic. Deterioration of the quality of Mississauga's natural areas can be expected to continue unless there is a substantial effort to manage natural areas through site specific Conservation Plans and community stewardship initiatives.

Encroachment into a woodland edge can result in a number of indirect impacts that can degrade the woodland. Woodland edges act as an interface between the interior forest conditions and the open areas outside the woodland. These natural edges function to support dense shrub growth and tree foliage, which is often thicker at least on the outside edge. Edge trees are generally more resilient to blow-down, as a result of having grown to maturity in the more exposed edge environment. When the edge is disturbed or removed, the edge microclimate changes, resulting in elevated temperatures, higher light levels, greater wind penetration, decreased humidity, *etc*. This can initiate a chain of events including soil desiccation, change in soil microfauna, and changes to food webs, nutrient cycles and decomposition cycles. This in turn can effect vegetation composition by making the habitat more suitable for species of open conditions (usually non-native), and less suitable for native woodland plant species, as well as impacting birds and other wildlife. The 'new" edge created when only part of a woodland is removed, is also more susceptible to windthrow.

6.3 Development

Direct impacts from development continue to impact natural areas, including the partial or complete removal of natural areas. These impacts can include: construction of a new residential subdivision, industrial complexes, in-fill construction, or the expansion of an industrial or commercial parking lot. In 2009, none of the 32 natural areas surveyed decreased in overall size due to development.

6.4 Non-native Species

There has been a continual increase in the proportion of non-native to native plant species in the natural areas surveyed between 1996 and 2009 (see Appendix 5). Of the 32 natural areas which

had been previously inventoried, all showed an increase of non-native species. An increase in the presence and dominance of non-native species within the City's natural areas is a serious management concern. Without active management species such as Norway maple (*Acer platanoides*), garlic mustard (*Alliaria petiolata*), European buckthorn (*Rhamnus cathartica*), and other non-native plant species will result in a continued loss of native plant species in natural areas. There are also some human health and/or safety issues associated with giant hogweed (*Heracleum mantegazzianum*) and wild parsnip (*Pastinaca sativa*). Giant hogweed was reported for the first time in Mississauga in 2008 (see Section 4.2). Giant hogweed is a non-native species introduced from Europe and has been noted at three natural areas in 2008, and three additional natural areas within the City in 2009. The non-native wild parsnip has been recorded during field work in Mississauga since 2000. As of the 2009 update, wild parsnip has been recorded from 23 natural areas. Both of these plants are a human health risk because they exude a clear watery sap containing photosensitizing agents which in combination with daylight cause skin in contact with the sap to burn. It is recommended that these species be made a priority for removal from sites AW3, AW4, CL8, CL9, CL13, CL24, CL31, CV6, CV8, CRR1, CRR2, CRR6, CRR7, CRR8, CRR10, CRR11, ETO2, LV5, MB7, MI1, MV15, NE3, NE9, NE12, RW5, AND RW6. A City-wide strategy to deal with aggressive non-native species impacts needs to be formulated and management plans developed to remove the most invasive exotic species as soon as possible.

Naturalized areas observed during field work at a number of sites have typically involved leaving an area of un-mowed grass to regenerate naturally. It has been noted that some areas observed during field work have been planted with native vegetation as part of the City's active restoration initiative. While the size of the natural area increases as a result of this regeneration, this strategy also provides habitat for invasive plants such as purple loosestrife (*Lythrum salicaria*) and dog-strangling vine (*Cynanchum rossicum*) (Toronto Region Conservation Authority 2008). In addition, if the natural area occurs in a valleyland its inherent ability to function as a linkage will promote the spread of these invasive species within the City. To the extent possible, such areas should be planted with native species or otherwise managed toward a native community to reduce the impact of non-native plant species.

As noted in previous studies, the dumping of discarded horticultural plants, largely as a result of encroachment where residents use the natural areas behind their house for compost and dumping yard waste, is another common vector for the introduction of non-native plants to natural areas. This was present at several of the residential areas visited during this update.

7.0 CONCLUSIONS

After over ten years of update surveys covering the entire City several trends have emerged. First, there has been a general decrease in the quality of vegetation as indicated by an increase in the number of natural areas with decreasing native mean coefficients (section 4.3; appendix 5). However, the decrease in the mean CC within the high category, from 4.82 in 1996 to 4.62 in 2009, suggests a slight increase in disturbance in at least some of Mississauga's natural areas. There is an overall increase in FQI values although this has not resulted in a shift toward higher FQI categories (*i.e.*, low to medium, medium to high, *etc.*). The increases in FQI values may be

a result of more thorough inventories. Continued monitoring of the natural areas over time will show whether these changes are a positive trend or an anomaly. Second, there has been a decrease in the amount of tableland (woodland and successional categories) and wetland habitats (section 3.1). Development between 1996 and 2009 has resulted in the total loss of approximately 105 ha from the natural areas system including the loss of thirteen natural areas. Three valleyland communities, eleven woodland communities, four successional communities, five wetland vegetation communities, two anthropogenic communities, and three "other" communities are uncommon in the City (Appendix 9). Of these, seven of the woodland communities, one successional community, one anthropogenic community, and one "other" community are "at risk" in the City, occurring in only one natural area each.

An overall trend continues to be a shift in the quality of vegetation within natural areas, likely as a result of increased human disturbance and changes in hydrology resulting from development. There has been a consequent decline in the diversity of amphibian species. These trends reinforce the need to maintain and manage (and where possible restore) the remaining natural areas in the City. In particular, tableland natural areas (including woodlands, wetlands and successional vegetation communities) which continue to be the most seriously threatened by development.

One positive trend is the naturalization projects undertaken by the City. The majority of naturalized areas observed during fieldwork between 1996 and 2009 have involved leaving an area of un-mowed grass adjacent to a watercourse or woodlot feature to regenerate naturally, with the addition of native plantings in some areas. While this approach will increase the overall size of the natural area in question, this initiative could be enhanced by taking an approach that includes long-term management, which would more likely result in a healthy natural area with a diversity of native plant and animal species such as at Jack Darling Park.

Continued efforts to protect and increase the proportion of the City occupied by natural habitat will promote biodiversity and reinforce the goals and objectives of the Natural Areas Program as set out in the original NAS report (Geomatics 1996).

8.0 RECOMMENDATIONS

1. All of the remaining natural areas in the City should be protected from development and managed to maintain or increase biodiversity. Of particular importance is the protection and subsequent management of all woodlands, wetlands and successional habitats wherever possible. Protection of wetlands in close proximity to forested and cultural habitats is particularly important for both plant and wildlife.

2. It is recommended that the City initiate Conservation Plans for natural areas. Consideration should be given to prioritize natural areas based on significance, representation, size and condition, and those of greatest value. Issues addressed in the Conservation Plans should include, but not be limited to: access, encroachment, appropriate activities, non-native plant control, and restoration initiatives (see Geomatics 1996 for a complete description of Conservation Plan requirements). Restoration

initiatives could be started on two or three natural areas for a period of two to three years, and natural areas could then be dealt with on a rotational basis that focuses on those natural areas at greatest risk.

3. Initiate a public education program in concert with community-based stewardship initiatives to involve local citizens in the conservation and management of natural areas, as outlined in the Natural Areas Survey (Geomatics 1996). The key to this is demonstrating the ongoing degradation of woodland through careless and improper use. The public education and stewardship activities in Cawthra Woods (LV7) offer a good example of what can be achieved.

4. A City-wide strategy should be developed to address non-native species and develop management initiatives to address the most invasive exotic species. Such a study should include an assessment of the feasibility of managing some aggressive exotics. In particular, the discovery of giant hogweed in 2008 posed potential human health risks and a programme to control or eliminate this species should be considered. Other species that are a high priority are Norway maple, garlic mustard, purple loosestrife, dog-strangling vine, white poplar (*Populus alba*), Japanese knotweed (*Polygonum cuspidatum*), European buckthorn, and white mulberry (*Morus alba*). At a minimum the City should adopt policies to restrict or prevent the planting of invasive non-native plants, as well as providing encouragement and a mechanism for the City and the community to work together to remove such plants.

5. All naturalization (creation of natural habitat from manicured parkland) projects undertaken in natural areas by the City should involve both the planting/seeding of native species and the control of non-native species.

6. Investigate the possibility of rehabilitating the compacted soils of mountain bike circuits through a combination of levelling the circuits and undertaking planting trials in publicly owned natural areas. This could be combined with a community education program and involve local volunteers. A publicly owned natural area surveyed in 2009 that would benefit from such work includes MY1.

9.0 REFERENCES CITED

City of Mississauga. 2007. Mississauga Plan. Goals and Objectives, and General Policies. p. 7, 30-32.

Credit Valley Conservation. Undated. Credit Watershed Bird Species of Conservation Interest. 2nd Edition. Bird Data Card.

Dillon Consulting Limited. 2005. Greenfield South Power Plant Site Environmental Impact Study – Vegetation Community Addendum. Final Report. Report prepared for Eastern Power. 6pp.

Dillon Consulting Limited. 2005. Greenfield South Power Plant Site Tree Inventory. Final Report. Report prepared for Eastern Power. 2pp.

Friesen, L. 1998. Impacts of urbanization on plant and bird communities in forest ecosystems. The Forestry Chronicle 74(6): 855-860.

Gartner Lee Limited. 2004. Environmental Impact Study for the Proposed Hydropole Training Facility, Part of Lot 2, Concession 4, East of Hurontario Street, Part 1 (43R – 24967), City of Mississauga. Report prepared for Pauls Properties Corporation. 17pp.

Gartner Lee Limited. 2005. Environmental Impact Study Update – Proposed EUSA Hydropole Training Facility, Creekbank Road and Matheson Boulevard, City of Mississauga. Report prepared for Pauls Properties Corporation. 22pp.

Gartner Lee Limited. 2006. Environmental Impact Study for Janoscik Property, Mississauga, Ontario.

Geomatics International Inc. 1996. City of Mississauga Natural Areas Survey. Report prepared for Planning and Building Department, City of Mississauga. 110 pp.

Geomatics International Inc. 1998. City of Mississauga Natural Areas Survey - Update. Report prepared for Planning and Building Department, City of Mississauga. 45 pp.

Kaiser, J. 1983. Native and exotic plant species in Ontario: a numerical synopsis. *The Plant Press* 1: 25-26.

Kaiser, J. 2001. The Vascular Plant Flora of the Region of Peel and the Credit Valley Conservation. Prepared for Credit Valley Conservation, Regional Municipality of Peel, and Toronto and Region Conservation.

Krahn, D., G. Roy, F. Pinto, B. Samoukovic, and D. Puric-Mladenovic. 1995. Determination of Significant Woodlands in the Regional Municipality of Peel. Ontario Ministry of Natural Resources Halton-Peel Area Team. 64pp.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and Its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Matlock, G.R. 1993. Sociological Edge Effects: Spatial Distribution of Human Impact in Suburban Forest Fragments. Environmental Management 17(6): 829-835.

Natural Heritage Information Centre (NHIC). 2004. Natural Heritage Information website. www.mnr.gov.on.ca/MNR/nhic/nhic.cfm

Newmaster, S.G., A. Lehela, P.W.C. Uhlig, S. McMurray and M.J. Oldham. 1998. Ontario Plant List. Ontario Ministry of Natural Resources, Ontario Forest Research Institute, Sault Ste. Marie, Ontario. Forest Research Information Paper No. 123, 550pp + appendices.

North-South Environmental Inc. 1999. City of Mississauga Natural Areas Survey - Update. Report prepared for Planning and Building Department, City of Mississauga. 56pp.

North-South Environmental Inc. 2000. City of Mississauga Natural Areas Survey - Update. Report prepared for Planning and Building Department, City of Mississauga. 53pp.

North-South Environmental Inc. 2001. City of Mississauga Natural Areas Survey - Update. Report prepared for Planning and Building Department, City of Mississauga. 56pp.

North-South Environmental Inc. 2002. City of Mississauga Natural Areas Survey - Update. Report prepared for Planning and Building Department, City of Mississauga. 67pp.

North-South Environmental Inc. 2004. City of Mississauga Natural Areas Survey - Update. Report prepared for Planning and Building Department, City of Mississauga. 80pp.

Ontario Ministry of Natural Resources (OMNR). 2004. Species at Risk in Ontario List. www.ontarioparks.com/english/sar.html

Ontario Ministry of Natural Resources (OMNR), Aurora District. 2009. Provincially Significant Rattray Marsh Wetland Complex, City of Mississauga, Region of Peel

Stantec Consulting Limited. 2004. Stonebrook Properties Inc. Scoped Environmental Impact Statement. Report prepared for Glen Schnarr and Associates. 20pp.

Stantec Consulting Limited. 2005. Orlando Mississauga Environmental Impact Study. Report prepared for Orlando Development Corporation. 33pp.

Toronto and Region Conservation Authority. 2008. Dog-strangling vine – *Cynanchum rossicum* (Kleopow) Borhidi, A review of distribution, ecology and control of this invasive exotic plant. 66pp.

Toronto and Region Conservation Authority. 2005. Comments on Site Plan Application. Report prepared for the City of Mississauga. 7pp.

Appendix 1: Natural Area Classification Scheme

Appendix 1: Natural Area Classification Scheme. As updated in Section 5.0 (North-South Environmental Inc. 2004)

With recent changes to the rarity status of significant species at the national, provincial and regional levels, the criteria for classifying the natural areas were updated in 2004. Changes to the criteria as defined in Geomatics (1996) are highlighted in bold. Areas still need only fulfill one criterion in any class to be designated in that class.

Significant Natural Site
These are areas that are outstanding from a natural areas perspective, in the context of the City of Mississauga. Significant Natural Sites must fulfill one of the following criteria:

- ANSI, ESA and other areas designated for outstanding ecological features
- areas with a Floristic Quality Index (FQI) of ≥ 40.00
- areas with a mean floristic coefficient of **≥** 4.50
- woodlands ≥ 10ha (25 acres) in size
- areas that support provincially significant (S1, S2, S3) or "species at risk" listed as special concern, threatened or endangered (designated by COSEWIC or COSSARO)
- woodlands with the potential to provide interior conditions (*i.e.*, no dimension of the woodland is < 700m)
- woodlands that support old-growth trees (**≥** 100 years old)
- wetlands **≥** 2ha (5 acres) in size regardless of rank
- the Credit River and Etobicoke Creek valleys

Natural Site
These are areas that represent good examples of remnant features that once characterized the City of Mississauga. Natural Sites must fulfill one of the following criteria:

- woodlands **≥** 2ha (5 acres) but < 10ha (25 acres) (defined as forests which support appropriate understory and canopy species
- **areas** that represent uncommon vegetation associations in the City
- areas that support regionally significant plant (in the City of Mississauga) or animal species (CVC species of concern)
- areas with a Floristic Quality Index (FQI) of 25.00 to 39.99
- areas with a mean floristic coefficient of 3.50 to 4.49
- areas that include natural (i.e., not engineered) landscape features [i.e., valley lands, watercourses, unusual (in the context of the City) landform features]

Natural Green Space
This class includes areas which perform ecological functions but do not satisfy any of the criteria for the previous two natural area classes. Natural Green Space includes:

- watercourses with vegetation other than mowed grass, even if they are predominantly engineered (i.e., straightened or channelized)
- wooded areas that are < 2ha (5 acres) in size and do not fulfill any of the other criteria for Natural Site or Significant Natural Site
- Lakes Aquitaine and Wabukayne

Residential Woodland
These are older residential areas, generally with large lots, and almost completely in private ownership. They support trees with a mature, fairly continuous canopy, but the native understory is generally absent or degraded, usually through maintenance of residential lawns and landscaping. However, these areas still serve some functions such as: providing habitat for tolerant canopy birds, both in migration and for breeding; fixing atmospheric carbon; and facilitating groundwater recharge owing to the high proportion of permeable ground cover. With approaches that involve landscaping with native species, the ecological function of these areas would be greatly increased.

Special Management Areas
These are areas adjacent to or close to existing natural areas, and which have the potential for restoration, or which should be planned or managed specially. They are primarily identified to alert planners to the possibility of directing compatible land uses to lands adjacent to natural areas.

Linkages
These are areas which serve to link two or more of any of the five previous classes within the City, or to natural areas outside of the City boundaries. Linkages could include:

- stormwater management facilities including ponds and watercourses;
- designated open space;
- rights of way; and
- greenspace along major arterial roads providing there is an adequate barrier between the linkage and roadway.

Appendix 2: Reports Examined for Natural Areas Survey Updates

Appendix 2: Reports Examined for Natural Areas Survey Updates

The format of this appendix follows Appendix 2 in the Natural Areas Survey (Geomatics 1996). The numbers correspond to those used in the database for literature references.

225 Gartner Lee Limited. 2004. Environmental Impact Study for the Proposed Training Facility, Part of Lot 2, Concession 4, East of Hurontario Street, Part 1.

226 Dillon Consulting Limited. 2003. Beaverbrook Homes (Lakeshore Village) Project Inc. "Lakeshore Village" Environmental Analysis Report.

227 Gartner Lee Limited. 2003. Scoped Environmental Impact Study, Glenerin Inn Redevelopment, City of Mississauga.

229 Philips Engineering Limited. 2004. North Sixteen District 'Scoped' Subwatershed Study and Ninth Line District Floodplain Mapping.

230 Stantec Consulting Ltd. 2004. Letter to Glen Schnarr & Associates Inc. re: Derrydale Golf Course - Ecological Constraints.

231 Bird and Hale Limited. 2003. Tree Evaluation Report 816 Meadow Wood Road Mississauga

232 Stantec Consulting Ltd. 2004. Credit River Pedestrian Bridge City of Mississauga Environmental Impact Study.

233 Aboud & Associates. 2004. Scoped Environmental Impact Study and Arborist Report. 77 Indian Valley Trail, Mississauga.

234 Dillon Consulting Limited. 2005. Greefield South Power Plant Site Tree Inventory. Final Report.

235 Dillon Consulting Limited. 2005. Greenfield South Power Plant Site Environmental Impact Study – Vegetation Community Addendum. Final Report.

236 Gartner Lee Limited. 2005. Environmental Impact Study Update – Proposed EUSA Hydropole Training Facility, Creekbank Road and Matheson Boulevard, City of Mississauga.

237 Stantec Consulting Limited. 2004. Stonebrook Properties Inc. Scoped Environmental Impact Statement.

239 Stantec Consulting Limited. 2005. Orlando Mississauga Environmental Impact Study.

240 Toronto and Region Conservation Authority. 2005. Comments on Site Plan Application.

250 Gartner Lee Limited. 2006. Environmental Impact Study for Janoscik Property, Mississauga, Ontario.

251 Golder Associates. 2006. Scoped Environmental Impact Study Part of Lot 9, Concession 2, West of Tomken Road - South of Eglinton Avenue, City of Mississauga.

252 North-South Environmental Inc. 2006. Hershey Centre Woods Conservation Plan for Sports Complex at Hershey Centre (Phase III).

253 Baker Forestry Services Nursery and Consulting. 2006. Tree Survey Report for 3669 Mississauga Road, Northeast corner of Burnhamthorpe Road West and Mississauga Road, Ghalioungui Property. 4pp.

254 The Municipal Infrastructure Group with Dillon Consulting and Parish Geomorphic. 2006. Streetsville Quarry Environmental Management and Servicing Report Update, City of Mississauga.

255 The Municipal Infrastructure Group. 2006. Streetsville Quarry: comments in response to queries from Credit Valley Conservation Authority.

256 The Municipal Infrastructure Group. 2006. Streetsville Quarry. Environmental Management and Servicing Report, City of Mississauga.
257 Tripodo, Paul, Leah Lefler, and Rod Krick. 2007. Credit Valley Conservation Authority field visit to NAS sites: SD5, CL13, LV4, LV5, MI1, and CL17.
258 Reid and Amelon. 2007. Acoustic Bat Monitoring Report. Credit River Watershed (Draft). August 30 – September 4 2007.
259 Reid, F. 2007. Small Mammals of the Credit River Watershed. Preliminary Monitoring Report: October 2 – 18, 2007. Draft.
260 Ecoplans Ltd. 2007. Jack Darling Park Rare Plant Management Plan.
261 EcoTec Environmental Consultants Inc. 2007. Tree Inventory and Avian Assessment CP Rail Right of Way at Bridge 19.9 Galt, Streetsville, Ontario.
262 Beacon Environmental. Uptown Mississauga: Hurontario and Eglinton Scoped Environmental Impact Study. Prepared for Pinnacle International (Ontario) Limited.
263 Philip van Wassenaer. Urban Forest Innovations Inc. 2008. Tree Preservation/Arborist Report for 2182 Gordon Drive, Mississauga, Ontario. Prepared for Marta Vodinelic.
264 North-South Environmental Inc. 2008. Tree survey for Part of Block E (1459 Stavebank Road), Registered Plan B-09, City of Mississauga.
265 Ecoplans Limited. 2007. Environmental Impact Statement. 2725 Speakman Drive.
266 Gray Owl Environmental Inc. 2008. Environmental Impact Statement for 2225 Dundas Street East, Mississauga, Ontario.
267 Dougan & Associates. 2007 (October 15). Scoped Environmental Impact Study for Thorny Brae Place, Part of Lot 3 & 5, Range 5 (N. of Dundas Street, Mississauga, Ontario.
268 Tree Specialists Inc., The. 2007 (December 4). Tree Preservation report for 4390 Mississauga Road, Mississauga.
269 North-South Environmental Inc. 2007 (November). Environmental Impact Study Proposed Townhouse Development, 4390 Mississauga Road, Mississauga, ON.
270 University of Toronto. 2008 (February 28). Prescribed Burn at University of Toronto (Memorandum).
271 Dougan & Associates. 2007 (July 18). Letter report summarizing assessment of vegetation along a section of trail proposed to be widened in Dunn Park.
272 Credit Valley Conservation and NHP. 2007 (August 2). Review of Flora and Fauna at SD5, CL13, LV4, MI1 and CL17.
273 Webber, J. and J. Kaiser. 2007 (March). Evaluation of the vegetation and flora of the wetland units within Rattray Marsh, Mississauga, Ontario.
274 White, A. 2008. Vegetation Inventory for the 260 Traders Boulevard Devlopment Site Mississauga, ON.
275 Dougan Associates Ecological Consulting & Design. 2009 (February, 18). Scoped Environmental Impact Study for Thorny Brae Place, Part of Lot 3 & 4, Range 5 (N. of Dundas Street), Mississauga, Ontario.
276 Ontario Ministry of Natural Resources, Aurora District. 2009. Provincially Significant Rattray Marsh Wetland Complex, City of Mississauga, Region of Peel
277 Liam Murray. 2006. Memo RE: Highway 401 Widening, 410 to 1st Line West, Mississauga, Meadowvale Station Woods South of Highway 401. Credit Valley Conservation. 2pp.

278 Marshall Macklin Monaghan and Ecoplans Limited. 2005. Highway 401 Improvements from Highway 410/403 Interchange to East of Credit River. Class Environmental Assessment for Provincial Transportation Facilities. Group 'B' Project. Ministry of Transportation Central Region.

279 INSITE Landscape Architects Inc. 2008. Tree Management Report for 2551 & 2555 Meadowpine Blvd. Mississauga, Ontario.

280 Ecoplans Ltd. 2008. HATCH Property (07-3279) - Breeding Bird Surveys and Vegetation Overview.

281 Thompson Environmental Planning and Design Ltd. 2008. Scoped Environmental Impact Statement at 2935 and 2955 Mississauga Road.

282 Ontario Ministry of Natural Resources, Aurora District. 2008. Provincially Significant Credit River Marshes Wetland Complex.

283 Dougan & Associates. 2008. City of Mississauga Lakeside Park Environmental Site Investigations, Analysis and Pre-Design Recommendations Report.

284 Ontario Ministry of Natural Resources, Aurora District. 2009. Provincially Significant Churchville-Norval Wetland Complex.

Appendix 3: Fieldwork Identified and Date Completed

Appendix 3: Fieldwork Identified and Date Completed.

Natural areas for which the need for a field visit was identified was based on aerial photograph interpretation and literature review. Natural areas are grouped into categories based on the type of change identified either within or adjacent to the natural area. Field Visit indicates the type of visit the natural area received, field work or a road side visit (see section 2.2 for an explanation). Ownership indicates whether the natural area is privately owned and therefore required access permission or whether it is a City owned site (*i.e.*, parkland or greenbelt).

Natural Area	Site Status	Reason for Field Visit (based on review of aerial photography and literature)	Ownership	Field Visit		Date
				Type	Timing	
Major Development Proposed Within Natural Area						
GT3	NS	Church development proposed within natural area – outside of Wards 3, 4, and 7	private	road side visit	breeding birds	12/06/09
					spring flora	12/06/09
Development Proposed Adjacent to Natural Area						
CRR11	SNS (ESA)	Development proposed adjacent to natural area – outside of Wards 3, 4, and 7	private	road side visit	breeding birds	12/06/09
					spring flora	12/06/09
					summer flora	27/08/09
MB1	NS	Development proposed adjacent to natural area – outside of Wards 3, 4, and 7	private	road side visit	breeding birds	12/06/09
					spring flora	12/06/09
Minor Boundary Revisions Required						
AW1	SNS	Minor boundary revision required; locate butternut (last observation 2000)	parkland	field work	breeding birds	10/06/09
					spring flora	10/06/09
					summer flora	25/08/09
					butternut	25/08/09
AW3	NGS	Minor boundary revision required	parkland	field work	breeding birds	10/06/09
					spring flora	10/06/09
					summer flora	25/08/09
AW4	NS	Minor boundary revision required	parkland	field work	breeding birds	10/06/09
					spring flora	10/0609

Natural Area	Site Status	Reason for Field Visit (based on review of aerial photography and literature)	Ownership	Field Visit		Date
				Type	Timing	
					summer flora	25/08/09
CC1	SNS	Minor boundary revision required; locate butternut (last observation 1980)	parkland/private	field work/road side visit	breeding birds	04/07/09
					spring flora	04/07/09
					summer flora	25/08/09
					butternut	25/08/09
CRR7	SNS (ESA & ANSI)	Minor boundary revision required; locate butternut (last observation 2005)	private	field work with permission	amphibians	05/04/09, 21/04/09
					breeding birds	03/07/09, 08/07/09
					spring flora	03/07/09, 08/07/09
					summer flora	26/08/09, 01/09/09
CV1	NS	Minor boundary revision required	parkland	field work	breeding birds	09/06/09
					spring flora	09/06/09
					summer flora	21/08/09
CV6	NS	Minor boundary revision required	parkland	field work	breeding birds	09/06/09
					spring flora	09/06/09
					summer flora	24/08/09
ER6	SNS	Minor boundary change; locate butternut (last observation 2000)	private/parkland	field work/ road side visit	breeding birds	09/06/09
					spring flora	09/06/09
					summer flora	21/08/09
					butternut	21/08/09
ETO6	SNS	Minor boundary revision required	private/parkland	road side visit/ field work	breeding birds	12/06/09
					spring flora	12/06/09
					summer flora	24/08/09
FV1	NS	Minor boundary revision required	parkland	field work	breeding birds	09/06/09

Natural Area	Site Status	Reason for Field Visit (based on review of aerial photography and literature)	Ownership	Field Visit		Date
				Type	Timing	
					spring flora	09/06/09
					summer flora	21/08/09
MY1	SNS	Minor boundary revision required; locate butternut (last observation 1980)	parkland	field work	amphibians	26/03/09, 23/04/09
					breeding birds	04/07/09
					spring flora	04/07/09
					summer flora	25/08/09
MY3	NGS	Minor boundary revision required	parkland	field work	breeding birds	04/07/09
					spring flora	04/07/09
					summer flora	24/08/09
NE1	NGS	Minor boundary revision required	private	road side visit	breeding birds	12/06/09. 01/07/09
					spring flora	12/06/09
					summer flora	24/08/09
NE4	SNS	Minor boundary revision required	parkland	field work	breeding birds	06/07/09
					spring flora	06/07/09
					summer flora	21/08/09
RW1	NS	Minor boundary revision required	private	road side visit	breeding birds	12/06/09
					spring flora	12/06/09
					summer flora	27/08/09
RW2	NGS	Minor boundary revision required	parkland	field work	breeding birds	12/06/09
					spring flora	12/06/09
					summer flora	27/08/09
RW4	NS	Minor boundary revision required	parkland	field work	breeding birds	10/06/09
					spring flora	10/06/09
					summer flora	25/08/09

Natural Area	Site Status	Reason for Field Visit (based on review of aerial photography and literature)	Ownership	Field Visit		Date
				Type	Timing	
RW5	NS	Minor boundary revision required	parkland	field work	breeding birds	10/06/09
					spring flora	10/06/09
					summer flora	25/08/09
RW6	NS	Minor boundary revision required	parkland	field work	breeding birds	10/06/09
					spring flora	10/06/09
					summer flora	25/08/09
Minor Boundary Revisions and Investigate Potential Additions						
CV8	NS	Minor boundary revision required investigate potential for inclusion of additional area in natural area	parkland	field work	amphibians	26/03/09
					breeding birds	26/06/09
					spring flora	26/06/09
					summer flora	24/08/09
CV10	NS	Minor boundary change; investigate potential for inclusion of additional area in natural area	parkland	field work	breeding birds	12/06/09, 26/06/09
					summer flora	12/06/09
					summer flora	24/08/09
ER7	NS	Minor boundary revision required; investigate potential for inclusion of additional area in natural area	parkland	field work	breeding birds	09/06/09
					spring flora	09/06/09
					summer flora	21/08/09
ETO5	SNS	Minor boundary change; investigate potential for inclusion of additional area in natural area	parkland	field work	amphibians	26/03/09
					breeding birds	12/06/09
					spring flora	12/06/09
					summer flora	24/08/09
Minor Boundary Revisions and Investigate Addition of SMA to Natural Area						
CRR8	SNS (ESA, ANSI, & wetland)	Minor boundary revision required	private	field work with permission	amphibians	05/04/09, 21/04/09
					breeding birds	06/07/09, 08/07/09

Natural Area	Site Status	Reason for Field Visit (based on review of aerial photography and literature)	Ownership	Field Visit		Date
				Type	Timing	
					spring flora	06/07/09, 08/07/09
					summer flora	26/08/09, 01/09/09
					butternut	08/07/09
CV12	SNS	Minor boundary change; investigate potential for inclusion of SMA in natural area; locate butternut (last observation 2005)	parkland	field work	breeding birds	15/06/09
					spring flora	15/06/09
					summer flora	24/08/09
					butternut	24/08/09
ETO4	SNS (ESA)	Minor boundary revisions required; investigate potential for inclusion of SMA in natural area; locate butternut (last observation 2000)	parkland	field work	breeding birds	01/07/09, 05/07/09
					spring flora	01/07/09, 05/07/09
					summer flora	21/08/09
					butternut	21/08/09
Minor Boundary Revisions and Investigate Potential Additions to Natural Area and Potential SMA Additions						
FV3	NS	Minor boundary revision required; investigate potential for inclusion of additional natural area to the south and inclusion of SMA to the north	parkland	field work	amphibians	26/03/09
					breeding birds	09/06/09
					spring flora	09/06/09
					summer flora	21/08/09
NE3	NGS	Minor boundary revision required; investigate potential for inclusion of additional area in natural area, as well as potential SMA addition	greenbelt	road side visit	breeding birds	05/07/09
					spring flora	05/07/09
					summer flora	21/08/09
Minor Boundary Revisions and Investigate Potential Linkage Additions						
CV2	RW	Residential woodland; minor boundary change; investigate linkage opportunities; locate butternut (last observation 1995)	private	road side visit	breeding birds	09/06/09
					spring flora	09/06/09
					summer flora	24/08/09

Appendix 4: Rarity Status Definitions

Appendix 4: Rarity Status Definitions

The following six rarity ranks follow the Natural Heritage Information Centre (NHIC 2004).

Global Rarity (G Rank)
Global ranks are assigned by a consensus of the network of conservation data centres, scientific experts, and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies or variety. This ranking system ranges from G1 to G5; with G1 being extremely rare and G5 being common.

COSEWIC
The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) provides assessments for species' at risk of extinction or extirpation and provides a subsequent designation. These designations range from Endangered (E), Extirpated (XT), Extinct (X), Not at Risk (NAR), Special Concern (SC), and Threatened (T). The Canadian list of Species at Risk is developed from these assessments.

SARA
The Species at Risk Act (SARA) is one part of a three part Government of Canada strategy for the protection of wildlife species at risk. This three part strategy also includes commitments under the Accord for the Protection of Species at Risk and activities under the Habitat Stewardship Program for Species at Risk. The species assessment process is conducted by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (see above). A committee of experts use status reports to conduct a species assessment and assign the status of a wildlife species believed to be at some degree of risk nationally.

National Rank (N RANK)
National Rank is a term used by conservation data centres and NatureServe to refer to the national conservation status rank of an element.

MNR Status
The Ontario Ministry of Natural Resources assigns rarity ranks ranging from Extinct, Extirpated, Endangered (Regulated), Endangered (Not Regulated), Threatened, Special Concern to Not at Risk.

COSSARO
The Committee on the Status of Species at Risk in Ontario is based on a Ministry of Natural Resources (MNR) committee that evaluates the conservation status for species at risk in Ontario. The Ontario list of Species at Risk, on which the Ontario Endangered Species Act and sections of the Planning Act are based, is developed from these assessments.

Provincial Rank (S RANK)
Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario. The NHIC evaluates provincial ranks on a continual basis and produces

updated lists at least annually. The ranking system ranges from S1 to S5; with S1 being critically imperilled and S5 being secure.

Provincially Significant Species
Flora species ranked S1, S2 or S3 by the NHIC are considered to be provincially significant. Fauna species ranked S1, S2 or S3 by the NHIC are currently breeding, or have bred historically (prior to 1970) within the City are considered to be provincially significant.

Regional Rarity (R Rank)
The regional rarity ranks are assigned to plant species within the City of Mississauga based on Webber (1984), and updated through contributions from Jocelyn Webber, consultant's reports, and 1995 field work.
The regional ranking system is as follows:

0 extirpated within the City;
1 1 to 3 locations within the City, these species are considered to be regionally rare;
2 4 to 10 locations within the City, these species are considered to be regionally significant
3 11 to 39 locations within the City; and
4 > 40 locations within the City.

Appendix 5: Changes in Natural Areas Updated (1996 to 2009)

Appendix 5: Changes in Natural Areas Updated (1996 to 2009)

Changes within natural areas evaluated in 2008. All changes between 1996 and 2009 are shown for natural areas where changes occurred. Blank cells represent no change from the previous year. Abbreviations as follows: SNS = Significant Natural Site, NS = Natural Site, NGS = Natural Green Space, Increase = ↑, Decrease = ↓. Some of the increases or decreases are significant in the context of the natural areas program while others are considered minor. Native FQI and native mean coefficient as well as definitions for provincially and regionally significant species are defined in section 2.3. Condition is explained in section 2.3. Credit Valley Conservation (CVC) Species of Conservation Interest are discussed in North-South (2000).

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
AW1	96	SNS		7.98	19.71	51	18 (35.0%)	18.45	3.21	3	1	1	5	1	0	0	0	Poor
	98	↓ NS									↓ 0							
	99																	
	00					↑ 75	↑ 28 (37.33%)	↑ 22.17	↑ 3.23			↑ 2	↑ 10					
	01																	
	02																	
	04																	
	05	↑ SNS		↓ 7.52	↓ 18.58	↑ 88	↑ 34 (38.64%)	↑ 25.23	↑ 3.43		↑ 1		↑ 21	↑ 2			↑ 2	↑ Fair
	09			↑ 7.92	↑ 19.57	↑ 125	↑ 53 (42.40%)	↑ 30.12	↑ 3.55	↑ 5			↑ 25	↑ 4				↓ Poor
AW3	96	NGS		7.92	19.57	33	21 (60.6%)	0	0	2	0	0	4	1	0	0	0	Poor
	98																	
	99																	
	00					↑ 52	↑ 30 (57.69%)	↑ 13.22	↑ 2.82				↑ 8					
	01																	
	02																	
	04																	
	05	↑ NS		↑ 7.96	↑ 19.67	↑ 58	↑ 31 (53.45%)	↑ 14.90	↑ 2.92			↑ 1	↑ 18				↑ 2	
	09	↓ NGS		↑ 8.05	↑ 19.89	↑ 91	↑ 50 (54.95%)	↑ 20.61	↑ 3.22				↑ 21	↑ 2			↓ 1	

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
AW4	96	NGS		11.71	28.92	0	0	0	0	1	0	0	0	0	0	0	0	Poor
	98																	
	99																	
	00	↑ NS				↑ 42	↑ 28 (66.67%)	↑ 8.29	↑ 2.21			↑ 2	↑ 3					
	01																	
	02																	
	04																	
	05			↓ 11.60	↓ 28.66	↑ 54	↑ 33 (61.11%)	↑ 11.85	↑ 2.65	↑ 2		↑ 3	↑ 12					
	09			↓ 11.47	↓ 28.34	↑ 102	↑ 55 (53.92%)	↑ 21.59	↑ 3.15			↓ 2	↑ 17					
CC1 / MY1	96	NS		15.33	37.87	129	43 (32.6%)	35.58	3.84	2	0	5	8	1	5	0	0	Fair
	98					↑ 130						↑ 7						
	99					↑ 133	↑ 44 (33.1%)	↑ 36.36	↑ 3.85				↑ 9		0			
	00			↑ 16.62	↑ 41.08	↑ 145	↑ 49 (33.79%)	↑ 36.84	↓ 3.76			↑ 9	↑ 10					
	01																	
	02																	
	04																	
	05	↑ SNS		↑ 16.77	↑ 41.44	↑ 165	↑ 54 (32.73%)	↑ 40.03	↑ 3.82		↑ 1	↑ 11	↑ 18	↑ 3		↑ 1	↑ 3	
	09			↑ 17.02	↑ 42.06	↑ 237	↑ 97 (40.93%)	↑ 44.51	↓ 3.78			↓ 8	↑ 26	↑ 4	↑ 2			
CRR7	96	SNS	ESA,ANSI	88.96	219.73	61	10 (13.10%)	33.89	4.75	3	1	8	0	0	9	0	0	Good
	98					↑ 74	↑ 18 (23.00%)	↑ 34.88	↓ 4.66			↑ 9						
	99					↑ 92	↑ 24 (26.00%)	↓ 34.68	↓ 4.21				↑ 4	↑ 1				
	00			↓ 88.94	↓ 219.69										↓ 6			
	01					⟨93	↓ 23 (24.73%)	⟨ 34.90	↓ 4.17			↑ 10	↑ 29	↑ 5	↑ 7		↑ 8	
	02																	
	04																	
	05			↑ 92.95	↑ 229.68	↑ 115	↑ 28 (24.35%)	↑ 41.13	↑ 4.44	↑ 5	↑ 2	↑ 18	↑ 41				↑ 12	
	09			↑ 98.36	↑ 243.05	↑ 301	↑ 100 (33.22%)	↑ 62.12	↓ 4.38			↑ 40	↑ 53	↑ 9	↑ 8		↓ 3	

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
CRR8	96	SNS	ESA,ANSI	110.62	273.23	43	3 (7.00%)	n/a	n/a	4	2	31	8	1	4	0	0	Good
	98		↑ ESA,ANSI,wetland															
	99																	
	00																	
	01					↑ 50					↓ 1	↓ 30	↑ 38	↑ 6	↑ 8		↑ 6	
	02																	
	04																	
	05			↑ 110.73	↑ 273.61	↑ 67	↑ 8 (11.94%)	↑ 39.71	↑ 5.17				↑ 48	↑ 8		↑ 1	↓ 14	Good - Fair
	09			↑ 111.68	↑ 275.97	↑ 297	↑ 93 (31.31%)	↑ 64.59	↓ 4.52		↑ 3	↑ 63	↑ 64	↑ 10			↓ 4	↑ Good
CV1	96	NS		1.48	3.66	29	9 (31.0%)	13.86	3.10	1	0	0	5	1	0	0	0	Fair
	98																	
	99																	
	00			↑ 1.71	↑ 4.23	↑ 52	↑ 25 (48.08%)	↑ 14.05	↓ 2.7	↑ 2			↑ 6					
	01																	
	02																	
	04																	
	05			↓ 1.65	↓ 4.08	↑ 61	↑ 25 (40.98%)	↑ 17.50	↑ 2.92				↑ 11					
	09			↑ 1.69	↑ 4.18	↑ 74	↑ 29 (39.19%)	↑ 20.27	↑ 3.02			↑ 1	↑ 15					
CV2	96	RW		53.17	131.33	143	43 (29.6%)	41.71	4.19	1	0	12	6	1	0	0	0	Fair
	98											↓ 10						
	99																	
	00			↓ 50.66	↓ 125.18		↓ 41 (28.67%)											
	01																	
	02																	
	04																	
	05			↓ 49.53	↓ 122.39		↑ 42 (29.37%)	↓ 41.29	↓ 4.11		↑ 1	↑ 10	↑ 17	↑ 4			↑ 3	
	09			↓ 49.48	↓ 122.28	↑ 156	↑ 49 (31.41%)	↓ 41.18	↓ 3.98			↓ 7	↑ 18					

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
CV6	96																	
	98																	
	99																	
	00	NS		2.71	6.69	57	13 (22.81%)	20.8	3.14	1	0	1	2	1	0	0	0	Fair
	01																	
	02																	
	04																	
	05					↑ 75	↑ 16 (21.33%)	↑ 26.17	↑ 3.41			↑ 3	↑ 11				↑ 2	
	09			↑ 2.76	↑ 6.82	↑ 96	↑ 26 (27.08%)	↑ 28.45	↓ 3.40			↓ 1	↑ 17				↓ 1	
CV8	96	NS		7.87	19.44	39	18 (43.6%)	13.53	2.95	4	0	1	1	0	0	0	0	Poor
	98																	
	99																	
	00			↑ 8.04	↑ 19.85	↑ 60	↑〈 25 (41.67%)	↑ 15.72	↓ 2.66			↑ 2	↑ 7	↑ 2				
	01																	
	02																	
	04																	
	05			↑ 8.09	↑ 19.99	↑ 86	↑ 37 (43.02%)	↑ 18.52	↓ 2.65	↑ 5		↑ 3	↑ 17	↑ 3			↑ 1	
	09			↑ 8.97	↑ 22.16	↑ 132	↑ 59 (44.70%)	↑ 26.34	↑ 3.08			↑ 5	↑ 24					
CV10	96	NS		4.59	11.34	20	9 (40.0%)	8.74	2.64	2	0	0	2	0	0	0	0	Poor
	98																	
	99																	
	00			↓ 4.26	↓ 10.53	↑ 51	↑ 22 (43.14%)	↑ 15.04	↑ 2.79			↑ 1	↑ 6	↑ 1				
	01																	
	02																	
	04																	
	05			↑ 5.05	↑〈 12.48	↑ 85	↑ 37 (43.53%)	↑ 21.94	↑ 3.17			↑ 4	↑ 17	↑ 2			↑ 1	
	09			↑ 5.76	↑ 14.23	↑ 138	↑ 63 (45.65%)	↑ 28.29	↑ 3.27	↑ 3		↑ 5	↑ 25	↑ 3	↑ 1		↓ 0	

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
CV12	96	SNS		6.99	17.27	199	89 (44.2%)	37.19	3.55	3	1	13	2	1	0	0	0	Fair
	98	↑ NS				↑ 201					↓ 0	↑14						
	99																	
	00					↑ 213	〈 92 (43.19%)	↑ 38.34	3.5			↑ 16	↑ 4					
	01																	
	02																	
	04																	
	05	↑SNS		↑ 7.44	↑18.38	↑227	↑101 (44.49%)	↑ 39.73	↑ 3.54	↑ 4	↑ 1	↑ 17	↑17	↑ 2	↑ 1		↑ 3	
	09			↑ 8.16	↑ 20.16	↑ 260	↑ 122 (46.92%)	↑ 42.27	↑ 3.60	↑ 5		↓ 11	↑ 25	↑ 3			↓ 1	
ER6	96	SNS		1.56	3.85	36	13 (36.1%)	16.26	3.39	1	1	0	1	0	0	0	0	Poor
	98																	
	99																	
	00	↓ NS		↓ 1.31	↓ 3.24	↑ 46	↑ 18 (39.13%)	↑ 18.33	↑ 3.46		↓ 0		↑ 5	↑ 1				
	01																	
	02																	
	04																	
	05	↑ SNS		↓ 1.29	↓ 3.19	↑ 59	↑ 26 (44.07%)	↑ 19.50	↓ 3.39		↑ 1		↑ 9				↑ 1	
	09			↑ 1.56	↑ 3.85	↑ 83	↑ 40 (48.19%)	↑ 20.59	↓ 3.14				↑ 15				↓ 0	
ER7	96																	
	98																	
	99																	
	00																	
	01	NS		3.15	7.78	50	17 (34.00%)	16.54	2.88	3	0	2	2	1	0	0	0	Poor
	02																	
	04																	
	05					↑ 77	↑ 29 (37.66%)	↑ 21.00	↑ 3.06			↑ 4	↑ 13				↑ 1	
	09			↑ 3.29	↑ 8.13	↑ 107	↑ 44 (41.12%)	↑ 24.51	↑ 3.11			↑ 3	↑ 14					

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
ETO4	96	SNS	ESA	58.00	143.32	128	35 (26.6%)	42.31	4.39	3	0	14	23	2	9	0	0	Fair
	98					↑ 141	↑ 37 (26.2%)	↑ 43.93	4.31			↑ 15	↑ 24	↑ 3				
	99																	
	00						↓ 36 (25.53%)								↑ 5		↑ 2	
	01																	
	02																	
	04																	
	05			↓ 52.81	↓ 130.49	↑ 179	↑ 53 (29.61%)	↑ 45.36	↓ 4.09	↑ 4	↑ 1	↑ 18	↑ 41				↑ 9	Good - Fair
	09			↑ 53.69	↑ 132.67	↑ 274	↑ 97 (35.40%)	↑ 53.22	↓ 4.02	↑ 5		↓ 16	↑ 49	↑ 7			↓ 4	↓ Fair
ETO5	96	SNS		9.12	22.56	0	0	0	0	2	0	0	0	0	0	0	0	Poor
	98																	
	99																	
	00					↑ 53	↑ 32 (60.38%)	↑ 10.91	↑ 2.38			↑ 2	↑ 8	↑ 1				
	01																	
	02																	
	04																	
	05			↓ 7.83	↓ 19.35	↑ 83	↑ 46 (55.42%)	↑16.36	↑ 2.76	↑ 6		↑ 5	↑ 16				↑ 3	Poor - Fair
	09			↑ 7.97	↑ 19.69	↑ 146	↑ 76 (52.05%)	↑ 27.65	↑ 3.30				↑ 23	↑ 2	↑ 1		↓2	↓ Poor
ETO6	96	SNS		11.39	28.13	0	0	0	0	3	0	0	0	0	0	0	0	Poor
	98																	
	99																	
	00			↓ 9.52	↓ 23.52													
	01																	
	02																	
	04																	
	05			↑11.36	↑ 28.07	↑ 7	↑5 (71.43%)			↑4		↑ 1	↑18	↑ 1			↑ 2	
	09			↓ 10.95	↓27.06	↑ 83	↑ 44 (53.01%)	↑ 16.90	↑ 2.78				↑ 24				↓ 1	

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
FV1	96	NS		2.23	5.51	38	7 (18.5%)	18.50	3.32	1	0	0	0	0	0	0	0	Fair
	98					↑ 46	↑9 (19.6%)	↑ 20.55	↑ 3.38			↑ 1	↑ 2					
	99																	
	00			↓ 2.11	↓ 5.22	↑54	↑ 11 (20.37%)	↑ 22.72	↑ 3.47			↑ 2						
	01																	
	02																	
	04																	
	05			↓ 2.05	↓ 5.07	↑ 59	↑ 11 (18.64%)	↑ 23.82	↓ 3.44				↑ 8	↑ 1			↑ 1	
	09			↑ 2.17	↑ 5.36	↑ 73	↑ 16 (21.92%)	↑ 25.70	↓ 3.40	↑ 2		↓ 1	↑ 18					
FV3	96	NS		7.00	17.29	50	15 (22.0%)	25.63	3.86	3	0	0	15	2	0	0	0	
	98					↑ 59	↑ 15 (23.7%)											
	99																	
	00			↓ 6.76	↓ 16.71	↑ 100	↑ 39 (39.00%)	↑ 27.69	↓ 3.52				↑ 16					
	01																	
	02																	
	04																	
	05			↓ 6.35	↓ 15.69	↑ 108	↑ 44 (40.74%)	↑28.50	↑ 3.56				↑ 19				↑ 2	
	09			↑ 6.73	↑ 9.20	↑ 148	↑ 63 (43.24%)	↑ 31.97	↓ 3.49	↑ 4		↑ 1	↑ 22				↓ 0	Fair
MY3	96	NGS		3.71	9.16	26	18 (69.2%)	6.01	2.13	1	0	0	0	0	0	0	0	Poor
	98																	
	99					↑ 41	↑ 27 (65.9%)	↑ 6.68	↓ 1.79			↑ 1						
	00																	
	01																	
	02																	
	04																	
	05			↓ 2.31	↓ 5.71	↑ 56	↑ 34 (60.71%)	↑ 11.09	↑ 2.36				↑ 12	↑ 1				
	09			↑2.63	↑ 6.50	↑ 95	↑ 59 (62.11%)	↑16.00	↑ 2.67		↑1		↑ 17					

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
NE1	96	NGS		0.95	2.35	54	26 (48.1%)	14.93	2.82	1	0	0	3	0	0	0	0	Fair
	98																	
	99																	
	00					↑ 62	26 (41.94%)	↑ 17	↑ 2.83				↑ 4					
	01																	
	02																	
	04																	
	05	↑ NS		↑ 1.07	↑ 2.64	↑ 70	↑ 27 (38.57%)	↑ 20.28	↑ 3.09			↑ 2	↑ 7	↑ 1			↑ 2	
	09					↑ 81	↑ 31 (38.27%)	↑ 21.35	↓ 3.02			↓ 1	↑ 15				↓ 1	
NE3	96	NGS		2.59	6.4	29	11 (34.5%)	0	0	2	0	0	0	0	0	0	0	Poor
	98																	
	99																	
	00						↓ 10 (34.48%)											
	01																	
	02																	
	04																	
	05	↑ NS		↑ 2.85	↑ 7.04	↑ 59	↑ 26 (44.07%)	↑ 12.19	↑ 2.12				↑ 15	↑ 2			↑ 3	
	09			↑ 3.04	↑ 7.51	↑ 118	↑ 59 (50.00%)	↑ 19.40	↑ 2.53			↑ 5	↑ 22		↑ 1		↓ 2	
NE4	96	NS		13.43	33.17	95	22 (23.0%)	33.04	3.79	5	0	8	5	0	0	0	0	Excellent
	98					↑ 96						↑ 9						
	99																	
	00					↑ 106	↓ 19 (17.92%)	↑ 34.31	↓ 3.68				↑ 8					
	01																	
	02																	
	04																	
	05			↓ 13.15	↓ 32.49	↑ 134	↑ 27 (20.15%)	↑ 39.15	↑ 3.79			↑ 16	↑ 24				↑ 4	↓ Good
	09	↑ SNS		↓ 12.94	↓ 80.28	↑ 164	↑ 39 (23.78%)	↑ 41.48	↓ 3.71			↓ 10	↑ 25				↓ 3	↑ Excellent

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
RW1	96	SNS		2.11	5.21	69	12 (17.4%)	34.04	4.51	1	0	3	0	1	0	0	0	Fair
	98																	
	99																	
	00																	
	01																	
	02																	
	04																	
	05	↓ NS				↑ 77	↑ 18 (23.38%)	↑ 34.11	↓ 4.44				↑ 1					Fair - Poor
	09			↑ 2.16	↑5.34							↓ 1	↑5					↑ Fair
RW2	96	NGS		3.50	8.64	0	0	0	0	1	0	0	0	0	0	0	0	Poor
	98																	
	99																	
	00			↑3.90	↑ 9.63	↑ 34	↑ 20 (58.82%)	↑ 9.89	↑ 2.64				↑ 4					
	01																	
	02																	
	04																	
	05	↑ NS		↓ 3.84	↓ 9.49	↑ 57	↑ 31 (54.39%)	↑ 16.67	↑ 3.27				↑ 15	↑ 1			↑ 2	↑ Fair
	09			↑ 4.09	↑ 10.11	↑ 94	↑ 50 (53.19%)	↑ 21.71		↑ 3		↑ 1	↑17	↑ 2			↓ 1	↓ Poor
RW4	96	NS		1.08	2.67	33	7 (18.2%)	22.36	4.38	1	0	0	3	0	0	0	0	Fair
	98																	
	99			↑ 1.09	↑ 2.68	↓ 32												
	00					↑ 44	↓ 7 (15.91%)	↑ 24.99	↓ 4.11				↑ 7	↑ 1				
	01																	
	02																	
	04																	
	05			↑ 1.22	↑ 3.01	↑ 52	↑ 8 (15.38%)	↑ 27.14	↓ 4.09	↑ 2			↑ 8					

Site	Year	Classification	Designation	Area		Flora							Fauna					Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	reg. sig. species	# birds	# mammals	# reptiles & amphibians	prov. sig. species	CVC	
	09			↑ 1.49	↑ 3.68	↑ 89	↑ 26 (29.21%)	↑ 30.24	↓ 3.81			↑ 1	↑ 16					
RW5	96	NS		3.51	8.68	0	0	0	0	1	0	0	0	0	0	0	0	Poor
	98																	
	99					↑ 54	↑ 27 (50.0%)	↑ 13.66	2.63			↑ 2	↑ 7	↑ 1				
	00																	
	01																	
	02						↓ 26 (48.15%)	↓ 13.42	↓ 2.54									
	04																	
	05			↓ 2.39	↓ 5.91	↑ 75	↑ 37 (49.33%)	↑ 14.83	↓ 2.47			↑ 3	↑ 14				↑ 1	
	09			↑ 2.50	↑ 6.18	↑ 95	↑ 48 (50.53%)	↑ 17.84	↑ 2.63	↑ 2		↓ 1	↑ 17					
RW6	96	NS		7.31	18.06	0	0	0	0	1	0	0	0	0	0	0	0	Poor
	98																	
	99					↑ 51	↑ 29 (56.9%)	↑ 14.28	↑ 3.05			↑ 1	↑ 11	↑ 1				
	00																	
	01																	
	02						↓ 28 (54.90%)	↓ 13.97	↓ 2.91									
	04																	
	05			↓ 6.13	↓ 15.15	↑ 71	↑ 37 (52.11%)	↑ 14.61	↓ 2.67			↑ 2	↑ 23				↑ 5	
	09			↑ 6.75	↑16.68	↑ 101	↑ 53 (52.48%)	↑19.98	↑ 2.91	↑ 5			↑ 27				↓ 3	

Appendix 6: Comparison of Classifications (1996 to 2009)

Appendix 6: Comparison of Natural Area Classifications (1996 to 2009)

Comparison Categories	Year	Classification				TOTAL
		Significant Natural Site (SNS)	Natural Site (NS)	Natural Green Space (NGS)	Residential Woodland (RW)	
Number of Sites	1996	51	59	31	3	144
	1998	45	64	31	3	143
	1999	46	68	28	3	145
	2000	45	70	27	3	145
	2001	47	67	26	3	143
	2002	47	66	24	3	140
	2004	62	53	21	3	139
	2005	61	61	14	3	139
	2006	62	53	21	3	139
	2007	62	58	16	3	139
	2008	62	59	17	3	141
	2009	62	59	17	3	141
Total Area (ha)	1996	1530.17	349.92	197.05	252	2329.14
	1998	1423.39	426.35	171.55	252	2273.29
	1999	1425.44	445.66	160.18	239.93	2271.21
	2000	1416.56	456.57	148.86	237.42	2259.41
	2001	1413.16	433.64	145.89	237.42	2230.11
	2002	1388.21	428.56	133.63	237.42	2182.82
	2004	1552.40	267.64	123.15	238.25	2181.44
	2005	1548.29	299.69	90.31	237.13	2175.42
	2006	1541.65	268.45	122.65	237.13	2169.88
	2007	1591.47	300.16	92.95	237.13	2221.71
	2008	1649.62	326.11	100.15	235.43	2311.31
	2009	1660.00	329.09	101.00	235.38	2325.47
Proportion of Natural Areas System	1996	74%	17%	9%	-	-
	1998	70%	21%	9%	-	-
	1999	70%	22%	8%	-	-
	2000	70%	23%	7%	-	-
	2001	71%	22%	7%	-	-
	2002	71%	22%	7%	-	-
	2004	71%	12%	6%	-	-
	2005	71%	14%	4%	-	-
	2006	71%	12%	6%	-	-
	2007	65.3%	12%	3.8%	-	-

Comparison Categories	Year	Classification				TOTAL
		Significant Natural Site (SNS)	Natural Site (NS)	Natural Green Space (NGS)	Residential Woodland (RW)	
	2008	71.37%	14.11%	4.33%	-	-
	2009	71.38%	14.15%	4.34%	-	-
Proportion of the City	1996	5.23%	1.2%	0.67%	-	7.10%
	1998	4.91%	1.41%	0.60%	-	6.92%
	1999	4.87%	1.52%	0.55%	-	6.94%
	2000	4.84%	1.56%	0.51%	-	6.91%
	2001	4.83%	1.48%	0.50%	-	6.81%
	2002	4.73%	1.46%	0.46%	-	6.65%
	2004	5.30%	0.91%	0.42%	-	6.63%
	2005	5.29%	1.02%	0.31%	-	6.62%
	2006	5.27%	0.92%	0.42%	-	6.61%
	2007	5.44%	1.03%	0.32%	-	6.76%
	2008	5.64%	1.11%	0.34%	-	7.09%
	2009	5.67%	1.12%	0.35%	-	7.14%

Appendix 7: Comparison of Major Landform Types (1996 to 2009)

Appendix 7: Comparison of Major Landform Types (1996 and 2009)

Comparison Categories	Year	Landform Type			
		valleylands and associated tablelands	tablelands	wetlands and associated valleylands	TOTAL
Number of Sites	1996	73	60	6	139
	1998	73	59	6	138
	1999	76	58	6	140
	2000	76	58	6	140
	2001	79	53	6	138
	2002	78	52	5	135
	2004	77	52	5	134
	2005	77	52	5	134
	2006	77	52	5	134
	2007	80	53	5	138
	2008	80	55	5	140
	2009	80	55	5	140
Total Area (ha)	1996	1626.3	339.9	103.7	2069.9
	1998	1588.0	328.5	100.4	2016.9
	1999	1622.1	301.6	100.3	2024
	2000	1594.8	319.7	100.3	2014.7
	2001	1593.9	291.2	100.3	1985.4
	2002	1555.3	285.2	97.7	1938.1
	2004	1554.8	285.1	96.0	1935.9
	2005	1550.08	284.98	95.97	1931.03
	2006	1542.49	287.03	95.97	1925.49
	2007	1590.35	290.54	96.43	1977.32
	2008	1656.95	312.81	98.86	2068.62
	2009	1670.56	313.40	98.86	2082.83
Mean Size (ha)	1996	22.3	5.7	17.3	-
	1998	21.8	5.6	16.7	-
	1999	21.3	5.2	16.7	-
	2000	20.2	5.3	16.7	-
	2001	19.4	5.3	16.7	-
	2002	19.2	5.4	19.5	-
	2004	19.4	5.4	19.2	-
	2005	19.4	5.4	19.2	-
	2006	19.28	5.4	19.20	-
	2007	19.88	5.48	19.29	-

Comparison Categories	Year	Landform Type			
		valleylands and associated tablelands	tablelands	wetlands and associated valleylands	TOTAL
	2008	20.71	5.69	19.77	-
	2009	20.88	5.70	19.77	-
Proportion of Natural Areas System	1996	78.30%	16.40%	5.00%	99.70%
	1998	78.50%	16.20%	5.00%	99.70%
	1999	79.90%	14.80%	4.90%	99.70%
	2000	79.10%	15.80%	4.90%	99.80%
	2001	80.30%	14.70%	5.00%	100%
	2002	80.30%	14.70%	5.00%	100%
	2004	80.30%	14.70%	5.00%	100%
	2005	80.30%	14.70%	5.00%	100%
	2006	80.11%	14.91%	4.98%	100%
	2007	80.43%	14.69%	4.88%	100%
	2008	80.10%	15.12%	4.78%	100%
	2009	80.21%	15.05%	4.75%	100%
Proportion of the City	1996	5.60%	1.16%	0.36%	7.10%
	1998	5.43%	1.12%	0.34%	6.90%
	1999	5.55%	1.03%	0.34%	6.92%
	2000	5.45%	1.09%	0.34%	6.88%
	2001	5.45%	0.99%	0.34%	6.78%
	2002	5.31%	0.97%	0.33%	6.62%
	2004	5.31%	0.97%	0.33%	6.61%
	2005	5.30%	0.97%	0.33%	6.60%
	2006	5.27%	0.98%	0.33%	6.58%
	2007	5.43%	0.99%	0.33%	6.76%
	2008	5.66%	1.07%	0.34%	7.07%
	2009	5.71%	1.07%	0.34%	7.12%

Note: The number of sites (140) does not include one small natural area that did not readily fall into the three landform categories. The residential woodlands are also omitted from this analysis. Consequently, figures differ slightly from those provided elsewhere in the report.

Appendix 8: Comparison of Community Size (1996 to 2009)

Appendix 8: Comparison of Community Size (1996 to 2009).

A comparison of the area (in hectares) of vegetation communities mapped for the City of Mississauga from 1996 to 2009 (grouped according to six broad categories). Communities are based on classifications of Bakowsky (1995) and Kavanaugh and McKay-Kuja (1992) see Geomatics (1996). See North-South (2000), Appendix 5, for a comparison of the vegetation communities with the Ecological Land Classification (Lee *et al.* 1998).

Code	Vegetation Community	# Occurrences											Area (hectares)										
		1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009
	Valleylands																						
A	wooded slope	19	20	20	22	22	22	21	22	22	22	22	347.36	348.54	340.69	347.85	341.65	335.38	328.13	327.34	341.17	343.15	349.19
B	floodplain	22	21	21	23	23	23	24	24	23	23	23	458.42	426.21	426.10	426.32	393.50	390.48	387.52	387.09	400.75	406.56	405.88
DD	sugar maple-American beech forest	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	2.48	2.48	2.48	2.48
G	golf course	4	4	4	4	4	4	4	4	4	4	4	101.18	101.19	101.13	101.13	99.73	99.73	99.30	100.17	100.17	99.81	97.60
J	wooded non-native valleylands	18	18	20	22	22	24	27	28	28	28	27	93.43	94.36	100.22	109.09	109.09	115.56	119.76	115.17	117.10	120.48	124.79
K	open with open slopes valleylands	31	32	33	33	33	33	33	35	34	34	31	229.02	210.58	217.62	215.34	197.49	196.47	192.81	195.06	192.67	208.28	193.94
L	wooded native valleylands	5	5	5	5	5	5	5	5	5	5	5	39.77	39.78	39.64	38.64	38.64	33.49	33.32	33.32	33.32	33.99	28.34
M	open with wooded slopes valleylands	2	2	2	1	1	1	0	0	0	0	0	5.26	5.25	5.25	0.82	0.82	0.82	0.00	0.00	0.00	0.00	0.00
N	open with manicured slopes valleylands	2	2	2	2	2	2	2	2	2	2	2	22.16	22.15	22.15	22.15	22.15	22.15	16.65	16.43	16.43	16.43	15.88
O	manicured with wooded slopes valleylands	1	1	1	0	0	0	0	0	0	0	1	5.17	5.17	5.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84
	Totals												***1301.77***	***1253.23***	***1257.98***	***1261.35***	***1203.0***	***1194.08***	***1177.48***	***1177.06***	***1214.90***	***1231.18***	***1219.94***
	Woodlands																						
BB	red ash-American elm forest	14	15	15	16	16	18	18	18	18	17	17	35.32	35.61	37.16	36.40	36.40	48.14	47.83	47.87	47.79	52.61	50.21
CC	sugar maple forest	7	7	7	7	7	7	7	7	7	7	7	14.79	13.12	13.12	13.12	11.62	11.62	11.15	11.00	11.09	11.09	11.09
DD	sugar maple-American beech forest	15	16	17	16	16	16	16	16	17	17	17	108.35	102.44	100.07	95.15	97.23	93.06	93.08	92.13	95.68	96.57	96.64
EE	sugar maple-white ash forest	9	9	9	9	9	9	9	9	9	9	9	63.06	62.18	61.73	61.27	61.20	61.07	62.36	62.65	62.42	63.02	56.18
FF	sugar maple-red oak forest	10	10	9	9	9	10	10	10	10	10	10	42.48	44.96	43.12	42.76	42.70	43.44	43.45	42.87	44.72	44.89	44.89
GG	sugar maple-eastern hemlock forest	1	1	1	1	1	1	1	1	1	1	1	16.03	16.07	16.07	15.97	15.97	15.97	15.97	15.86	16.00	17.99	17.99
II	sugar maple-black cherry forest	1	1	1	1	1	1	1	1	1	1	1	1.93	1.94	1.94	1.94	1.94	1.94	1.94	1.77	1.77	1.77	1.77
KK	sugar maple-American beech-red oak forest	5	5	5	5	5	5	5	5	5	5	5	29.46	29.46	29.46	29.46	28.92	28.92	28.80	28.50	28.93	28.93	28.25
LL	sugar maple-American beech-eastern hemlock forest	1	1	1	1	1	1	1	1	1	1	1	4.44	4.45	4.45	4.45	4.45	4.45	4.45	4.26	4.26	6.21	6.21
MM	white pine-eastern hemlock-sugar maple forest	1	1	1	1	1	1	1	1	1	1	1	6.77	6.77	5.69	5.69	5.69	5.69	5.69	5.82	5.82	6.00	6.00
NN	eastern hemlock forest	3	3	3	3	4	4	4	4	4	4	4	4.09	4.11	4.11	4.11	5.20	5.20	5.20	5.20	5.20	5.42	5.42

Code	Vegetation Community	# Occurrences											Area (hectares)										
		1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009
OO	red maple-red oak forest	5	6	6	6	6	6	6	6	6	6	6	30.24	30.24	30.42	30.42	30.42	29.89	29.89	29.89	29.89	30.53	30.53
PP	American beech forest	1	1	1	1	1	1	1	1	1	1	1	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	1.81	1.81	1.81
QQ	bur oak-American beech forest	1	1	1	0	0	0	0	0	0	0	0	2.24	2.24	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RR	oak-ash forest	8	9	10	10	9	9	9	9	9	9	8	28.61	28.57	27.34	27.34	24.23	23.94	23.88	23.60	26.24	26.83	24.82
SS	oak-hickory forest	5	7	7	7	8	8	8	8	8	8	8	24.20	23.56	23.31	22.58	27.22	26.92	26.65	27.37	28.33	28.51	28.68
TT	ash-hickory forest	3	3	3	3	3	4	4	4	4	4	4	6.94	6.68	6.68	6.21	6.21	8.88	8.88	8.77	8.50	8.50	8.50
VV	black cherry-eastern hemlock-white ash forest	1	1	1	1	1	1	1	1	1	1	1	2.02	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.38	2.38
WW	bur oak-black walnut forest	1	1	1	0	0	0	0	0	0	2	1	0.90	0.90	0.90	0.00	0.00	0.00	0.00	0.00	0.00	3.27	3.27
ZZ	oak-white pine forest	0	0	2	2	2	2	2	2	2	2	2	0	0	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.80	2.80
	Totals												***424.43***	***417.89***	***414.73***	***403.81***	***406.32***	***416.07***	***416.17***	***415.92***	***422.83***	***439.13***	***427.44***
	Successional																						
C	old field	26	27	27	32	36	40	41	43	42	44	41	88.45	95.33	95.30	97.75	109.12	116.24	113.09	115.16	116.09	167.08	164.99
D	hedgerow	5	5	4	4	4	4	4	4	4	4	4	7.68	7.01	6.95	5.46	5.46	5.46	5.46	5.45	5.61	5.62	5.62
E	early successional forest	9	10	10	7	9	12	16	17	16	16	16	21.68	14.66	12.82	7.68	11.12	24.33	33.18	33.28	32.41	32.23	34.03
P	hawthorn thicket	4	4	4	4	5	5	4	5	4	4	4	14.54	14.35	14.35	14.35	14.57	14.36	13.80	14.36	14.36	14.47	14.47
XX	birch forest	1	1	1	1	1	1	1	1	1	1	1	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
YY	poplar forest	1	2	2	2	2	4	4	4	4	4	4	2.37	1.69	1.69	1.69	1.69	3.11	3.11	3.11	3.11	3.26	3.26
	Totals												***135.18***	***133.5***	***131.56***	***127.39***	***142.41***	***163.96***	***169.10***	***171.82***	***175.74***	***223.12***	***222.83***
	Wetland																						
AA	silver maple forest	5	5	5	3	3	3	3	3	3	3	3	18.59	18.14	17.58	7.24	7.24	7.24	7.24	6.57	6.57	6.61	6.61
V	cattail marsh	13	14	14	15	16	16	17	17	17	17	17	27.73	26.99	26.99	27.07	27.21	27.10	26.18	26.17	26.72	28.06	28.23
W	open water marsh	6	6	6	7	7	8	8	8	8	8	8	22.70	22.70	22.70	22.56	22.56	21.29	21.29	21.55	21.55	21.00	21.00
X	willow-buttonbush swamp thicket	1	1	1	1	1	1	1	2	2	2	2	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.97	3.00	3.00	3.00
Y	wet meadow	1	3	3	3	4	5	5	5	5	6	6	3.43	3.72	3.72	3.72	4.23	10.91	10.91	10.88	10.93	15.67	15.67
Z	willow-ash forest	2	2	2	2	2	3	3	3	3	3	3	0.55	0.56	0.56	0.56	0.56	1.15	1.15	1.09	1.09	1.09	1.09
	Totals												***75.77***	***74.88***	***74.32***	***63.92***	***64.56***	***70.46***	***69.54***	***69.60***	***69.86***	***75.43***	***75.60***
	Anthropogenic																						
F	manicured	11	11	12	13	12	16	18	19	19	19	19	72.41	75.16	76.28	72.99	61.25	58.52	65.67	66.49	63.75	63.56	63.81
H	urban lake	2	2	2	2	2	2	2	2	2	2	2	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26

Code	Vegetation Community	# Occurrences											Area (hectares)										
		1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009
I	wooded residential	3	3	3	3	3	3	3	3	3	3	3	251.59	251.59	237.43	237.43	237.43	238.26	237.13	237.13	237.13	235.42	235.37
T	plantation	11	11	13	12	13	14	15	15	15	15	15	21.58	21.57	21.73	20.80	20.92	22.67	22.80	22.88	23.13	25.57	26.09
UU	black walnut grove	1	1	1	1	1	1	1	1	1	1	1	0.17	0.17	0.17	0.17	0.17	0.08	0.08	0.08	0.08	0.08	0.08
	Totals												***353.01***	***355.75***	***342.87***	***338.65***	***327.03***	***326.79***	***333.02***	***333.84***	***331.35***	***331.89***	***332.61***
	Other																						
R	beach	3	3	4	4	4	6	6	6	6	6	6	2.36	1.96	2.18	2.18	2.18	2.72	2.72	2.72	2.72	2.73	2.73
S	tall grass prairie	1	1	1	1	1	1	1	1	1	1	1	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
U	unknown	5	3	3	3	3	1	1	1	1	1	1	35.65	35.64	35.68	35.68	35.68	7.33	7.33	7.33	7.33	7.69	7.69
	Totals												***38.07***	***37.66***	***37.92***	***37.92***	***37.92***	***10.11***	***10.11***	***10.11***	***10.11***	***10.48***	***10.48***

Appendix 9: Summary of Changes in the Proportion of Communities in the NAS (1996 to 2009)

Appendix 9: Summary of Changes in the Proportion of Communities in the NAS (1996 to 2009).

A comparison of the proportion of the vegetation communities within the Natural Areas System and the City of Mississauga from 1996 to 2009 (grouped according to six broad categories). Communities are based on classifications of Bakowsky (1995) and Kavanaugh and McKay-Kuja (1992) see Geomatics (1996). North-South Environmental (2000) Appendix 5 shows a comparison of the vegetation communities with the Ecological Land Classification (Lee *et al.* 1998).

Code	Vegetation Community	Proportion of Natural Area (%)											Proportion of City Area (%)										
		1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009
	Valleylands																						
A	wooded slope	14.92	15.33	15.08	15.40	15.12	14.84	15.08	14.49	15.12	15.19	15.46	1.19	15.33	1.16	1.19	1.17	1.15	1.12	1.12	1.17	1.17	1.19
B	floodplain	19.69	18.75	18.86	18.87	17.42	17.28	17.81	17.13	17.74	17.99	17.96	1.57	18.75	1.46	1.46	1.34	1.33	1.32	1.32	1.37	1.39	1.39
DD	sugar maple-american beech forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
G	golf course	4.35	4.45	4.48	4.48	4.41	4.41	4.56	4.43	4.43	4.42	4.32	0.35	4.45	0.35	0.35	0.34	0.34	0.34	0.34	0.34	0.34	0.33
J	wooded non-native valleylands	4.01	4.15	4.44	4.83	4.83	5.11	5.50	5.10	5.18	5.33	5.52	0.32	4.15	0.34	0.37	0.37	0.39	0.41	0.39	0.40	0.41	0.43
K	open with open slopes valleylands	9.84	9.26	9.63	9.53	8.74	8.70	8.86	8.63	8.53	9.22	8.58	0.78	9.26	0.74	0.74	0.67	0.67	0.66	0.67	0.66	0.71	0.66
L	wooded native valleylands	1.71	1.75	1.75	1.71	1.71	1.48	1.53	1.47	1.47	1.50	1.25	0.14	1.75	0.14	0.13	0.13	0.11	0.11	0.11	0.11	0.12	0.10
M	open with wooded slopes valleylands	0.23	0.23	0.23	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.02	0.23	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	open with manicured slopes valleylands	0.95	0.97	0.98	0.98	0.98	0.98	0.77	0.73	0.73	0.73	0.70	0.08	0.97	0.08	0.08	0.08	0.08	0.06	0.06	0.06	0.06	0.05
O	manicured with wooded slopes valleylands	0.22	0.23	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.23	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	Totals	***55.92***	***55.12***	***55.68***	***55.83***	***53.25***	***52.93***	***54.13***	***52.09***	***53.79***	***54.49***	***53.98***	***4.47***	***55.12***	***4.30***	***4.31***	***4.11***	***4.08***	***4.02***	***4.02***	***4.11***	***4.21***	***4.17***
	Woodlands																						
BB	red ash-American elm forest	1.52	1.57	1.64	1.61	1.61	2.13	2.20	2.12	2.12	2.33	2.22	0.12	1.57	0.13	0.12	0.12	0.16	0.16	0.16	0.16	0.18	0.17
CC	sugar maple forest	0.64	0.58	0.58	0.58	0.51	0.51	0.51	0.49	0.49	0.49	0.49	0.05	0.58	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
DD	sugar maple-American beech forest	4.65	4.51	4.43	4.21	4.30	4.12	4.28	4.08	4.23	4.27	4.28	0.37	4.51	0.34	0.33	0.33	0.32	0.32	0.31	0.33	0.33	0.33

Code	Vegetation Community	Proportion of Natural Area (%)											Proportion of City Area (%)										
		1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009
EE	sugar maple-white ash forest	2.71	2.74	2.73	2.71	2.71	2.70	2.87	2.77	2.76	2.79	2.49	0.22	2.74	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.22	0.19
FF	sugar maple-red oak forest	1.82	1.98	1.91	1.89	1.89	1.92	2.00	1.90	1.98	1.99	1.99	0.15	1.98	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
GG	sugar maple-eastern hemlock forest	0.69	0.71	0.71	0.71	0.71	0.71	0.73	0.70	0.71	0.80	0.80	0.05	0.71	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06
II	sugar maple-black cherry forest	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.01	0.08	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
KK	sugar maple-American beech-red oak forest	1.27	1.30	1.30	1.30	1.28	1.28	1.32	1.26	1.28	1.28	1.25	0.10	1.30	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
LL	sugar maple-American beech-eastern hemlock forest	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.27	0.27	0.02	0.20	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02
MM	white pine-eastern hemlock-sugar maple forest	0.29	0.30	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.27	0.27	0.02	0.30	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
NN	eastern hemlock forest	0.18	0.18	0.18	0.18	0.23	0.23	0.24	0.23	0.23	0.24	0.24	0.01	0.18	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
OO	red maple-red oak forest	1.30	1.33	1.35	1.35	1.35	1.32	1.37	1.32	1.32	1.35	1.35	0.10	1.33	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
PP	American beech forest	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.08	0.08	0.08	0.01	0.11	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
QQ	bur oak-American beech forest	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RR	oak-ash forest	1.23	1.26	1.21	1.21	1.07	1.06	1.10	1.04	1.16	1.19	1.10	0.10	1.26	0.09	0.09	0.08	0.08	0.08	0.08	0.09	0.09	0.08
SS	oak-hickory forest	1.04	1.04	1.03	1.00	1.20	1.19	1.23	1.21	1.25	1.26	1.27	0.08	1.04	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10
TT	ash-hickory forest	0.30	0.29	0.30	0.27	0.27	0.39	0.41	0.39	0.38	0.38	0.38	0.02	0.29	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
VV	black cherry-eastern hemlock-white ash forest	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.11	0.11	0.01	0.09	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
WW	bur oak-black walnut forest	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
ZZ	oak-white pine forest	0.00	0.00	0.10	0.10	0.10	0.10	0.11	0.10	0.10	0.12	0.12	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Totals	***18.25***	***18.41***	***18.36***	***17.87***	***17.98***	***18.42***	***19.13***	***19.04***	***18.71***	***19.44***	***18.85***	***1.45***	***18.41***	***1.42***	***1.38***	***1.39***	***1.42***	***1.42***	***1.41***	***1.45***	***1.51***	***1.46***
	Successional																						
C	old field	3.80	4.19	4.22	4.33	4.83	5.14	5.20	5.10	5.14	7.39	7.30	0.30	0.33	0.33	0.33	0.37	0.40	0.39	0.39	0.40	0.57	0.56
D	hedgerow	0.33	0.31	0.31	0.24	0.24	0.24	0.25	0.24	0.25	0.25	0.25	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Code	Vegetation Community	Proportion of Natural Area (%)											Proportion of City Area (%)										
		1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009	1996	1998	2000	2001	2002	2004	2005	2006	2007	2008	2009
E	early successional forest	0.93	0.65	0.57	0.34	0.49	1.08	1.53	1.47	1.43	1.43	1.51	0.07	0.05	0.04	0.03	0.04	0.08	0.11	0.11	0.11	0.11	0.12
P	hawthorn thicket	0.62	0.63	0.64	0.64	0.64	0.64	0.63	0.64	0.64	0.64	0.64	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
XX	birch forest	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
YY	poplar forest	0.10	0.07	0.07	0.07	0.07	0.14	0.14	0.14	0.14	0.14	0.14	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Totals	***5.8***	***5.87***	***5.82***	***5.64***	***6.30***	***7.26***	***7.77***	***7.61***	***7.78***	***9.87***	***9.86***	***0.46***	***0.46***	***0.46***	***0.44***	***0.49***	***0.56***	***0.58***	***0.58***	***0.60***	***0.76***	***0.76***
	Wetland																						
AA	silver maple forest	0.80	0.80	0.78	0.32	0.32	0.32	0.33	0.29	0.29	0.29	0.29	0.06	0.06	0.06	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
V	cattail marsh	1.19	1.19	1.19	1.20	1.20	1.20	1.20	1.16	1.18	1.24	1.25	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10
W	open water marsh	0.97	1.00	1.00	1.00	1.00	0.94	0.98	0.95	0.95	0.93	0.93	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07
X	willow-buttonbush swamp thicket	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Y	wet meadow	0.15	0.16	0.16	0.16	0.19	0.48	0.50	0.48	0.48	0.69	0.69	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.05	0.05
Z	willow-ash forest	0.02	0.02	0.02	0.02	0.02	0.05	0.00	0.05	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Totals	***3.25***	***3.29***	***3.29***	***2.83***	***2.86***	***3.12***	***3.20***	***19.9***	***3.08***	***3.33***	***3.34***	***0.25***	***0.25***	***0.25***	***0.22***	***0.22***	***0.24***	***0.24***	***0.23***	***0.23***	***0.25***	***0.25***
	Anthropogenic																						
F	manicured	3.11	3.31	3.38	3.23	2.71	2.59	3.02	2.94	2.82	2.81	2.82	0.25	0.26	0.26	0.25	0.21	0.20	0.22	0.23	0.22	0.22	0.22
H	urban lake	0.31	0.32	0.32	0.32	0.32	0.32	0.33	0.32	0.32	0.32	0.32	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
I	wooded residential	10.81	11.07	10.51	10.51	10.51	10.55	10.90	10.50	10.50	10.42	10.42	0.86	0.86	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.80	0.80
T	plantation	0.93	0.95	0.96	0.92	0.93	1.00	1.05	1.01	1.02	1.13	1.15	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09
UU	black walnut grove	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Totals	***15.17***	***15.66***	***15.18***	***14.99***	***14.47***	***14.46***	***15.31***	***14.77***	***14.66***	***14.68***	***14.71***	***1.2***	***1.21***	***1.17***	***1.16***	***1.12***	***1.12***	***1.14***	***1.14***	***1.13***	***1.13***	***1.13***
	Other																						
R	beach	0.10	0.09	0.10	0.10	0.10	0.12	0.13	0.12	0.12	0.12	0.12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
S	tall grass prairie	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
U	unknown	1.53	1.57	1.57	1.58	1.58	0.32	0.34	0.32	0.32	0.34	0.34	0.12	0.12	0.12	0.12	0.12	0.03	0.03	0.03	0.03	0.03	0.03
	Totals	***1.63***	***1.66***	***1.67***	***1.68***	***1.68***	***0.45***	***0.46***	***0.44***	***0.44***	***0.46***	***0.46***	***0.13***	***0.13***	***0.13***	***0.13***	***0.13***	**0.03**	***0.03***	***0.04***	***0.04***	***0.04***	***0.04***

Appendix 10: Butternut Survey Summary

Appendix 10: Butternut Survey Summary of 2009 Field Season in Wards 3, 4, and 7.

Site	Results of 2009 Survey	Last Recorded Observation Prior to 2009 Survey	Condition
AW1	None located	NAS database 2005	-
CC1/MY1	One tree located (LL 25/08/09, SKM 04/07/09)	NAS database 1980	Fair condition; some dead limbs and small amount of canker
CL9	-	Ref. 272 (CVC 2007); Macdonald 1970	-
CL16	-	NAS database 2005; NAS database 1998, HBT AGRA Limited (1993)	60cm, 50 cm, 45cm, 15cm dbh infected with canker; 80cm dbh almost dead
CL21	-	NAS Database 2008	-
CL24	-	NAS database 1999	-
CL31	-	NAS database 2004	-
CRR1	-	Ecologistics Limited (1979)	In 2005: 35cm; 25cm; 35cm; 25cm; 15cm; all infected with canker
CRR3	-	NAS database 1998	-
CRR6	-	NAS database 2006	-
CRR7	One tree located (LL 26/08/09, SKM 08/07/09, SKM 03/07/09)	NAS database 2005 (SKM 10/07/05)	Good condition
CRR8	Two young trees located (LL 26/08/09, SKM 08/07/09)	Not previously recorded	One tree 3 cm dbh, the other 5 cm dbh – both in fair condition some dead limbs noted
CRR10	-	NAS database 2001	-
CV2	-	NAS database 1995 (HK/MJ 24/07/95)	-
CV12	Two trees located (LL 24/08/09, SKM 15/06/09)	Gore & Storrie Limited and R.E. Winter and Associates Limited (1994)	15cm dbh in good condition ; both trees in excellent condition
ER6	None located	NAS database 2000	-
ETO4	Two young trees (LL 21/08/09, SKM 05/07/09)	NAS database 2005	One infected with canker, the other in good condition with no canker
ETO8	-	NAS database 2008	-

Site	Results of 2009 Survey	Last Recorded Observation Prior to 2009 Survey	Condition
LV1	-	NAS database 1995	30cm, 10 cm dbh infected with canker
LV7	-	NAS database 1999	-
ME10	-	MJ 25/07/01, MJ/CZ 15/06/95	-
MI7	-	NAS database 1999	-
NE9	-	NAS database 2002	-
PC1	-	NAS database 2008	-
SD1	-	Dougan & Associates (2003)	-
SD5	-	Ref. 272 (CVC 2007)	-
SD7	-	NAS database 2008; NAS database 2005; NAS database 1999	45cm dbh infected with canker

Appendix 11: Provincially Significant Native Flora Species

Appendix 11: Provincially significant native flora species.
These species are also documented for the City of Mississauga. Provincial rarity status follows (NHIC 2009). Rarity ranks are defined in Appendix 4) of the Natural Areas Survey.

Scientific Name	Common Name	G RANK	S RANK	MNR	COSEWIC	Reg. Rank	Location
Dryopteris x *triploidea* Wherry	Hybrid Wood Fern	GNA	S3S4			1	CL39
Juglans cinerea L.	Butternut	G4	S3?	END	END	3	46 Natural Areas
Hypericum ascyron L.	Great St. Johns Wort	G4	S3?			1	CL16
Populus x *jackii* Sarg.	Balm-of-gilead	GNA	S2			1	CL9
Cardamine x maxima (Nutt.) Alph. Wood	Hybrid Cress	GNA	S2S3			2	EM4, MV2
Crataegus scabrida Sarg.	Hawthorn	G5?	S3?			1	CL9, CRR10, CRR6, MV12, NE9, SP1
Potentilla paradoxa Nutt.	Bushy Cinquefoil	G5	S3			1	CL8, CL9
Astragalus neglectus (Torr. & A. Gray) E. Sheld.	Coopers Milkvetch	G4	S3			1	CRR6
Lupinus perennis L. ssp. *perennis*	Wild Lupine	G5	S3			0	
Oenothera clelandii W. Dietr., Raven & W.L. Wagner	Clelands Evening-primrose	G3G5	S1			1	CL30
Polygala sanguinea L.	Field Milkwort	G5	S3			0	
Panax quinquefolius L.	American Ginseng	G3G4	S2		END	2	Mentioned in Peel Flora
Erigenia bulbosa (Michx.) Nutt.	Harbinger-of-spring	G5	S3?			0	
Mertensia virginica (L.) Pers. ex Link	Bluebells	G5	S3			1	CL22
Aureolaria flava (L.) Farw.	Yellow False-	G5	S2?			1	CRR7

Scientific Name	Common Name	G RANK	S RANK	MNR	COSEWIC	Reg. Rank	Location
	foxglove						
Solidago rigida L.	Prairie Goldenrod	G5T5	S3			1	CRR8
Symphyotrichum x *amethystinum* (Nutt.) Nesom	Amethyst Aster	GNA	S3?			1	CL9, CRR6
Helianthus pauciflorus Nutt. ssp. *subrhomboideus* (Rydb.) Heiser	Prairie Sunflower	G5T?	S2S3			1	
Scirpus clintonii A. Gray	Clintons Bulrush	G4	S2			0	
Carex conoidea Schkuhr ex Willd.	Field Sedge	G5	S3			0	
Carex amphibola Steud.	Narrow-leaved Sedge	G5	S2			1	CRR10, LS1, ME10
Muhlenbergia sylvatica (Torr.) Torr. ex A. Gray var. *sylvatica*	Woodland Satin Grass	G5	S2			1	CRR1, EM4, ETO3
Digitaria cognata (Schult.) Pilger ssp. cognata	Fall Witch Grass	G5	S1			0	
x *Elyhordeum macounii* (Vasey) Barkworth & D.R. Dewey	Macouns Hybrid Grass	GNA	S1			1	

Appendix 12: Updated CVC Bird Species of Conservation Interest

Appendix 12: Updated CVC Bird Species of Conservation Interest.

Updated list of Credit River Watershed birds of conservation interest documented for the City of Mississauga including migrant and wintering species listed alphabetically by common name. An asterisk indicates an historical record. Rarity status follows (NHIC 2009). Rarity ranks are defined in Appendix 4 of the Natural Areas Survey. Breeding status refers to the highest recorded breeding status within the City natural areas. The city wide notation applies to birds which have been found in more than ten locations within the city.

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Breeding Status	Location
Acadian flycatcher	*Empidonax virescens*	G5	S2S3B	END	END	migrant	CL9
alder flycatcher	*Empidonax alnorum*	G5	S5B			possible	CRR1, CRR10, EC13, CL9
American bittern	*Botaurus lentiginosus*	G4	S4B			possible	CL9, CRR9, EC13
American black duck	*Anas rubripes*	G5	S4			possible	CL9, EC13, ETO8, PC1, SD1, SD7
American coot	*Fulica americana*	G5	S4B	NAR	NAR	migrant	CL9, SD7
American redstart	*Setophaga ruticilla*	G5	S5B			probable	city wide
bank swallow	*Riparia riparia*	G5	S4B			possible	city wide
barn swallow	*Hirundo rustica*	G5	S4B			confirmed	city wide
barred owl	*Strix varia*	G5	S5			migrant	CL9
belted kingfisher	*Ceryle alcyon*	G5	S5B			probable	city wide
black tern	*Chlidonias niger*	G4	S3B	SC	NAR	migrant	CL9
black-and-white warbler	*Mniotilta varia*	G5	S5B			migrant	city wide
blackburnian warbler	*Dendroica fusca*	G5	S5B			migrant	CL9, CRR10, EM4, CRR6, LV7
black-crowned night-heron	*Nycticorax nycticorax*	G5	S3B,S3N			probable	CL16, CL8, CL9, CRR4, CRR9, ETO7, LV3, LV4, NE9, SD1

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Breeding Status	Location
black-throated blue warbler	*Dendroica caerulescens*	G5	S5B			migrant	CL9, CRR10, EC13, EM4, LV7, SD1
black-throated green warbler	*Dendroica virens*	G5	S5B			migrant	CL9, CM12, CRR10, CRR6, EM4, ETO7, LV3, MI7, MV2, SD1
blue-gray gnatcatcher	*Polioptila caerulea*	G5	S4B			possible	CL9, CL17, CRR6, CRR8, CRR10, ETO4, LV1, LV7, PC1, SD1
blue-winged warbler	*Vermivora pinus*	G5	S4B			migrant	CL9, SD1
bobolink	*Dolichonyx oryzivorus*	G5	S4B			probable	CL9, CM7, CRR2, CRR10, EC13, EM4, ETO3, MV2, MV19
broad-winged hawk	*Buteo platypterus*	G5	S5B			migrant	CL9
brown creeper	*Certhia americana*	G5	S5B			probable	CL16, CL9, CRR5, CRR7, LV7, SD1, SD7, SP1
brown thrasher	*Toxostoma rufum*	G5	S4B			probable	city wide
Canada warbler	*Wilsonia canadensis*	G5	S4B		THR	possible	CL8, CL9, CL39, CRR3, CRR6, EC13, HO3, LV7
Carolina wren	*Thryothorus ludovicianus*	G5	S4			probable	city wide
Caspian tern	*Hydroprogne caspia*	G5	S3B	NAR	NAR	migrant	CL9, PC1, SD1
chestnut-sided warbler	*Dendroica pensylvanica*	G5	S5B			possible	CL9, CL16, CL39CRR6, CRR10, EM4, LV7, PC1, SD1, SP1
chimney swift	*Chaetura pelagica*	G5	S4B,S4N			probable	city wide
clay-colored sparrow	*Spizella pallida*	G5	S4B			probable	CL9, EC13
cliff swallow	*Petrochelidon pyrrhonota*	G5	S4B			possible	city wide
common grackle	*Quiscalus quiscula*	G5	S5B			probable	city wide
common merganser	*Mergus merganser*	G5	S5B,S5N			possible	CL9, CRR5, CRR8, PC1, SD1

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Breeding Status	Location
common moorhen	*Gallinula chloropus*	G5	S4B			migrant	CL9, CRR5, CRR8, PC1, SD1
common nighthawk	*Chordeiles minor*	G5	S4B		THR	possible	CL9, CL16, CRR6, SD1
common snipe	*Gallinago gallinago*	G5	S5B			migrant	CL9, EC1, EC13
common tern	*Sterna hirundo*	G5	S4B	NAR	NAR	migrant	CL9, CRR8, CRR9, LV4, PC1, SD1
Connecticut warbler	*Oporornis agilis*	G4	S4B			migrant	CL9
Coopers hawk	*Accipiter cooperii*	G5	S4	NAR	NAR	probable	city wide
dark-eyed junco	*Junco hyemalis*	G5	S5B			wintering	city wide
eastern kingbird	*Tyrannus tyrannus*	G5	S4B			probable	city wide
eastern meadowlark	*Sturnella magna*	G5	S4B			probable	CL9, CRR2, EC13, MV2
eastern towhee	*Pipilo erythrophthalmus*	G5	S4B			possible	CL16, CRR1, EC13, EM4, PC1, SP1
eastern wood-pewee	*Contopus virens*	G5	S4B			probable	city wide
evening grosbeak	*Coccothraustes vespertinus*	G5	S4B			migrant	MI1, CL9
gadwall	*Anas strepera*	G5	S4			migrant	CL9, CRR8, CRR9, EM4, SD1, SD7
golden-crowned kinglet	*Regulus satrapa*	G5	S5B			migrant	CL9, EC13, EM4, LV3, LV7, PC1, SD1, SD7, SP1
golden-winged warbler	*Vermivora chrysoptera*	G4	S4B			migrant	CL9, CRR10, SD1
grasshopper sparrow	*Ammodramus savannarum*	G5	S4B			confirmed	ETO3
gray catbird	*Dumetella carolinensis*	G5	S4B			confirmed	city wide
great blue heron	*Ardea herodias*	G5	S5			possible	city wide

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Breeding Status	Location
green-winged teal	*Anas crecca*	G5	S4			probable	CL9, EC13, SD1
hairy woodpecker	*Picoides villosus*	G5	S5			probable	city wide
herring gull	*Larus argentatus*	G5	S5B,S5N			migrant	CL9, CRR4, CRR6, CRR10, EC13, MV2, PC1, SD1, SD7
hooded merganser	*Lophodytes cucullatus*	G5	S5B,S5N			migrant	CL9, LV3
horned lark	*Eremophila alpestris*	G5	S5B			probable	EC13, ETO3, MV2, MV3
killdeer	*Charadrius vociferus*	G5	S5B,S5N			confirmed	city wide
least bittern	*Ixobrychus exilis*	G5	S4B	THR	THR	migrant	CL9
least flycatcher	*Empidonax minimus*	G5	S4B			possible	city wide
loggerhead shrike	*Lanius ludovicianus*	G5	S2B	END	END	migrant	CL9
magnolia warbler	*Dendroica magnolia*	G5	S5B			possible	CL9, CRR6, CRR10, EC13, EM4, LV7, MI1, MI4, SD1
marsh wren	*Cistothorus palustris*	G5	S4B			possible	CL9
mourning warbler	*Oporornis philadelphia*	G5	S4B			possible	CL9, CRR10, CRR3, CRR7, SD1
Nashville warbler	*Vermivora ruficapilla*	G5	S5B			migrant	CL9, CRR10, EM4, ETO4, LV7, SD1
northern goshawk	*Accipiter gentilis*	G5	S4	NAR	NAR	probable	CL9, CRR3
northern harrier	*Circus cyaneus*	G5	S4B	NAR	NAR	confirmed	CL9, CRR1, EC13, EM30, ETO3, MI1, NE4
northern mockingbird	*Mimus polyglottos*	G5	S4			probable	city wide
northern saw-whet owl	*Aegolius acadicus*	G5	S4			wintering	CL9, HO9, GT4, MI1
northern waterthrush	*Seiurus noveboracensis*	G5	S5B			migrant	CL9, CRR10, EC13, EM4, SD1

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Breeding Status	Location
orchard oriole	*Icterus spurius*	G5	S4B			migrant	CL16, EC13
osprey	*Pandion haliaetus*	G5	S5B			migrant	CL9, CRR1, EC13
ovenbird	*Seiurus aurocapillus*	G5	S4B			possible	CRR10
peregrine falcon	*Falco peregrinus anatum*	G4T4	S3B			possible	CC1/MY1, CL9, SD1, SD7
pied-billed grebe	*Podilymbus podiceps*	G5	S4B,S4N			migrant	CL9, PC1, SD1
pileated woodpecker	*Dryocopus pileatus*	G5	S5			probable	city wide
pine siskin	*Carduelis pinus*	G5	S4B			migrant	CL9, MB6, SD1
pine warbler	*Dendroica pinus*	G5	S5B			probable	city wide
purple finch	*Carpodacus purpureus*	G5	S4B			possible	CL9, CRR10, MI1
purple martin	*Progne subis*	G5	S4B			possible	CL42, CL9, PC1
red-breasted nuthatch	*Sitta canadensis*	G5	S5			probable	city wide
red-headed woodpecker	*Melanerpes erythrocephalus*	G5	S4B	SC	THR	possible	CL9, CRR10, PC1
red-shouldered hawk	*Buteo lineatus*	G5	S4B	NAR	NAR	confirmed	CL9, LV7, MV2
ruffed grouse	*Bonasa umbellus*	G5	S5			possible	CL9
savannah sparrow	*Passerculus sandwichensis*	G5	S4B			probable	city wide
scarlet tanager	*Piranga olivacea*	G5	S4B			possible	CL9, CRR10, EM4, LV7, MB6, MI1, PC1
sharp-shinned hawk	*Accipiter striatus*	G5	S5	NAR	NAR	possible	CL9, CL43, CRR7, EM30, GT1, RW4, SD1, SD7, SP1
short-eared owl	*Asio flammeus*	G5	S2N,S4B	SC	SC	migrant	CL9

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Breeding Status	Location
turkey vulture	*Cathartes aura*	G5	S5B			migrant	CL9, CM7, CR1, CRR1, CRR3, CRR8, EC13, LV7, MV2
upland sandpiper	*Bartramia longicauda*	G5	S4B			confirmed	EC1, ETO3
veery	*Catharus fuscescens*	G5	S4B			migrant	CL9, CRR10, HO9, LV7
vesper sparrow	*Pooecetes gramineus*	G5	S4B			probable	CL9, EC13, MV2
white-throated sparrow	*Zonotrichia albicollis*	G5	S5B			possible	city wide
winter wren	*Troglodytes troglodytes*	G5	S5B			possible	CL9, CL16, CL24, CRR7, CRR10, CRR6, MI1, SD1, SP1
wood thrush	*Hylocichla mustelina*	G5	S4B			probable	city wide
yellow-bellied sapsucker	*Sphyrapicus varius*	G5	S5B			probable	CE10, CL9, CL16, MI1, MV3, NE3, SD1
yellow-billed cuckoo	*Coccyzus americanus*	G5	S4B			possible	CL8, CL9, NE4, CRR6
yellow-rumped warbler	*Dendroica coronata*	G5	S5B			migrant	city wide

Appendix 13: Updated Provincial Fauna Rarity

Appendix 13: Updated provincially significant native fauna species.
These species are documented for the City of Mississauga, and include migrant and wintering bird species. Rarity status follows (NHIC 2009) and are defined in Appendix 4 of the Natural Areas Survey.

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Historical	Highest Breeding Evidence	Documented sites
Bird								
red-necked grebe	*Podiceps grisegena*	G5	S3B,S4N	NAR	NAR		migrant	CL9
horned grebe	*Podiceps auritus*	G5	S1B,S4N	DD			migrant	CL9, SD1, SD7
red-throated loon	*Gavia stellata*	G5	S3B,S1N				migrant	CL9
black tern	*Chlidonias niger*	G4	S3B	SC	NAR		migrant	CL9
Caspian tern	*Hydroprogne caspia*	G5	S3B	NAR	NAR		migrant	CL9, PC1, SD1
great black-backed gull	*Larus marinus*	G5	S2B				wintering	CL9, CRR6, SD1, SD7
canvasback	*Aythya valisineria*	G5	S1B,S4N				wintering	CL9, SD7
long-tailed duck	*Clangula hyemalis*	G5	S3B				wintering	CL9, SD1, SD7
redhead	*Aythya americana*	G5	S2B,S4N				migrant	CL9, SD1
great egret	*Ardea albus*	G5	S2B				migrant	CL9, CRR2, CRR8, CRR9, PC1
black-crowned night-heron	*Nycticorax nycticorax*	G5	S3B,S3N				probable	CL8, CL9, CL16, CRR4, CRR9, ETO7, LV3, LV4, NE9, SD1
least bittern	*Ixobrychus exilis*	G5	S4B	THR	THR		migrant	CL9
Wilsons phalarope	*Phalaropus tricolor*	G5	S3B			Yes	migrant	EC1
semipalmated sandpiper	*Calidris pusilla*	G5	S3B,S4N				migrant	CL9, MB8/ME8

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Historical	Highest Breeding Evidence	Documented sites
American golden-plover	*Pluvialis dominica*	G5	S2S3B,S4N				migrant	CL9
bald eagle	*Haliaeetus leucocephalus*	G5	S1S2N, S4B				migrant	CL9
rough-legged hawk	*Buteo lagopus*	G5	S1B,S4N	NAR	NAR		wintering	CL9, EM30
peregrine falcon	*Falco peregrinus anatum*	G4T4	S3B				possible	CC1, CL9, MY1, SD1, SD7
short-eared owl	*Asio flammeus*	G5	S2N,S4B	SC	SC		migrant	CL9
red-headed woodpecker	*Melanerpes erythrocephalus*	G5	S4B	SC	THR		possible	CL9, CRR10, PC1
common nighthawk	*Chordeiles minor*	G5	S4B		THR		possible	CL16, CL9, CRR6, SD1
Acadian flycatcher	*Empidonax virescens*	G5	S2S3B	END	END		migrant	CL9
western meadowlark	*Sturnella neglecta*	G5	S3B				probable	CL9, CRR2, EC13, MV2
rusty blackbird	*Euphagus carolinus*	G5	S4B		SC		migrant	CL9
loggerhead shrike	*Lanius ludovicianus*	G5	S2B	END	END		migrant	CL9
white-eyed vireo	*Vireo griseus*	G5	S2B				migrant	CL9
cerulean warbler	*Dendroica cerulea*	G4	S3B				migrant	CL9
yellow-breasted chat	*Icteria virens*	G5	S2B	SC	SC	Yes	confirmed	GT4, HO9
Canada warbler	*Wilsonia canadensis*	G5	S4B		THR		probable	CL8, CL9, CL39, CRR3, CRR6, EC13, HO3, LV7
prothonotary warbler	*Protonotaria citrea*	G5	S1B	END	END		migrant	migrant – SD1

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Historical	Highest Breeding Evidence	Documented sites
gray-cheeked thrush	*Catharus minimus*	G5	S2S4B				migrant	migrant – CL9
northern bobwhite	*Colinus virginianus*	G5	S1	END	END		migrant	migrant – CL9
Amphibian								
Jefferson/blue-spotted salamander complex	*Ambystoma jeffersonianum*	G4	S2				-	CRR6, LV7, MV2
Reptile								
common snapping turtle	*Chelydra serpentina serpentina*	G5	S3		SC		-	CL9, CL22, CL39, CRR1, CRR2, CRR3, CRR4, CRR5, CRR9, EC13, ETO7, MB9, MV2
wood turtle	*Gleptemys insculpta*	G4	S2	END	THR	Yes	-	ETO7
common map turtle	*Graptemys geographica*	G5	S3	SC	SC		-	CL9, CRR8, CRR9
Blandings turtle	*Emydoidea blandingi*	G4	S3	THR	THR		-	CL9
eastern milk snake	*Lampropeltis triangulum triangulum*	G5	S3	SC	SC		-	CL9, CM7, CRR3, CRR4, CRR5, CRR6, CRR7, CRR9, ETO4, ETO7, ME12
ribbon snake	*Thamnophis sauritus*	G5	S3	SC	SC		-	CL9
eastern hognose snake	*Heterodon platirhinos*	G5	S3	THR	THR	Yes	-	CL9

Appendix 14: Amphibian Surveys for 2009

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Rarity status follows (NHIC 2004) and are defined in Appendix 4 of the Natural Areas Survey. None of the species documented from the 2009 field season have a COSEWIC or MNR rank.

Common Name	Scientific Name	G Rank	S Rank	Location
Green frog	*Rana clamitans*	G5	S5	CRR7, CRR8, ETO5
Eastern redback salamander	*Plethodon cinerus*	G5	S5	CRR7, MY1
Spotted salamander	*Ambystoma maculatum*	G5	S4	CRR7, CRR10