City of Mississauga

Natural Areas Survey

2010 Update

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City of Mississauga

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EXECUTIVE SUMMARY

The Natural Areas Survey for the City of Mississauga (Geomatics 1996) identified the City's natural areas system which included144 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.

The intent of updating the Natural Areas Survey (NAS) is to provide the current status of natural areas and updated information on flora, fauna, impacts, boundary changes and management needs. With the completion of the 2010 update, the third round of reviews of the City Wards continues. In 2010 natural areas in Wards 8, 9, and 10 were updated.

In 1996, the 141 natural areas comprised 7.10% of the total area of the City. The total number of natural areas had decreased to 136 by 2004, increased to 138 by 2008, and has since decreased to 137 by 2010 (excluding the three Residential Woodlands). This decrease in the number of natural areas and alterations to natural sites equated to a loss of approximately 159.3 ha from 1996 to 2006. However, since 2006 there were increases of 51.8 ha in 2007, 89.6 ha in 2008, and 14.16 ha in 2009. In 2010 there was a further increase of 21.13 ha, thus since its inception in 1996, the overall area of natural areas in the natural areas system is 17.46 ha larger. The recent increases can be attributed to the inclusion of additional City owned areas into the natural areas system and to property boundary adjustments or minor changes in natural area boundaries. There has also been a reduction in the number of Special Management Areas and Linkages to 44 and 29, respectively, as many of these have been converted to natural areas.

The natural areas in the City were grouped into three major landform types (valleyland, tableland, and wetland). Since 1996, the proportion of natural areas associated with valleylands has more or less remained the same (78.3% in 1996 to 78.64% in 2010). In contrast, tablelands only account for 14.61% of the total natural areas system in 2010; a decrease from 16.4% in 1996. From a City-wide perspective, there were steady decreases from 1.16% in 1996 to 1.07% in 2010 of the land base represented in tableland natural areas. 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 4.60% in 2010. The proportion of the City that is classified as wetland decreased marginally from 0.36% in 1996 to 0.34% in 2010.

Generally, the natural areas within the City that were surveyed in 2010 continue 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 2010 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. Disturbances are prevalent in almost all of the natural areas surveyed in 2010. 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 management plans (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 area of tableland and wetland habitats. Recent development in Wards 8, 9, and 10 has resulted in the loss of 0.7 ha in 2010. However, the overall total area of natural areas has increased by 17.46 ha from 1996 to 2010. Much of this increase was composed of valleylands, and some associated tablelands. A total of 33 vegetation communities are uncommon in the City, occupying less than 1% of the total area of the natural areas system. Of these, ten communities 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) 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 increase in naturalization projects undertaken by the City. The majority of naturalized areas observed between 1996 and 2010 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 to accelerate succession which will more likely result in a healthy natural area with a diversity of native plant and animal species.

1.0 INTRODUCTION

A Natural Areas Survey for the City of Mississauga was initially 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 (SNS), Natural Sites (NS), or Natural Green Spaces (NGS), and three were classified as Residential Woodlands (RW). 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. The natural areas, Residential Woodlands, Special Management Areas and Linkages form the City's natural areas system.

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 NAS database current, updates have been undertaken on an annual basis (with one exception) 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 2010 work, the natural features in all Wards in the City have been updated three times since the initial study in 1996. The completion of the third round of updates, comprising those natural areas in Wards 8, 9, and 10, is reported herein.

Periodically, new candidate natural areas, Linkages, or SMAs are evaluated as part of the annual reviews. Over the course of the NAS and subsequent updates, 156 natural areas have been identified. However as of 2010, 14 sites have been removed from the NAS (*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); one of which, CM25, was subsequently removed due to development in 2010. Thus at present there are 137 natural areas and three residential woodlands.

The intent of updating the NAS is to provide 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 NAS is that it serves to identify natural areas in the City that should be protected. 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 threats to natural areas and management considerations.

2.0 METHODS

The primary focus of this update was the review of 36 natural areas located in Wards 8, 9, and 10. Appendix 2 provides details on specific methodologies for the background review, fieldwork, data analysis, and mapping conducted each year. Appendix 3 lists documents reviewed during

background review. Appendix 4 lists the reasons for fieldwork, and the dates when fieldwork was conducted for each of the natural areas.

Field visits were made to 34 of the 36 sites included in the NAS review for 2010. Natural areas MB1 and MB2 did not receive a full field visit because permission to access these sites was not provided, however, these sites received a road side visit or were visited by walking along public areas adjacent to the natural areas (*e.g.,* along stream corridors).

2.1 Analysis

In addition to analyzing the data with respect to provincial rarity lists (further explained in Appendix 2), analysis in 2010 included comparison with the list of Species of Conservation Concern (SCC) developed by Credit Valley Conservation (CVC). Previously, the CVC had a Bird Species of Conservation Interest which identified only bird species which were of interest within the watershed. The new SCC lists account for both flora and fauna. CVC developed a 'tier' system for these new lists in which Tier 1-3 species are considered to be of conservation concern within the urban areas (*i.e*., within the City of Mississauga) of the Credit River watershed. The qualifications of each tier are explained in Appendix 5.

2.2 Vegetation and 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 2010, and thus the 2004 criteria are considered up to date. These are provided in Appendix 1.

It should be noted that the vegetation classification does not follow the Ecological Land Classification (ELC) that is the provincial standard. This is because the NAS and the classification of vegetation in natural areas pre-dated the ELC (see Appendix 2).

3.0 GENERAL TRENDS

Appendix 6 documents the changes that occurred in Ward 8, 9, and 10 natural areas between 1996 and 2010 using the same categories. Some of the changes outlined in Appendix 6 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 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 7) 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 analysis of 2009 digital aerial photographs provided by the City and field investigation. Due to the scale of mapping, Significant Natural Sites (SNS), Natural Sites (NS) and Natural Green Space (NGS) are not discriminated on Figure 1, and are all labelled as "natural area". However, RWs, SMAs, Linkages and any Proposed Additions, are identified.

3.1 Potential Additions

Nine additions to existing natural areas and three additions to SMAs are proposed in this update. These potential additions are considered to be major changes (refer to Section 3.0) to the boundaries of natural areas or SMAs. The natural area classifications of the potential additions are the same as the existing natural area to which each is proposed to be added. This is because they provide habitat similar to the habitat currently existing in the natural area. Table 1 provides a summary of the category and classifications of the potential additions.

Table 1: Potential 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.* B, BB, C, and E) at the end of the natural area designations refers to the community type. Suffixes correlate to mapping notations on potential additions maps.

Potential Addition (PADD)	Natural Area	NAS Category	Natural Area Classification of Proposed Addition	Reason for Recommendation
PADD1	CRR6	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area and adds natural area buffer around creek.
PADD2	CRR6	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area and adds natural area buffer around creek.
PADD3	CRR6	Natural Area	Significant Natural Site	Continuous area which adds to interior habitat of natural area along Credit River.
PADD4BB[1]	ME12	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area.
PADD5C	ME12	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area.
PADD6E	EM14	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area.
PADD7C	EM14	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area.
PADD8C	EM14	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area.
PADD9B	EM4	Natural Area	Significant Natural Site	Continuous habitat similar to existing natural area.

Potential Addition (PADD)	Natural Area	NAS Category	Natural Area Classification of Proposed Addition	Reason for Recommendation
PADD10SMA	CRR11	Special Management Area	N/A	Provides additional buffer area to the Credit River and with management and restoration, would add to interior habitat in CRR11.
PADD11SMA	MB4	Special Management Area	N/A	Provides a linkage between natural areas MB3 and MB4. Recommended as a SMA because with management the area will provide greater linkage function for wildlife.
PADD12SMA	MB4	Special Management Area	N/A	Provides a linkage between natural areas MB3 and MB4. Recommended as a SMA because with management the area will provide greater linkage function for wildlife.

3.2 Natural Areas System

Overall, the number of natural areas (excluding Residential Woodlands) decreased from 141 in 1996 to 136 in 2004. In 2008, the number of natural areas (excluding Residential Woodlands) increased to 138 because of the addition of ME13 and CM25. The total number of natural areas in 2010 is 137 due to the conversion of CM25 from NGS to a SMA. During the 2010 field season CM25 underwent extensive grading due to the conversion of the property to a City park and recreational area. Extensive restoration and the addition of woodlands and other vegetation communities are planned to occur at this site according to the O'Connor Park Pre-design Brief (PMA 2009). However, until this restoration occurs, this area has been classified as SMA to highlight the importance of management and restoration at this site.
A detailed summary of the changes to natural area classifications between 1996 and 2010 is provided in Appendix 7. Overall, there has been an increase in the total proportion of the City included within natural areas from 7.10%[1] in 1996 to 7.21% in 2010. In 2010, there was an increase of 21.13 ha (0.07%) of natural area within the City since 2009. This change was due to small increases (0.01% and 0.09%) in NS and SNS categories in 2010, despite a decrease by 0.03% in the NGS category. These changes are related to refining natural area boundaries.

With the exception of a reduction in Natural Green Space (NGS) owing to succession to other classifications, changes to natural area classifications in the NAS were generally trivial. Overall, the proportion of SNS in the City has increased from 5.23% in 1996 to 5.76% in 2010 (Appendix 7). The proportion of the City occupied by NS has decreased from 1.2% in 1996 to 1.13% in

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

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 (Not Yet Named)
SD4
SD5 (Meadowwood)
SD7 (Lakeside)

CLARKSON-LORNE PARK
CL52 (Meadowwood)
CL1 (Meadowwood)
CL9 (Rattray Marsh)
CL8 (Gleneven)
CL15
CL16 (Jack Darling Park)
CL17 (Lorne Park Estates)
CL13 (Sheridan Creek Trail)
CL43 (Turtle Glen)
CL42 (Not Yet Named)
CL21 (Birch Glen)
CL39 (Whiteoaks)
CL22 (Fairbirch)
CL30 (Lorne Park Prairie)
CL31 (Lornewood Creek Trail)
CL24 (Tecumseh)
CL26 (Not Yet Named)
CRR9 (Credit River Flats)

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

MINEOLA
CRR9 (Credit River Flats)
MI4
MI1 (Not To Be Named)
MI17 (Mary Fix)
M17 (Credit River Flats)

LAKEVIEW
LV3 (Adamson Estate)
LV4 (Helen Molasy Memorial)
LV5 (Helen Molasy Memorial)
LV2
LV1 (Not Yet Named)
ETO8 (Orchard Heights)
LV14 (Lakeview Golf Course)
LV6
LV7 (Cawthra Woods)
ETO7 (Valley Park & Etobicoke Valley)

SHERIDAN PARK
SP1
SP3

SHERIDAN
SH6 (Thornelodge)
CRR7 (Loyalist Creek Hollow)
CRR8

ERINDALE
CRR7 (Loyalist Creek Hollow)
CRR8
ER6
CRR6 (Erindale)
ER7 (Huron)

COOKSVILLE
CV1 (Iroquois Flats)
CV2 (Not To Be Named)
CV12 (Richard Jones)
CV10 (Cooksville)
CV8 (Camilla)
CV6 (Stillmeadow)

DIXIE
ETO7 (Valley Park & Etobicoke Valley)
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 (Pheasant Run & McCauley Green)
EM14 (Sawmill Valley Trail)
EM4 (Sawmill Valley Trail)
EM5 (Glen Erin Trail)
EM21 (R.F.C. Mortensen)
CRR10 (Riverwood)

CREDITVIEW
CR1 (Deer Run & Deer Wood)

FAIRVIEW
FV1 (Grand Park Woods)
FV3 (Dr. Martin L. Dobkin)

CITY CENTRE
CC1 (Bishopstoke Walk)

MISSISSAUGA VALLEY
MY1 (Mississauga Valley)
MY3 (Stonebrook)

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

Table 2 continued…

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

CHURCHILL MEADOWS
CM7 (Not Yet Named)
CM9 (Not Yet Named)
CM12 (Not Yet Named)
CM25 (Undeveloped)

CENTRAL ERIN MILLS
CE7 (Sugar Maple Woods)
CE9 (Quenippenon Meadows
CE10 (Erin Wood)
CE5 (Woodland Chase Trail)
CE1 (Woodland Chase Trail)
CE12 (Bonnie Brae)
CRR5
CRR4 (Not To Be Named)
CRR11 (Not Yet Named)

STREETSVILLE
SV12 (Bonnie Brae)
SV10
CRR4 (Not To Be Named)
SV1 (Turney Woods)
CRR3 (Riverview & Timothy Street)
CRR2 (Credit Meadows)

EAST CREDIT
CRR5
CRR4 (Not To Be Named)
CRR3 (Riverview & Timothy Street)
CRR2 (Credit Meadows)
EC22 (Bidwell Trail common)
EC13 (Willowvale Fields & Creditview Wetlands)
CRR11 (Not Yet Named)

HURONTARIO
HO1 (Ceremonial Green)
HO3 (Staghorn Woods)
HO6 (Hawthorne Valley Trail)
HO7 (McKechnie Woods)
HO9 (Britannia Woods)

NORTHEAST
NE4 (Not Yet Named)
NE3 (Not To Be Named)
NE1
NE6
NE5 (Not To Be Named)
NE7 (Not To Be Named)
ETO4 (Not Yet Named)
ETO3 (Edward L. Scarlett & Red Oak Plan & Not To Be Named)
NE8
NE10
NE11 (Wildfield)
NE12 (Wildfield)
ETO2 (King's)
ETO1 (Mount Charles)
NE9 (Wildwood)

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

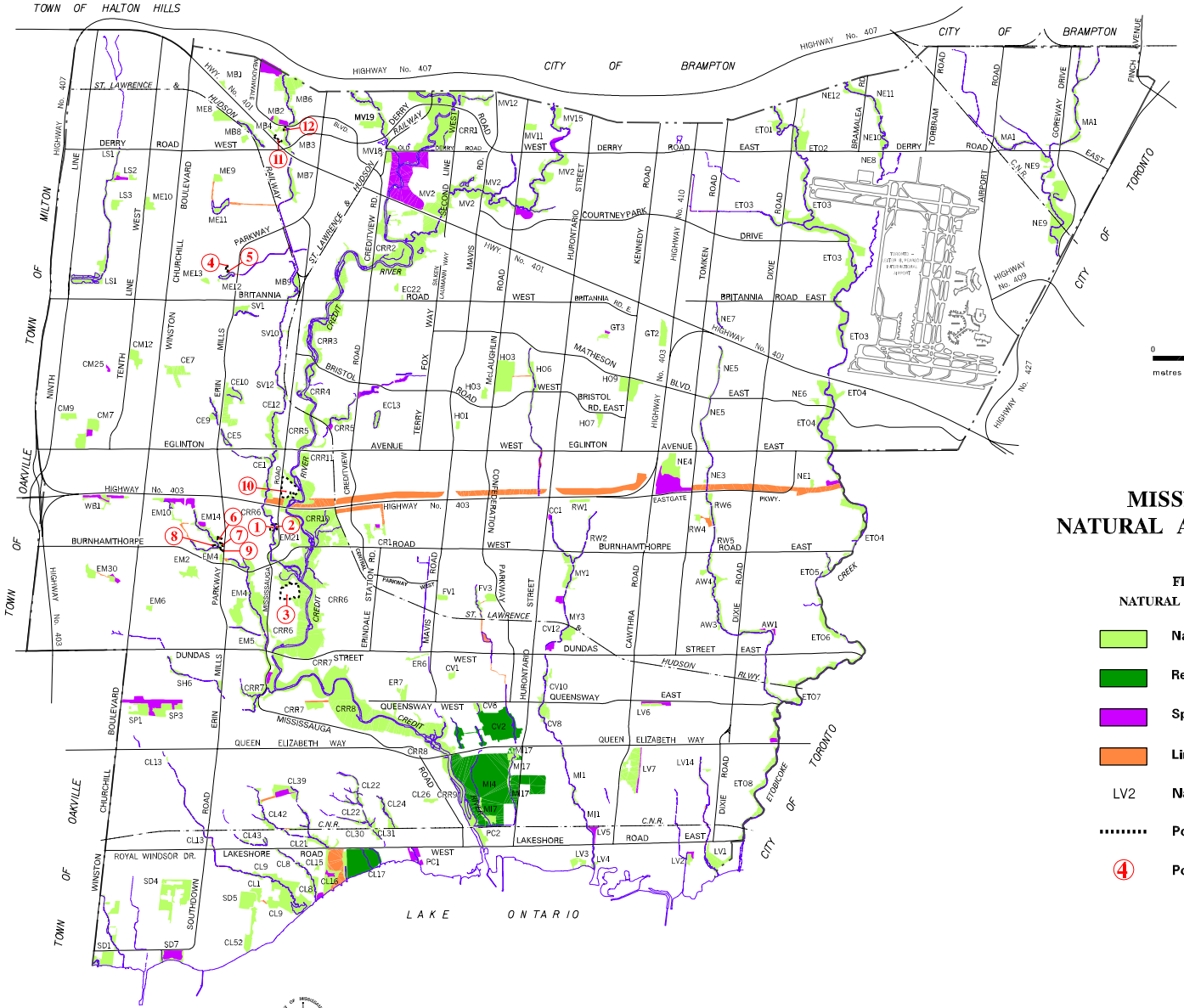
MEADOWVALE
ME10 (Eden Woods)
ME12 (Lake Wabukayne)
ME11 (Lake Aquitaine)
ME9 (Maplewood)
ME8 (Windrush Woods)
ME13 (Windwood)

MEADOWVALE BUSINESS PARK
MB9
MB7 (Mullet Creek)
MB8 (Maple Grove)
MB3 (Syntex Green)
MB4 (Leslie Trail)
MB6 (Totoredaca)
MB2
MB1

MEADOWVALE VILLAGE
MV19 (Levis Valley)
CRR1 (Meadowvale C.A.)
MV18 (Not Yet Named)
MV2 (Fletcher's Flats)
MV12 (Not Yet Named)
MV11
MV15
CRR2 (Credit Meadows)

GATEWAY
GT3
GT2 (Not Yet Named)

MALTON
MAI (Brandon Gate, Malton Greenway & Derry Greenway)



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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2010

2010. Presently, NGS constitutes 0.32% of the City; this is a decrease from 0.67% in 1996. As noted, the proportion of NGS within the natural areas system has also decreased (from 9% in 1996 to 3.93% in 2010) reflecting the transition of natural areas to other classifications.

3.3 Special Management Areas

In 2010, 44 Special Management Areas were identified; this is a decrease of 11 SMAs from 1996. Eight of these 11 changes are due to re-classification of SMAs to natural areas and the other 3 are owing to losses 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 majority of these changes occurred prior to 2010; however one change that occurred this year was the re-classification of CM25 from natural area (NGS) to SMA.

3.4 Landform Types

The overall changes to the three major landform types (valleyland, tableland, and wetland) in the NAS between 1996 and 2010 are presented in Appendix 8. The majority of the NAS in 2010, 1689.47 ha (78.64% of the NAS), is associated with valleylands. This has increased by 63.17 ha (0.34%) 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, the 313.84 ha of tablelands only account for 14.61% of the NAS in 2010; a decrease from 16.40% in 1996. This is largely owing to a loss of 8 tableland sites from 1996 to 2002 due to development. However, two tableland sites were added in 2008, with one of those tableland sites (CM25) being re-classified to SMA in 2010.

From a City-wide perspective, there were steady decreases in the area of tableland natural areas from 339.9 ha (1.16% of the City) in 1996 to 313.84 ha (1.07% of the City) in 2010. The area of wetlands also decreased marginally from 103.7 ha (0.36% of the City) in 1996 to 98.86 ha (0.34% of the City) in 2010 (Appendix 8). In contrast, the proportion of valleylands has increased from 1626.3 ha (5.60%) in 1996 to 1689.47 ha (5.77%) in 2010. Although the decrease in tableland and wetland area are relatively minor, the trend is consistent over the past 14 years. Between 2009 and 2010 there was no change in the total area of wetland and very minor increases in the total area of tableland (0.44 ha owing to boundary refinement). This trend indicates a small but gradual loss of natural areas in the City.

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.

The mean size of natural areas in valleyland and tableland landscape types has been decreasing since 1996 due to the incremental removal of portions of natural areas for development (Appendix 8). Although the mean size of wetlands increased between 2001 (16.7 ha) and 2002 (19.5 ha) this was owing to the removal of EC1, which was smaller than the average wetland size, thus the actual total area of wetland decreased. Currently the mean size of wetlands is

19.77 ha, compared to 17.3 ha in 1996. Tableland natural areas are generally very small (mean size of 5.71 ha) when compared to the valleyland areas (mean size of 21.12 ha) in 2010. Tableland natural areas are decreasing in size and abundance. In contrast, the number of valleyland natural areas is increasing. This is directly related to which areas are readily developable (tableland) and which areas are not (valleyland). The general loss of natural areas within the City since the inception of this study in 1996 indicates a need to review the City's strategy for the protection of the natural areas system, including the development approval process and policy framework to ensure that this trend does not continue.

3.5 Vegetation Communities

The 49 vegetation communities described for the City (Appendices 9 and 10) were compared between 1996 and 2010. 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.

Changes to vegetation community categories between 1996 and 2010 are summarized in Table 3 and detailed in Appendices 9 and 10. Between 1996 and 2010, there were decreases of 74.63 ha (28%) of valleyland communities, 27.59 ha (0.09%) of other communities; and 16.05 ha (0.05%) of anthropogenic communities in the City. In contrast, there were increases of 52.46 ha (0.18%) in woodlands, 116.68 ha (0.40%) in successional communities and 10.83 ha (0.05%) in wetlands in the City between 1996 and 2010. The increases are mainly due to the inclusion of additional areas to existing natural areas. Many of these changes are also due to further refinement of vegetation community classification in the natural areas in Wards 8, 9, and 10. Details on changes to each community are provided below.

Table 3: Changes to the area of vegetation communities 1996-2010 and 2009-2010.

Vegetation Community Category	2010 Area (hectares)	Amount of Change		Reason For Change (2009 - 2010)
		1996 – 2010 (hectares)	2009 – 2010 (hectares)	
Valleylands	1227.14	- 74.63	+ 7.20	Boundary and community adjustments to natural areas
Woodlands	476.89	+ 52.46	+ 49.45	Boundary and community adjustments to natural areas
Successional	251.86	+ 116.68	+ 29.03	Boundary and community adjustments to natural areas
Wetland	86.60	- 10.83	+ 11.00	Addition of natural areas, boundary and community adjustments to natural areas

Vegetation Community Category	2010 Area (hectares)	Amount of Change		Reason For Change (2009 - 2010)
		1996 – 2010 (hectares)	2009 – 2010 (hectares)	
Anthropogenic	336.96	- 16.05	+ 4.35	Revision of community boundaries at several sites due to naturalization of plant community edges, and revisions based on property boundaries.
Other	10.48	- 27.59	0.00	None of the communities in this category are located within the sites visited in 2010 (within Wards 8, 9, and 10); therefore no changes have been made.

Valleylands

There was a decrease of 124.71 ha between 1996 and 2006, however, since then there has been an increase of 50.08 ha. Between 2009 and 2010 there was an increase of 7.20 ha in this category (Table 4). Four vegetation communities in this category are considered uncommon in the City (Appendix 10), occupying less than 1% of the total area of NAS: sugar maple-American beech forest (DD), open with wooded slopes valleylands (M), open with manicured slopes valleylands (N), and manicured with wooded slopes valleylands (O). Between 2009 and 2010 both DD and N communities decreased in size. One community, DD, can also be considered "at risk" in the City, being represented only in a single natural area (CE1).

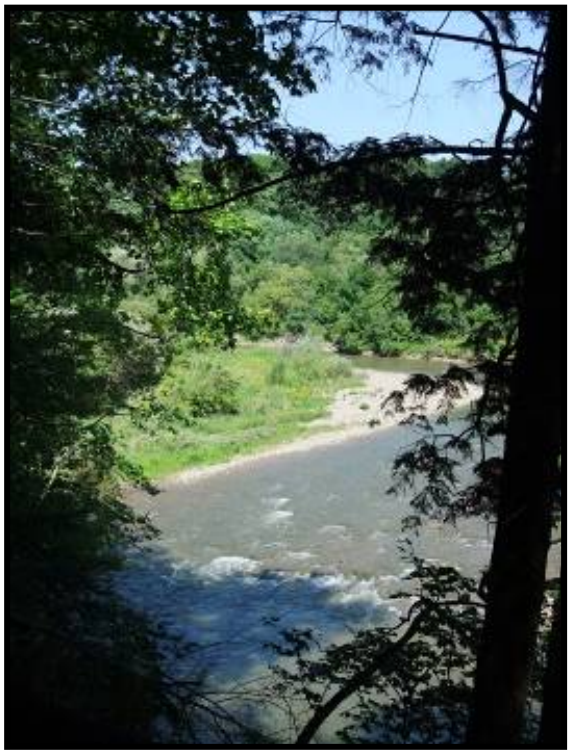

Photo 1. Valleyland of CRR10 (Riverwood Park)

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 an increase of 7.20 ha in valleyland area between 2009 and 2010, although since 1996 the overall area has decreased by 74.63 ha.

Woodlands

Woodlands include 24 vegetation communities, all of which occur outside of valleylands, although they may contain woodland streams. Overall, there was an increase of 52.46 ha in woodland communities between 1996 and 2010. Sixteen of the vegetation communities in this category are considered uncommon in the City, each occupying less than 1% of the total area of natural areas 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 (Table 4). In addition, the Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study (NSE *et al*. 2009) identifies moist-fresh hemlock – sugar maple mixed forest type (FOM6-1) to be regionally significant, which best fits Mississauga's sugar maple -American beech – eastern hemlock forest (LL) vegetation community. Therefore, this community would be considered regionally rare.

Photo 2. Woodlands at MB6 (Totoredaca Park)

Table 4: Woodland vegetation communities considered to be "at risk" in the City.

Vegetation Community	Community Code	Location
Wooded slope	A	EM4(Sawmill Valley Trail, Sawmill Creek Park)
Silver maple forest	AA	CE7(Sugar Maple Woods Park)
Early successional forest	E	CV10(Cooksville Common, Cooksville Park
Sugar maple-black cherry forest	II	MB4(Leslie Trail Park)
Sugar maple-American beech-eastern hemlock forest	LL	EM4(Sawmill Valley Trail Park, Windy Hollow Park)
American beech forest	PP	GT3
Black cherry-eastern hemlock-white ash	VV	LV6

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 49.45 ha of woodlands between 2009 and 2010. This reflects increases in two of the 15 woodland communities between 2009 and 2010, although there were also small decreases in the size of nine woodland communities. The changes reflect boundary revisions due to the naturalization of plant community edges, and revisions based on property boundaries.

Successional

The successional category is composed of six vegetation communities (Appendix 9). This category increased in size by 116.68 ha between 1996 and 2010 (Table 4). Between 2009 and 2010 there was an increase of 29.03 ha which is due to minor boundary revisions and further refinement of vegetation community classifications. The overall increase in size is largely related to increases in the area of early successional forest (E) and old field (C) communities. Four of the vegetation communities in this category remain uncommon in the City occupying approximately 1% of the total area of natural areas (Appendix 10). 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 (CL16-Jack Darling Park).

Photo 3. Successional community at CRR11, Hewick Meadows.

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), act as a buffer between forests and adjacent development, 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). Since 1996, this category decreased in size from 75.77 ha to 64.56 ha in 2002, but since then has increased to 86.60 ha in 2010. A major increase occurred between 2009 and 2010 with an increase of 11 ha. This reflects the refinement of vegetation community classifications, and minor boundary revisions. Wetlands comprise only 0.30% (86.60 ha) of the total City area (Appendix 10). Four 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. The two vegetation communities that do not fall into the 'uncommon' category, open water marsh (W) and cattail marsh (V), represent only 1.01 and 1.52% of the total area of natural areas, respectively.

Despite their small size, wetland communities tend to contribute disproportionately to the biodiversity of the City, mainly owing to the large number of plant and animal species that 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 likely 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.

Photo 4. Wetland at CRR6 (Erindale).

Anthropogenic

The anthropogenic category is composed of five vegetation communities (Appendix 8). This category decreased in area between 1996 and 2010 from 353.01 ha to 336.96 ha. 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. Two of the vegetation communities in this category urban lake (H) and manicured with wooded slopes valleylands (O) remain uncommon in the City occupying approximately 1% of the total area of natural areas.

Other

The "other" category is composed of three vegetation communities (Appendix 8): beach (R), tall grass prairie (S), and unknown (U). This category has had an overall decrease in area of 27.59 ha between 1996 and 2010 (Table 4). The "other" category represents 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 0.48% 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). In addition, the tall grass prairie community is considered to be provincially significant.

4.0 SIGNIFICANT FEATURES

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

4.1 Flora

The total number of floral species in the City of Mississauga stands at 1,163. There are 701 native species in Mississauga (60% of the flora) and 462 non-natives. Nine flora species were added to the plant list this year; eight native species and one non-native species (Table 5). Of the native species recorded from Mississauga, 29 (4%) are considered extirpated, 384 (33%) are rare (known from only 1 to 3 locations in the City) or uncommon (known from 4 to 10 locations in the City). There were no additional plants designated as provincially rare in 2010 (NHIC 2009), thus the provincial status of species occurring in Mississauga remains unchanged. There are seven provincially significant species documented from Wards 8, 9, and 10 in 2010 (Appendix 12). Three of these records are older, with recent records for only 4 of the species (butternut, yellow false-foxglove (*Aureolaria flava*), prairie goldenrod (*Solidago rigida*), and woodland satin grass (*Muhlenbergia sylvatica*)). Two of the newly-recorded species in Mississauga are also provincially significant (pin oak (*Quercus palustris*) and showy goldenrod (*Solidago speciosa*), but they were noted during the literature review (NRSI 2009) and were documented outside of Wards 8, 9, and 10 and are therefore not included in Appendix 12.

Table 5: Species added to the City of Mississauga flora list in 2010 – records from field work and literature review.

Common Name	Latin Name	Rarity Status		NAS Site
		G Rank	S Rank	
giant sunflower	*Helianthus gigantus*	G5	S5	MB7, LS1
wood lily	*Lilium philadelphicum*	G5	S5	LS1
switch grass	*Panicum virgatum*	G5	S4	CRR6, MB6
shrubby cinquefoil	*Potentilla fruticosa ssp. Floribunda*	G5T	S5	MB7
purpleleaf sand cherry*	*Prunus x cistena*	GNR	SNA	CRR10
pin oak	*Quercus palustris*	G5	S3	LV1
sage-leaved willow	*Salix candida*	G5	S5	ME9
showy goldenrod	*Solidago speciosa*	G5T?	S1	LV1
hoary vervain	*Verbena stricta*	G5	S4	SD1

* indicates a non-native species

The Butternut tree 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*) (Photo 5). In 2010, surveys for butternut were conducted at eleven natural areas where access was available (Appendix 11). A total of eight butternut trees were observed in six natural areas, including one site (MB6) where there were no previous records of the species.

Photo 5. Butternut canker in tree at EM4, Sawmill Valley Trail.

There are 297 floral species which are considered to be a Species of Conservation Concern (CVC 2010) within Wards 8, 9, and 10. Of these, 11 floral species are Tier 1, 183 are Tier 2, and 103 are Tier 3 (see Appendix 5 for definitions of each Tier). As can be expected, the larger natural areas (*i.e*. CRR6, CRR7, CRR10, and CRR11) have greater amounts of floral Species of Conservation Concern.

4.2 Floristic Quality Assessment

The Floristic Quality Index (FQI) and Coefficient of Conservatism (CC) were re-calculated for 36 natural areas based on field data collected in 2010. Appendix 6 provides the FQIs and native mean coefficients for all natural areas that were assessed and summarizes changes. In 1996, 107 of the 144 natural areas 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 2010, a total of 137 natural areas and all three residential woodlands have been assessed using the FQA, based on data collected during a field or roadside visit. The current FQI values range from 4.90 to 83.66 and the native mean coefficients range from 1.40 to 4.52. High, medium and low values for these are defined in Appendix 2.

Photo 6. Great blue lobelia (*Lobelia siphilitica*) at EM4 (Sawmill Valley Trail Park).

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 2010, this is still the case for both the native mean CC and the FQI. Lower native mean CC indicates a greater

presence of species characteristic of disturbed environments, and a commensurate lower 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 4.52 in 2010, suggests a slight increase in disturbance in at least some of Mississauga's natural areas. This could also be attributed to more species being identified over the years as further inventory of natural areas occurs. In addition, FQI values have increased at 35 sites in 2010. Overall, these increases were minor, with the exception of two sites, CRR7 and MB9, which increased approximately 20 points. Increase ranging between 2 to 10 points occurred at 32 natural areas, which may be a result of more thorough inventory.

4.3 Fauna

The 2010 breeding bird surveys conducted in natural areas in Wards 8, 9 and 10 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/or patches with a high diversity of vegetation communities. Many of these species are significant (Species of Conservation Concern) in the Credit River Watershed (CVC 2010). Highlights included extensive riparian areas with connected tableland forest, such as the Credit River (CRR6, CRR7 and CRR10). These sites sustained the highest number of "possible" breeding bird species of any areas surveyed in 2010, 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, hairy woodpecker and blue-gray gnatcatcher).

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 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 in 2008, and Virginia rail in CRR9 in 2004 – there are no records within Wards 8, 9, or 10). Raptorial birds (hawks, falcons, *etc*.) are more common along the Credit River 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 four forested sites in 2010: CM12, CRR6, CRR7, and CRR10. 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 and are not present in new residential areas. Such species include barn swallow, chimney swift, and cliff swallow. Barn swallow was

documented from natural areas along the Credit River, Mullet Creek, and Sawmill Creek during the 2010 field season; areas typically surrounded by older residential neighbourhoods.

Provincial rarity ranks have not changed in 2010 for fauna species reported in the City of Mississauga. Within Wards 8, 9, and 10 there are 11 provincially significant fauna species including seven species of birds, one species of amphibian, and three species of reptiles (Appendix 13). Only one provincially significant bird species within Wards 8, 9, and 10 is a confirmed breeder, yellow-breasted chat at CRR10. Of the 11 provincially rare fauna species in these wards, only three were documented in 2010 (Caspian tern, yellow-breasted chat, and Jefferson/blue-spotted salamander complex). Other more recent records include great egret (2008) and red-headed woodpecker (2004). The remaining six species were last recorded over 10 years ago (Appendix 13).

The CVC Bird Species of Conservation Interest (CVC undated) has been revised to include all flora and fauna within the Credit River watershed, and is now called Species of Conservation Concern (SCC) (CVC 2010). Currently, there are 125 fauna SCC documented from Wards 8, 9, and 10. Of these, 17 fauna species are Tier 1, 47 are Tier 2, and 61 are Tier 3 (Tiers are defined in Appendix 5). Of the 125 fauna SCC, 107 are birds, of which 33 species are possibly breeding, 21 probably breeding, 45 observed in natural areas, one wintering species, and seven are documented as migrants. As described above, most of these SCC 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 (Appendix 14) and focused on early forest breeding amphibians that require vernal pools: spring peepers and wood frogs. Generally, very few sites within the natural areas system provide habitat for forest breeding amphibians, which require "fishless" ponds in or near woodlands for breeding. These ponds are fed by snow melt, groundwater and/or rainfall, and are full in early spring and dry out slowly over the summer. 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 rare in Mississauga. The following sites, where habitat appeared potentially suitable for woodland frogs (from aerial photo review), were surveyed for amphibians in 2010: CM9, CM25, CRR6, CRR10, MB4, ME11, ME12, and LS1.

American toads and northern leopard frogs are still extant in several locations, as they can use a number of upland and wetland habitats for foraging and breeding. These species were documented at CM9, CM25, and LS1. Western chorus frogs were documented from CM9 in 2010. During the last round of surveys at this site in 2006, chorus frogs were present, but since then the area surrounding CM9 has been developed. It is encouraging to note that the western chorus frog population has been able to persist at this location while development occurs around it. CM9 is entirely fenced off from public access and the forested area around the ephemeral pool has been protected. This demonstrates the benefits of buffers and restricted public access to natural areas.

Mammals common to urban areas are found occasionally with the natural areas system. Such mammals include white-tailed deer, grey squirrel, and raccoon (Photo 7). White-tailed deer are

typically more common in larger valleyland systems including CRR6, CRR7, CRR8, CRR10, and CRR11 in Wards 8, 9, and 10.

Photo 7. Common urban mammals, raccoons, at EM4 (Sawmill Valley Trail Park).

5.0 MANAGEMENT ISSUES

Generally, the natural areas within the City that were surveyed in 2010 continue to be in fair condition (see Appendix 6 for changes and Appendix 2 for definitions of "condition"). Natural areas evaluated as being 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. The overall condition of the natural areas visited in 2010 remained largely unchanged from previous studies.

The most common disturbances within natural areas are those associated with the inevitable increase in the uncontrolled human use of natural areas following development of 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, vandalism, invasive species, toxic non-native species. These disturbances have become more prevalent at many of the natural areas surveyed this year and are discussed below. Another threat to these natural areas is the ongoing pressure for additional development within Mississauga.

5.1 Ad-hoc Paths

Threat

Ad-hoc paths are commonly created within NAS sites (Photo 8). These paths greatly increase the amount of disturbance by compacting the soil, trampling vegetation, introduction of non-native species, and potentially disturbing local wildlife by increasing human activity in areas which were previously undisturbed.

Photo 8. *Ad-hoc* paths severely compact soils and degrade flora on the forest floor.

Management Recommendation
Generally, *ad-hoc* trails should be closed off and covered with natural debris (*i.e.* place logs *etc*. across path) to discourage use of the path and allow the area to regenerate. Signs could be posted at the entrances to these closed off trails to explain that the trail has been closed for natural regeneration. Ideally, natural areas prone to human use should be subject to a trail plan to rationalize the best location and design for trails. Providing well-constructed trails satisfies the need for passive recreation and thus mitigates the impact of *ad-hoc* trails. Where a natural area is located in an area subject to development, the trail plan could be required as part of the development application.

Locations
This management issue was noted at 26 NAS sites in 2010.

5.2 Mountain and BMX Bike Use

Threat
Mountain and "Bicycle Moto-cross" (BMX) circuits have been created in many natural areas. These circuits typically involve disturbance of soil and degradation of vegetation in the surrounding area (Photo 9). They often include the construction of elaborate circuits that may involve excavations, mounding of soil to create jumps, and construction of aerial routes with lumber. These pose a significant impact to natural areas. Mountain bike trails also frequently traverse steep slopes and may result in erosion issues and exposure of root systems.

Management Recommendation
There is a high demand for BMX and mountain bike trails in natural settings. Although the City has three dirt jump parks and one park specifically for mountain bikes (Ellis Leuschner Challenge Park), this recreational activity continues to be an issue which needs to be addressed. Consideration could be given to a ban on BMX and mountain bike use off of sanctioned trails,signage, barriers, education initiatives and promotion of existing facilities may assist in addressing this impact. This issue could be addressed jointly with CVC as they have similar issues in many of the Conservation Areas they manage, and may be able to assist with education and outreach through their Stewardship Programming.

The City could develop a rehabilitation protocol for areas impacted by trails and circuits. This could include re-grading areas, scarifying compacted soils and undertaking planting programs to re-establish natural cover in publicly owned natural areas. This could be combined with a community education program and involve local volunteers.

Locations
This management issue was noted at the following NAS sites in 2010: CE9, CRR6, CRR10, CRR11, EM4, EM6, EM10, LS1, MB8, and ME8.

Photo 9. Mountain bike circuit has severely degraded this area of ME8 (Windrush Woods), soils are compacted and vegetation unable to grow in such conditions.

5.3 Dumping/Garbage

Threat

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. In addition to dumping yard waste, garbage and compost often gets dumped into these natural areas as well. Garbage and compost is detrimental to natural areas in that it does not allow flora to grow up from underneath, contains potential harmful contaminants, and is a potential hazard for fauna.

Management Recommendation

Fencing off natural areas adjacent to residential and industrial lands is an expensive but effective method of deterring dumping within natural areas. In addition, volunteer events could be held to pick up garbage from these natural areas. This would help to keep the garbage issue under control. Signage which states that no dumping is allowed and the associated fines is also a deterrent for people dumping garbage at NAS sites. This signage has been posted at many NAS sites, however text on these signs tends to fade over time, and therefore these signs should be replaced as needed (Photo 10). This is another impact that

Photo 10. No dumping signage has faded and should be replaced at some NAS sites (pictured here at CE1 (Woodland Chase Trail)).

would benefit from additional education, as the public is often unaware of the impact of dumping garden waste.

Locations
This management issue was noted at 23 NAS sites in 2010.

5.4 Boundary Encroachment

Threat
Encroachment into a woodland edge can result in a number of indirect impacts that can degrade woodlands. 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 along 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. Additionally, edge encroachment often takes the form of residents manicuring the woodland ground layer. This often involves removing native flora and changing the structural characteristics of the woodland with resulting detrimental effects on wildlife habitat.

Management Recommendation
Chain link fencing should be placed in locations where natural areas directly abut residential or industrial areas. The impacts of encroachment should be addressed in educational and stewardship programs. Boundary encroachment by-laws should be enforced to the extent possible, with education being emphasized for first-time offenders.

Locations
This management issue was noted at the following NAS site in 2010: ME10.

5.5 Vandalism

Threat
Tree carving, tree cutting, and spay-paint are all types of vandalism which have been observed at NAS sites. At one NAS site, EM5, the side of a slope (in a $10m^2$ area) was dug up in an effort to find and collect worms, presumably as bait for fishing. These activities are detrimental to the growth and function of the ecosystem.

Management Recommendation
Similar to previous recommendations, limiting public access via fencing *etc*., as well as enforcement of City by-laws, would decrease the occurrence of this threat.

Locations
This management issue was noted at the following NAS sites in 2010: CE9, EM4, EM5, EM30, LS1, MB6, ME8/MB8, ME10, and ME12.

5.6 Development

Threat
Development continues to impact natural areas, through the removal of individual trees and larger areas containing native vegetation. Impacts can result from the construction of residential dwellings and related structures such decks, sheds and swimming pools, industrial buildings, infrastructure and parking areas. In 2010, one natural area (CM25) surveyed significantly decreased in overall size due to development and was therefore re-classified to SMA (Photo 11).

Management Recommendations
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.

Locations
This management issue was noted at the following NAS sites in 2010: CM25, WB1.

Photo 11. Development of O'Connor Park (CM25).

5.7 Invasive Species

Threat
There has been a continual increase in the proportion of non-native to native plant species in natural areas since 1996 (see Appendix 6). Of the 36 natural areas surveyed this year, all showed an increase of non-native species. 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.

Management Recommendation
Actively manage for highly invasive non-native species such as garlic mustard and European buckthorn. These species in particular are highly competitive and often out-compete native vegetation.

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.

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. 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*). The City should consider ways 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.

Locations
This management issue was noted at all NAS sites in 2010.

5.8 Toxic Non-native Species

Threat
There are 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 2009 (see Section 4.2). Giant hogweed is a non-native species introduced from Europe and has been noted at six natural areas within the Wards 8, 9, and 10. The non-native wild parsnip has been recorded during field work in Mississauga since 2000. As of the 2010 update, wild parsnip has been recorded from seven natural areas in Wards 8, 9, and 10. 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.

Management Recommendation
It is recommended that these species be made a priority for removal from NAS sites. 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.

Locations
This management issue was noted at the following NAS sites in 2010: CRR6, CRR7, CRR8, CRR10, CRR11, and MB7.



Photos 12 and 13. Giant hogweed growing at CRR11, Hewick Meadows Park.

5.9 City Naturalization Initiatives

Threat
Naturalized areas observed during field work at a number of sites have typically involved leaving an area of un-mowed grass to regenerate naturally. 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.

Management Recommendation
To the extent possible, such areas should be planted with native species or otherwise managed toward a native community to prevent or reduce the impact of non-native plant species. It is important that restoration plantings be managed, at least through the establishment phase, otherwise in most cases the plantings do not survive, as has happened at natural area ME13.

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.

5.10 Need for Management Plans

Threat
All of the management issues noted above are a result of development adjacent to natural areas and uncontrolled human use of natural areas. Use of NAS sites by the public is appropriate and should be encouraged to promote an appreciation of Mississauga's natural heritage. However, uncontrolled use and access will degrade the City's natural areas.

Management Recommendation
The only approach to minimizing and hopefully preventing this is through the development of management plans for natural areas. These management plans should identify permitted uses and locate trails consistent with the capacity of each site to sustain use, as well as identifying portions of area that are too sensitive to permit human access and areas that should be rehabilitated and/or restored. The development of management plans for natural areas within the City could be prioritized with higher consideration given to areas that are most susceptible to degradation, and which have high natural heritage values.

Consideration should be given to prioritize natural areas based on significance, representation, size and condition, and those of greatest value. Issues addressed in the management 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 management plan (previously named "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.

5.11 Summary of Management Issues

Observations at natural areas in Mississauga are consistent with reports from the literature that human use of natural areas results in the degradation of such areas through: alteration of decomposition and nutrient cycles, 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 management plans (Conservation Plans) and community stewardship initiatives.

6.0 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 4.2, Appendix 6). However, the decrease in the mean CC within the high category, from 4.82 in 1996 to 4.52 in 2010, suggests there may be a slight increase in disturbance in at least some of Mississauga's natural areas, although this may be a result of more thorough inventories. 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.*). 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 area of tableland and wetland natural areas in the City (Section 3.4). Development between 1996 and 2010 has resulted in the total loss of approximately 106 ha from the natural areas system including the loss of fourteen natural areas. There has been no net loss of natural area within the natural areas system since 2006. Between 2006 and 2010, the natural areas system has increased by 176.7 ha.

Four valleyland communities, sixteen woodland communities, four successional communities, four wetland vegetation communities, two anthropogenic communities, and three "other" communities are uncommon in the City (Appendix 9). Of these, one of the valleyland communities, seven woodland communities, one successional community, and one "other" community are "at risk" in the City, occurring in only one natural area each.

Tableland NAS sites tend to be discrete islands that have limited connections to other remnant natural features. 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.

An overall trend continues to be a negative 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 and abundance 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 increase in naturalization projects undertaken by the City. The majority of naturalized areas observed during fieldwork between 1996 and 2010 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. It has been noted that some areas have also been planted with native vegetation as part of the City's active restoration initiative. These planted species would benefit from management after being planted.

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).

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Appendix 1: Natural Area Classification Scheme

Appendix 1: Natural Area Classification Scheme (as updated in 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 [*e.g.*, 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 (*e.g.*, 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: Methods

Appendix 2: Methods for the Mississauga Natural Areas Survey.

Background Review

A background review was carried out comprising a careful analysis of 2009 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 visits were made to 34 of the 36 sites included in the NAS review for 2010 (Appendix 3). Natural areas MB1 and MB2 did not receive a full field visit because permission to access these sites was not provided, however, these sites received a road side visit or were visited by walking along public areas adjacent to the natural areas (*e.g.,* along stream corridors).

Fieldwork

For those sites in Wards 8, 9, and 10 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 to confirm identification;
- vegetation community descriptions were confirmed and 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, 2010 for all of the natural areas in Wards 8, 9, and 10 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 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.

Of the 36 sites visited in 2010, 11 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 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).

As the NAS study pre-dated the provincial Ecological Land Classification (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.

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 2010. 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 5). For the purpose of reporting descriptive statistics, 29,269.0 ha was used as the total area of the City of Mississauga.

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 programs, 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 2010.

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.

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 2009

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.

Appendix 3: Reports Examined for Natural Areas Survey Updates

Appendix 3: 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. Greenfield 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

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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.

285 W.D. McIlveen. 2009. Winter Birds in Mississauga Shoreline Parks. Monitoring Program 2008-2009. Prepared for Credit Valley Conservation.

286 Natural Resource Solutions Inc. 2009. Credit Valley Conservation Terrestrial Ecological Land Classification. Prepared for Credit Valley Conservation.

287 Stantec Consulting Ltd. 2009. 701 Winston Churchill Boulevard Environmental Impact Study. Prepared for Southdown Station Partnership, 200 Front St. West.

288 Ecoplans Ltd. 2010. Mississauga Bus Rapid Transit East Project Limits: Terrestrial Impact Assessment Technical Memorandum. Prepared for the City of Mississauga.

289 LGL Limited. 2009. Butternut Tree Survey, Lornewood Creek Sanitary Sewer Class Environmental Assessment, Regional Municipality of Peel.

Appendix 4: Fieldwork Identified and Date Completed

Appendix 4: 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	Reason for Field Visit (based on review of aerial photography and literature)	Field Visit		Ownership	Date
		Type	Timing		
Minor Boundary Change					
CM7	Minor boundary revision required	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		13/08/10
CM9	Minor boundary revision required; investigate frog breeding	field work	breeding birds	parkland	15/06/10
			amphibians		15/04/10
			spring flora		15/06/10
			summer flora		13/08/10
CM12	Minor boundary revision required	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		27/08/10
CE1	Minor boundary revision required	field work	breeding birds	parkland	18/06/10
			spring flora		18/06/10
			summer flora		27/08/10
CRR6	Minor boundary revision required; search for butternut (last observation 2006); investigate salamander breeding	field work	breeding birds	parkland	23/06/10, 26/06/10, 01/07/10, 06/07/10
			amphibians		23/03/10, 30/03/10, 01/04/10
			spring flora		23/06/10, 26/06/10, 1/07/10, 6/07/10
			summer flora		30/08/10, 01/09/10
			butternut		30/08/10, 01/09/10

Natural Area	Reason for Field Visit (based on review of aerial photography and literature)	Field Visit		Ownership	Date
		Type	Timing		
CRR7	Minor boundary revision required; Credit Valley Golf & Country Club property fully inventoried in 2009, therefore only City-owned lands remain to be surveyed in 2010; search for butternut (last observation 2009)	field work	breeding birds	Public	18/06/10
			spring flora		18/06/10
			summer flora		30/08/10
			butternut		30/08/10
ME13	Minor boundary revision required	field work	breeding birds	parkland	18/06/10
			spring flora		18/06/10
			summer flora		10/08/10
CM25	Minor boundary revision required; investigate frog breeding	field work	breeding birds	parkland	15/06/10
			amphibians		15/04/10
			spring flora		15/06/10
			summer flora		12/08/10
CE7	Minor boundary revision required; search for butternut (literature record 1976)	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		13/08/10
			butternut		13/08/10
CE9	Minor boundary revision required	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		31/08/10
CRR11	Minor boundary revision required; search for butternut (literature record 2005)	field work	breeding birds	parkland	01/07/10
			spring flora		01/07/10
			summer flora		30/08/10
			butternut		30/08/10
EM6	Minor boundary revision required	field work	breeding birds	parkland	17/06/10
			spring flora		17/06/10
			summer flora		31/08/10

Natural Area	Reason for Field Visit (based on review of aerial photography and literature)	Field Visit		Ownership	Date
		Type	Timing		
EM21	Minor boundary revision required	field work	breeding birds	parkland	23/06/10
			spring flora		23/06/10
			summer flora		24/08/10
EM30	Minor boundary revision required	field work	breeding birds	parkland	17/06/10
			spring flora		17/06/10
			summer flora		31/08/10
LS2	Minor boundary revision required	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		12/08/10
LS3	Minor boundary revision required	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		12/08/10
MB1	Minor boundary revision required	road visit	breeding birds	Private	14/06/10
			spring flora		14/06/10
			summer flora		18/08/10
MB2	Minor boundary revision required	road visit	breeding birds	Private	13/06/10
			spring flora		13/06/10
			summer flora		26/08/10
MB3	Minor boundary revision required	field work	breeding birds	parkland	14/06/10
			spring flora		14/06/10
			summer flora		18/08/10
MB4	Minor boundary revision required; investigate frog breeding	field work	breeding birds	Private	14/06/10
			amphibians		15/04/10
			spring flora		14/06/10
			summer flora		18/08/10

Natural Area	Reason for Field Visit (based on review of aerial photography and literature)	Field Visit		Ownership	Date
		Type	Timing		
MB6	Minor boundary revision required	field work	breeding birds	Totoredaca Park	13/06/10
			spring flora		13/06/10
			summer flora		26/08/10
ME8	Minor boundary revision required	field work	breeding birds	Private	14/06/10
			spring flora		14/06/10
			summer flora		18/08/10
ME9	Minor boundary revision required	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		10/08/10
ME10	Minor boundary revision required; locate butternut (last observation 2001)	field work	breeding birds	parkland	15/06/10
			spring flora		15/06/10
			summer flora		10/08/10
			butternut		10/08/10
ME11	Minor boundary revision required; investigate frog breeding	field work	breeding birds	parkland	18/06/10
			amphibians		15/04/10
			spring flora		18/06/10
			summer flora		10/08/10
CRR10	Minor boundary revision required; search for butternut (last observation 2001); investigate salamander breeding	field work	breeding birds	parkland	15/06/10, 23/06/10
			amphibians		23/03/10, 30/03/10
			spring flora		15/06/10, 23/06/10
			summer flora		24/08/10
			butternut		24/08/10
MB8	Minor boundary revision required; search for butternut (last observation 1995)	field work	breeding birds	greenbelt	14/06/10
			spring flora		14/06/10

Natural Area	Reason for Field Visit (based on review of aerial photography and literature)	Field Visit		Ownership	Date
		Type	Timing		
			summer flora		18/08/10
			butternut		18/08/10
WB1	Minor boundary revision required	field work	breeding birds	parkland	18/06/10
			spring flora		18/06/10
			summer flora		26/08/10
Investigate Potential Additions					
EM2	Investigate potential additions and minor boundary revisions; search for butternut (last observation 1995)	field work	breeding birds	parkland	17/06/10
			spring flora		17/06/10
			summer flora		26/08/10
			butternut		26/08/10
EM4	Investigate potential additions and minor boundary revisions; search for butternut (last observation 1995)	field work	breeding birds	parkland	06/06/10
			spring flora		06/06/10
			summer flora		26/08/10, 27/08/10, 31/08/10
			butternut		26/08/10, 27/08/10, 31/08/10
EM5	Investigate potential additions and minor boundary revisions	field work	breeding birds	greenbelt	17/06/10
			spring flora		17/06/10
			summer flora		23/08/10
EM10	Investigate potential additions and minor boundary revisions	field work	breeding birds	parkland	17/06/10
			spring flora		17/06/10
			summer flora		31/08/10
EM14	Investigate potential additions and minor boundary revisions; search for butternut (last observation 2001)	field work	breeding birds	parkland	17/06/10
			spring flora		17/06/10
			summer flora		31/08/10
			butternut		31/08/10

Natural Area	Reason for Field Visit (based on review of aerial photography and literature)	Field Visit		Ownership	Date
		Type	Timing		
LS1	Investigate potential additions and minor boundary revisions; investigate frog breeding	field work	breeding birds	parkland	15/06/10
			amphibians		15/04/10
			spring flora		15/06/10
			summer flora		12/08/10
MB7	Investigate potential additions and minor boundary revisions	field work	breeding birds	parkland	14/06/10
			spring flora		14/06/10
			summer flora		18/08/10
ME12	Investigate potential additions and minor boundary revisions; investigate frog breeding	field work	breeding birds	parkland	18/08/10
			amphibians		15/04/10
			spring flora		18/06/10
			summer flora		10/08/10

Appendix 5: Rarity Status Definitions

Appendix 5: Rarity Status Definitions – Provincial Rarity and CVC's Species of Conservation Concern.

The following six rarity ranks follow the Natural Heritage Information Centre (NHIC 2009).

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.

Credit Valley Conservation Species of Conservation Concern tiers (CVC 2010).

Tier 1—Species of Conservation Concern
Tier 1 species, Species of Conservation Concern, are either currently protected under Canada's Species At Risk Act (SARA) or Ontario's Endangered Species Act (ESA), have been designated a species at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or by the Committee on the Status of Species at Risk on Ontario (COSSARO), or have been assigned at Subnational Rank (S-rank) of S1-S3? by the Natural Heritage Information Centre (NHIC). Once sufficient data on species of the Credit River Watershed is collected, an anticipated outcome is for species that are locally rare to be updated to Tier 1 status and for CVC to develop policy to protect these species and their habitat.

Tier 1 species are generally characterized by low abundance, low population density, specialized habitat requirements, and/or a narrow tolerance for survival. Because of their rarity and sensitivity, species of conservation concern should be identified and managed carefully, as even minor alterations to their habitat could be catastrophic. Identification and protection of habitats at various scales will help to maintain local populations and contribute to the protection and recovery of species identified as conservation priorities.

Tier 2—Species of Interest
Tier 2 species are those that have not been identified as Species of Conservation Concern but may be at risk from extirpation from the Credit River Watershed. These species appear to be exhibiting population declines, are naturally rare, are known or suspected to be sensitive to habitat loss and the effects of urbanization, or are species for which data is lacking. CVC aims to track these species to ensure that through policy and stewardship they receive the protection they require to prevent extirpation.

Tier 3—Species of Urban Interest

Species that have been designated Tier 3 are being tracked in urban areas. Urban areas are considered to be those within 2 km of built up cities or towns, including Mississauga, Brampton, Georgetown, Acton, Erin and Orangeville. Generally these species are secure in rural areas but have shown declines in or sensitivities to areas that are anthropogenically influenced or disturbed. CVC is interested in tracking these species to guide management decisions and address species declines in urban areas.

Appendix 6: Changes in Natural Areas Updated (1996 to 2010)

Appendix 6: Changes in Natural Areas in Wards 8, 9 and 10 from 1996 to 2010

This table provides changes within natural areas evaluated in 2010. All changes between 1996 and 2010 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, native mean coefficient and condition are explained in Appendix 2.Provincially and regionally significant species are defined in Appendix 5.. Credit Valley Conservation (CVC) Species of Conservation Interest are discussed in North-South Environmental (2000).

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
CL13	96	NGS		1.50	3.70	40	23 (55.00%)	8.25	1.94	2	0	0		2	0	0	0	0		Poor
	98																			
	99	↑NS		↑8.42	↑20.70	↑61	↑34 (55.74%)	↑13.47	↑2.59			↑1		↑5						
	00																			
	01					↑74	↑43 (58.11%)	↑14.37	↓2.58	↑3				↑8						
	02																			
	04			↓7.03	↓17.35	↑86	↑49 (56.98%)	↑15.04	↑2.54					↑11	↑1			↑1		
	05																			
	06					↑87	↑50 (57.47%)								↑3					
	10			↓6.18	↓15.27	↑135	↑77 (57.04%)	↑20.71	↑2.77			↑3	13	↑16	↑5				0	
CM25	96																			
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06	NGS		0.70	1.73	24	11 (45.83%)	5.27	1.46	2			1	7		1		2		Fair - Poor
	10			↓0	↓0	↑37	↑17 (45.95%)	↑8.50	↑1.90					↑12		↑2		↑5	3	

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
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		
	06			↓ 92.82	↓229.26									↑ 44						
	10			↑98.36	↑243.05	↑319	↑109 (34.17%)	↑63.26	↓4.37	↑6		↑43	88	↑54	↑9	↑8		↓3	3	
CRR6	96	SNS	ESA,ANSI	213.66	527.74	269	88 (32.30%)	63.63	4.73	4	4	65		87	8	17	1	0		Good
	98			↓213.22	↓526.64	↑277	↑91 (32.50%)	↑64.67	↑4.74		↓3	↑73								
	99					↑281	↑92 (32.70%)	↑65.03	↓4.73			↓72								
	00						↓91 (32.38%)											↑8		
	01			↓135.16	↓333.86	↓264	↓88 (33.33%)	↓61.21	↓4.61		↓2	↓62		↓67		↑18		↑10		
	02			↓134.94	↓333.30	↑272	↑91 (33.46%)	↑61.74	↓4.59			↑64			↓7					
	04																			
	05																			
	06			↓134.55	↓332.33	↑302	↑97 (32.12%)	↑66.11`	↑4.62			↑73		↑74	↑8			↑16		
	10			↑139.89	↑345.67	↑375	↑126 (33.60%)	↑70.79	↓4.49	↑18		↓68	111	↑76			↑2	↑18	16	
WB1	96	NS		7.12	17.58	53	9 (16.98%)	25.93	3.91	5	0	0		4	0	1	0	0		Fair
	98																			
	99																			
	00																			
	01			↓3.94	↓9.73	↑57	↑10 (17.54%)	↑26.11	↓3.81					↑5						↓Fair-Poor
	02																			
	04																			
	05																			
	06			↓3.90	↓9.62	↑72	↑18 (25.00%)	↑28.85	↑3.93			↑1		↑15	↑2			↑2		↑Good-Fair
	10					↑106	↑27 (25.47%)	↑31.84	↓3.58	↑9		↑3	19	↑21					2	↓Fair

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
EM30	96	NS		5.57	13.75	52	5 (9.62%)	29.61	4.32	2		6		5	8	0	0	0		Good
	98																			
	99																			
	00																			
	01					↑68	↑8 (11.76%)	↑30.73	↓3.97	↑5		↑7		↑7						
	02																			
	04																			
	05																			
	06			↓5.23	↓12.93	↑93	↑19 (20.43%)	↑33.83	↓3.93			↑8		↑12						
	10			↑5.37	↑13.27	↑107	↑29 (27.10%)	↑34.76	↑3.94	↑6		↓4	24	↑13		↑1		↑1	1	
EM6	96	NS		1.07	2.65	53	11 (20.75%)	25.00	3.86	1	0	1		6	1	0	0	0		Fair
	98																			
	99																			
	00																			
	01					↑58	↑14 (24.14%)	↓24.72	↓3.73											
	02																			
	04																			
	05																			
	06			↓1.03	↓2.55	↑70	↑20 (28.57%)	↑27.01	↑3.82					↑7						
	10			↑1.23	↑3.04	↑81	↑25 (30.86%)	↑28.73	↑3.84				15	↑10				↑1	0	
EM2	96	SNS		4.90	12.09	63	12 (19.05%)	28.85	4.04	1	1	0		8	1	0	0	0		Fair
	98																			
	99																			
	00	↓NS									↓0									
	01					↑74	↑15 (20.27%)	↑29.81	↓3.88											
	02																			
	04																			
	05																			
	06			↓4.78	↓11.81	↑85	↓15 (17.65%)	↑32.99	↑3.94		↑1	↑1		↑12						
	10	↑SNS		↑5.55	↑13.71	↑91	↑16 (17.58%)	↑33.83	↓3.91	↑2			21	↑14					0	

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
EM10	96	NS		3.99	9.86	43	9 (20.93%)	21.78	3.74	2	0	0		4	2	0	0	0		Fair
	98																			
	99																			
	00																			
	01			↓3.73	↓9.22	↑54	↑13 (24.07%)	↑22.96	↓3.59											
	02																			
	04																			
	05																			
	06			↑3.82	↑9.43	↑70	↑21 (30.00%)	↑24.43	↓3.49	↑3				↑9		↑1		↑1		
	10			↑4.07	↑10.06	↑95	↑32 (33.68%)	↑29.10	↑3.67			↑1	14	↑13					0	
EM14	96	NS		9.61	23.74	49	22 (44.90%)	15.40	2.96	2	0	0		4	0	0	0	0		Poor
	98																			
	99																			
	00																			
	01			↓9.19	↓22.70	↑74	↑36 (48.65%)	↑17.36	↓2.82					↑8						↑Fair
	02																			
	04																			
	05																			
	06	↑SNS		↑9.38	↑23.16	↑94	↑42 (44.68%)	↑21.22	↑2.94	↑5	↑1			↑15	↑3	↑1		↑1		
	10			↑10.00	↑24.71	↑136	↑66 (48.53%)	↑26.18	↑3.13	↑6			12	↑23	↑4			↑3	2	↓Poor
EM4	96	SNS	ESA,ANSI	46.82	115.65	225	61 (26.70%)	55.05	4.30	8	2	28		67	4	6	0	0		Good - Fair
	98					↑ 228					↓ 1	↑ 30								
	99			↓ 43.18	↓ 106.65	↑ 235	↑ 64 (27.20%)	↑ 56.28				↑ 31			↑ 5					
	00																			
	01			↓ 42.98	↓106.17		↓ 62 (26.38%)	↓ 55.96	↓ 4.25		↑ 2							↑ 2		
	02																			
	04					↑ 240	↑ 66 (27.50%)	↑ 56.25	↑ 4.26			↑ 32								
	05			↑ 42.99	↑ 106.22	↑ 251	↑ 75 (29.88%)	↓ 56.01	↓ 4.22											
	06			↓ 41.93	↓ 103.57	↑258	↑76 (29.46%)	↑ 57.15	↑ 4.24			↑ 36		↑ 70	↑ 7			↑ 5		
	10			↑46.25	↑114.28	↑328	↑103 (31.40%)	↑63.67		↑17	↑3	↓35	96	↑71					4	

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
EM5	96	NS		1.88	4.64	49	9 (32.70%)	22.27	3.94	1				4						Fair
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06			↑4.89	↑12.09	↑61	↑19 (31.15%)	↑23.15	↓3.57	↑2				↑6				1		
	10			↑6.13	↑15.15	↑112	↑51 (45.54%)	↑25.35	↓3.25	↑3		↑1	12	↑14	↑1	↑1		↑3	2	
EM21	96	NS		1.13	2.79	42	8 (16.70%)	21.27	3.65	1				2	1					Fair
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06			↓0.84	↓2.08	↑51	↑10 (19.61%)	↑22.18	↓3.46											Fair
	10			↑1.04	↑2.57	↑74	↑23 (31.08%)	↑26.19	↑3.67			↑1	13	↑8	↑2			↑1	1	
CM7	96	SNS		11.38	28.11	88	18 (20.50%)	34.78	4.16	3	0	5		15	1	5	0	0		Excellent
	98																			
	99																			
	00																			
	01																			
	02					↑89		↑35.13	↑4.17			↓3					↑1			
	04																			
	05																			
	06			↓11.17	↓27.58	↑92	↓18 (19.57%)	↑35.57	↓4.14					↑22	↑3		↑1	↑2		↓Good
	10			↑11.60	↑28.66	↑101	↑19 (18.81%)	↑36.55	↑4.04			↓1	22	↑23					1	↑Excellent

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
CM9	96	NS		3.37	8.32	62	12 (17.7%)	27.58	3.90	2	0	3		8	2	0	0	0		Good
	98																			
	99																			
	00																			
	01																			
	02					↑64		↑27.74	↓3.85											
	04																			
	05																			
	06			↑3.91	↑9.67	↑78	↑14 (17.95%)	↑31.00	↑3.88	↑4		↑5		↑13		↑3		↑1		
	10			↑4.02	↑9.93	↑111	↑31 (27.93%)	↑33.76	↓3.78	↓3			15	↑15				↑2	1	
CM12	96	NS		8.22	20.30	54	8 (14.80%)	27.42	4.04	2	0	2		11	2	5	0	0		Good
	98																			
	99			↓8.21	↓20.28	↑76	↑15 (19.74%)	↑29.96	↓3.84			↑3		↑14	↑5	↑6				
	00																			
	01			↓5.77	↓14.25	↑82		↑30.42	↓3.72	↓1										
	02																			
	04																			
	05																			
	06			↑6.05	↑14.95	↑87	↑17 (19.54%)	↑31.79	↑3.80					↑19		↑8		↑1		Good
	10			↓6.04	↓14.92	↑108	↑26 (24.07%)	↑34.34	↓3.79			↑4	21	↑21				↑3	2	
CE7	96	SNS		10.08	24.90	88	28 (31.82%)	30.47	3.93	2	0	4		2	1	7	0	0		Good
	98																			
	99																			
	00																			
	01					↑98	↑29 (29.59%)	↑33.11	↑3.99			↑6		↑4						
	02																			
	04																			
	05																			
	06			↓9.33	↓23.04	↑109	↑33 (30.28%)	↑35.67	↑4.09		↑1	↑7		↑8						
	10			↑9.52	↑23.52	↑139	↑43 (30.94%)	↑37.97	↓3.88	↑3		↓5	27	↑9	↑2				0	

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
CE9	96	NS		4.83	11.94	58	14 (24.10%)	26.99	4.07	3	0	2		2	1	0	0	0		Fair
	98																			
	99																			
	00					↑76	↑16 (21.05%)	↑32.29	↑4.20											
	01			↓4.74	↓11.70	↑78	↑17 (21.79%)	↑32.52	↓4.16			↑5		↑10	↑2					
	02																			
	04																			
	05																			
	06			↑5.04	↑12.44	↑96	↑28 (29.17%)	↑33.71	↓4.09	↑5		↑7		↑14						
	10			↑5.42	↑13.39	↑132	↑41 (31.06%)	↑37.95	↓3.98	↑6		↓4	23	↑18				↑1	0	
CE1	96	NGS		16.94	41.84	50	24 (46.00%)			2				3						Poor
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06			↓16.84	↓41.60	↑85	↑25 (29.41%)	23.85	4.15	↑3				↑13	1	5		2		
	10			↑18.04	↑45.58	↑153	↑63 (41.18%)	↑29.61	↓3.73	↑8		↑3	14	↑22	↑3			↑5	2	
LS1	96	SNS	Wetland	28.92	71.42	63	14 (22.22%)	27.14	3.88	3	0	6		4	0	0	0	0		Good - Fair
	98																			
	99																			
	00																			
	01			↓28.47	↓70.32	↑111	↑39 (35.14%)	↑28.99	↓3.42			↑7		↑9	↑1					
	02																			
	04																			
	05																			
	06			↓26.39	↓65.17	↑145	↑59 (40.69%)	↑32.35	↑3.49			↑10		↑25	↑2			↑1		
	10			↑32.68	↑80.75	↑182	↑70 (38.46%)	↑38.68	↑3.65			↑11	32	↑30		↑1		↑6	4	

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
LS2	96	NS		1.27	3.13	45	13 (28.89%)	22.09	3.97	1	0	0		2	0	0	0	0		↓Fair
	98																			
	99																			
	00																			
	01			↓1.03	↓2.55	↑52	↑15 (28.85%)	↑23.18	↓3.81					↑5	↑1					↓Fair-Poor
	02																			
	04																			
	05																			
	06					↑59	↑17 (28.81%)	↑24.53	↓3.79					↑6						↓Poor
	10			↑1.18	↑2.91	↑64	↑18 (28.13%)	↑25.95	↑3.83				10	↑8					0	↑Fair
LS3	96	NS		3.00	7.40	66	22 (33.33%)	23.94	3.65	2	0	2		1	1	2	0	0		Fair
	98																			
	99																			
	00																			
	01					↑95	↑29 (30.53%)	↑27.94	↓3.44	↑3		↑4		↑4						
	02																			
	04																			
	05																			
	06					↑113	↑40 (35.40%)	↑29.38						↑11	↑2			↑1		
	10			↑3.29	↑8.13	↑128	↑47 (36.72%)	↑30.00	↓3.33	↑4		↓2	17	↑13					0	
ME10	96	SNS		4.18	10.33	55	15 (27.27%)	24.67	3.90	1	1	2		4	0	0	0	0		Fair
	98										↓0	↑3								
	99																			
	00																			
	01			↓2.92	↓7.22	↑64	↑17 (26.56%)					↓2			↑1					
	02																			
	04																			
	05																			
	06			↑3.39	↑8.38	↑73	↑18 (24.66%)	↑27.91	↓3.76		↑1	↑3		↑7				↑1		
	10			↑3.69	↑9.12	↑86	↑22 (25.58%)	↑32.00	↑4.00			↑4	18	↑12	↑2				0	

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
ME12	96	NGS		2.90	7.16	49	27 (55.10%)	12.00	2.62	1	0	0		7	2	7	0	0		Poor
	98																			
	99																			
	00																			
	01					↑64	↑36 (56.25%)	↑14.55	↑2.75					↑8						
	02																			
	04																			
	05																			
	06	↑SNS				↑87	↑49 (56.32%)	↑16.60	↓2.73			↑1		↑18	↑3	↑7	↑1			
	10			↑3.65	↑9.02	↑96	↑52 (54.17%)	↑18.91	↑2.88	↑3			8	↑23				↑2	1	
ME11	96	NGS		4.36	10.78	41	21 (51.20%)	11.40	2.55	1	0	0		5	2	4	0	0		Poor
	98																			
	99																			
	00					↑51	↑22 (43.14%)	↑16.17	↑3.11			↑3								
	01					↑56	↑27 (48.21%)	↑17.08	↑3.17					↑9						
	02																			
	04																			
	05																			
	06					↑83	↑45 (54.22%)	↓14.79	↓2.70			↑5		↑17	↑4			↑1		↑Fair-Poor
	10			↑5.40	↑13.34	↑118	↑60 (50.85%)	↑21.50	↑3.04	↑2		↑8	19	↑18	↑5			↑2	1	↓Poor
ME9	96	NS		2.39	5.90	44	11 (25.00%)	25.59	4.45	1	0	2		2	1	0	0	0		Fair
	98																			
	99																			
	00																			
	01					↑54	↑13 (24.07%)	↑29.20	↑4.56			↑3								
	02																			
	04																			
	05																			
	06			↓2.26	↓5.58	↑64	15 (23.44%)	↑30.14	↓4.31			↑4		↑4						↑Good
	10			↑2.40	↑5.93	↑82	↑22 (27.83%)	↑32.43	↓4.19			↓3	16	↑10					0	↓Fair

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
ME8/ MB8	96	SNS		15.98	39.47	87	13 (26.40%)	30.25	3.78	2	1	4		3	3	4	0	0		Fair
	98										↓0									
	99																			
	00					↓88	↑24 (27.27%)													
	01					↑90		↑31.27	↑3.85											
	02																			
	04																			
	05																			
	06			↓15.68	↓38.74	↑93	↓24 (25.81%)	↑32.02	↑3.86		↑1			↑15						
	10			↓15.65	↓38.67	↑142	↑46 (32.39)	↑36.03	↓3.68	↑5		↑5	22	↑22	↑4			↑3	9	
MB9	96	NGS		6.60	16.30	0	0	0	0	1	0	0		0	0	2	0	0		Poor
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06																			
	10			↓5.78	↓14.28	↑88	↑42 (47.73%)	↑19.76	↑2.91			↑3	9	↑17	↑1		↑1		0	
MB7	96	NGS		10.45	25.80	0	0	n/a	n/a	1	0	0		0	0	0	0	0		Poor
	98																			
	99																			
	00																			
	01					↑35	↑21 (60.00%)	↑6.68	↑1.79					↑4						
	02																			
	04																			
	05																			
	06			↓10.23	↓25.27	↑43	↑24 (55.81%)	↑7.99	↑1.83					↑12				↑1		
	10			↓9.95	↓24.59	↑95	↑48 (50.53%)	↑18.28	↑2.67	↑5		↑1	8	↑17	↑1			↑2	1	

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
MB3	96	NGS		7.11	17.55	0	0	n/a	n/a	1	0	0		0	0	0	0	0		Poor
	98																			
	99																			
	00																			
	01			↓4.91	↓12.13	↑26	↑15 (57.69%)	↑4.82	↑1.45					↑3		↑1				
	02																			
	04																			
	05																			
	06			↑5.38	↑13.28	↑34	↑19 (55.88%)	↑5.94	↑1.53					↑15	↑1			↑1		↑Fair
	10			↑5.42	↑13.39	↑58	↑33 (55.93%)	↑9.79	↑1.92	↑3			3	↑17					1	↓Poor
MB4	96	NS		1.93	4.77	40	11 (27.50%)	19.31	3.59	1										Poor
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06			↓1.77	↓4.36									↑8				↑1		
	10			↑2.12	↑5.24	↑71	↑28 (39.44%)	↑21.35	↓3.26	↑2			5	↑15	↑1			↑3	2	
MB6	96	SNS		23.70	58.54	84	14 (16.67%)	30.70	3.70	2	0	6		1	1	2	0	0		Good
	98																			
	99																			
	00																			
	01			↑23.76	↑58.68	↑100	↑18 (18.00%)	↑33.57	↑3.71			↑9		↑5	↑2					
	02																			
	04																			
	05																			
	06			↓23.56	↓58.20	↑141	↑39 (27.66%)	↑35.65	↓3.53			↑13		↑27	↑7			↑7		

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
	10			25.13	↑62.10	↑208	↑69 (33.17%)	↑43.40	↑3.68	↑9	↑1	↓12	41	↑36				↑9	7	
MB2	96	NS		1.34	3.31	41	6 (14.60%)	23.66	4.00	1		1		1						Poor
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06					↑50	↓6 (12.00%)	↑25.63	↓3.86					↑7				1		
	10			↑1.68	↑4.15	↑77	↑26 (33.77%)		↓3.59				8	↑11	↑2				1	
MB1	96	NS		0.94	2.32	34	6 (17.60%)	22.87	4.32	1										Fair
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06			↓0.77	↓1.89	34	↑6 (17.65%)							1						
				↑1.16	↑	52	↑12 (23.08%)	↑25.77	↓4.07				7	↑7				↑1	1	
CRR10	96																			
	98																			
	99																			
	00																			
	01	SNS	ESA,ANSI	43.75	108.07	359	129 (35.93%)	65.28	4.30	2	1	64		88	8	9	1	25		Good
	02			↑65.25	↑161.16	↑361	↑130 (36.01%)	↑65.75	↑4.33	↑9						↑10				
	04																			
	05																			
	06			↓60.42	↓149.23	↑373	↓130 (34.85%)	↑67.89	↑4.36		↑2	↑70		↑89	↑10	↑11		↑27		

Site Code	Year	Classification	Designation	Area		Flora								Fauna						Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# veg. comm.	prov. sig. species	loc. sig. species	CVC 2010	# birds	# mammals	# herptiles	prov. sig. species	CVC	CVC 2010	
	10			↑63.56	↑157.06	↑417	↑147 (35.25%)	↑71.49	↓4.35	↑14		↑53	117	↑94	↑12		↑2	↑28	25	
CRR11	96																			
	98																			
	99																			
	00																			
	01	SNS	ESA	32.16	79.44	0	0	n/a	n/a	2	0	0		12	1	5	0		0	Good
	02					↑101	↑44 (43.56%)	24.64	3.26	↑4		↑3		↑19	↑2					
	04																			
	05																			
	06					↑157	↑48 (30.57%)	↑40.02	↑3.83		↑1	↑15		↑25	↑3					
	10			↑33.66	↑83.17	↑242	↑95 (39.26%)	↑46.34	↓3.82	↑8		↑16	46	↑38	↑6			↑9	7	
ME13	96																			
	98																			
	99																			
	00																			
	01																			
	02																			
	04																			
	05																			
	06	NGS		1.42	3.50	25	6 (24.00%)	18.58	4.26	1				3						Fair - Poor
	10			↑1.43	↑3.53	↑40	↑10 (25.00%)	↑22.09	↓4.03			↑1	4	↑7	↑1				0	

Appendix 7: Comparison of Classifications (1996 to 2010)

Appendix 7: Comparison of Natural Area Classifications (1996 to 2010)

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
	2010	62	62	13	3	140
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
	2010	1685.11	332.01	94.10	235.38	2346.60
Proportion of Natural Areas	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%	-	-

Comparison Categories	Year	Classification				TOTAL
		Significant Natural Site (SNS)	Natural Site (NS)	Natural Green Space (NGS)	Residential Woodland (RW)	
	2006	71%	12%	6%	-	-
	2007	65.3%	12%	3.8%	-	-
	2008	71.37%	14.11%	4.33%	-	-
	2009	71.38%	14.15%	4.34%	-	-
	2010	70.42%	13.88%	3.93%	-	-
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%
	2010	5.76%	1.13%	0.32%	-	7.21%

Appendix 8: Comparison of Major Landform Types (1996 to 2010)

Appendix 8: Comparison of Major Landform Types (1996 and 2010)

Comparison Categories	Year	Landform Type			
		valleylands and associated tablelands	tablelands	wetlands	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
	2010	80	54	5	139
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
	2010	1689.47	313.84	98.86	2148.42
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	-

Comparison Categories	Year	Landform Type			
		valleylands and associated tablelands	tablelands	wetlands	TOTAL
	2006	19.28	5.4	19.20	-
	2007	19.88	5.48	19.29	-
	2008	20.71	5.69	19.77	-
	2009	20.88	5.70	19.77	-
	2010	21.12	5.71	19.77	-
Proportion of Natural Areas	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%
	2010	78.64%	14.61%	4.60%	97.85%
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%
	2010	5.77%	1.07%	0.34%	7.18%

Note: The number of sites (139) 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. Also, combined sites (*i.e.* MB8/ME8) do not necessarily have the same landform type, and are therefore counted separately. Consequently, figures differ slightly from those provided elsewhere in the report.

Appendix 9: Comparison of Community Size (1996 to 2010)

Appendix 9: Comparison of Community Size (1996 to 2010).

A comparison of the area (in hectares) of vegetation communities mapped for the City of Mississauga from 1996 to 2010 (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	2002	2004	2005	2006	2007	2008	2009	2010	1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010
	Valleylands																						
A	wooded slope	19	20	20	22	22	21	22	22	22	22	32	347.36	348.54	340.69	341.65	335.38	328.13	327.34	341.17	343.15	349.19	328.30
B	floodplain	22	21	21	23	23	24	24	23	23	23	33	458.42	426.21	426.10	393.50	390.48	387.52	387.09	400.75	406.56	405.88	417.27
DD	sugar maple-American beech forest	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	2.48	2.48	2.48	2.48	1.92
G	golf course	4	4	4	4	4	4	4	4	4	4	4	101.18	101.19	101.13	99.73	99.73	99.30	100.17	100.17	99.81	97.60	97.82
J	wooded non-native valleylands	18	18	20	22	24	27	28	28	28	27	30	93.43	94.36	100.22	109.09	115.56	119.76	115.17	117.10	120.48	124.79	132.22
K	open with open slopes valleylands	31	32	33	33	33	33	35	34	34	31	31	229.02	210.58	217.62	197.49	196.47	192.81	195.06	192.67	208.28	193.94	198.00
L	wooded native valleylands	5	5	5	5	5	5	5	5	5	5	10	39.77	39.78	39.64	38.64	33.49	33.32	33.32	33.32	33.99	28.34	45.10
M	open with wooded slopes valleylands	2	2	2	1	1	0	0	0	0	0	0	5.26	5.25	5.25	0.82	0.82	0.00	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	16.65	16.43	16.43	16.43	15.88	6.51
O	manicured with wooded slopes valleylands	1	1	1	0	0	0	0	0	0	1	0	5.17	5.17	5.17	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00
	Totals												***1301.77***	***1253.23***	***1257.98***	***1203.0***	***1194.08***	***1177.48***	***1177.06***	***1214.90***	***1231.18***	***1219.94***	***1227.14***
	Woodlands																						
A	wooded slope	0	0	0	0	0	0	0	0	0	0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.41
AA	silver maple forest	0	0	0	0	0	0	0	0	0	0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
BB	red ash-American elm forest	14	15	15	16	18	18	18	18	17	17	26	35.32	35.61	37.16	36.40	48.14	47.83	47.87	47.79	52.61	50.21	65.90
CC	sugar maple forest	7	7	7	7	7	7	7	7	7	7	11	14.79	13.12	13.12	11.62	11.62	11.15	11.00	11.09	11.09	11.09	27.89
DD	sugar maple-American beech forest	15	16	17	16	16	16	16	17	17	17	18	108.35	102.44	100.07	97.23	93.06	93.08	92.13	95.68	96.57	96.64	94.03
E	early successional forest	0	0	0	0	0	0	0	0	0	0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87
EE	sugar maple-white ash forest	9	9	9	9	9	9	9	9	9	9	10	63.06	62.18	61.73	61.20	61.07	62.36	62.65	62.42	63.02	56.18	64.26
FF	sugar maple-red oak forest	10	10	9	9	10	10	10	10	10	10	16	42.48	44.96	43.12	42.70	43.44	43.45	42.87	44.72	44.89	44.89	58.51
GG	sugar maple-eastern hemlock forest	1	1	1	1	1	1	1	1	1	1	2	16.03	16.07	16.07	15.97	15.97	15.97	15.86	16.00	17.99	17.99	9.27
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	1.77	1.77	1.77	1.77	1.85
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	28.92	28.92	28.80	28.50	28.93	28.93	28.25	28.59
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	4.26	4.26	6.21	6.21	6.21

Code	Vegetation Community	# Occurrences											Area (hectares)										
		1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010	1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010
MM	white pine-eastern hemlock-sugar maple forest	1	1	1	1	1	1	1	1	1	1	2	6.77	6.77	5.69	5.69	5.69	5.69	5.82	5.82	6.00	6.00	6.03
NN	eastern hemlock forest	3	3	3	4	4	4	4	4	4	4	4	4.09	4.11	4.11	5.20	5.20	5.20	5.20	5.20	5.42	5.42	5.79
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	29.89	29.89	29.89	29.89	30.53	30.53	27.33
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	1.81	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	9	9	9	9	9	9	8	8	28.61	28.57	27.34	24.23	23.94	23.88	23.60	26.24	26.83	24.82	25.06
SS	oak-hickory forest	5	7	7	8	8	8	8	8	8	8	8	24.20	23.56	23.31	27.22	26.92	26.65	27.37	28.33	28.51	28.68	27.23
TT	ash-hickory forest	3	3	3	3	4	4	4	4	4	4	5	6.94	6.68	6.68	6.21	8.88	8.88	8.77	8.50	8.50	8.50	8.89
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	2.38	2.38	2.38
WW	bur oak-black walnut forest	1	1	1	0	0	0	0	0	2	1	2	0.90	0.90	0.90	0.00	0.00	0.00	0.00	0.00	3.27	3.27	3.27
Z	willow-ash forest	0	0	0	0	0	0	0	0	0	0	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.37
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	2.80	2.80	2.80
	Totals												***424.43***	***417.89***	***414.73***	***406.32***	***416.07***	***416.17***	***415.92***	***422.83***	***439.13***	***427.44***	***476.89***
	Successional																						
C	old field	26	27	27	36	40	41	43	42	44	41	48	88.45	95.33	95.30	109.12	116.24	113.09	115.16	116.09	167.08	164.99	173.46
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	5.45	5.61	5.62	5.62	5.70
E	early successional forest	9	10	10	9	12	16	17	16	16	16	29	21.68	14.66	12.82	11.12	24.33	33.18	33.28	32.41	32.23	34.03	52.12
P	hawthorn thicket	4	4	4	5	5	4	5	4	4	4	6	14.54	14.35	14.35	14.57	14.36	13.80	14.36	14.36	14.47	14.47	16.85
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	4	4	4	4	4	4	4	2.37	1.69	1.69	1.69	3.11	3.11	3.11	3.11	3.26	3.26	3.26
	Totals												***135.18***	***133.5***	***131.56***	***142.41***	***163.96***	***169.10***	***171.82***	***175.74***	***223.12***	***222.83***	***251.86***
	Wetland																						
AA	silver maple forest	5	5	5	3	3	3	3	3	3	3	4	18.59	18.14	17.58	7.24	7.24	7.24	6.57	6.57	6.61	6.61	7.74
V	cattail marsh	13	14	14	16	16	17	17	17	17	17	19	27.73	26.99	26.99	27.21	27.10	26.18	26.17	26.72	28.06	28.23	33.03
W	open water marsh	6	6	6	7	8	8	8	8	8	8	10	22.70	22.70	22.70	22.56	21.29	21.29	21.55	21.55	21.00	21.00	22.06
X	willow-buttonbush swamp thicket	1	1	1	1	1	1	2	2	2	2	2	2.77	2.77	2.77	2.77	2.77	2.77	2.97	3.00	3.00	3.00	3.00
Y	wet meadow	1	3	3	4	5	5	5	5	6	6	12	3.43	3.72	3.72	4.23	10.91	10.91	10.88	10.93	15.67	15.67	19.90
Z	willow-ash forest	2	2	2	2	3	3	3	3	3	3	2	0.55	0.56	0.56	0.56	1.15	1.15	1.09	1.09	1.09	1.09	0.87
	Totals												***75.77***	***74.88***	***74.32***	***64.56***	***70.46***	***69.54***	***69.60***	***69.86***	***75.43***	***75.60***	***86.60***

Code	Vegetation Community	# Occurrences											Area (hectares)										
		1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010	1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010
	Anthropogenic																						
F	manicured	11	11	12	12	16	18	19	19	19	19	22	72.41	75.16	76.28	61.25	58.52	65.67	66.49	63.75	63.56	63.81	66.39
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	6.11
I	wooded residential	3	3	3	3	3	3	3	3	3	3	3	251.59	251.59	237.43	237.43	238.26	237.13	237.13	237.13	235.42	235.37	235.37
O	manicured with wooded slopes valley lands	0	0	0	0	0	0	0	0	0	0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84
T	plantation	11	11	13	13	14	15	15	15	15	15	16	21.58	21.57	21.73	20.92	22.67	22.80	22.88	23.13	25.57	26.09	27.17
UU	black walnut grove	1	1	1	1	1	1	1	1	1	1	1	0.17	0.17	0.17	0.17	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	Totals												***353.01***	***355.75***	***342.87***	***327.03***	***326.79***	***333.02***	***333.84***	***331.35***	***331.89***	***332.61***	***336.96***
	Other																						
R	beach	3	3	4	4	6	6	6	6	6	6	6	2.36	1.96	2.18	2.18	2.72	2.72	2.72	2.72	2.73	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	1	1	1	1	1	1	1	35.65	35.64	35.68	35.68	7.33	7.33	7.33	7.33	7.69	7.69	7.69
	Totals												***38.07***	***37.66***	***37.92***	***37.92***	***10.11***	***10.11***	***10.11***	***10.11***	***10.48***	***10.48***	***10.48***

Appendix 10: Comparison of Community Proportion (1996 to 2010)

Appendix 10: Comparison of Changes in the Proportion of Communities (1996 to 2010).

A comparison of the proportion of the vegetation communities within natural areas and the City of Mississauga from 1996 to 2010 (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 Areas (%)											Proportion of City Area (%)										
		1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010	1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010
	Valleylands																						
A	wooded slope	14.92	15.33	15.08	15.12	14.84	15.08	14.49	15.12	15.19	15.46	15.09	1.19	15.33	1.16	1.17	1.15	1.12	1.12	1.17	1.17	1.19	1.12
B	floodplain	19.69	18.75	18.86	17.42	17.28	17.81	17.13	17.74	17.99	17.96	19.18	1.57	18.75	1.46	1.34	1.33	1.32	1.32	1.37	1.39	1.39	1.43
DD	sugar maple-american beech forest	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.11	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
G	golf course	4.35	4.45	4.48	4.41	4.41	4.56	4.43	4.43	4.42	4.32	4.50	0.35	4.45	0.35	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.33
J	wooded non-native valleylands	4.01	4.15	4.44	4.83	5.11	5.50	5.10	5.18	5.33	5.52	6.08	0.32	4.15	0.34	0.37	0.39	0.41	0.39	0.40	0.41	0.43	0.45
K	open with open slopes valleylands	9.84	9.26	9.63	8.74	8.70	8.86	8.63	8.53	9.22	8.58	9.10	0.78	9.26	0.74	0.67	0.67	0.66	0.67	0.66	0.71	0.66	0.68
L	wooded native valleylands	1.71	1.75	1.75	1.71	1.48	1.53	1.47	1.47	1.50	1.25	2.07	0.14	1.75	0.14	0.13	0.11	0.11	0.11	0.11	0.12	0.10	0.15
M	open with wooded slopes valleylands	0.23	0.23	0.23	0.04	0.04	0.00	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	0.77	0.73	0.73	0.73	0.70	0.30	0.08	0.97	0.08	0.08	0.08	0.06	0.06	0.06	0.06	0.05	0.02
O	manicured with wooded slopes valleylands	0.22	0.23	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.02	0.23	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	Totals	***55.92***	***55.12***	***55.68***	***53.25***	***52.93***	***54.13***	***52.09***	***53.79***	***54.49***	***53.98***	***56.41***	***4.47***	***55.12***	***4.30***	***4.11***	***4.08***	***4.02***	***4.02***	***4.11***	***4.21***	***4.17***	***4.19***
	Woodlands																						
A	wooded slope	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
AA	silver maple forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BB	red ash-American elm forest	1.52	1.57	1.64	1.61	2.13	2.20	2.12	2.12	2.33	2.22	3.03	0.12	1.57	0.13	0.12	0.16	0.16	0.16	0.16	0.18	0.17	0.23
CC	sugar maple forest	0.64	0.58	0.58	0.51	0.51	0.51	0.49	0.49	0.49	0.49	1.28	0.05	0.58	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.10

Code	Vegetation Community	Proportion of Natural Areas (%)											Proportion of City Area (%)										
		1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010	1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010
DD	sugar maple-American beech forest	4.65	4.51	4.43	4.30	4.12	4.28	4.08	4.23	4.27	4.28	4.32	0.37	4.51	0.34	0.33	0.32	0.32	0.31	0.33	0.33	0.33	0.32
E	early successional forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	sugar maple-white ash forest	2.71	2.74	2.73	2.71	2.70	2.87	2.77	2.76	2.79	2.49	2.95	0.22	2.74	0.21	0.21	0.21	0.21	0.21	0.21	0.22	0.19	0.22
FF	sugar maple-red oak forest	1.82	1.98	1.91	1.89	1.92	2.00	1.90	1.98	1.99	1.99	2.69	0.15	1.98	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.20
GG	sugar maple-eastern hemlock forest	0.69	0.71	0.71	0.71	0.71	0.73	0.70	0.71	0.80	0.80	0.43	0.05	0.71	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.03
II	sugar maple-black cherry forest	0.08	0.08	0.09	0.09	0.09	0.09	0.08	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	1.28	1.28	1.32	1.26	1.28	1.28	1.25	1.31	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	0.19	0.19	0.27	0.27	0.29	0.02	0.20	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
MM	white pine-eastern hemlock-sugar maple forest	0.29	0.30	0.25	0.25	0.25	0.26	0.26	0.26	0.27	0.27	0.28	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	0.23	0.23	0.24	0.23	0.23	0.24	0.24	0.27	0.01	0.18	0.01	0.02	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	1.32	1.37	1.32	1.32	1.35	1.35	1.26	0.10	1.33	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09
PP	American beech forest	0.11	0.11	0.11	0.11	0.11	0.12	0.11	0.08	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	1.07	1.06	1.10	1.04	1.16	1.19	1.10	1.15	0.10	1.26	0.09	0.08	0.08	0.08	0.08	0.09	0.09	0.08	0.09
SS	oak-hickory forest	1.04	1.04	1.03	1.20	1.19	1.23	1.21	1.25	1.26	1.27	1.25	0.08	1.04	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.09
TT	ash-hickory forest	0.30	0.29	0.30	0.27	0.39	0.41	0.39	0.38	0.38	0.38	0.41	0.02	0.29	0.02	0.02	0.03	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	0.11	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	0.14	0.14	0.15	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Z	willow-ash forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZZ	oak-white pine forest	0.00	0.00	0.10	0.10	0.10	0.11	0.10	0.10	0.12	0.12	0.13	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Code	Vegetation Community	Proportion of Natural Areas (%)											Proportion of City Area (%)										
		1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010	1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010
	Totals	***18.25***	***18.41***	***18.36***	***17.98***	***18.42***	***19.13***	***19.04***	***18.71***	***19.44***	***18.85***	***21.92***	***1.45***	***18.41***	***1.42***	***1.39***	***1.42***	***1.42***	***1.41***	***1.45***	***1.51***	***1.46***	***1.63***
	Successional																						
C	old field	3.80	4.19	4.22	4.83	5.14	5.20	5.10	5.14	7.39	7.30	7.97	0.30	0.33	0.33	0.37	0.40	0.39	0.39	0.40	0.57	0.56	0.59
D	hedgerow	0.33	0.31	0.31	0.24	0.24	0.25	0.24	0.25	0.25	0.25	0.26	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
E	early successional forest	0.93	0.65	0.57	0.49	1.08	1.53	1.47	1.43	1.43	1.51	2.40	0.07	0.05	0.04	0.04	0.08	0.11	0.11	0.11	0.11	0.12	0.18
P	hawthorn thicket	0.62	0.63	0.64	0.64	0.64	0.63	0.64	0.64	0.64	0.64	0.77	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06
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	0.14	0.14	0.14	0.14	0.14	0.14	0.15	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***	***6.30***	***7.26***	***7.77***	***7.61***	***7.78***	***9.87***	***9.86***	***11.58***	***0.46***	***0.46***	***0.46***	***0.49***	***0.56***	***0.58***	***0.58***	***0.60***	***0.76***	***0.76***	***0.86***
	Wetland																						
AA	silver maple forest	0.80	0.80	0.78	0.32	0.32	0.33	0.29	0.29	0.29	0.29	0.36	0.06	0.06	0.06	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03
V	cattail marsh	1.19	1.19	1.19	1.20	1.20	1.20	1.16	1.18	1.24	1.25	1.52	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.11
W	open water marsh	0.97	1.00	1.00	1.00	0.94	0.98	0.95	0.95	0.93	0.93	1.01	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.08
X	willow-buttonbush swamp thicket	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	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	0.19	0.48	0.50	0.48	0.48	0.69	0.69	0.91	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.05	0.05	0.07
Z	willow-ash forest	0.02	0.02	0.02	0.02	0.05	0.00	0.05	0.05	0.05	0.05	0.04	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***	***2.86***	***3.12***	***3.20***	***19.9***	***3.08***	***3.33***	***3.34***	***3.98***	***0.25***	***0.25***	***0.25***	***0.22***	***0.24***	***0.24***	***0.23***	***0.23***	***0.25***	***0.25***	***0.30***
	Anthropogenic																						
F	manicured	3.11	3.31	3.38	2.71	2.59	3.02	2.94	2.82	2.81	2.82	3.05	0.25	0.26	0.26	0.21	0.20	0.22	0.23	0.22	0.22	0.22	0.23
H	urban lake	0.31	0.32	0.32	0.32	0.32	0.33	0.32	0.32	0.32	0.32	0.28	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	10.55	10.90	10.50	10.50	10.42	10.42	10.82	0.86	0.86	0.81	0.81	0.81	0.81	0.81	0.81	0.80	0.80	0.80
O	manicured with wooded slopes valley lands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
T	plantation	0.93	0.95	0.96	0.93	1.00	1.05	1.01	1.02	1.13	1.15	1.25	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09
UU	black walnut grove	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	0.00
	Totals	***15.17***	***15.66***	***15.18***	***14.47***	***14.46***	***15.31***	***14.77***	***14.66***	***14.68***	***14.71***	***15.49***	***1.2***	***1.21***	***1.17***	***1.12***	***1.12***	***1.14***	***1.14***	***1.13***	***1.13***	***1.13***	***1.15***
	Other																						

Code	Vegetation Community	Proportion of Natural Areas (%)											Proportion of City Area (%)										
		1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010	1996	1998	2000	2002	2004	2005	2006	2007	2008	2009	2010
R	beach	0.10	0.09	0.10	0.10	0.12	0.13	0.12	0.12	0.12	0.12	0.13	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	0.32	0.34	0.32	0.32	0.34	0.34	0.35	0.12	0.12	0.12	0.12	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	Totals	***1.63***	***1.66***	***1.67***	***1.68***	***0.45***	***0.46***	***0.44***	***0.44***	***0.46***	***0.46***	***0.48***	***0.13***	***0.13***	***0.13***	***0.13***	**0.03**	***0.03***	***0.04***	***0.04***	***0.04***	***0.04***	***0.04***

Appendix 11: Butternut Survey Summary

Appendix 11: Butternut Survey Summary of 2010 Field Season in Wards 8, 9, and 10.

Site	Results of 2010 Survey	Last Recorded Observation Prior to 2010 Survey	2010 Condition
CE7	not located	literature record 1990	-
CRR6	1 tree located (LL 01/09/2010) – possible hybrid	2006 field survey (SKM 30/06/2006)	(no UTM, but located E side of river, N of Erindale Park)
CRR7	butternut not located in area studied in 2010	2009 field survey (LL 26/08/2009)	-
CRR10	1 live tree and 2 dead trees located (LL 24/08/2010)	2001 field survey (SKM 16/07/2001)	the live tree has some canker but the crown in healthy (UTM 607094/4824572)
CRR11	1 tree located (LL 30/08/2010)	literature record 2005	healthy
EM2	not located	1995 field survey (MJ 30/06/1995)	-
EM4	2 trees located (SP 26/08/2010, LL 27/08/2010)	1995 field survey (HK/MJ 25/07/1995)	both relatively healthy – one is a split stem tree with each stem having approx. 5 sooty canker, and the other tree has approx. 50% of crown remaining and old canker wounds which have healed over
EM14	3 trees located (SP 31/08/2010)	2001 field survey (MJ 25/07/2001)	all in fair condition – 2 trees have open and sooty canker, the other tree has only 1 open wound which is healing over
MB6	1 dead tree (LL 26/08/2010)	not previously recorded	dead
ME8/MB8	not located	1995 field survey (HK/GW/MJ 12/07/1995)	-
ME10	not located	2001 field survey (MJ 25/07/2001)	-

Appendix 12: Provincially Significant Native Flora Species

Appendix 12: Provincially significant native flora species in Wards 8, 9, and 10.
These species are documented for the City of Mississauga in Wards 8, 9, and 10. Provincial rarity status follows (NHIC 2009). Rarity ranks are defined in Appendix 5 of the Natural Areas Survey.

Scientific Name	Common Name	G RANK	S RANK	MNR	COSEWIC	Loc. Rank	Location	Last recorded in Mississauga
Juglans cinerea L.	Butternut	G4	S3?	END	END	3	11 Natural Areas	See Appendix 10 for details
Astragalus neglectus (Torr. & A. Gray) E. Sheld.	Coopers Milkvetch	G4	S4			1	CRR6	1977
Aureolaria flava (L.) Farw.	Yellow False-foxglove	G5	S2?			1	CRR7	2010
Solidago rigida L.	Prairie Goldenrod	G5T5	S3			1	CRR8	2009
Symphyotrichum x *amethystinum* (Nutt.) Nesom	Amethyst Aster	GNA	S3?			1	CL9, CRR6	1976 (CL9) 1980 (CRR6)
Carex amphibola Steud.	Narrow-leaved Sedge	G5	S2			1	CRR10	1977
Muhlenbergia sylvatica (Torr.) Torr. ex A. Gray var. *sylvatica*	Woodland Satin Grass	G5	S2			1	EM4	2010

Appendix 13: Updated Provincial Fauna Rarity

Appendix 13: Provincially significant native fauna species in Wards 8, 9, and 10.
These species are documented for Wards 8, 9, and 10 in the City of Mississauga, and include migrant and wintering bird species. Rarity status follows (NHIC 2009) and are defined in Appendix 5 of the Natural Areas Survey.

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Highest Breeding Evidence	Documented sites	Last recorded in Mississauga
Bird								
Caspian tern	*Hydroprogne caspia*	G5	S3B	NAR	NAR	migrant	ME12	2010
great egret	*Ardea albus*	G5	S2B			migrant	CRR8	literature record 2008
rough-legged hawk	*Buteo lagopus*	G5	S1B,S4N	NAR	NAR	wintering	EM30	literature record 1982
red-headed woodpecker	*Melanerpes erythrocephalus*	G5	S4B	SC	THR	possible	CRR10	literature record 2004
common nighthawk	*Chordeiles minor*	G5	S4B		THR	possible	CRR6	literature record 1995
yellow-breasted chat	*Icteria virens*	G5	S2B	SC	SC	confirmed	CRR10	2010
Canada warbler	*Wilsonia canadensis*	G5	S4B		THR	probable	CRR6	literature record 1995
Amphibian								
Jefferson/blue-spotted salamander complex	*Ambystoma jeffersonianum*	G4	S2			-	CRR6	literature record 1993
Reptile								
common snapping turtle	*Chelydra serpentina serpentina*	G5	S3		SC	-	CRR6	literature record 1993
common map turtle	*Graptemys geographica*	G5	S3	SC	SC	-	CRR8	1999

Common Name	Scientific Name	G RANK	S RANK	MNR	COSEWIC	Highest Breeding Evidence	Documented sites	Last recorded in Mississauga
eastern milk snake	*Lampropeltis triangulum triangulum*	G5	S3	SC	SC	-	CRR7 ME12	1986 (CRR7) 1984 (ME12)

Appendix 14: Amphibian Surveys for 2010

Appendix 14: Amphibian Surveys for 2010.

Rarity status follows (NHIC 2009) and are defined in Appendix 5 of the Natural Areas Survey. None of the species are considered to be significant by MNR or COSWEIC

Common Name	Scientific Name	G Rank	S Rank	Location
American toad	*Bufo americanus americanus*	G5	S5	CM25, LS1
Western chorus frog	*Pseudacris triseriata*	G5	S4	CM9
Northern leopard frog	*Rana pipiens*	G5	S5	CM9
Jefferson/blue-spotted salamander complex	*Ambystoma jeffersonianum*	G4	S2	CRR6
Spotted salamander	*Ambystoma maculatum*	G5	S4	CRR10