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NATURAL AREAS SURVEY

UPDATE
1999 December

(Part 2 of Volume 3 of 3)

NOTE:

This Part 2 of Volume 3 of 3, Natural Areas Survey Update, 1999 December, is to be read in conjunction with the Natural Areas Survey Report, 1996 September, (Volume 1 of 3) and Natural Areas Survey Appendices, 1996 September, (Volume 2 of 3) and the Updates of 1998 February.

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NATURAL AREAS SURVEY UPDATE - PART 2 OF VOLUME 3 of 3

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1.0 INTRODUCTION

A Natural Areas Survey for the City of Mississauga was undertaken during 1995 and 1996 (Natural Areas Survey, 1996 September). One hundred and forty-four natural areas were identified that represented the best remaining natural features in the City. Of these 144 natural areas, 141 were classified as either Significant Natural Sites, Natural Sites, or Natural Green Space and three as residential woodlands. Together, the 141 natural sites 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 the Natural Areas Survey, 1996 September.

Since completion of the Natural Areas Survey in 1996 a number of development projects have been initiated within or adjacent to the natural areas identified in the 1996 survey. Programs to update the Natural Areas Survey were undertaken in 1998 and 1999. This current report documents the second year of updates. The intent of updating the Natural Areas Survey is to review the current status of natural areas and update information on floristics, impacts, boundary changes and management needs. The intent is to review natural areas within a different quadrant of the City each year. In 1998, the update was conducted on the natural areas in Wards 5 and 6 as well as additional natural areas throughout the City that were identified as having possible changes. In 1999, Wards 1 and 2 were similarly updated. This report documents the methods used, summarizes changes to the natural areas, and provides some recommendations based on the 1999 update project.

2.0 METHODS

2.1 Background Review

The primary focus of this update was the natural areas located in Wards 1 and 2. Additional natural areas in the City that had been the subject of recent Environmental Impact Studies (EISs) and capital projects undertaken since 1995 within natural areas by the City Transportation and Works Department were also reviewed. Information from the reports reviewed in 1999 was incorporated into the NAS database and are listed in Appendix 1.

The need for field work was determined from aerial photograph analysis and review of reports (inventory reports, EISs, etc.) on Natural Areas undertaken since 1996. Aerial photographs from 1999 and 1996 were compared to identify impacts to natural area boundaries. Any area where changes to boundaries were noted, or where there was a change in land use within 500 m of a natural area boundary, was identified for a detailed field check, subject to arranging access. New natural area boundaries were delineated on mylar overlays where applicable. These boundaries were verified in the field and subsequently mapped. All natural sites within Wards 1 and 2 were, at minimum, the subject of a "drive by" inspection, even if there was no indication of impacts from the aerial photograph analysis. Six natural sites were visited in the spring to examine the spring flora, in response to recommendations made in the 1998 update study (see Appendix 3).

Using this protocol, a list of 61 natural sites were identified as requiring investigation for updating (Appendix 2). This includes: 38 natural areas that occur in Wards 1 and 2, seven Community Services projects, seven projects undertaken by the Transportation and Works Department, six natural areas that were identified in the 1998 update as requiring spring inventories, and eight sites that were subject to Environmental Impact Studies (some sites fell into more than one of the above categories thus they add up to more than 61).

2.2 Fieldwork

All but 9 of the natural areas identified for field work received a visit. The 9 sites are: SP1, SP3, SD4, CL17, CL22, MB9, CRR8 and MI1. Appendix 2 lists the type of field work and the date field work was conducted for each of these natural areas. If there was no development within or adjacent to a natural area or change in the boundaries (identified through aerial photograph interpretation and literature review) a site inspection from the road was conducted. A more complete field evaluation was conducted at all natural areas where the boundaries had changed based on the aerial photographs or where development had occurred either within or adjacent to the site. Landowner contact for natural areas in private ownership was undertaken by the City Planning and Building Department.

The following information was collected for each natural area that received a field visit:
- all flora and fauna species observed were recorded, and specimens collected;
- vegetation community descriptions were updated where necessary;
- evidence of disturbance, regeneration and management needs were noted;
- field data sheets were filled out; and
- the overall condition was qualitatively rated in comparison to other sites in the City.

A copy of the field notes and field data sheets were provided to the City under separate cover for inclusion in the natural area files.

In response to the Terms of Reference, a wetland evaluation was undertaken at natural area LV7 (Cawthra Woods). This was undertaken following the standard provincial evaluation procedures. During one field visit, North - South Environmental staff were accompanied in the field by OMNR staff to discuss the wetland area at Cawthra Woods.

A study to investigate Ambystomid salamander breeding at Cawthra Woods (Bogart 1999) was undertaken concurrently with this update study. Since it was a requirement of the Terms of Reference of this study to report on Ambystomid breeding at Cawthra, North-South Environmental staff accompanied Dr. Bogart on his initial field investigation, and the principal findings of his study are repeated here.

2.3 Analysis

The databases and fact sheets for each natural area were updated based on the literature review and fieldwork carried out in 1999. The provincial and regional rarity ranks of floral and faunal species were evaluated to determine the need for updating. Provincial rarity status was based on the following literature, Bakowsky (1996) and NHIC (1999a, 1999b, 1999c, 1999d, 1999e). Regional rarity status was updated based on site records in the databases. The comparison table for the City (Table 4 in the Natural Areas Survey, 1996 September, Volume 1 of 3) was updated to allow an comparison of the revised sites in the perspective of the entire City (see Table 1, page 7).

The Floristic Quality Indices (FQI) were updated for natural areas where the floral inventory changed between 1996 and 1999. The Floristic Quality Assessment System for Southern Ontario (Oldham *et al.* 1995) adapted for use within the City of Mississauga was used for this purpose. For a summary of the methodology and interpretation of the Floristic Quality Assessment see the Natural Areas Survey (1996 September, Volume 1 of 3). Overall, the ranking of the native mean coefficients (high > 4.00, medium = 3.3 to 3.99, low < 3.3) and Floristic Quality Indices (FQIs) (high > 40, medium = 30 to 39.99, low < 30) remained the same as in 1996.

Recent disturbances, threats and management needs were noted where they changed from the 1996 or 1998 reports. Recommendations for the mitigation of real or potential impacts that resulted from recent developments, including naturalization projects were identified.

2.4 Mapping

Boundary changes identified for natural areas were updated on mylar plots provided by the City. Boundary delineation followed the approach used in the Natural Areas Survey (1996 September, Volume 1 of 3). These revisions were subsequently digitized using MicroStation GeoGraphics format and supplied to the City in digital form (see Appendix 6 for detailed description of digital mapping protocols. Page-sized hard copy maps of natural sites, with revised boundaries, will be produced by the City for inclusion with the updated fact sheets. Updated surficial areas for the natural areas and vegetation communities were determined using GIS and incorporated into the databases. The updated UTM coordinates for the natural areas and vegetation communities were also incorporated into the databases.

3.0 NATURAL AREAS FRAMEWORK

Table 1 (page 7) summarizes the current information available for each natural area in the City of Mississauga, updating Table 4 from 1996 September, Volume 1 of 3. This includes the following information:

- the classification of the natural areas following the system outlined in the Natural Areas Survey (1996 September, Volume 1 of 3);
- designation of the natural area as a significant feature (ANSI, ESA, evaluated wetland);
- size of the natural area in hectares and acres;
- the number of flora species;
- the proportion of the flora that are non-native;
- the native FQI and native mean coefficient;
- the number of vegetation communities;
- the number of provincially and regionally significant flora and fauna species;
- the number of birds, mammals, and herptiles; and
- the condition of the natural areas.

Appendix 7 documents the changes for natural areas that occurred between 1996 and 1999 using the same categories.

Figure 1 (see page 17) shows the locations of natural areas, Special Management Areas, Residential Woodlands and Linkages, updating Figure 2 from 1996 September, Volume 1 of 3. Due to the scale of mapping, Significant Natural Sites, Natural Sites and Natural Greenspace are not discriminated on this map, but are all labelled as "natural area". The location of "minor natural features" and "shoreline reaches" are the same as in the 1996 September, Volume 1 of 3 report.

3.1 Summary of Changes

Table 2 (see page 13) summarizes the changes in the natural areas based on classification. The total number of natural sites has increased from 141 in 1996 to 142 in 1999, and is up from 140 in 1998. However, the overall area of the City identified in natural area system in 1999, 6.94%, is still smaller than in 1996 at 7.10%, but marginally up from 6.92% in 1998. This decrease represents an overall reduction of 45.86 ha (111.14 a.). The increase from 1998 is owing to the addition of 3 natural areas in 1999 (SD7, MI7 and MI17) respectively as a result of investigation of the Avonhead Creek south of Lakeshore Road and the Residential Woodland in the Mineola District (MI4). The three Residential Woodlands remain, however they are reduced in area from 252 ha (621.67 a.) to 239.93 ha (592.88 a.), as a result of the redesignation of the two natural sites within the Mineola residential woodland, MI4. One area, EC10, was deleted in 1999 as a result of development.

One Special Management Area was added to the system to bring the total up to 52, one more than in 1998 but still down from the original number of 55 identified in 1996. The number of Linkages remained the same as 1998 at 40.

Three sites, CL13, RW5 and RW6 were upgraded from Natural Green Space to Natural Sites owing to the addition of regionally significant plants to their inventories. All other natural areas retained the same designations as in 1998. It is worth noting that two areas that have been substantially impacted from

development (HO7 - Frank McKechnie Community Centre) and the Mavis Road extension (GT1), may have lost species which would result in their redesignation. However, because it is difficult to demonstrate that a plant has been lost from an area, these sites have been retained for the time being. If in future years, repeated inventory fails to find significant species, these areas should be re-evaluated.

Table 3 (see page 13) shows the number and area of natural areas associated with the three major landform types in the City. Most of the natural areas, 76 areas or 79.9% of the natural areas system, are associated with valley systems, which is up from 73 (approximately 78.4%) in 1996 and 1998. The number of natural areas located on the table lands was 60 in 1996 and is now 58 with the removal of natural area HO2 in 1998 and EC10 in 1999, both for residential development. Table land natural areas are small (mean size of 5.2 ha or 12.9 a.) when compared to the valley land areas (mean size of 21.34 ha or 52.74 a.). The mean area of all three landscape types has been decreasing since 1996.

Based on the two years of updating, a few trends may be emerging. The size of natural areas within all categories has been decreasing (although there was a slight increase in valley lands between 1998 and 1999 owing to the addition of the two Mineola areas). Also, each year the proportion of the natural area system that is valley land has been increasing (78.3%, 78.5%, 79.9%) and the proportion that is table land has been decreasing (16.4%, 16.2%, 14.8%). This trend is also reflected in the amount of table land that is protected in the City, with steady decreases from 0.36% in 1996 to 0.34% in 1999. Wetlands remain more or less constant, with the proportion in the natural area system (5.0%, 5.0%, 4.9%), and in the City overall (0.36%, 0.34%, 0.34%).

Table land natural areas (which are mainly wooded) tend to be discrete islands that have limited connections to other remnant natural features. Valley lands are better connected by virtue of the linearity of the landform and historically have been better protected from development. From a City-wide perspective, in 1999 only 1% of the landbase is represented in table land natural areas, down 0.16% from 1996. This reinforces the need for protection of table land features within the City.

Figure 1: Legend For Natural Area Framework for the City of Mississauga

(Note: There are 142 natural areas and 3 Residential Woodlands identified on Figure 1, however 150 areas are listed below because 5 span two planning districts and are thus listed twice)

SOUTHDOWN
1. SD1
2. SD4
3. SD5 (Meadowwood)
150. SD7 (Lakeside)

CLARKSON-LORNE PARK
4. CL52 (Meadowwood)
5. CL1 (Meadowwood)
6. CL9 (Rattray Marsh)
7. CL8
8. CL15
9. CL16 (Jack Darling Park)
10. CL17 (Lorne Park Estates)
11. CL13
12. CL43
13. CL42
14. CL21 (Birch Glen)
15. CL39 (Whiteoaks)
16. CL22
17. CL30 (Lorne Park Prairie)
18. CL31 (Lornewood Creek Trail)
19. CL24 (Tecumseh)
20. CL26
24. CRR9 (Credit River Flats)

PORT CREDIT
21. PC1 (Rhododendron Gardens)
22. PC2 (Port Credit Memorial)
23. PC3

MINEOLA
24. CRR9 (Credit River Flats)
25. MI4
26. MI1
151. MI17 (Mary Fix)
152. MI7

LAKEVIEW
27. LV3 (Adamson Estate)
28. LV4 (Helen Molasy Memorial)
29. LV5
30. LV2
31. LV1
32. ETO8
33. LV14 (Lakeview Golf Course)
34. LV6
35. LV7 (Cawthra Woods)
36. ETO7

SHERIDAN PARK
37. SP1
38. SP3

SHERIDAN
39. SH6
40. CRR7
41. CRR8

ERINDALE
40. CRR7
41. CRR8
42. ER6
43. CRR6

COOKSVILLE
44. CV1 (Iroquois Flats)
45. CV2
46. CV12 (Richard Jones)
47. CV10
48. CV8 (Camilla)

DIXIE
36. ETO7
49. ETO6
50. AW1 (Willowcreek)

WESTERN BUSINESS PARK
51. WB1 (Erin Mills Twin Arena)

ERIN MILLS
52. EM30 (Tom Chater Memorial)
53. EM6 (King's Masting)
54. EM2 (South Common)
55. EM10
56. EM14
57. EM4
58. EM5 (Glen Erin Trail)
43. CRR6
59. EM21 (Richard F.C. Mortensen)

CREDITVIEW
60. CR1

FAIRVIEW
61. FV1
62. FV3

CITY CENTRE
63. CC1 (Bishopstoke Walk)

MISSISSAUGA VALLEY
64. MY1 (Mississauga Valley)
65. MY3 (Stonebrook)

APPLEWOOD
50. AW1 (Willowcreek)
66. AW4 (Applewood Hills)
67. AW3 (Applewood Hills)
68. ETO5
49. ETO6

RATHWOOD
69. ETO4
70. RW5 (Applewood Hills)
71. RW6 (Applewood Hills)
72. RW4 (Rathwood District)
73. RW1
74. RW2 (Woodington Green)

CHURCHILL MEADOWS
75. CM7
76. CM9
77. CM11
78. CM12
79. CM17
80. CM13

CENTRAL ERIN MILLS
81. CE7 (Sugar Maple Woods)
82. CE9 (Quenippenon Meadows)
83. CE10 (Erin Wood)
84. CE5
85. CE1 (Woodland Chase Trail)
86. CE12 (Bonnie Brae)
87. CRR5
88. CRR4

STREETSVILLE
89. SV12 (Bonnie Brae)
90. SV10
88. CRR4
91. SV1 (Turney Woods)
92. CRR3
93. CRR2

EAST CREDIT
87. CRR5
88. CRR4
92. CRR3
93. CRR2
94. EC22
96. EC13
97. EC1

HURONTARIO
98. HO1
100. HO3 (Staghorn Woods)
101. HO6
102. HO7
103. HO9 (Britannia Woods)

NORTHEAST
104. NE4
105. NE3
106. NE2
107. NE1
108. NE6
109. NE5
110. NE7
69. ETO4
111. ETO3
112. NE8
113. NE10
114. NE11
115. NE12
116. ETO2
117. ETO1
118. NE9 (Wildwood)

LISGAR
119. LS1 (Lisgar Meadow Brook)
120. LS2
121. LS3 (Trelawny Woods)

MEADOWVALE
122. ME10 (Eden Woods)
123. ME12 (Lake Wabukayne)
124. ME11 (Lake Aquitaine)
125. ME9 (Maplewood)
126. ME8 (Windrush Woods)

MEADOWVALE BUSINESS PARK
127. MB9
128. MB7 (Mullet Creek)
129. MB8
130. MB3
131. MB5
132. MB4
133. MB6 (Totoredaca)
134. MB2
135. MB1

MEADOWVALE VILLAGE
136. MV19
137. CRR1 (Meadowvale C.A.)
138. MV18
139. MV2
140. MV3
141. MV12
142. MV14
143. MV11
144. MV15
93. CRR2

GATEWAY
145. GT1
146. GT3
147. GT2
148. GT4 (Britannia Woods)

MALTON
149. MAI

Insert Figure 1: Natural Areas Framework

4.0 NATURAL ENVIRONMENT OVERVIEW

4.1 Vegetation Communities

The 48 vegetation communities described for the City (see Table 2, 1996 September, Volume 1 of 3) were compared between 1996 and 1999 (see Table 4, page 20). One new vegetation community, oak-white pine forest, was added in 1999, making 49 vegetation communities in total. The vegetation communities have been grouped into six broad categories to facilitate discussion; valley lands, 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 one of the other five categories. The most prevalent communities within the City remain those in the valley land category. Table 5 (see page 23) identifies those valley land vegetation communities that changed in area since 1996. The tall grass prairie community is still considered the only provincially rare vegetation community within the City.

Table 5: Changes to Area of Valley Land Vegetation Communities 1996-1999

Vegetation Community	Natural Areas surveyed in 1999	Extent of Change and Reason
Wooded Slope	N/A	Unchanged from 1998 to 1999, reasons for 1998 changes provided in table 1 of last year's report
Floodplain	N/A	Unchanged from 1998 to 1999, reasons for 1998 changes provided in table 1 of last year's report
Wooded Non-native Valley Lands	SD7 MI7, MI17	Increased marginally from 1996 to 1998. Increased 5.91 ha (14.6 a.) in 1999 owing to addition of SD7, MI7 and MI17
Open with Open Slopes Valley Lands	CL13	Decreased 18.44 ha (45.57 a.) in 1998. Increased 6.92 ha (17.1 a.) in 1999 owing to substantial addition to CL13

Valley lands includes nine vegetation communities (listed in Table 4). Even though this category is termed valley lands, the boundaries of these vegetation communities do not necessarily follow floodplain boundaries. This category saw a continued decrease in area from 1301.77 ha (3215.37 a.) in 1996, to 1253.23 ha (3096.68 a.) in 1998 and 1265.99 ha (3128.30 a.) in 1999, for a total decrease of 35.78 ha (approximately 88 a.). The substantial changes to this category documented in 1998 are provided in last year's report (1998 February, Volume 3 of 3). Two valley land communities changed substantially between 1996 and 1999. Wooded non-native valley land (J) increased from 93.43 ha (230.77 a.) to 100.27 ha (247.77 a.) owing to the addition of SD7 and MI17. Open with open slopes valley land (K) decreased from 229.02 ha (565.68 a.) in 1996 to 217.50 ha (537.45 a.) in 1999, although it was up from the 1998 value owing to an addition to natural area CL13. Four of the vegetation communities in this category are still the most widespread in the City: wooded slope, floodplain, wooded non-native, and open with open slopes.

Woodlands includes nineteen vegetation communities, all of which occur outside of valley lands, although intermittent streams may be present within. Between 1996 and 1999 this category was reduced in size by 9.56 ha (23.62 a.) to 414.87 ha (1024.63 a.), or 1.4% of the total City area. Fifteen of the vegetation communities in this category (see Table 4 for a complete list) 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). This is up one from previous years as a result of one new woodland community being added, oak-white pine, which occupies less than 1% of the natural area system. Three woodland areas showed substantial changes. Red ash - American elm (BB) increased by 2.03 ha (5.0 a.) owing to the addition of MI17, although the overall effect was tempered by the removal of EC10. Sugar maple - American beech (DD) woodland decreased 8.28 ha (20 a.). Sugar maple - white ash decreased by 0.88 ha (2.17 a.), owing to changes in the boundaries of several natural areas.

The successional category has six vegetation communities. This category has decreased in size by 1.7 ha (4.2 a.) between 1996 and 1999. In 1999 this category comprised 133.44 ha (330 a.) or 0.46 % of the total City area, remaining essentially unchanged since 1998. Five vegetation communities in this category are still considered to be uncommon in the City occupying less than 1% of the total area of natural areas.

The wetland category is composed of six vegetation communities. Between 1996 and 1999 this category decreased in size by 0.9 ha (2.2 a.) to a size of 74.9 ha (185 a.), or 0.25% of the total City area. This is unchanged from 1998. All of the vegetation communities in this category are still considered to be uncommon in the City occupying no more than 1% of the total area of natural areas (open water marsh is

1%).

Anthropogenic is composed of five vegetation communities. The size of this category increased between 1996 and 1998 by 2.75 ha (6.8 a.) to 355.75 ha (879 a.), or 1.2 % of the total City area, but decreased in 1999 to 344.12 ha (850.31 a.) representing 1.17 of the total area of the City. This is a decrease of 8.89 ha (21.9 a.) overall since 1996. Woodland residential is still considered to be one of the largest communities in the City.

Other is composed of three vegetation communities that do not easily fit in the other categories: beach, tall grass prairie and unknown. It remained substantially unchanged over the monitoring period, decreasing marginally by 0.15 ha (0.37 a.).

4.2 Flora

Changes to the flora of Mississauga are summarized in Table 6 (see page 25). A total of eight new species were added, and 7 species were deleted from the flora for the City, thus the total number of species stands at 1104, one more than in 1998. Five of the 8 new species are not native to Mississauga, although 3 of the five are native elsewhere in Ontario. The three plants native elsewhere in Ontario are cardinal flower (*Lobelia cardinalis*), cup plant (*Silphium perfoliatum*), and sand cherry (*Prunus pumila*). All of these species were planted in natural areas by the City. The total number of native species in Mississauga now stands at 671 (61% of flora) and non-natives number 433 (39% of the flora).

Definitions of rarity status can be found in the Natural Areas Survey, Appendix 4 (1996 September, Volume 2 of 3). There were no changes to the provincial rarity ranks, thus Appendix 5 from the 1998 update report (1998 February, Volume 3 of 3) is considered to be current and is not provided in this report. Of the 671 native species in the Mississauga flora, 433 (65%) are rare or uncommon in the City, and 238 (36%) are common. This is basically unchanged from 1998. Changes in regional rankings are reported in Appendix 4. A total of 18 plant species had changes to regional rankings. Eight of these are new records for the City of Mississauga. Four species were reassessed in ranking from uncommon to common (from a level 2 to a 3), one species was reassessed from rare to common (level 1 to level 3), and 5 species were reassessed from rare to uncommon. These changes are all a result of additional records from the updating process.

One plant record from existing reports and studies is considered an unlikely occurrence and may have been misidentified. This species requires confirmation before it is added to the floral database. Tall northern green orchid (*Platanthera hyperborea* var. *huronensis*) documented for natural area CL 30 (see ref # 197 in Appendix 1) is most likely helleborine (*Epipactis helleborine*).

Table 6: Additions and Deletions to the Flora of the City of Mississauga Resulting from the 1999 Update Study

Scientific Name	Common Name	Non-native in Mississauga	Non-native in Canada	Comments
Acer x freemanii	hybrid soft maple	no	no	addition, based on 1999 field work and update study (planted)
Arabis glabra	tower mustard	no	no	addition, based on 1999 field work and update study
Chenopodium rubrum	red goosefoot	yes	yes?	deleted based on review of Peel flora by Kaiser (1999)
Crataegus chrysocarpa	round-leaved hawthorn	no	no	deleted based on review of Peel flora by Kaiser (1999)
C. crus-galli	cockspur hawthorn	no	no	deleted based on review of Peel flora by Kaiser (1999)
C. laevigata	hawthorn	yes	?	deleted based on review of Peel flora by Kaiser (1999)
Euphorbia peplus	petty spurge	yes	yes	deleted based on review of Peel flora by Kaiser (1999)
Hedera helix	English ivy	yes	yes	addition, based on 1999 field work and update study
Juncus brachycephalus	small-headed rush	no	no	deleted based on review of Peel flora by Kaiser (1999)
Lobelia cardinalis	cardinal flower	yes	no	addition, based on 1999 field work and update study (planted)
Oenothera biennis	hairy-yellow evening-primrose	no	no	addition, based on 1999 field work and update study
Prunus pumila	sand cherry	yes	no	addition, based on 1999 field work and update study (planted)
Salix humilis	upland or prairie willow	no	no	deleted based on review of Peel flora by Kaiser (1999)
Silphium perfoliatum	cup plant	yes	no	addition, based on 1999 field work and update study (planted)
Taxus baccata	English yew	yes	yes	addition, based on 1999 field work and update study (planted)

4.3 Floristic Quality Assessment

Table 1 (page 7) provides the FQI and native mean coefficient for all natural areas that were assessed and Appendix 7 summarizes changes. In 1996, 107 of the 144 natural areas were assessed. FQIs ranged from 2.68 to 80.10 and the native mean coefficients ranged from 1.20 to 4.82. The majority of natural areas fell in the medium range of native mean coefficients (3.3 to 3.99) and in the low range for the FQIs (<30.00). FQIs and native mean coefficients were re-calculated for 61 sites in 1999; those that had a change in their floral inventories.

Of the natural areas evaluated in 1999, most (22) have high mean coefficients, 21 are medium and 18 have low values. However, most sites (37) have low FQI values, with 14 being medium and 10 being high. High, medium and low value are defined in the 1996 Natural Areas report (page 28).

Thirty-three natural areas increased their FQI in this update, three of which (SV1, EC22, and CE9) increased their FQI rank from medium to high. Increases in FQIs at these 33 natural areas are the result of more complete inventories of flora species and are probably closer reflections of actual conditions. Only five sites had lower FQIs, and none of these changed in their ranking.

Eighteen natural areas saw an increase in their native mean coefficient, but none were sufficiently large to change the status (high, medium, low) of areas. Eighteen areas also decreased their mean coefficient, four of which changed from being high to medium values. These new native mean coefficients probably more accurately reflect the floral species composition of these natural areas. A decrease in the native mean coefficient indicates an increase in the numbers of native species with low coefficients documented for these natural areas. An increase in the native mean coefficient is the result of the documentation of additional conservative species within natural areas.

4.4 Fauna

There were no changes to the provincial rankings for flora, thus Appendix 6 in the 1998 update report is considered current and is not provided here. A summary of the significant fauna for the City can be found in the 1998 update.

In 1999, a number of natural areas had additional faunal records documented and added to the NAS database, however, no new species were documented for the City of Mississauga. The fauna information for the City is still very limited and additional surveys of the fauna that use the City's natural areas need to be conducted.

4.5 Significant Features

There are no changes to Areas of Natural and Scientific Interest (ANSIs) since they were last updated by MNR, as reported in the 1998 update report. Cawthra Woods (LV7) was evaluated as a wetland in 1999, as part of this study. A copy of the wetland evaluation has been provided to the City under separate cover.

4.6 Salamander Breeding at Cawthra Woods

In 1999, a study undertaken by Dr. J. Bogart from the University of Guelph, confirmed that Jefferson's salamanders (*Ambystoma jeffersonianum*) were breeding at Cawthra Woods. This taxonomically complex groups of salamanders live the majority of their lives underground, but surface in the spring to breed in woodland ponds. A total of 82 juveniles were live trapped and released in the early summer months. The complete findings of the study are documented in a report (Bogart 1999), on file with the City of Mississauga.

5.0 CONDITION OF NATURAL AREAS

5.1 Condition

Generally, the natural areas within the City that were surveyed continue to be in fair condition (see Table 1). It should be noted that 1998, the year previous to this update study, was a year of exceptionally low precipitation. The drier than usual conditions persisted through the winter and spring of 1999. Many natural areas, in particular table land woodlots, appeared affected by these drought conditions. The most prevalent effect was smaller populations of many native ground cover species. Other impacts included dry soil conditions, an increase in exposed soil, an apparent increase in the populations of non-native species and a loss of leaves in canopy trees. The effects of this drought were still apparent in 1999, although not to the extent that they were in 1998. Vegetation did not appear dried out in 1999, but populations of some ground flora species still appeared smaller than expected.

Only one natural area (CL21) had its condition downgraded in 1999 from fair to fair to poor. The poorer condition at this natural area can be attributed to increased pressure within the site as a result of adjacent development.

5.2 Disturbances

As with the surveys in 1996 and 1998, the most common disturbances within natural areas are still those associated primarily with increased use following development in adjacent areas. Examples of these disturbances include: the creation of *ad hoc* trails, the use of mountain bikes (including the construction of some elaborate racing circuits), garbage, encroachment, and vandalism. In Erin Woods (CE10), one of the areas identified for a spring inventory, a relatively large burned area (10 m x 30 m) was noted. This was probably an accident associated with the fort building and use of the woods by juveniles. These disturbances have become more prevalent at all of the natural areas surveyed and especially in table land forests where adjacent development has recently occurred.

5.3 Development

Another disturbance that caused impacts was development that resulted in removal of portions of natural areas. Eight of the 62 natural areas surveyed in 1999 had decreased in overall size due to development. Some impacts that resulted from the removal of portions of natural areas included increased light penetration in the remainder of the area, and changes in the vegetation structure. Other potential long-term impacts that could occur are changes in the moisture (soil and air), temperature and precipitation within the natural area.

5.4 Non-native Species

There has been an increase in the proportion of non-native plant species in the natural areas surveyed between 1996 and 1999 (see Appendix 7). Thirteen non-native species decreased their regional rarity status within the City due to an increase in site records. Two of these species are considered invasive non-native species: white mulberry (*Morus alba*) and jewelweed (*Impatiens glandulifera*). An increase in the presence of these species within the City's natural areas is a serious management concern. If allowed to continue

increasing their populations, these species could easily replace native plant species in a number of natural areas. As was noted in the 1998 survey, City-wide strategy and management plans should be developed to deal with these exotic species before they are no longer manageable.

It was noted that 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 resulting in the introduction of non-native plants. Some of these plants are severely impacting some natural areas. For instance, the horticultural groundcover Euonymous (*Euonymous fortunei* var. *coloratum*) was noted spreading aggressively at White Oak Woods Park (CL39), MI17 and Tecumseh Park (CL24).

6.0 RECOMMENDATIONS

1. Continue restoration initiatives, in particular the native planting scheme for Jack Darling Park and the prescribed burns at Lorne Park Prairie. Consider similar prairie and savannah initiatives for the other natural areas that contain remnants of the Lorne Park Prairie: CL24, CL31 and CL22. In particular, White Oak Woods park (CL39) is an excellent candidate for restoration of the indigenous savannah community of that area.

2. The analysis of trends in section 4.0 notes that table land natural areas continue to decrease and decrease overall within the natural areas system. This trend reinforces the observation and recommendation made in the 1996 report that the tableland woodlands of Mississauga are very threatened and every effort should be made to maintain and restore those that are still undeveloped. Although the extension of Mavis Road severely impacted the tableland woodland GT1, the remnant portion was retained in the natural areas system solely owing to the scarcity of woodlands outside of the valley lands.

3. Initiate greater control over natural areas to reduce impacts related to human use. This is best achieved through site-specific conservation plans. Issues addressed in the conservation plans should include, but not be limited to: access issues, appropriate activities, non-native plant control, and restoration initiatives (see 1996 September, Volume 1 of 3 for a complete description of conservation plan requirements). Encroachment was still noted as a source of major disturbance that is worthy of attention, especially with respect to the dumping of horticultural weeds that are invading natural areas (see recommendation 6 below).

4. Initiate a public education program in concert with community-based stewardship initiatives to involve local citizens in the management of natural areas, as outlined in the Natural Areas Survey (1996 September, Volume 1 of 3).

5. The mowing of the areas being rehabilitated in Jack Darling Park, and the area behind the tennis courts where the big bluestem occurs, should cease. The mowing is clearly preventing species from maturing and setting seed. This defeats the purpose of planting native species and prevents natural communities from forming. The plantings at Jack Darling should be considered to be more or less horticultural, with respect to the evaluation of the site as a natural area, until the native plants appear to be reproducing naturally. Annual burning should be considered at Jack Darling as an alternative to the mowing. If no maintenance is undertaken, there is a risk that the planted areas will be overtaken by weeds such as white clover (*Melilotus alba*).

6. Develop a City-wide strategy and management plans to deal with invasive non-native species, especially: Norway maple (*Acer platinoides*), garlic mustard (*Alliaria petiolata*), purple loosestrife (*Lythrum salicaria*), dog-strangling vine (*Vincetoxicum rossicum*), white poplar (*Populus alba*), Japanese knotweed (*Polygonum cuspidatum*) and white mulberry (*Morus alba*). The City should at least adopt policies that restrict or prevent their use by the City (if this has not already been done), and provides encouragement and a mechanism for the City and the community to remove such plants.

7. An inventory of fish species in urban watercourses that are being rehabilitated (*e.g.*, Sheridan Creek) should be considered. A baseline inventory at this point in time would facilitate evaluation of any positive impact of riparian planting and the establishment of buffer strips being undertaken by Community Services. It is suggested that repeat inventories need only be undertaken infrequently (*e.g.*,

every 10 years) as it is expected to take some time before rehabilitated areas mature sufficiently to have a measurable impact. The fish inventory could be included as part of the yearly update of natural areas currently being undertaken. This recommendation was initiated through discussion with Eugene Furgiuele (Community Services) while conducting field investigations for the 1999 update study.

8. The province has developed a new classification of vegetation communities within an Ecological Classification Framework. This is becoming widely accepted as the standard for describing vegetation units in Ontario. At some point, the vegetation communities used for the Mississauga Natural Areas Survey, which was based on an older provincial scheme, should be updated to the new system.

9. The CVC has developed a list of "species of concern" for fauna within the Credit watershed. It is probably reasonable to use these as a basis for assigning regional rarity for fauna in Mississauga. Currently, there is no regionally significant status assigned to fauna. Use of the CVC "species of concern" will involve updating the NAS database.

7.0 REFERENCES CITED

Bakowsky, W.D. 1996. Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario. 21 pp.

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

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

Kaiser, J. 1999. A Vascular Plant Flora of the Region of Peel and the Credit River Watershed - Preliminary List. Draft report prepared for Credit Valley Conservation.

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Natural Heritage Information Centre. 1999d. Natural Heritage Resources of Ontario: Amphibians. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario.

Natural Heritage Information Centre. 1999e. Natural Heritage Resources of Ontario: Vascular Plants. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario.

Oldham, M.J., W.D. Bakowsky, and D.A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. 17 pp. + app.

Appendix 1: Reports Examined for Background Review

The format of this appendix follows Appendix 2 in the Natural Areas Survey (1996 September, Volume 2 of 3). The numbers correspond to those used in the database for literature references.

187 Dougan and Associates. 1997. Environmental Impact Study and Preliminary Tree Preservation Plan. Sawmill Valley Phase III, Registered Plan M-199, City of Mississauga. Report prepared for Sawmill Valley III Development Inc. 19pp + app.

188 Construction Control Inc. 1998. Report on the Geotechnical Investigation for the Proposed Residential Development at the Collegeway, Mississauga, Ontario. Report prepared for Granite Gates II Development Inc. 12pp + maps.

189 Milus Bollenberghe Topps Watchorn. 1995. Inventory and Evaluation of the westerly portion of Woodlot 22-N, Draft Plan of Subdivision 21T-95044, Britannia West District, City of Mississauga. Report prepared for Fitzwood Investments Ltd. 10 pp + maps.

190 Ecologistics Ltd. 1998. Streetsville Quarry Redevelopment Environmental Study. Report prepared for Jannock Properties Ltd. 21 pp + app and maps.

191 Strybos Associates Ltd. 1997. Vegetation Analysis and Tree Preservation Guidelines, Proposed Severance 1945 Mississauga Road, City of Mississauga. Report prepared for Richard and Robt. MacFarlane. 11pp + maps.

192 Ecoplans Ltd. 1998. Tree Preservation Plan - Woodlot EC10. Letter report prepared for Graylight Development Inc. 4pp + app and maps.

193 Ecoplans Ltd. 1998a. Woodlot 14E - Scoped Environmental Impact Statement. Report prepared for Erin Mills Development Corporation, Churchill Meadows District Plan, Neighbourhood 404 North - Phase 3. 29pp + app.

194 Ecoplans Ltd. 1998b. Quenippenon Woodland - Scoped Environmental Impact Statement. Report prepared for Erin Mills Development Corporation, Proposed Apartment Buildings Block 6 Plan 43M-908, Erin Mills Boulevard and Erin Mills Parkway. 7pp + app and maps.

195 LGL Limited. 1999. Environmental Impact Study, Indian Road Subdivision, City of Mississauga. Prepared for Mattamy Development Co. 17 pp + app.

196 Fahey, W.T. 1997. Jack Darling Park: Native Vegetative Community Reconstruction. Report prepared for the City of Mississauga. 24pp

197 Fahey, T., E. Furgiuele and B. Montague. 1997. Lorne Park Prairie P-335 Site Inventory. Letter report consisting of a list of plants recorded. 2pp.

198 Kaiser, J. 1999. Letter to Mrs. J. Phillips providing a review of the EIS for the proposed Indian Road Subdivision (LGL 1999, ref # 195). 3pp + app and map.

199 Ursic, K. 1999. List of species observed at 1198 Mona Road, Mississauga, Ontario on May 5, 1999. Plant list prepared for OMB Hearing File # C990029. Located in NAS file for area MI7. 3pp.

200 Ontario Municipal Board. 1999. Decision Order 1239, File #C990029. Appeal by S.M. Blight and W. Kenny. 11pp.

201 Bogart, J. 1999. Salamander survey at Cawthra Park for the City of Mississauga. 9pp.

Appendix 3: Natural Areas (Outside Wards 1 and 2) Identified for Fact Sheet Updates Based on Recommendations in the 1998 Update (Volume 3 of 3)

Natural Area	Reason for Update
EC22	check spring flora following year of drought
GT4/HO9	check spring flora following year of drought
HO7	check spring flora following year of drought
MV19	check spring flora following year of drought
SV1	check spring flora following year of drought
CE10	check spring flora following year of drought

Appendix 4: Regional Rarity Rank Updates for the Flora of the City of Mississauga

Regional rarity ranks are defined in Appendix 4 of the Natural Areas Survey (1996 September, Volume 2 of 3). A rank of 0 is extirpated, a rank of 1 is rare, a rank of 2 is uncommon, and a rank of 3 or 4 is common.

Scientific Name	Common Name	Non-native	# of Occurrences	Regional Rarity Rank	
				1996	1999
Acer x freemanii	hybrid soft maple		1	0	1
Arabis glabra	rock-cress		1	0	1
Berberis vulgaris	barberry	yes	12	2	3
Carex radiata	sedge		14	2	3
Dryopteris clintoniana	Clinton's wood fern		5	1	2
Euonymous alata	winged euonymous	yes	7	1	2
Hedera helix	English ivy	yes	1	0	1
Impatiens glandulifera	jewelweed	yes	11	2	3
Lobelia cardinalis	cardinal flower	yes	1	0	1
Mentha spicata	spearmint	yes	4	1	2
Morus alba	white mulberry	yes	12	2	3
Nasturtium officinale	water cress	yes	6	1	2
Oenothera biennis	hairy-yellow evening-primrose		1	0	1
Picea glauca	white spruce	yes	15	1	3
Prunus pumila	sand cherry	yes	1	0	1
Scilla sibirica	squill	yes	4	1	2
Silphium perfoliatum	cup plant	yes	1	0	1
Taxus baccata	English yew	yes	1	0	1

Appendix 5: Flora Species Collected in the City of Mississauga and Identified (June to October 1999)

Collections are currently held by North-South Environmental Inc., and will eventually be deposited in the herbarium at the Univeristy of Toronto, Erindale.

Number	Confirmed ID	Habitat	Location
99-001	too young for identification	young maple woods	HO7
99-002	*Athyrium filix-femina*	young maple woods	HO7
99-004	*Crataegus monogyna*	young maple woods	HO7
99-005	*Carex deweyana*	young maple woods	HO7
99-009	*Dryopteris carthusiana*	maple woods	GT4/HO9
99-010	*Carex rosea*	maple-beech forest	GT4/HO9
99-011	*Lonicera dioica*	maple woods	GT4/HO9
99-013	*Carex intumescens*	edge of dry pond, hickory-ash forest	EC22
99-014	*Carex blanda*	hickory-ash forest	EC22
99-015	*Carex blanda*	hickory-ash forest	EC22
99-016	*Carex radiata*	hickory-ash forest	EC22
99-017	*Carex projecta*	hickory-ash forest	EC22
99-018	*Glyceria striata*	edge of dry pond, hickory-ash forest	EC22
99-019	*Carex woodi*	hickory-ash forest	EC22
99-020	too young for identification	oak-maple woods	CE10
99-021	too young for identification	oak-maple woods	CE10
99-022	too young for identification	oak-maple woods	CE10
99-023	*Carex cephaloidea*	oak-maple woods	CE10
99-024	*Carex blanda*	oak-maple woods	CE10
99-025	*Carex radiata*	oak-maple woods	CE10
99-026	*Dryopteris clintoniana*	floodplain of Levi Creek	MV19
99-027	*Athyrium filix-femina*	floodplain of Levi Creek	MV19
99-028	*Carex radiata*	floodplain of Levi Creek	MV19
99-029	*Carex blanda*	floodplain of Levi Creek	MV19
99-030	*Carex hirtifolia*	floodplain of Levi Creek	MV19
99-031	*Carex platyphylla*	mesic maple woods	SV1
99-032	*Carex hystericina*	edge of small stream	SV1
99-033	*Carex stipata*	wet meadow	SV1
99-034	*Glyceria striata*	edge of small stream	SV1

Appendix 5: continued....

Number	Confirmed ID	Habitat	Location
99-035	*Carex* cf. *projecta*	maple woods	SV1
99-036	*Carex radiata*	maple woods	SV1
99-037	*Poa compressa*	maple woods	SV1
99-039	*Carex albursina*	maple woods	LV7
99-040	*Carex tribuloides*	maple woods	LV7
99-041	*Carex sparganioides*	maple woods	LV7
99-042	*Carex radiata*	maple woods	LV7
99-043	*Carex gracillima*	maple woods	LV7
99-044	*Carex intumescens*	maple woods	LV7
99-045	*Carex communis*	maple woods	LV7
99-046	*Poa nemoralis*	maple-beech forest	LV7
99-063	*Cyperus esculentus*	edge of stream	ETO7
99-064	*Aster macrophyllus*	steep bank in maple woods	ETO7
99-065	*Inula brittanica**	damp soil on bank of L. Etobicoke Creek	ETO7
99-070	*Carex gracillima*	maple-oak-hemlock ravine	CL24
99-071	*Carex radiata*	mesic maple-oak woods	CL24
99-074	*Salix x rubens*	floodplain of small creek	CL39
99-075	*Carex gracillima*	oak woods	CL39
99-076	*Carex rosea*	oak woods	CL39
99-077	*Digitaria ischaemum*	oak woods	CL39
99-079	*Carex gracillima*	oak woods	CL39
99-082	*Ranunculus repens*	edge of small stream	SV1
99-115	*Glyceria striata*	floodplain of Levi Creek	MV19
99-116	*Carex intumescens*	floodplain of Levi Creek	MV19
99-117	*Carex* cf. *laxiflora* or *leptonerva*	maple woods	LV7

Appendix 6: Summary of MicroStation GeoGraphics Updates

WORK PERFORMED ON NAS99 DATASET
for the City of Mississauga and North-South Environmental Inc.
by Anthony Bonnici, GeoData Resources Inc. (Nov/Dec 1999)

The City's Natural Area Survey was updated in 1999 from field surveys conducted by the staff of North-South Environmental (NSE). GeoData Resources incorporated those updates into the City of Mississauga's (the City) MicroStation GeoGraphics dataset. GeoData also incorporated new system data provided by the City and produced a hardcopy map suitable for use in written reports.

The work performed on the dataset can be divided into two parts: (A) the work done on the NAS database in Microsoft Access, consisting of new system tables provided by the City and incorporating new NAS attribute data provided by NSE, and (B) work done on the features in the NAS MicroStation map file provided by the City (including cartographic work on the separate NASMAP file used to produce the 11x17 hardcopy maps).

This document is a summary of the changes made to the NAS project. All steps are listed in chronological order so that this document can serve as a workflow outline in the future. Relevant details are included in bulleted lists with each step. An indication of which part of the dataset was affected is included like so: DB (database work) and MAP (map work). A description of the deliverables (page 7) and design specifications (page 8) are included.

Workflow Preparation

1. DB: Replaced all **system tables** in the NAS99.Mb (provided by NSE) with system tables imported from the NAS98_oracle.mdb (provided by the City)
   - The following tables were imported: FEATURE, UGFEATURE, MAPS, UGMAP, MSCATALOG, UGJOIN_CAT, and UGTABLE_CAT.
   - Did *not* import the CATEGORY and UGCATEGORY tables since the new and existing versions were identical.
   - In the new MSCATALOG table, the EntityNum column type was changed from Text to Long Integer.
   - In the new UGMAP table, the name of the map file was revised from NAS98.dgn to NAS99.dgn.
   - Original versions of all replaced system tables were renamed to "z XXXXX old" before importing new tables (e.g. existing "feature" table renamed to "z feature old"). These copies can be deleted from the database once the City is satisfied with the changes described above.

2. N/A: **Created** MicroStation GeoGraphics **project**
   - manually created the PRJ project folder with the minimum number of subfolders: DGN, IDX, SEED, SCR, and IMA.
   - created an ODBC data source, user configuration file, and project shortcut
   - did not set up or use the key map, work map, or Map Manager

Map Revision

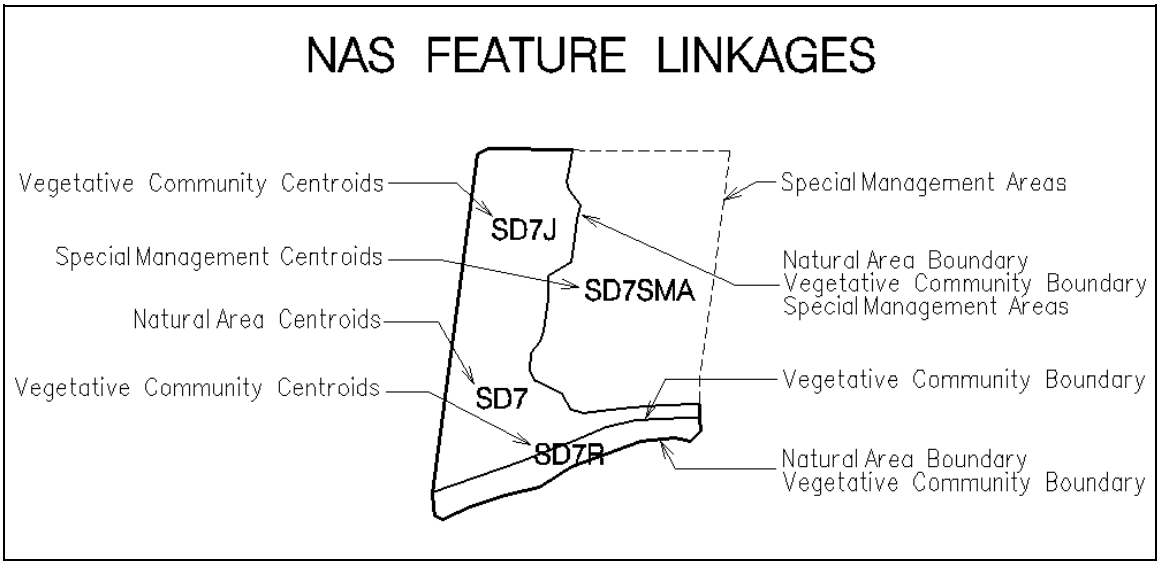
3. MAP: **Revised** the Natural Area, Vegetative Community, and Special Management **map features** with changes shown on mylar manuscripts provided by NSE.
   - *Added* the following new areas: **MI7**, **MI17**, and **SD7** and added new disjoint polygons to the existing **CL13** area.
   - *Changed* boundaries on these existing areas: **CL22**, **CL26**, **CL31**, **CL39**, **CL43**, **EM4**, **ETO7**, **GT1**, **SD1**, and **SH6**.
   - *Removed* the entire **EC10** area (the corresponding NAS_LNK database record was not deleted but has been flagged as REMOVED).
   - All additions and revisions were traced from linework on the mylar manuscripts, which were scanned, warped, and attached to the map file as raster references (these raster images are provided in the project's IMA subfolder).
   - Four circles were found of unknown purpose; the City may want to delete these. (on level 1, green, not filled, with Natural Area Boundaries feature linkages, three are located near SD1 and the fourth is just east of SD7).

4. DB/MAP: Made **other changes** to the NAS99.dgn map file:
   - Changed the text font for Natural Area Centroids, Vegetative Community Centroids, and Special Management Centroids (on levels 11, 12, 13) from font 0 to 43 (Low Res Filled). Corresponding feature definitions in the FEATURE table were also revised.
   - Replaced all letter "O"s to zeros and vice-versa as required for all Natural Area and Vegetative Community centroids.
   - Four circles of unknown purpose were found on level 1; three are located near SD1 and the fourth is just east of SD7 (they are green, not filled, with Natural Area Boundaries feature linkages). The City may want to delete these.

5. MAP: **Created plots** of each of the revised natural areas (at a scale of 1:8025, or 204 metres per inch, to match the mylar manuscripts) to send to NSE for checking purposes. Also created **Saved Views** in the map file for convenient retrieval in MicroStation.

Feature Revisions

6. MAP: Revised **Feature Linkages** (association between map features and feature definitions in the database) as necessary due to new definitions from the City's Oracle database, as follows:
   - Vegetative Community Boundary (106001) features relinked – were 103003
   - Vegetative Community Centroids (106002) features relinked – were 7004
   - Natural Area Centroids (105002) features relinked – were 106002
   - Contaminated Boundary (107001) features relinked - were 103006
   - Contaminated Centroid (107002) features relinked - were 106002
   - All Natural Area Boundary (105001) features were also designated as Vegetative Community Boundary features and, where necessary, as Special Management Area features (in addition to their original Natural Area Boundary designation). These features now serve as "coincident features", i.e. map elements with multiple feature linkages (see example in figure following).



7. DB: Added or revised **Feature Definitions**, as follows:
   - Added new feature definitions for Special Management Areas and Special Management Centroids.
   - Linked Special Management Areas Centroids map features to new feature definitions.
   - Added Feature Priority values in feature definitions of Natural Area Boundary (set to 1), Vegetative Community (2), and Special Management Areas (3) so that "coincident features" would display properly.
   - Also changed the Weight value in the Special Management Areas feature definition from 4 to 0.

Topology Cleanup

8. DB/MAP: Validated and repaired **Topology** for Natural Area Boundary and Centroids, Vegetative Community Boundary and Centroids, and Special Management Areas and Centroids:
   - Over 100 anomalies in total, mostly centroids located outside the area and uncleaned linework.
   - Also manually repositioned the majority of Natural Area and Vegetative Community centroids to avoid overlapping text labels and to better represent each individual polygon, and updated corresponding X,Y columns in database.
   - Four extra centroids (i.e. additional centroids in a single area) were deleted: one Natural Area Centroid and three Vegetative Community Centroids.

Natural Areas Attribute Processing

9. MAP: **Linked** new Natural Areas **CL13**, **MI7**, **MI17**, and **SD7** to new NAS_LNK attribute records (using the DB Text Manager's Join function).

10. DB/MAP: **Updated attribute records** for all Natural Areas, i.e. the following columns in the NAS_LNK table:
    - Area (m^2) – using Load Area facility (with Process Holes enabled to allow for "island" polygons such as MI7 and MI17 within MI4)
    - Cent_X and Cent_Y (mE, mN) – using Load Origin facility
    - Site_Num – manually updated MI7 as 150, MI17 as 151, and SD7 as 152 (CL13 already assigned)

- MapID – manually updated as 104
- MSlink – automatically updated when linked
- ExistsOnMap – new column added to check correspondence between records in table and features on map, and updated using the DBfenupd.bas Basic macro (provided in projects SCR subfolder).

11. DB: **Processed attribute records** for all Natural Areas, i.e. the following columns in the NAS_LNK table:
    - Hectares - Calculated total Hectares for each Natural Area, summing up individual areas of disjoint polygons belonging to a single Natural Area, using NAS_Hectares 1... and NAS_Hectares 2... update queries (1 ha = 10,000 m^2)
    - Acres – Calculated from Hectares using NAS_Hectares 3... update query (1 ha = 2.47 acres)
    - Area, Cent_X, Cent_Y, Hectares, Acres – rounded using NAS_Hectares 4... update query

12. DB: **Deleted attribute records** for Natural Areas from NAS_LNK table.
    - These redundant records seem to have been created inadvertently by the City because the Active Linkage Mode was set to NEW when (1) attribute records were linked to map features or (2) map features with attribute linkages were copied. This should normally be set (with Settings > Database) to DUPLICATE to prevent records from being created.
    - A total of 180 redundant NAS_LNK records were deleted, reducing the total records from 401 to 221 (including 10 new records).

Vegetative Communities Attribute Processing

13. DB/MAP: **Created attribute records** in VEGCOM_LNK table for **CL13**, **MI7**, **MI17**, and **SD7** Vegetative Communities and linked them to corresponding map features (using the DB Text Manager's Insert function which also populates Centroid and MSlink columns).

14. DB/MAP: **Updated attribute records** for all Vegetative Communities, i.e. the following columns in the VEGCOM_LNK table:
    - Area (m^2) – using Load Area facility (with Process Holes enabled to allow for "island" polygons such as MI7 and MI17 within MI4)
    - Cent_X and Cent_Y (mE, mN) – using Load Origin facility
    - NAS_Lnk – manually updated with MSlink value from corresponding record in NAS_LNK table
    - MapID – manually updated with 104
    - Community_Code – manually updated with suffix of Centroid value
    - ExistsOnMap – new column added to check correspondence between records in table and features on map, updated using the DBfenupd.bas Basic macro (provided in project's SCR subfolder).

15. DB: **Processed attribute records** for all Vegetative Communities, i.e. the following columns in the VEGCOM_LNK table:
    - Area, Cent_X, Cent_Y – rounded using VEGCOM_LNK... update query

Special Management Areas Attribute Processing

16. DB: **Created new table** for Special Management Areas named SMA_LNK
    - added to MSCATALOG (as Entity number 114) and UGTABLE_CAT system tables

17. DB/MAP: **Inserted attribute records** for Special Management Areas
    - using the DB Text Manager's Insert function

18. DB/MAP: **Updated attribute records** for all Special Management Areas, i.e. the following columns in the SMA_LNK table:
    - Area (m^2) – using Load Area facility
    - Cent_X and Cent_Y (mE, mN) – using Load Origin facility

19. DB: **Processed attribute records** for all Special Management Areas, i.e. the following columns in the SMA_LNK table:
    - Area, Cent_X, Cent_Y – rounded using SMA_LNK... update query

NAS Hardcopy Map Preparation

20. Created **colour-filled shapes** of the following boundary features: Natural Areas, Special Management Areas, Linkages, and Woodlots.
    - Created all shapes in Nas99shape.dgn (a temporary copy of Nas99.dgn)
    - Turned on boundary and centroid features with Display Manager in Feature mode
    - Set active level to an empty level for new shapes
    - Set line and fill colour to those specified in design specifications
    - Used the Create Areas tool with a fence

21. **Revised** the current **NasMap.dgn** file, used to produce 11x17 hardcopy maps:
    - Renamed the original file to NasMap98.dgn and made a copy named NasMap.dgn for all new work.
    - Established relationships between legend entries on the hardcopy map and features in the NAS GeoGraphics project. These are summarized in the table below.
    - Copied all new or revised Natural Areas and Special Management Areas from the NAS99shape.dgn file
    - Manually added Site Number labels for each of the three new Natural Areas MI7, MI17, and SD7
    - Added additional Site Numbers for extended Natural Area CL13.
    - Deleted Natural Area EC10 and its associated Site Number 95, which has not been reused.
    - Minor Natural Areas that approximately coincide with new Natural Areas MI7 and MI17 were retired (moved to level 61 and not plotted)
    - Added Fence Limit element on level 60, based on the corner marks in the 11x17sur.dgn file (this map is no longer used to produce the hardcopy maps). This element is useful as a guide for placing a fence for plotting but is not included in the final plot.
    - Made other changes and improvements to the title block, colours (latest colour table saved as NasMap.tbl), fonts, text placement, etc.

Relationships between Legend Categories on hardcopy map and NAS GeoGraphics features.

Legend Category	GeoGraphics Features		Comments
Natural Area	Natural Area Boundary	Natural Area Centroids	All Natural Areas except Residential Woodland below
Residential Woodland	Natural Area Boundary	Natural Area Centroids	NAS_LNK Classification column set to "Residential Woodland"
Special Management Area	Special Management Area	Special Management Centroids	
Minor Natural Feature	Woodlots	N/A	Excluded if boundaries approximately coincide with Natural Area
Linkage	Linkages	N/A	

22. **Revised** the **NasMajRd.dgn** map file, which is attached as a reference file to the NasMap.dgn file above to produce required hardcopy plots:
    - Changed fonts and repositioned text as necessary to avoid conflict with other map features

Recommendation

For the NAS2000 project, the following approach should be used to produce the NASMAP hardcopy maps:

- Create and maintain all required shapes in the GeoGraphics project (in the Nas00.dgn map or in a separate map
- Use Opaque fill type (rather than Outline fill type) so that shape outlines and fills are the same colour (to simplify the resultant map image). This was incorporated to some extent in 1999 but adjusting the colour table.
- Consider designating shapes as features in the GeoGraphics project
- Consider using level symbology or alternate feature symbology to provide differences in colours required for the gray-scale and colour hardcopy maps
- Create a Nas11x17.dgn map using the surround elements (legend, north arrow, title, scale bar, notes) from current NasMap.dgn and discard the NasMap.dgn file. (Note: the NasMap.dgn design file contains some corrupted elements that prevent its elements from being processed in a fence or selection set. This corruption is also present in the NasMap98.dgn map).
- Retain the NasMajRd.dgn map file as a separate reference map.

Deliverables

This is a listing of all items delivered at the conclusion of this project.

Files on CD

Docs folder

- Summary99.doc - a digital copy of this document.
- Summary98.doc - a copy of previous year's document.
- Nas99fig.tif – the image inserted into this document

Prj folder

- Nas99.Mb – the project database, with all NAS99 updates incorporated

Dgn sub-folder

- NAS99.dgn - MicroStation map file, cleaned and linked as explained in report.
- Figure.dgn – original design file for figure included in report.
- Other map files – used for reference but not revised or updated

Ima sub-folder

- TIFF images – scanned from mylar manuscripts and referenced to NAS99.dgn in order to incorporate revisions

Scr sub-folder

- DBfenupd.bas – MicroStation Basic macro used during processing as explained in report on page 4.

Idx and Seed sub-folders

- Folders required for a MicroStation GeoGraphics project - empty

Map folder

- NasMap.dgn – revised design file for hardcopy plots.
- NasMajRd.dgn – revised reference map of street network.
- NasMap.tbl - colour table for above.
- NasMap98.dgn – design file from previous year.
- NasMap98.tbl - colour table from previous year.

Source folder

- Nas98_oracle.zip – contains system database tables provided by City.
- Nas99_nse.zip - contains attribute database tables provided by NSE.
- Used to generate the above, returned in their original state.

Hardcopy Documents

Summary Report

- this document
- also including nine 8.5” x 11” plots of revisions to Natural Area boundaries

Plots of the Natural Area Survey map, 11” x 17”

- two sample colour copies
- two sample gray-scale copies

Please see the next page for Design Specifications for these maps.

Design Specifications

NasMap.dgn

Level	Contents	Colour	Fill	Style	Weight	Font	Size
1	Natural Area shapes	130	148	0	0		
4	S.M.A. shapes	207	204	0	0		
5	Residential Woodland shapes	130	126	0	0		
10	Natural Area Site numbers	0	--	0	0	43	125
(38)	Centroids (temporary)	(not plotted)					
39	Linkage shapes	143	165	0	0		
41	Minor Natural Feature shapes	193	188	0	0		
47	Shoreline Reach lines	74	--	0	6		
48	Shoreline Reach numbers	74	--	0	0		
50	Legend						
(60)	Fence Limit element	(not plotted)					
(61)	Retired Minor Natural Features	(not plotted)					
62	Minor Rivers	74	--	0	0		
(63)	Roads	(not plotted)					

NasMajRd.dgn

Level	Contents	Colour	Fill	Style	Weight	Font	Size
1	Title	(not plotted)					
2	Minor Roads	9		0	0		
3	Minor Roads Text	9		0	0	57	105
4	Major Roads	0		0	3		
5	Major Roads Text	0		0	0	57	125
6	Railroads	9		2	0		
7	Railroads Text	9		0	0	57	105
8	Airport	9		0	0		
10	River, Shoreline	77		0	0		
11	River Text	77		0	0	58	120
12	City Limits	230		3	9		
13	Neighbouring Town Text	0		0	0	23	150
14	Lake Ontario Text	77		0	0	23	150

Table 1: Summary of Natural Area Features, Their Significant Features and Condition

Update of Table 4 in the Natural Areas Survey (1996 September, Volume 1 of 3). Classification abbreviations are as follows: SNS = Significant Natural Site, NS = Natural Site, NGS = Natural Greenspace, and RW = Residential Woodland. Native FQI and native mean C are defined in the Natural Areas Survey (1996 September, Volume 1 of 3). Definitions for provincially significant species (prov. sig. species) and regionally significant species (reg. sig. species) are in the Natural Areas Survey (1996 September, Volume 1 of 3) with updates as discussed in this report. Condition is explained in Appendix 1 of the Natural Areas Survey (1996 September, Volume 2 of 3) abbreviations are as follows: n/a = not available. * Areas evaluated in 1999. - Areas evaluated that changed between 1996 and 1999 (see Appendix 7 for a summary of the changes).

Site Number	Site Code	Classification	Designation	Area		Flora							Fauna				Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# vegetation communities	prov. sig. species	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
1 -	SD1	NS		19.35	47.78	96	27 (28.1%)	30.22	3.64	5		4	13	4	2		Fair
2 *	SD4	NS		26.59	65.67	65	16 (24.6%)	26.14	3.73	1		2					n/a
3 -	SD5	SNS		10.14	25.05	48	7 (14.6%)	28.74	4.49	2		3	3	1			Good
4 -	CL52	NGS		6.69	16.53	44	24 (54.5%)	15.21	3.4	1			11	1	2		Poor
5 -	CL1	SNS		3.59	8.86	48	7 (14.6%)	28.74	4.49	2		3	3	1			Good
6 -	CL9	SNS	ESA,ANSI, wetland	46.81	115.63	495	161 (32.5%)	79.83	4.37	13		131	200	23	22	1	Good
7 -	CL8	SNS	wetland	11.28	27.86	73	20 (27.4%)	22.94	3.15	7		5	14	10	1		Good
8 -	CL15	NS		0.83	2.05	46	10 (21.7%)	22.12	4.17	1		3	2	2			Fair
9 -	CL16	NS		8.52	21.04	138	46 (33.3%)	37.95	3.96	5		14	38	17			Fair-Poor
10 *	CL17	RW		33.48	82.7	71	13 (18.6%)			1		18			4		n/a
11 -	CL13	NS		8.42	20.79	61	34 (55.7%)	13.47	2.59	2		1	5				Poor
12 -	CL43	NS		4.14	10.24	69	11 (16.2%)	29.27	3.88	2		5	5	1			Fair
13 -	CL42	NS		8.88	21.93	115	34 (29.6%)	37.33	4.15	3		12	4	1			Fair-Poor
14 -	CL21	SNS	ESA,wetland	9.36	23.11	97	22 (21.6%)	38.91	4.49	3		20	2		1		Fair-Poor
15 -	CL39	SNS		12.9	31.87	265	79 (29.8%)	56.46	4.14	2		43	25	5	8		Fair
16 -	CL22	SNS	ESA,ANSI	17.78	43.92	134	47 (35.1%)	37.74	4.07	1	1	15	2	1	6		Good
17 -	CL30	SNS	ESA,ANSI	0.06	0.14	51	18 (35.3%)	25.29	4.58	1	1	14					Fair-Poor
18 -	CL31	SNS	ESA,ANSI	2.61	6.45	59	26 (44.1%)	19.32	3.36	1		2	4				Poor

Table 1: continued .....

Site Number	Site Code	Classification	Designation	Area		Flora							Fauna				Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# vegetation communities	prov. sig. species	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
19 -	CL24	SNS	ESA,ANSI	7.8	19.27	235	62 (26.4%)	59.23	4.5	4		37	10	1			Good
20 -	CL26	NS		4.76	11.75	178	68 (38.2%)	34.52	3.29	2		18	18	7			Fair
21 -	PC1	NS		1.09	2.68	92	44 (47.8%)	26.56	3.83	1		6	68	1			Poor
22 -	PC2	NGS		4.37	10.79	18	10 (55.6%)			1			5				Poor
23 *	PC3	NS		1.77	4.36	11				1							n/a
24 *	CRR9	SNS	ESA,ANSI, wetland	25.63	63.3	37	14 (37.8%)	17.1	3.57	3		12	10	1	13		Fair
25 -	MI4	RW		153.28	378.61	28	17 (60.7%)			1		1					Fair
26 *	MI1	NS		6.31	15.59	9	5 (44.4%)			1							Fair
27 -	LV3	NS		3.55	8.76	83	34 (41.0%)	25.43	3.63	3		1	20	3			Fair
28 -	LV4	NS		1.09	2.68	44	26 (59.1%)	10.61	2.5	1		2	5				Poor
29 -	LV5	NGS		0.95	2.34					1							Poor
30 *	LV2	NS		2.09	5.17	26	11 (42.3%)	11.62	3	1			3				Poor
31 -	LV1	NS		14.22	35.12	93	38 (40.9%)	24.54	3.31	4		1	8				Fair
32 *	ETO8	SNS		16.67	41.17	86	34(37.6%)	26.05	3.65	3		4	2	4	1		Fair
33 -	LV14	NGS		1.95	4.82	40	17 (45.7%)	13.76	3.16	1			1				Poor
34 -	LV6	NS		2.03	5.01	64	20 (31.3%)	25.48	3.84	1		4	1	1			Fair
35 -	LV7	SNS	ESA,ANSI, wetland	21.56	53.26	331	110 (33.2%)	62.84	4.25	2		60	68	7	5	1	Good
36 -	ETO7	SNS	ESA	27.36	67.59	96	35(36.5%)	25.1	3.21	2		4	11	2	11	1	Fair
37 -	SP1	NS		9.04	22.34	108	27 (24.3%)	33.99	3.8	1		11	4	1			Fair
38 -	SP3	SNS		8.84	21.83	134	30 (21.8%)	41.09	4.05	1		11	5	2	1		Good
39 -	SH6	NS		6.44	15.91	80	38 (47.5%)	23.3	3.6	2		2	6	1			Poor
40 -	CRR7	SNS	ESA,ANSI	88.94	219.69	92	24 (26.0%)	34.68	4.21	3	1	9	4	1	9		Good
41 *	CRR8	SNS	ESA,ANSI, wetland	110.62	273.23	43	3 (7.0%)			4	1	30	8	1	4		Good
42	ER6	SNS		1.51	3.73	36	13 (36.1%)	16.26	3.39	1			1				Poor

Table 1: continued .....

Site Number	Site Code	Classification	Designation	Area		Flora							Fauna				Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# vegetation communities	prov. sig. species	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
43	CRR6	SNS	ESA,ANSI	213.22	526.64	281	92 (32.7%)	65.03	4.73	4	3	72	87	8	17	1	Good
44	CV1	NS		1.48	3.66	29	9 (31.0%)	13.86	3.1	1			5	1			Fair
45	CV2	RW		53.17	131.33	143	43 (29.6%)	41.71	4.19	1		10	6	1			Fair
46	CV12	NS		6.99	17.27	201	89 (44.2%)	37.19	3.55	3		14	2	1			Fair
47	CV10	NS		4.59	11.33	20	9 (40.0%)	8.74	2.64	2			2				Poor
48	CV8	NS		7.88	19.45	39	18 (43.6%)	13.53	2.95	4		1	1				Poor
49	ETO6	SNS		11.39	28.14					3							Poor
50	AW1	NS		7.98	19.71	51	18 (35.0%)	18.45	3.21	3		1	5	1			Poor
51	WB1	NS		7.12	17.58	53	9 (17.0%)	25.93	3.91	3			4		1		Fair
52	EM30	NS		5.57	13.75	52	5 (9.6%)	29.61	4.32	2		6	9	8			Good
53	EM6	NS		1.07	2.65	53	11 (20.8%)	25	3.86	1		1	6	1			Fair
54	EM2	SNS		4.9	12.09	63	12 (19.0%)	28.85	4.04	1			8	1			Fair
55	EM10	NS		3.99	9.86	43	9 (18.6%)	21.78	3.74	2			4	2			Fair
56	EM14	NS		9.61	23.74	49	22 (42.9%)	15.4	2.96	2			4				Poor
57	EM4	SNS	ESA,ANSI	43.18	106.65	235	64 (27.2%)	56.28	4.3	8	1	31	67	5	6		Good-Fair
58	EM5	NS		1.87	4.63	49	9 (32.7%)	22.27	3.94	1			4				Fair
59	EM21	NS		1.13	2.8	42	8 (16.7%)	21.27	3.65	1			2	1			Fair
60	CR1	SNS	ESA	4.9	12.1	47	3 (4.3%)	29.55	4.45	2		6	2	1			Fair
61	FV1	NS		2.23	5.5	46	9 (19.6%)	20.55	3.38	1		1	2				Fair
62	FV3	NS		7	17.29	59	15 (23.7%)	25.63	3.86	3			15	2			Fair
63	CC1	NS		3.18	7.84	133	44 (33.1%)	36.36	3.85	2		7	9	1			Fair
64	MY1	NS		12.16	30.03	133	44 (33.1%)	36.36	3.85	2		7	9	1			Fair
65	MY3	NGS		3.71	9.16	41	27 (65.9%)	6.68	1.79	1		1					Poor
66	AW4	NGS		11.71	28.92					1							Poor
67	AW3	NGS		7.92	19.57	33	21 (60.6%)			2			4	1			Poor
68	ETO5	SNS		9.12	22.52					2							Poor

Table 1: continued .....

Site Number	Site Code	Classification	Designation	Area		Flora							Fauna				Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# vegetation communities	prov. sig. species	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
69	ETO4	SNS	ESA	58	143.27	141	37 (26.2%)	43.93	4.31	3		15	24	3	9		Fair
70	RW5	NS		3.51	8.68	54	27 (50.0%)	13.66	2.63	1		2	7	1			Poor
71	RW6	NS		7.31	18.06	51	29 (56.9%)	14.28	3.05	1		1	11	1			Poor
72	RW4	NS		1.09	2.68	32	7 (18.2%)	22.36	4.38	1			3				Fair
73	RW1	SNS		2.11	5.21	69	12 (17.4%)	34.04	4.51	1		3		1			Fair
74	RW2	NGS		3.5	8.65					1							Poor
75	CM7	SNS		11.38	28.12	88	18 (20.5%)	34.78	4.16	3		4	15	1	5		Excellent
76	CM9	NS		3.37	8.34	62	12 (17.7%)	27.58	3.9	2		3	8	2			Good
77	CM11	NS		2.24	5.53	22	1 (4.5%)	18.33	4	1			1				Good
78	CM12	NS		8.21	20.28	76	15 (19.7%)	29.96	3.84	2		3	14	5	6		Good
79	CM17	NS		8.39	20.71	25	4 (16.0%)	16.8	3.67	1			5				Fair
80	CM13	NGS		0.77	1.91	37	14 (35.1%)	16.26	3.39	1			1	1			Poor
81	CE7	SNS		10.08	24.9	88	28 (31.8%)	30.47	3.93	2		4	2	1	7		Good
82	CE9	NS		4.83	11.94	76	17 (21.1%)	32.29	4.2	3		5	10	2			Fair
83	CE10	SNS		18.2	44.95	99	19 (19.2%)	37.9	4.24	3		9	13	2	2		Good-Fair
84	CE5	NGS		5.47	13.5	13	8 (61.5%)	2.68	1.2	1							Poor
85	CE1	NGS		16.93	41.82	50	24 (46.0%)			2			3				Poor
86	CE12	NS		17.62	43.51	91	39 (41.8%)	22.19	3.08	2		1	13	3	1		Fair
87	CRR5	SNS		21.22	52.41	64	27 (42.2%)	21.37	3.51	2			5		5		Fair
88	CRR4	SNS	ESA,ANSI	24.69	60.97	11	2 (5.5%)			3		1			7		Good
89	SV12	NS		1.72	4.25	91	39 (41.8%)	22.19	3.08	2		1	13	3	1		Fair
90	SV10	NGS		3.93	9.71	29	14 (48.3%)	9.55	2.47	1			1	1			Poor
91	SV1	NS		4.63	11.44	94	22 (23.4%)	34.77	4.1	2		5	9	2			Fair
92	CRR3	SNS		68.94	170.28	74	26 (35.1%)	25.26	3.65	4		3	7		9		Fair
93	CRR2	SNS	ESA,ANSI	91.29	225.5	100	31 (31.0%)	32.99	3.97	8		2	14		10		Good
94	EC22	NS		2.32	5.73	72	9 (12.5%)	30.62	3.86	1		6	4	1			Fair-Poor

Table 1: continued .....

Site Number	Site Code	Classification	Designation	Area		Flora							Fauna				Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# vegetation communities	prov. sig. species	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
95 -	EC10	**Removed 99**		0	0	41	9 (22.0%)	19.98	3.53	2		1	2				**Removed**
96	EC13	SNS	wetland	4.61	11.39	168	29 (16.7%)	53.01	4.5	4		65	89	6	11		Excellent
97	EC1	SNS	ESA,wetland	2.63	6.5	10	4 (40.0%)	4.9	2	1		1	13		3		Poor
98	HO1	NS		1.2	2.97	23	5 (21.7%)	17.44	4.11	1			3	1			Fair-Poor
99	HO2	**Removed 98**		0	0	24	3 (12.5%)	18.77	4.1	2			3				**Removed**
100	HO3	NS		14.41	35.59	56	11 (19.6%)	25.79	3.84	3			12	2			Fair
101	HO6	NGS		8.5	21					1							Poor
102 -	HO7	NS		2.11	5.21	72	16 (22.2%)	29.13	3.89	2		4	6				Fair-Poor
103 -	HO9	SNS	ESA	11.94	29.48	204	55 (29.7%)	51.2	4.19	1		22	18	2	1		Good-Poor
104	NE4	NS		13.43	33.17	96	22 (23.0%)	33.04	3.79	5		9	5				Excellent
105	NE3	NGS		2.59	6.4	29	11 (34.5%)			2							Poor
106	NE2	NS		1.85	4.56	55	11 (18.2%)	28.49	4.3	1		5	5				Fair
107	NE1	NGS		0.95	2.35	54	26 (48.1%)	14.93	2.82	1			3				Fair
108	NE6	NS		4.34	10.72	60	16 (26.7%)	24.27	3.66	2		1	4	1			Good
109	NE5	NGS		12.75	31.5					1							Poor
110	NE7	NGS		2.76	6.82					1							Poor
111	ETO3	SNS		112.22	277.18	400	167(41.8%)	56.47	3.7	4	1	58	7	5	5		Fair-Poor
112	NE8	NGS		6.25	15.45					1							Poor
113	NE10	NGS		8.27	20.42					1							Poor
114	NE11	NGS		5.72	14.13					1							Poor
115	NE12	NGS		6.49	16.02					1							Poor
116	ETO2	SNS		13.01	32.14	20	12 (60.0%)	3.54	1.25	1			2	1			Poor
117	ETO1	SNS		9.13	22.55	37	11 (29.7%)	15.3	3	4		1	3	1			Fair-Poor
118	NE9	NS		43.66	107.84	67	27 (40.3%)	20.55	3.25	4		5	12	1	1		Fair
119	LS1	SNS	wetland	28.92	71.42	63	14 (20.6%)	27.14	3.88	3		7	4				Good-Poor
120	LS2	NS		1.27	3.13	45	14 (31.1%)	22.09	3.97	1			2				Fair

Table 1: continued .....

Site Number	Site Code	Classification	Designation	Area		Flora							Fauna				Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# vegetation communities	prov. sig. species	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
121	LS2	NS		3	7.4	66	23 (33.3%)	23.94	3.65	2		2	1	1	2		Fair
122	ME10	SNS		4.18	10.33	56	15 (27.3%)	24.67	3.9	1		3	4				Fair
123	ME12	NGS		2.9	7.16	49	28 (57.1%)	12	2.62	1			7	2	7		Poor
124	ME11	NGS		4.36	10.78	51	24 (47.1%)	16.17	3.11	1			5	2	4		Poor
125	ME9	NS		2.39	5.9	44	11 (25.0%)	25.59	4.45	1		2	2	1			Fair
126	ME8	SNS		5.82	14.38	88	13 (26.4%)	30.25	3.78	2		4	3	3	4		Fair
127 *	MB9	NGS		6.6	16.31					1					2		Poor
128	MB7	NGS		10.45	25.8					1							Poor
129	MB8	SNS		10.17	25.11	88	13 (26.4%)	30.25	3.78	2		4	3	3	4		Fair
130	MB3	NGS		7.11	17.55					1							Poor
131	MB5	NS		0.9	2.22	42	4 (9.8%)	23.67	3.89	1							Poor
132	MB4	NS		1.94	4.78	40	11 (27.5%)	19.31	3.59	1							Poor
133	MB6	SNS		23.76	58.68	84	15 (16.7%)	30.7	3.7	2		6	1	1	2		Good
134	MB2	NS		1.34	3.31	41	6 (14.6%)	23.66	4	1		1	1				Poor
135	MB1	NS		0.94	2.33	34	6 (17.6%)	22.87	4.32	1							Fair
136 *	MV19	SNS		22.66	55.96	207	53 (25.6%)	52.06	4.19	3		30	20	6	4		Good
137	CRR1	SNS	ESA	71.4	176.36	76	23 (30.3%)	26.65	3.66	5	1	4	6	2	1		Fair
138	MV18	NS		3.14	7.76	19	1 (5.3%)			2		1	2				Fair
139	MV2	SNS	ESA,ANSI	78.83	194.71	215	69 (31.6%)	47.59	3.94	4		20	59	12	2		Good-Fair
140	MV3	NS		2.67	6.58	46	13 (27.7%)	21.61	3.71	1							Fair
141	MV12	NS		13.38	33.05	115	35 (30.4%)	35.33	3.95	3		6	8	3			Fair
142	MV14	NGS		4.56	11.25					1							Poor
143	MV11	NS		2.9	7.17	24	4 (16.7%)	17.44	3.9	1			1				Fair
144	MV15	NS		10.7	26.44	53	25 (45.3%)	14.74	2.79	2		1	7	1			Poor
145 *	GT1	NS		1.95	4.82	41	10 (24.4%)	18.5	3.32	1		1	2				Fair
146	GT2	NS		7.2	17.78	56	10 (17.9%)	26.24	3.87	6		6	9	3	1		Good

Table 1: continued .....

Site Number	Site Code	Classification	Designation	Area		Flora							Fauna				Condition
				(ha)	(acres)	total	# non-native (proportion)	native FQI	native mean C	# vegetation communities	prov. sig. species	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
147	GT3	NS		2.67	6.59	43	12 (25.6%)	19.04	3.42	2		1	1				Fair
148	GT4	SNS	ESA	4.16	10.27	204	55 (29.7%)	51.2	4.19	1		22	18	2	1		Good-Poor
149	MA1	NS		24.06	59.42	50	25 (50.0%)	14	2.8	1		3	2				Poor
150	SD7	NGS		2.01	4.97	34	16 (47.1%)			2				1			Poor
151	MI17	NS		6.04	14.92	145	45 (31.0%)	42.2	4.22	2		15	6	2	3		Fair
152	MI7	SNS		5.95	14.69	125	39 (31.2%)	39.9	4.3	2		7	1	5			Poor

Table 2: Comparison of Natural Area Classes for the City of Mississauga Between 1996 and 1999

Classification	Number of Sites			Total Area (ha)			Total Area (acres)			Proportion of Natural Areas System			Proportion of the City		
	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999
Significant Natural Site (SNS)	51	45	46	1530.17	1423.39	1425.44	3779.52	3517.15	3522.33	74%	70%	70%	5.23%	4.91%	4.87%
Natural Site (NS)	59	64	68	349.92	426.35	445.66	864.30	1053.50	1101.25	17%	21%	22%	1.2%	1.41%	1.52%
Natural Green Space (NGS)	31	31	28	197.05	171.55	160.18	486.71	423.89	395.81	9%	9%	8%	0.67%	0.60%	0.55%
Residential Woodland (RW)	3	3	3	252	252	239.93	621.67	621.67	592.88	-	-	-	-	-	-
TOTAL	144	143	145	2329.14	2273.29	2271.21	5752.2	5616.21	5612.27	100%	100%	100%	7.10%	6.92%	6.94%

* Note: Residential Woodlands were not used in the calculations for proportion of natural areas system or proportion of the City.

Table 3: Comparison of Natural Areas by Major Landform Type Between 1996 and 1999

Landform Type	No. of Sites			Size (ha)			Size (acres)			Mean Size (ha)			Mean Size (acres)			Proportion of Natural Area System			Proportion of entire City		
	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999
valley lands and associated table lands	73	73	76	1626.3	1588	1622.08	4016.96	3923.89	4008.23	22.28	21.75	21.34	55.03	53.74	52.74	78.3%	78.5%	79.9%	5.6%	5.43%	5.55%
table lands	60	59	58	339.89	328.46	301.62	839.53	811.61	745.32	5.66	5.57	5.20	13.98	13.76	12.85	16.4%	16.2%	14.8%	1.16%	1.12%	1.03%
wetlands and associated valley land	6	6	6	103.69	100.40	100.32	256.11	248.09	247.9	17.28	16.73	16.72	42.70	41.34	41.32	5.0%	5.0%	4.9%	0.36%	0.34%	0.34%
TOTAL	139*	138*	140*	2069.9*	2016.9*	2024.0*	5112.6*	4983.6*	5001.5*	-	-	-	-	-		99.7%*	99.7%*	99.7%	7.1%	6.9%	6.92%

* Note: two small areas that did not readily fall into these three categories and the residential woodlands were omitted from this analysis so figures differ slightly from those provided elsewhere in the report.

Table 4: A Comparison of the Vegetation Communities Mapped for the City of Mississauga in 1996 and 1999

(grouped according to six broad categories), their areas, their proportion of the total vegetation area and their proportion of the total City area [communities are based on classifications of Bakowsky (1995) and Kavanaugh and McKay-Kuja (1992) see 1996 September, Volume 1 of 3].

Code	Vegetation Community	# Occurrences			Area						Proportion of Natural Areas (%)			Proportion of City Area (%)		
		1996	1998	1999	1996		1998		1999		1996	1998	1999	1996	1998	1999
					(ha)	(acres)	(ha)	(acres)	(ha)	(acres)						
	Valley Lands															
A	wooded slope	19	20	20	347.36	857.98	348.54	861.23	348.72	861.70	14.92	15.33	15.35	1.19	1.19	1.19
B	floodplain	22	21	21	458.42	1132.30	426.21	1053.15	426.10	1052.91	19.69	18.75	18.76	1.57	1.46	1.46
G	golf course	4	4	4	101.18	249.91	101.19	250.04	101.19	250.05	4.35	4.45	4.45	0.35	0.35	0.35
J	wooded non-native valley lands	18	18	20	93.43	230.77	94.36	233.16	100.27	247.77	4.01	4.15	4.42	0.32	0.32	0.32
K	open with open slopes valley lands	31	32	33	229.02	565.68	210.58	520.34	217.50	537.45	9.84	9.26	9.58	0.78	0.72	0.74
L	wooded native valley lands	5	5	5	39.77	98.23	39.78	98.29	39.64	97.95	1.71	1.75	1.75	0.14	0.14	0.14
M	open with wooded slopes valley lands	2	2	2	5.26	12.99	5.25	12.97	5.25	12.97	0.23	0.23	0.23	0.02	0.02	0.02
N	open with manicured slopes valley lands	2	2	3	22.16	54.74	22.15	54.73	22.15	54.73	0.95	0.97	0.97	0.08	0.08	0.08
O	manicured with wooded slopes valley lands	1	1	1	5.17	12.77	5.17	12.77	5.17	12.77	0.22	0.23	0.23	0.02	0.02	0.02
	Totals				1301.77	3215.37	1253.23	3096.68	1265.99	3128.30	55.92	55.12	55.74	4.47	4.30	4.32
	Woodlands															
BB	red ash-American elm forest	14	15	15	35.32	87.24	35.61	87.99	37.35	92.29	1.52	1.57	1.64	0.12	0.12	0.12
CC	sugar maple forest	7	7	7	14.79	36.53	13.12	32.42	13.12	32.42	0.64	0.58	0.58	0.05	0.04	0.04
DD	sugar maple-American beech forest	15	16	16	108.35	267.62	102.44	253.13	100.07	247.28	4.65	4.51	4.41	0.37	0.35	0.34
EE	sugar maple-white ash forest	9	9	9	63.06	155.76	62.18	153.64	62.18	153.64	2.71	2.74	2.74	0.22	0.21	0.21
FF	sugar maple-red oak forest	10	10	10	42.48	104.93	44.96	111.09	44.96	111.09	1.82	1.98	1.98	0.15	0.15	0.15
GG	sugar maple-eastern hemlock forest	1	1	1	16.03	39.59	16.07	39.71	16.07	39.71	0.69	0.71	0.71	0.05	0.05	0.05
II	sugar maple-black cherry forest	1	1	1	1.93	4.77	1.94	4.79	1.94	4.79	0.08	0.08	0.08	0.01	0.01	0.01
KK	sugar maple-American beech-red oak forest	5	5	5	29.46	72.77	29.46	72.77	29.46	72.77	1.27	1.30	1.30	0.10	0.10	0.10
LL	sugar maple-American beech-eastern	1	1	1	4.44	10.97	4.45	11.00	4.44	10.97	0.19	0.20	0.19	0.02	0.02	0.02

Table 4: A Comparison of the Vegetation Communities Mapped for the City of Mississauga in 1996 and 1999

(grouped according to six broad categories), their areas, their proportion of the total vegetation area and their proportion of the total City area [communities are based on classifications of Bakowsky (1995) and Kavanaugh and McKay-Kuja (1992) see 1996 September, Volume 1 of 3].

Code	Vegetation Community	# Occurrences			Area						Proportion of Natural Areas (%)			Proportion of City Area (%)		
		1996	1998	1999	1996		1998		1999		1996	1998	1999	1996	1998	1999
					(ha)	(acres)	(ha)	(acres)	(ha)	(acres)						
	hemlock forest															

Table 4: continued .....

Code	Vegetation Community	# Occurrences			Area						Proportion of Natural Areas (%)			Proportion of City Area (%)		
		1996	1998	1999	1996		1998		1999		1996	1998	1999	1996	1998	1999
					(ha)	(acres)	(ha)	(acres)	(ha)	(acres)						
MM	white pine-eastern hemlock-sugar maple forest	1	1	1	6.77	16.72	6.77	16.72	5.69	14.06	0.29	0.30	0.25	0.02	0.02	0.02
NN	eastern hemlock forest	3	3	3	4.09	10.10	4.11	10.16	4.11	10.16	0.18	0.18	0.18	0.01	0.01	0.01
OO	red maple-red oak forest	5	6	6	30.24	74.69	30.24	74.69	30.42	74.69	1.30	1.33	1.33	0.10	0.10	0.10
PP	American beech forest	1	1	1	2.56	6.32	2.56	6.32	2.56	6.32	0.11	0.11	0.11	0.01	0.01	0.01
RR	oak-ash forest	8	9	9	28.61	70.67	28.57	70.60	24.75	61.16	1.23	1.26	1.09	0.10	0.10	0.10
QQ	bur oak-American beech forest	1	1	1	2.24	5.53	2.24	5.53	2.24	5.53	0.10	0.10	0.10	0.01	0.01	0.01
SS	oak-hickory forest	5	7	7	24.20	59.77	23.56	58.22	23.55	58.19	1.04	1.04	1.04	0.08	0.08	0.08
TT	ash-hickory forest	3	3	3	6.94	17.14	6.68	16.51	6.68	16.51	0.30	0.29	0.29	0.02	0.02	0.02
VV	black cherry-eastern hemlock-white ash forest	1	1	1	2.02	4.99	2.03	5.02	2.03	5.02	0.09	0.09	0.09	0.01	0.01	0.01
WW	bur oak-black walnut forest	1	1	1	0.90	2.22	0.90	2.22	0.90	2.22	0.04	0.04	0.04	0.00	0.00	0.00
ZZ	oak-white pine forest	0	0	2	0	0	0	0	2.35	5.81	0.00	0.00	0.1	0.00	0.00	0.00
	Totals				424.43	1048.33	417.89	1032.53	414.87	1024.63	18.25	18.41	18.25	1.45	1.41	1.40
	Successional															
C	old field	26	27	27	88.45	218.47	95.33	235.56	95.33	235.56	3.80	4.19	4.19	0.30	0.33	0.33
D	hedgerow	5	5	4	7.68	18.97	7.01	17.32	6.95	17.17	0.33	0.31	0.31	0.03	0.02	0.02
E	early successional forest	9	10	10	21.68	53.55	14.66	36.22	14.66	36.22	0.93	0.65	0.65	0.07	0.05	0.05
P	hawthorn thicket	4	4	4	14.54	35.91	14.35	35.46	14.35	35.46	0.62	0.63	0.63	0.05	0.05	0.05
XX	birch forest	1	1	1	0.46	1.14	0.46	1.14	0.46	1.14	0.02	0.02	0.02	0.00	0.00	0.00
YY	poplar forest	1	2	2	2.37	5.85	1.69	4.18	1.69	4.18	0.10	0.07	0.07	0.01	0.01	0.01
	Totals				135.18	333.89	133.5	329.88	133.44	329.73	5.8	5.87	5.87	0.46	0.46	0.46
	Wetland															
V	cattail marsh	13	14	14	27.73	68.49	26.99	66.69	26.99	66.69	1.19	1.19	1.19	0.09	0.09	0.09
W	open water marsh	6	6	6	22.70	56.07	22.70	56.07	22.70	56.07	0.97	1.00	1.00	0.08	0.08	0.08
X	willow-buttonbush swamp thicket	1	1	1	2.77	6.84	2.77	6.84	2.77	6.84	0.12	0.12	0.12	0.01	0.01	0.01

Table 4: continued .....

Code	Vegetation Community	# Occurrences			Area						Proportion of Natural Areas (%)			Proportion of City Area (%)		
		1996	1998	1999	1996		1998		1999		1996	1998	1999	1996	1998	1999
					(ha)	(acres)	(ha)	(acres)	(ha)	(acres)						
Y	wet meadow	1	3	3	3.43	8.47	3.72	9.19	3.72	9.19	0.15	0.16	0.16	0.01	0.01	0.01
Z	willow-ash forest	2	2	2	0.55	1.36	0.56	1.38	0.56	1.38	0.02	0.02	0.02	0.00	0.00	0.00
AA	silver maple forest	5	5	5	18.59	45.92	18.14	44.82	18.14	44.82	0.80	0.80	0.80	0.06	0.06	0.06
	Totals				75.77	187.15	74.88	184.99	74.88	184.99	3.25	3.29	3.29	0.25	0.25	0.25
	Anthropogenic															
F	manicured	11	11	11	72.41	178.85	75.16	185.71	75.16	185.71	3.11	3.31	3.31	0.25	0.26	0.26
H	urban lake	2	2	2	7.26	17.93	7.26	17.93	7.26	17.93	0.31	0.32	0.32	0.02	0.02	0.02
I	wooded residential	3	3	3	251.59	621.43	251.59	621.67	239.93	592.88	10.81	11.07	10.56	0.86	0.86	0.82
T	plantation	11	11	11	21.58	53.30	21.57	53.30	21.60	53.37	0.93	0.95	0.95	0.07	0.07	0.07
UU	black walnut grove	1	1	1	0.17	0.42	0.17	0.42	0.17	0.42	0.01	0.01	0.01	0.00	0.00	0.00
	Totals				353.01	871.93	355.75	879.03	344.12	850.31	15.17	15.66	15.15	1.2	1.21	1.17
	Other															
R	beach	3	3	4	2.36	5.83	1.96	4.84	2.18	5.39	0.10	0.09	0.10	0.01	0.01	0.01
S	tall grass prairie	1	1	1	0.06	0.15	0.06	0.15	0.06	0.15	0.00	0.00	0.00	0.00	0.00	0.00
U	unknown	5	3	3	35.65	88.06	35.64	88.06	35.68	88.17	1.53	1.57	1.57	0.12	0.12	0.12
	Totals				38.07	94.04	37.66	93.05	37.92	93.71	1.63	1.66	1.67	0.13	0.13	0.13

Appendix 2: Field Work Identified for Natural Areas and Date Completed

Field work identified for natural areas 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 work indicates the type of visit the natural area received, a field visit 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 was a City owned site (*i.e.*, parkland or greenbelt).

Natural Area	Impacts (Based on Review of Aerial Photographs and Literature Review)	Fieldwork	Ownership	Date Completed
Minor Development Adjacent to Natural Areas				
CL21	possible structure behind residence west of Nesdale Ct.	field visit	parkland	17/08/99
CL42	new house on Clarkson Rd., adjacent to hydro ROW	field visit	parkland	17/08/99
PC2	possible erosion on east side by railway bridge	field visit	parkland	11/08/99
LV1	possible change on north boundary associated with armoury	field visit	restricted access	12/08/99
ETO7	possible erosion adjacent to natural area boundary	field visit	private?	18/08/99
CRR9	new cul-de-sac south side of Indian Road, opp. Temagami Cres.	field visit	public road	17/08/99
Major Development Adjacent to Natural Areas				
CL31	townhouse development	field visit	parkland	03/08/99
CL43	new houses along Fellen Place, north side of natural area	field visit	parkland	17/08/99
SH6	new cul-de-sac and houses	field visit	parkland/private	29/10/99
CL8	townhouse on south side of Lakeshore Rd., east of CL8	field visit	greenspace/private	17/08/99
Minor Development Within Natural Areas				
CL39	new house on west side of Glen Road	field visit	parkland?/private	17/08/99
SD1	new building, north side of Lakeshore Rd., east side of natural area	field visit	parkland	18/08/99
CL22	Birchwood Dr., some trees removed in rear yard	no access	private	-

Appendix 2: continued .....

Natural Area	Impacts (Based on Review of Aerial Photographs and Literature Review)	Fieldwork	Ownership	Date Completed
EM4	residential development at south end of EM4, EIS review	field visit	parkland	18/08/99
ETO7	clearing within edge to expand driving range, just south of Dundas	field visit	greenspace	18/08/99
Major Development Within Natural Areas				
EC10	natural area removed	road visit	private	18/08/99
GT1	Mavis Road extension	field visit	public road	18/08/99
No Change				
PC1	no change, Rhododendron gardens	field visit	parkland	11/08/99
PC3	no change, but not visited in 1995	road visit	private	11/08/99
MI1	no change	no access	private?	-
MI4	no change but re-evaluate potential for natural site delineation	field visit	private/greenbelt	29/08/99
SP1	no change	no access	private	-
SP3	no change	no access	private	-
SD4	no change	road visit	private	18/08/99
CL1/SD5	no change	road visit	private	11/08/99
CL9	no change	field visit	parkland	17/08/99
CL13	no change, community services project	field visit	parkland	03/08/99
CL15	no change, but visited since its adjacent to school	field visit	greenspace/private	17/08/99
CL16	no change, community services project	field visit	parkland	03/08/99
CL17	no change (Lorne Park Estate)	no access	private	-
CL24	no change	field visit	parkland	18/08/99

Appendix 2: continued .....

Natural Area	Impacts (Based on Review of Aerial Photographs and Literature Review)	Fieldwork	Ownership	Date Completed
CL30	no change, but burned by community services in 1998	field visit	parkland	03/08/99
CL52	no change	field visit	parkland	11/08/99
LV2	no change	road visit	private	12/08/99
LV3	no change, Adamson Estate	field visit	parkland	11/08/99
LV4	no change, transportation and works project (Cooksville Creek)	road visit	private?	11/08/99
LV5	no change, bldg. to east of SMA removed, transportation & works project	road visit	?	11/08/99
LV6	no change	road visit	?	12/08/99
LV7	no change, but visit for wetland eval and salamander study (Cawthra)	field visit	parkland	11/08/99
LV14	no change	road visit	private	12/08/99
RW5/6	no change, community services project	field visit	parkland	12/08/99
CC1/MY1	no change, transportation and works project (Cooksville Creek)	field visit	parkland	12/08/99
CL22	no change, transportation and works project (Lornewood Creek Pond)	no access	private	-
CL39	no change, transportation and works project (Birchwood Creek Pond)	no access	private	-
CRR6	no change, transportation and works project (Conliffe Ct outfall)	field visit	greenspace	18/08/99
CRR7	no change, transportation and works project (Loyalist Creek)	field visit	private	18/08/99
CRR8	no change, transportation and works project (Wolfdale Creek)	no access	private	-
ETO8	no change	road visit	private	12/08/99
Proposed Development no change on aerial photograph				
CL26	no change, visited with L. Pavan	field visit	private	04/11/99
MB9	no change, proposed for redevelopment (Streetsville Quarry)	no access	private	-

Appendix 2: continued .....

Natural Area	Impacts (Based on Review of Aerial Photographs and Literature Review)	Fieldwork	Ownership	Date Completed
CE9	proposed development adjacent to CE9	field visit	parkland	18/08/99
CM12	proposed residential subdivision adjacent to CM12	road visit	private	18/08/99
CRR8	proposed redevelopment of residential lot on Mississauga Rd.	no access	private	-
Expansion to Natural Areas				
SD7	proposed new natural area	field visit	parkland	18/08/99
-	MacMillan Headland, proposed natural area	field visit	parkland	11/08/99
-	Lakefront Promenade Park, proposed natural area	field visit	parkland	11/08/99

Appendix 7: Comparison of Changes at Natural Areas Between 1996 and 1999

Blank cells for the years 1998 and 1999 represent no change from the previous year. Abbreviations as follows: SNS = Significant Natural Site, NS = Natural Site, NGS = Natural Green Space, Increase = ↑, Decrease = ↓. Native FQI and native mean coefficient as well as definitions for provincially and regionally significant species are defined in the Natural Areas Survey (1996 September, Volume 1 of 3). Condition is explained in the Natural Areas Survey (1996 September, Volume 1 of 3).

Site #	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	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
1	SD1	96	NS		19.5	48.16	96	27 (28.1%)	30.22	3.64	5	0	4	13	4	2	0	Fair
		98																
		99			↓ 19.35	↓ 47.78												
2	SD4	96	NS		26.58	65.65	65	16 (24.6%)	26.14	3.73	1	0	2	0	0	0	0	n/a
		98																
		99																
4	CL52	96	NGS		6.67	16.47	34	18 (52.9%)	12.75	3.19	1	0	0	10	1	0	0	Poor
		98																
		99			↑ 6.69	↑ 16.53	↑ 44	↑ 24 (54.5%)	↑ 15.21	↑ 3.4				↑ 11		↑ 2		
5/3	CL1/ SD5	96	SNS		13.74	33.94	38	4 (10.5%)	28.13	4.82	2		2	2				Good
		98																
		99					↑ 48	↑ 7 (14.6%)	↑ 28.74	↓ 4.49			↑ 3	↑ 3	↑ 1			
6	CL9	96	SNS	ESA,ANSI,wetland	46.89	115.82	491	156 (31.4%)	80.1	4.38	13	2	125	200	23	22	1	Good
		98					↑ 496	↑ 161(32.3%)				↓ 0	↑ 132					
		99					↑ 495		↓ 79.83	↓ 4.37			↑ 131					
7	CL8	96	SNS	wetland	11.28	27.86	48	9 (18.8%)	19.86	3.18	7	0	2	13	10	1	0	Good
		98					↑ 57	↑ 10 (17.5%)	↑ 21.73	↓ 3.17			↑ 4					
		99					↑ 73	↑ 20 (27.4%)	↑ 22.94	↓ 3.15			↑ 5	↑ 14				
8	CL15	96	NS		0.83	2.05	44	9 (18.2%)	24.51	4.14	1	0	3	2	2	0	0	Fair
		98																
		99					↑ 46	↑ 10 (21.7%)	↓ 22.12	↑ 4.17								
9	CL16	96	NS		8.52	21.04	119	33 (26.9%)	37.63	4.06	5	0	11	37	16	0	0	Fair-Poor
		98					↑ 134	↑ 42 (30.6%)	↑ 38.47	↓ 4.01			↑ 13	↑ 38	↑ 17			
		99					↑ 138	↑ 46 (33.3%)	↑ 37.95	↓ 3.96			↑ 14					

Appendix 7: continued .....

Site #	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	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
10	CL17	96	RW		33.28	82.2	71	13 (18.6%)	0	0	1	0	17	0	0	4	0	n/a
		98											↑ 18					
		99			↑ 33.48	↑ 82.7												
11	CL13	96	NGS		1.5	3.7	40	23 (55.0%)	8.25	1.94	2	0	0	2	0	0	0	Poor
		98																
		99	↑ NS		↑ 8.42	↑ 20.79	↑ 61	↑ 34 (55.7%)	↑ 13.47	↑ 2.59			↑ 1	↑ 5				
12	CL43	96	NS		4.16	10.28	68	11 (16.2%)	29.27	3.88	2	0	5	5	1	0	0	Fair
		98																
		99			↓ 4.14	↓ 10.24												
13	CL42	96	NS		8.87	21.91	103	28 (27.2%)	35.8	4.13	3	0	9	4	1	0	0	Fair-Poor
		98																
		99			8.88	21.93	↑ 115	↑ 34 (29.6%)	↑ 37.33	↑ 4.15			↑ 12					
14	CL21	96	SNS	ESA,ANSI,wetland	9.36	23.12	97	22 (21.6%)	38.91	4.49	3	0	18	2	0	1	0	Fair
		98		↓ ESA,wetland									↑ 20					
		99																↓ Fair-Poor
15	CL39	96	SNS		12.98	32.06	245	69 (28.0%)	54.51	4.13	2	0	41	6	2	8	0	Fair
		98					↑ 250	↑ 72 (28.4%)	↑ 54.72	↓ 4.1			↓ 40	↑ 22	↑ 5			
		99			↓ 12.9	↓ 31.87	↑ 265	↑ 79 (29.8%)	↑ 56.46	↑ 4.14			↑ 43	↑ 25				
16	CL22	96	SNS	ESA,ANSI	17.85	44.09	131	45 (34.4%)	37.74	4.07	1	2	13	2	1	6	0	Good
		98										↓ 1	↑ 15					
		99			↓ 17.78	↓ 43.92												
17	CL30	96	SNS	ESA,ANSI	0.06	0.15	24	8 (33.3%)	n/a	n/a	1	2	11	0	0	0	0	Poor
		98					↑ 46	↑ 16 (34.8%)	25.56	4.67		↓ 1						↑ Fair-Poor
		99					↑ 51	↑ 18 (35.3%)	↓ 25.29		↓ 4.58			↑ 14				↑ Fair
18	CL31	96	SNS	ESA,ANSI	2.78	6.87	50	26 (50.0%)	n/a	n/a	1	0	2	1	0	0	0	Poor
		98																
		99			↓ 2.61	↓ 6.45	↑ 59	26 (44.1%)	↑ 19.32	↑ 3.36				↑ 4				
19	CL24	96	SNS		7.8	19.27	213	51 (23.0%)	58.06	4.56	3	0	31	6	1	0	0	Good
		98		↑ ESA, ANSI			↑ 216						↑ 36					
		99					↑ 235	↑ 62 (26.4%)	↑ 59.23	↓ 4.5	↑ 4		↑ 37	↑ 10				

Appendix 7: continued .....

Site #	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	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
20	CL26	96	NS		4.34	10.72	157	58 (35.7%)	31.66	3.18	2	0	14	5	2	0	0	Fair
		98											↑ 15					
		99			↑ 4.76	↑ 11.75	↑ 178	↑ 68 (38.2%)	↑ 34.52	↑ 3.29			↑ 18	↑ 18	↑ 7			
21	PC1	96	NS		1.09	2.69	87	39 (44.8%)	26.56	3.83	1	0	9	68	1	0	0	Poor
		98																
		99					↑ 92	↑ 44 (47.8%)					↓ 6					
22	PC2	96	NGS		4.37	10.79	0	0	0	0	1	0	0	0	0	0	0	Poor
		98																
		99					↑ 18	↑ 10 (55.6%)						↑ 5				
23	PC3	96	NS		1.73	4.27	11	0	0	0	1	0	0	0	0	0	0	n/a
		98																
		99																
24	CRR9	96	SNS	ESA,ANSI,wetland	25.63	63.31	37	14 (37.8%)	17.1	3.57	3	0	12	10	1	13	0	Fair
		98																
		99																
25	MI4	96	RW		165.14	407.9	97	27 (24.7%)	36.65	4.32	1	0	5	0	0	3	0	Fair
		98					↑ 134	↑ 41 (30.6%)	↑ 40.13	4.16			↑ 14	↑ 2				
		99			↓ 153.28	↓ 378.6	↓ 28	↓ 0	↓ 0	↓ 0			↓ 1	↓ 0	↓ 0	↓ 0		
26	MI1	96	NS		6.31	15.59	9	5 (44.4%)	0	0	1	0	0	0	0	0	0	Fair
		98																
		99																
27	LV3	96	NS		3.54	8.74	80	34 (40.0%)	24.33	3.59	3	0	0	18	2	0	0	Fair
		98																
		99			3.55	8.76	↑ 83	34 (41.0%)	↑ 25.43	↑ 3.63			↑ 1	↑ 20	↑ 3			
28	LV4	96	NGS		0.95	2.35	n/a	n/a	n/a	n/a	1	0	0	0	0	0	0	Poor
		98																
		99	↑ NS		↑ 1.09	↑ 2.68	↑ 44	↑ 26 (59.1%)	↑ 10.61	↑ 2.5			↑ 2	↑ 5				
29	LV5	96	NGS		1.09	2.69	0	0	0	0	0	0	0	0	0	0	0	Poor
		98																
		99			↓ 0.95	↓ 2.34												

Appendix 7: continued .....

Site #	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	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
30	LV2	96	NS		2.09	5.16	26	11 (38.5%)	11.62	3	1	0	0	3	0	0	0	Poor
		98																
		99																
31	LV1	96	SNS		14.03	34.65	82	34 (40.2%)	23.09	3.33	4	1	0	8	0	0	0	Fair
		98	↓ NS				↑ 83											
		99			↑ 14.22	↑ 35.12	↑ 93	↑ 38 (40.9%)	↑ 24.54	↓ 3.31			↑ 1					
32	ETO8	96	SNS		16.67	41.17	85	34 (37.6%)	26.05	3.65	3	0	3	2	4	1	0	Fair
		98																
		99																
33	LV14	96	NGS		1.95	4.82	35	17 (45.7%)	13.67	3.22	1	0	0	0	0	0	0	Poor
		98																
		99					↑ 40		↑ 13.76	↓ 3.16				↑ 1				
34	LV6	96	NS		2.02	4.99	61	19 (29.5%)	24.38	3.76	1	0	3	0	0	0	0	Fair
		98																
		99			2.03	5.01	↑ 64	↑ 20 (31.3%)	↑ 25.48	↑ 3.84			↑ 4	↑ 1	↑ 1			
35	LV7	96	SNS	ESA,ANSI	21.56	53.25	292	101 (33.9%)	57.67	4.17	2		46	65	6	3	1	Good
		98					↑ 300	↑103 (34.0%)	↑ 58.71	↑ 4.18			↑ 49	↑ 68	↑ 7	↑ 5		
		99		↑ESA,ANSI,wetland			↑ 331	↑110 (33.2%)	↑ 62.84	↑ 4.25			↑ 60					
36	ETO7	96	SNS	ESA	27.18	67.13	84	35 (39.3%)	21.39	3.04	2	0	2	11	2	11	1	Fair
		98																
		99			↑ 27.36	↑ 67.59	↑ 96	35 (36.5%)	↑ 25.1	↑ 3.21			↑ 4					
37	SP1	96	NS		9.05	22.36	108	27 (24.3%)	33.99	3.8	1	0	11	4	1	0	0	Fair
		98																
		99																
38	SP3	96	SNS		8.84	21.84	134	30 (21.8%)	41.09	4.05	1	0	11	5	2	1	0	Good
		98																
		99																
39	SH6	96	NS		6.85	16.92	70	32 (46.4%)	21.37	3.51	2	0	1	4	0	0	0	Poor
		98																
		99			↓ 6.44	↓ 15.91	↑ 80	↑ 38 (47.5%)	↑ 23.3	↑ 3.6			↑ 2	↑ 6	↑ 1			

Appendix 7: continued .....

Site #	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	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
40	CRR7	96	SNS	ESA,ANSI	88.96	219.73	61	10 (13.1%)	33.89	4.75	3	1	8	0	0	9	0	Good
		98					↑ 74	↑ 18 (23.0%)	↑ 34.88	↓ 4.66			↑ 9					
		99			↓ 88.94	↓ 219.7	↑ 92	↑ 24 (26.0%)	↑ 34.68		↓ 4.21				↑ 4	↑ 1		
41	CRR8	96	SNS	ESA,ANSI	110.62	273.23	43	3 (7.0%)	0	0	4	2	31	8	1	4	0	Good
		98		↑ ESA,ANSI,wetland														
		99																
43	CRR6	96	SNS	ESA,ANSI	213.66	527.74	269	88 (32.3%)	63.63	4.73	4	4	65	87	8	17	1	Good
		98			↓ 213.22	↓ 526.86	↑ 277	↑ 91 (32.5%)	↑ 64.67	↑ 4.74		↓ 3	↑ 73					
		99					↑ 281	↑ 92 (32.7%)	↑ 65.03	4.73			↑ 72					
57	EM4	96	SNS	ESA,ANSI	46.82	115.65	225	61 (26.7%)	55.05	4.3	8	2	28	67	4	6	0	Good-Fair
		98					↑ 228					↓ 1	↑ 30					
		99			↓ 43.18	↓ 106.7	↑ 235	↑ 64 (27.2%)	↑ 56.28				↑ 31		↑ 5			
63/ 64	CC1/ MY1	96	NS		15.33	37.87	129	43 (32.6%)	35.58	3.84	2	0	5	8	1	5	0	Fair
		98					↑ 130						↑ 7					
		99					↑ 133	↑ 44 (33.1%)	↑ 36.36	↑ 3.85				↑ 9		0**		
65	MY3	96	NGS		3.71	9.16	26	18 (69.2%)	6.01	2.13	1	0	0	0	0	0	0	Poor
		98																
		99					↑ 41	↑ 27 (65.9%)	↑ 6.85	↓ 1.79			1					
70	RW5	96	NGS		3.51	8.67	0	0	0	0	1	0	0	0	0	0	0	Poor
		98																
		99	↑ NS				↑ 54	↑ 27 (50.0%)	↑ 13.66	↑ 2.63			↑ 2	↑ 7	↑ 1			
71	RW6	96	NGS		7.31	18.06	0	0	0	0	1	0	0	0	0	0	0	Poor
		98																
		99	↑ NS				↑ 51	↑ 29 (56.9%)	↑ 14.28	↑ 3.05			↑ 1	↑ 11	↑ 1			
78	CM12	96	NS		8.22	20.3	54	8 (14.8%)	27.42	4.04	2	0	2	11	2	5	0	Good
		98																
		99			8.21	20.28	↑ 76	↑ 15 (19.7%)	↑ 29.96	↓ 3.84			↑ 3	↑ 14	↑ 5	↑ 6		
82	CE9	96	NS		4.83	11.93	58	14 (24.1%)	26.99	4.07	3	0	2	2	1	0	0	Fair
		98																
		99					↑ 76	↑ 17 (21.1%)	↑ 32.29	↑ 4.2			↑ 5	↑ 10	↑ 2			

Appendix 7: continued .....

Site #	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	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
83	CE10	96	SNS		18.2	44.95	73	13 (17.8%)	33.82	4.37	3	0	6	8	0	2	0	Good
		98					↑ 93	19 (20.4%)	↑ 36.04	↓ 4.19			↑ 7	↑ 9	↑ 2			↓ Good-Fair
		99					↑ 99	↑ 19 (19.2%)	↓ 37.9	↓ 4.24			↑ 9	↑ 13				
91	SV1	96	SNS		5.62	13.88	67	16 (23.9%)	29.55	4.14	2	0	3	0	0	0	0	Fair
		98	↓ NS		↓ 4.63	↓ 11.44	↑ 79	↑ 18 (22.8%)	↑ 31.75	↓ 4.07			↑ 4	↑ 7	↑ 2			
		99					↑ 94	↑ 22 (23.4%)	↑ 34.77		↓ 4.1			↑ 5	↑ 9			
94	EC22	96	NS		2.59	6.4	39	4 (10.3%)	24	4.06	1	0	4	1	1	0	0	Fair
		98			↓ 2.32	↓ 5.73	↑ 55	↑ 7 (12.7%)	↑ 25.26	↓ 3.65								↓ Fair-Poor
		99					↑ 72	↑ 9 (12.5%)	↑ 30.62		↓ 3.86			↑ 6	↑ 4			
95	EC10	96	NS		3.35	8.27	41	9 (22.0%)	19.98	3.53	2	0	1	2	0	0	0	Fair
		98																
		99	**Removed**															
102	HO7	96	NS		4.09	10.1	54	10 (16.7%)	26.53	4	3	0	4	0	0	0	0	Fair
		98			↓ 2.11	↓ 5.21	↑ 59	10 (16.9%)	↓ 26.43	↓ 3.78	↓ 2			↑ 2				↓ Fair-Poor
		99					↑ 72	↑ 16 (22.2%)	↑ 29.13	↓ 3.89				↑ 6				
111	ETO3	96	SNS		134.93	333.28	405	169 (41.2%)	57.09	3.72	4	2	60	7	5	5	0	Fair
		98			↓ 112.22	↑ 277.29	↑ 406					↓ 1	↑ 61					↓Fair-Poor
		99					↓ 400	↓ 167 (41.8%)	↓ 56.47	↓ 3.7			↓ 58					
127	MB9	96	NGS		6.6	16.3	0	0	0	0	1	0	0	0	0	2	0	Poor
		98																
		99																
136	MV19	96	SNS		26.3	64.96	196	50 (25.0%)	50.48	4.18	3	0	31	13	6	3	0	Excellent
		98			↓ 22.66	↓ 55.99	↑ 202	↑ 53 (25.7%)	↑ 51.04				↓ 29	↑ 14				↓ Good
		99					↑ 207		↑ 52.06	↑ 4.19			↓ 30	↑ 20		↑ 4		
145	GT1	96	NS		5.77	14.25	33	8 (24.2%)	17	3.4	1	0	1	0	0	0	0	Fair
		98																
		99			↓ 1.95	↓ 4.82	↑ 41	↑ 10 (24.4%)	↑ 18.5	↓ 3.32			1	2				
148/ 103	GT4/ HO9	96	SNS	ESA,ANSI	27.06	66.84	201	55 (26.4%)	50.4	4.17	2	0	22	9	1	0	1	Excellent-Poor
		98		↓ ESA	↓ 16.09	↓ 39.76	↑ 202	55 (26.7%)	↑ 50.64	↑ 4.18	↓ 1		↓ 21	11				↓ Good-Poor
		99					↑ 204	55 (29.7%)	↑ 51.2	↑ 4.19			22	↑ 18	2	1		

Appendix 7: continued .....

Site #	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	reg. sig. species	# birds	# mammals	# herptiles	prov. sig. species	
150	SD7*	96																
		98																
		99	NGS		2.01	4.97	34	16 (47.1%)			2				1			Poor
151	MI17*	96																
		98																
		99	NS		6.04	14.92	145	45 (31.0%)	42.2	4.22	2		15	6	2	3		Fair
152	MI7*	96																
		98																
		99	SNS		5.95	14.69	125	39 (31.2%)	39.9	4.3	2		7	1	5			Poor

* These natural areas were newly designated in 1999.

** The five herptile species documented for this site in 1996 were a transcription error, they should be counted for natural area CE1 which was not updated this year.