

Natural

AREAS SYSTEM

2018 UPDATE



MISSISSAUGA

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1.0 *Mississauga's Natural Areas Study Programme*

The conservation of natural features has become an accepted component of land use planning in Ontario. In the more developed, southern portions of the province, incorporation of significant environmental areas into local planning documents first became commonplace in the 1970s. At that time, remnant areas were viewed as “islands of green” around which development could be undertaken. However, there was a gradual realization that just setting areas aside does not provide sufficient protection to maintain the natural features in the long term. The influence of adjacent development results in impacts that gradually and incrementally degrade the remnant natural areas. Also, studies in conservation biology indicate that isolated populations of plants and animals will not remain healthy over long periods of time and are prone to local extinction.

– City of Mississauga Natural Areas Survey, 1996

In the early 1990s the City of Mississauga (the City) observed the ongoing loss of natural features and realized the need for environmental planning. In response to this need, the City established the Natural Areas Study (NAS) to document existing significant features and provide a tool to improve land use planning practices within the City. The first NAS report was finalized in 1996 and submitted to the Planning and Building Department for planners to use in evaluating development applications. Since that time, land use planning in Ontario (and the City) have evolved to include more protections and consideration for natural heritage and has established policies, tools and mechanisms for implementation. Where the NAS was once *the* tool for natural heritage planning in the City, it now represents one of many tools available to planners, other practitioners (e.g., consultants) and agencies (e.g., Conservation Authorities).

The state of environmental planning continues to progress, striving to achieve an appropriate balance between the natural environment and land use needs (e.g., development and population growth). Similarly, the opportunities associated with the NAS program continue to grow. Between the first NAS survey and present, natural areas assessed and included in the NAS programme have been modified to reflect the changes in the landscape (e.g., development) and ongoing updates to policies, plans, and landscape ecology best practices. When the first NAS report was composed the governing land use documents were:

- Provincial Policy Statement, 1996;
- The Region of Peel Official Plan, 1996;
- Mississauga Official Plan (City Plan), 1996.

Since 1996, the Provincial Policy Statement (PPS) has been updated twice (first in 2005 and again in 2014) and several provincial plans have been developed and subsequently updated (Growth Plan for the Greater Golden Horseshoe, 2017 and Greenbelt Plan, 2017).

At the municipal level, the Peel Regional Official Plan (ROP) has undergone numerous amendments, the most recent edition being an office consolidation in December 2016 and the City of Mississauga has created an updated Official Plan (OP) in addition to the 1996 City Plan and is working to consolidate both plans. The City also created the Natural Heritage and Urban Forest Strategy (NH&UFS) in 2014. Land use planning within the City must be in conformity with and have regard for the policies of these plans and guidance documents.

As with changes in policies and plans, the audience for NAS results has evolved over time. Environmental and land use planners still use this information to evaluate development applications, while other City staff and the public use the NAS results to familiarize themselves with their City and its natural heritage (for example, the Parks, Forestry & Environment Division staff use the data to manage natural features). Although the audience and use of the information has shifted, the NAS continues to serve as an important program because it:

- Identifies natural areas in the City that should be protected;
- Provides long-term monitoring of ecological form and function in the City;
- Documents change to natural areas over time and thus provides the means to assess the cumulative impacts of development, the efficacy of mitigation measures and identify those natural areas that are most at risk; and
- Allows residents to engage with their surroundings and take responsibility for the protection of natural areas.

Initially, 144 natural areas that represented the best remaining natural features in the City were identified in the 1996 NAS. At that time there were no Provincial guidance documents or plans that provided direction with respect to consistent terminology or definitions for natural areas and systems. So, descriptive categories were developed, the natural areas were classified as Significant Natural Sites (SNS), Natural Sites (NS), Natural Green Spaces (NGS), Residential Woodlands (RW), Special Management Areas (SMA), and Linkages. In 2014 terminology used in the NAS was updated to be consistent with changes in Provincial policies and plans. Specifically, the updated terminology moved from individual areas to identifying all of the natural areas collectively as a part of a Natural Heritage System (NHS) and the natural area classifications (SNS and NS) were refined. Significant Natural Sites (SNS) were reclassified as Significant Natural Areas (SNA), Natural Sites (NS) were removed as a category with those areas becoming SNAs or NGSs, depending on their character (Figure 2).

The NAS has been ongoing since 1996; each year approximately 25% of the City's NAS sites are updated (Figure 1). Thus an update of entire NAS is completed in a four-year cycle. The completion of surveys in 2018 marks the fifth NAS Cycle completed in the City.

The intent of updating the NAS is to provide the updated status of natural areas and document information on floristics, fauna, impacts, boundary changes and management needs on a 4-year occurrence cycle. A Natural Area Survey Update Report, submitted to the City, document the natural areas of the surveyed quarter and report on findings and

changes. A comprehensive overview of key outcomes and changes to natural areas in the City are documented in a four-year report. This report, representing the fifth Natural Areas Update Report, serves as a public record to document the history of the City's NAS programme and to evaluate the status of natural areas in Mississauga.

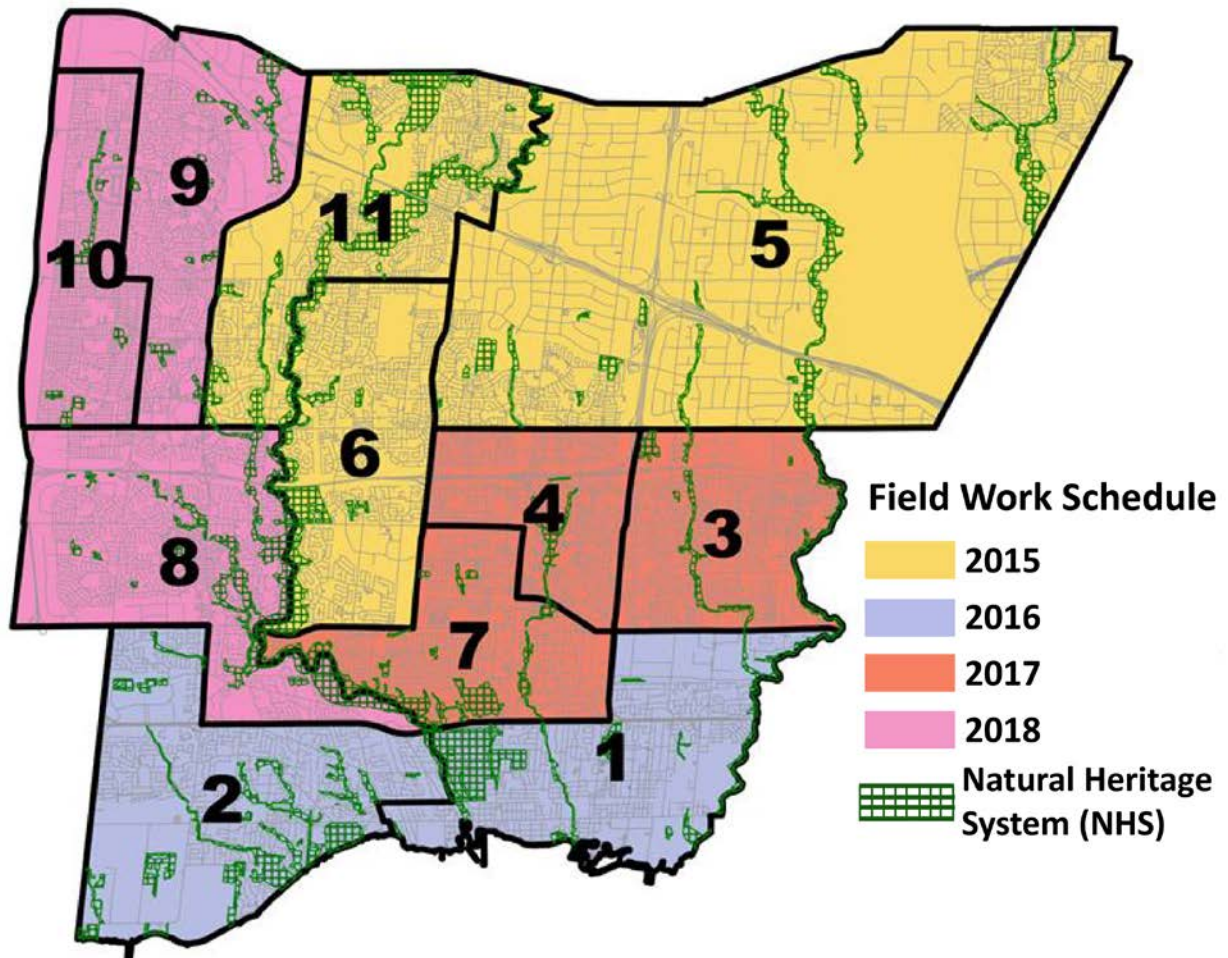
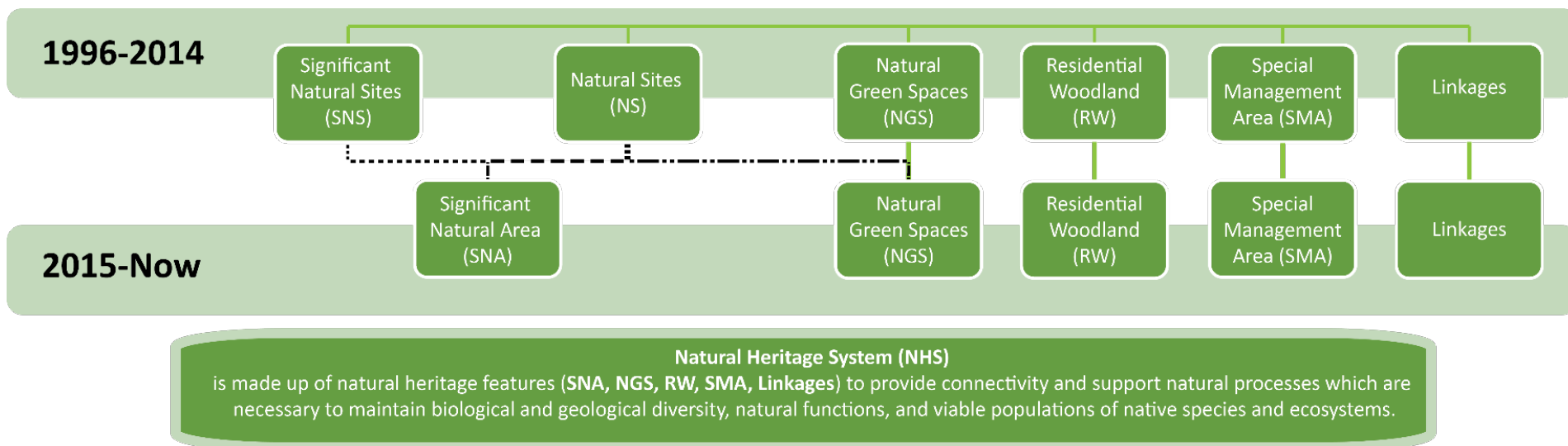


Figure 1. Quarters of the City that are Updated Yearly



**Figure 2. Changes in nature area classifications between 1996 and now
 Dotted lines represent reclassification.**

2.0 Mississauga's Natural Heritage (1996-2018)

The earliest survey records for Peel County (which encompassed what is now the City of Mississauga), date from between 1806 and 1822, and suggest that almost the entire County was forested (Geomatics International, 1996). Over time, lands were cleared for agriculture and rural areas began to urbanize. This land cover transformation is common across southern Ontario and has resulted in the landscape we are familiar with today.

2.1 Distribution and Classification

At the onset of this project in 1996, the approach used to identify natural areas was first to include every area that has *some* remnant natural value (Geomatics International, 1996). The natural areas were gathered from all applicable plans and policies, aerial photo examination, and review of existing reports. After this process, 170 candidate natural areas were identified and labelled based on planning districts (e.g., areas in Churchill Meadows were named CM1 through CM12). These 170 candidate natural areas were narrowed to 144 confirmed natural areas after review of studies and reconnaissance visits. Areas removed from the NAS were found to have been previously removed for development or of insufficient natural value to merit inclusion.

The number and size of natural areas has changed over the years. Since 1996, eight sites have been combined to form four sites (MB8/ME8, CC1/MY1, CE12/SV12, and CL1/SD5), resulting in a decrease in the total number of natural areas from 144 in 1996 to 141 in 2018. In 2018, natural areas encompass 8.19% (Linkages and SMA's are not included) of the total area of the City, representing an increase from 7.10% in 1996. The increase in total area of the natural areas can generally be attributed to property boundary adjustments and minor changes in natural area boundaries, as well as, the City's naturalization efforts along the edges of these features (e.g., within SMA's which were subsequently incorporated into natural areas). In addition to these revisions, new SMA and Linkages may be added or existing SMA and Linkages may be absorbed into a SMA or NGS during yearly reviews.



Figure 3: Breakdown of NAS sites in 2018

2.2 Landform in Mississauga

Landform type was fundamental to the NAS in the early years as there was no other industry standard method of classification. The natural areas in the City are grouped into three major landform types: valleyland, tableland, and wetland. Emphasis when surveying was placed on tablelands over valleylands, as valleylands were better studied and protected by plans and policies (Geomatics International, 1996).

Since 1996, the total area of valleylands has increased by close to 7%. In contrast, the total area of tableland and wetland natural areas has decreased since 1996 by close to 6% and 4%, respectively. As a result of these changes, the composition of natural areas surveyed by the NAS has shifted over time with the largest change, as noted above, associated with valleylands. In 1996, 78.30% of all surveyed areas were valleylands; in 2018, they represent 80.47% of surveyed natural areas.

Historically, tableland natural areas have been the most susceptible to land use conversion from natural to anthropogenic types (e.g., to active agriculture, development) as they pose little hindrance to conversion compared to slopes (valleylands) and wetlands. This trend continues today, although current plans and policies (e.g., provincial, municipal) provide increased levels of protection for *significant* features than was available in the early years of the NAS. Between 1996 and 2018, changes to tableland natural areas have included:

- Eight tableland natural areas removed (converted to development);
- Two tableland natural areas added;
- One site (CM25) was changed to an SMA and then later changed back to a tableland natural area in 2014.

Wetlands are generally protected by current plans, policies, and legislation from direct removal (Provincially Significant and wetlands regulated by Conservation Authorities); therefore, decreases in wetland coverage are likely a result of habitat changes. Habitat changes in wetlands may be the result of changes in surface water and/or groundwater contributions (i.e., changes in hydrology). Because of the dependence of wetlands on water, an increase or decrease of one or both water sources can result in a change in the vegetation type present and therefore a change in the habitat recorded. Changes in hydrology may be natural (e.g. climate variability) or man-made (e.g., land use changes in the local landscape changing local hydrology).

2.3 Flora and Fauna in Mississauga

Characterization of the natural areas is based on information collected from background documents and observations made during field surveys. Each natural area is assessed on a four-year survey cycle. Where land access is available (i.e., public land, or landowner permission is available) and where habitat exists surveys include Salamander Egg Mass, Calling Amphibians (one visit), Breeding Birds (one visit), and Vegetation and Ecological Land Classification (ELC) (one visit). Flora are better represented through this survey approach as a comprehensive survey for fauna requires multiple visits (e.g., two for breeding birds, three for amphibians) and targeted effort (e.g., trapping, tracking, etc.).

While it is known that many natural areas contain water features that do, or are anticipated to provide fish habitat, the NAS focuses on terrestrial features and aquatic surveys are not undertaken.

In addition to direct field surveys, analysis of aerial imagery and review of reports submitted to the City (e.g., inventory reports, Environmental Impact Studies, etc.) provide important information and species records for natural areas. Reports are reviewed for relevant information (e.g., species records, Species at Risk, etc.) to natural areas across the City. Enough information is collected through the single-visit approach and the background review to generally update the documentation of natural area diversity. Combined across survey years, records provide a good representation of habitat form and function and a record of changes over time.



Natural Area CRR11, Credit River (August 2018)

2.3.1 Vegetation Communities

In 1996, a standard for classifying vegetation communities had not been developed for Ontario. Formerly, communities were classified in a system unique to the City and based on the early work of Bakowsky (1995) and Kavanaugh and McKay-Kuja (1992). Bakowsky later helped developed Ecological Land Classification for Southern Ontario: First Approximation and Its Application (Lee et al. 1998). ELC is currently the industry standard and is used to classify communities in the NAS.

Vegetation communities within the study area were delineated using aerial photography and ground truthing during the flora field surveys. Usually, communities smaller than 0.5

ha in size are not mapped, however, for the NAS smaller communities are often identified. Anthropogenic communities (i.e., communities designed for human activity, such as golf courses and manicured parks) are mapped and included in the NAS when they are within natural areas. Within the NAS, 100 ELC communities are described for the City. For this report, the 100 different ELC communities grouped into five broad categories: woodlands, wetlands, cultural, anthropogenic, and other (Table 1). The category 'other' was used for three communities (tall-grass prairie, open beach/bar, and treed beach/bar) that did not easily fit into any of the other five categories.

Table 1. How the ELC communities are grouped into the Five Categories¹

<i>Woodland</i>	<i>Wetland</i>	<i>Cultural</i>	<i>Anthropogenic</i>	<i>Other</i>
FOC	SWC	CUM	Anthropogenic	BBO
FOM	SWM	CUT	Manicured	BBT
FOD	SWD	CUW		TPO
SWC	SWT	CUS		
SWM	MAM	CUP		
SWD	MAS			
CUW	SAF			
CUS	OA0			
CUP				

The most common ELC communities within the City are those in the woodland category. The woodland category has the highest number of occurrences, the most extensive area, and they represent highest proportion of natural area in both the NAS and the City overall (Table 2). It is anticipated that this skew is because woodlands are the most common habitat type associated with valleylands, which have historically been left on the landscape. It is interesting to note that wetland and anthropogenic communities have nearly the same hectareage despite wetland communities having more than double the number of occurrences; the individual wetland communities, therefore, are much smaller than the anthropogenic communities.

¹ See the ELC for Southern Ontario manual (Lee *et al.* 1998) for explanation of ELC codes

Table 2. Details of each of the five vegetation community categories between 2015 and 2018

<i>Community Category</i>	<i>Number of ELC Community Types</i>	<i>Number of Community Occurrences</i>	<i>Area (ha)</i>	<i>Proportion of the NAS (%)*</i>	<i>Proportion of the City (%)*</i>
Woodland	65	368	1,683.06	77.36	5.75
Wetland	24	88	194.56	8.94	0.67
Cultural	29	141	502.53	23.10	1.72
Anthropogenic	2	32	178.22	8.19	0.61
Other	3	6	3.00	0.14	0.01

* some natural areas fall into more than one category (e.g., swamps are both woodlands and wetlands) and therefore percentages will not equal 100%

Historically and in the current landscape, the most substantial pressure(s) on vegetation communities in the City are associated with clearing for agriculture and urbanization. Large white pines and oaks were historically harvested for ship masts (Geomatics International, 1996), removing stands of mature forests. In both a historic and current context, significant impacts to species have also occurred by introduced pests and diseases such as larch saw-fly (tamarack trees), Dutch Elm Disease (elm trees), and Emerald Ash Borer (ash trees) are a recurring threat.

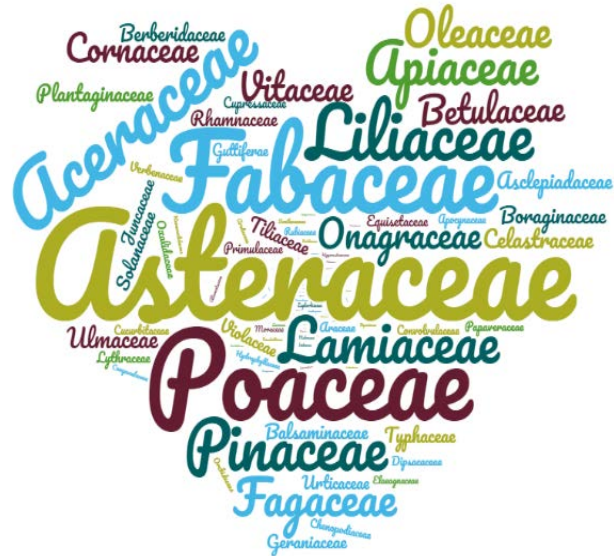
2.3.2 *Flora*

Flora documented in the City to date is not dissimilar from flora documented in 1996 (Table 3). Approximately 60% of the flora in the City has remained native, and 40% has is non-native. Despite the relative consistency, the City has a high proportion of non-native species compared to the provincial flora, which is 27.4% (Kaiser, 1983). Intensive three-season (i.e., spring, summer, and fall) inventories of sites could reveal higher proportions of either native or non-native species and is required to verify floral composition.

Table 3: Flora between 1996 and 2018

	1996	2018
Number of Native Flora (%)	670 (61%)	693 (64%)
Number of Non-native Flora (%)	431 (39%)	390 (36%)
Total Number of Flora species	1,101	1,083

In 2018, a total of 1,083 species were observed. Of these, 24 were Provincially Significant (S1-S3), and 6 were Species At Risk (SAR) (including historical records). There are 338 floral species which are Species of Conservation Concern Tier 1 and 2 (CVC 2010) within the City. The three most abundant plant Family's documented in the NAS are Asteraceae (Daisy/Aster Family), Fabaceae (Legume Family), and Poaceae (Grass Family).



Most abundant plant families in NAS sites. The larger the word, the more often it was observed.

2.3.3 Floristic Quality Assessment

The Floristic Quality Assessment (FQA) system allows for an objective, quantitative evaluation of an area based on the quality of its flora. It can be used to compare two or more areas at a single point in time or monitor sites on an ongoing basis (useful in restoration programmes). The premise upon which the evaluation is based derives from the region's flora and the specific needs of individual plant species for specific habitat conditions and its tolerance to degradation / change in that habitat. Some plants exhibit conservative characteristics which restrict them to a relatively narrow range of conditions provided by specific habitats (e.g. prairie, wetlands, undisturbed woodland, etc.). Other species are not as restricted and can persist in a wide variety of habitats (woodland, edge habitats, abandoned fields, etc.). Conservative species are generally intolerant of disturbances because they will only persist in that narrow range of conditions provided by a specific habitat (i.e., generally undisturbed or unaltered). Species in the latter group are generally tolerant of disturbed conditions. As a result of the above, the relative presence of conservative/intolerant species compared to tolerant species provides a sense of habitat quality. Only native species are used in this evaluation; native species are those that were present prior to European settlement.

A total of 2,333 native plant species in Ontario have been assigned a numerical value from 0 to 10 by a group of experts on the provincial flora (Oldham et al. 1995). The numerical value is referred to as the 'coefficient of conservatism' (CC). Species with a value of 8-10 are considered to be in environmental conditions similar to those conditions in which the species (and community) evolved (Freyman, et al., 2016) and thus are most representative of high-quality habitat. Conversely, species with a value of 0-3 are adapted to degradation and often thought of as habitat generalists.

The CC values of all plants within the study area (e.g., NAS Site) is then averaged to provide a mean CC. The Floristic Quality Index (FQI) is derived from the mean CC times the square

root of species richness (SR, species richness is the count of native species). The mean CC and FQI provide an FQA. The FQA is ultimately a measure of the study area’s flora integrity.

$$FQI = \text{mean CC} \times \sqrt{SR}$$

Consider when looking at NAS factsheets (completed for each natural area) that during a plant inventory the mean CC tends to stabilize quickly and therefore can be an indicator of quality, but, FQI is influenced by species richness and consequently more complete inventories may have a higher FQI. Additionally, although species richness can increase based on the size of a site (i.e., larger sites can hold more species) the FQI is not necessarily correlated to the size of a site. Equally important to consider is that areas with incomplete inventories (i.e., less than 30 native species), or where just rare plants are inventoried, can provide biased results and FQA should not be used.



Bloodroot (*Sanguinaria canadensis*), an ephemeral spring species, emerging in ETO4 (April 2017)

In 1996, a scale for CC and FQI was established and was as follows:

Native mean CC	remnant landscape ²	> 4.5
	high	> 4.00
	medium	= 3.3 to 3.99
	low	< 3.3

Floristic Quality Indices	high	> 40
	medium	= 30 to 39.99
	low	< 30

Floristic Quality Assessment is completed yearly for the NAS sites surveyed. In 1996, the majority of natural areas fell in the low range for the FQIs and there was an even spread of native mean CC and unevaluated sites (Figure 4). In 2018 there is a more even spread of FQI and majority of native mean CC falls in the medium category (Figure 4).

Areas with low mean CC indicate a greater presence of species characteristic of disturbed environments, and correspondingly a lower proportion of plant species that indicate high-quality habitat. Sites that have a medium or high mean CC but low FQI likely reflect it’s diminishing quality; this is better explained as a few non-native species displacing a larger number of native species, resulting in lower species richness (i.e., FQI). The mean CC is preserved as some of those native species are still present. As mean CC decreases and biodiversity is lost as the quality of the area degrades and becomes depauperate, resulting

² Chicago Flora

in the weakened capacity of the area to sustain its original integrity. Damaged systems will change to another plant community over time; however, the natural quality of the community is typically reduced and will be characterized by species of lower CC values and non-native origins. Restored landscapes rarely attain or sustain mean CC values over 3.2 ± 0.7 (Whilhelm and Rericha, 2017). Thus, landscapes with high natural quality must be preserved and managed adequately as once they are destroyed, they cannot be readily reconstructed.

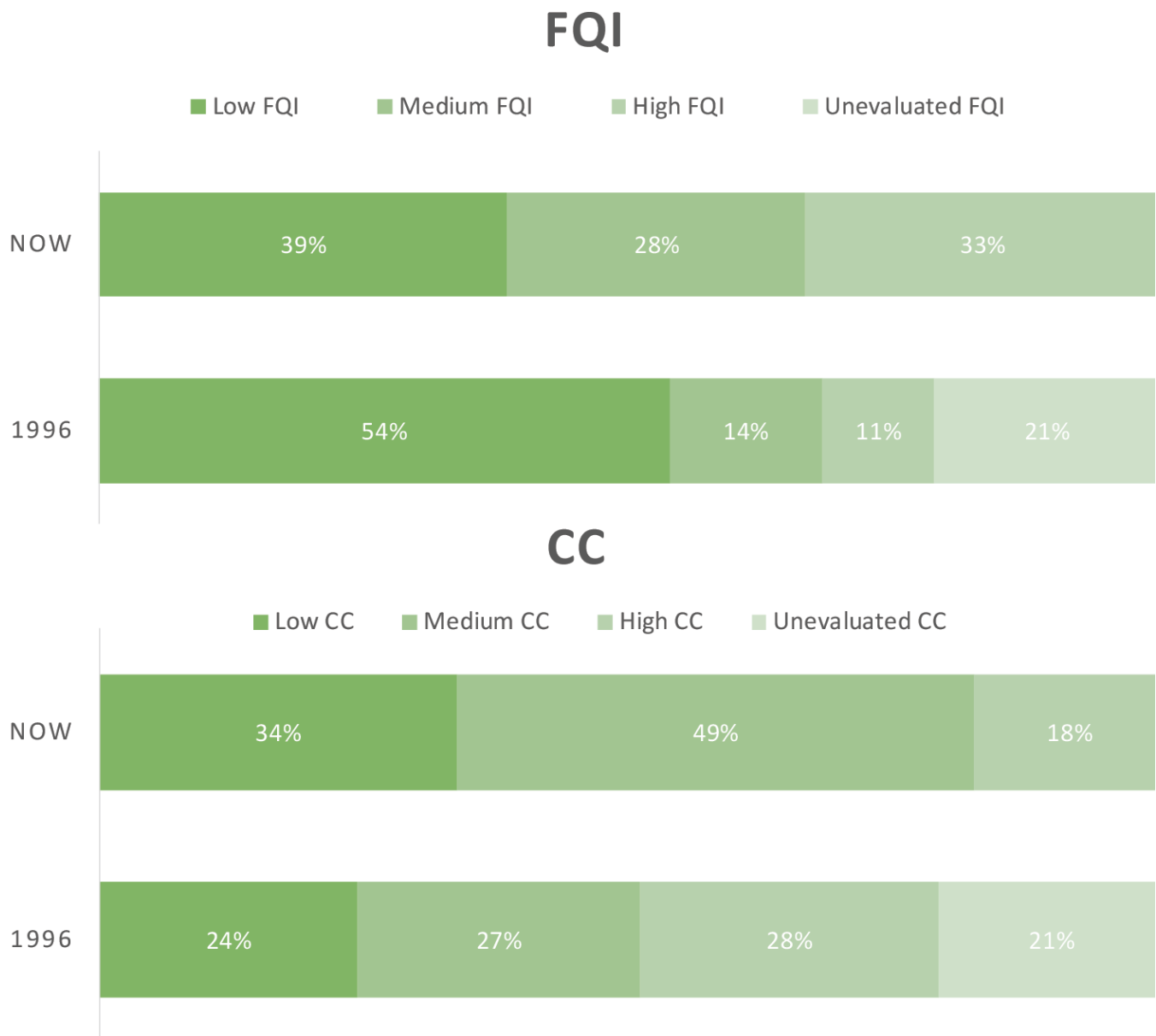


Figure 4: Division of FQI and native mean CC between categories and 1996 vs 2018

2.3.4 Fauna

Many animal species are more sensitive to human presence and urbanization than plants. Accordingly, the fauna of an urban area is often more degraded than the local flora. Habitat loss (i.e., direct removal of and environmental degradation of air, water, and soil) and fragmentation are the primary reasons for the loss of fauna diversity. *“Prior to European settlement, species such as black bear and wolf, now only associated with relatively wild areas, were common in Mississauga”* (Geomatics International, 1996). Humans also play a role in fauna diversity; the presence of humans can decrease animal diversity, and some human habits can increase the abundance of specific animals. Some animals have adapted to human presence, such as eastern grey squirrel, raccoon, opossum, skunk, American robin, American crow, and several others.

*Prior to European settlement, species such as black bear and wolf, now only associated with relatively wild areas, were common in Mississauga
- City of Mississauga Natural Areas Survey, 1996*

How do Species become “Species at Risk” (SAR)?

Species at Risk (SAR) are assessed and listed by the government. There are both provincial and federal laws that protect SAR: The Endangered Species Act (ESA, Ontario) and the Species at Risk Act (SARA, Canadian).

Advisory committees made up of independent scientists assess the status of currently listed wildlife, and those considered to be at risk and provide recommendations as to the status of each species. In Ontario, the committee is called the Committee on the Status of Species at Risk in Ontario (COSSARO) and reports to the Minister of Environment, Conservation and Parks, and in Canada, the committee is called Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and reports to the minister of Environment and Climate Change.

Species listed as Threatened or Endangered under the ESA and/or the SARA are afforded protection at the individual and habitat level. Species listed as Special Concern under the ESA or the SARA do not

The presence of significant flora and fauna species and populations were documented through NAS fieldwork and background / secondary source data (e.g., reports). Species lists were compared against Federal and provincial Species at Risk (SAR) lists and Species of Conservation Concern (SCC) developed by Credit Valley Conservation (CVC). During fieldwork, the location of species that are provincially and federally monitored and regionally significant were documented. Location data was not available for all observations of sensitive species identified through secondary sources. In the City there are 359 individual records for SAR, some records are historical. Figure 5 shows the 5 most frequently recorded SAR in the City; these SAR are on the ESA, SARA, or both.

Birds

Bird surveys conducted in natural areas between 2015-2018 continued to document widespread use of most natural areas by habitat-generalist species and species tolerant of urban habitats (e.g., American Robin, Black-capped Chickadee, Northern Cardinal, and Song Sparrow). As with FQA, fauna species diversity does not automatically increase with size of the natural area. Some of the largest natural areas, >100 ha, have a bird diversity equal to areas that are less than half that size (Figure 6). Larger areas and smaller areas may have relatively similar habitat diversity (total number of habitat types), which corresponds to species diversity. Alternatively, some large natural areas encompass substantial areas of anthropogenic uses (e.g. golf

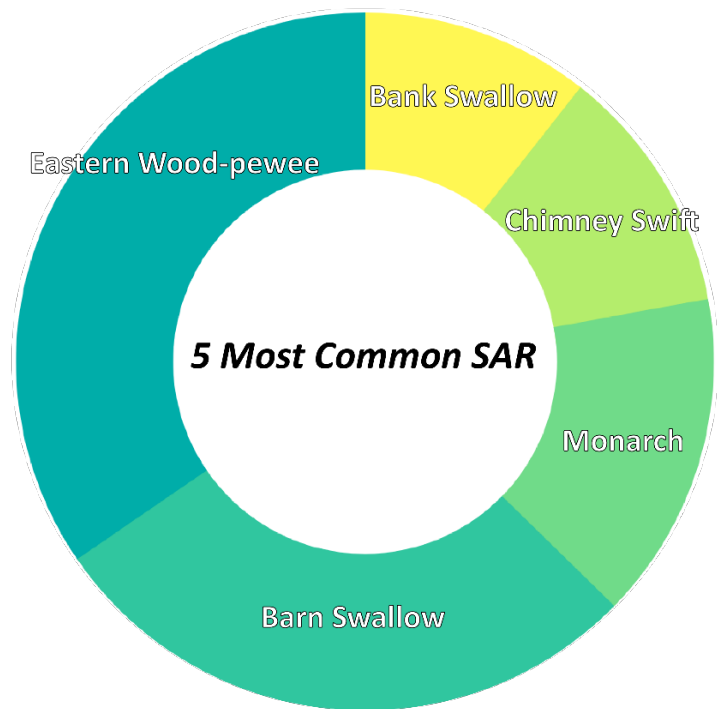
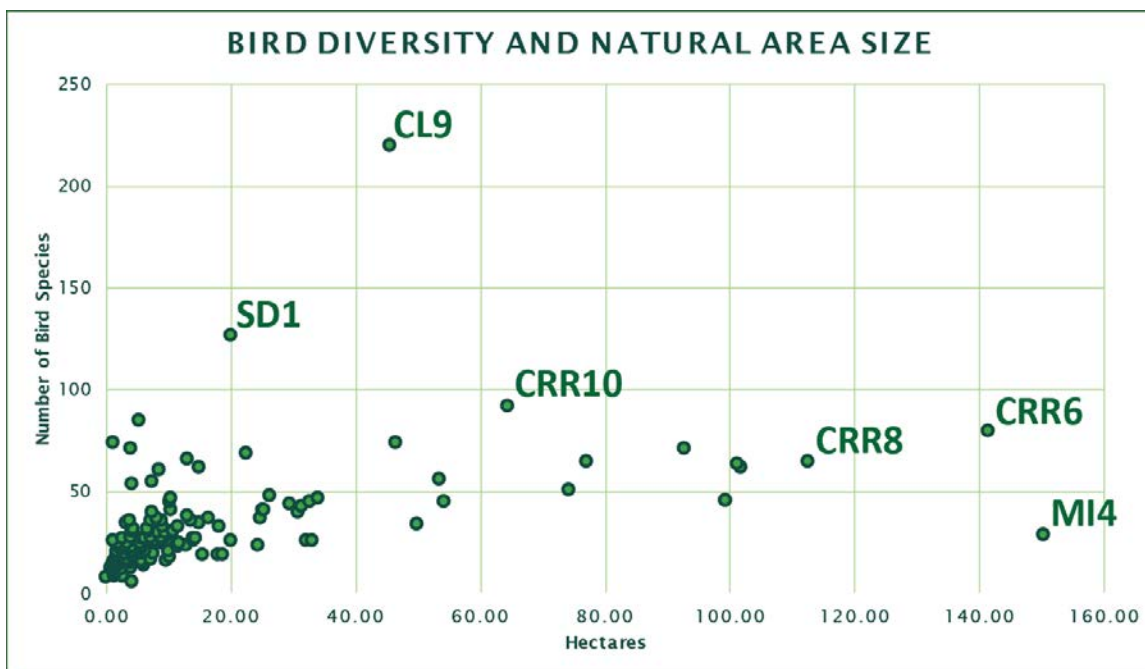


Figure 5: 5 most frequently recorded Species at Risk (SAR)



courses) in

Figure 6: Displaying the relationship between bird diversity and natural area size

comparison to smaller, more natural areas such as Rattray Marsh (CL9) and Harding Waterfront Estate (SD1). Habitat patch size (the area of a specific habitat type, or the total area of a natural area) can affect species assemblages by providing habitat for more area sensitive species (i.e., those that require larger ranges or are less tolerant to non-natural land uses). The degree of ‘naturalness’ of the area will directly influence this.

In the natural areas surveyed by NAS, large riparian areas with connected tableland forest, such as the Credit River (CRR6, CRR10) and its tributaries (EM4) sustain high numbers of breeding bird species and provide good habitat diversity. The riparian areas regularly provide habitat for urban-adapted species as well as for more habitat-specific and area-sensitive species (e.g., Black-and-white Warbler, Wood Thrush, Eastern Wood-pewee, Yellow-billed Cuckoo, Red-breasted Nuthatch, Tree Swallow, Black-throated Green Warbler, and Eastern Phoebe), many of which are forest-dependent.

Provincially significant bird species, such as Eastern Wood-pewee, Barn Swallow, Bank Swallow, Chimney Swifts, and Grasshopper Sparrow have been documented in the City’s natural areas. These species have been observed foraging in or adjacent to natural areas as well as breeding.

Numerous species identified by CVC as rare / uncommon within the watershed have also been documented in natural areas. The CVC lists are developed to determine population trends and recognizing species that are at risk of decline (CVC, 2010). Therefore, some species found in natural areas are of conservation concern to the CVC while others are secure. Ten CVC Tier 1 species (Species of Conservation Concern [SCC]) occur in nature areas, and 34 CVC Tier 2 (Species of Interest) occur in nature areas.



A sample of birds encountered during 2014-2018 updates

Raptors (hawks, falcons, etc.) are commonly found in forest patches with adjacent open communities (e.g. meadow) and are therefore more common along larger creek valleys (e.g., Credit River, Etobicoke Creek) and tributaries close to intact natural areas (e.g., Clarkson-Lorne Park area and Rattray Marsh) than in other parts of Mississauga. In 2015-2018 Red-tailed Hawk was noted along the Credit River (CRR sites) and the adjacent Residential Woodland (MI4 and MI7) as well as at Clarkson-Lorne (CL) sites, which are relatively naturalized and occur in proximity to Rattray Marsh. Red-tailed Hawk was also seen along Cooksville Creek and Mullet Creek. Cooper's Hawk was seen along the Credit River in 2015-2018.

Amphibians

Amphibian species utilize a broad range of habitats to complete their life cycles (e.g., wetlands, meadow, forest), however all require moisture and most require water (e.g., wetland, pond, watercourse, lake). Some species (e.g., mole salamanders, Western Chorus Frog, Wood Frog) have more restrictive habitat requirements for breeding; these species require fishless ponds that occur within or in close proximity to good quality woodlands.

In Mississauga, wetland and aquatic habitat features (e.g., ponds, watercourses) occur within and outside of surveyed natural areas and have varying potential to support breeding amphibians. More specialized pond /pool breeding habitat is available in very few sites.

Habitat surveyed for Western Chorus Frog and salamander breeding between 2015-2018 included known ponds that are fed by snowmelt, groundwater and/or rainfall, and are full in early spring and dry out slowly over the summer. The water in the ponds needs to persist long enough to allow amphibian larvae to transform into adults, generally around mid-July. Other habitat surveyed includes stormwater management ponds as these ponds can provide suitable habitat for large adult frogs (e.g., Green Frogs and Bullfrogs).

Between 2015-2018 frogs and toads were found at 23 natural areas. Documented species



Eastern Red-backed Salamander MV2 (May 2015)

include American Bullfrog, American Toad, Gray Treefrog, Green Frog, Northern Leopard Frog, Spring Peeper, Western Chorus Frog, and Wood Frog. American Toad and Green Frog are adaptable species that use a broad range of aquatic features for breeding, these species are more likely to persist in an urbanized landscape. The remaining species have more specific habitat requirements and are seen in low numbers across the City. Western Chorus Frog was recorded in 2 natural areas in the City (2015-2018). The areas surrounding their habitat has been developed and their habitat is isolated in the landscape. This loss in connectivity will impact the ability of the species to persist in the natural areas surveyed long-term and could contribute to its extirpation from the City.

Eastern Red-backed Salamanders were found at 2 natural areas between 2015-2018. Red-backed salamanders live in deciduous, coniferous and mixed woodlands and are tolerant of human-modified woodlands, if fallen logs, leaf litter, and underground areas exist. They are not readily detected through general surveys; as such, it is likely they occur in other forested areas of the City. This species plays an important ecological role, they “process and recycle” immense numbers of invertebrate prey and are a food source for many predators (Harding, 2014).

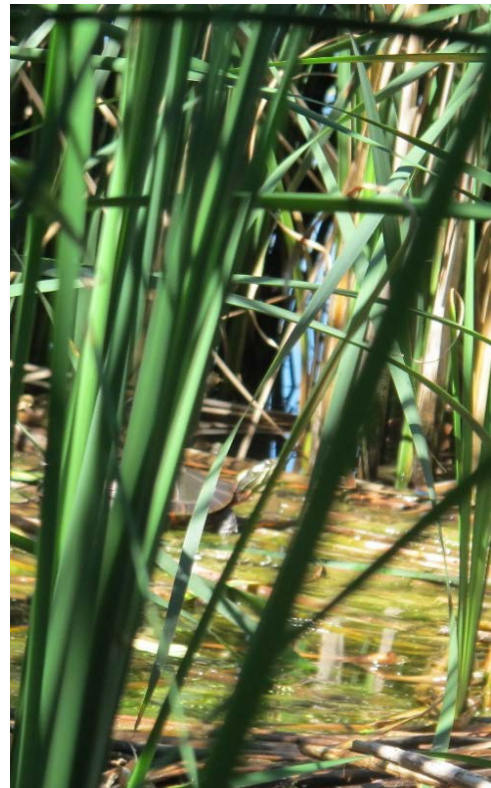
Jefferson/Blue-spotted Salamander hybrid egg masses were found in one natural area. The Jefferson Salamander is a SAR, and any hybrid of Jefferson Salamander is of interest to the Province. The Jefferson Salamander requires undisturbed woodland habitats with fishless breeding ponds. This habitat type is limited within the City.

Reptiles

As specific reptile surveys are not completed for NAS updates, the number and diversity of reptile observations probably under-represents actual presence. Three snakes and 3 turtles were found incidentally in the nature areas in 2015-2018. Dekay’s Brownsnake was found at 1 nature area, Eastern Gartersnake was found at 6 nature areas, and Northern Watersnake was found at 3 nature areas. Snapping Turtle is a SAR and was found at 4 nature



Snapping Turtle basking at CRR2 (May 2015)



Midland painted turtle ME11 (August 2018)

areas. Midland Painted Turtle was found at 2 nature areas, and Red-eared Slider (an invasive species) was found at 1 nature areas, ETO4.

Mammals

As a result of survey methods used for the NAS, it is anticipated that mammals (e.g., bats) are underrepresented in results. Many mammals are crepuscular or nocturnal and / or are cryptic in their behaviour (i.e., try not to be seen) and therefore are not readily observed during surveys. Some species are also difficult to identify even with visual observation. Bats for example move quickly and erratically and are difficult to identify unless captured (at risk of mortality to them) or their ultrasonic communication recorded. Conversely, some mammals are so common that they may get overlooked / not recorded. For example, the Eastern Grey Squirrel is ubiquitous across the nature areas but is not recorded in every natural area.

Generally, mammals common to urban areas were observed occasionally within some natural areas, such as White-tailed Deer, Coyote, Grey Squirrel, Raccoon, and Eastern Cottontail. Other species found in 2015-2018 include American Mink, Beaver, Striped Skunk, and Virginia Opossum. These species and rodents (Groundhogs, mice, voles, shrews



White-tailed Deer antler; evidence of past activity in ETO4 (April 2017)

White-tailed Deer skull with antlers; evidence of past activity in EM5 (August 2018)



and moles) undoubtedly occur in higher numbers than reported.

Fish

Fisheries information has not been collected for the NAS since 1996. In 1996 it was found that 7 subwatersheds are not considered to support fish as the watercourses have been completely sewered and diverted. The seven subwatersheds are Avonhead Creek, Port Credit, Cumberland Creek, Moore Creek, Lakeside, Lake Ontario Outfall, and Cawthra Creek. Watercourses in the NAS were categorized by the Ministry of Natural Resources designation, which designated the entire watercourse, as either Type 1, Type 2, or Type 3 (Geomatics International, 1996).

- **Type 1:** high-quality fisheries habitat (spawning or nursery habitat) or presence of a SAR
- **Type 2:** do not limit the productive capacity of fish
- **Type 3:** a low capacity for fish production and no reasonable potential for enhancement and restoration

Lepidoptera and Odonata

Starting in 2015, Lepidoptera (butterflies and moths) and Odonata (dragonflies and damselflies) were documented in natural areas on an incidental basis during surveys. Very few records exist for the City and even background reports yield few results as surveys for this group are not common and are often overlooked in development applications. Species are found in larger natural areas and natural areas connected via valleyland system(s). These species groups can be found across a broad range of habitats and partially urbanized environments. Odonates require aquatic habitats for reproduction; species preference varies between still and moving water, waterbodies and watercourses. Like other species groups, some have more specific habitat requirements than others and increased diversity and presence of sensitive species, or tolerant species, provides some indication of habitat quality.

Cabbage white (introduced species) and Monarch were the most documented species. The monarch butterfly is of conservation concern and a federal SAR.

Gypsy moth, an introduced species which is also invasive, was documented at 7 sites but likely has an extensive range in the City. This species typically has a cyclical population, with very large numbers in some years and relatively moderate numbers in other years.



Gypsy Moth adult female and egg mass (left) and adult male (right) CV2 (July 2017)

3.0 Goals and Objectives of the Natural Areas Study

At the onset of the NAS programme, a goal and ten objectives were established for the Natural Heritage System in the City of Mississauga. The proposed goal was “[t]o protect, for the long term, remnant natural areas in the City of Mississauga that are representative of the indigenous ecosystems and landscapes that once characterized the area. The maintenance and restoration of ecological integrity of natural areas shall be paramount in this regard” (Geomatics International, 1996).

The 10 objectives for the City’s Natural Areas are to:

1. *“Maintain and, where possible and feasible, restore natural ecological processes (such as natural regeneration, decomposition, nutrient cycling, and groundwater recharge and discharge) in remnant natural areas and the surrounding lands which affect them;*
2. *Maximize biological diversity in the City through the protection and maintenance of native flora and fauna and the ecological interactions between them and the environment;*
3. *Protect identified natural areas in the City from further fragmentation by development, road construction and utility routing;*
4. ***Maintain, restore, or create functional ecological linkages between remnant natural areas;***
5. *Minimize impacts on identified natural areas through designation of compatible adjacent land uses;*
6. *Develop and initiate a stewardship programme that will actively involve the public in the management and protection of natural areas;*
7. *Minimize harmful disturbance to identified natural areas through:*
 - i) *controlling and limiting access in areas sensitive to human use;*
 - ii) *limiting the type of recreational activities that are permitted in natural areas;*
 - iii) *reviewing and refining City trail plans and standards to respect the sensitive nature of natural areas and as a means to control certain activities;*
8. *Develop and implement natural area management in areas requiring mitigation of existing or historic impacts including:*
 - i) *development of management plans for specific natural areas;*
 - ii) *removing and controlling non-native plant species where required;*
 - iii) *restoring indigenous vegetation where appropriate;*
 - iv) *removing litter and dumped materials from natural areas; and*
 - v) *rehabilitation and controlling, using non-engineered solutions, areas where erosion has occurred, with the emphasis on elimination the cause of the problem, rather than treating symptoms;*
9. ***Periodically update the inventory of natural areas and maintain a current electronic data base of the flora and fauna of all natural areas;***

10. Develop and implement a public education programme to increase general awareness of the value of natural areas and the protection and management required to preserve them.”

The objectives set out in 1996 are still relevant today. They represent much of the direction that environmental planning practice and policy has taken in the last two decades, as well as providing more specific objective to ensure the long-term viability of natural areas in Mississauga.

The NAS fulfills objective #9: the periodic update and inventory of natural areas and assists in the identification of linkages (objective #4). The results of the NAS provide important information to identify potential concerns and issues that could be addressed through programs, activities or policies, which in turn would help fulfill other objectives as set out in 1996. Management plan(s) should be developed for the City’s natural areas using the NAS results to identify specific objectives, mitigation and restoration. Through those management plans, specific implementation strategies, and efficacy of implemented programs and/or recommendations can be assessed (e.g. restoration, mitigation measures, etc.).

4.0 Summary of Trends

Appendix 1 documents the changes that occurred in the natural areas between 1996 and 2018. For comparison between years, the same categories (e.g., number of flora and fauna species, significant species, etc.) are used. After 22 years of update surveys spanning across the City, the trends that have emerged are a decrease in tableland and wetland habitats, and a decline in the quality of vegetation.

The current NAS results tell us that the condition of nature areas did not change significantly from the last update in 2014 and disturbances identified at that time continue to be widespread. On average, natural areas are in fair condition overall but ranged from poor to excellent. Natural areas evaluated as being in fair condition have many disturbances (e.g., informal trails, dumping of garbage and / or yard-waste, some trampling and compaction, etc.) and many non-native floral species. The most common disturbances within natural areas are those associated with an increase in the uncontrolled human use of natural areas. In general, deterioration of the quality of the City’s natural areas can be expected to continue unless there is a substantial effort to manage natural areas through site-specific management plans and community stewardship initiatives.

Sixty percent of the natural areas in the City contains a high proportion of non-native and invasive species (>35%), and a vast majority of the sites have a poor or fair ranking. While many sites started with a condition of poor or fair in 1996, there has been no improvement from this condition. With increasing urbanization, it becomes even harder to improve conditions and control the spread of non-native and invasive species. Poor and fair health of nature areas in Mississauga are consistent with reports from the literature that human use of natural areas results in the degradation of such areas through: alteration of

decomposition and nutrient cycles and the loss of understory vegetation (particularly herbaceous species) (Friesen 1998, Matlock 1993, McWilliam et al. 2011), as well as the loss of leaf litter and humus, reduction of moss species, and soil compaction (Matlock 1993). Matlock (1993) also suggested that the recovery of soil and understory vegetation could take 10 to 20 years after the cessation of traffic.

The trends mentioned above are outlined in the *Natural Heritage and Urban Forest Strategy* (NH&UFS) (City of Mississauga, 2014). The NH&UFS notes that to counteract the decreasing trends there is a need for:

- Stronger protection for Natural Areas, especially woodlands and smaller wetlands, and development of site-specific management plans and a natural area conservation plan,
- More active management of protected areas that are City or Conservation Authority-owned and an increase in stewardship initiatives and,
- Habitat enhancement and expansion, as well as rehabilitation and mitigation.

A positive trend is an increase in naturalization projects undertaken by the City. Most of the naturalized areas observed between 1996 and 2018 have involved leaving a zone of unmown grass adjacent to a watercourse or woodlot feature to regenerate naturally, with the addition of native plantings in some areas. While this approach will increase the overall size of the adjacent natural area in question, this initiative should be improved by actively planting up buffer areas. Adding and maintaining planting will accelerate succession and is more likely to result in a healthy natural area with a diversity of native plant and animal species.

5.0 Conclusion

This four-year summary report provides a review of the remnant natural features and the history of the City's NAS programme. While plans and policies adapt to a growing population, it is incumbent upon the City and citizens to ensure that the environment and natural areas are healthy and protected from development. As noted in the 1996 NAS report (Geomatics International) *"[i]t is unreasonable to expect Mississauga to ever support pristine examples of its historic natural features. It is [a] primarily urban landscape and will remain that way in the foreseeable future. However, the uniqueness of the original landscape, the need to maintain functioning natural ecosystems for human well being, and the desire to provide environments composed of natural features for human enjoyment, is sufficient rationale for the protection and maintenance of the remaining natural areas in the City."*

Some restoration and management recommendations are provided on individual factsheets for each site, but most of the sites share the same issues. Overall, it is recommended that the City create a management plan for the NAS. A management plan should address naturalization initiatives and methods, permitted uses of nature areas, trail locations and capacity, limiting access to sensitive areas and rehabilitated areas, education and signage, vegetation management, edge management, and adaptive monitoring/management in a comprehensive, City-wide manner. The development of

management plans for natural areas within the City could be prioritized with higher consideration given to areas that are most susceptible to degradation, and which have high natural heritage value(s). Restoration initiatives could be started on two or three natural areas for a period of two to three years, and natural areas could then be dealt with on a rotational basis that focuses on those nature areas at greatest risk.

Deterioration of the quality of Mississauga's natural areas can be expected to continue unless there is a substantial effort to protect, increase cover, improve, and manage the proportion of the City occupied by natural areas. Protecting, increasing, improving, and managing natural areas through site-specific management plans and community stewardship initiatives will promote biodiversity and reinforce the goals and objectives as set out in the original NAS report (Geomatics International, 1996).



Honeybees in a tree cavity at LS1 (July 2018)

6.0 Glossary

Anthropogenic	In the context of the Natural Areas Study (NAS) Anthropogenic includes communities that have been created and maintained through human intervention (e.g., manicured areas, lawns, golf courses)
Cultural	In the context of the Natural Areas Study (NAS) Cultural includes Ecological Land Classification (ELC) categories that are dominated by communities that resulted from or are maintained by cultural or anthropogenic disturbances.
Ecological Land Classification (ELC)	Ecological Land Classification (ELC) for Southern Ontario: First Approximation and Its Application (Lee et al. 1998) is used to describe various systems to indicate natural regions based on ecological factors and in Ontario is used for descriptive, planning, and resource management purposes. ELC is used to classify communities in the NAS.
Endangered	Lives in the wild in Ontario (Endangered Species Act [ESA]) or Canada (Species at Risk Act [SARA]) but is facing imminent extinction or extirpation.
Endangered Species Act (ESA)	An Ontario specific act to identify, protect, and promote stewardship of Species at Risk (SAR) and their habitat.
Extirpated	Lives somewhere in the world, and at one time lived in the wild in Ontario (Endangered Species Act [ESA]) or Canada (Species at Risk Act [SARA]).
Linkage	<p>Linkages serve to link two or more natural areas, Significant Natural Areas (SNA), Natural Green Spaces (NGS), Special Management Areas (SMA) or Residential Woodlands (RW). Linkages are necessary to maintain biodiversity and support ecological functions. Some linkages are designated as SNA, NGS owing to their overall significance, however those that are largely recreational in function are classified as Linkages.</p> <p>Note that Lake Ontario constitutes as an important ecological linkage but is not included within the boundaries of the City.</p>
Natural Areas Survey (NAS)	The Natural Areas Study (NAS) is a long-term study which identifies and inventories natural areas within the City. The study consists reviews reports and databases, conducts site visits to remnant natural areas, maintains a database for the natural areas, and reports yearly. Each year one quadrant of the City is updated.

<p>Natural Green Space (NGS)</p>	<p>Often recreational and dominated by mowed grass but retains some for of ‘naturalness’. This category performs some ecological functions but does not fit under Significant Natural Area (SNA). NGS fits following criteria:</p> <ul style="list-style-type: none"> • woodlands greater than 0.5 hectares that do not fulfill the requirements of a significant woodland; • wetlands that do not fulfill the requirements of a significant wetland; • watercourses that do not fulfill the requirements of a significant valleyland, • all natural areas greater than 0.5 hectares that have vegetation that is uncommon in the city.
<p>Natural Heritage System</p>	<p>A natural heritage system is defined by the Province of Ontario as: <i>“A system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions and working landscapes that enable ecological functions to continue. The Province has a recommended approach for identifying natural heritage systems, but municipal approaches that achieve or exceed the same objectives may also be used”</i> (Provincial Policy Statement 2014). Mississauga’s Natural Heritage System is composed of Significant Natural Areas (SNA), Natural Green Spaces (NGS), Special Management Areas (SMA), Residential Woodlands (RW), and Linkages.</p>
<p>Natural Site (NS)</p>	<p>A term used prior to 2015. The refinement essentially combined SNS with most of the NS category and added to the Natural Green Space category or re-labeled as Significant Natural Area (SNA). These areas represent good examples of remnant features that once characterized the City.</p>
<p>Official Plan (OP)</p>	<p>Policy document that guides the short-term and long-term development. The OP applies to all lands within the municipal boundary and provides direction for the land uses, provision of municipal services and facilities,</p>

	and preparation of regulatory bylaws to control the development and use of land.
Provincial Policy Statement (PPS)	<i>“The Provincial Policy Statement provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario’s policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians.”</i> (Provincial Policy Statement 2014).
Remnant Natural Features	Are areas that contain native flora and fauna that has not been significantly disturbed by destructive activities (e.g., agriculture, logging, pollution, development, fire suppression, or non-native species invasion).
Residential Woodland (RW)	Residential Woodlands are areas, generally private ownership and in older residential areas. RW support mature trees with a fairly continuous canopy but the native understory is absent or degraded, due to maintenance of lawns and landscaping. These areas still support tolerant wildlife and serve as groundwater recharge areas (permeable ground cover) and fixing atmospheric carbon.
Significant Natural Area (SNA)	Refinement of terms used prior to 2015. These are areas which stand out from other natural areas in the City. Significant Natural Areas are areas that meet one or more of the following criteria: <ul style="list-style-type: none"> • provincially or regional significant life science areas of natural and scientific interest (ANSI); • environmentally sensitive or significant areas; • habitat of threatened species or endangered species; • fish habitat; • significant wildlife habitat; • significant woodlands; • significant wetlands; • significant valleylands.
Significant Natural Site (SNS)	A term used prior to 2015. The refinement essentially combined SNS with most of the NS category and added to the Natural Green Space category or re-labeled as Significant Natural Area (SNA). These are areas which stand out from other natural areas in the City.
Special Concern	lives in the wild in Ontario (Endangered Species Act [ESA]) or Canada (Species at Risk Act [SARA]), is not endangered or threatened, but may become threatened

	or endangered due to a combination of biological characteristics and identified threats.
Special Management Area (SMA)	Special Management Areas are lands adjacent to or near Significant Natural Areas (SNA) or Natural Green Spaces (NGS) and have the potential to be managed or restored to enhance and support the SNA or NGS.
Species at Risk (SAR)	Is a species (subspecies, variety, or genetically or geographically distinct population) under threat of disappearing, more often than not as a result of human activities. Species at Risk are either extirpated, endangered, threatened, or special concern.
Species at Risk Act (SARA)	A Canada wide act to prevent wildlife species in Canada from disappearing and to manage the recovery of Species at Risk (SAR) and their habitat.
Threatened	Lives in the wild in Ontario (Endangered Species Act [ESA]) or Canada (Species at Risk Act [SARA]), is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it
Wetland	In the context of the Natural Areas Study (NAS) Wetland includes Ecological Land Classification (ELC) categories that are dominated by flooding regimes.
Woodland	In the context of the Natural Areas Study (NAS) Woodland includes Ecological Land Classification (ELC) categories that are dominated by tree cover.

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*Appendix 1: Changes in Natural Areas Between
1996 And 2018*

Table 1: Sites that were founded in 1996 and remain in 2018

NAS Site	Year	Area #	Classification	Hectares	Total Plants	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	# Vegetation Communities	Bird	Mammal	Herp	Condition
SD1	1996	1	Natural Site	19.5	96	27	28.1%	30.22	3.64	5	13	4	2	Fair
SD1	2018	1	Significant Natural Area	20.03	235	100	42.55%	42.60281754	3.666666746	6	127	11		Fair
SD4	2018	2	Significant Natural Area	24.38	107	24	22.43%	31.99761963	3.51219511	5	24	1		Fair
CL52	1996	4	Natural Green Space	6.67	34	18	52.9%	12.75	3.19	1	10	1	0	Poor
CL52	2018	4	Significant Natural Area	8.93	112	58	51.79%	22.04540825	3	1	36	2	1	Poor
CL9	1996	6	Significant Natural Site	46.89	491	156	31.40%	80.1	4.38	13	200	23	22	Good
CL9	2018	6	Significant Natural Area	45.51	646	226	34.98%	92.72733307	4.524630547	12	220	28	9	Good
CL8	1996	7	Significant Natural Site	11.28	48	9	18.8%	19.86	3.18	7	13	10	1	Good
CL8	2018	7	Significant Natural Area	13.6	160	54	33.75%	37.78396225	3.669902802	7	36	1		Good
CL15	1996	8	Natural Site	0.83	44	9	18.2%	24.51	4.14	1	2	2	0	Fair
CL15	2018	8	Significant Natural Area	0.77	60	13	21.67%	25.7832222	3.760869503	1	13	1		Fair
CL16	1996	9	Natural Site	8.52	119	33	26.9%	37.63	4.06	5	37	16	0	Fair-Poor
CL16	2018	9	Significant Natural Area	14.87	213	65	30.52%	50.35145187	4.255474567	6	62	17	1	Fair - Poor
CL13	1996	11	Natural Green Space	1.5	40	23	55.00%	8.25	1.94	2	2	0	0	Poor
CL13	2018	11	Significant Natural Area	10.12	152	85	55.92%	23.41893959	2.904761791	1	18	5		Poor
CL43	1996	12	Natural Site	4.16	68	11	16.2%	29.27	3.88	2	5	1	0	Fair
CL43	2018	12	Significant Natural Area	4.22	180	56	31.11%	44.18033218	3.983606577	3	23	3		Fair - Poor
CL42	1996	13	Natural Site	8.87	103	28	27.2%	35.8	4.13	3	4	1	0	Fair-Poor
CL42	2018	13	Significant Natural Area	8.91	145	45	31.03%	38.68687057	3.868686914	3	28	1		Fair - Poor
CL21	1996	14	Significant Natural Site	9.36	97	22	21.6%	38.91	4.49	3	2	0	1	Fair
CL21	2018	14	Significant Natural Area	9.51	189	60	31.75%	48.98058319	4.3125	4	30	3	1	Fair - Poor
CL39	1996	15	Significant Natural Site	12.98	245	69	28.0%	54.51	4.13	2	6	2	8	Fair
CL39	2018	15	Significant Natural Area	13.01	310	97	31.29%	60.51218414	4.146226406	4	38	7	1	Fair
CL22	1996	16	Significant Natural Site	17.85	131	45	34.4%	37.74	4.07	1	2	1	6	Good
CL22	2018	16	Significant Natural Area	17.91	181	69	38.12%	42.33201981	4	2	19		1	Good
CL30	1996	17	Significant Natural Site	0.06	24	8	33.30%	0	0	1	0	0	0	Poor

NAS Site	Year	Area #	Classification	Hectares	Total Plants	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	# Vegetation Communities	Bird	Mammal	Herp	Condition
CL30	2018	17	Significant Natural Area	0.06	95	37	38.95%	29.64711761	3.892857075	1	8	1		Fair
CL31	1996	18	Significant Natural Site	2.78	50	26	50.0%	0	0	1	1	0	0	Poor
CL31	2018	18	Significant Natural Area	2.88	129	55	42.64%	31.10977936	3.616438389	1	15	2	2	Poor
CL24	1996	19	Significant Natural Site	7.8	213	51	23.0%	58.06	4.56	3	6	1	0	Good
CL24	2018	19	Significant Natural Area	8.03	297	89	29.97%	63.03558731	4.370731831	6	26	4	1	Good
CL26	1996	20	Natural Site	4.34	157	58	35.70%	31.66	3.18	2	5	2	0	Fair
CL26	2018	20	Significant Natural Area	1.93	213	74	34.74%	40.41005707	3.427536249	1	23	5	0	Fair
PC1	1996	21	Natural Site	1.09	87	39	44.8%	26.56	3.83	1	68	1	0	Poor
PC1	2018	21	Significant Natural Area	1.08	171	86	50.29%	33.48084259	3.674999952	1	74	2	0	Poor
PC2	1996	22	Natural Green Space	4.37	0	0	0.00%	0	0	1	0	0	0	Poor
PC2	2018	22	Natural Green Space	4.35	132	64	48.48%	27.34811401	3.654545546	1	18	2	2	Poor
CRR9	1996	24	Significant Natural Site	25.63	37	14	37.84%	17.1	3.57	3	10	1	13	Fair
CRR9	2018	24	Significant Natural Area	26.31	116	45	38.79%	30.45451355	3.614285707	4	48	2	9	Fair
MI4	2018	25	Residential Woodland	150.33	108	48	44.44%	28.01403999	4.043478489	1	29	7	0	Fair
MI1	1996	26	Natural Site	6.31	9	4	44.44%	n/a	n/a	1	0	0	0	Fair
MI1	2018	26	Significant Natural Area	7.37	114	59	51.75%	18.66761971	3.299999952	5	55	5	0	Fair
LV3	1996	27	Natural Site	3.54	80	34	40.0%	24.33	3.59	3	18	2	0	Fair
LV3	2018	27	Significant Natural Area	4.14	189	73	38.62%	39.42710114	3.660714388	5	54	3	0	Fair
LV4	1996	28	Natural Green Space	0.95	n/a	n/a	n/a	0	0	1	0	0	0	Poor
LV4	2018	28	Significant Natural Area	3.17	166	82	49.40%	29.3058548	3.197530746	5	35	2	0	Poor
LV5	1996	29	Natural Green Space	1.09	0	0	0.00%	0	0	1	0	0	0	Poor
LV5	2018	29	Significant Natural Area	1.39	139	72	51.80%	26.82277107	3.27692318	1	13	3	0	Poor
LV2	1996	30	Natural Site	2.09	26	11	38.5%	11.62	3	1	3	0	0	Poor
LV2	2018	30	Significant Natural Area	2.51	41	13	31.71%	12.73880291	2.407407522	1	17	1	0	Poor
LV1	1996	31	Significant Natural Site	14.03	82	34	40.2%	23.09	3.33	4	8	0	0	Fair
LV1	2018	31	Significant Natural Area	12.94	251	109	43.43%	44.70340729	3.764705896	7	66	7	2	Fair
ETO8	1996	32	Significant Natural Site	16.67	85	34	37.6%	26.05	3.65	3	2	4	1	Fair

NAS Site	Year	Area #	Classification	Hectares	Total Plants	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	# Vegetation Communities	Bird	Mammal	Herp	Condition
ETO8	2018	32	Significant Natural Area	16.41	194	75	38.66%	42.78848267	3.922413826	4	37	4	0	Fair
LV14	1996	33	Natural Green Space	1.95	35	17	45.7%	13.67	3.22	1	0	0	0	Poor
LV14	2018	33	Significant Natural Area	2.31	100	51	51.00%	18.66666603	2.666666746	1	23	1	0	Poor
LV6	1996	34	Natural Site	2.02	61	19	29.5%	24.38	3.76	1	0	0	0	Fair
LV6	2018	34	Significant Natural Area	2.37	116	40	34.48%	35.21990204	4.039999962	1	17	1	0	Fair
LV7	1996	35	Significant Natural Site	21.56	292	101	33.9%	57.67	4.17	2	65	6	3	Good
LV7	2018	35	Significant Natural Area	22.46	367	119	32.43%	67.58258057	4.291498184	2	69	7	4	Good
ETO7	1996	36	Significant Natural Site	27.18	84	35	39.3%	21.39	3.04	2	11	2	11	Fair
ETO7	2018	36	Significant Natural Area	31.42	196	84	42.86%	36.55947113	3.454545498	3	43	7	7	Fair
SP1	1996	37	Natural Site	9.05	108	27	24.3%	33.99	3.8	5	4	1	0	Fair
SP1	2018	37	Significant Natural Area	8.44	216	89	41.20%	40.75025177	3.615999937	6	61	8	0	Fair
SP3	2018	38	Significant Natural Area	8.77	162	44	27.16%	41.50139236	3.820512772	5	27	0	0	Good
SH6	1996	39	Natural Site	6.85	70	32	46.4%	21.37	3.51	2	4	0	0	Poor
SH6	2018	39	Significant Natural Area	7.52	171	80	46.78%	32.85790634	3.444444418	2	20	6	0	Poor
CRR7	1996	40	Significant Natural Site	88.96	61	10	13.10%	33.89	4.75	3	0	0	9	Good
CRR7	2018	40	Significant Natural Area	101.24	362	126	34.81%	66.2829895	4.314655304	7	64	11	8	Good
CRR8	1996	41	Significant Natural Site	110.62	43	3	7.00%	n/a	n/a	4	8	1	4	Good
CRR8	2018	41	Significant Natural Area	112.66	351	116	33.05%	67.85063171	4.426086903	5	65	10	7	Good
ER6	1996	42	Significant Natural Site	1.56	36	13	36.1%	16.26	3.39	1	1	0	0	Poor
ER6	2018	42	Significant Natural Area	2.74	110	57	51.82%	22.98230743	3.156862736	2	23	1	0	Poor
CRR6	1996	43	Significant Natural Site	213.66	269	88	32.30%	63.63	4.73	4	87	8	17	Good
CRR6	2018	43	Significant Natural Area	141.48	449	152	33.85%	77.97046661	4.524305344	17	80	13	14	Good
CV1	1996	44	Natural Site	1.48	29	9	31.0%	13.86	3.1	1	5	1	0	Fair
CV1	2018	44	Significant Natural Area	1.95	125	56	44.80%	26.53160477	3.194029808	3	25	1	0	Fair
CV2	1996	45	RW	53.17	143	43	29.6%	41.71	4.19	1	6	1	0	Fair
CV2	2018	45	Residential Woodland	49.83	189	69	36.51%	41.86828232	3.822033882	1	34	4	0	Fair
CV12	1996	46	Significant Natural Site	6.99	199	89	44.2%	37.19	3.55	3	2	1	0	Fair

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CV12	2018	46	Significant Natural Area	8.16	281	133	47.33%	44.66363907	3.671328783	6	37	2	1	Fair
CV10	1996	47	Natural Site	4.59	20	9	40.0%	8.74	2.64	2	2	0	0	Poor
CV10	2018	47	Significant Natural Area	6.67	165	74	44.85%	30.97496796	3.247058868	6	32	4	1	Poor
CV8	1996	48	Natural Site	7.87	39	18	43.6%	13.53	2.95	4	1	0	0	Poor
CV8	2018	48	Significant Natural Area	8.95	167	77	46.11%	29.81576157	3.142857075	3	33	3	0	Poor
ETO6	1996	49	Significant Natural Site	11.39	0	0	0.00%	0	0	3	0	0	0	Poor
ETO6	2018	49	Significant Natural Area	11.49	112	54	48.21%	20.74861908	2.823529482	3	33	1	0	Poor
AW1	1996	50	Significant Natural Site	7.98	51	18	35.0%	18.45	3.21	3	5	1	0	Poor
AW1	2018	50	Significant Natural Area	8.28	160	71	44.38%	32.25105286	3.418604612	2	30	4	0	Poor
WB1	1996	51	Natural Site	7.12	53	9	16.98%	25.93	3.91	5	4	0	1	Fair
WB1	2018	51	Significant Natural Area	3.9	136	43	31.62%	34.99886703	3.629213572	7	28	2	0	Fair
EM30	1996	52	Natural Site	5.57	52	5	9.62%	29.61	4.32	2	5	8	0	Good
EM30	2018	52	Significant Natural Area	5.47	174	52	29.89%	43.99100494	3.982758522	6	25	9	1	Good
EM6	1996	53	Natural Site	1.07	53	11	20.75%	25	3.86	1	6	1	0	Fair
EM6	2018	53	Significant Natural Area	1.17	120	43	35.83%	33.7592392	3.847222328	1	11	1	0	Fair
EM2	1996	54	Significant Natural Site	4.9	63	12	19.05%	28.85	4.04	1	8	1	0	Fair
EM2	2018	54	Significant Natural Area	5.55	179	48	26.82%	41.2954483	3.60800004	2	16	1	0	Fair
EM10	1996	55	Natural Site	3.99	43	9	20.93%	21.78	3.74	2	4	2	0	Fair
EM10	2018	55	Significant Natural Area	4.35	161	60	37.27%	36.03743362	3.585858583	4	20	4	1	Fair
EM14	1996	56	Natural Site	9.61	49	22	44.90%	15.4	2.96	2	4	0	0	Poor
EM14	2018	56	Significant Natural Area	10.7	194	93	47.94%	32.22514343	3.206521749	5	31	5	1	Poor
EM4	1996	57	Significant Natural Site	46.82	225	61	26.70%	55.05	4.3	8	67	4	6	Good - Fair
EM4	2018	57	Significant Natural Area	46.52	405	133	32.84%	70.71750641	4.28787899	15	74	8	4	Good - Fair
EM5	1996	58	Natural Site	1.88	49	9	32.70%	22.27	3.94	1	4	0	0	Fair
EM5	2018	58	Significant Natural Area	6.13	175	74	42.29%	36.49691772	3.631578922	3	21	4	1	Fair
EM21	1996	59	Natural Site	1.13	42	8	16.70%	21.27	3.65	1	2	1	0	Fair
EM21	2018	59	Significant Natural Area	1.4	116	40	34.48%	32.24391174	3.698630095	1	10	2	0	Fair

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CR1	1996	60	Significant Natural Site	4.9	47	3	4.30%	29.55	4.45	2	1	0	0	Fair
CR1	2018	60	Significant Natural Area	6.01	145	47	32.41%	38.66972733	3.926315784	2	14	2	0	Fair
FV1	1996	61	Natural Site	2.23	38	7	18.5%	18.5	3.32	1	0	0	0	Fair
FV1	2018	61	Significant Natural Area	2.19	103	32	31.07%	29.01003075	3.442857027	3	24	1	0	Fair
FV3	2018	62	Significant Natural Area	7.24	202	88	43.56%	37.89881897	3.54954958	5	28	3	0	Fair
MY3	1996	65	Natural Green Space	3.71	26	18	69.20%	6.01	2.13	1	0	0	0	Poor
MY3	2018	65	Natural Green Space	2.63	131	71	54.20%	22.37723732	2.888888836	1	27	3	0	Poor
AW4	1996	66	Natural Green Space	11.71	0	0	0.00%	0	0	1	0	0	0	Poor
AW4	2018	66	Significant Natural Area	11.47	138	71	51.45%	25.7071228	3.140625	2	23	2	0	Poor
AW3	1996	67	Natural Green Space	7.92	33	21	60.6%	0	0	2	4	1	0	Poor
AW3	2018	67	Natural Green Space	8.05	122	63	51.64%	24.86608124	3.237288237	2	26	4	0	Poor
ETO5	1996	68	Significant Natural Site	9.12	0	0	0.00%	0	0	2	0	0	0	Poor
ETO5	2018	68	Significant Natural Area	8.88	186	90	48.39%	32.87057114	3.35483861	8	25	2	1	Poor
ETO4	1996	69	Significant Natural Site	58	128	35	26.6%	42.31	4.39	3	23	2	9	Fair
ETO4	2018	69	Significant Natural Area	53.52	328	121	36.89%	57.92539978	4.045685291	9	56	9	3	Fair
RW5	1996	70	Natural Site	3.51	0	0	0.00%	0	0	1	0	0	0	Poor
RW5	2018	70	Significant Natural Area	2.5	130	64	49.23%	23.41893959	2.904761791	2	24	2	0	Poor
RW6	1996	71	Natural Site	7.31	0	0	0.00%	0	0	1	0	0	0	Poor
RW6	2018	71	Significant Natural Area	6.86	161	81	50.31%	26.42756462	2.973333359	5	31	1	0	Poor
RW4	1996	72	Natural Site	1.08	33	7	18.2%	22.36	4.38	1	3	0	0	Fair
RW4	2018	72	Significant Natural Area	1.6	137	48	35.04%	34.25433731	3.630952358	2	19	2	0	Fair
RW1	1996	73	Significant Natural Site	2.11	69	12	17.4%	34.04	4.51	1	0	1	0	Fair
RW1	2018	73	Significant Natural Area	1.31	90	23	25.56%	33.48553467	4.090909004	1	16	0	0	Fair
RW2	1996	74	Natural Green Space	3.5	0	0	0.00%	0	0	1	0	0	0	Poor
RW2	2018	74	Significant Natural Area	4.28	155	82	52.90%	26.2696228	3.074626923	4	32	2	0	Poor
CM7	1996	75	Significant Natural Site	11.38	88	18	20.50%	34.78	4.16	3	15	1	5	Excellent
CM7	2018	75	Significant Natural Area	11.66	170	48	28.24%	44.27584839	4.008546829	3	25	3	0	Excellent

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CM9	1996	76	Natural Site	3.37	62	12	17.7%	27.58	3.9	2	8	2	0	Good
CM9	2018	76	Significant Natural Area	4.02	137	41	29.93%	36.48176193	3.723404169	4	13	3	3	Good
CM12	1996	78	Natural Site	8.22	54	8	14.80%	27.42	4.04	2	11	2	5	Good
CM25	1996	78	Natural Site	0.7	24	11	45.83%	5.27	1.46	2	7	0	1	Fair - Poor
CM12	2018	78	Significant Natural Area	5.62	166	49	29.52%	39.88640976	3.6875	2	27	5	4	Good
CM25	2018	78	Significant Natural Area	2.55	98	41	41.84%	23.47312164	3.109090805	2	9	0	2	Poor
CE7	1996	81	Significant Natural Site	10.08	88	28	31.82%	30.47	3.93	2	2	1	7	Good
CE7	2018	81	Significant Natural Area	9.52	182	52	28.57%	45.06835175	3.952755928	4	16	3	0	Good
CE9	1996	82	Natural Site	4.83	58	14	24.10%	26.99	4.07	3	2	1	0	Fair
CE9	2018	82	Significant Natural Area	5.51	218	75	34.40%	48.88818359	4.088235378	4	22	3	0	Fair
CE10	1996	83	Significant Natural Area	18.2	73	13	17.80%	33.82	4.37	3	8	0	2	Good
CE10	2018	83	Significant Natural Area	18.68	180	51	28.33%	46.78128815	4.134920597	3	19	3	1	Good - Fair
CE5	2018	84	Natural Green Space	4.18	58	30	51.72%	10.96096992	2.071428537	1	16	0	0	Poor
CE1	1996	85	Natural Green Space	16.94	50	24	46.00%	0	0	2	3	0	0	Poor
CE1	2018	85	Natural Green Space	18.12	224	94	41.96%	36.97096252	3.642857075	7	33	7	1	Poor
CRR5	1996	87		0	0	0	0.00%	0	0	0	0	0	0	Good
CRR5	2018	87	Significant Natural Area	29.51	190	85	44.74%	35.00196075	3.415841579	5	44	7	2	Fair
CRR4	1996	88	Significant Natural Site	24.69	11	2	18.18%	0	0	3	0	0	7	Good
CRR4	2018	88	Significant Natural Area	25.28	160	66	41.25%	34.79557037	3.588888884	8	41	4	1	Good
SV10	1996	90	Natural Green Space	3.93	28	13	42.90%	9.55	2.47	1	1	0	0	Poor
SV10	2018	90	Natural Green Space	5.34	126	65	51.59%	21.74306488	2.807017565	1	25	0	0	Poor
SV1	1996	91	Significant Natural Site	5.62	67	16	23.90%	4.14	2	0	0	0	0	Fair
SV1	2018	91	Significant Natural Area	5.68	170	55	32.35%	40.80739975	3.805309772	4	22	2	0	Fair
CRR3	1996	92	Significant Natural Site	68.94	34	5	14.71%	0	0	4	1	0	0	Fair
CRR3	2018	92	Significant Natural Area	74.18	219	92	42.01%	41.40358734	3.688524485	6	51	6	3	Fair
CRR2	1996	93	Significant Natural Site	91.29	89	30	30.00%	32.94	4.29	8	13	9	10	Good
CRR2	2018	93	Significant Natural Area	101.82	285	93	32.63%	54.91548538	3.973545074	11	62	9	9	Good

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EC22	1996	94	Natural Site	2.59	39	4	10.30%	24	4.06	1	1	1	0	Fair
EC22	2018	94	Significant Natural Area	1.57	103	26	25.24%	31.52059555	3.59210515	1	16	2	0	Fair - Poor
EC13	1996	96	Significant Natural Site	4.61	162	29	16.70%	50.73	4.4	4	89	6	11	Excellent
EC13	2018	96	Significant Natural Area	5.18	226	47	20.80%	57.28623962	4.293785095	5	85	7	5	Excellent
HO1	1996	98	Natural Site	1.2	20	5	25.00%	16.27	4.2	1	2	1	0	Fair
HO1	2018	98	Significant Natural Area	1.16	56	12	21.43%	23.29350471	3.511627913	1	15	2	0	Fair - Poor
HO3	1996	100	Natural Site	1.2	20	5	25.00%	16.27	4.2	1	2	1	0	Fair
HO3	2018	100	Significant Natural Area	24.66	122	39	31.97%	33.42667007	3.691358089	4	37	4	0	Fair
HO6	1996	101	Natural Green Space	8.5	0	0	0.00%	0	0	1	0	0	0	Poor
HO6	2018	101	Natural Green Space	14.36	111	59	53.15%	20.98705482	2.938775539	2	27	3	0	Poor
HO7	1996	102	Natural Site	4.09	54	10	16.70%	26.53	4	3	0	0	0	Fair
HO7	2018	102	Significant Natural Area	2.52	144	52	36.11%	35.09916306	3.65934062	3	22	1	0	Fair - Poor
HO9	1996	103	Significant Natural Site	27.06	201	55	26.40%	50.4	4.17	2	9	1	0	Excellent-Poor
HO9	2018	103	Significant Natural Area	12.76	231	66	28.57%	53.02574539	4.128048897	1	24	2	1	Good - Poor
NE4	1996	104	Natural Site	13.43	95	22	23.0%	33.04	3.79	5	5	0	0	Excellent
NE4	2018	104	Significant Natural Area	14.89	204	63	30.88%	44.46377563	3.744525433	3	35	5	0	Excellent
NE3	1996	105	Natural Green Space	2.59	29	11	34.5%	0	0	2	0	0	0	Poor
NE3	2018	105	Significant Natural Area	3.81	176	82	46.59%	28.32352257	2.921348333	3	36	3	1	Poor
NE1	1996	107	Natural Green Space	0.95	54	26	48.1%	14.93	2.82	1	3	0	0	Fair
NE1	2018	107	Significant Natural Area	1.11	110	44	40.00%	25.7261219	3.166666746	1	26	2	0	Fair
NE6	1996	108	Natural Site	4.34	40	10	25.00%	20.27	3.7	2	0	0	0	Good
NE6	2018	108	Significant Natural Area	1.61	126	45	35.71%	31.47919083	3.519480467	1	18	3	0	Good
NE5	1996	109	Natural Green Space	13.29	0	0	0.00%	0	0	0	0	0	0	Poor
NE5	2018	109	Natural Green Space	14.03	110	59	53.64%	11.56554794	2.523809433	1	27	0	0	Poor
NE7	1996	110	Natural Green Space	2.76	0	0	0.00%	0	0	1	0	0	0	Poor
NE7	2018	110	Natural Green Space	3.05	91	46	50.55%	16.29135323	2.428571463	1	19	2	0	Poor

NAS Site	Year	Area #	Classification	Hectares	Total Plants	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	# Vegetation Communities	Bird	Mammal	Herp	Condition
ETO3	1996	111	Significant Natural Site	134.93	405	169	41.20%	57.09	3.72	4	7	5	5	Fair
ETO3	2018	111	Significant Natural Area	99.34	429	180	41.96%	57.81591034	3.663934469	5	46	7	2	Fair - Poor
NE8	1996	112	Natural Green Space	11.05	0	0	0.00%	0	0	1	0	0	0	Poor
NE8	2018	112	Significant Natural Area	4.19	42	24	57.14%	8.734848022	2.058823586	2	6	0	0	Poor
NE10	1996	113	Natural Green Space	8.27	0	0	0.00%	0	0	1	0	0	0	Poor
NE10	2018	113	Significant Natural Area	9.23	98	52	53.06%	13.88011742	2.04651165	2	27	0	0	Poor
NE11	1996	114	Natural Green Space	6.07	0	0	0.00%	0	0	1	0	0	0	Poor
NE11	2018	114	Significant Natural Area	6.04	93	48	51.61%	15.13245964	2.255813837	1	15	0	0	Poor
NE12	2018	115	Significant Natural Area	7.07	104	53	50.96%	19.56751442	2.74000001	1	17	0	0	Poor
ETO2	1996	116	Significant Natural Site	13.01	0	0	0.00%	0	0	1	0	0	0	Poor
ETO2	2018	116	Significant Natural Area	15.56	122	53	43.44%	23.0320034	2.772727251	2	19	3	1	Poor
ETO1	1996	117	Significant Natural Site	10.4	0	0	0.00%	0	0	2	0	0	0	Fair
ETO1	2018	117	Significant Natural Area	10.34	196	81	41.33%	35.22130585	3.284403563	4	47	3	0	Fair - Poor
NE9	1996	118	Natural Site	45.21	46	24	50.00%	0	0	4	5	0	0	Fair
NE9	2018	118	Significant Natural Area	54.28	256	100	39.06%	44.06609344	3.539473772	8	45	7	7	Fair
LS1	1996	119	Significant Natural Site	28.92	63	14	22.22%	27.14	3.88	3	4	0	0	Good - Fair
LS1	2018	119	Significant Natural Area	32.68	254	97	38.19%	46.85863113	3.739726067	5	45	2	2	Fair
LS2	1996	120	Natural Site	1.27	45	13	28.89%	22.09	3.97	1	2	0	0	Fair
LS2	2018	120	Significant Natural Area	1.18	83	26	31.33%	28.10216141	3.722222328	1	13	1	0	Fair
LS3	1996	121	Natural Site	3	66	22	33.33%	23.94	3.65	2	1	1	2	Fair
LS3	2018	121	Significant Natural Area	3.29	167	62	37.13%	34.90050507	3.405940533	2	17	3	0	Fair
ME10	1996	122	Significant Natural Site	4.18	55	15	27.27%	24.67	3.9	1	4	0	0	Fair
ME10	2018	122	Significant Natural Area	3.69	103	27	26.21%	34.41236115	3.947368383	1	15	2	0	Fair
ME12	1996	123	Natural Green Space	2.9	49	27	55.10%	12	2.62	1	7	2	7	Poor
ME12	2018	123	Significant Natural Area	4.06	147	80	54.42%	24.75897408	3.047619104	5	31	4	2	Poor
ME11	1996	124	Natural Green Space	4.36	41	21	51.20%	11.4	2.55	1	5	2	4	Poor
ME11	2018	124	Natural Green Space	5.4	155	81	52.26%	26.1492481	3.21875	2	20	5	3	Poor

NAS Site	Year	Area #	Classification	Hectares	Total Plants	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	# Vegetation Communities	Bird	Mammal	Herp	Condition
ME9	1996	125	Natural Site	2.39	44	11	25.00%	25.59	4.45	1	2	1	0	Fair
ME9	2018	125	Significant Natural Area	2.4	115	36	31.30%	34.61717987	3.894736767	1	12	1		Fair
MB9	1996	127	Natural Green Space	6.6	0	0	0.00%	0	0	1	0	0	0	Poor
MB9	2018	127	Significant Natural Area	6.16	147	68	46.26%	24.31601715	2.753246784	2	27	2	3	Poor
MB7	1996	128	Natural Green Space	10.45	0	0	0.00%	n/a	n/a	1	0	0	0	Poor
MB7	2018	128	Natural Green Space	9.95	137	67	48.91%	25.88416862	3.09375	5	21	1	0	Poor
MB3	1996	130	Natural Green Space	7.11	0	0	0.00%	n/a	n/a	1	0	0	0	Poor
MB3	2018	130	Natural Green Space	5.6	126	57	45.24%	23.84804916	2.870967627	4	23	2	1	Poor
MB4	1996	132	Natural Site	1.93	40	11	27.50%	19.31	3.59	1	0	0	0	Poor
MB4	2018	132	Significant Natural Area	2.12	78	32	41.03%	22.50500488	3.318181753	2	15	1	0	Poor
MB6	1996	133	Significant Natural Site	23.7	84	14	16.67%	30.7	3.7	2	1	1	2	Good
MB6	2018	133	Significant Natural Area	25.13	290	82	28.28%	57.76166153	4.005050659	10	41	7	3	Good
MB2	1996	134	Natural Site	1.34	41	6	14.60%	23.66	4	1	1	0	0	Poor
MB2	2018	134	Significant Natural Area	1.68	96	37	38.54%	25.95697594	3.379310369	1	21	2	0	Fair
MB1	1996	135	Natural Site	0.94	34	6	17.60%	22.87	4.32	1	0	0	0	Fair
MB1	2018	135	Significant Natural Area	1.14	71	20	28.17%	26.18523788	3.666666746	2	14	0	0	Fair
MV19	1996	136	Significant Natural Site	26.3	196	50	25.00%	50.48	4.18	3	13	6	3	Excellent
MV19	2018	136	Significant Natural Area	30.7	307	105	34.20%	57.56043243	4.059999943	5	40	7	5	Good
CRR1	1996	137	Significant Natural Site	71.4	41	12	26.80%	0	0	5	2	2	1	Fair
CRR1	2018	137	Significant Natural Area	77.09	346	126	36.42%	56.48786545	3.808411121	11	65	11	8	Fair - Poor
MV18	1996	138	Natural Site	3.14	19	1	5.26%	0	0	2	2	0	0	Fair
MV18	2018	138	Significant Natural Area	2.93	105	37	35.24%	23.0851059	3.297872305	2	20	1	0	Fair
MV2	1996	139	Significant Natural Site	80.18	200	60	29.50%	46.99	3.97	4	58	10	2	Good - Fair
MV2	2018	139	Significant Natural Area	92.67	332	120	36.14%	59.43664551	4.091787338	6	71	15	11	Good - Fair
MV12	1996	141	Significant Natural Site	13.28	103	32	31.07%	33.94	4.03	3	5	4	0	Fair
MV12	2018	141	Significant Natural Area	8.98	189	61	32.28%	43.00413513	3.815999985	4	26	5	4	Fair
MV11	2006	143	Natural Site	2.9	24	4	16.67%	17.44	3.2	1	0	0	0	Fair

NAS Site	Year	Area #	Classification	Hectares	Total Plants	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	# Vegetation Communities	Bird	Mammal	Herp	Condition
MV11	2018	143	Significant Natural Area	1.39	74	21	28.38%	25.34038162	3.480769157	1	9	0	0	Fair
MV15	1996	144	Natural Site	10.7	53	25	45.30%	14.74	2.79	2	7	1	0	Poor
MV15	2018	144	Significant Natural Area	10.38	171	80	46.78%	27.37005806	2.885057449	3	41	1	2	Poor
GT2	1996	146	Natural Site	7.2	41	6	7.00%	22.12	3.79	3	2	1	0	Good
GT2	2018	146	Significant Natural Area	7.31	152	49	32.24%	38.83623886	3.845360756	5	40	3	1	Good
GT3	1996	147	Natural Site	2.67	43	12	25.60%	19.04	3.42	2	1	0	0	Fair
GT3	2018	147	Significant Natural Area	1.89	108	47	43.52%	24.34194565	3.116666555	1	14	0	0	Fair
MA1	1996	149	Natural Green Space	25.79	0	0	0.00%	0	0	1	0	0	0	Poor
MA1	2018	149	Significant Natural Area	32.98	151	79	52.32%	27.34754372	3.268656731	1	26	1	0	Poor
CL1/SD5	1996	3/5	Significant Natural Site	13.73	38	4	10.5%	28.13	4.82	3	2	0	0	Good
CL1/SD5	2016	3/5	Significant Natural Area	13.52	157	47	29.94%	41.86	3.99	3	47	4	1	Good
ME8/MB8	1996	126/129	Significant Natural Site	15.98	87	13	26.40%	30.25	3.78	2	3	3	4	Fair
ME8/MB8	2018	126/129	Significant Natural Area	15.98	208	66	31.73%	45.11	3.79	2	28	6	4	Fair
CC1/MY1	1996	63/64	Natural Site	15.33	129	43	32.6%	35.58	3.84	2	8	1	5	Fair
CC1/MY1	2017	63/64	Significant Natural Area	13.97	277	166	41.88%	47.46	3.74	4	29	4	2	Fair
CE12/SV12	1996	86/89	Significant Natural Site	17.61	52	19	34.60%	17.76	3.09	2	4	1	0	Fair
CE12/SV12	2015	86/89	Significant Natural Area	22.32	196	90	45.92%	32.83	3.2	3	26	7	0	Fair

Table 2: Sites that were founded in 1996 and deleted before 2018

NAS Site	Area #	Total Plants	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	Comments
PC3	23	11	3	27.27%	0	0	Removed residential development 2004
CM11	77	22	1	4.55%	18.55943	4.05	Removed 2001 development
CM17	79	25	4	16.00%	16.80278	3.666667	Removed 2001 development
CM13	80	37	14	37.84%	16.26412	3.391304	Removed 2001 development
EC10	95	46	10	21.74%	21.83333	3.638889	Removed in 1999 from development
EC1	97	10	4	40.00%	4.89898	2	Removed for development 2002
HO2	99	24	3	12.50%	18.76674	4.095238	HO2 removed in 1998 development removed the sugar maple forest
NE2	106	55	10	18.18%	28.17446	4.2	Removed in 2000 to development
MB5	131	42	5	11.90%	23.82415	3.916667	Removed large portion in 2001
MV3	140	57	17	29.82%	23.51437	3.717949	Mavis road extension removes it (2000)
MV14	142	0	0	0	0	0	Residential development and Mavis road extension remove it (2002)
GT1	145	41	10	24.39%	18.55921	3.333333	Removed for Mavis road extension (1999)
GT4	148	206	56	27.18%	51.12693	4.174497	Proposed for development (2001). Removed.

Table 3: Sites added post 1996

NAS Site	Area #	Classification	Designation	Hectares	Total	# Introduced plants	% Introduced plants	Native FQI	Native mean CC	# Veg Comm.	Bird	Mammal	Herp	Condition	Comments
SD7	150	Significant Natural Area		3.93	168	84	50.00%	27.3313007	3	3	71	2	0	Poor	added in 1999
MI17	151	Significant Natural Area		7.17	184	59	32.07%	45.5461388	4.073770523	3	36	9	0	Fair	added in 1999
MI7	152	Significant Natural Area		6.89	186	67	36.02%	45.3423004	4.156521797	3	26	6	0	Poor	added in 1999
CV6	153	Significant Natural Area		2.88	146	53	36.30%	34.4865341	3.576086998	1	24	2	0	Fair	added in 2000
CRR10	154	Significant Natural Area	ESA,ANSI	64.4	501	194	38.72%	77.129158	4.401993275	17	92	14	9	Good	added in 2001- divided from CRR6
CRR11	155	Significant Natural Area	ESA	33.98	328	128	39.02%	55.5319443	3.926701546	9	47	7	7	Good	added in 2001- divided from CRR6
ER7	156	Significant Natural Area		3.97	174	79	45.40%	30.5022545	3.146067381	3	21	5	1	Poor	added in 2001
ME13	157	Significant Natural Area		1.43	61	18	29.51%	24.9502544	3.804877996	1	16	1	0	Fair - Poor	Added in 2006