



Don River Watershed Plan

Terrestrial Natural Heritage – Report on Current Conditions and Refinement of a Target System

2009

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Toronto and Region Conservation for The Living City

Member of Conservation Ontario Natural Champions

theDon

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1.0 Introduction

The Toronto and Region Conservation Authority (TRCA), in consultation with the multi-stakeholder Don Watershed Regeneration Council and watershed municipalities, is developing a watershed plan for the Don River. This watershed planning process has been initiated in response to a number of recent policy and planning developments, including the need to fulfill York Region's watershed planning requirements under the Oak Ridges Moraine Conservation Plan (ORMCP, Ontario Regulation 140/02) and to update the original management strategy outlined in *Forty Steps to a New Don* (Metropolitan Toronto and Region Conservation Authority [MTRCA], 1994).

The goal of the watershed planning study is to recommend updated management strategies that will guide land and water use decisions, such that the overall ecological health of the Don River watershed is protected and improved. The aim is to build on the *Forty Steps'* principles to protect what is healthy, regenerate what is degraded, and take responsibility for the Don. Recognizing the significant watershed planning work that has already been completed, and given that there are limited undeveloped lands remaining on the ORM within the watershed boundary, the watershed plan will focus mainly on filling information gaps, guiding land use planning and approval decisions, and providing direction to advance implementation of regeneration priorities.

This report has been prepared as part of the scoping and characterization phase of the watershed planning process, in which current watershed conditions are presented in the form of technical reports covering a range of subject areas, including groundwater quality and quantity, surface water quantity, low flows and water use, surface water quality, fluvial geomorphology, aquatic systems, terrestrial systems, nature-based experiences, cultural heritage, and land and resource use.

Since *Forty Steps* was published, there has been a wealth of information both from the science-based tools of landscape ecology using air photo interpretation and from on-the-ground biological field inventories[1]. This report describes the current conditions of the terrestrial landscape and presents a refined target Terrestrial Natural Heritage System (TNHS) with management considerations for the Don watershed. Section 2 provides background information on the Terrestrial Natural Heritage (TNH) Program and the data collected for this report. Section 3 outlines the data sources and methods used to evaluate current conditions. Section 4 presents the current conditions of the Don River watershed based on the results and analysis of information collected through remote-sensing and field surveys. This section presents objectives, indicators, measures and targets for evaluating the condition of the terrestrial natural heritage system, as per sections 24 and 25 of the ORMCP. Section 5

[1] In a sense, the first watershed plan is actually over half a century old, and predates Hurricane Hazel; the Don Valley Conservation Report (Department of Planning and Development, 1950) is an extremely detailed and useful baseline reference with much historical information.

describes refinement of the target TNHS and outlines key issues and management considerations needed for achieving the objectives.

2.0 Terrestrial Natural Heritage in an Urban Watershed

Historically, the Don has gone through several periods of change leading up to its current condition. A detailed description of the urbanization of the Don watershed can be found in *Forty Steps to a New Don* (MTRCA, 1994). Prior to European settlement, the Don River watershed was almost entirely forest and wetland with some clearings. Just over 200 years ago, Elizabeth Simcoe described a wilderness landscape with wolves, bald eagles, and runs of Atlantic salmon (Simcoe, 1796). Ashbridge's Bay was a huge marsh at the mouth of the Don and the Lower Don subwatershed included floodplain forests of elm (*Ulmus americana*), butternut (*Juglans cinerea*), and sycamore (*Platanus occidentalis*), with a dry oak (*Quercus* spp) / pine (*Pinus* spp.) woodland in the Castlefrank area and ground cover of sweet fern (*Comptonia peregrina*).

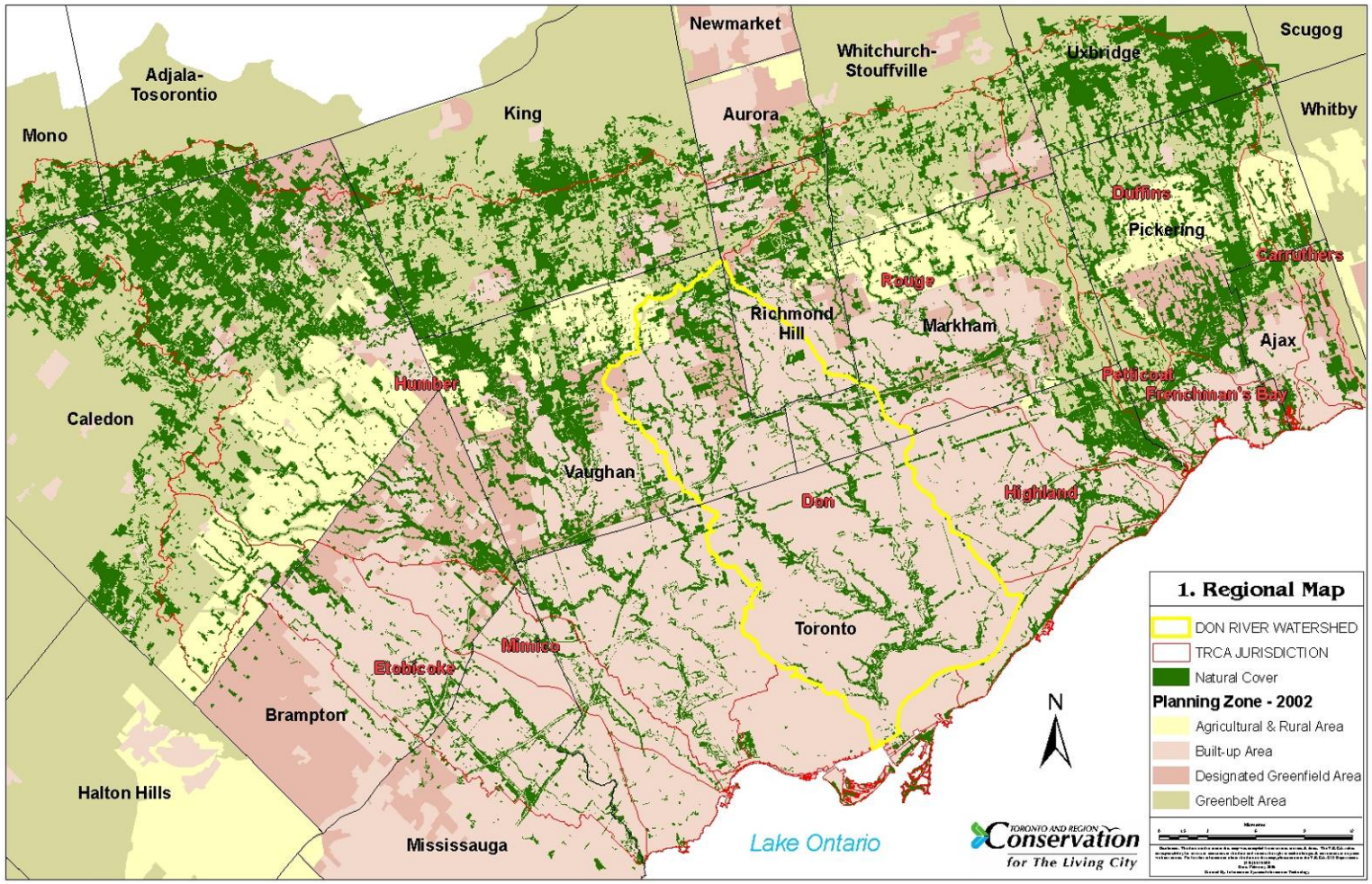
Rapid agricultural expansion in the 19th century led to the clearing of almost all of the forest cover. At the same time, urbanization began near the mouth of the Don in the old city of York and has been spreading north ever since. The lower Don River was channelized and Ashbridge's Bay was filled in by the early 20th century. By 1950, there was very little forest cover remaining, mostly due to agricultural expansion. From 1950 onwards, urban expansion has occurred steadily and rapidly.

The Don River is 80% urbanized and one of the most disturbed watersheds in the TRCA's jurisdiction. The natural cover that remains is mostly in the larger valleys and in the headwaters. The large scale loss of habitat has led to a decline in biodiversity in the watershed. Figure 1 illustrates the location of the Don watershed in the TRCA's jurisdiction and shows the extent of natural cover and urbanization across the TRCA's nine watersheds. Mapping from 2002 shows that only about 16% natural cover remains regionally.

2.1 Terrestrial Natural Heritage System Strategy

TRCA has developed a Regional Terrestrial Natural Heritage System Strategy (TRCA, 2007) for retaining and recovering terrestrial natural heritage within its jurisdiction to protect and improve biodiversity. The strategy incorporates target-setting for improvement and modeling of natural cover at the regional level. The targets include improving the quality distribution, and quantity of natural cover. The quantity target is essentially the amount of natural cover necessary to achieve the quality distribution targets for vegetation and biodiversity. The aim of the target is to achieve a conservation strategy designed both to protect elements of the natural system (i.e., vegetation communities, flora and fauna species) before they become rare and to promote improved ecological function of the natural system as a whole (TRCA, 2007).

Figure 1: Natural cover and urbanization across TRCA's jurisdiction.



The Strategy addresses the decline in biodiversity in two ways:

1. By applying a systems approach that emphasizes the importance of the terrestrial natural heritage system as a single functional unit, rather than as separate natural areas; and
2. By determining targets for the quality, distribution, and quantity indicators of terrestrial natural heritage needed in the landscape, in order to support native biodiversity and a sustainable city/region. These targets will provide direction in planning at all scales.

Further refinement of the regional modeled target system is carried out at more detailed scales, such as through watershed planning studies. The refinement of the target system for the Don is described in Section 5.1.

3.0 Data Sources and Methods

The methods used to inventory and evaluate the state of terrestrial biodiversity include a combination of field inventory and desktop analysis using GIS software and tools. The biological and land use information needed for monitoring and decision-making related to terrestrial natural heritage is collected and organized in different levels of detail. Field data collection of natural cover is an essential tool for confirming the remotely-sensed information and to identify particular species or community sensitivities.

3.1 Vegetation Communities and Species of Concern

Vegetation communities and flora and fauna species are assigned relative scores according to their ecological needs and sensitivities. The total scores allow separation into L1 (intolerant) to L5 (tolerant) ranks. The respective scoring criteria are discussed in sections 3.5 to 4.6. This ranking system replaces the idea of rare communities or species with communities or species of regional concern, ranked L1-L3. Species of concern in the urban areas are mapped as L4.

The vegetation community and species levels of data are collected in the field during the appropriate season by TRCA biologists. Vegetation communities are mapped according to the Ecological Land Classification (ELC) System of the Ontario Ministry of Natural Resources (MNR) (Lee *et al.*, 1998). Roughly 1,557 ha of natural cover have been surveyed in the Don watershed. The natural cover in the Lower West, Lower East and Lower Don river subwatersheds was surveyed almost completely, whereas the headwaters, especially the Upper East Don subwatershed, have not been as extensively surveyed.

TRCA's species of concern are mapped as point data using the data collection protocol developed by TRCA (TRCA, 2005). A complete species list is also collected for each site. All data is digitized and incorporated into TRCA's Geographical Information System. The TRCA data set incorporates both past and present field level inventory data including that collected by biologists from other agencies such as MNR; however, only data from 1996-2005 are included in the current conditions calculations. Table 1 summarizes the years data were collected.

3.2 Landscape mapping

The landscape level of data was collected via remote-sensing through interpretation of 2002 digital ærial photography. Natural cover and land use types are identified and digitized from digital color ærial photography using ArcView and the information is stored in the TRCA's Geographic Information System. The terrestrial habitat types identified through remote sensing include forest, wetland, successional, cultural meadow and coastal habitats (e.g., beaches and bluffs) and are defined in Appendix A. All descriptions and calculations were conducted using subwatershed boundary mapping. Where a habitat patch straddles the watershed boundary, the entire patch is included in calculations of quality.

Table 1: Terrestrial natural heritage data sources and years collected.

Year Data Collected	Data Type	Source
1995	Maple Uplands and Kettle Wetlands ANSI flora species and vegetation communities data	MNR
1996-97	various locations, flora and fauna data	MNR,TRCA
1998	Sherwood Park, flora and vegetation communities data (Draper, 1998)	Bill Draper - William Draper Consulting
1999	Remote sensed habitat types and fauna data	TRCA
2000	various locations, flora, fauna and vegetation communities data	TRCA
2001	various locations, flora, fauna and vegetation communities data	TRCA
2002	various locations, flora, fauna and vegetation communities data. remote sensed habitat types updated using 2002 orthophotos	TRCA, obtained some species records from Gartner Lee
2003	various locations, flora, fauna and vegetation communities data	TRCA
2004	various locations, flora, fauna and vegetation communities data	TRCA
2005	various locations, incidental flora and fauna data	Consultant reports in support of planning initiatives

3.3 Quality Distribution and Quantity of Natural Cover

Each habitat patch delineated through landscape mapping (Section 3.2) is scored and analyzed according to three criteria: size (i.e., the number of hectares occupied by the patch), shape (i.e., edge-to-area ratio), and matrix influence (i.e., measure of the positive and negative impacts from surrounding land use). A total score for each patch is obtained through a weighted average of the scores for the three criteria. This total score is used as an indicator of the "quality" of a habitat patch and is translated into a local rank (L-rank) ranging from L1-L5 based on the range of possible total scores from 0 to 15 points. Of these L-ranks, L1 represents the highest quality habitat and L5 the poorest. Based on the landscape analysis modelling (LAM) described above a few Species of Concern can live in "poor" quality patches, however most Species of Concern (L1-L3, and L4 in urban areas) require at least "fair" quality habitat (TRCA, 2007). Please refer to the *Regional Terrestrial Natural Heritage System Strategy* (TRCA, 2007) for details on regional targets for quality distribution and quantity of natural cover.

4.0 Current Conditions in the Don River Watershed

This section presents an assessment of the current status of the existing terrestrial habitat conditions in the Don River watershed, based on the results and analysis of remote-sensing of the entire watershed's natural system and field inventories conducted across the watershed between 1995 and 2005 (Table 1). Although the urban canopy outside of the terrestrial natural system was not surveyed as part of the TRCA inventories, management considerations are addressed in Section 5.2.3. Historical records from the Ministry of Natural Resources from 1995 for the Maple Uplands ANSI were consulted for comparison to more current findings. Figure 2 shows the natural cover types mapped during the 2002 remote sensing exercise. Most of that natural cover is forest and is found in the lower valleys and in the headwaters.

4.1 Physiographic Regions

Within the Don River watershed, terrestrial habitats are associated with four broad physiographic regions: the Oak Ridges Moraine (ORM), the South Slope, the Peel Plain and the Iroquois Plain (Figure 3). The physiographic regions define the character of the vegetation communities that can persist within an area. Section 4.4 provides more information on the vegetation communities within each physiographic feature. The Don River watershed is found within two floristic regions or Life Zones, the Great Lakes – St. Lawrence Mixed Forest Zone and the Carolinian Forest Zone. Forest was the dominant natural pre-settlement condition, interspersed by wetlands and native meadows in both of these zones. The Carolinian forest zone predominates in the southern part of the Don watershed, especially along and south of the Lake Iroquois shoreline, while the northern portion is mainly Great Lakes - St. Lawrence forest. The two types intermingle. Cool north and east-facing slopes in the south have a coniferous component, while warmer sandy exposures on the Oak Ridges Moraine have a strong oak component, more characteristic of the Carolinian zone. Carolinian species such as black oak and shagbark hickory are still present in the southern part of the watershed.

Figure 2: Natural habitat types in the Don River watershed (based on 2002 aerial photo interpretation).

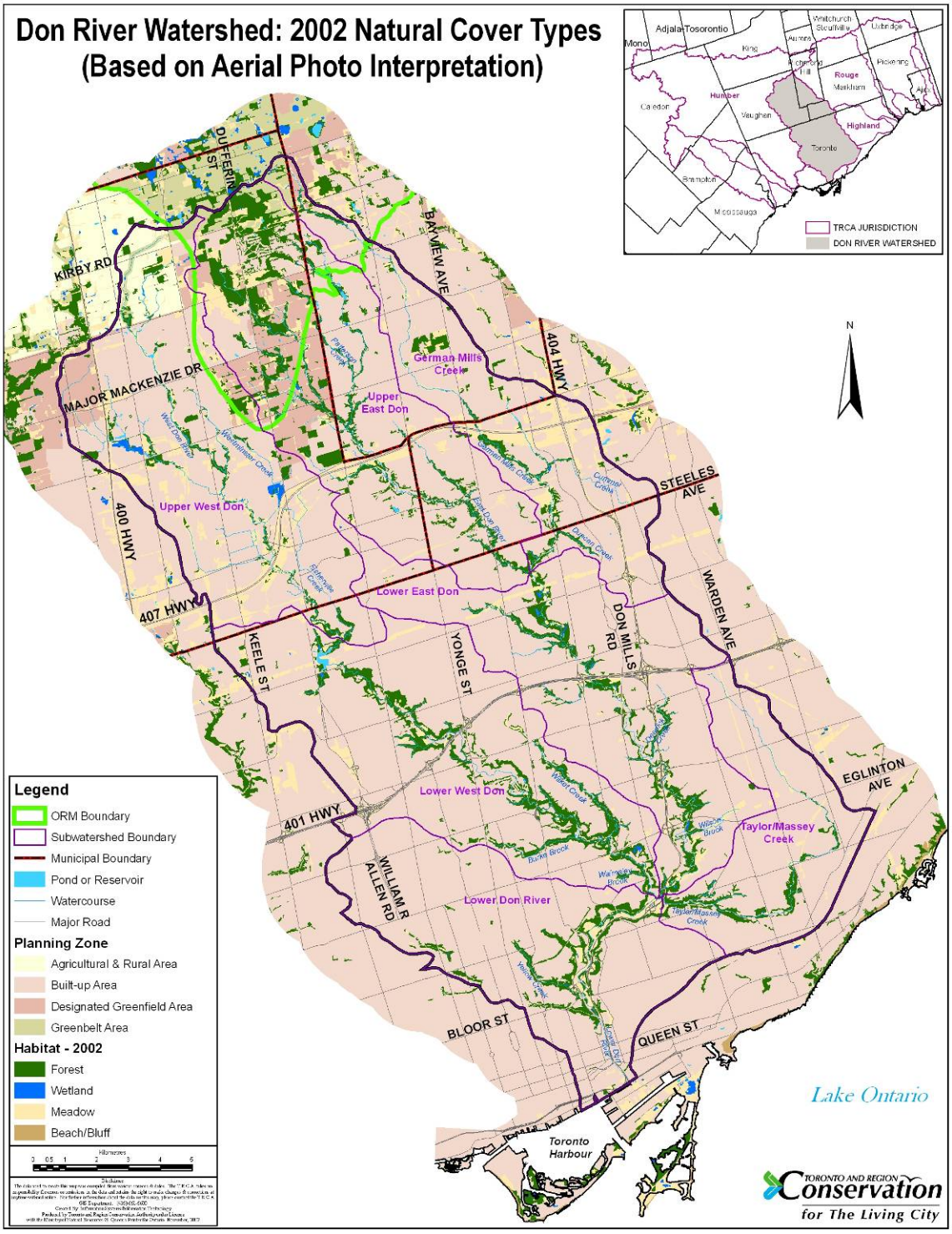
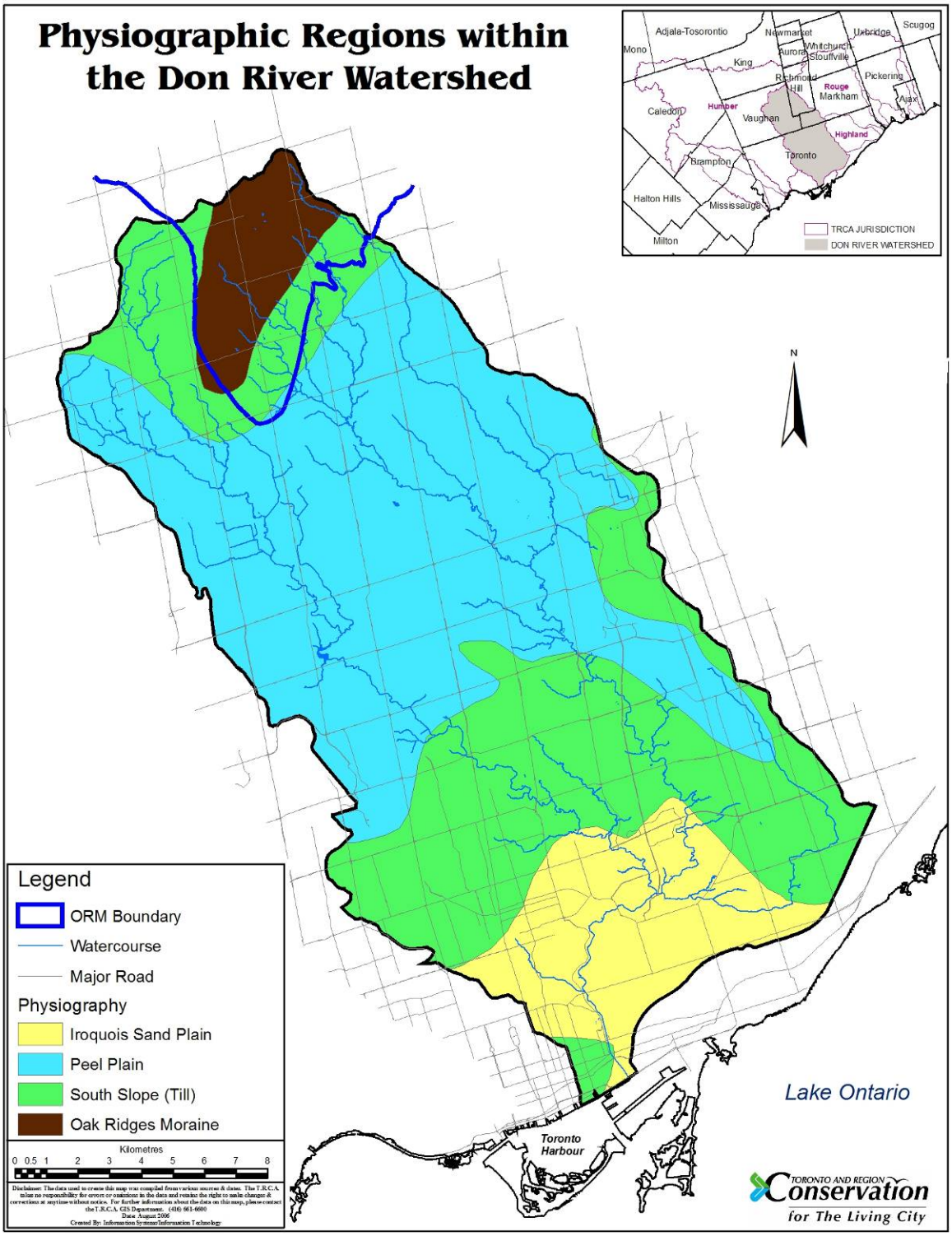


Figure 3: Physiographic regions in the Don River watershed.



4.1.1 The Oak Ridges Moraine

The headwaters, especially within the Oak Ridges Moraine (ORM), contain a high diversity of species relative to the rest of the watershed, including a number of species of concern, partly due to the combination of northern and southern conditions and the presence of relatively intact patches of mature, remnant forest in the Maple Uplands and Kettle Wetlands Area of Natural and Scientific Interest (ANSI) (Figure 4). Certain features in the Don watershed are found only on the ORM, such as kettle wetlands, while other features have the best representation there; for example, cedar swamps associated with groundwater seepage. Two Don subwatersheds, the Upper East Don and German Mills Creek, have significant portions of land on the moraine. Figure 4 outlines the Oak Ridges Moraine Conservation Plan and Greenbelt Plan planning zones. The Greenbelt boundary follows the ORM boundary almost entirely except for a narrow arm that extends south west along the West Branch of the Don towards Jane Street and Teston Road.

4.2 Selected Policy Areas

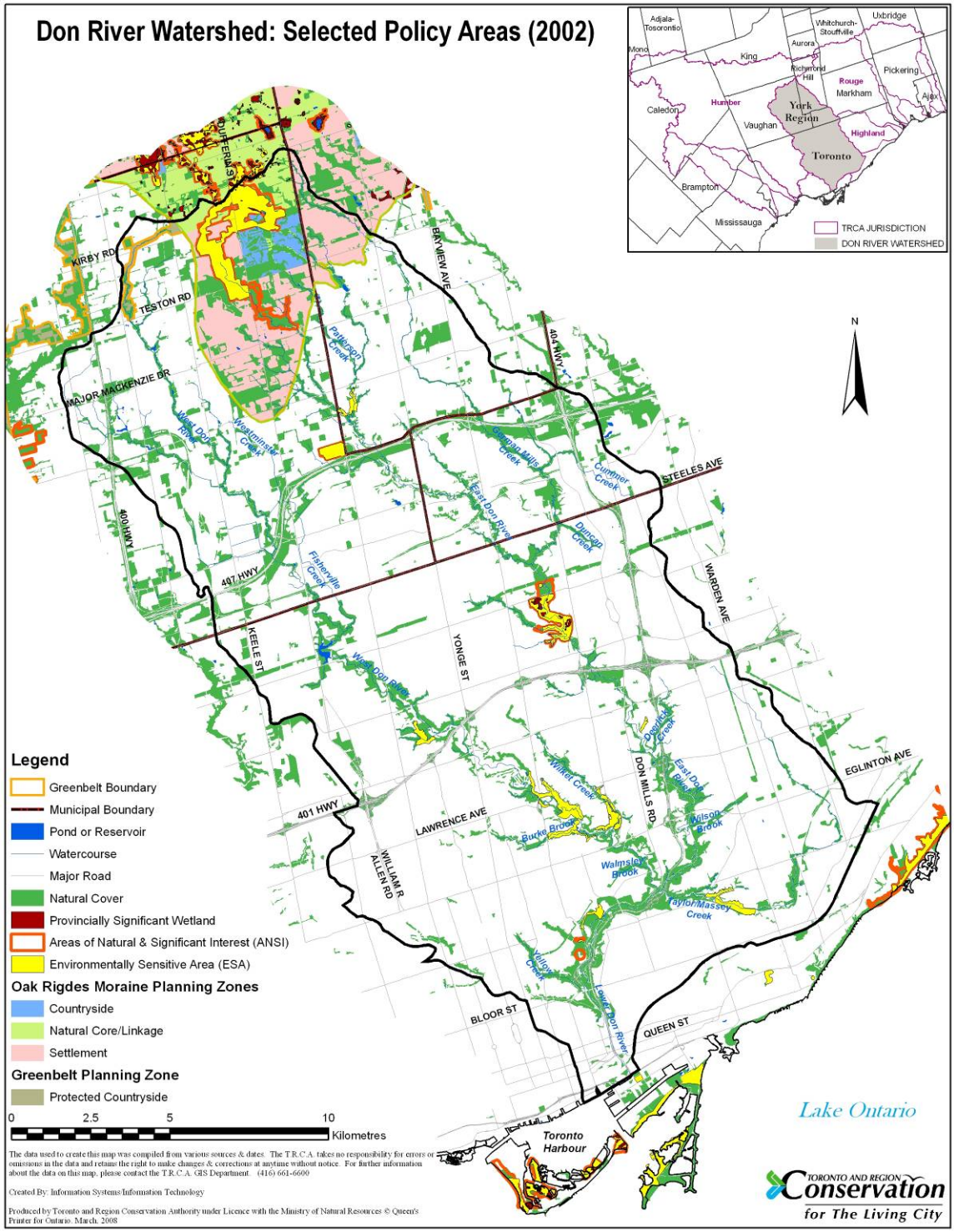
Through the 1980s and 1990s, the TRCA led the identification of Environmentally Significant Areas (ESAs) based on criteria specific to the Toronto region and these, by and large, have been identified for some measure of protection in municipal official plans. For example, the City of Toronto identifies ESAs on Map 12 of its Official Plan. The province also created an approach for protecting natural heritage systems in Ontario based on Areas of Natural and Scientific Interest (ANSI), significant wetlands and cores-and-corridors. The Oak Ridges Moraine Conservation Act is a more recent effort to protect natural heritage features within a physiographic region.

The fundamental flaw of these traditional approaches is that they generally focus on protecting the existing features rather than envisioning the system that would be required in the long-term for sustainable species populations and ecosystem services. The features are often protected out of context, in isolation of other natural cover and surrounded by an increased urban cover.

Notable features of the Moraine include the southern-most wetlands of the provincially significant King-Vaughan Wetland Complex, the Maple Uplands and Kettles ANSI and Maple Spur ANSI (the McGill Area Environmentally Significant Area - ESA covers most of the same area), and a cluster of locally significant wetlands in the headwaters. Baker's Woods ANSI and ESA and Richvale Forest ESA are found south of the ORM in the Upper East Don River subwatershed.

There are other provincially and locally significant habitats found elsewhere in the Don, such as the East Branch of Don River ANSI (the same area is also called East Don Valley Swamp ESA) and Bell's Woodlot ESA in the Lower East Don River subwatershed; and Earl Bales ESA and Glendon Forest ESA in the Lower West Don River. Refer to Figure 4 for the location of all Provincially Significant Wetlands (PSWs), ANSIs, and ESAs.

Figure 4: Policy areas in the Don River watershed.



4.3 Natural Cover Landscape Analysis

4.3.1 Quality Distribution of Natural Cover

Natural cover performs innumerable functions that include supporting native bio-diversity, providing recreational and æsthetic opportunities for people, and many water-related benefits (e.g., improved water quality). However, the benefits of natural cover are dependent on how high quality habitat patches are distributed. If high quality patches are distributed evenly across the region, then ecological functions are provided evenly.

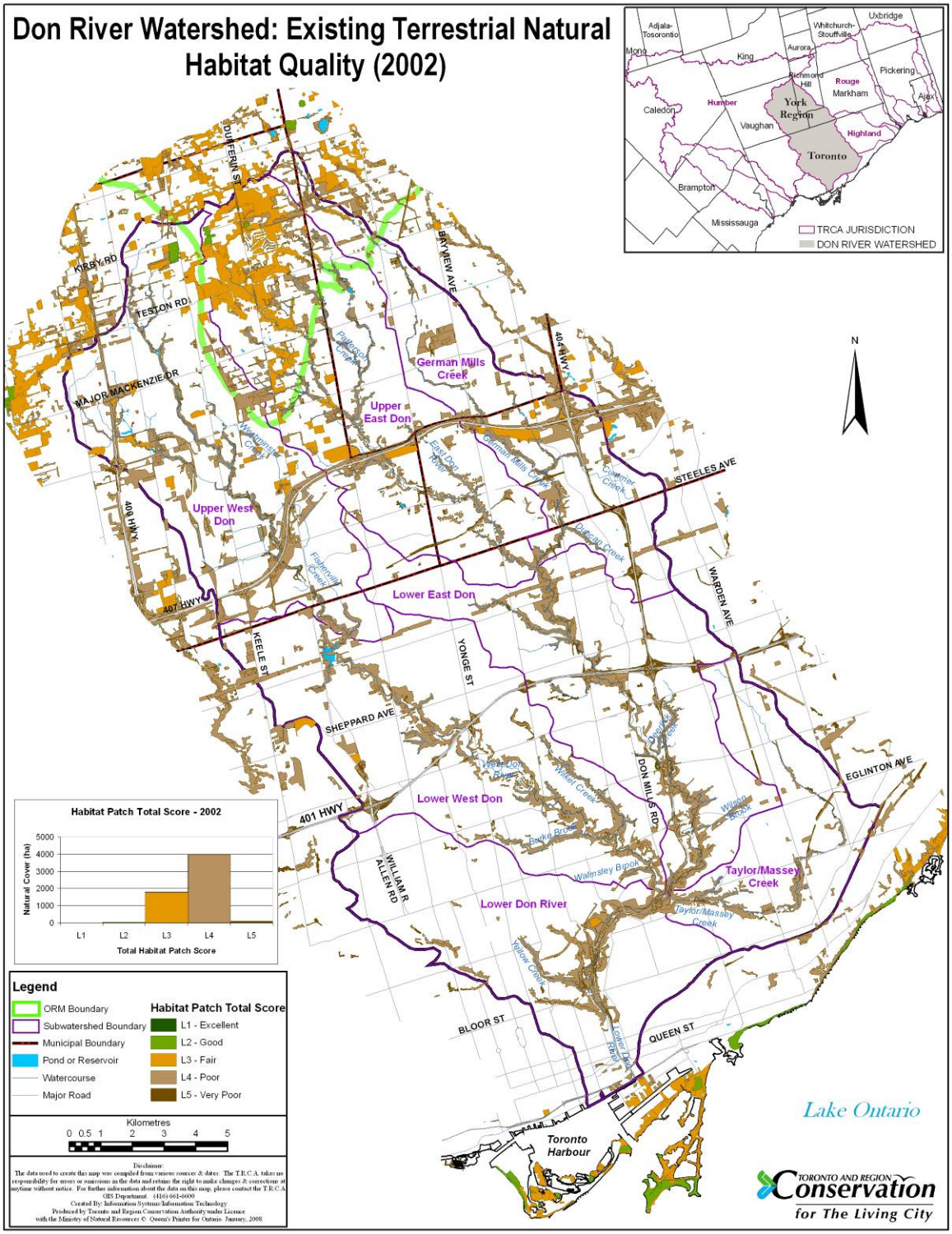
The results for quality in the Don River watershed are reported below under the headings of habitat patch size, shape, matrix influence, and total score. The highest score possible is 15 or "excellent" quality. Forest interior and connectivity are important secondary indicators of habitat patch quality, closely linked to size, shape, and matrix influence. They are discussed briefly in this section. Disturbances in natural areas, from trampling/trails, trash/dumping, and non-native species, also affect the quality of natural cover and are addressed in this section. Figure 5 shows the habitat patch total scores for quality based on the 2002 LAM. A summary of quality scores across the subwatersheds of the Don River watershed is presented in Table 2.

Table 2: Existing conditions (2002) for terrestrial natural heritage by subwatershed based on 2002 remote sensing and LAM.

Subwatershed	Quantity							Quality	
	Total		L1	L2	L3	L4	L5	Mean Total Score	Mean L-rank*
	ha	%	ha	ha	ha	ha	ha		
Upper West Don River	1,146	19	0	18	149	923	56	8	L4 - poor
Upper East Don River	1,557	25	0	14	751	765	27	8	L4 - poor
German Mills Creek	711	18	0	0	79	579	52	7	L4 - poor
Lower West Don River	891	14	0	0	8	843	39	7	L4 - poor
Lower East Don River	678	12	0	0	2	608	68	7	L4 - poor
Taylor/Massey Creek	245	9	0	0	1	222	23	7	L4 - poor
Lower Don River	428	9	0	0	9	401	19	7	L4 - poor
Don Watershed	**5,656**	**16**	**0**	**33**	**998**	**4,341**	**284**	**7**	**L4 - poor**

* L-ranks correspond to the following quality scores: L1, 13+; L2, 11-13; L3, 9-11; and L4, 6-9. The L-ranks are intended to characterize quality conditions across TRCA's jurisdiction and represent a broader range of condition than is found within the Don River watershed.

Figure 5: Existing natural habitat quality in the Don River watershed (2002 conditions).



Habitat Patch Size

For biodiversity and maintenance of ecosystem integrity, large habitat patches are preferable because:

- They can support bigger populations of species, thus promoting their viability,
- They have the capacity to support area-sensitive and forest interior species,
- They likely feature a greater diversity of habitat types which increases biodiversity,
- They are buffered from external influences, and
- They have a greater capacity to maintain and promote a variety of natural ecological processes.

In the Don River watershed, habitat patches receive a mean score of 1.6 that translates to a "poor" score for patch size. The high level of urbanization in the watershed has resulted in significant fragmentation of natural cover. Few large patches remain, and those that do are mostly found in the northern half of the watershed, notably on the Oak Ridges Moraine.

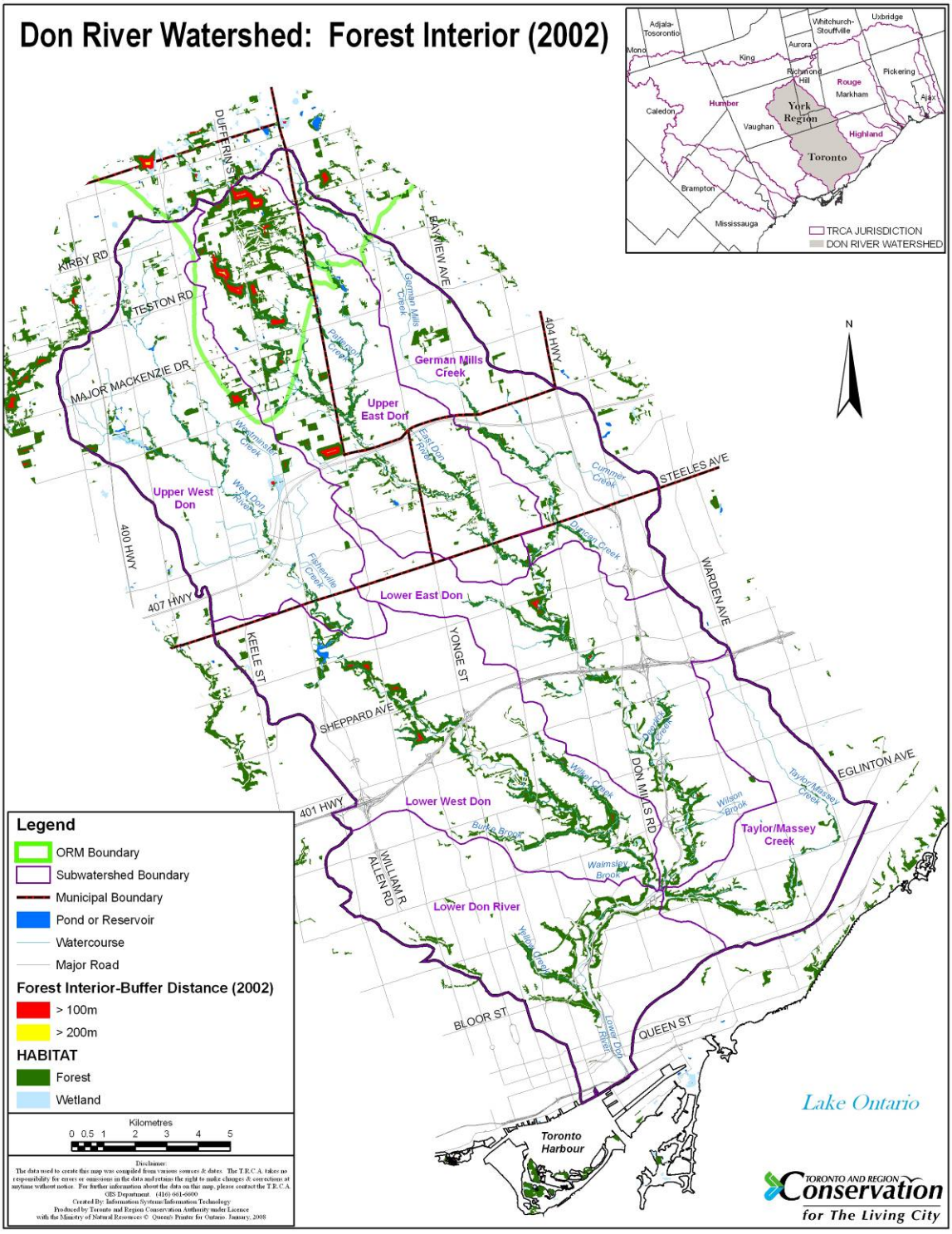
Habitat Patch Shape

Habitat patch shape is a measure of the exposure of a patch to external influences, including the negative edge effects resulting from habitat fragmentation. In general, rounder patches are better and score higher since they have a higher edge-to-area ratio (i.e., less "edge effect"). The more convoluted the habitat patch shape, the longer its edge, and the higher its exposure to external negative influences. The mean patch shape score for the Don watershed is 3.6, corresponding to an overall shape score of "poor". Many small patches receive high scores for shape, although they typically score low for size and matrix influence, bringing the overall quality below levels necessary for species of concern. In contrast, many of the largest habitat patches score poorly for shape.

Forest Interior

The term "interior" is applied to those parts of the forest patch that are greater than 100 metres in from any edge. Forest interior provides shaded, moist, cool conditions, and some refuge from external effects; the conditions needed by many native plants and animals. The larger a forest patch becomes, the more removed it will be from the negative matrix influences accompanying urbanization. The largest area of forest interior in the Don watershed is in the headwaters on the Oak Ridges Moraine on the east side of Dufferin Street, and is 92 hectares in size (Figure 6). This forest is part of the Maple Uplands ANSI and is one of only 4 patches that accommodate forest interior beyond 200 metres from the forest edge. The other patches are further south, but still north of the 407 Highway. Forest interior calculations, unlike woodland quantity measures, do not include successional habitat but only closed-canopy tree cover.

Figure 6: Forest interior in the Don River watershed.



Habitat Patch Matrix Influence

Surrounding each habitat patch in the TRCA jurisdiction (or any other region where there has been settlement), is a matrix of land uses of natural, agricultural, or urban character. Each of these land uses has an influence on the ecological function of the neighbouring habitat patch. Adjoining natural cover benefits the system, agricultural or cultivated areas exert a moderately negative influence, and urban areas exert a strongly negative influence. The matrix for most patches within the Don is urban land use.

The mean score for matrix influence in the Don is 2.2, or "poor". This suggests natural cover is experiencing negative impacts such as hydrological changes; incursions by opportunistic fauna, such as increased raccoon populations and domestic cats; invasive non-native plant species; trampling; dumping; and collection (see the discussion below regarding Disturbances in Natural Areas). Regardless of whether a particular habitat patch is "protected" in a park or reserve, the species composition and level of biodiversity found in that area is directly related to the land use type found in the surrounding matrix.

Connectivity

Most native species in the Toronto region are adapted to a highly connected landscape with complete natural cover. Fragmented landscapes with isolated habitat patches separated by artificial barriers have only occurred in the last two centuries. This condition is especially apparent in the Don watershed and has resulted in substantial declines in species presence. Habitat fragmentation presents a problem, of varying degree, for any species of flora or fauna that need to migrate or disperse for breeding, feeding, or colonization. Connectivity prevents genetic isolation and inbreeding in plant and animal populations by allowing genetic exchange to occur over a larger area. It also allows fauna to move between areas of crucial habitat. Many species of fauna and flora are habitat specialists and require corridors consisting of their preferred habitat type. Connections are generally poor between the Don and adjacent watersheds (Highland Creek and Humber River), among the subwatersheds within the Don, and between the Don and the waterfront natural areas such as Toronto Island and the Leslie Spit.

Habitat Patch Total Score

Figure 5 shows that habitat patch total scores (derived from size, shape, and matrix influence scores) throughout most of the Don River watershed received a score of 6-8 points (beige) and 9-10 points (orange). The mean total score was 7.4 corresponding to a rank of L4 and indicating "poor" patch quality (Table 2). This is due to the matrix influence, the small size of the remnant patches, and their linear shape. The habitat quality in the Don is lower than that of the average condition in the TRCA jurisdiction which is "fair" (L3). However, L4 habitat patches represent valuable habitat in a watershed as highly urbanized as the Don. Maintenance and enhancement of L4 patches will contribute both to the quality of the Don's terrestrial system as well as the quality of the regional system.

In the Don watershed, the distribution of natural cover is weighted to the north in the Upper East and Upper West Don subwatersheds. The higher quality habitat patches in the watershed also are distributed more in the central north, in the Upper East Don subwatershed, where there are relatively large patches of forest on the ORM (Table 2, Figure 5 and Figure 6). The Upper East Don subwatershed has the highest average total quality score at 8.0. Although this average is considered "poor" there are many "fair" (orange) habitat patches as seen on Figure 5.

Disturbances in Natural Areas

During field data collection and mapping of ELC vegetation communities, the extent of disturbance to communities is assessed. Disturbance for each community is ranked from 1 (light) to 3 (severe) for each of a number of stresses, including trampling/trails, trash/dumping, and non-native species. Table 3 and Figure 7 show the extent of visited sites which have been ranked as severely disturbed (2000-2005 data). Exotics were the most widespread and evenly distributed problem, with 26% of the 1,785 ha surveyed ranked as severely disturbed. Trash and trampling disturbances are more prevalent south of Steeles Avenue. Disturbance of these sorts, and others (e.g., deer over-browsing) affect the health of natural areas and the quality of nature-based recreational experiences, on those sites where recreation is permitted.

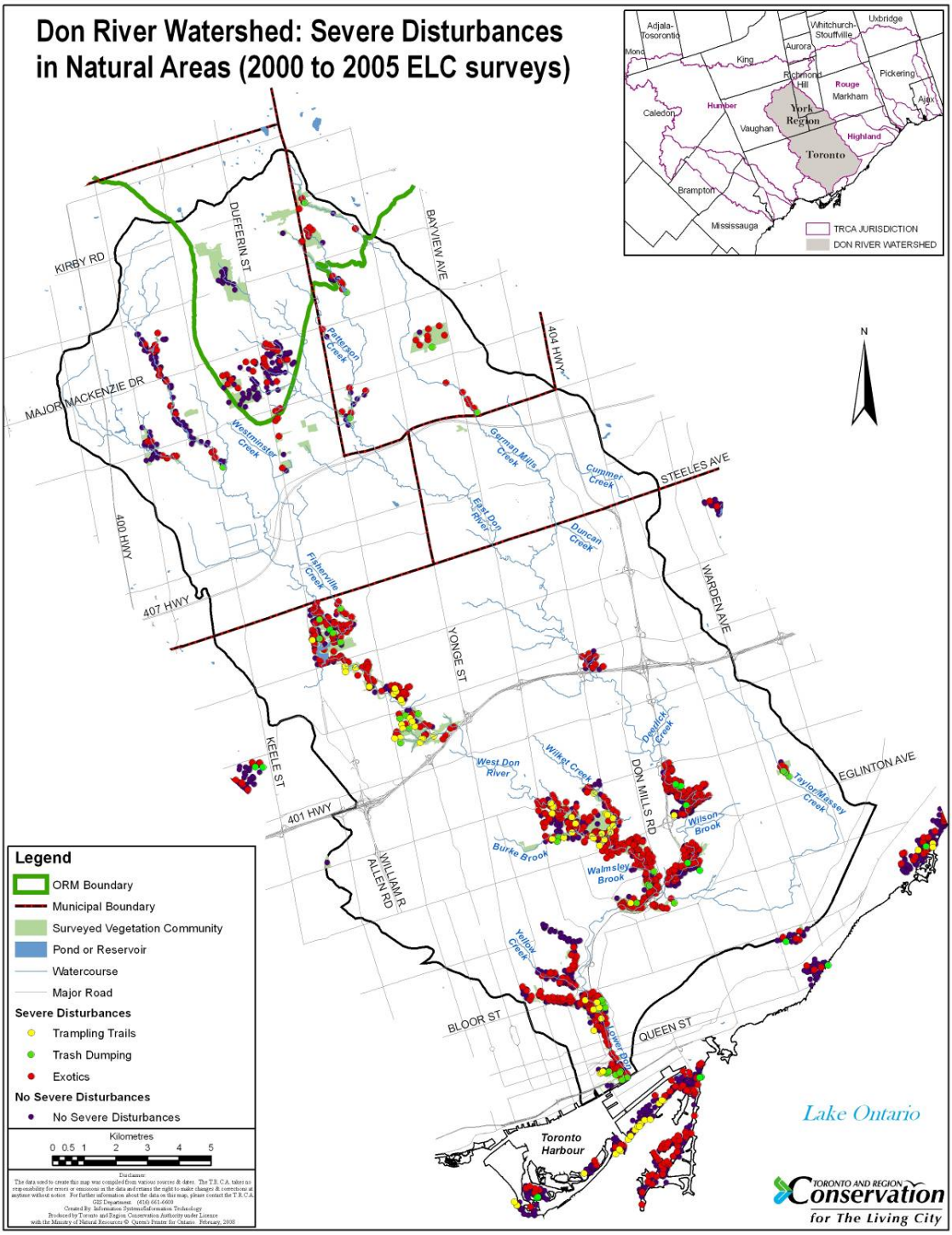
Table 3: Severe disturbances in natural areas based on data collected for ELC polygons (2000-2005 data).

Disturbance Type[2]	Ratio of Severely Disturbed Area to Total Area Evaluated (ha : ha)	% of Evaluated Area that is Severely Disturbed[1]
Trampling/trails	68:1,785	3.8
Trash/dumping	62:1,785	3.5
Exotics	462:1,785	25.9

[1] 1,785 ha, representing less than a third of the natural areas have been evaluated (surveyed) in the Don River watershed (2000-2005).

[2] Disturbance types are not mutually exclusive. A site may rank as "severely disturbed" for any or all of these types.

Figure 7: Surveyed vegetation communities severely disturbed by trampling, trash, or non-native species (2000-2005 data).



4.3.2 Quantity of Terrestrial Natural Cover

The land area in the TRCA jurisdiction is 25% natural cover, including forest (coniferous, deciduous and swamp), wetlands (marsh, meadow marsh, bog and fen), meadow (including sand barren, savannah and tallgrass prairie), and coastal habitat (including beach, dune, and bluff). Approximately 16% of the jurisdiction is covered by forest/woodland (including successional habitat) and wetland; the remainder is mostly meadow or old field (Figure 1).

The Don River watershed is 35,806 hectares (based on the regional-scale watershed boundary) containing 5,656 hectares natural cover (16% of the land-base), including 3,130 hectares of forest and 77 hectares of wetland (Table 2, Table 4, and Figure 2). The watershed is 80% urban land use and there is very little rural land left (<5%). The Upper East Don River subwatershed has the highest amount of natural cover (1,557 hectares or 25%) (Table 2). Taylor/Massey Creek and the Lower Don River subwatersheds have the least amount of natural cover; cover only 9% of the subwatersheds in each case. Groups such as Taylor/Massey Project and Friends of the Don East (FODE) have been actively tree planting Taylor/Massey Creek subwatershed which will help to bolster natural cover there in the future.

Table 4: Woodlands, wetlands and meadows by subwatershed in the Don River watershed.

Subwatershed	Amount of Natural Cover (ha)			
	Woodland	Wetland	Meadow	Total
Upper West Don River	316	40	790	1,146
Upper East Don River	1,024	11	522	1,557
German Mills Creek	241	4	467	711
Lower West Don River	661	9	222	891
Lower East Don River	420	11	247	678
Taylor/Massey Creek	164	0.7	80	245
Lower Don River	304	2	122	428
Don Watershed	**3,130**	**77**	**2,450**	**5,656**

In spite of the constraints imposed by urban land use, over the last six years, an estimated 110,000 native trees, shrubs, wildflowers and aquatic plants have been planted by local volunteers, our municipal partners, the TRCA and other organizations throughout the Don River watershed (TRCA, 2007). Furthermore, major redevelopment initiatives, such as naturalization of the Don Mouth, will present additional opportunities for expanding natural cover in the Don.

Woodlands (Forest and Successional)

Forest cover in the heavily urbanized areas of the watershed is typically only found along the valley and stream corridors, with very little tableland forest or wetland remaining. The majority of the remaining tableland forest is found in the headwaters. Forests cover about 9% of the watershed, representing 56% of the total natural cover (forest, meadow and wetlands combined).

Since the 2003 Watershed Report Card (TRCA, 2003) there have been some losses to natural cover, such as the woodlot at Rutherford Road and Jane Street in Vaughan. The actual cumulative loss in the watershed is not known. The Upper East Don River subwatershed has the greatest area of forest cover (1,024 hectares or 16% of the subwatershed). Taylor/Massey Creek and the Upper West Don subwatersheds have the lowest percentage of forest cover at just 5%.

The Don has a much lower percent forest cover (9%) compared to some of its neighbouring watersheds. The Rouge watershed has 13% and the Humber has 20% forest cover. However, efforts to improve the forest cover in the Don have been initiated. The City of Vaughan has acquired the 34.5-hectare Maple Nature reserve and has plans to restore and fill in gaps in the forest cover to help protect the existing mature forest from the newly urbanizing matrix. Moreover, the growing number and strength of planning policies protecting forests (municipal and provincial) has meant that some recent greenfield development in the Don Watershed incorporates the protection, enhancement, and where possible, restoration of forest cover. For example, newly approved Blocks 11, 12 and 18 in Vaughan, all include preserved woodlands that will have edge management plans, woodlot/wetland restoration plans, and be dedicated into public ownership, as conditions of their approval.

Wetlands

Wetlands account for only 0.2% of the entire Don watershed land base. Just over 1% of natural cover in the TRCA jurisdiction has been categorized as wetland[2]. Wetland communities are mostly found in the Upper West Don. As a percentage of natural cover, Taylor/Massey Creek subwatershed has the lowest wetland representation (0.3%). There have been small gains in wetland cover including the creation of Chester Springs Marsh and Ketter Marsh. The Beechwood wetland creation project is another example of active wetland restoration in the most urbanized portion of the Don. These and other new wetlands in the Lower Don subwatershed will help maintain and perhaps improve upon biodiversity and provide many local level ecosystem benefits. The Don Mouth Naturalization and Port Lands Flood Protection Project which is ongoing, proposes to re-establish wetlands with existing and historical natural heritage in mind.

Meadows

Many of the areas categorized as meadow are hydro corridors, vacant properties within industrial zones, and fallow farm fields that are now being urbanized. As of 2002, meadows comprised 43% of the natural cover in the watershed and 7% of the total land base. Many meadows are on vacant land approved for commercial or industrial uses, thus few of them will actually be retained in the future with perhaps the exception of open spaces along hydro

[2] Some treed swamps may have been categorized as forest, rather than wetlands, during remote sensing, thus the percent of wetland cover may be slightly higher than is reported here.

corridors. Meadows have the potential to serve a very important role in the achievement of the targeted natural system because they can be restored forests (except for meadow areas in hydro utility corridors) or wetlands.

4.4 Vegetation Community Findings

Remote-sensed landscape data is backed up with ground-truthed field data to get an accurate, detailed picture of the condition of the natural system; 192 vegetation communities based on ELC vegetation type (Lee *et al.*, 1998) were identified by TRCA staff in the Don and are listed in Appendix B. Eighty percent of the surveyed natural cover is composed of communities that have a native canopy; however, this figure must be put into context. The dominant regeneration and ground flora in many "native" communities are invasive non-native species, especially in the urban areas. The threat of long-term change toward non-native-dominated communities is discussed in Section 4.4.2. Alien-dominated communities are generally secondary or tertiary growth following major disturbance (abandoned agricultural land, fill embankments, floodplains) and in the Don they are fairly evenly-divided between floodplain forest, successional, and meadow types.

Forest is the dominant vegetation type and covers 915 hectares of the surveyed area (1,557 ha) of the watershed. Forest is defined in the ELC as having a greater than 60% cover of trees over 5 m tall (Lee *et al.*, 1998). Plantations are included in this total. Treed swamps are classified as wetlands in the ELC but often as forest in remote-sensing analysis. Sugar maple forests (FOD5 and FOD6) are the prevailing single forest community in the Don, often associated with beech, oak, and ash species. They cover over 400 hectares of the surveyed area. There are also significant amounts of mixed forest, with hemlock, white pine, sugar maple, and oak. These findings are similar to those of 1950, indicating a certain degree of stability in composition of mature forests over the past five decades (Richardson *et al.*, 1950). Plantation forests are less prominent in the Don than in the wide stretches of Oak Ridges Moraine in the Humber and Duffins headwaters, but plantations that are designed specifically for restoring native communities (CUP1-A, 2-A, and 3-A) are starting to appear. These are composed of a blend of native species. Many of them are very small and young, and so far they total just 27 hectares of the surveyed area. Community plantings of this type really began in the 1990's. A highly visible example is on the east slope of Riverdale Park.

There is a relatively large amount of very mature forest or even occasionally forest with old-growth qualities in the Don. One small forest patch of white pine at Sunnybrook Park (FOC1-1) and sections of Crother's Woods near the Millwood Bridge in Leaside have been identified as old growth forest. Other high quality mature deciduous and mixed forests occur in the Sunnybrook Park area. Deciduous forests in the Rosedale area (e.g., in the vicinity of Craigleigh Gardens) and in the Charles Sauriol Reserve are also likely pre-settlement. Agriculture and urbanization bypassed many steep ravine slopes but these slopes are under stress from the influence of the surrounding urban land uses.

Successional communities cover 265 hectares of the area surveyed. As these areas have largely been heavily disturbed, including by soil excavation and dumping of fill, non-native

species (exotics) are prominent. Semi-treed cultural woodland (CUW1-b) and savannah (CUS1-b) with a largely non-native canopy account for 75 hectares, while shrub thickets of buckthorn and other non-native species cover 28 hectares. More natural successional communities include substantial areas of sumac thicket (CUT1-1) and savannah or woodland dominated by native trees (CUS1-A1, CUS1-A2). Communities dominated by hawthorns (CUS1-1 and CUW1-D) are a clear indicator of past cattle pasture.

Wetland communities are sparse in the Don watershed. Urbanization and agriculture eliminated most of the wetlands many decades ago. The base of the Don originally included a huge wetland complex extending from the lower valley south of what is now the Bloor (Prince Edward) Viaduct out to Ashbridges Bay. This wetland was drained and mostly filled between 1912 and 1928 (MTRCA,1994). Before settlement, some of the forested tableland on the Peel clay plain was almost certainly swamp forest; virtually none remains. Woodlots on the York University campus contain silver maple mineral deciduous swamp (SWD3-2) and bur oak mineral deciduous swamp (SWD1-2). Topographically, these fall within the Don watershed and are included here, although catch basins divert at least some of the flow towards Black Creek. Only 97 hectares of currently-existing wetland have been identified during field surveys; they are a mix of swamps and marshes. Most of them are associated with small areas of seepage on the Oak Ridges Moraine (headwater swamps) and along valley walls where the valley intercepts an aquifer; a few are riparian oxbows such as at Todmorden Mills (Herzberg and Juhola, 1987) or restoration plantings as at Chester Springs Marsh. The Riverdale Farm ponds in the lower Don began as oxbow meanders, then became features of the zoo, and recently have been planted with native species. Only 1.6 hectares of vegetated aquatic habitat – that is, with macrophyte growth – were surveyed in the Don. Some of these relict wetlands are dominated by invasive species such as narrow-leaved cattail (MAS2-1b), while others (especially the ground water seeps) are refugia for species of concern.

Meadow areas (with less than 25% woody regeneration cover) cover 215 hectares of the area surveyed. They are dominated in varying degrees by native forbs such as tall goldenrod (*Solidago altissima*) and common milkweed (*Asclepias syriaca*), non-native cool-season grasses such as smooth brome (*Bromus inermis*), and invasive non-native forbs such as dog-strangling vine (*Cynanchum rossicum*) and sweet clover (*Melilotus alba*). These meadows provide critical breeding, foraging, and migratory habitat for the monarch butterfly along with other invertebrates, small mammals and some avian species.

Scattered across the watershed are vegetation communities maintained in an open or semi-open state by natural or semi-natural processes, or soil conditions. These include bluffs (BL-) and stream bars (BB-), and clay and sand barrens (CB-) and (SB-). Some of the lower Don subwatershed on the Iroquois sand plain would have originally supported tallgrass prairie and savannah. Tiny, altered relicts of these communities remain.

4.4.1 Vegetation Communities of Concern

Vegetation communities with a rank of L1 to L3 are considered of regional concern in the TRCA jurisdiction. L4 communities are considered of concern in the urban portion of the jurisdiction

meaning that, while common elsewhere, they are more at risk in the urban area. Ranks are based on two criteria: local distribution and geophysical requirements (TRCA 2005a). Communities that score a 4 or 5 under local distribution are considered rare in the TRCA jurisdiction (Appendix B). They are restricted to less than seven of the forty-four 10x10 kilometre squares that encompass the jurisdiction. In the Don, 46 of the 108 communities of concern (L1-L4) are considered regionally-rare in the TRCA jurisdiction. The geophysical requirements of communities is based on their relation to certain site conditions; some types are restricted to particular locations based on slope aspect, hydrology, soil character (e.g. structure and nutrient status), and dynamic processes (e.g. erosion and flooding). For example, red oak deciduous forests (FOD1-1) require good drainage and are therefore found in upland areas, often on sand. On the other hand, wetlands are usually found in water-logged bottomlands or seepage areas.

Fifty-nine of the 192 vegetation communities (119 ha) found in the Don are considered to be of regional concern (ranked L1 to L3) (Appendix B). Twenty-two of the vegetation communities of concern are wetlands including forested swamp. An additional 49 communities (totalling 267 ha) are ranked L4.

The Don is noteworthy because its high-ranked vegetation communities have an even distribution throughout the watershed as opposed to strictly in the northern, rural landscape as is the character of most other watersheds in the jurisdiction (excluding the Rouge River). This results partly from the fact that the watershed is already heavily urbanized, but also from the wide range of physiographic regimes in different parts of the watershed. Some of these communities are characterized below.

The dry sandy moraine soils found in the Maple Uplands near Teston Road sustain a small Dropseed Sand Barren (SBO1-A) and White Pine Coniferous Forest (FOC1-2) (both ranked L1), in addition to two L2 communities: Flat-stemmed Bluegrass - Forb Sand Barren (SBO1-B) and Dry-Fresh Hardwood-Hemlock Mixed Forest (FOM3-1). These L1 and L2 communities are largely within the McGill ESA.

Descending off the Oak Ridges Moraine, the Don River enters the Peel Clay Plain and South Slope, with its heavier soils. In the mid-reaches of the West Don River, G. Ross Lord Park has a distinctive Shrub Clay Barren community (CBS1); perhaps originally of agricultural origin, this community has impervious soil, with seasonal saturation and drought. It was first noted in 1996 (Miller and Smith, 1997). Woody growth is stunted, and a few unusual sedges are found here.

As the Don River and its tributaries interact with the shoreline of glacial Lake Iroquois and its sand plain, communities associated with dry, sandy conditions reappear. Small patches of White Pine Coniferous Forest (FOC1-2) (rank L1) occur both in the Maple Uplands on the moraine and at Sunnybrook Park north of Eglinton Avenue; the latter stand is considered old-growth. Near the Science Centre is a small treed sand barren (SBT1) (L1). Tiny relicts of Red Oak Savannah (CUS1-3) and woodland (CUW1-2) (L3) can be found on the “Hogsback” site near Castlefrank in the lower Don. More closed-canopy oak-dominated forests are also found

in the Rosedale area. The small tallgrass prairie community (TPO1-1) (L1) at Gerrard Prairie along the railway tracks just brushes the border of the Don watershed (Taylor/Massey Creek subwatershed) near Victoria Park Avenue.

Seepage wetlands form the next general class of communities of conservation concern. They occur throughout the watershed where aquifers are intercepted by valleys. Headwater swamps on organic soils (often of white cedar mixed with other conifers or deciduous trees)(SWC3-1, SWC3-2, SWCA-A and SWM4-1) are a characteristic feature of the Humber and Duffins headwaters on the Oak Ridges Moraine, but also do occur in the Don headwaters (Upper East Don and German Mills Creek subwatersheds), along with similar communities on mineral soils. Organic soil (over 40 cm deep) in a wetland indicates a long history without disturbance because such soils can take centuries to develop.

Along the deep ravines throughout the Don watershed, small seepage slopes occur frequently, including a Paper Birch – Poplar Organic Deciduous Swamp (SWD7-1) (L2) at Sunnybrook Park and numerous other swamp and marsh types. Speckled Alder Organic Thicket Swamps (SWT3-1) occur both on the toe of the Oak Ridges Moraine and at isolated seepage areas further downstream. Some of the Broad-leaved Sedge Mineral Meadow Marshes (e.g. MAM2-6) are dominated by hairy-fruited sedge (*Carex trichocarpa*), a species that is both of regional concern and provincially-rare. A Mineral Fen Meadow Marsh (MAM5-1)(L1) located near Taylor/Massey Creek receives groundwater discharge from Iroquois sand deposits and supports numerous flora species of concern, including some found nowhere else in the Don watershed.

4.4.2 Threats to Vegetation Communities

The major threats to vegetation communities in the Don watershed are direct loss due to development; and long-term alterations due to changes in hydrology, disturbance regime, and species composition.

Direct losses have occurred historically and are currently happening in the headwaters areas now undergoing urbanization. The vegetation communities that tend to occur on tableland sites are most at risk whereas valley land communities typically receive more protection. The consequences of this loss are limited community diversity and lower overall biodiversity; hence, the “poor” quality conditions. For example, deciduous swamps of bur oak (SWD1-2), silver or swamp maple (SWD3-2, SWD3-3, SWD6-2, and SWD6-3) or of red ash (SWD2-2) are usually on tablelands where a clay substrate restricts drainage and surface water accumulates. Such communities in the TRCA jurisdiction are mostly restricted to the Peel clay plain. While much of the middle portion of the Don watershed is hydrogeologically suitable for such communities, the only known examples are at the eastern edge of the York University campus, where one can find a Silver Maple Mineral Deciduous Swamp (SWD3-2) at the South Keele Woodlot, and a Bur Oak Mineral Deciduous Swamp (SWD1-2) at the North Keele Woodlot. Tableland representation of more common communities, such as sugar maple forests (FOD5, FOD6) is also weak: Bakers Woods at the corner of Highway 7 and Bathurst Street is the best

example. These may have a richer ground flora than examples of the same communities found on steep valley slopes.

Natural cover in valleys is offered some regulatory protection under TRCA's generic regulation covering development within regulated areas and any interference or alteration to watercourses, wetlands and shorelines (Ontario Regulation 166-06[3]). Many tableland woodlots have been secured in headwater reaches during the process of development. However, many forests and early successional woodlands are at risk due to infill development and redevelopment. The cumulative impact of such losses can be significant; especially where the vegetation cleared is mature forest that cannot be quickly replaced by restoration elsewhere.

The Don is affected by changes in land use (urban matrix influence) as well as by such unknowns as global climate change and regional air pollution. Hydrological changes to communities may result from drainage alterations with nearby development or from climate change. Road construction may lead to flooding on one side of the road and drying-out on the other, changing the vegetation characteristics (Sauer, 1998).

Storm water management is still a chronic issue particularly in steep valleylands and in the established urban areas of the City of Toronto which have no storm water controls. Increased frequency of flood events in the Don means more frequent scouring and disturbance of floodplain forests, as well as more rapid erosion of bluffs and stream banks. The wholesale collapse of pieces of mature forest into eroding channels is an all-too-common sight in city ravines, as is the direct discharge of stormwater runoff onto steep valley walls. Both these phenomena can be observed in the vicinity of Wilket Creek Park.

Deposition of nitrates and other nutrients can occur through air pollution as well as fertilizers, storm water runoff, yard waste dumping, and siltation. Such alterations affect both wetland and upland communities that historically depend on low nutrient status, for example, Mineral Fen Meadow Marsh (MAM5-1) or oak savannahs and woodlands.

Such impacts, together with recreational use (see also Section 4.3.1) appear to be responsible for potentially inhibiting the continuation of native species in urban forests. For example, many ravine forests with native trees such as oak (*Quercus* spp) and sugar maple (*Acer saccharum* ssp *saccharum*) in the canopy have a lower layer of Norway maple (*Acer platanoides*) regeneration, and a ground layer that is either absent or composed of garlic mustard (*Alliaria petiolata*) and urban avens (*Geum urbanum*). The future of such forests, even if they are mature pre-development stands, is uncertain in the face of the aggressive non-native species.

One phenomenon that seems to be of particular concern is the inability of native communities to re-establish themselves on disturbed sites in urban regions, especially where soils have been moved or fill dumped. There is often a clear demarcation between natural forests and

[3] Ontario Regulation 166-06 – Regulation for Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses.

disturbed sites, with no regeneration of the natives from the adjacent habitat into the disturbed area. Succession on such sites seems to inevitably lead towards dominance by non-natives such as Manitoba maple, dog-strangling vine, and garlic mustard rather than successional natives such as poplar, ash, and asters. Active management and restoration of such disturbed areas (especially removal of invasive species) appears to be necessary to re-establish native plant communities.

4.5 Flora Findings

A total of 725 naturally occurring flora species (regenerating naturally) were found in the Don River watershed over the 10-year period 1996- 2005[4], of which 60% are native species and 40% are non-native (see Appendix C for a complete list of flora). There are also 49 species that occur only as planted but more-or-less persistent individuals or populations.

The high biodiversity of the Don watershed attests to the fact that even in the city, areas of natural habitat have been preserved, largely due to the steep, inaccessible character of the valley and its tributary ravines, as well as the setting aside of valleys as parkland due to flood hazards.

The floristic status of the Don is thus relatively high for an intensively urbanized watershed, although there are clear signs of degradation when we compare it to a rural watershed with abundant natural cover such as Centreville Creek sub-watershed of the Humber River watershed (TRCA, 2004). Although the Centreville Creek sub-watershed is much smaller than the Don, approximately the same amount of natural cover (approx. 1500-1800 ha) has been surveyed. Both watersheds have just over 700 naturally occurring flora species. However, 71% of Centreville Creek's flora is native, while 60% of the Don watershed flora is native. The Don has 170 species of flora that are considered regionally sensitive or of concern compared to Centreville Creek that has retained 250 such species.

4.5.1 Flora Species of Concern

For an explanation of the term "flora species of concern" please see section 4.4.1.

Most of the flora species of regional concern (ranked L1-L3) are not necessarily rare plants, since factors other than abundance are taken into consideration in ranking them. They are generally of concern due to their sensitivity to development and restriction to specific habitats or certain areas within the TRCA region. Thus, they are vulnerable to decline and even extirpation, especially over the long term, even if they are currently not rare. The L4 species are an intermediate category between the species of regional concern and the robust and tolerant L5 species. Although widespread in relatively intact urban sites, they too are vulnerable to long-term declines in urban areas, usually because of their sensitivity to development. For example, bulblet fern (*Cystopteris bulbifera*), an L4 species, shows a high degree of adaptability to moist forest habitats and swamps and is common across southern Ontario, but is declining in the

[4] Not every year during this period involved extensive fieldwork; some years such as 2005 only had incidental observations of flora included in Appendix 2 and no vegetation community mapping.

Don due to hydrological changes and invasive species. Since most of the Don is urbanized and urbanizing, L4 species were found in most of the watershed and have been taken into account in the discussion of species of concern.

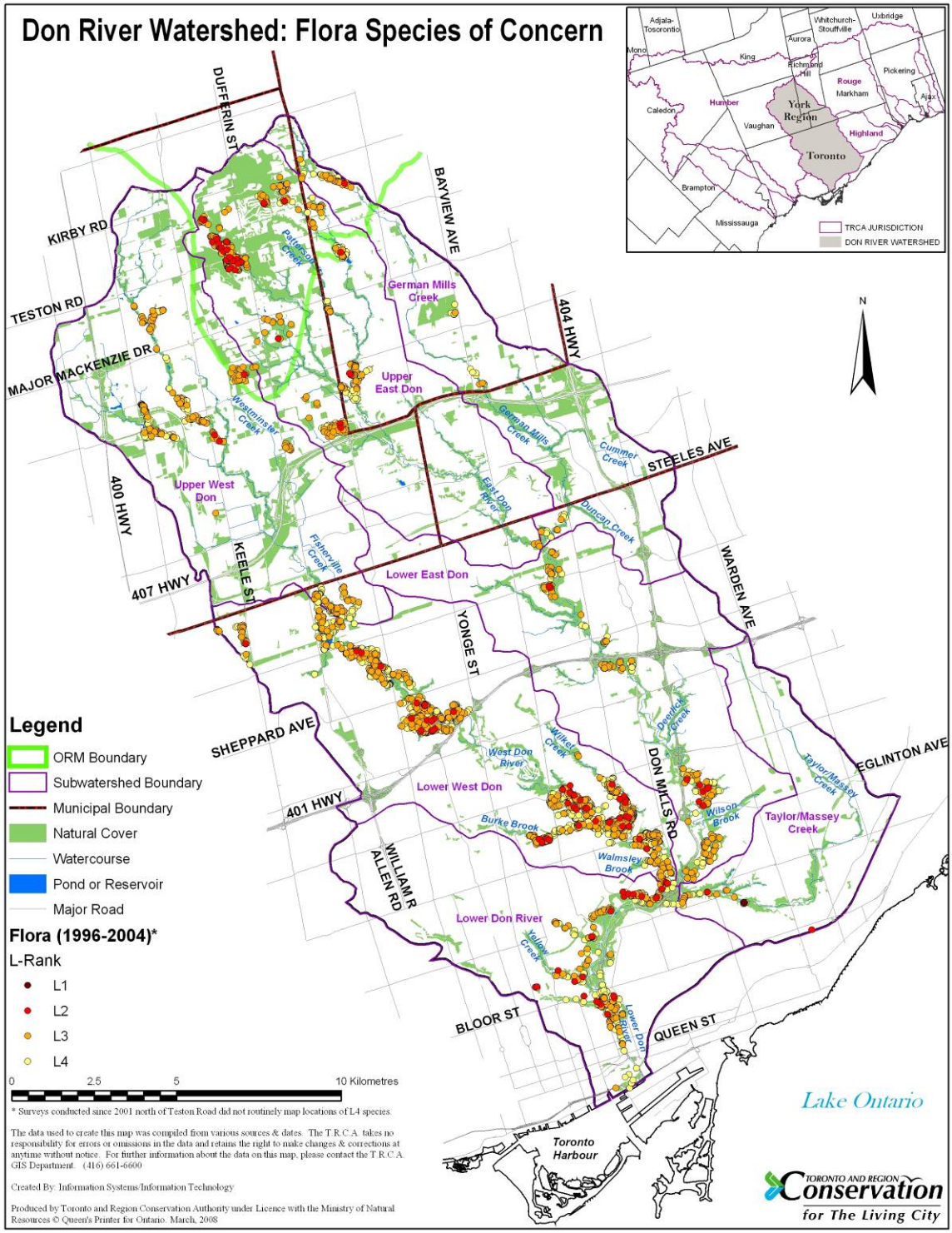
Local occurrence and local population trends are two of the criteria used to determine a species L-rank (TRCA, 2007). Species that score a 4 or 5 for local occurrence are considered relatively rare in the TRCA jurisdiction (Appendix C). These species have a restricted distribution in the region and are only found in less than 7 of the forty-four 10x10 km squares that encompass the jurisdiction. Drawing from the experiences of and data collected by TRCA staff, population trends of most native plants in the Don are undergoing at least slight declines. Most of the locally rare or declining plants found in the Don watershed have other factors associated with their status, discussed in this section as habitat dependence and sensitivity to development (TRCA, 2007).

About 23% of the 725 established vascular plant species identified primarily by TRCA from 1996-2005 were found to be of regional concern, L1-L3 (Appendix C; Figure 8). It is important to note that there have not been many surveys completed in the ORM portion of the Don by TRCA and therefore the majority of species of concern appear to be south of Steeles Ave. Hooded ladies' tresses (*Spiranthes romanzoffiana*) is the only naturally occurring L1 record, found in a mineral fen meadow marsh seepage zone (vegetation type MAM5-1) in Taylor/Massey Creek subwatershed. Thirty-four L2 species were found and 135 L3 species. Many of the L2 species points in the Lower West and Lower Don subwatersheds represent very low numbers of individuals. An additional 123 species found are ranked L4. In addition, 17 species of concern (L1 – L4 plus those extirpated (LX) from the wild in the TRCA jurisdiction) occur now in the Don only as planted specimens or populations as part of restoration efforts.

Natural areas are subject to impacts associated with the adjacent land use or 'matrix influence'. Many species are particularly sensitive to these impacts and tend to disappear from habitat fragments surrounded by urban land uses. Flora species scoring 3 or higher for habitat dependence are considered habitat specialists and are associated with 7 or fewer habitat types or ecosites of the Ecological Land Classification system; 284 of the 293 naturally occurring species ranking L1-L4 found are considered habitat specialists. Most of these species occur in the mature forests and seepage areas of the ORM or in continuous valley systems in some of the larger parklands of the Don (e.g. Sunnybrook Park off Leslie Street).

Most of the sensitive flora in the Don are found in remnants of high-quality habitat. Such habitat remnants occur scattered across the watershed on steep ravine slopes and in other protected areas as already noted for the vegetation communities. Sensitive flora tend to persist longer in urban situations than sensitive fauna, so clusters of flora species of concern occur both in the headwater regions and in the lower-to-middle reaches of the Don (Figure 8).

Figure 8: Flora species of concern in the Don River watershed.



The headwaters of the Don on the Oak Ridges Moraine, partly covered by the Maple Uplands ANSI and McGill ESA, with their combination of dry sandy upland and headwater swamp, support a number of flora species found nowhere else in the watershed, including L2 round-branched ground-pine (*Lycopodium dendroideum*), L2 round-lobed hepatica (*Anemone americana*), L2 goldthread (*Coptis trifolia*), and L3 balsam fir (*Abies balsamea*). The rolling topography of the northern third of the Upper East Don sub-watershed provides a diversity of microhabitats that translates into a diverse floral species composition. Many of the flora found there are associated with mature upland forests that are not exposed to significant disturbances.

Seepage wetlands also occur along the lower slopes of ravines throughout the watershed, including the mineral fen at Taylor Creek that hosts the above-mentioned ladies' tresses as well as fringed gentian (*Gentianopsis crinita*) and a number of sedges. A natural population of tamarack (*Larix laricina*) still exists in the East Don Swamp on the south side of Finch along with many other species of concern.

Forest-dwelling flora of concern also occur both on the Oak Ridges Moraine and on ravine slopes. The Sunnybrook Park area, comprising the Glendon lands, Burke Ravine, and Edwards Gardens still has many species associated with its mature forests both deciduous and coniferous, such as starflower (*Trientalis borealis*), Indian pipe (*Monotropa uniflora*), narrow-leaved spring beauty (*Claytonia virginica*), black-fruited mountain-rice (*Oryzopsis racemosa*), leatherwood (*Dirca palustris*), partridgeberry (*Mitchella repens*), and wood ferns (*Dryopteris* spp.) Crothers Woods has recent records of tall straw sedge (*Carex normalis*), sweet Joe Pye weed (*Eupatorium purpureum*) and poke milkweed (*Asclepias exaltata*). Clusters of high biodiversity are associated with areas of mature and occasionally even old-growth forest in the city ravine lands.

Very little tableland forest remains in the Don. The Baker sugar bush remains perhaps the best example; it supports slippery elm (*Ulmus rubra*), Wood's sedge (*Carex woodii*), and Hitchcock's sedge (*Carex hitchcockiana*) along with a wide range of spring ephemerals and other woodland flora.

Prairie, sand barren, and oak savannah flora occur in a few places on the Oak Ridges Moraine and in the lower reaches south of the Iroquois shoreline where sandy soils are found. Examples of these include woodland sunflower (*Helianthus divaricatus*), arrow-leaved aster (*Aster urophyllus*), and sharp-leaved goldenrod (*Solidago arguta*). One or two black oak trees (*Quercus velutina*) can be found in the Rosedale ravine, eastern outliers of the Humber Plains population centred in the High Park / Lambton area. A large number of specimen white and red oak trees (*Quercus alba, Q. rubra*) remain not only in the Rosedale ravines, but also in the residential neighbourhoods in the vicinity of the Iroquois shoreline. These are old trees (>130 years) pre-dating development and represent remnants of the pre-urban vegetation and biodiversity. They are thus especially important members of the urban canopy. There has been very little assessment of the urban canopy in the Don watershed; many relict street trees in the old-borough of East York were catalogued over twenty years ago (Blackshaw *et al.*, 1984).

With the recent concerns about climate change and advent of invasive pests, municipalities have started to look at the role and health of the urban canopy.

4.5.2 Threats to Flora Species

Floristic biodiversity in the Don is mostly threatened by direct and indirect effects of urbanization. Comparing records from natural areas in the Sunnybrook Park area from the 1960's – 1970's and 2000 - 2004 periods can yield direct evidence. The matrix of Sunnybrook Park was urbanized over a few decades in the mid twentieth century, so it has been subject to this influence for about forty or fifty years. The Toronto Field Naturalists did several studies of different parts of the park area (Banville and Cardini, 1978; Cramner-Byng *et al.*, 1977; Toronto Field Naturalists, 1972 (see also Banville (1994) for a summary of sites in the southern half of the Don watershed). The following relatively conspicuous species of concern found in these early surveys were not noted by the TRCA during recent work and have likely disappeared: New Jersey tea (*Ceanothus americanus*), swamp thistle (*Cirsium muticum*), interrupted fern (*Osmunda claytoniana*) – found in the Thorncliffe Park area as recently as 1984 (Miller, 1984); wood betony (*Pedicularis canadensis*), horsebalm (*Collinsonia canadensis*), and silvery glade fern (*Deparia acrostichoides*). New and imminent development on the Oak Ridges Moraine will subject species to increased disturbances at similar levels to the urbanized mid and lower reaches because of urban matrix influences. Dissected grape fern (*Botrychium dissectum*) and interrupted fern (*Osmunda claytoniana*) are examples of L1 species found in the Maple Uplands by the MNR prior to 1996 that may not be able to persist without proper protection and management of matrix influence (Varga *et al.*, 1997).

Some extremely sensitive plants such as calypso orchid (*Calypso bulbosa*) were last recorded in the Don in the 19th century (Farmery, 1894; Whiting and Catling, 1986). Other species have disappeared more recently. Naturally-occurring (as opposed to planted) red pine (*Pinus resinosa*) was represented by a single tree in 1950 (Ontario Department of Planning and Development, 1950). Ginseng (*Panax quinquefolia*) was last recorded in a woodlot near Walmsley Brook that was clear-cut for development in 1982 (Juhola, personal communication).

The development impacts on flora species in the Don include increased recreational use; hydrological changes and erosion; changes to soil, water and air chemistry (fill, dumping, pollution); competition from invasive non-native species; browsing by increased numbers of herbivores such as deer or Canada geese; trampling, and collection or picking. Flora species scoring greater than or equal to 3 under sensitivity to development are considered to have a high sensitivity to development. Out of the 293 naturally occurring species of regional and urban concern, 264 receive this high score.

The informal use of natural areas involves trampling by hikers, mountain bikes, and off-leash dogs. Users tend to prefer the more attractive mature forests and so these suffer the most trampling impact, while scrublands and wetlands are less affected. Wide trails and expanses of bare soil occur in the urban forests such as Crothers Woods and Sherwood Park. Slow-growing delicate species and those that produce only one set of leaves per season, for

example, trilliums and starflower (*Trientalis borealis*), are vulnerable. Trampling also leads to soil compaction, erosion, and the spread of invasive species.

Changes in hydrology – drying out or inundation – can be associated with urbanization of the matrix. Wetland species such as tamarack (*Larix laricina*), naked mitrewort (*Mitella nuda*), sweet flag (*Acorus americanus*), and (*Equisetum fluviatile*) are all found to be dependent on specific hydrological conditions and would be negatively affected if development were to initiate hydrological changes. The same is true of many established forest trees such as hemlock (*Tsuga canadensis*). This species, ranked L4, is relatively common but is reproducing very little. In disturbed or fragmented habitats, mature hemlock often dies. In fact, development may lead either to drying of nearby habitats through drainage, or increased water through storm water runoff. Erosion can result from what seems to be a very small increase in storm water.

Many construction, design, and land use practices can lead not only to changes in hydrology, but also to soil alterations. Species such as balsam fir (*Abies balsamea*) and New Jersey tea (*Ceanothus americanus*) (now no longer found in the Don) are vulnerable to changes in soil chemistry and nutrient status resulting from storm water input, fertilization of nearby fields or lawns, or dumping. Wetlands with altered chemistry, especially high levels of nutrients and silt, have been taken over by aggressive species that take advantage of the high fertility, reed canary grass (*Phalaris arundinacea*) being a good example. The disturbed and often nutrient-enriched soils tend to support invasive non-native species, which are a major threat in their own right.

A significant proportion: 40%, of the vascular plants found in the Don are non-native species, many of which are invasive. Twenty of the twenty-eight plants listed as Category 1 invasives are established in the Don watershed (Smith, 2000; Havinga and Ontario Invasive Plants Working Group, 2000). These species are top priority for control since they exclude all other species and dominate sites indefinitely. Many native plants are readily out-competed by invasive species in all types of habitat. In upland forests white trillium (*Trillium grandiflorum*) and shinleaf (*Pyrola elliptica*) are two of many species of concern that are vulnerable to invasive competition. Wetland species such as sedges have been overrun by purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), and hybrid cattail (*Typha x glauca*); biological control has reduced the impact of the first species, but disturbance continues to favour the others.

Three Category 1 invasive species are of notable concern in the Don watershed: European buckthorn (*Rhamnus cathartica*), dog-strangling vine (*Cynanchum rossicum*), and garlic mustard (*Alliaria petiolata*). All are known to dominate the vegetation in many places in the mid and lower Don. Dog-strangling vine is likely the most problematic as the seed is wind-dispersed. Invasion by dog-strangling vine was noted as early as 1913 when it was noted to be "found in abundance in Don Valley" (Faull, 1913). It has reached an extent where it is the single dominant herbaceous species in large areas of the Don, especially the lower-middle reaches just upstream of the Forks. The Charles Sauriol Reserve is a good example of the many sites

that are over-run with this species, which can move into almost any upland habitat from forest to meadow, including areas that are relatively undisturbed. In other locations, such as the Maple Uplands ANSI/McGill ESA in the north, dog-strangling vine has only recently become a threat.

European buckthorn fruits heavily and the seed is dispersed by birds. It dominates the under storey of many small woodlots to the extent that it is the only regenerating species. This invasive species was recorded by TRCA during the 1996-2005 ELC surveys as a dominant vegetation layer within many forested and cultural vegetation communities.

Garlic mustard is characteristic of degraded forests in Toronto, preferring rich but disturbed soils. The seed is slightly adhesive when moist and is spread via shoes and bike treads, as well as by small animals and runoff. Its presence can be directly related to soil disturbance caused by trail proliferation, dumping and increased surface runoff. Garlic mustard occurs along trails (including informal trails) and near edges in the richer, forested communities, and is dominant in the ground layer throughout forests in the more disturbed areas in the Don.

Populations of invasive species have increased alongside urban development in the Don, which enabled plants to penetrate into areas that were previously inaccessible to them. The relatively low population of invasive species currently in the headwaters will increase if a combination of the following occurs:

- habitat patch size is diminished and environmental conditions change
- informal use of the habitat increases, thus disturbing the soil and increasing the informal path network
- seed source/dispersal increases

Certain herbivorous fauna can also increase in developed or semi-developed landscapes. The proliferation of deer, squirrels, and Canada geese results from increased food sources and lack of predators. Deer have been found in the entire Don watershed including the lower Don, and their browsing has seriously altered native flora in eastern North American forests (Sauer, 1998). It is likely that high populations of deer eliminate palatable natives and open the habitat while releasing non-palatable non-native species such as dog-strangling vine from competition (Bazely, personal communication). Spring ephemerals and tree saplings are particularly affected. Urban squirrels are implicated in the decline of recruitment of native trees such as oak, as they eat more acorns than they leave cached. Canada geese take advantage of manicured turf; they prevent the establishment of wetland vegetation and cause eutrophication of aquatic habitats.

Butternut (*Juglans cinerea*) is a special case. Now listed as endangered under the federal Species at Risk Act, butternut is precipitously declining due to a canker disease. Although it is found in a reasonably wide range of forest habitats throughout the watershed, its future is in question.

Finally, certain flora species are directly collected because they are attractive or edible. They may end up in backyard gardens or on the dinner table. This is the case with Michigan lily (*Lilium michiganense*), wild leek (*Allium tricoccum*), spring woodland flowers such as hepatica (*Anemone acutiloba*, *A. americana*), and a number of orchid and fern species.

4.6 Fauna Findings

TRCA fauna surveys conducted in the Don Watershed between 1996 and 2005 have documented a total of 109 vertebrate fauna species: 83 breeding bird species, 12 herpetofauna species, and 14 mammal species. The similarly urbanized watershed of Etobicoke Creek reports a total of 126 vertebrate fauna species; many of Etobicoke's additional species occur in the extensive agricultural area in the northern section of the watershed where some forest cover persists, although rather fragmented.

Forest indicators such as pileated woodpecker, red-backed salamander and wood thrush and L3 forest species in general are much better represented in the mature forest habitat persisting in the ravines throughout the urbanized lower Don watershed, with very few reports of open habitat species which are represented by vesper sparrows and bobolinks in the Etobicoke watershed. The neighbouring lower Humber watershed (south of Hwy 407) has not been as extensively surveyed as the lower half of the Don but, like Etobicoke, was found to support fewer L3 forest species than the Don watershed. Looking east and west within the city, the Don watershed is providing some of the best urban forest habitat. However, it is only in the less disturbed headwater forests that sensitive fauna species such as American woodcock, ovenbird and veery will be able to persist.

The TRCA terrestrial vertebrate fauna species list for the entire TRCA jurisdiction currently stands at 262 species; terrestrial natural heritage surveys also track the occurrence and distribution of 1 terrestrial invertebrate fauna species, the “chimney” crayfish (*Fallicambarus fodiens*), but this species has not been reported from the Don watershed. From that larger regional fauna list it is likely that a further 5 or 6 species can be added to the Don checklist with species such as house mouse and Norway rat simply having been missed by the formal TRCA surveys. One additional species – peregrine falcon – is known to have bred within the Don watershed but has not yet been included in the database, primarily because TRCA surveys have not been conducted in the downtown core where the species’ nest sites are located.

TRCA fauna biologists use a checklist that records the presence *and* degree of representation of each species (i.e. the species abundance) since this can vary considerably. For the Don watershed, species such as hermit thrush and mourning warbler are represented by only one point each in the database, while red-eyed vireo is represented by a total of 91 points. The terrestrial fauna checklist in Appendix D includes a field that presents the total number of mapped points (by subwatershed) for those species that are mapped according to the TRCA survey protocol, together with their corresponding L-ranks.

Due to the focus on breeding bird species and frogs during fauna surveys, it is possible that at least meadow vole, reported from the watershed prior to 1996 (also reported were snapping turtle and Blanding's turtle) is persisting within the watershed.

The City of Toronto is preparing a report on migratory birds that will provide additional information on migratory bird observations in the Don, including observations of migrant bird species at risk.

4.6.1 Fauna Species of Concern

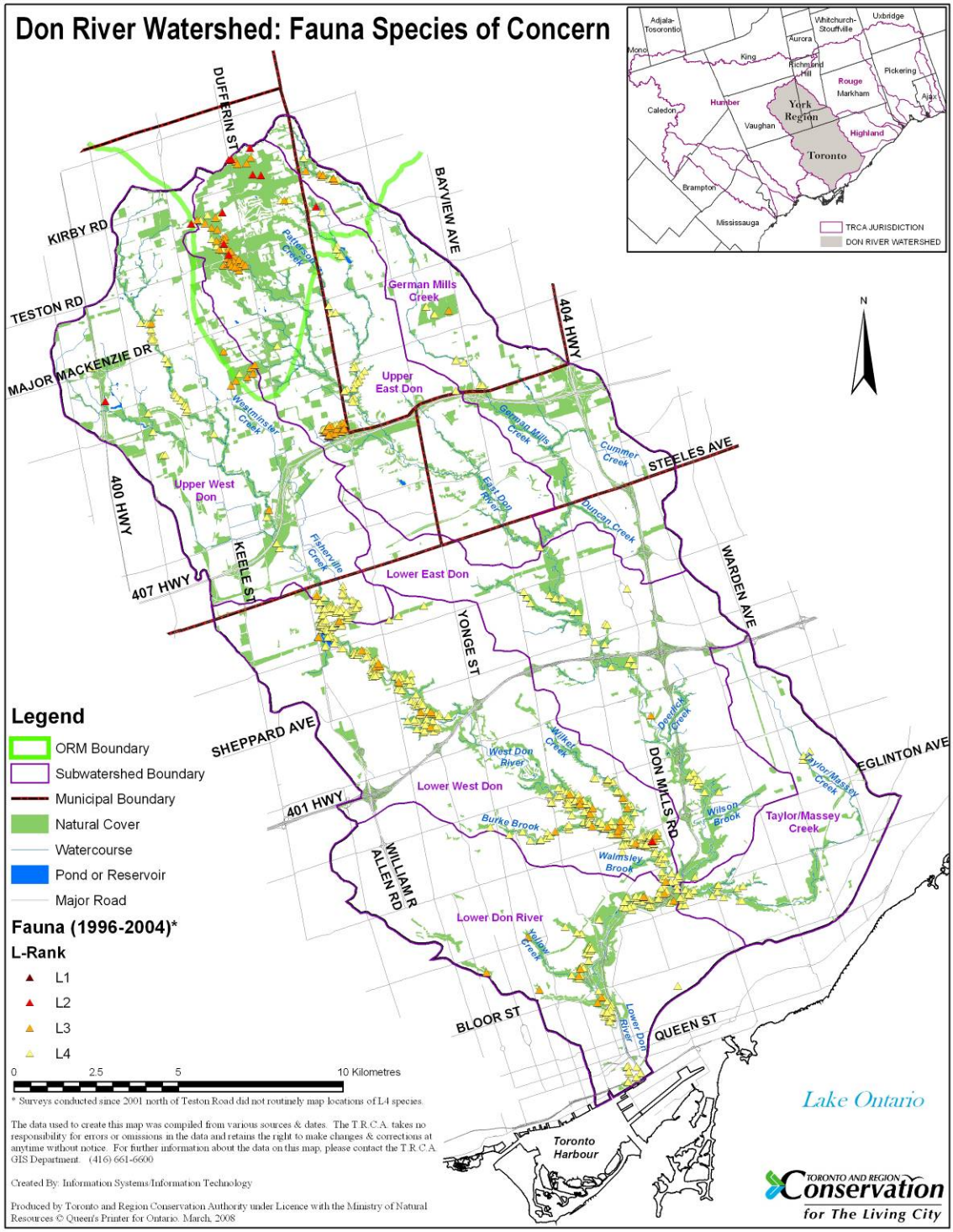
Fauna species are considered of regional concern if they rank L1- L3 based on their scores for seven criteria. The seven criteria are local occurrence, local population trend, continent-wide population trend, sensitivity to development, area-sensitivity, mobility restriction, and habitat dependence. As with flora, this is a pro-active, preventive approach, identifying where conservation efforts need to be made before a species becomes rare. L4 species are those considered to be of concern within the urban zone. Because the majority of the Don watershed is in the urban or urbanizing portion of the TRCA jurisdiction, L4 species are included in this discussion.

The fauna list of 109 species for the Don watershed for the past decade includes six L2 species (porcupine, gray treefrog, spring peeper, wood frog, hooded merganser and veery); twenty-six L3 species; and forty L4 species (of urban concern). This amounts to a total of seventy-two fauna species of concern. Locations of these breeding fauna species are depicted on Figure 9.

There is a total of 127 L1 – L3 points mapped for fauna species of regional concern in the entire Don watershed. Much of the survey effort has been concentrated in the southern half of the watershed yet more than 70% of the mapped L1 – L3 points occur in the northern half of the watershed with over half located north of Major Mackenzie Drive mostly in the Upper East subwatershed headwaters. Thus it is apparent that fauna species of regional concern (L1-L3), those most sensitive to the effects of urbanization, have already disappeared from a large proportion of the watershed. As urbanization continues in the northern extreme of the watershed many of these L2 and L3 species may disappear and local biodiversity will tend towards the L4 dominated system currently found in the larger ravine complexes of the middle reaches of the watershed. The following paragraphs consider the factors and criteria that seem to be most influential in determining the distribution and representation of fauna biodiversity throughout the Don watershed.

Using local occurrence as a measure of regional rarity, any species that is reported as a probable or confirmed breeder in fewer than ten of the forty-four 10 km squares in the TRCA jurisdiction is considered regionally rare (i.e. scores 3-5 points for this criterion). The Don watershed hosts a total of thirteen regional rarities: nine bird species, three mammal species and one reptile species. There are no reports of federally listed Species at Risk from the Don watershed within the past decade, but the current status in the watershed of Blanding's turtle (listed as a Species of Special Concern under the *Species at Risk Act*) should be further investigated; there have been no reports since 1983.

Figure 9: Fauna species of concern in the Don River watershed.



There is one additional species that should be added to the Don fauna checklist that has been reported from non-TRCA sources. In the fall of 2002, large numbers of red efts - the terrestrial "juvenile" stage of the eastern newt - were found milling about in the parking lot of the Elgin West Community Centre car park (Natalie Helferty pers. comm.). These animals were dispersing from their natal pond to upland forest foraging and wintering grounds. This event was documented in 2002 and no one has reported observations since. The pond and some of the upland forest still remain in the area although a new subdivision has been built in the vicinity. If this population persists it constitutes the only L1 fauna species within the Don watershed and efforts should be taken to ascertain the status of the population and to secure its future.

Fauna species are scored for area sensitivity based on their requirement for a certain minimum size of preferred habitat. Species that require large tracts of habitat (>100 hectares in total) score the maximum five points, while species that either show no minimum habitat requirement, or require < 1 hectare in total, score one point. Species scoring three points or more (require 5+ hectares in total) are deemed area sensitive species. Researchers have shown that, for some species of birds, area sensitivity is a rather fluid factor, dependent and varying inversely with the overall percentage forest cover within the landscape surrounding the site where those species are found (Rosenburg *et al.*, 1999).

Fauna species are considered to have a high sensitivity to development if they score 3 or more points (out of a possible five) for this criterion. In the Don watershed, all but one of the L2 and L3 fauna species and the majority of L4 species score three or more points and therefore should be considered sensitive to development. It is encouraging to see so many development sensitive L4 species in the larger ravine complexes in the middle and lower reaches of the watershed. However, species that score higher for Sensitivity to Development – 4 and 5 points – are much better represented in the upper reaches of the watershed.

It should be noted that all herpetofauna species that occur in the Don watershed are considered sensitive to development and as such this group constitutes a very good indication of the matrix influence. Two L2 frog species, spring peeper and wood frog, are restricted to the natural habitat in the Upper East Don subwatershed to the north of Major Mackenzie Drive and gray treefrogs have only been recorded north of Teston Road. Populations of green frog and American toad persist in the middle and lower reaches of the Don watershed, and red-backed salamanders are still in some of the southern woodlots (including Sunnybrook Park, Rosedale Ravine and Thorncliffe Park). This species scores 5 points for Sensitivity to Development largely because of its requirement for a relatively undisturbed forest floor complete with rotting logs and similar debris. As an entirely terrestrial salamander this species is particularly susceptible to changes in the moisture regime in forest habitat.

Wetland species are poorly represented owing primarily to the over all lack of wetland habitat in the watershed. The only two songbird species on the Don watershed fauna list that can be considered wetland obligates to any extent are common yellowthroat and swamp sparrow. Both of these species are ranked L4 and were not mapped in the more rural landscape (e.g.

north of Teston Road) following the data collection methodology (TRCA, 2005). Any wetland habitat in this northern area will likely have these two species, but, L3 ranked wetland obligates such as sora and Virginia rail are absent.

Twenty-two fauna species of regional concern can be considered area sensitive; there are seven species that require in excess of 20 hectares of contiguous natural habitats. Of these, four species have been reported breeding in the heavily urbanized middle reaches of the Don watershed, especially within the more extensive natural cover found at Sunnybrook Park: Cooper's hawk (2 of the 3 watershed records are in intense urban matrix), pileated woodpecker (6 of the 7), pine warbler (1 of the 6) and scarlet tanager (2 of the 3). Thus, for those species of regional concern (L1 – L3) that currently occur within the Don watershed that are considered area sensitive, habitat patch size does not appear to be the most limiting factor. Indeed, when area sensitive L4 species are also considered, species such as hairy woodpecker, great-crested flycatcher and white-breasted nuthatch, are well represented throughout the natural areas of the watershed. Those area sensitive species that are not currently well-represented are generally species that are limited by other criteria such as Sensitivity to Development. In the northern-most portion of the watershed there are seven locations for ovenbird, an L3 species that requires in excess of 20 hectares of habitat, and yet there are none to the south where seemingly adequate habitat exists at places such as Sunnybrook and G. Ross Lord. This absence is a result of the species' high vulnerability to negative Matrix Influences. One way of mitigating the Matrix Influences that negatively affect such species is to increase the patch sizes.

Area Sensitivity constraints are due to a variety of factors including foraging requirements and the need for isolation within a habitat block. In the latter case, regardless of the provision of a forest area of sufficient size, if that forest block is frequently disturbed by human intrusion such species will be liable to abandon the site. In addition to requiring an area of a particular minimum size, some fauna species are forest-interior obligates, requiring an area of forest that is at least 100m from any edge. Examples of such L1 – L4 fauna species occurring in the Don watershed are red-breasted nuthatch, brown creeper, veery and ovenbird – all four were recorded from the northern forest blocks containing interior habitat.

Mobility restriction in fauna measures the physical ability or the predisposition of a species to move about within the landscape and is related to the connectivity of habitat within a landscape. Adults foraging for food during the nestling and fledgling stages of the breeding season is one example of a reason for this requirement. By maintaining and improving the connectivity of natural cover within the landscape (e.g. by reforestation of intervening lands) we are able to positively influence the populations of such species, improving their foraging and dispersal potential.

The score for mobility restriction does not address the issue of species that habitually - and as a part of their life-cycle - move across a variety of habitat types. Such species will readily cross open ground but in so doing expose themselves to potentially fatal encounters with predators and vehicular traffic. This is particularly true of herpetofauna such as snapping turtle, wood

frog, and northern leopard frog. The Don watershed to the south of Major Mackenzie has apparently lost all of the representatives of the most mobile herp species – the wood frog. There are records of snapping and Blanding's turtles from 1983 for the pond adjacent to the East Don River just north of Lawrence Ave. and efforts should be made to ascertain the current status of this population. The northern portion of the watershed still supports a small population of wood frogs and if this population is to be maintained it is important that any connections between wetland breeding habitat and upland-forest foraging and wintering habitat are protected and enhanced.

Fauna species that score greater than three points under the habitat dependence criterion are considered habitat specialists. These species exhibit a combination of very specific habitat requirements that range from the microhabitat (e.g. decaying logs, aquatic vegetation), through requirements for particular moisture conditions, vegetation structure or spatial landscape structures, to preferences for certain community series and macro-habitat types. Within the list of L1- L4 fauna species occurring in the Don watershed there are 18 species that score 3 or more points for Habitat Dependence. Almost all of these species are dependent on fairly specific mature forest habitat, both deciduous and mixed. As the individual trees that constitute such forest blocks mature and die it is essential that younger examples of the same species are available to take on the role of a canopy tree. It is also essential that the dead tree is allowed to contribute as much as possible to the ground layer of the forest patch, for example, providing shelter for red-backed salamanders.

Not surprisingly for a watershed so devoid of meadow and savannah habitat types, open habitat fauna specialists (e.g. monarch butterflies, vesper sparrow, bobolink and horned lark) are very poorly represented. As urbanization proceeds agricultural and meadow lands are the first habitat types to be built upon. Remaining natural habitat tends to be concentrated in areas that are unlikely to be developed, areas such as ravine slopes and floodplains. For this reason the fauna of the Don watershed can be characterized generally as that found in low to fair quality woodland habitats.

Ostensibly sensitive bird species such as Cooper's hawk, pileated woodpecker, wood duck and wood thrush (all L3 species) are still present in the most highly urbanized sections of the watershed, and it can be expected that with appropriate mitigation such species will continue to thrive and potentially be joined by other species with similar habitat requirements. Both Cooper's hawk and pileated woodpecker need mature trees to provide the appropriate nest locations. At the same time, Cooper's hawks require a certain degree of isolation during their nesting season, but this is readily afforded by inaccessible ravine slopes and private properties. Trail design should be conducted in such a way as to consider the needs of such species, whether those trails are used by hikers or bikers.

4.6.2 Threats to Fauna Species

Impacts resulting from development - considered separately from the issue of actual habitat loss - can be divided into two distinct categories. The first category involves changes that arise from local urbanization that directly affect the breeding habitat of the species in question.

These changes alter the composition and structure of the vegetation communities; for example, the clearing and manicuring of the habitat (e.g. by removal of dead wood and clearance of shrub under storey). The second category of impacts involves changes that directly affect individuals of the species in question. Examples include increased predation from an increase in the local population of predator species that thrive alongside human developments (e.g. blue jays, crows, squirrels, raccoons, and house cats); parasitism (from the facilitating of brown-headed cowbird access, a species which prefers more open, edge-type habitat); competition (for nest-cavities with bird species such as house sparrows and Eurasian starlings); flushing (causing disturbance and abandonment of nest); and sensitivity to pesticides.

The tendency for urbanization to be accompanied by the clearing and tidying of woodlands and thickets in the vicinity dramatically disrupts any species that are dependent on such scrub cover for nesting or foraging. Typical of such under storey habitat are species such as gray catbird, indigo bunting and rose breasted grosbeak. All three of these species are ranked L4 and are currently fairly well represented in the larger ravine complexes such as Sunnybrook, because, in places the "ecotone" between open manicured lawns and the remnant forest patches has been left relatively intact with fairly healthy growth of shrub under story. Since gray catbird and rose-breasted grosbeak can nest above head-height, neither species is as sensitive to ground-borne disturbance in the ravine parks (hikers and dogs) as other lower nesting species. However, it should be understood that the reporting of territories at a site does not necessarily mean that the individuals concerned are actually succeeding as breeding birds. The only way to be sure of the status of these birds would be to conduct in depth population surveys such as the Mapping Avian Productivity and Survivorship project (currently being conducted by the TRCA in Claireville CA); unfortunately, the highly public nature of many of the Don watershed parks precludes such intensive research. Nevertheless, the fact that such bird species are holding multiple territories illustrates that appropriate habitat is available.

Several bird species on the TRCA regional checklist conduct most of their breeding cycle activities at ground level or in the ground vegetation and as such are highly susceptible both to increased predation from ground-foraging predators (house cats, raccoons) and to repeated flushing from the nest (by pedestrians, off-trail bikers and dogs). These repeated disturbances typically result in abandonment and failed breeding attempts. Such sensitive forest-bird species, including ruffed grouse, veery, blue-winged warbler and ovenbird, have either been completely extirpated from the Don watershed or have retreated to the northern extremes. Many open habitat species – bobolink, brown thrasher, vesper sparrow - are also ground-nesters and have likewise been severely affected by increases in pedestrian or dog traffic within their habitat.

The lack of wetland habitat in the urban matrix may have been exacerbated by the changes in hydrology associated with intense urban development. As water tables drop a general drying of habitat ensues, together with the loss of associated tall wetland vegetation. This, together with other matrix influence factors, may explain the loss of wood frogs throughout all but the

northern area. The most recent reports of wood frog in the urban area are from the 1970s in the Glendon area (Lawrence and Bayview) (Banville and Cardini, 1978).

Several species that have been reported in the past decade are on the verge of extirpation. However, there is some hope inspired by the condition of the fauna biodiversity found persisting in very recent years in the larger ravine complexes in the middle reaches of the Don: Sunnybrook and G. Ross Lord. Enhancement of and increased native forest and wetland within the watershed will provide breeding opportunities for many of the less sensitive L4 species, and foraging opportunities for hosts of migrant birds that pass through the watershed on their journeys north and south. Meadow habitat may be a good option when isolated from public use.

4.7 Summary of Current Conditions and Ratings for the Natural Heritage Indicators

In evaluating current conditions in the Don River watershed, a rating system was adopted based on standard letter grades. Each of these categories corresponds with “poor”, “fair”, “good” and “excellent” levels of condition as shown in the table below. Where the measures and targets were quantitative and data permitted, ratings were assigned, in part, to reflect the percent satisfaction of the target. Comparisons to conditions in other watersheds under TRCA jurisdiction were made and informed evaluations where data were available, to reflect relative conditions. Where measures and targets were qualitative, or data were lacking, evaluations were based on professional judgment.

Grade	Rank	Percent of Target Achieved
A	Excellent	Better than 80
B	Good	Between 70 and 79
C	Fair	Between 60 and 69
D	Poor	Between 50 and 59
F	Fail	Below 50
TBD	To be determined	Further study required; baseline data not available

The management objectives, indicators, measures, targets, and current conditions ratings for the terrestrial natural heritage indicators are presented below. Current conditions have been compared to previous assessments of condition undertaken as part of report cards prepared after *Forty Steps*, where detailed assessments were available (Don Watershed Regeneration Council (DWRC) and MTRCA, 1997; TRCA, 2000, 2003).

Table 5 presents the objectives, indicators, measures and targets used to evaluate the current condition of terrestrial systems in the Don watershed. The management objectives are to:

1. Protect and expand the Terrestrial Natural Heritage System and improve connectivity among the watershed’s forests, meadows, and wetlands.
2. Regenerate the health of natural areas, and the whole urban landscape, to improve their quality, biodiversity, and ecological function.

3. Manage the impact of human activities and neighbouring land uses in the watershed.

As measured against the overall natural heritage objectives, the current conditions are rated as "poor" (or D). Natural cover comprises 16% of the total land base, with overall quality distribution scores being "poor", although better in the upper watersheds (Table 2). The Upper East Don River subwatershed scores highest under quality distribution and also retains the largest quantity of natural cover at 1,557 hectares or 25% of its land base. Fauna of regional concern are strongly restricted to the higher-quality patches in the upper part of the watershed, while sensitive flora are less restricted, occurring in refugia provided by small patches of mature relict forest and seepage wetland.

The 1997 report card on the Don River watershed, *Turning the Corner*, set the following targets for natural cover (by 2030) in the watershed (DWRC and MTRCA, 1997):

- 10% of the watershed in woodland cover,
- 0.5% of the watershed in wetlands, and
- 5% of the watershed in meadows.

Since 1997, woodland cover has grown slightly, from 8% to 9% of the watershed, wetland cover has grown very slightly from 0.14% to 0.2%, and meadow cover has expanded from 3.5% to 7%; however, the 2030 targets set in *Turning the Corner* have not been met. As urbanization has continued in the intervening decade, updated targets for natural cover are warranted. Table 5 sets out new targets for natural cover in the Don, based on a refined target Terrestrial Natural Heritage System (Section 5.1).

Table 5: Objectives, indicators, measures, and targets for terrestrial natural heritage in the Don River watershed.

Objectives: **1. Protect and expand the Terrestrial Natural Heritage System and improve connectivity among the watershed's forests, meadows, and wetlands.** **2. Regenerate the health of natural areas, and the whole urban landscape, to improve their quality, biodiversity, and ecological function.** **3. Manage the impact of human activities and neighbouring land uses in the watershed.**				**Overall Rating** D - Poor
Indicators	**Measures**	**Targets[1]**	**Current Conditions (2002)**	**Ratings**
Quality of natural cover	Average total quality distribution score based on the weighted scores for Size, Shape, and Matrix Influence for all patches	Mean L-rank: L4 "poor" Mean Total Score: 7.2 The target is determined by the zonal mean total patch score of the target terrestrial system.	Mean L-rank: L4, "poor" Mean Total Score: 7.4 Mean Size Score: 1.6 Mean Shape Score: 3.6 Mean Matrix Influence Score: 2.2	D – Poor
	Ratio of the area of severely disturbed ELC patches to the total area of ELC patches for trampling/trails, trash/dumping, and non-native species	Maintain or reduce the ratio of natural areas deemed severely disturbed area to total ELC area	Trampling/trails: 63:1,785 Trash/dumping: 59:1,785 Exotics: 358:1,785	TBD[2]
Quantity of natural cover	% of natural cover based on interpretation of digital ærial photographs	Overall natural cover target: 13% (minimum long term)	16% of the total land base is identified as natural cover (forest, wetland, meadow)	D – Poor[3]
	Forest	Site conditions will dictate what communities are restored during implementation of the target system	9% of watershed land base	
	Wetland		0.2% of watershed land base	
	Meadow		7% of watershed land base	
Biological diversity	# of vegetation community types and communities of concern present in the watershed as determined by TRCA ELC field work	No loss of vegetation communities of concern (L1-L4) from watershed	192 vegetation types 111 communities of concern (L1-L4)	TBD[4]
	# of flora species and species of concern present in the watershed based on records from field work	No loss of flora species of concern (L1-L4) from watershed	725 flora species, naturally occurring 293 species of concern (L1-L4)	
	# of fauna species and species of concern present in the watershed based on records from field work	No loss of fauna species of concern (L1-L4) from watershed	109 vertebrate fauna species: 83 bird species, 12 herpetofauna species, and 14 mammal species 72 species of concern (L1-L4)	
	# of frog species present in the watershed based on records from field work	Maintain viable populations of spring peeper, wood frog, grey treefrog in the Upper East and Upper West Don subwatersheds. Maintain viable populations of northern leopard frog, green frog, and American toad throughout watershed. Retain all existing populations.	2 species restricted to north of Major Mackenzie Rd (spring peeper, wood frog); 1 species restricted to north of Teston Rd. (gray treefrog); 1 species local (northern leopard frog); 2 widely distributed (Am. Toad, green frog)	D – Poor

[1] See section 5.1 for an explanation of the development of targets for the quantity and quality of natural cover in the watershed.
[2] Baseline conditions have been established for 2000-2005 and will be used for future evaluations.
[3] In 2002, the watershed had 16% natural cover. The long term target of 13% is reflective of losses in cover since 2002 and the exclusion of some existing cover from the target system (e.g., isolated patches, patches vulnerable to change of use, such as those in utility and highway right-of-ways). A "D" rating has been assigned to reflect the strong need to protect all existing natural areas and to buffer them from surrounding urban land activities.
[4] Baseline conditions have been established for 1996-2005 and will be used for future evaluations.

5.0 Regenerating the Don

To maintain or improve ecological conditions in the watershed, a more robust terrestrial natural heritage system is needed. The TRCA's Terrestrial Natural Heritage System Strategy (TRCA, 2007) and its principles can be applied in a more specific way to the Don through refinement of the target system within the watershed, and taking other opportunities to protect and regenerate it.

The overall goal is a natural system capable of supporting, over the long term, populations of the full range of flora and fauna species that occur in the watershed, including those of high sensitivity. The target natural system for the Don will represent the minimum land base that should be secured, protected and restored to a natural state over the next century in order to achieve the objectives and targets set out in Table 5.

Securing the target natural system is just a beginning. Other management considerations are needed to ensure its health and integrity.

5.1 Refinement of the Target System for the Don River Watershed

The Don River watershed portion of TRCA's regional (modeled) target terrestrial natural heritage system underwent further refinement with the aid of more detailed land use planning information, local field data, and other current information. In the case of the Don, the refined target system does not capture all the opportunities for expanding and improving the natural heritage system, as the model excludes manicured lands and many small habitat patches. Instead, it forms a minimum system of natural cover that ensures at least some high-quality habitat. It forms the basis of a broader regeneration strategy.

In preparation for the refinement process, ArcReader files were created using ArcMap to assemble digital data layers of the following reference information for the Don watershed:

- TRCA Regional Target Terrestrial System (TRCA, 2007);
- Digital colour ærial photography (2005) and up to date imagery from Google Earth©;
- Land cover classification showing land use (e.g. built-up and greenfield) (2002);
- Oak Ridges Moraine Conservation Plan (2002) and Greenbelt Plan (2005) boundaries and designations;
- Detailed field information/data on the locations of species and communities of conservation concern and species at risk (where available);
- Existing natural cover characterized as forest, wetland, meadow, and beach/bluff habitat types remotely sensed in 2002;
- Watercourse, roads and other land features; and
- Information from development applications approved since 2002, notably block plans for currently developing areas in Vaughan (blocks 10, 11, 12, 18).

The steps taken for refining the target system for the Don were:

1. The target terrestrial system was carefully inspected to correct instances where urban cover or incompatible land use designations were incorrectly classified as natural and these patches were removed from the target terrestrial system. When this occurred the cover that was removed was replaced manually in equal area in a location nearby if possible. For example, much land was lost from the target system in block 11 (Rutherford and Dufferin) and some of it was allocated to fill in a gap in the same block.
2. Known locations of species and communities of conservation concern and species at risk were captured in the watershed target system. The target system boundary was increased around the locations when sensitive species and communities of concern were outside of the modeled target area.
3. Gaps between areas of the regional target system were filled in to ensure the target system was as contiguous as possible, particularly where existing natural cover was present.
4. In some cases, such as within the Greenbelt Natural Heritage System area, additional core areas were created to improve the distribution of high quality habitat patches throughout the watershed. These areas included locations that are largely suitable for the restoration of swamps or tableland forest.
5. Connections and linkages in the system were improved wherever possible. For instance, a connection was improved between the Upper West Don and a corridor leading to Purpleville Creek in the Humber River watershed.
6. Areas were added where mature native forest was present. If it was far removed from the system, the size and habitat function were considered.
7. Areas were added where protected under the *Greenbelt Act* or the *Oak Ridges Moraine Conservation Act*.
8. Areas were removed or added from the target system in accordance to urban land designations under an approved development plan (e.g., block plan).

The resulting refined target terrestrial natural heritage system for the Don River watershed, as shown in Figure 10 and Table 6, represents approximately 13% natural cover of the total watershed area, an apparent decline from the 16% natural cover in 2002. The difference is largely a result of ongoing urbanization north of Steeles Avenue, as well as exclusion of small or narrow existing patches (e.g. strips along highway corridors) from the target that did not meet either the model criteria or the refinement rules. Some opportunities for expansion of the terrestrial system are not captured by the modeled target; for instance, major redevelopment plans that have not yet been approved (e.g., Don Mouth Naturalization) may offer opportunities to enhance the terrestrial system. Furthermore, the target represents the areas important for regional biodiversity, and therefore may exclude some small, isolated patches that nevertheless are valued for other reasons (e.g., recreation, aesthetics, matrix influence). The target quantities for natural cover are intended to identify protection and restoration opportunities in each subwatershed. As implementation proceeds quantity targets may need to be adjusted over time based on feasibility and opportunity.

Figure 10: Refined target terrestrial natural heritage system for the Don River watershed.

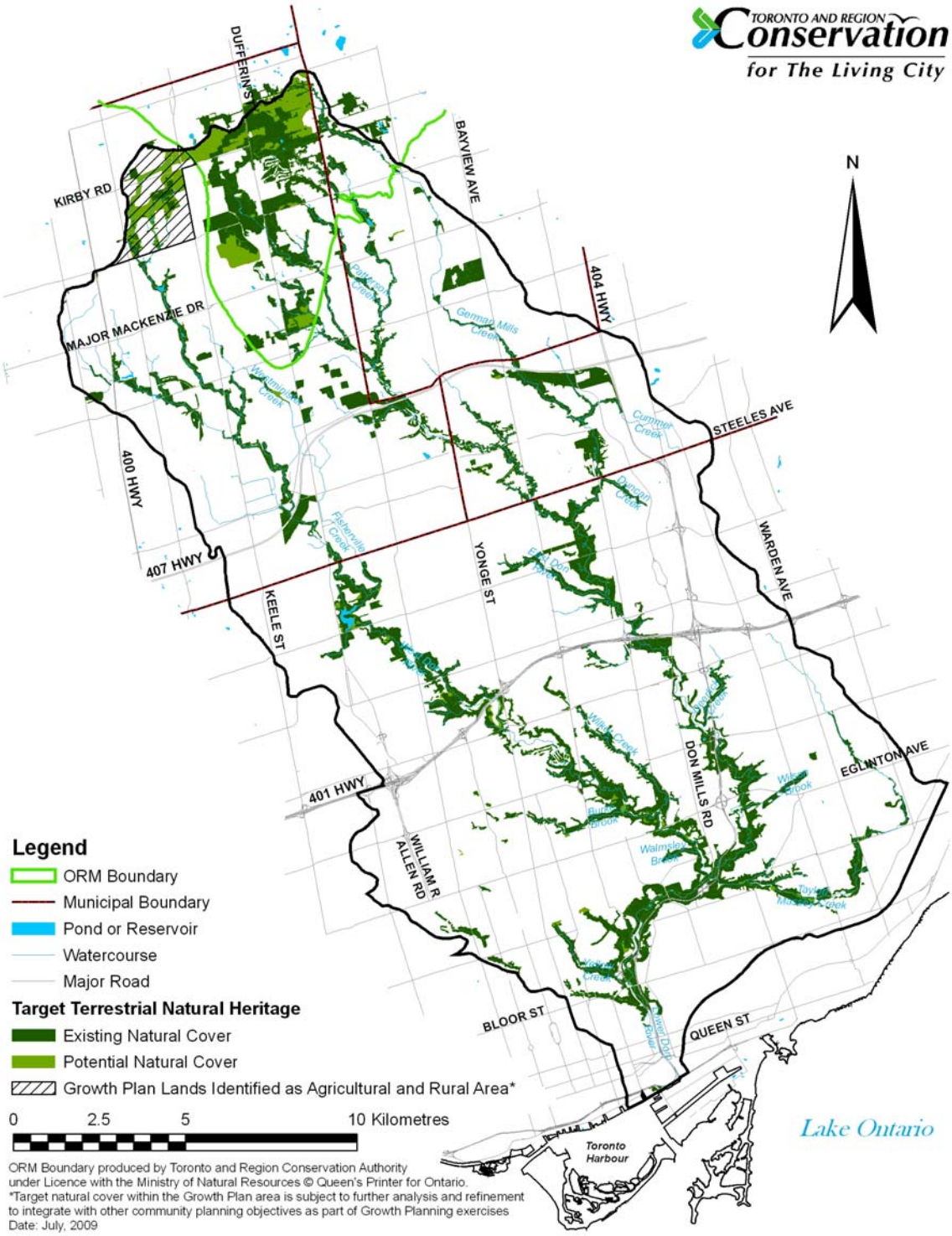


Table 6: Refined target terrestrial natural heritage system by subwatershed.

Subwatershed	Quantity							Quality	
	Total		L1	L2	L3	L4	L5	Mean Total Score	Mean L-rank**
	ha	%*	ha	ha	ha	ha	ha		
Upper West	720	12	0	73	220	414	13	7	L4 - poor
Upper East	1,436	23	0	552	381	478	25	7	L4 - poor
German Mills Creek	464	12	0	60	111	282	11	8	L4 - poor
Lower West	805	13	0	0	0	804	1	7	L4 - poor
Lower East	583	10	0	0	5	564	14	7	L4 - poor
Taylor/Massey Creek	202	7	0	0	0	190	11	7	L4 - poor
Lower Don River	403	8	0	0	0	390	12	7	L4 - poor
Don Watershed	4611	13	0	685	718	3,122	86	7	L4 - poor

* Percentages are derived from the number of hectares of natural cover in relation to the landbase. Zonal statistical data were used.

** L-ranks correspond to the following quality scores: L1, 13+; L2, 11-13; L3, 9-11; and L4, 6-9. The L-ranks are intended to characterize quality conditions across TRCA's jurisdiction and represent a broader range of condition than is found within the Don River watershed.

The target system represents the minimum natural cover required to maintain the current level of habitat quality in the watershed. The quality of the refined target system (represented by mean L-rank for the watershed) is unchanged from 2002 conditions, although there is an increase of L2 patches watershed-wide.

In the case of the Don, attainment of the management objectives will be reflected in both a comparison of existing conditions with the target as well as actions taken outside of the natural heritage system (e.g., improvements in the urban forest, naturalization of back yards and park lands, implementation of green roofs, etc).

5.2 Management Considerations

5.2.1 Implementing the Terrestrial Natural Heritage System Strategy

Protect the land base and improve habitat with a long-term view (over the next 100 years) by implementing the Terrestrial Natural Heritage System Strategy and target natural system within the watershed.

- Secure all remaining habitat patches in the watershed, especially mature forests, wetlands, and any patches containing vegetation communities or flora or fauna of concern.
- Secure all other lands within the target system that are currently unvegetated.
- Expand the natural system towards the target by increasing size, improving shape, and maximizing forest interior values of existing habitat patches.

- Maximize connections between existing features, plan for species movement corridors; focus on restoring east-west connections on tableland where possible and improving connections between the headwaters and southern valleys.
- The Lower Don is undergoing an Environmental Assessment to rehabilitate the river mouth. This may provide opportunities for natural cover and connectivity linking the Don Valley with the waterfront natural areas (Cherry Beach, Toronto Island, Leslie Spit).
- Restoration projects should be compatible with the site conditions; for example, sites that support open-habitat species of concern should usually not be reforested. Field inventory and assessment of prospective restoration sites is advisable. Habitat Implementation Plans (HIPs) can be a useful tool for input.
- Prioritize efforts to buffer the known locations of sensitive vegetation and species. HIPss can be used to help prioritize sites.
- Plantings should emphasize quality (appropriate to site, high survivability) over quantity (numbers of trees planted) and use bioregionally-derived stock with adequate aftercare. In some cases it may be appropriate to mix in southern species as a mechanism for climate change adaptation. In any case, stock information should be documented.
- Ensure recruitment and survival of young native trees in mature and old growth forests through natural regeneration. This will also improve the under storey for avian habitat requirements.
- Continue terrestrial inventories to obtain status of species such as Blanding's turtle and improve understanding of the range of vegetation communities and species in the Don.
- Consider special attention to recovery of vegetation communities and species that are of concern or that are lost from the Don watershed.
- Create wetland types that are under-represented in the Don watershed due to historic and current land use issues (e.g. swamp forests on tableland).
- Convert manicured areas and old fields to forests and wetlands where possible and appropriate to achieve habitat above and beyond the target system.
- Secure adequate buffers to protect and improve existing habitat.

5.2.2 Mitigate the Matrix Influence

If we protect and enhance the existing natural system, there will be significant mitigation of the matrix influence impacts. However, in an urban watershed such as the Don, the following additional steps should be taken.

- Encourage the naturalization and the use of native plants on private lands (including employment districts) and public lands wherever possible.
- Control and manage the spread of non-native invasive species.
- Maintain and expand the urban street canopy with native trees such as oak that attain large sizes (see below)
- Ensure that infrastructure placement is compatible with the target natural system. For example, storm water facilities for the Wet Weather Flow Programme should be placed away from forest and wetland or species of concern. However, storm water facilities can

have a major beneficial effect on the target system when placed upstream of mature forests that are suffering from riparian erosion.

- Manage public access through the natural system, emphasizing the protection of areas where sensitive species and communities exist.
- Use wetlands to provide protected habitats and restrict public access
- Plan our communities to protect wildlife populations, especially reptiles and amphibians as they move from forest to wetland. There needs to be detailed knowledge of their routes in terms of the placement of buildings, roads, and amphibian tunnels. Tunnels across road barriers between forest and wetlands even where no amphibians currently occur may facilitate recolonization and improve natural system health.
- Ensure that proposals for trail development take the locations of sensitive species and communities into consideration to mitigate all potential threats. Use signage to identify formal trails and sensitive areas that should be kept free of public use.
- Restore new areas with resilient vegetation to address recreational demands and provide opportunities for nature appreciation and recreation.
- Control roving pets (cats and dogs); keep dogs on leashes and cats indoors during the bird breeding season. Provide adequate off-leash dog areas away from the targeted system and enforce leash laws.
- Identify and rectify sources of erosion, invasive non-native species, trash, yard waste, and pollution (e.g. unfenced parking lots in business districts that direct storm water runoff and garbage straight into ravines; mature Norway maples adjacent to woodlots, etc.)
- Control encroachment by adjacent property owners into public natural areas (improved education and stewardship, enforcement).
- Encourage storm water management where possible including using green roofs for water quality and quantity improvements; microclimate mitigation, biodiversity, and gardening. For green roofs, prioritize areas that are close to the targeted natural system. The contribution of green roofs located near the natural heritage system could be enhanced by designing for biodiversity.
- Reduce light pollution adjacent to and within natural areas

By protecting and restoring the ability of natural systems to carry out ecological functions within a developed landscape such as the Don River watershed, there will be less need for costly maintenance of infrastructure, as well as cost savings from taking a preventative approach rather than relying on remedial solutions.

5.2.3 Urban canopy

In a highly urbanized watershed such as the Don, the tree canopy throughout the city neighbourhoods is of significant importance as a support to the natural system. It is estimated that there are more than three million trees in the City of Toronto on public land alone (City of Toronto, 2006). They provide improved air quality, cooling in summer, and habitat for invertebrates and migrating birds. In some neighbourhoods, a significant share of the urban canopy is actually composed of original native trees that pre-date development. The ecological

functions of the urban canopy and its connection with the terrestrial natural system need further study. Growing a green canopy over the City is one of the goals of *Our Common Grounds*, the 15-year strategic action plan for Toronto Parks, Forestry and Recreation (City of Toronto, 2007). Annual plantings, public outreach efforts, and service levels would all be increased under the plan. The current urban canopy cover for the entire City is 20%, while 35% has been estimated as an optimum target (City of Toronto, 2006).

Infill development, redevelopment, and such practices as front-yard parking can leave too little soil area for anything other than shrubs or very small trees. Invasive pests such as Asian Long-horned Beetle (ALHB) are a very serious threat to many tree species in the existing canopy. Efforts have been made to prevent the spread of the ALHB from the regulatory zone that falls partly within the West Don River subwatershed. These efforts have so far been successful however the Emerald Ash Borer arrived recently in the TRCA region and there has been no effective method found for controlling its spread. The following points will help to mitigate some of the effects of the urban matrix on city trees.

- Determine successful ways to grow street trees along urban streets.
- Protect topsoil and prevent compaction
- Minimize the ratio of hardened surface to urban population in the landscape. This will encourage infiltration, reduce runoff and help allow for enough root space for street and yard trees to grow.
- Ensure compatibility of above- and below-ground infrastructure with the existing and planned urban canopy. Remember that below-ground structures such as water mains will require maintenance, which in turn entails major soil and root disturbance.
- Plant long-lived native trees such as oak that attain large sizes where possible.
- Collect seed from existing original native urban canopy trees that pre-date development. This will help protect genetic and bioregional heritage.
- Look for host trees that appear resistant to invasive pests and attempt to collect and save their seeds.
- Include native tree species in planting plans that are not known to host major invasive pests such as ALB and Emerald Ash Borer.

Some woodlots in the Upper West Don, in Vaughan, fall outside of the ORM and Greenbelt boundaries. Vaughan currently uses a functional assessment methodology (described in the OPA 400 Environmental Background Study, Gartner Lee Limited, 1993) to evaluate environmental function. In OPA 600, Vaughan's Terrestrial Resources Protection policies state that those woodlands assessed with high or moderate environmental function are deemed significant terrestrial resources requiring preservation. Further, these policies state that woodlands in Rural Areas are subject to evaluation based on the Environmental Management Guidelines and will have boundaries confirmed through subsequent efforts at a site-specific level.

York Region's Forest Conservation Bylaw requires a permit for cutting trees in a woodland (at least 1 hectare) or woodlot (0.2 to 1 hectare). In addition, York Region recently completed and

endorsed a study that identifies forested lands for protection; those selected forested lands were included in amendment 37 to York Region's Official Plan. In the rest of the Don River watershed depending on location, zoning, and other considerations, the remaining wooded areas may be protected from cutting through various policies including the Greenbelt legislation and the ORM Conservation Act (Figure 4), or municipal and regional bylaws. The ORM, Greenbelt, and OP legislation do not protect against existing approved uses.

5.2.4 Regeneration of Mature and Old-growth Forests

The mature forests found in Toronto parks and private ravines and tablelands are important for their contribution to species habitat, the regional natural system, ecological services and human enjoyment. Efforts should ensure their long-term viability. The best way to encourage regeneration in the existing forests in the Don is to allow the forest to maintain its own integrity and "heal itself". For this to happen, disturbances must be controlled including but not limited to trampling and trails, invasive species, off-leash dogs, erosion, and dumping. Tree-planting is not recommended except in a very limited way with bioregionally-derived seed because:

- planting does not address the root of the problem which is disturbance leading to lack of recruitment (i.e., native trees on site fail to reproduce).
- most nursery stock is not regionally sourced. Planting alters the natural character of mature communities because it is “artificial” regeneration, usually employing genotypes of unknown origin.
- Planting activity itself constitutes a form of disturbance because it involves trampling, digging, and sometimes vehicles and equipment.

On the other hand, planting is a good strategy when dealing with medium-to-large tracts of disturbed, agricultural, or manicured open land with little native seed source nearby. In such situations, even conventional conifer plantations can suppress invasive species and encourage the build-up of decay-resistant duff that is a favourable nursery for native forest flora.

5.2.5 Take a Long-term Approach

The best restoration results in disturbed urban areas appear to come with small-scale, long-term projects. At Todmorden Mills Wildflower Preserve, a heavily disturbed section of the Lower Don (also one of the oldest European settlement sites in the Toronto area (Herzberg and Juhola, 1987)), efforts to regenerate native vegetation have been going on for over ten years (Kamstra, 2003). Despite the overwhelmingly exotic (i.e., non-native) character of the vegetation at the outset, subtle but very real positive changes are now visible, especially in the all-important sapling regeneration and ground flora layers. As Leslie Sauer (Sauer, 1998) noted with regard to New York City’s Central Park restoration work, there can be no substitute for people who deeply know and are dedicated to an area over a long period. It is better to keep projects a manageable size in such urban situations than to risk becoming overwhelmed.

5.2.6 Special Wetland Considerations

Wetlands deserve special attention in the Don watershed for two reasons. Firstly, they are under-represented; and secondly, they are more resistant to negative matrix influences; fewer

people, dogs and cats will intrude in swamp or marsh habitat as people typically prefer the drier mature forests for recreational activities. As discussed in section 4.3, most wetlands, especially on the tablelands, have been eliminated from the Don watershed. Historical wetland locations and other potential areas should be targeted for wetland creation with the targeted system in mind, where complimentary habitats and objectives are present.

It is crucial, if the biodiversity of the Don watershed is to be maintained and enhanced, that an effective means for mitigating the overwhelmingly negative Matrix Influence be found. Wetland creation or wetland enhancement in particular has great potential for restoring fauna and flora diversity in an urban landscape.

The Lower Don EA presents opportunities for wetland creation through the naturalization of the mouth of the Don.

5.2.7 Opportunities outside the Target System

Even the natural system shown by the target will still be fragmented and occupy a relatively small portion of the watershed. Compared to such watersheds as the Humber and the Duffins, the Don has fewer opportunities for expansion of the natural system because most of the land base is already urbanized.

Some lands, however, are not captured by the current methodology for identifying the target system. These include some of the area included in the City of Toronto's designated Natural Heritage System, existing and planned belts of riparian vegetation too narrow to be picked up by the methodology (for example, at Donalda Golf Course, and a large quantity of manicured land in parks, golf courses, etc.

Consideration should be given to expanding the natural system onto these manicured lands, should they become available, based upon the following criteria:

- landscape ecology modeling indicates that habitat patch quality scores will be significantly improved;
- the manicured land is adjacent to existing mature forest or wetland;
- the adjacent natural cover already supports vegetation communities, flora, or fauna of concern;
- the site has heavy clay soils that may provide an opportunity for seasonal wetlands or light sandy soils that may support oak savannah or woodland;
- the demand for the current use of the manicured area is not too high, or can be accommodated elsewhere; and
- The site is included within the designated natural heritage system of the City of Toronto or other municipality.

5.2.8 Opportunities for Native Terrestrial Species within the Don River Watershed

Despite the pressure of threats detailed in previous sections there are still opportunities for salvaging and enhancing the natural system within the Don watershed, indeed in some respects the opportunities are perhaps more promising than in many other similar city landscapes across the North American continent. The Don watershed's mature and largely intact ravine woodlands still support significant urban forest species such as wood thrush, pileated woodpecker, red-backed salamander, Christmas fern (*Polystichum acrostichoides*) and Michigan lily (*Lilium michiganese*). There are opportunities to help ensure healthy populations of species that have shown resilience in the urban matrix.

Building on what remains and creating additional habitat in areas that will result in the most stable and high functioning system possible within this urban watershed are two aspects of an important approach that will ensure that habitat is available for species such as wood thrush and red-backed salamanders, together with all of the more typically resilient L4 and L5 species. In some cases more common L3 flora species would also benefit.

Appropriate trail design in the ravine parks throughout the watershed will help allow fauna species that are sensitive to disturbance – Cooper's hawk and pileated woodpecker – to be able to nest in relative peace in more secluded portions of the remaining natural cover, while sensitive flora populations are avoided. Restoration of ground cover and forest under story in areas that have been heavily over-used in the past will present non-ground-nesting songbirds – wood thrush, American redstart, rose-breasted grosbeak – with opportunities to nest and forage successfully. The same action would also benefit spring ephemerals and other forest ground flora.

The fostering of responsible stewardship among those city residents who live alongside or in the vicinity of areas of natural cover with regards to the control of their pets, the naturalization of their gardens and waste management, will ensure that native fauna species do not succumb to the pressures of increased predation and reduced foraging opportunities associated with the urban matrix. Useful stewardship tools have been developed by The Don Watershed Regeneration Council and the Don Watershed Task Force, including watershed report cards, and education and outreach material. The Task Force to Bring Back the Don is a citizens group that also does extensive stewardship work.

Much has been made of restoring opportunities for breeding songbirds within the urban landscape. An equally important opportunity exists in restoring urban forests for migrant songbirds. As described earlier it seems that the main restriction imposed on potential breeding fauna is matrix influence as opposed to patch size; for migrating birds this matrix influence is transient and therefore migrants will fare better in passing through the remaining natural cover of the urban landscape than do breeding birds. Taken to the extreme, some of the migrant songbird species traveling north or south along the watershed will only need a more or less continuous canopy corridor, reacting little to the urban disturbances that persist

on the ground below. More reasonably though, in order to satisfy the foraging requirements of the full range of migrant songbirds passing through the watershed it would be important to provide opportunities at all levels of the forest structure – providing habitat for migrant sparrows and thrushes at ground level, for certain warbler species at the under story level and for warblers, vireos and tanagers at the middle and upper canopy levels.

It is possible that, in enhancing and creating such habitats for migrant birds, breeding opportunities for avian and non-avian fauna species will be incidentally created and improved habitat for native flora species as well. Sensitive flora species tend to persist longer than sensitive fauna, especially when buffers are created to mitigate the matrix influence. Existing native flora and fauna species in the Don watershed, although incomplete, include a rich and varied diversity that can provide ample motivation for people to become aware and concerned for those more sensitive species that are still to be found in the natural habitat remaining in the rural areas outside of the city. In this way, provision of nest-boxes for eastern screech-owls and wood ducks in Sunnybrook Park can be seen as an introduction for urbanites to conservation issues beyond the regional boundaries.

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6.0 References

Banville, Diana, 1994. Vascular Plants of Metropolitan Toronto. Toronto: Toronto Field Naturalists.

Banville, Diana, and Linda Cardini, 1978. West Don River Valley: Toronto Field Naturalists' Ravine Survey #8. Toronto: Toronto Field Naturalists.

Bazely, Dawn. York University Department of Biology. Personal Communication.

Blackshaw, Marjorie, Molly Campbell, Cathie Duncan, Gavin Miller, Rina Palumbo, and Matthew Ng, 1984. An Inventory of Natural Resources of East York outside of parks. Toronto: Environment Canada and Toronto Field Naturalists. Environment 2000 Project SA 29.

City of Toronto, 2006. http://www.toronto.ca/trees/urban_forest_now_forever.htm

City of Toronto, 2007. http://www.toronto.ca/parks/commongrounds.htm

Cramner-Byng, Jack, Robin Cunningham, Emily Hamilton and Helen Juhola, 1977. Burke Ravine: Toronto Field Naturalists Ravine Study #6. Toronto: Toronto Field Naturalists.

Department of Planning and Development, 1950. Don Valley Conservation Report. Toronto

Don Watershed Regeneration Council (DWRC) and Metropolitan Toronto and Region Conservation Authority (MTRCA). 1997. Turning the Corner: the Don Watershed Report Card. Toronto, ON: MTRCA.

Draper, William, 1998. Ecological Land Classification Vegetation Inventory and Monitoring Plan for Sherwood Park, City of Toronto (draft). Toronto: William Draper Consulting.

Farmery, R.J., 1894. Calypso borealis Salisb. The Biological Review 1: 79.

Faull, J.H., 1913. The Natural History of the Toronto Region. Toronto: Canadian Institute.

Gartner Lee Limited, 1993. The City of Vaughan Subwatershed Study – Background Report on Existing Environmental Conditions and Functional Assessment.

Havinga, Donna and Ontario Invasive Plants Working Group, 2000. Sustaining Biodiversity: A Strategic Plan for Managing Invasive Plants in Southern Ontario. City of Toronto.

Herzberg, Louise, and Helen Juhola, 1987. Todmorden Mills: a human and natural history. Toronto: Toronto Field Naturalists.

Juhola, Helen. Former Board Member Toronto Field Naturalists. Personal Communication.

Kamstra, James, 2003. Todmorden Mills Wildflower Preserve Environmental Baseline Study. Toronto: Todmorden Wildflower Preserve.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. *Ecological Land Classification for Southern Ontario: First Approximation and its Application*. Peterborough, Ontario: Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch.

MTRCA, 1994. *Forty Steps to a New Don*. The Report of the Don Watershed Task Force. Toronto: Metropolitan Toronto and Region Conservation Authority.

Miller, Gavin C., 1984. Draft notes for East York Natural Resources inventory.

Miller, Gavin C. and Steve Smith, 1997. A Botanical Survey of the Fisherville Creek Ravine and Clay Barren. Toronto: Urban Forest Associates.

Rosenburg, K.V., R.W. Rohrbaugh, Jr., S.E. Barker, J.D. Lowe, R.S. Hames, and A.A. Dhondt, 1999. A Land Manager's Guide to improving Habitat for Scarlet Tanagers and other Forest-dwelling Birds. Ithaca, NY: Cornell Lab of Ornithology.

Sauer, Leslie, 1998. The Once and Future Forest. San Francisco: Island Press.

Simcoe, E. 1796. Mrs. Simcoe's Diary (ed. Mary Quayle Innis, 1965). Toronto: MacMillan.

Smith, Steve, 2000. Invasive Exotic Species Ranking for Southern Ontario. Urban Forest Associates Inc.

Toronto and Region Conservation Authority (TRCA), 1994. Valley and Stream Corridor Management Program. Toronto and Region Conservation Authority.

Toronto and Region Conservation Authority (TRCA). 2000. A Time for Bold Steps: The Don Watershed Report Card 2000. A report of the Don Watershed Regeneration Council.

Toronto and Region Conservation Authority (TRCA). 2003. Breathing New Life into the Don. A report of the Don Watershed Regeneration Council.

Toronto and Region Conservation Authority (TRCA). 2007. Forging a New Deal for the Don: The 2006 Progress Report by the Don Watershed Regeneration Council.

TRCA, 2004. Centreville Creek Subwatershed Terrestrial Biological Inventory. Toronto and Region Conservation Authority.

TRCA, 2005. Terrestrial Natural Heritage Program Data Collection Methodology. Toronto and Region Conservation Authority.

TRCA, 2007. Regional Terrestrial Natural Heritage System Strategy. Toronto and Region Conservation Authority.

Varga, S: John Fraser, Lionel Normand, 1997. Inventory of the Life Science Maple Uplands and Kettle Wetlands and Earth Science Oak Ridges Moraine Maple Spur Areas of Natural and Scientific Interest, City of Vaughan. Aurora: Ontario Ministry of Natural Resources.

Whiting, R. Emerson, and Paul M. Catling, 1986. Orchids of Ontario. Ottawa: CanadaColl Foundation.

Appendix A: Summary of the habitat type and land use patch definitions used in landscape analysis.

Habitat Type or Land Use	Community Types Considered	Minimum patch size
Forest	coniferous, mixed, deciduous forest communities, plantations, successional lands, treed-swamps	0.5 ha based on ELC guide using 1:10 000 air photos, can be slightly smaller when using 1:4000 scale as a base and when small patch is deemed valuable to system
Wetland	shallow marsh, meadow marsh, shallow aquatic ponds (where water is know to be less than 2 m deep), thicket swamps and treed-swamps where known to exist; meadow marsh often indistinguishable from drier meadows cannot always be mapped accurately unless known to exist	no limit was set; wetlands often occur naturally as small pockets in the landscape; if discernable at 1:4000, it is mapped
Meadow	old field habitat or cultural meadows, natural tallgrass prairie, sand barren and sometimes meadow marsh are included in this category	0.5 ha based on ELC guide using 1:10 000 air photos, can be slightly smaller when using 1:4000 scale as a base and when small patch is deemed valuable to system
Beach/Bluff	natural barren coastal habitats not corresponding to other habitat types, including natural beach, coastal dunes and bluffs	no limit was set; beach/bluff habitats often occur as small features in the landscape; if a beach/bluff type is discernable at a scale of 1:4000 it is mapped
Agricultural	croplands, fruit tree plantations, and pastures (may also include golf courses and aggregate extraction pits within a rural matrix)	no minimum sizes are assigned to agricultural and urban land use types
Urban	"urban" areas are considered any part of the landscape that has been modified primarily for human use other than agriculture/forestry; includes residential, commercial, industrial land, roads, and manicured areas such as cemeteries, golf courses, and parkland (due to intensity of management and potential negative impacts on natural areas).	no minimum sizes are assigned to agricultural and urban land use types

Appendix B: List of vegetation communities mapped in the Don River watershed 1996-2005.

Appendix B: List of Vegetation Communities Mapped in the Don Watershed 1996-2005

ELC Code	Vegetation Type	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2004-02)
	Forest					
FOC1-2	Dry-Fresh White Pine Coniferous Forest	5.4	4	5	9	L1
FOC2-2	Dry-Fresh White Cedar Coniferous Forest	1.9	2	2	4	L4
FOC3-1	Fresh-Moist Hemlock Coniferous Forest	7.1	2	2	4	L4
FOC3-A	Fresh-Moist Hemlock - White Pine Coniferous Forest	5.1	3	2	5	L3
FOC4-1	Fresh-Moist White Cedar Coniferous Forest	5.0	2	2	4	L4
FOC4-2	Fresh-Moist White Cedar - Hemlock Coniferous Forest	2.9	2	2	4	L4
FOC4-A	Fresh-Moist White Cedar - White Pine Coniferous Forest	1.1	4	2	6	L3
FOM2-1	Dry-Fresh White Pine - Oak Mixed Forest	4.1	4	4	8	L2
FOM2-2	Dry-Fresh White Pine - Sugar Maple Mixed Forest	18.5	2	0	2	L5
FOM2-A	Dry-Fresh White Pine - Hardwood Mixed Forest	5.9	3	1	4	L4
FOM3-1	Dry-Fresh Hardwood Hemlock Mixed Forest	12.2	5	3	8	L2
FOM3-2	Dry-Fresh Hemlock - Sugar Maple Mixed Forest	18.9	2	2	4	L4
FOM4-1	Dry-Fresh White Cedar - Paper Birch Mixed Forest	0.4	3	1	4	L4
FOM4-A	Dry-Fresh White Cedar - Hardwood Mixed Forest	0.1	3	1	4	L4
FOM5-1	Dry-Fresh Paper Birch Mixed Forest	4.5	4	2	6	L3
FOM5-2	Dry-Fresh Poplar Mixed Forest	1.9	4	1	5	L3
FOM6-1	Fresh-Moist Sugar Maple - Hemlock Mixed Forest	43.6	2	2	4	L4
FOM6-2	Fresh-Moist Hemlock - Hardwood Mixed Forest	0.6	3	2	5	L3
FOM7-1	Fresh-Moist White Cedar - Sugar Maple Mixed Forest	1.0	2	2	4	L4
FOM7-2	Fresh-Moist White Cedar - Hardwood Mixed Forest	13.9	2	2	4	L4
FOM8-1	Fresh-Moist Poplar Mixed Forest	1.1	5	2	7	L2
FOD1-1	Dry-Fresh Red Oak Deciduous Forest	1.9	4	4	8	L2
FOD1-4	Dry-Fresh Mixed Oak Deciduous Forest	0.3	4	3	7	L2
FOD2-2	Dry-Fresh Oak - Hickory Deciduous Forest	1.1	5	1	6	L3
FOD2-4	Dry-Fresh Oak - Hardwood Deciduous Forest	13.2	3	1	4	L4
FOD3-1	Dry-Fresh Poplar Deciduous Forest	16.6	2	0	2	L5
FOD3-2	Dry-Fresh Paper Birch Deciduous Forest	1.4	2	1	3	L4
FOD4-1	Dry-Fresh Beech Deciduous Forest	2.2	5	0	5	L3
FOD4-2	Dry-Fresh White Ash Deciduous Forest	17.9	2	0	2	L5
FOD4-A	Dry-Fresh Ironwood Deciduous Forest	0.3	5	1	6	L3
FOD4-b	Dry-Fresh Manitoba Maple Deciduous Forest	8.2	2	0	2	L+
FOD4-d	Dry-Fresh Norway Maple Deciduous Forest	9.6	4	0	4	L+

Appendix B: List of Vegetation Communities Mapped in the Don Watershed 1996-2005

ELC Code	Vegetation Type	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2004-02)
FOD4-e	Dry-Fresh Exotic Deciduous Forest (miscellaneous alien spp.)	21.5	5	0	5	L+
FOD4-F	Dry-Fresh Black Cherry Deciduous Forest	0.1	4	0	4	L4
FOD4-G	Dry-Fresh Basswood Deciduous Forest	0.9	4	0	4	L4
FOD4-H	Dry-Fresh Hawthorn - Apple Deciduous Forest	1.0	3	0	3	L4
FOD5	Dry-Fresh Sugar Maple Deciduous Forest (no clear secondary dominant)	8.8	1	0	1	L5
FOD5-1	Dry-Fresh Sugar Maple Deciduous Forest	103.7	1	0	1	L5
FOD5-2	Dry-Fresh Sugar Maple - Beech Deciduous Forest	61.4	1	0	1	L5
FOD5-3	Dry-Fresh Sugar Maple - Oak Deciduous Forest	75.8	2	1	3	L4
FOD5-4	Dry-Fresh Sugar Maple - Ironwood Deciduous Forest	10.4	2	0	2	L5
FOD5-5	Dry-Fresh Sugar Maple - Hickory Deciduous Forest	11.5	4	1	5	L3
FOD5-6	Dry-Fresh Sugar Maple - Basswood Deciduous Forest	2.4	4	0	4	L4
FOD5-7	Dry-Fresh Sugar Maple - Black Cherry Deciduous Forest	13.2	3	0	3	L4
FOD5-8	Dry-Fresh Sugar Maple - White Ash Deciduous Forest	29.2	2	0	2	L5
FOD5-10	Dry-Fresh Sugar Maple - Paper Birch - Poplar Deciduous Forest	4.8	2	1	3	L4
FOD5-A	Dry-Fresh Sugar Maple - Hawthorn Deciduous Forest	3.1	3	0	3	L4
FOD5-b	Dry-Fresh Sugar Maple - Norway Maple Deciduous Forest	6.5	3	0	3	L4
FOD6-1	Fresh-Moist Sugar Maple - Ash Deciduous Forest	9.4	2	0	2	L5
FOD6-2	Fresh-Moist Sugar Maple - Black Maple Deciduous Forest	2.4	3	0	3	L4
FOD6-3	Fresh-Moist Sugar Maple - Yellow Birch Deciduous Forest	0.4	4	2	6	L3
FOD6-4	Fresh-Moist Sugar Maple - White Elm Deciduous Forest	4.8	2	0	2	L5
FOD6-5	Fresh-Moist Sugar Maple - Hardwood Deciduous Forest	62.6	2	0	2	L5
FOD7-1	Fresh-Moist White Elm Lowland Deciduous Forest	11.6	2	0	2	L5
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest	7.2	2	0	2	L5
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest	25.2	1	0	1	L5
FOD7-4	Fresh-Moist Black Walnut Lowland Deciduous Forest	8.4	5	0	5	L3
FOD7-5	Fresh-Moist Black Maple Lowland Deciduous Forest	0.9	3	0	3	L4
FOD7-a	Fresh-Moist Manitoba Maple Lowland Deciduous Forest	61.1	2	0	2	L5
FOD7-b	Fresh-Moist Norway Maple Lowland Deciduous Forest	9.6	4	0	4	L+
FOD7-c	Fresh-Moist Exotic Lowland Deciduous Forest (miscellaneous alien spp.)	5.7	5	0	5	L+
FOD7-F	Fresh-Moist Basswood Lowland Deciduous Forest	2.3	4	0	4	L4
FOD8-1	Fresh-Moist Poplar Deciduous Forest	34.5	2	0	2	L5
FOD8-B	Fresh-Moist Paper Birch Deciduous Forest	1.2	3	0	3	L4
FOD9-1	Fresh-Moist Oak - Sugar Maple Deciduous Forest	1.2	3	2	5	L3

Appendix B: List of Vegetation Communities Mapped in the Don Watershed 1996-2005

ELC Code	Vegetation Type	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2004-02)
FOD9-A	Fresh-Moist Oak - Beech Deciduous Forest	0.9	4	1	5	L3
CUP1-3	Black Walnut Deciduous Plantation	1.5	5	0	5	L5
CUP1-5	Silver Maple Deciduous Plantation	1.3	2	0	2	L5
CUP1-7	Red (Green) Ash Deciduous Plantation	0.8	2	0	2	L5
CUP1-7A	White Ash Deciduous Plantation	0.1	4	0	4	L5
CUP1-A	Restoration Deciduous Plantation	12.5	2	0	2	L5
CUP1-b	Willow Deciduous Plantation	0.7	4	0	4	L+
CUP1-c	Black Locust Deciduous Plantation	10.7	3	0	3	L+
CUP1-d	Exotic Deciduous Plantation (miscellaneous alien spp.)	0.1	4	0	4	L+
CUP1-f	Siberian Elm Deciduous Plantation	0.9	5	0	5	L+
CUP2-1A	Black Walnut - Conifer Mixed Plantation	0.9	4	0	4	L5
CUP2-A	Restoration Mixed Plantation	14.1	3	0	3	L5
CUP2-b	Black Locust - Conifer Mixed Plantation	0.8	3	0	3	L+
CUP2-c	Norway Maple - Conifer Mixed Plantation	2.7	2	0	2	L+
CUP2-D	Apple - Conifer Mixed Plantation	3.5	3	0	3	L5
CUP2-E	Silver Maple - Conifer Mixed Plantation	1.1	3	0	3	L5
CUP2-f	Hybrid Poplar - Conifer Mixed Plantation	0.6	3	0	3	L+
CUP2-h	Horticultural Mixed Plantation (largely alien spp.)	0.2	3	0	3	L+
CUP3-1	Red Pine Coniferous Plantation	6.3	2	0	2	L5
CUP3-2	White Pine Coniferous Plantation	2.6	2	0	2	L5
CUP3-3	Scotch Pine Coniferous Plantation	9.0	1	0	1	L+
CUP3-8	White Spruce - European Larch Coniferous Plantation	1.6	2	0	2	L5
CUP3-9	Norway Spruce - European Larch Coniferous Plantation	3.9	2	0	2	L+
CUP3-A	Restoration Coniferous Plantation	0.8	5	0	5	L5
CUP3-b	Austrian Pine Coniferous Plantation	0.5	2	0	2	L+
CUP3-C	White Spruce Coniferous Plantation	0.2	2	0	2	L5
CUP3-e	Norway Spruce Coniferous Plantation	1.1	2	0	2	L+
CUP3-G	White Cedar Coniferous Plantation	1.3	3	0	3	L5
CUP3-H	Mixed Conifer Coniferous Plantation (alien and native spp.)	7.4	2	0	2	L5
	Successional					
CUT1-1	Sumac Cultural Thicket	31.9	1	0	1	L5
CUT1-3	Chokecherry Cultural Thicket	0.3	3	0	3	L4
CUT1-5	Raspberry Cultural Thicket	1.1	2	0	2	L5

Appendix B: List of Vegetation Communities Mapped in the Don Watershed 1996-2005

ELC Code	Vegetation Type	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2004-02)
CUT1-A1	Native Deciduous Sapling Cultural Thicket	14.5	1	0	1	L5
CUT1-A2	Native Mixed Sapling Cultural Thicket	0.5	2	0	2	L5
CUT1-b	Buckthorn Cultural Thicket	11.5	3	0	3	L+
CUT1-c	Exotic Cultural Thicket (miscellaneous alien spp.)	16.5	4	0	4	L+
CUT1-D	Round-leaved Dogwood Cultural Thicket	0.3	4	2	6	L3
CUH1-A	Treed Hedgerow	14.5	1	0	1	L5
CUH1-B	Native Shrub - Sapling Hedgerow	0.3	2	0	2	L5
CUH1-c	Buckthorn Hedgerow	0.6	2	0	2	L+
CUS1-1	Hawthorn Cultural Savannah	13.9	2	0	2	L5
CUS1-A1	Native Deciduous Cultural Savannah	32.1	2	0	2	L5
CUS1-A2	White Pine Cultural Savannah	4.1	4	1	5	L3
CUS1-b	Exotic Cultural Savannah (miscellaneous alien spp.)	25.7	2	0	2	L+
CUW1-A1	White Cedar Cultural Woodland	0.6	3	1	4	L4
CUW1-A2	White Pine Cultural Woodland	21.6	4	1	5	L3
CUW1-A3	Native Deciduous Cultural Woodland	22.4	2	0	2	L5
CUW1-b	Exotic Cultural Woodland (miscellaneous alien spp.)	49.5	2	0	2	L+
CUW1-D	Hawthorn Cultural Woodland	3.4	2	0	2	L5
	Wetland					
SWC1-1	White Cedar Mineral Coniferous Swamp	2.0	2	2	4	L4
SWC1-2	White Cedar - Conifer Mineral Coniferous Swamp	3.8	4	2	6	L3
SWC3-1	White Cedar Organic Coniferous Swamp	0.3	2	3	5	L3
SWC3-2	White Cedar - Conifer Organic Coniferous Swamp	4.1	3	3	6	L3
SWCA-A	Hemlock Organic Coniferous Swamp	0.8	5	3	8	L2
SWM1-1	White Cedar - Hardwood Mineral Mixed Swamp	2.3	2	2	4	L4
SWM3-1	Birch - Conifer Mineral Mixed Swamp	0.03	4	2	6	L3
SWM4-1	White Cedar - Hardwood Organic Mixed Swamp	2.6	2	3	5	L3
SWM6-1	Birch - Conifer Organic Mixed Swamp	2.4	4	3	7	L2
SWD1-2	Bur Oak Mineral Deciduous Swamp	0.2	5	2	7	L2
SWD3-2	Silver Maple Mineral Deciduous Swamp	3.0	3	2	5	L3
SWD3-4	Manitoba Maple Mineral Deciduous Swamp	1.6	3	1	4	L4
SWD4-1	Willow Mineral Deciduous Swamp	10.8	1	0	1	L5
SWD4-2	White Elm Mineral Deciduous Swamp	2.6	2	1	3	L4
SWD4-3	Paper Birch - Poplar Mineral Deciduous Swamp	7.2	2	1	3	L4

Appendix B: List of Vegetation Communities Mapped in the Don Watershed 1996-2005

ELC Code	Vegetation Type	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2004-02)
SWD4-4	Yellow Birch Mineral Deciduous Swamp	0.3	4	2	6	L3
SWD7-1	Paper Birch - Poplar Organic Deciduous Swamp	0.3	4	3	7	L2
SWD7-2	Yellow Birch Organic Deciduous Swamp	0.03	4	3	7	L2
SWT2-2	Willow Mineral Thicket Swamp	5.2	1	0	1	L5
SWT2-3	Mountain Maple Mineral Thicket Swamp	0.1	3	2	5	L3
SWT2-5	Red-osier Mineral Thicket Swamp	2.4	2	0	2	L5
SWT2-8	Silky Dogwood Mineral Thicket Swamp	0.6	4	1	5	L3
SWT3-1	Alder Organic Thicket Swamp	1.1	3	4	7	L2
SWT3-2	Willow Organic Thicket Swamp	0.02	3	3	6	L3
SWT3-5	Red-osier Organic Thicket Swamp	2.4	2	3	5	L3
MAM5-1	Mineral Fen Meadow Marsh	0.04	5	3	8	L2
MAM2-2	Reed Canary Grass Mineral Meadow Marsh	8.2	2	0	2	L5
MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh	0.1	2	1	3	L4
MAM2-6	Broad-leaved Sedge Mineral Meadow Marsh	1.2	3	1	4	L4
MAM2-7	Horsetail Mineral Meadow Marsh	0.5	3	2	5	L3
MAM2-9	Jewelweed Mineral Meadow Marsh	1.6	2	1	3	L4
MAM2-10	Forb Mineral Meadow Marsh	9.2	2	1	3	L4
MAM2-a	Common Reed Mineral Meadow Marsh	1.5	3	0	3	L+
MAM2-b	Purple Loosestrife Mineral Meadow Marsh	1.5	2	0	2	L+
MAM2-C	Rush Mineral Meadow Marsh	0.3	2	2	4	L4
MAM3-2	Reed Canary Grass Organic Meadow Marsh	0.3	2	2	4	L4
MAM3-8	Jewelweed Organic Meadow Marsh	0.1	4	3	7	L2
MAM3-9	Forb Organic Meadow Marsh	0.01	3	3	6	L3
MAS2-1A	Broad-leaved Cattail Mineral Shallow Marsh	2.5	2	1	3	L4
MAS2-1b	Narrow-Leaved / Hybrid Cattail Mineral Shallow Marsh	9.8	1	0	1	L5
MAS2-2	Bulrush Mineral Shallow Marsh	0.1	2	1	3	L4
MAS2-3	Narrow-leaved Sedge Mineral Shallow Marsh	0.8	3	1	4	L4
MAS2-4	Broad-leaved Sedge Mineral Shallow Marsh	0.1	3	1	4	L4
MAS2-8	Rice Cut-grass Mineral Shallow Marsh	0.1	2	1	3	L4
MAS2-9	Forb Mineral Shallow Marsh	0.4	2	1	3	L4
MAS2-a	Common Reed Mineral Shallow Marsh	0.5	2	0	2	L+
MAS2-b	Purple Loosestrife Mineral Shallow Marsh	0.1	3	0	3	L+
MAS2-C	Horsetail Mineral Shallow Marsh	0.04	2	1	3	L4

Appendix B: List of Vegetation Communities Mapped in the Don Watershed 1996-2005

ELC Code	Vegetation Type	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2004-02)
MAS2-d	Reed Canary Grass Mineral Shallow Marsh	0.5	1	0	1	L5
MAS2-e	Giant Manna Grass Mineral Shallow Marsh	0.9	4	1	5	L+
MAS3-1A	Broad-leaved Cattail Organic Shallow Marsh	0.3	2	3	5	L3
MAS3-4	Broad-leaved Sedge Organic Shallow Marsh	0.01	4	3	7	L2
MAS3-10	Forb Organic Shallow Marsh	0.02	4	3	7	L2
MAS3-a	Purple Loosestrife Organic Shallow Marsh	0.1	5	2	7	L+
	Aquatic					
SAM1-2	Duckweed Mixed Shallow Aquatic	0.2	4	1	5	L3
SAF1-1	Water Lily - Bullhead Lily Floating-leaved Shallow Aquatic	0.2	3	2	5	L3
SAF1-3	Duckweed Floating-leaved Shallow Aquatic	1.2	2	1	3	L4
OAO1	Open Aquatic (deep or riverine)	3.4				L5
OAO1-T	Turbid Open Aquatic (disturbed)	43.5				L+
	Dynamic (Beach, Bluff, Barren, Prairie, Savannah)					
BBO1-3	Reed Canary Grass Open Beach	0.1	5	2	7	L2
BBO1-A	Riparian Sand / Gravel Bar	0.3	2	2	4	L4
BBS1-2	Willow Shrub Beach	0.3	4	3	7	L2
BLO1	Mineral Open Bluff	1.8	2	2	4	L4
BLS1-A	Sumac - Willow Shrub Bluff	0.6	3	2	5	L3
BLS1-B	Serviceberry - Buffaloberry Shrub Bluff	0.3	5	3	8	L2
BLS1-c	Exotic Shrub Bluff	0.5	1	2	3	L+
BLT1-A	White Cedar Treed Bluff	0.1	4	3	7	L2
BLT1-B	Deciduous Treed Bluff	3.2	3	2	5	L3
BLT1-c	Exotic Treed Bluff (miscellaneous alien spp.)	0.3	4	2	6	L+
CBS1	Shrub Clay Barren	2.4	3	4	7	L2
SBO1-A	Dry Dropseed Sand Barren	0.4	5	4	9	L1
SBO1-B	Dry-Fresh Flat-stemmed Bluegrass - Forb Sand Barren	0.4	5	3	8	L2
SBT1	Treed Sand Barren	0.1	5	5	10	L1
TPO1-1	Dry Tallgrass Prairie	0.02	5	5	10	L1
CUS1-3	Red Oak Cultural Savannah	0.1	4	2	6	L3
CUW1-2	Dry Red Oak Cultural Woodland	0.1	4	2	6	L3
	Meadow					
CUM1	Mineral Cultural Meadow Ecosite	112.3	1	0	1	L5

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ELC Code	Vegetation Type	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2004-02)
CUM1-A	Native Forb Old Field Meadow	24.4	1	0	1	L5
CUM1-b	Exotic Cool-season Grass Old Field Meadow	53.5	1	0	1	L+
CUM1-c	Exotic Forb Old Field Meadow	25.2	1	0	1	L+
	Actively Managed Lands					
ag	Agricultural (includes horse paddocks at Sunnybrook, etc.)	9.8				
m	Manicured (includes athletic fields, gardens, treed lawns)	226.9				

VEGETATION SUMMARY FOR DON WATERSHED 1996-2005

TOTAL AREA COVERED BY VEGETATION FIELD SURVEYS (HECTARES)	1793.2
NUMBER OF VEGETATION TYPES (NATURAL COVER)	192
TOTAL HECTARES OF SURVEYED NATURAL COVER	1556.5
TOTAL HECTARES OF NATIVE-DOMINATED VEG TYPES	1239.4
TOTAL HECTARES OF EXOTIC-DOMINATED VEG TYPES	317.1
PERCENTAGE OF NATURAL COVER DOMINATED BY NATIVE CANOPY *(may, however, be dominated by invasive alien ground layer or regeneration)*	79.6

TOTAL HECTARES OF L1-L3 VEG TYPES	121.8
TOTAL HECTARES OF L4 VEG TYPES	266.6
TOTAL HECTARES OF L5 VEG TYPES	851.0

TOTAL HECTARES OF FOREST VEG TYPES (INCL. PLANTATIONS)	919.2
TOTAL HECTARES OF SUCCESSIONAL VEG TYPES (INCL. PLANTATIONS)	265.3
TOTAL HECTARES OF WETLAND VEG TYPES (INCL. FOREST SWAMP)	97.2
TOTAL HECTARES VEGETATED AQUATIC TYPES	1.6
TOTAL HECTARES NON-VEGETATED AQUATIC	46.9
TOTAL HECTARES DYNAMIC VEG TYPES	10.9
TOTAL HECTARES MEADOW	215.4
TOTAL HECTARES ACTIVELY MANAGED LANDS INCLUDED IN SURVEYS	236.7

Appendix C: List of flora species found in the Don River watershed from 1996-2005.

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Spiranthes romanzoffiana	hooded ladies' tresses	5	4	5	5	19	L1
Anemone americana (Hepatica americana)	round-lobed hepatica	3	5	5	5	18	L2
Asclepias exaltata	poke milkweed	4	5	4	4	17	L2
Botrychium virginianum	rattlesnake fern	3	5	5	5	18	L2
Brachyeletrum erectum	bearded shorthusk	4	5	4	4	17	L2
Carex aquatilis	water or Goodenough's sedge	4	4	5	4	17	L2
Carex grayi	Gray's sedge	5	5	4	4	18	L2
Caulophyllum thalictroides	blue cohosh	5	3	5	4	17	L2
Comandra umbellata	comandra or bastard toadflax	5	2	5	5	17	L2
Coptis trifolia (C. groenlandica)	goldthread	3	5	5	5	18	L2
Cypripedium calceolus var. parviflorum (C. parviflorum)	smaller yellow lady's slipper	3	4	5	5	17	L2
Cypripedium calceolus var. pubescens (C. pubescens)	larger yellow lady's slipper	4	4	5	4	17	L2
Cypripedium reginae	showy lady's slipper	3	4	5	5	17	L2
Cystopteris tenuis (Cystopteris fragilis var.mackayi)	Mackay's fragile fern	3	4	5	5	17	L2
Dicentra cucullaria	Dutchman's breeches	3	4	5	5	17	L2
Diphasiastrum digitatum (Lycopodium digitatum)	crowfoot club-moss	3	5	5	5	18	L2
Dryopteris clintoniana	Clinton's wood fern	3	5	5	4	17	L2
Gentianopsis crinita	fringed gentian	4	4	5	5	18	L2
Geum rivale	water avens	4	4	5	4	17	L2
Lindera benzoin	spice-bush	5	5	4	4	18	L2
Lycopodium dendroidium (L. obscurum v. dendroideum)	round-branched ground-pine	3	5	5	5	18	L2
Medeola virginiana	Indian cucumber-root	3	5	4	5	17	L2
Monotropa hypopithys	pinesap	3	4	5	5	17	L2
Muhlenbergia glomerata	marsh wild timothy	5	3	4	5	17	L2
Nymphaea odorata (incl. ssps. odorata & tuberosa)	fragrant water lily	4	5	5	4	18	L2
Osmorhiza longistylis	smooth sweet cicely	5	4	4	4	17	L2
Osmunda cinnamomea	cinnamon fern	2	5	5	5	17	L2
Polygala paucifolia	fringed polygala or gaywings	3	5	4	5	17	L2
Polypodium virginianum (P. vulgare)	rock polypody	4	4	5	5	18	L2
Pyrola asarifolia	pink pyrola	4	4	5	5	18	L2
Quercus alba	white oak	3	5	4	5	17	L2
Quercus velutina	black oak	5	4	4	5	18	L2
Shepherdia canadensis	buffalo-berry or soap-berry	4	4	5	4	17	L2
Symphoricarpos albus var. albus	snowberry (low or native)	4	4	4	5	17	L2
Ulmus rubra	slippery or red elm	5	5	4	3	17	L2
Abies balsamea	balsam fir	2	3	4	5	14	L3
Acorus americanus (A. calamus misapplied)	sweet flag	4	3	5	4	16	L3
Adiantum pedatum	northern maidenhair fern	2	3	5	5	15	L3
Allium tricoccum	wild leek or ramps	2	3	4	4	13	L3
Alnus incana ssp. rugosa (A. rugosa)	speckled or tag alder	3	4	4	5	16	L3
Anaphalis margaritacea	pearly everlasting	3	4	4	3	14	L3
Anemone acutiloba (Hepatica acutiloba)	sharp-lobed hepatica	2	4	4	5	15	L3

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Anemone quinquefolia var. quinquefolia	wood-anemone	3	4	4	5	16	L3
Aquilegia canadensis	wild columbine	2	4	3	5	14	L3
Aralia racemosa ssp. racemosa	spikenard	3	4	4	3	14	L3
Aster oolentangiensis (A. azureus)	sky-blue or azure aster	4	3	4	3	14	L3
Aster urophyllus (A. sagittifolius)	arrow-leaved aster	4	3	4	3	14	L3
Bromus ciliatus (B. canadensis)	fringed brome grass	3	4	4	5	16	L3
Cardamine concatenata (Dentaria lacinata)	cut-leaved toothwort	2	3	5	4	14	L3
Carex alopecoidea	foxtail or brown-headed wood sedge	3	3	4	4	14	L3
Carex cephalophora	oval-headed sedge	5	2	5	3	15	L3
Carex digitalis	slender wood sedge	4	3	4	3	14	L3
Carex disperma	two-seeded or soft-leaved sedge	3	3	5	4	15	L3
Carex eburnea	bristle-leaved sedge	3	4	4	4	15	L3
Carex flava	yellow sedge	3	3	5	3	14	L3
Carex hirtifolia	pubescent or hairy-leaved sedge	3	3	5	3	14	L3
Carex hitchcockiana	Hitchcock's sedge	4	3	5	3	15	L3
Carex interior	inland or prairie star sedge	3	2	5	4	14	L3
Carex laevivaginata	smooth-sheathed sedge	2	4	4	4	14	L3
Carex leptalea ssp. leptalea	bristle-stalked sedge	3	3	5	4	15	L3
Carex lupulina	hop sedge	2	4	4	4	14	L3
Carex molesta	troublesome sedge	4	3	4	3	14	L3
Carex normalis	tall straw sedge	5	3	5	3	16	L3
Carex pallescens	pale sedge	4	3	5	3	15	L3
Carex plantaginea	plantain-leaved sedge	3	4	5	4	16	L3
Carex platyphylla	broad-leaved sedge	3	4	4	3	14	L3
Carex scabrata	rough sedge	3	3	4	3	13	L3
Carex tonsa var. rugosperma (C. rugosperma)	red- or wrinkle-seeded oak sedge	4	4	4	4	16	L3
Carex trichocarpa	hairy-fruited sedge	4	3	5	3	15	L3
Carex utriculata (C. rostrata var. utriculata)	beaked or bottle-shaped sedge	3	3	5	4	15	L3
Carex woodii (C. tetanica var. woodii)	purple-tinged or Wood's sedge	5	3	5	3	16	L3
Carya ovata	shagbark hickory	3	4	4	4	15	L3
Chelone glabra	turtlehead	3	3	4	4	14	L3
Chrysosplenium americanum	golden saxifrage	3	3	5	4	15	L3
Cicuta bulbifera	bulblet-bearing water-hemlock	3	3	5	4	15	L3
Cinna arundinacea	tall wood reed	3	4	5	2	14	L3
Cinna latifolia	nodding wood reed	3	3	5	3	14	L3
Circaea alpina	smaller enchanter's nightshade	2	4	5	4	15	L3
Claytonia caroliniana	broad-leaved spring beauty	3	4	5	4	16	L3
Claytonia virginica	narrow-leaved spring beauty	3	4	4	4	15	L3
Clintonia borealis	yellow clintonia or bluebead lily	2	5	4	5	16	L3
Cornus rugosa	round-leaved dogwood	3	4	4	3	14	L3
Crataegus chrysocarpa var. aboriginum	round-leaved or fire-berry hawthorn	5	2	4	3	14	L3
Crataegus corusca	gleaming hawthorn	5	2	5	3	15	L3

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Crataegus submollis	Emerson's hawthorn	5	2	4	3	14	L3
Desmodium glutinosum	pointed-leaved tick-trefoil	3	4	4	5	16	L3
Dicentra canadensis	squirrel-corn	2	4	5	4	15	L3
Dirca palustris	leatherwood	3	4	5	4	16	L3
Dryopteris cristata	crested wood fern	2	4	4	4	14	L3
Epilobium angustifolium	fire-weed	4	4	4	4	16	L3
Equisetum fluviatile	water horsetail	2	4	5	4	15	L3
Equisetum pratense	meadow or thicket horsetail	4	4	5	3	16	L3
Equisetum scirpoides	dwarf scouring rush	2	4	5	5	16	L3
Equisetum sylvaticum	woodland horsetail	3	3	5	4	15	L3
Euonymus obovata (E. obovatus)	running strawberry-bush	3	4	4	4	15	L3
Eupatorium purpureum var. purpureum	sweet Joe-Pye weed	5	4	4	3	16	L3
Galium boreale	northern bedstraw	5	4	4	3	16	L3
Glyceria septentrionalis	eastern manna grass	3	3	5	4	15	L3
Gymnocarpium dryopteris	oak fern	2	3	5	5	15	L3
Hamamelis virginiana	witch-hazel	2	4	4	4	14	L3
Helianthus decapetalus	thin-leaved sunflower	4	3	4	3	14	L3
Helianthus divaricatus	woodland sunflower	5	3	4	4	16	L3
Hydrocotyle americana	marsh pennywort	3	4	4	4	15	L3
Iris versicolor	blue flag	2	5	4	5	16	L3
Juglans cinerea	butternut	2	4	4	4	14	L3
Larix laricina	tamarack	3	4	4	4	15	L3
Lemna trisulca	star or ivy-leaved duckweed	3	4	5	3	15	L3
Lilium michiganense	Michigan or Turk's cap lily	3	4	3	5	15	L3
Liparis loeselii	fen or Loesel's twayblade	3	3	5	5	16	L3
Lobelia siphilitica	great blue lobelia	3	3	4	4	14	L3
Lonicera dioica	wild or glaucous honeysuckle	2	4	4	4	14	L3
Luzula multiflora ssp. multiflora (L. campestris var. vulgaris)	wood rush	5	4	4	3	16	L3
Lysimachia thyrsiflora	tufted loosestrife	3	3	4	4	14	L3
Menispermum canadense	moonseed	3	4	4	3	14	L3
Mimulus ringens	square-stemmed monkey-flower	5	2	3	4	14	L3
Mitchella repens	partridgeberry	2	4	4	5	15	L3
Mitella nuda	naked mitrewort	2	4	5	5	16	L3
Monotropa uniflora	Indian-pipe	2	4	5	5	16	L3
Myosotis laxa	smaller forget-me-not	5	4	3	4	16	L3
Nuphar variegata	bullhead lily or yellow water lily	3	4	5	3	15	L3
Oryzopsis asperifolia	white-fruited or rough-leaved mountain-rice	2	4	4	5	15	L3
Oryzopsis racemosa	black-fruited mountain-rice	3	3	5	4	15	L3
Osmorhiza claytonii	woolly sweet cicely	3	4	4	4	15	L3
Panicum virgatum	switch grass	3	2	5	5	15	L3
Parietaria pensylvanica	Pennsylvania pellitory or false nettle	5	4	4	3	16	L3
Phegopteris connectilis	northern or long beech fern	3	3	5	5	16	L3

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Physalis virginiana	smooth ground cherry	5	4	4	3	16	L3
Pilea fontana	spring clearweed	3	4	4	4	15	L3
Poa alsodes	grove meadow grass or woodland poa	4	3	5	3	15	L3
Polygonatum pubescens	downy Solomon's seal	2	4	5	5	16	L3
Polygonum amphibium (P. natans; P. coccineum)	water smartweed	2	4	4	4	14	L3
Polygonum hydropiperoides	mild water-pepper	5	2	5	3	15	L3
Polystichum acrostichoides	Christmas fern	2	3	5	5	15	L3
Potamogeton natans	floating pondweed	3	4	5	3	15	L3
Prenanthes alba	white wood lettuce	3	4	4	3	14	L3
Prunus nigra	Canada plum	4	4	4	3	15	L3
Pyrola elliptica	shinleaf	2	4	4	4	14	L3
Ribes triste	swamp red currant	3	4	4	5	16	L3
Rhamnus alnifolia	alder-leaved buckthorn	4	3	4	4	15	L3
Rubus flagellaris	northern dewberry	4	3	4	4	15	L3
Rumex orbiculatus	great water dock	4	3	4	4	15	L3
Salix lucida	shining willow	2	4	5	3	14	L3
Salix nigra	black willow	4	2	5	4	15	L3
Schizachne purpurascens ssp. purpurascens	purple or false melic grass	3	3	3	5	14	L3
Scirpus acutus	hard-stemmed bulrush	4	3	5	4	16	L3
Scirpus cyperinus	woolly bulrush or wool-grass	2	3	4	5	14	L3
Scirpus fluviatilis	river bulrush	4	2	5	4	15	L3
Scirpus pendulus	drooping, nodding, or red bulrush	3	4	5	4	16	L3
Sisyrinchium montanum	blue-eyed grass	3	3	4	4	14	L3
Solidago arguta var. arguta	sharp-leaved goldenrod	5	3	4	3	15	L3
Solidago patula	rough-leaved goldenrod	4	3	4	3	14	L3
Sparganium eurycarpum	giant or great bur-reed	3	4	5	4	16	L3
Sphenopholis intermedia	slender wedge grass	4	2	4	4	14	L3
Spiraea alba	meadowsweet or wild spiraea	3	4	4	3	14	L3
Sporobolus cryptandrus	sand dropseed	4	2	5	3	14	L3
Staphylea trifolia	bladdernut	4	3	4	3	14	L3
Streptopus roseus	rose twisted-stalk	2	4	4	5	15	L3
Taxus canadensis	Canada yew or ground hemlock	2	4	4	5	15	L3
Trientalis borealis ssp. borealis	star-flower	2	4	4	5	15	L3
Trillium erectum	red trillium or stinking Johnny	2	4	3	5	14	L3
Trillium grandiflorum	white trillium	1	4	4	5	14	L3
Uvularia grandiflora	large-flowered bellwort	2	4	5	5	16	L3
Veronica americana	American speedwell or brooklime	3	3	4	4	14	L3
Veronica catenata (V. anagallis-aquatica ssp. ...)	water speedwell (native)	5	3	4	4	16	L3
Viburnum acerifolium	maple-leaved viburnum	2	3	4	5	14	L3
Viola affinis	Le Conte's violet	3	4	4	3	14	L3
Viola canadensis	Canada violet	3	4	4	4	15	L3
Viola cucullata	marsh blue violet	3	3	4	4	14	L3

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Viola rostrata	long-spurred violet	3	4	4	3	14	L3
Wolffia columbiana	columbia water-meal	3	4	5	2	14	L3
Acer rubrum	red maple	2	4	2	5	13	L4
Acer saccharinum	silver maple	2	2	4	3	11	L4
Acer saccharum ssp. nigrum	black maple	3	3	3	2	11	L4
Acer spicatum	mountain maple	2	3	4	4	13	L4
Actaea pachypoda	white baneberry	2	3	4	3	12	L4
Alisma plantago-aquatica (A. triviale)	water-plantain	2	2	5	2	11	L4
Amelanchier cf. arborea (A. canadensis misapplied)	downy serviceberry or Juneberry	2	2	4	3	11	L4
Amelanchier laevis	smooth serviceberry	3	2	4	3	12	L4
Amelanchier sanguinea var. sanguinea	round-leaved serviceberry	4	2	3	4	13	L4
Apocynum androsaemifolium	spreading dogbane	5	3	2	3	13	L4
Arisaema triphyllum	Jack-in-the-pulpit	1	3	3	4	11	L4
Asarum canadense	wild ginger	2	3	4	3	12	L4
Asclepias incarnata ssp. incarnata	swamp milkweed	2	3	4	3	12	L4
Aster umbellatus var. umbellatus	flat-topped aster	4	2	3	3	12	L4
Betula allegheniensis (B. lutea)	yellow or curly birch	1	4	3	5	13	L4
Betula papyrifera	paper or white birch	1	4	2	4	11	L4
Boehmeria cylindrica	false nettle	2	4	4	3	13	L4
Bromus latiglumis	eared or tall brome	2	2	5	2	11	L4
Calamagrostis canadensis	Canada blue joint	2	2	4	3	11	L4
Caltha palustris	marsh marigold	2	4	3	4	13	L4
Calystegia sepium (incl. ssp. americanum, angulatum, erraticum)	hedge bindweed	4	2	3	2	11	L4
Cardamine diphylla (Dentaria diphylla)	broad- or two-leaved toothwort	2	3	4	4	13	L4
Cardamine pensylvanica	bitter cress	2	2	4	3	11	L4
Carex albursina (C. laxiflora var. latifolia)	white bear sedge	2	3	5	3	13	L4
Carex arctata	nodding wood sedge	2	4	2	3	11	L4
Carex aurea	golden-fruited sedge	3	2	4	4	13	L4
Carex communis	fibrous-rooted sedge	2	4	3	3	12	L4
Carex deweyana	Dewey's sedge	2	4	3	3	12	L4
Carex gracillima	graceful sedge	4	3	4	2	13	L4
Carex hystericina (C. hystricina)	porcupine sedge	2	3	2	5	12	L4
Carex intumescens	bladder sedge	3	4	3	2	12	L4
Carex lacustris	lake-bank sedge	3	3	3	4	13	L4
Carex laxiflora	loose-flowered sedge	3	3	4	3	13	L4
Carex peckii (C. nigromarginata var. elliptica)	Peck's sedge	3	2	4	3	12	L4
Carex pedunculata	early-flowering sedge	2	3	3	3	11	L4
Carex pellita (C. lanuginosa; C. filiformis var. lanuginosa)	woolly sedge	4	3	4	2	13	L4
Carex pensylvanica	Pennsylvania sedge	2	4	3	4	13	L4
Carex pseudo-cyperus	pseudocyperus sedge	1	3	3	4	11	L4
Carex retrorsa	retrorse sedge	2	3	3	4	12	L4
Carex sparganioides	bur-reed sedge	2	2	5	2	11	L4

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Carex sprengelii	long-beaked sedge	3	4	4	2	13	L4
Carex stricta	tussock sedge	2	3	3	4	12	L4
Carex tenera	straw sedge	3	3	3	3	12	L4
Carpinus caroliniana ssp. virginiana	blue beech or American hornbeam	2	3	4	2	11	L4
Carya cordiformis	bitternut hickory	2	4	4	2	12	L4
Caulophyllum giganteum (C. thalictroides var. giganteum)	long-styled blue cohosh	2	3	4	4	13	L4
Celastrus scandens	climbing or American bittersweet	3	2	3	4	12	L4
Cornus amomum ssp. obliqua	silky dogwood	3	3	5	2	13	L4
Cornus foemina ssp. racemosa (C. racemosa)	grey dogwood	5	2	4	2	13	L4
Corylus cornuta (C. rostrata)	beaked hazel	2	4	3	4	13	L4
Crataegus holmesiana	thin-leaved or Holmes' hawthorn	3	3	5	3	14	L4
Crataegus macracantha (C. succulenta var. macracantha)	long-spined hawthorn	2	2	4	3	11	L4
Cuscuta gronovii	swamp dodder	4	3	3	3	13	L4
Cystopteris bulbifera	bulblet fern	1	4	4	4	13	L4
Danthonia spicata	poverty oat grass	2	4	3	4	13	L4
Diervilla lonicera	bush honeysuckle	2	3	2	4	11	L4
Dryopteris intermedia (D. spinulosa var. intermedia)	evergreen wood fern	2	4	3	3	12	L4
Dryopteris marginalis	marginal wood fern	1	3	3	4	11	L4
Elymus hystrix (Hystrix patula)	bottle-brush grass	2	2	4	3	11	L4
Elymus riparius	riverbank wild rye	2	2	5	2	11	L4
Epifagus virginiana	beech-drops	2	3	4	2	11	L4
Epilobium coloratum	purple-leaved willow-herb	3	3	4	2	12	L4
Equisetum variegatum ssp. variegatum	variegated scouring-rush	3	2	5	3	13	L4
Eupatorium perfoliatum	boneset	1	3	4	3	11	L4
Fagus grandifolia	American beech	1	4	3	4	12	L4
Festuca subverticillata (F. obtusa)	nodding fescue	4	2	4	3	13	L4
Fraxinus nigra	black ash	2	4	4	3	13	L4
Galium aparine	cleavers	3	3	4	2	12	L4
Galium palustre	marsh bedstraw	2	2	4	3	11	L4
Geranium maculatum	wild geranium or spotted cranesbill	2	3	4	3	12	L4
Glyceria grandis	tall manna grass	2	3	4	2	11	L4
Helianthus strumosus	pale-leaved sunflower	4	2	4	3	13	L4
Heracleum lanatum (H. maximum)	cow-parsnip	3	2	3	2	10	L4
Hydrophyllum canadense	Canada waterleaf	3	3	4	3	13	L4
Impatiens pallida	yellow touch-me-not (pale jewelweed)	3	2	4	2	11	L4
Juncus balticus	Baltic rush	4	2	5	2	13	L4
Juncus effusus ssp. solutus	soft rush	2	4	4	3	13	L4
Juncus nodosus	knotted rush	3	2	5	3	13	L4
Juncus torreyi	Torrey's rush	4	2	4	2	12	L4
Lactuca canadensis	wild lettuce	3	3	2	3	11	L4
Leersia virginica	white grass	3	2	5	3	13	L4
Lycopus americanus	American or cut-leaved water-horehound	2	4	3	3	12	L4

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Lycopus uniflorus	northern water-horehound or bugleweed	2	3	3	3	11	L4
Maianthemum canadense	Canada mayflower	2	4	1	5	12	L4
Mitella diphylla	mitrewort	2	3	4	4	13	L4
Muhlenbergia frondosa	wire-stemmed or leafy muhly grass	4	2	4	2	12	L4
Panicum acuminatum (P. implicatum; P. lanuginosum)	hairy panic grass	2	3	3	3	11	L4
Penstemon digitalis	foxglove beard-tongue	4	2	4	2	12	L4
Penthorum sedoides	ditch stonecrop	4	2	4	3	13	L4
Physalis heterophylla	clammy ground-cherry	3	2	3	3	11	L4
Pinus strobus	white pine	1	4	3	4	12	L4
Podophyllum peltatum	May-apple	2	3	3	3	11	L4
Populus grandidentata	large-toothed aspen	2	3	4	3	12	L4
Potamogeton pectinatus	sago pondweed	2	2	5	3	12	L4
Prunus pensylvanica	pin cherry	3	4	3	3	13	L4
Pteridium aquilinum var. latiusculum	eastern bracken	2	4	2	4	12	L4
Quercus macrocarpa	bur oak	1	4	3	3	11	L4
Quercus rubra	red oak	1	4	2	4	11	L4
Ranunculus hispidus var. caricetorum (R. septentrionalis)	swamp buttercup	2	4	4	3	13	L4
Rhus radicans (R. radicans ssp. radicans; ssp. negundo)	poison ivy (vine form)	4	2	4	2	12	L4
Rorippa palustris ssp. fernaldiana (R. islandica var. fernaldiana)	Fernald's marsh cress	3	2	4	2	11	L4
Rosa blanda	smooth wild rose	3	2	3	3	11	L4
Rubus pubescens	dwarf raspberry	2	3	3	5	13	L4
Rudbeckia hirta (R. serotina)	black-eyed Susan	2	4	4	3	13	L4
Sagittaria latifolia	common arrowhead	2	2	5	4	13	L4
Salix amygdaloides	peach-leaved willow	2	2	5	3	12	L4
Salix bebbiana	beaked or Bebb's willow	1	4	4	4	13	L4
Salix discolor	pussy willow	2	3	4	3	12	L4
Scirpus microcarpus (S. rubrotinctus)	barber-pole sedge or bulrush	2	2	4	3	11	L4
Scirpus pungens (S. americanus)	three-square or chairmaker's rush	3	2	5	3	13	L4
Scirpus validus	soft-stemmed bulrush	2	2	5	3	12	L4
Silphium perfoliatum	cup-plant	5	1	3	2	11	L4
Sium suave	water-parsnip	2	2	4	4	12	L4
Smilax hispida (S. tamnoides var. hispida)	bristly greenbrier	2	3	3	3	11	L4
Solidago juncea	early goldenrod	3	3	4	2	12	L4
Symplocarpus foetidus	skunk cabbage	3	2	4	3	12	L4
Thelypteris palustris var. pubescens	marsh fern	2	4	2	4	12	L4
Thuja occidentalis	white cedar	1	4	1	5	11	L4
Tiarella cordifolia	foam-flower	2	3	3	4	12	L4
Tsuga canadensis	eastern hemlock	+	4	3	5	12	L4
Typha latifolia	broad-leaved cattail	1	4	4	4	13	L4
Viola cf. selkirkii	Selkirk's or spurred violet	3	3	4	3	13	L4
Waldsteinia fragarioides	barren strawberry	2	4	4	3	13	L4
Acalypha virginica var. rhomboidea	three-seeded mercury	2	1	3	0	6	L5

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Acer saccharum ssp. saccharum	sugar maple	1	3	0	2	6	L5
Achillea millefolium ssp. lanulosum	woolly yarrow	1	2	1	1	8	L5
Actaea rubra	red baneberry	2	3	2	3	10	L5
Agrimonia gryposepala	agrimony	2	2	0	2	6	L5
Ambrosia artemisiifolia	common ragweed	1	1	4	0	6	L5
Ambrosia trifida	giant ragweed	4	1	4	0	9	L5
Amphicarpaea bracteata	hog-peanut	2	2	2	2	8	L5
Anemone canadensis	Canada anemone	1	2	2	2	7	L5
Anemone virginiana (inc. vs. alba, cylindroidea, riparia)	common thimbleweed	2	3	0	3	8	L5
Apocynum cannibinum (inc. var. hypericifolium)	Indian-hemp dogbane	2	2	3	2	9	L5
Aralia nudicaulis	wild sarsaparilla	2	3	2	3	10	L5
Asclepias syriaca	common milkweed	1	2	0	1	4	L5
Aster cordifolius	heart-leaved aster	1	1	0	1	3	L5
Aster ericoides ssp. ericoides (Virgulus ericoides)	heath aster	1	1	2	1	5	L5
Aster lanceolatus ssp. lanceolatus	panicled or tall white aster	1	2	2	1	6	L5
Aster lateriflorus	calico or one-sided aster	1	2	3	2	8	L5
Aster macrophyllus	big-leaved aster	1	3	2	3	9	L5
Aster novae-angliae (Virgulus novae-angliae)	New England aster	1	2	2	1	6	L5
Aster puniceus var. puniceus	swamp or purple-stemmed aster	2	2	3	2	9	L5
Athyrium filix-femina var. angustum	northeastern lady fern	1	3	1	3	8	L5
Bidens cernuus	nodding bur-marigold	2	2	3	3	10	L5
Bidens frondosus	common or devil's beggarticks	1	1	4	0	6	L5
Bidens tripartitus (inc. B. connatus, B. comosus)	three-parted beggar's ticks	2	2	4	2	10	L5
Carex bebbii	Bebb's sedge	1	2	4	3	10	L5
Carex blanda (C. laxiflora var. blanda)	common wood sedge	2	2	0	2	6	L5
Carex cristatella	crested sedge	2	2	4	1	9	L5
Carex granularis	meadow sedge	1	2	1	3	7	L5
Carex radiata (formerly C. rosea)	stellate or straight-styled sedge	2	2	2	2	8	L5
Carex rosea (formerly convoluta)	curly-styled sedge	2	2	3	2	9	L5
Carex stipata	awl-fruited sedge	2	3	2	2	9	L5
Carex vulpinoidea	fox sedge	1	2	4	1	8	L5
Cicuta maculata	spotted water-hemlock	2	2	2	2	8	L5
Circaea lutetiana ssp. canadensis (C. quadrisulcata)	enchanter's nightshade	1	1	1	1	4	L5
Clematis virginiana	virgin's bower	2	2	1	3	8	L5
Clinopodium vulgare (Satureja vulgaris)	dogmint or wild basil	2	3	1	2	8	L5
Conyza canadensis (Erigeron canadensis)	horse-weed	1	1	2	0	4	L5
Cornus alternifolia	alternate-leaved dogwood	2	2	1	2	7	L5
Cornus stolonifera	red osier dogwood	1	2	0	3	6	L5
Crataegus pedicellata	scarlet or pedicelled hawthorn	2	2	3	3	10	L5
Crataegus punctata	dotted hawthorn	2	2	3	3	10	L5
Cryptotaenia canadensis	honewort	2	2	4	1	9	L5
Desmodium canadense	showy tick-trefoil	2	2	1	3	8	L5

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Dryopteris carthusiana (D. spinulosa)	spinulose wood fern	1	3	2	2	8	L5
Echinochloa microstachya (E. pungens v. microstachya)	small-spiked barnyard grass	4	1	5	0	10	L5
Echinocystis lobata	wild cucumber	2	2	1	1	6	L5
Eleocharis erythropoda (E. calva; E. palustris v. calva)	creeping or red-stemmed spike-rush	2	2	3	1	8	L5
Elymus virginicus var. virginicus	Virginia wild rye	2	2	3	2	9	L5
Epilobium ciliatum ssp. ciliatum	sticky willow-herb	2	2	2	1	7	L5
Equisetum arvense	field or common horsetail	1	2	1	1	5	L5
Equisetum hyemale ssp. affine	scouring rush	2	2	1	2	7	L5
Erigeron annuus	annual or daisy fleabane	2	2	0	1	5	L5
Erigeron philadelphicus ssp. philadelphicus	Philadelphia fleabane	2	2	0	1	5	L5
Erythronium americanum ssp. americanum	yellow trout-lily	1	3	3	2	9	L5
Eupatorium maculatum ssp. maculatum	spotted Joe-Pye weed	1	2	3	3	9	L5
Eupatorium rugosum	white snakeroot	2	2	2	1	7	L5
Euthamia graminifolia (Solidago graminifolia)	grass- or narrow-leaved goldenrod	1	1	4	1	7	L5
Fragaria virginiana (incl. ssps. glauca & virginiana)	wild or common strawberry	1	2	0	2	5	L5
Fraxinus americana	white ash	1	2	0	3	6	L5
Fraxinus pennsylvanica var. pennsylvanica	red ash	2	2	2	3	9	L5
Fraxinus pennsylvanica var. subintegerrima	green ash	2	2	2	3	9	L5
Galium triflorum	sweet-scented bedstraw	2	2	2	2	8	L5
Geum aleppicum (G. strictum)	yellow avens	2	3	2	2	9	L5
Geum canadense	white avens	2	2	1	2	7	L5
Glyceria striata (incl. vars. striata & stricta)	fowl manna grass	2	2	1	2	7	L5
Hackelia virginiana	Virginia stickseed	4	2	0	2	8	L5
Hydrophyllum virginianum	Virginia waterleaf	1	2	1	2	6	L5
Impatiens capensis (I. biflora)	orange touch-me-not (spotted jewelweed)	1	2	0	2	5	L5
Juglans nigra	black walnut	1	1	2	1	5	L5
Juncus articulatus	jointed rush	2	2	4	2	10	L5
Juncus bufonius	toad rush	3	1	4	1	9	L5
Juncus dudleyi	Dudley's rush	2	2	3	1	8	L5
Juncus tenuis	path rush	2	2	1	1	6	L5
Juniperus virginiana	red cedar	4	1	4	1	10	L5
Laportea canadensis	wood nettle	2	3	2	2	9	L5
Leersia oryzoides	rice cut grass	2	2	3	2	9	L5
Lemna minor	common or lesser duckweed	2	2	4	2	10	L5
Lysimachia ciliata	fringed loosestrife	1	2	2	2	7	L5
Maianthemum racemosum ssp. racemosum (Smilacina racemos	false Solomon's seal	2	3	2	3	10	L5
Maianthemum stellatum (Smilacina stellata)	starry false Solomon's seal	2	2	1	3	8	L5
Matteuccia struthiopteris var. pensylvanica	ostrich fern	1	2	2	2	7	L5
Mentha arvensis ssp. borealis	wild mint	1	2	3	2	8	L5
Monarda fistulosa	wild bergamot	2	2	2	2	8	L5
Muhlenbergia mexicana	slender muhly grass	2	2	0	2	6	L5
Oenothera biennis	common or hairy evening-primrose	2	1	1	1	5	L5

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Onoclea sensibilis	sensitive fern	2	3	1	3	9	L5
Ostrya virginiana	ironwood	1	3	2	2	8	L5
Panicum capillare	panic or witch grass	2	1	4	1	8	L5
Parthenocissus inserta (P. vitacea)	thicket creeper	2	2	0	1	5	L5
Phryma leptostachya	lopseed	2	2	3	2	9	L5
Pilea pumila	dwarf clearweed	2	2	1	1	6	L5
Plantago rugelii	red-stemmed or Rugel's plantain	2	2	0	1	5	L5
Poa palustris	fowl meadow-grass	2	2	3	2	9	L5
Polygonum lapathifolium var lapathifolium	pale smartweed	2	1	4	0	7	L5
Populus balsamifera ssp. balsamifera	balsam poplar	1	2	3	2	8	L5
Populus deltoides (inc. ssp. monilifera)	cottonwood	2	1	4	1	8	L5
Populus tremuloides	trembling aspen	1	3	1	3	8	L5
Prenanthes altissima	tall wood lettuce	2	3	2	2	9	L5
Prunus serotina	black cherry	1	2	0	2	5	L5
Ranunculus abortivus	small-flowered or kidneyleaf buttercup	1	3	1	2	7	L5
Ranunculus recurvatus var. recurvatus	hooked buttercup	2	3	2	3	10	L5
Ranunculus sceleratus	cursed crowfoot	2	2	3	2	9	L5
Rhus rydbergii (R. radicans ssp. rydbergii)	poison ivy (shrub form)	1	2	0	2	5	L5
Rhus typhina	staghorn sumach	1	1	2	2	6	L5
Ribes americanum	wild black currant	2	3	2	2	9	L5
Ribes cynosbati	prickly gooseberry	2	3	2	2	9	L5
Rubus allegheniensis	common blackberry	2	3	0	1	6	L5
Rubus idaeus ssp. melanolasius (R. strigosus)	wild red raspberry	1	1	0	1	3	L5
Rubus occidentalis	wild black raspberry	2	1	0	1	4	L5
Rubus odoratus	purple-flowering raspberry	2	2	2	2	8	L5
Salix eriocephala (S. rigida; S. cordata misapplied)	narrow heart-leaved or Missouri willow	1	1	3	1	6	L5
Salix exigua (S. interior)	sandbar willow	2	1	5	2	10	L5
Sambucus canadensis	common elderberry	2	3	2	2	9	L5
Sambucus racemosa ssp. pubens (S. pubens)	red-berried elder	1	3	2	2	8	L5
Sanguinaria canadensis	bloodroot	1	3	3	3	10	L5
Scirpus atrovirens	black-fruited or dark green bulrush	2	2	4	2	10	L5
Scutellaria galericulata (S. epilobiifolia)	common skullcap	2	2	3	3	10	L5
Scutellaria lateriflora	mad-dog skullcap	2	2	3	3	10	L5
Smilax herbacea	carrion-flower	2	3	2	2	9	L5
Solanum ptychanthum (S. nigrum var. americanum)	black nightshade	3	1	4	0	8	L5
Solidago altissima	tall goldenrod	1	2	0	0	3	L5
Solidago caesia	blue-stemmed goldenrod	1	2	4	2	9	L5
Solidago canadensis var. canadensis	Canada goldenrod	1	2	0	1	4	L5
Solidago flexicaulis	zig-zag goldenrod	1	1	3	2	7	L5
Solidago gigantea	late goldenrod	2	1	1	1	5	L5
Solidago nemoralis ssp. nemoralis	grey goldenrod	2	2	2	2	8	L5
Solidago rugosa ssp. rugosa	rough-stemmed goldenrod	3	2	2	2	9	L5

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Thalictrum dioicum	early meadow rue	1	3	3	2	9	L5
Thalictrum pubescens (T. polygamum)	tall meadow rue	2	3	2	2	9	L5
Tilia americana	basswood	1	4	2	3	10	L5
Ulmus americana	white elm	1	4	0	2	7	L5
Urtica dioica ssp. gracilis (U. procera)	American stinging nettle	2	3	2	2	9	L5
Verbena hastata	blue vervain	2	2	4	2	10	L5
Verbena urticifolia	white vervain	2	2	2	2	8	L5
Viburnum lentago	nannyberry	2	3	1	2	8	L5
Viola conspersa	dog violet	2	2	0	2	6	L5
Viola pubescens (inc. vars. pubescens & scabriuscula)	stemmed yellow violet	2	3	1	2	8	L5
Viola sororia	common blue violet	1	2	0	2	5	L5
Vitis riparia	riverbank grape	1	1	0	0	2	L5
Xanthium strumarium (inc. var. canadensis)	clotbur or cocklebur	2	1	4	0	7	L5
Acer x freemanii (A. rubrum x saccharinum)	Freeman's or hybrid swamp maple	h	h	h	h		LH
Amelanchier x interior	hybrid serviceberry complex	h	h	h	h		LH
Cardamine x maxima (C. concatenata x diphylla)	hybrid toothwort	h	h	h	h		LH
Dryopteris x triploidea (D. carthusiana x intermedia)	confusing hybrid wood fern	h	h	h	h		LH
Populus x jackii (P. balsamifera x P. deltoides)	Jack's poplar	h	h	h	h		LH
Acer ginnala	Amur maple	+	+	+	+		L+
Acer platanoides	Norway maple	+	+	+	+		L+
Acer pseudo-platanus	sycamore maple	+	+	+	+		L+
Aegopodium podagraria	goutweed or herb-Gerard	+	+	+	+		L+
Aesculus hippocastanum	horse-chestnut	+	+	+	+		L+
Agrostis gigantea (A. stolonifera var. major; A. alba)	redtop	+	+	+	+		L+
Ailanthus altissima	tree-of-heaven	+	+	+	+		L+
Alliaria petiolata (A. officinalis)	garlic mustard	+	+	+	+		L+
Allium vineale ssp. vineale	field or wild garlic	+	+	+	+		L+
Alnus glutinosa	black or European alder	+	+	+	+		L+
Alnus incana ssp. incana	European grey alder	+	+	+	+		L+
Alopecurus pratensis	meadow foxtail	+	+	+	+		L+
Amaranthus blitoides (A.graecizans)	prostrate pigweed	+	+	+	+		L+
Amaranthus retroflexus	green or red-root pigweed	+	+	+	+		L+
Anagallis arvensis	scarlet pimpernel or poor man's weatherglass	+	+	+	+		L+
Aquilegia vulgaris	garden or European columbine	+	+	+	+		L+
Arctium lappa	great burdock	+	+	+	+		L+
Arctium minus ssp. minus	common burdock	+	+	+	+		L+
Arenaria serpyllifolia	thyme-leaved sandwort	+	+	+	+		L+
Artemisia biennis	biennial wormwood or mugwort	+	+	+	+		L+
Artemisia vulgaris	mugwort or wormwood	+	+	+	+		L+
Asparagus officinalis	asparagus	+	+	+	+		L+
Barbarea vulgaris	winter cress or yellow rocket	+	+	+	+		L+
Berberis thunbergi	Japanese barberry	+	+	+	+		L+

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Berberis vulgaris	common or European barberry	+	+	+	+		L+
Betula pendula (B. verrucosa)	European white or silver birch	+	+	+	+		L+
Brassica juncea	brown or Indian mustard	+	+	+	+		L+
Brassica nigra	black mustard	+	+	+	+		L+
Brassica rapa (B. campestris)	turnip	+	+	+	+		L+
Briza media	quaking grass	+	+	+	+		L+
Bromus commutatus (B. racemosus)	upright or hairy chess	+	+	+	+		L+
Bromus inermis ssp. inermis	smooth brome grass	+	+	+	+		L+
Bromus japonicus	Japanese chess or brome	+	+	+	+		L+
Bromus tectorum	downy chess	+	+	+	+		L+
Campanula rapunculoides	creeping bellflower	+	+	+	+		L+
Capsella bursa-pastoris	shepherd's purse	+	+	+	+		L+
Caragana arborescens	Siberian pea-shrub	+	+	+	+		L+
Cardamine impatiens	balsam bitter cress	+	+	+	+		L+
Carduus acanthoides	plumeless thistle	+	+	+	+		L+
Carduus nutans ssp. nutans	nodding thistle	+	+	+	+		L+
Carex praegracilis	freeway or clustered field sedge	+	+	+	+		L+
Carex spicata	spiked or European meadow sedge	+	+	+	+		L+
Catalpa speciosa	northern catalpa	+	+	+	+		L+
Celastrus orbiculatus	oriental or Asiatic bittersweet	+	+	+	+		L+
Centaurea jacea	brown knapweed	+	+	+	+		L+
Centaurea maculosa	spotted knapweed	+	+	+	+		L+
Centaurium pulchellum	branching centaury	+	+	+	+		L+
Cerastium fontanum (C. vulgatum)	mouse-ear chickweed	+	+	+	+		L+
Cercidophyllum japonicum	katsura tree	+	+	+	+		L+
Chaenorrhinum minus	dwarf snapdragon	+	+	+	+		L+
Chelidonium majus	celandine	+	+	+	+		L+
Chenopodium album var. album	lamb's quarters	+	+	+	+		L+
Chenopodium botrys	Jerusalem-oak	+	+	+	+		L+
Chenopodium glaucum (inc. ssp. salinum)	oak-leaved goosefoot	+	+	+	+		L+
Chrysanthemum leucanthemum	ox-eye daisy	+	+	+	+		L+
Cichorium intybus	chicory	+	+	+	+		L+
Cirsium arvense	creeping (Canada) thistle	+	+	+	+		L+
Cirsium vulgare	bull thistle	+	+	+	+		L+
Commelina communis	Asiatic dayflower	+	+	+	+		L+
Convallaria majalis	lily-of-the-valley	+	+	+	+		L+
Convolvulus arvensis	field bindweed	+	+	+	+		L+
Coronilla varia	crown vetch	+	+	+	+		L+
Corydalis intermedia	pink corydalis	+	+	+	+		L+
Cosmos bipinnatus	cosmos	+	+	+	+		L+
Cotoneaster cf. acutifolius	cotoneaster	+	+	+	+		L+
Crataegus monogyna	English hawthorn	+	+	+	+		L+

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Crepis cf. tectorum	narrow-leaved hawk's beard	+	+	+	+		L+
Cynanchum rossicum (C. medium; Vincetoxicum rossicum))	dog-strangling vine or pale swallow-wort	+	+	+	+		L+
Cynoglossum officinale	hound's tongue	+	+	+	+		L+
Dactylis glomerata	orchard grass	+	+	+	+		L+
Datura stramonium	jimsonweed	+	+	+	+		L+
Daucus carota	Queen Anne's lace or wild carrot	+	+	+	+		L+
Descurainia pinnata cf. ssp. brachycarpa	tansy mustard	+	+	+	+		L+
Dianthus armeria	Deptford pink	+	+	+	+		L+
Digitaria sanguinalis	hairy crab grass	+	+	+	+		L+
Diplotaxis tenuifolia	slender-leaved wall rocket	+	+	+	+		L+
Dipsacus fullonum ssp. sylvestris	teasel	+	+	+	+		L+
Duschenea indica	Indian-strawberry	+	+	+	+		L+
Echinochloa crus-galli	barnyard grass	+	+	+	+		L+
Echium vulgare	viper's bugloss or blueweed	+	+	+	+		L+
Elaeagnus angustifolia	Russian olive	+	+	+	+		L+
Elaeagnus umbellata	autumn olive	+	+	+	+		L+
Elymus repens (Agropyron repens; Elytrigia repens)	quack grass	+	+	+	+		L+
Epilobium hirsutum	hairy or European willow-herb	+	+	+	+		L+
Epilobium parviflorum	small-flowered willow-herb	+	+	+	+		L+
Epipactis helleborine	helleborine	+	+	+	+		L+
Eragrostis minor (E. pooides)	little love grass	+	+	+	+		L+
Erucastrum gallicum	dog mustard	+	+	+	+		L+
Erysimum cheiranthoides	wormseed mustard	+	+	+	+		L+
Erysimum hieraciifolium	hawkweed-leaved wormseed mustard	+	+	+	+		L+
Euonymus alatus (E. alata)	winged spindle-tree	+	+	+	+		L+
Euonymus europaea (E. europaeus)	European spindle-tree	+	+	+	+		L+
Euonymus fortunei	wintercreeper euonymus	+	+	+	+		L+
Euphorbia cyparissias	cypress spurge	+	+	+	+		L+
Euphorbia esula	leafy spurge	+	+	+	+		L+
Euphorbia peplus	petty spurge	+	+	+	+		L+
Festuca arundinacea (F. elatior ssp. arundinacea)	tall fescue	+	+	+	+		L+
Festuca pratensis (F. elatior var. pratensis)	meadow fescue	+	+	+	+		L+
Festuca trachyphylla (F. longifolia; F. brevipila; F. ovina)	hard or sheep fescue	+	+	+	+		L+
Forsythia viridissima	forsythia	+	+	+	+		L+
Fraxinus excelsior	European ash	+	+	+	+		L+
Galeopsis tetrahit	hemp-nettle	+	+	+	+		L+
Galium mollugo	white bedstraw or wild madder	+	+	+	+		L+
Galium verum	yellow bedstraw	+	+	+	+		L+
Geum urbanum	urban avens or herb Bennett	+	+	+	+		L+
Glechoma hederacea	creeping Charlie or ground-ivy	+	+	+	+		L+
Gleditsia triacanthos	honey locust	+	+	+	+		L+
Hedera helix	English ivy	+	+	+	+		L+

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Hemerocallis fulva	orange day-lily	+	+	+	+		L+
Hesperis matronalis	dame's rocket	+	+	+	+		L+
Hieracium caespitosum ssp. caespitosum (H. pratense)	yellow or field hawkweed	+	+	+	+		L+
Hieracium lachenalii (H. vulgatum)	blotched or showy hawkweed	+	+	+	+		L+
Hieracium pilosella	mouse-ear hawkweed	+	+	+	+		L+
Hordeum jubatum ssp. jubatum	squirrel-tail barley	+	+	+	+		L+
Humulus japonicus	Japanese hops	+	+	+	+		L+
Hypericum perforatum	common St. Johnswort	+	+	+	+		L+
Impatiens glandulifera	Himalayan balsam	+	+	+	+		L+
Inula helenium	elecampane	+	+	+	+		L+
Iris germanica	garden iris	+	+	+	+		L+
Iris pseudacorus	yellow flag	+	+	+	+		L+
Iris sibirica	Siberian flag	+	+	+	+		L+
Juncus compressus	round-fruited or compressed rush	+	+	+	+		L+
Juniperus x media (J. chinensis x sabina; J. x pfitzeriana)	pfitzer or ornamental juniper	+	+	+	+		L+
Kerria japonica	Japanese kerria	+	+	+	+		L+
Kochia scoparia	summer-cypress	+	+	+	+		L+
Lactuca serriola (L. scariola)	prickly lettuce	+	+	+	+		L+
Lamium purpureum	purple dead-nettle	+	+	+	+		L+
Lappula squarrosa (L. echinata)	Eurasian stickseed	+	+	+	+		L+
Larix decidua	European larch	+	+	+	+		L+
Lathyrus latifolius	everlasting pea	+	+	+	+		L+
Leonurus cardiaca ssp. cardiaca	motherwort	+	+	+	+		L+
Lepidium campestre	field pepper-grass	+	+	+	+		L+
Ligustrum vulgare	privet	+	+	+	+		L+
Linaria vulgaris	toadflax, butter-and-eggs	+	+	+	+		L+
Lithospermum officinale	Eurasian gromwell	+	+	+	+		L+
Lolium perenne (inc. var. aristatum)	perennial rye	+	+	+	+		L+
Lonicera morrowii	Morrow's honeysuckle	+	+	+	+		L+
Lonicera tatarica	Tartarian honeysuckle	+	+	+	+		L+
Lonicera x bella (L. morrowi x tatarica)	hybrid shrub or Bell's honeysuckle	+	+	+	+		L+
Lonicera xylosteum	European fly honeysuckle	+	+	+	+		L+
Lotus corniculatus	bird's foot trefoil	+	+	+	+		L+
Lupinus polyphyllus	western or garden lupine	+	+	+	+		L+
Lycopersicon esculentum	tomato (inc. cherry tomato)	+	+	+	+		L+
Lysimachia nummularia	moneywort	+	+	+	+		L+
Lythrum salicaria	purple loosestrife	+	+	+	+		L+
Malus baccata	Siberian crab-apple	+	+	+	+		L+
Malus pumila (M. domestica; Pyrus malus)	apple	+	+	+	+		L+
Malva neglecta	common mallow or bread &butter	+	+	+	+		L+
Matricaria matricarioides	pineappleweed	+	+	+	+		L+
Matricaria perforata (M. maritima; M. inodora)	scentless chamomile	+	+	+	+		L+

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Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Matricaria recutita (M. chamomilla)	wild chamomile	+	+	+	+		L+
Medicago lupulina	black medick	+	+	+	+		L+
Medicago sativa ssp. sativa	alfalfa	+	+	+	+		L+
Melilotus alba	white sweet clover	+	+	+	+		L+
Melilotus officinalis	yellow sweet clover	+	+	+	+		L+
Miscanthus sacchariflorus	eulalia or Amur silver grass	+	+	+	+		L+
Morus alba	white mulberry	+	+	+	+		L+
Muscari botryoides	grape hyacinth	+	+	+	+		L+
Myosotis scorpioides	true or European forget-me-not	+	+	+	+		L+
Narcissus poeticus	narcissus	+	+	+	+		L+
Narcissus pseudonarcissus	daffodil	+	+	+	+		L+
Nepeta cataria	catnip	+	+	+	+		L+
Papaver somniferum	opium or common poppy	+	+	+	+		L+
Pastinaca sativa	wild parsnip	+	+	+	+		L+
Petasites japonicus	Japanese coltsfoot	+	+	+	+		L+
Phellodendron amurense	Amur cork-tree	+	+	+	+		L+
Philadelphus coronarius	mock-orange	+	+	+	+		L+
Phleum pratense	timothy grass	+	+	+	+		L+
Pinus sylvestris	Scots pine	+	+	+	+		L+
Plantago arenaria (P. psyllium, P. indica)	flaxseed or Indian plantain or psyllium	+	+	+	+		L+
Plantago lanceolata	English plantain	+	+	+	+		L+
Plantago major	broad-leaved or common plantain	+	+	+	+		L+
Poa bulbosa	bulblet-bearing blue grass	+	+	+	+		L+
Poa compressa	Canada or flat-stemmed blue grass	+	+	+	+		L+
Poa nemoralis	wood blue grass or spear grass	+	+	+	+		L+
Poa pratensis ssp. pratensis	Kentucky blue grass	+	+	+	+		L+
Poa trivialis	rough blue grass	+	+	+	+		L+
Polygonatum cf. multiflorum	European Solomon's seal	+	+	+	+		L+
Polygonum achoreum	striate knotweed	+	+	+	+		L+
Polygonum aviculare (P. monspeliense)	prostrate knotweed	+	+	+	+		L+
Polygonum convolvulus	black bindweed	+	+	+	+		L+
Polygonum cuspidatum (Reynoutria japonica)	Japanese knotweed	+	+	+	+		L+
Polygonum orientale	prince's feather	+	+	+	+		L+
Polygonum persicaria	lady's thumb	+	+	+	+		L+
Populus alba	white poplar (including cultivars)	+	+	+	+		L+
Populus x canadensis (P. deltoides x nigra)	Carolina poplar	+	+	+	+		L+
Populus x heimburgeri (P. alba x tremuloides)	Heimburger's poplar	+	+	+	+		L+
Portulaca grandiflora	rose-moss or garden portulaca	+	+	+	+		L+
Portulaca oleracea	purslane	+	+	+	+		L+
Potamogeton crispus	curly pondweed	+	+	+	+		L+
Potentilla argentea	silvery cinquefoil	+	+	+	+		L+
Potentilla recta	rough-fruited or sulphur cinquefoil	+	+	+	+		L+

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Potentilla x inclinata (P. argentea x recta; P. x canescens)	downy or intermediate cinquefoil	+	+	+	+		L+
Prunus avium	sweet or mazzard cherry	+	+	+	+		L+
Prunus mahaleb	mahaleb cherry	+	+	+	+		L+
Prunus tomentosa	Manchu or Nanking cherry	+	+	+	+		L+
Prunus triloba	flowering almond	+	+	+	+		L+
Puccinellia distans	alkali or sea-meadow grass	+	+	+	+		L+
Pulmonaria officinalis	lung-wort	+	+	+	+		L+
Ranunculus acris	tall buttercup	+	+	+	+		L+
Ranunculus repens	creeping buttercup	+	+	+	+		L+
Rhamnus cathartica	common or European buckthorn	+	+	+	+		L+
Rhamnus frangula	glossy buckthorn	+	+	+	+		L+
Ribes rubrum	garden red currant	+	+	+	+		L+
Robinia pseudoacacia	black locust	+	+	+	+		L+
Rosa cf. canina	dog rose	+	+	+	+		L+
Rosa multiflora	multiflora or Japanese rose	+	+	+	+		L+
Rosa rugosa	wrinkled or seaside rose	+	+	+	+		L+
Rumex crispus	curly dock	+	+	+	+		L+
Rumex obtusifolius ssp. obtusifolius	bitter dock	+	+	+	+		L+
Salix alba var. alba	white willow	+	+	+	+		L+
Salix fragilis	crack willow	+	+	+	+		L+
Salix matsudana	corkscrew willow (cultivar)	+	+	+	+		L+
Salix purpurea	purple osier or basket willow	+	+	+	+		L+
Salix triandra	almond-leaved willow	+	+	+	+		L+
Salix x rubens (S. alba x fragilis)	European tree willow	+	+	+	+		L+
Salix x sepulcralis (S. alba var. vitellina x babylonica)	weeping willow	+	+	+	+		L+
Salsola cf. collina	Russian thistle	+	+	+	+		L+
Sanguisorba minor	small burnet	+	+	+	+		L+
Saponaria officinalis	bouncing Bet or soapwort	+	+	+	+		L+
Scilla siberica	scilla or Siberian squill	+	+	+	+		L+
Sedum acre	mossy stonecrop	+	+	+	+		L+
Setaria faberi	giant foxtail	+	+	+	+		L+
Setaria glauca (S. pumila)	yellow foxtail	+	+	+	+		L+
Setaria viridis	green foxtail	+	+	+	+		L+
Silene pratensis (S. alba; S. latifolia; Lychnis alba)	evening lychnis	+	+	+	+		L+
Silene vulgaris (S. cucubalus; S. latifolia)	bladder campion	+	+	+	+		L+
Sinapis arvensis (Brassica kaber)	charlock	+	+	+	+		L+
Sisymbrium altissimum	tumble mustard	+	+	+	+		L+
Solanum dulcamara	bittersweet nightshade	+	+	+	+		L+
Sonchus arvensis ssp. arvensis	glandular perennial or field sow-thistle	+	+	+	+		L+
Sonchus arvensis ssp. uliginosus (S. uliginosus)	smooth perennial sow-thistle	+	+	+	+		L+
Sonchus asper ssp. asper	spiny sow-thistle	+	+	+	+		L+
Sonchus oleraceus	common or annual sow-thistle	+	+	+	+		L+

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Sorbus aucuparia	European mountain-ash or rowan	+	+	+	+		L+
Sorbus intermedia	whitebeam	+	+	+	+		L+
Spergularia marina	salt-marsh sand spurrey	+	+	+	+		L+
Spergularia media	salt-marsh or intermediate sand spurrey	+	+	+	+		L+
Stellaria graminea	grass-leaved chickweed or stitchwort	+	+	+	+		L+
Stellaria media	common chickweed or starwort	+	+	+	+		L+
Symphoricarpos albus var. laevigatus	western snowberry	+	+	+	+		L+
Syringa vulgaris	common lilac	+	+	+	+		L+
Tanacetum vulgare	tansy	+	+	+	+		L+
Taraxacum officinale	dandelion	+	+	+	+		L+
Taxus cuspidata	Japanese yew	+	+	+	+		L+
Thlaspi arvense	penny-cress	+	+	+	+		L+
Tilia cordata	little-leaf linden	+	+	+	+		L+
Torilis japonica	hedge-parsley	+	+	+	+		L+
Tradescantia virginiana	Virginia spiderwort	+	+	+	+		L+
Tragopogon dubius	lemon-yellow goat's beard	+	+	+	+		L+
Tragopogon pratensis ssp. pratensis	meadow goat's beard	+	+	+	+		L+
Trifolium pratense	red clover	+	+	+	+		L+
Trifolium repens	white clover	+	+	+	+		L+
Tussilago farfara	coltsfoot	+	+	+	+		L+
Typha angustifolia	narrow-leaved cattail	+	+	+	+		L+
Typha x glauca (T. angustifolia x latifolia)	hybrid cattail	+	+	+	+		L+
Ulmus glabra	Scotch elm	+	+	+	+		L+
Ulmus pumila	Siberian elm	+	+	+	+		L+
Urtica dioica ssp. dioica	European stinging nettle	+	+	+	+		L+
Valeriana officinalis	common valerian	+	+	+	+		L+
Verbascum blattaria	moth mullein	+	+	+	+		L+
Verbascum thapsus	common mullein	+	+	+	+		L+
Veronica anagallis-aquatica	water speedwell (European)	+	+	+	+		L+
Veronica chamaedrys	germander speedwell	+	+	+	+		L+
Veronica longifolia	long-leaved speedwell	+	+	+	+		L+
Veronica officinalis	common speedwell	+	+	+	+		L+
Veronica serpyllifolia ssp. serpyllifolia	thyme-leaved speedwell	+	+	+	+		L+
Viburnum lantana	wayfaring tree	+	+	+	+		L+
Viburnum opulus	guelder-rose/Eu highbush cranberry	+	+	+	+		L+
Vicia cracca	cow, tufted, or bird vetch	+	+	+	+		L+
Vinca minor	periwinkle	+	+	+	+		L+
Acer negundo	Manitoba maple	+?	+?	+?	+?		L+?
Agrostis stolonifera (A. alba var. palustris)	creeping bent grass	+?	+?	+?	+?		L+?
Atriplex patula (A. patula var. hastata)	halberd-leaved orache or spearscale	+?	+?	+?	+?		L+?
Chamaesyce cf. glyptosperma (Euphorbia glyptosperma)	ridge-seeded spurge	+?	+?	+?	+?		L+?
Cyperus esculentus	yellow nut-sedge or chufa	+?	+?	+?	+?		L+?

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Geranium robertianum	herb Robert	+?	+?	+?	+?		L+?
Lepidium densiflorum	common pepper-grass	+?	+?	+?	+?		L+?
Mertensia virginica	Virginia bluebells	+?	+?	+?	+?		L+?
Oxalis stricta (O. europaea; O. fontana)	common or upright yellow wood-sorrel	+?	+?	+?	+?		L+?
Phalaris arundinacea	reed canary grass	+?	+?	+?	+?		L+?
Phragmites australis (P. communis)	common, giant, or great reed	+?	+?	+?	+?		L+?
Polygonum hydropiper	water- or marsh-pepper	+?	+?	+?	+?		L+?
Potentilla norvegica (inc. ssps. norvegica & monspeliensis?)	rough cinquefoil	+?	+?	+?	+?		L+?
Prunella vulgaris (incl. ssp. lanceolata and vulgaris)	heal-all	+?	+?	+?	+?		L+?
Sporobolus vaginiflorus	ensheathed dropseed	+?	+?	+?	+?		L+?
Verbena bracteata	creeping or bracted vervain	+?	+?	+?	+?		L+?
Pinus resinosa	red pine	4	5	5	5	19	pL1
Platanus occidentalis	sycamore	5	5	5	4	19	pL1
Rosa palustris	swamp rose	5	5	5	4	19	pL1
Aronia melanocarpa (A. prunifolia)	black choke-berry	4	5	5	4	18	pL2
Heliopsis helianthoides	ox-eye	5	5	4	4	18	pL2
Potamogeton zosteriformis	eel-grass or flat-stemmed pondweed	3	5	5	5	18	pL2
Rosa carolina	pasture or Carolina rose	5	5	4	3	17	pL2
Viburnum trilobum (V. opulus var. trilobum)	highbush cranberry	4	5	4	4	17	pL2
Carex amphibola (C. grisea)	grey sedge	5	2	4	3	14	pL3
Carex comosa (C. pseudo-cyperus var. comosa)	bristly sedge	3	3	5	4	15	pL3
Cephalanthus occidentalis	buttonbush	4	4	4	3	15	pL3
Peltandra virginica	tuckahoe or green arrow-arum	5	2	5	4	16	pL3
Physocarpus opulifolius	ninebark	5	2	5	4	16	pL3
Picea glauca	white spruce	3	5	4	3	15	pL3
Rudbeckia laciniata	cut-leaved or green-headed coneflower	4	2	3	2	11	pL4
Asclepias tuberosa	butterfly milkweed	e	e	e	e		pLX
Cimifuga racemosa	black snakeroot or cohosh	e	e	e	e		pLX
Acer pensylvanicum	striped maple	+	+	+	+		pL+
Amelanchier cf. alnifolia	Saskatoonberry	+	+	+	+		pL+
Aralia elata	Japanese angelica-tree	+	+	+	+		pL+
Asimina triloba	paw-paw	+	+	+	+		pL+
Carex dolichostachys	Japanese sedge (variegated)	+	+	+	+		pL+
Chasmanthium latifolium	northern sea-oats	+	+	+	+		pL+
Cornus mas	cornelian-cherry	+	+	+	+		pL+
Corylus cf. avellana	European filbert	+	+	+	+		pL+
Dicentra spectabilis	bleeding heart	+	+	+	+		pL+
Dryopteris sp.	an Asian ornamental shield fern	+	+	+	+		pL+
Eleutherococcus sieboldianus (Acanthopanax sieboldianus)	five-leaved aralia	+	+	+	+		pL+
Fagus sylvatica	European beech	+	+	+	+		pL+
Filipendula rubra	queen of the prairie	+	+	+	+		pL+
Hippophae rhamnoides	sea-buckthorn	+	+	+	+		pL+

Appendix C: List of Flora Species Found in the Don River Watershed from 1996 - 2005

Scientific name	Common Name	Local Occurrence 1-5	Population Trend 1-5	Habitat Dependence 0-5	Sensitivity to Development 0-5	Total Score 2-20	Rank TRCA Apr.2003
Hyacinthus orientalis	garden hyacinth	+	+	+	+		pL+
Kolreuteria paniculata	golden-rain tree	+	+	+	+		pL+
Picea abies	Norway spruce	+	+	+	+		pL+
Picea pungens	Colorado spruce	+	+	+	+		pL+
Pinus banksiana	Jack pine	+	+	+	+		pL+
Pinus mugo	mugho pine	+	+	+	+		pL+
Pinus nigra	Austrian pine	+	+	+	+		pL+
Pinus wallichiana	Himalayan white pine	+	+	+	+		pL+
Platanus x acerifolia	London plane tree	+	+	+	+		pL+
Populus simonii	Chinese balsam popular	+	+	+	+		pL+
Pseudotsuga menziesi	Douglas-fir	+	+	+	+		pL+
Quercus robur	English oak	+	+	+	+		pL+
Shepherdia argentea	silver buffaloberry	+	+	+	+		pL+
Spiraea x vanhouttei	bridal-wreath spiraea	+	+	+	+		pL+
Tilia cf. heterophylla var. michauxii	white basswood	+	+	+	+		pL+
Tulipa sylvestris ssp. sylvestris	garden tulip	+	+	+	+		pL+
Veronicastrum virginicum	Culver's root	+	+	+	+		pL+
Nymphaea sp.	water-lily (ornamental)	+?	+?	+?	+?		pL+?

LEGEND

"cf." in the species name indicates the species found was most likely named correctly but could not be confirmec
"pL…" in the rank column indicates that the species was only found planted and not regenerating
"LX" in the rank column indicates that the species is extirpated from the TRCA jurisdiction
"L+" in the rank column indicates that the species is non-native

SUMMARY OF VASCULAR PLANTS 1996-2005	Total number	% of non-planted
Total vascular plant species (natural & planted)	775	
Total naturally-occurring species (not planted)	726	
Total species present only as planted	49	
Total native species (naturally-occurring)	439	*60*
Total of exotic species (naturally-occurring)	287	*40*
Total L1-L3 species (naturally-occurring)	171	*24*
Total L4 species (naturally-occurring)	123	*17*
Total L5 species & hybrids (natural)	145	*20*

Appendix D: List of fauna species found in the Don River watershed.

Appendix D: List of Fauna Species Found in the Don River Watershed from 1996 - 2005

Survey Species: species for which the TRCA protocol effectively surveys

													No. of points by Subwatershed						
Common Name	**CODE**	**Scientific Name**	**LO**	**PTn**	**PTt**	**HD**	**AS**	**MR**	**STD**	**AP**	**TS**	**L-rank**	**GM**	**LD**	**LDE**	**TMC**	**UE**	**LW**	**UW**
Birds																			
hooded merganser	HOME	*Lophodytes cucullatus*	4	2	3	3	3	1	4	0	20	L2						1	
veery	VEER	*Catharus fuscescens*	2	3	3	4	3	2	5	1	23	L2					2		
American redstart	AMRE	*Setophaga ruticilla*	2	3	2	2	2	2	3	0	16	L3					1	2	1
American woodcock	AMWO	*Scolopax minor*	0	2	3	2	3	2	4	0	16	L3					2		2
black-billed cuckoo	BBCU	*Coccyzus erythropthalmus*	1	3	2	2	3	2	3	0	16	L3	1				1	1	2
black-throated green warbler	BTNW	*Dendroica virens*	2	2	2	3	3	2	4	0	18	L3					2		
bobolink	BOBO	*Dolichonyx oryzivorus*	0	3	2	2	3	1	4	0	15	L3					1		1
brown creeper	BRCR	*Certhia americana*	1	2	2	2	3	3	3	0	16	L3					5		
brown thrasher	BRTH	*Toxostoma rufum*	1	4	3	1	2	2	4	0	17	L3					2		
Cooper's hawk	COHA	*Accipiter cooperii*	2	2	2	3	4	1	2	0	16	L3					1	2	
field sparrow	FISP	*Spizella pusilla*	1	3	3	2	2	1	4	0	16	L3	1				1		1
hermit thrush	HETH	*Catharus guttatus*	4	1	2	2	3	2	4	0	18	L3					1		
least flycatcher	LEFL	*Empidonax minimus*	2	3	3	1	2	2	3	0	16	L3		1				1	
ovenbird	OVEN	*Seiurus aurocapillus*	0	2	3	3	4	2	4	0	18	L3					7		
pileated woodpecker	PIWO	*Dryocopus pileatus*	1	2	2	3	4	2	3	0	17	L3		1				5	1
pine warbler	PIWA	*Dendroica pinus*	1	1	2	3	4	2	3	0	16	L3					5	1	
scarlet tanager	SCTA	*Piranga olivacea*	1	2	3	3	4	2	3	0	18	L3					1	2	
sharp-shinned hawk	SSHA	*Accipiter striatus*	1	2	2	3	4	1	3	0	16	L3					1		
vesper sparrow	VESP	*Pooecetes gramineus*	3	3	3	2	2	1	4	0	18	L3					1		
wood duck	WODU	*Aix sponsa*	2	1	1	3	3	1	4	0	15	L3		1				4	
wood thrush	WOTH	*Hylocichla mustelina*	0	3	3	3	3	2	4	0	18	L3	6				19	6	4
yellow-billed cuckoo	YBCU	*Coccyzus americanus*	3	3	2	2	2	2	3	0	17	L3						1	
alder flycatcher	ALFL	*Empidonax alnorum*	2	1	2	2	1	2	4	0	14	L4						1	
bank swallow	BANS	*Riparia riparia*	3	2	2	2	1	1	2	0	13	L4		2					1
belted kingfisher	BEKI	*Ceryle alcyon*	0	3	2	2	2	2	2	0	13	L4	1	4			x	4	1
blue-grey gnatcatcher	BGGN	*Polioptila caerulea*	3	1	0	1	3	2	2	0	12	L4			2			2	
common yellowthroat	COYE	*Geothlypis trichas*	0	2	2	2	1	2	4	0	13	L4			3	3	x	2	1
eastern meadowlark	EAME	*Sturnella magna*	0	3	2	2	3	1	3	0	14	L4				5		3	2
eastern phoebe	EAPH	*Sayornis phoebe*	1	2	2	2	1	2	1	0	11	L4					1	6	1
eastern screech-owl	EASO	*Megascops asio*	1	2	2	3	1	2	3	0	14	L4		1	1		6	6	2
eastern wood-pewee	EAWP	*Contopus virens*	0	4	2	1	2	2	2	0	13	L4	4	4	1	1	17	15	3
great horned owl	GHOW	*Bubo virginianus*	2	2	2	1	2	2	1	0	12	L4					x		x
great crested flycatcher	GCFL	*Myiarcyhus crinitus*	0	2	3	1	3	2	2	0	13	L4		5	2	2	4	22	2
gray catbird	GRCA	*Dumetella carolinensis*	0	3	1	1	1	2	3	0	11	L4	1	13	7	5	2	37	11
hairy woodpecker	HAWO	*Picoides villosus*	0	2	1	2	3	2	2	0	12	L4		2			2	11	2

Appendix D: List of Breeding Fauna Species Found in Don Watershed from 1996 to 2005 (Shaded Entries are 1980-1995)

													No. of points by Subwatershed						
Common Name	**CODE**	**Scientific Name**	**LO**	**PTn**	**PTt**	**HD**	**AS**	**MR**	**STD**	**AP**	**TS**	**L-rank**	**GM**	**LD**	**LDE**	**TMC**	**UE**	**LW**	**UW**
horned lark	HOLA	*Eremophila alpestris*	0	3	2	2	2	1	3	0	13	L4							2
indigo bunting	INBU	*Passerina cyanea*	0	2	2	2	1	1	3	0	12	L4	x	4	5		x	22	1
mourning warbler	MOWA	*Oporornis philadelphia*	0	2	2	2	2	2	4	0	14	L4					1		
northern flicker	NOFL	*Colaptes auratus*	0	3	2	0	1	2	3	0	11	L4		9	4	2	4	17	4
northern mockingbird	NOMO	*Mimus polyglottos*	4	2	0	1	1	2	1	0	12	L4		2				3	
northern rough-winged swallow	NRWS	*Stelgidopteryx serripennis*	3	2	3	2	1	1	1	0	13	L4		1					4
red-breasted nuthatch	RBNU	*Sitta canadensis*	1	1	1	3	3	2	2	0	13	L4	1				1	4	3
red-eyed vireo	REVI	*Vireo olivaceus*	0	2	2	1	2	2	3	0	12	L4	1	7	3	4	14	46	16
rose-breasted grosbeak	RBGR	*Pheucticus ludovicianus*	0	2	2	2	3	2	3	0	14	L4					x	9	x
ruby-throated hummingbird	RTHU	*Archilocus colubris*	3	2	2	1	1	1	2	0	12	L4						1	
savannah sparrow	SAVS	*Passerculus sandwichensis*	0	3	1	2	1	1	3	0	11	L4	x		1		x	2	x
spotted sandpiper	SPSA	*Actitis macularius*	1	2	3	2	1	1	4	0	14	L4	1	5			1	4	4
swamp sparrow	SWSP	*Melospiza georgiana*	0	1	2	2	1	2	5	1	14	L4					1		x
tree swallow	TRES	*Tachycineta bicolor*	0	2	2	2	1	1	3	0	11	L4		4				3	1
white-breasted nuthatch	WBNU	*Sitta carolinensis*	1	2	1	3	3	2	2	0	14	L4		1	2		x	4	2
willow flycatcher	WIFL	*Empidonax traillii*	0	4	2	1	1	2	3	0	13	L4	1	3		1		2	4
American crow	AMCR	*Corvus brachyrhynchos*	0	2	1	0	1	1	1	0	6	L5	x	4	10	1	x	9	x
American goldfinch	AMGO	*Carduelis tristis*	0	2	2	0	1	1	1	0	7	L5	x	9	17	6	x	14	2
American kestrel	****	*Falco sparverius*	0	2	2	2	1	1	0	0	8	L5						x	x
American robin	AMRO	*Turdus migratorius*	0	1	2	0	1	1	1	0	6	L5	x	5	13	10	x	25	3
Baltimore oriole	BAOR	*Icterus galbula*	0	2	2	0	1	1	1	0	7	L5		3	1	2	x	9	1
barn swallow	BARS	*Hirundo rustica*	0	2	2	2	1	1	1	0	9	L5		x			x	x	x
black-capped chickadee	BCCH	*Poecile atricapillus*	0	1	1	1	1	2	0	0	6	L5	x	5	13	5	x	13	x
blue jay	BLJA	*Cyanocitta cristata*	0	4	2	0	1	1	0	0	8	L5	x	3	9	5	x	12	x
brown-headed cowbird	BHCO	*Molothrus ater*	0	2	2	0	1	1	1	0	7	L5	x	10	6	2	x	11	1
Canada goose	CANG	*Branta canadensis*	0	1	0	1	1	1	0	0	4	L5		x			x	x	
cedar waxwing	CEDW	*Bombycilla cedrorum*	0	1	2	0	1	1	2	0	7	L5	x	5	9	8	x	7	2
chimney swift	CHSW	*Chaetura pelagica*	0	3	3	1	1	1	0	0	9	L5		x				x	
chipping sparrow	CHSP	*Spizella passerina*	0	2	2	0	1	1	1	0	7	L5		x		1	x	2	x
cliff swallow	CLSW	*Petrochelidon pyrrhonota*	0	2	2	2	1	1	1	0	9	L5		x					x
common grackle	COGR	*Quiscalus quiscula*	0	3	2	0	1	1	1	0	8	L5	x	4	8	7	x	7	1
downy woodpecker	DOWO	*Picoides pubescens*	0	2	1	1	1	2	1	0	8	L5	x	6	8	3	x	3	x
eastern kingbird	EAKI	*Tyrannus tyrannus*	0	2	2	1	2	1	1	0	9	L5	1	12	4	1	1	15	5
house finch	HOFI	*Carpodacus mexicanus*	0	2	0	0	1	1	0	0	4	L5		5	2	1	x	10	
house wren	HOWR	*Troglodytes aedon*	0	2	1	1	1	2	1	0	8	L5		3		1	x	3	x
killdeer	KILL	*Charadrius vociferus*	0	2	2	1	1	1	2	0	9	L5		2				3	x
mallard	MALL	*Anas platyrhynchos*	0	1	2	1	1	1	3	0	9	L5		1		1	x	3	x
mourning dove	MODO	*Zenaida macroura*	0	2	1	0	1	1	0	0	5	L5	x	7	5	3	x	10	
northern cardinal	NOCA	*Cardinalis cardinalis*	0	2	1	0	1	2	2	0	8	L5	x	7	15	7	x	15	1
orchard oriole	OROR	*Icterus spurius*	3	2	1	0	1	1	1	0	9	L5		x					

Appendix D: List of Breeding Fauna Species Found in Don Watershed from 1996 to 2005 (Shaded Entries are 1980-1995)

												No. of points by Subwatershed						
Common Name	**CODE**	**Scientific Name**	**LO**	**PTn**	**PTt**	**HD**	**AS**	**MR**	**STD**	**AP**	**TS**	**L-rank**	**GM**	**LD**	**LDE**	**TMC**	**UE**	**LW**	**UW**
red-tailed hawk	RTHA	*Buteo jamaicensis*	0	2	2	1	2	1	1	0	9	L5	x				x	2	x
red-winged blackbird	RWBL	*Agelaius phoeniceus*	0	2	2	0	1	1	3	0	9	L5	x	11	9	7	x	19	4
song sparrow	SOSP	*Melospiza melodia*	0	2	2	0	1	2	2	0	9	L5	x	9	18	4	x	11	3
warbling vireo	WAVI	*Vireo gilvus*	0	1	2	0	1	2	2	0	8	L5	x	5	8	7	x	8	
yellow warbler	YWAR	*Dendroica petechia*	0	1	1	1	1	2	3	0	9	L5	x	x			x	x	x
European starling	EUST	*Sturnus vulgaris*										L+	x	7	5	7	x	16	x
house sparrow	HOSP	*Passer domesticus*										L+	x	3	8	3	x	8	x
rock pigeon	ROPI	*Columba livia*										L+		x			x	x	
Herpetofauna																			
gray treefrog	TGTF	*Hyla versicolor*	2	2	3	2	3	3	5	1	21	L2					3		
spring peeper	SPPE	*Pseudacris crucifer*	1	2	3	3	3	2	5	1	20	L2					3		1
wood frog	WOFR	*Rana sylvatica*	0	2	3	4	3	2	5	1	20	L2					1		
eastern red-backed salamander*	RBSA	*Plethodon cinereus*	1	2	2	3	1	3	5	1	18	L3		6			1	1	
northern leopard frog	LEFR	*Rana pipiens*	0	3	2	2	1	2	5	1	16	L3		1					
American toad	AMTO	*Bufo americanus*	0	2	2	1	1	2	4	0	12	L4		4			x	14	1
green frog	GRFR	*Rana clamitans*	0	2	2	1	1	2	4	0	12	L4		3	1		2	7	1
Incidental Species: species that are reported on as incidental to the TRCA protocol.																			
Mammals																			
porcupine	PORC	*Erithizon dorsatum*	3	2	3	3	4	2	4	0	21	L2							1
beaver	BEAV	*Castor canadensis*	2	2	1	1	2	3	4	0	15	L3		1				2	
hairy-tailed mole	HTMO	*Parascalops breweri*	4	2	2	1	1	5	3	1	19	L3						2	
mink	MINK	*Mustela vison*	3	2	2	1	3	2	4	0	17	L3			1			1	
eastern chipmunk	EACH	*Tamias striatus*	0	2	2	1	2	2	3	0	12	L4		4	1		2	15	2
eastern cottontail*	EACO	*Sylvilagus floridanus*	1	2	2	0	2	2	4	0	13	L4	1	1	1		2	10	3
meadow vole*	MEVO	*Microtus pennsylvanicus*	1	2	2	1	1	2	3	0	12	L4		1					
muskrat	MUSK	*Ondatra zibethicus*	1	2	2	2	1	3	3	0	14	L4				1		2	
red squirrel	RESQ	*Tamiasciurus hudsonicus*	2	2	2	0	1	2	2	0	11	L4			1		1	17	2
white-tailed deer	WTDE	*Odocoileus virginianus*	1	2	2	1	3	1	2	0	12	L4	x				2	2	x
woodchuck*	WOOD	*Marmota monax*	1	2	2	1	2	2	3	0	13	L4		3				1	1
gray squirrel	GRSQ	*Sciurus carolinensis*	0	2	2	0	1	2	0	0	7	L5	x	2	5		x	7	1
raccoon	RACC	*Procyon lotor*	0	2	1	1	1	1	1	0	7	L5	x	x			x	x	
red fox	REFO	*Vulpes vulpes*	0	2	2	0	1	1	1	0	7	L5					x	1	
striped skunk	STSK	*Mephitis mephitis*	1	2	2	0	2	1	1	0	9	L5		x				x	
Herpetofauna																			
Blanding's turtle	BLTU	*Emydoidea blandingii*	5	2	2	2	3	2	5	1	22	L2			1				
northern red-bellied snake	RBSN	*Storeria occipitomaculata*	3	2	2	2	2	2	5	1	19	L3							1
snapping turtle*	SNTU	*Chelydra serpentina*	1	3	2	2	1	2	4	0	15	L3			1				

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												No. of points by Subwatershed						
Common Name	**CODE**	**Scientific Name**	**LO**	**PTn**	**PTt**	**HD**	**AS**	**MR**	**STD**	**AP**	**TS**	**L-rank**	**GM**	**LD**	**LDE**	**TMC**	**UE**	**LW**	**UW**
Dekay's brownsnake	BRSN	*Storeria dekayi*	2	2	2	1	1	2	4	0	14	L4		1				3	
eastern gartersnake	EAGA	*Thamnophis sirtalis sirtalis*	0	2	2	1	1	2	3	0	11	L4		1				7	1
midland painted turtle*	MPTU	*Chrysemys picta marginata*	1	2	2	1	1	2	4	0	13	L4		2	1			2	
pond slider	SLID	*Trachemys scripta*										L+		x					

LEGEND

*=local occurrence needs confirmation
LO = local occurrence
PTn = population trend, continent-wide
PTt = population trend, TRCA
HD = habitat dependence
AS = area sensitivity
gray areas are records from pre-1995

x = no points mapped but known to occur
MR = mobility restriction
STD = sensitivity to development
AP = additional points
TS = total score
L-rank = TRCA Rank

Subwatershed names

GM = German Mills
LD = Lower Don
LDE = Lower Don East
TMC = Taylor Massey Creek
UE = Upper East
LW = Lower West
UW = Upper West