Mimico Creek Study Area

Terrestrial Biological Inventory and Assessment

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1.0 Introduction

This report describes the Mimico Creek Study Area in the context of the Terrestrial Natural Heritage Program of the Toronto and Region Conservation Authority (TRCA). The question that the report addresses is ***"How does the area surveyed at the Mimico Creek site fit within the regional natural system, and how should its contribution to this system be protected and maximized?"*** The important message outlined by this question is that the health of the natural system is measured at the *regional* scale and specific sites must be considered together for their benefits at all scales, from the site to the larger system. The TRCA has developed a Terrestrial Natural Heritage Systems Strategy for retaining and recovering natural heritage within its jurisdiction that incorporates target-setting at the regional level. A target system that identifies a land base for where natural cover should be restored is a key component of the Strategy. Although the objectives of the Strategy are based on making positive changes at all scales, the evaluation models were developed at the landscape scale using a combination of digital land cover mapping and field-collected data. Field-collected data also provides ground-level information in the application of the landscape models at the site scale. This report explains the results of vegetation community and flora and fauna species inventories conducted at Mimico Creek and, more importantly, will explain how this site-specific information fits into the regional Natural Heritage Strategy and targets.

The report is divided into several sections and sub-sections. The first section of the report includes this introduction followed by a sub-section providing background information on the Terrestrial Natural Heritage (TNH) Program. Section 1 is *broad scoped*. This information will assist the reader in understanding the science and rationale behind the Strategy and targets that are a key part of this program and the recommendations for this site. Also included in the first section of the report is the methodology for the collection of data pertaining to the site. Section 2 is *site-focused*. Having examined the regional context, our reporting now describes the site and the results and analysis of information collected through both remote-sensing and field surveys. Section 3 combines results from Sections 1 & 2 to provide recommendations for the site in context with the regional natural heritage strategy and targets.

1.1 The Terrestrial Natural Heritage Program

Rapid urban expansion in the TRCA jurisdiction has led to continuous incremental loss of natural cover and species. In a landscape that probably supported 95 percent forest cover prior to European settlement, current mapping shows that only about 16 percent forest and wetland cover remains. Agricultural and natural lands are increasingly being urbanised while species continue to disappear. This represents a substantial loss of ecological integrity and ecosystem function that would be exacerbated in the future according to trends.

In the late 1990s the TRCA initiated the Terrestrial Natural Heritage (TNH) Program to address terrestrial biodiversity loss in the nine watersheds that compose its jurisdiction. It based this work on two landscape-level indicators: the quality distribution and

quantity of natural cover. These indicators summarize changes that occurred to the historical natural system. The aim of the program is to create a conservation strategy designed to both protect elements of the natural system (vegetation communities, flora and fauna species) *before* they become rare and to promote greater ecological function of the natural system as a whole. This aim is accomplished through the TNH Strategy by setting targets – both short and long term (100 years) - for the two "indicators" to provide direction in planning at all scales (TRCA, 2006a). The two indicators and the targets that have been set for them are explained below. It is important to understand that each of the two indicators is interdependent, for example, neither well-distributed, poor-quality natural cover, nor poorly-distributed good quality natural cover, achieves the desired conditions.

An example of the stress placed on the natural system is illustrated by a continent-wide study undertaken by the Cornell Lab of Ornithology. The study showed that scarlet tanagers (a bird species that requires mature deciduous forests) are less *area sensitive* in a landscape that still has a high percentage of forest cover than in a landscape where overall forest cover has been greatly reduced (Rosenburg et al., 1999). This example demonstrates how important it is to view development and management at the broader regional scale rather than solely at the site-specific level. The important issue is the cumulative loss of natural cover in the TRCA region that has resulted from innumerable site-specific decisions.

1.1.1 Landscape Indicators

The quality distribution and quantity of natural cover in a region are important determinants of the species distribution, vegetation community health and the provision of ecosystem services in that region. As agricultural and urban land uses replace natural cover, diminishing proportions of various natural vegetation communities and reduced populations of native species remain. Unforeseen stresses are then exerted on the remaining flora and fauna in the natural heritage system and they become rarer and may eventually be at risk of extirpation. This pattern ultimately lowers the ability of the land to support biodiversity and to maintain or enhance the quality of human life (e.g. through increased pollution and decreased space for recreation).

Base Mapping

The first step in evaluating a natural system or an individual patch is to interpret and map land cover using ærial photographs. The basic unit for the evaluation at all scales is the individual *habitat patch* in the region, which are then combined and evaluated as a system at any scale. A habitat patch is a continuous piece of habitat, as determined from ærial photo interpretation. TRCA maps habitat according to four broad categories: *forest*, *wetland*, *meadow*, and *coastal* (beach, dune, or bluff). At the regional level, the TRCA jurisdiction is made up of thousands of *habitat patches*. This mapping of habitat patches in broad categories is conducted through remote-sensing and is used in the evaluation of quality, distribution and quantity. It should not be confused with the more

detailed mapping of vegetation communities that is obtained through field surveys and that is used to ground-truth the evaluation (the latter follows in Section 2).

Quality Distribution

Quality is not just viewed on its own across the watershed, distribution of this quality is considered at the same time. If the distribution of quality habitat is poor, then the distribution of species of concern will also be poor. Where these species occur there is often a high correlation to the range and quality of ecosystem services provided. Therefore, for a watershed to deliver the range of ecosystem services equally across the watershed and provide the habitat necessary to maintain a complex and dynamic terrestrial system, good quality habitat must be distributed evenly. By examining the quality of habitat across each subunit or subwatershed the distribution of quality habitat, or 'quality distribution' can be ascertained.

Each habitat patch is evaluated according to three criteria: *size* (the number of hectares occupied by the patch), *shape* (edge-to-area ratio), and *matrix influence* (measure of the positive and negative impacts from surrounding land use)(TRCA, 2006b). 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 a surrogate for 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 3 to 15 points. Of these L-ranks, L1 represents the highest quality habitat and L5 the poorest.

Species presence or absence correlates to habitat patch size, shape and matrix influence (patch quality)(Kilgour, 2003). The quality target is based on attaining a quality of habitat patch throughout the natural system that would support in the very long term a broad range of biodiversity, more specifically a quality that would support the region's fauna Species of Conservation Concern (Table 1). The target for quality distribution is to increase the quality of patches in all subwatersheds while promoting the "good quality" (L2) average regionally.

Table 1: Habitat Patch Quality, Rank and Species Response

Size, Shape and Matrix	Patch Rank	Fauna Species of Concern
Excellent	L1	Generally Found
Good	L2	Generally Found
Fair	L3	Generally Found
Poor	L4	Generally Not Found
Very Poor	L5	Generally Not Found

In addition to the three criteria that make up the total habitat patch score, another important measure to consider in assessing habitat patch quality is *forest interior*, i.e. the amount of forest habitat that is greater than 100 meters from the edge of the forest patch, using 100 meter increments. A recognized distance for deep interior conditions

occurs at 400 meters from the patch edge. Such conditions are a habitat requirement for several sensitive fauna species.

Quantity

The *quantity target* is largely the amount of forest and wetland cover necessary to achieve the quality distribution targets. This illustrates how the two targets are dependent on each other. The quantity target of 30 per cent is the minimum forest and wetland cover required for the "good quality" average to be distributed where possible in the TRCA jurisdiction.

Based on 2002 orthophotography, 25% of the land area in the TRCA jurisdiction consists of natural cover. Although historically, the region would have consisted of up to 95% forest cover, today only about 15% is covered by forest (the remaining natural cover is mostly meadow or old field). Of the non-natural cover (i.e. the remaining 75%), 48% is urban and 27% is rural/agricultural.

1.1.2 The Region Today

The regional level analysis of habitat patches shows that the present average patch quality across the TRCA jurisdiction is "fair" (L3); forest and wetland cover is contained largely in the northern half of the TRCA jurisdiction, especially on the Oak Ridges Moraine; and the quantity is 16 per cent of the surface area of the TRCA jurisdiction. Thus the existing system stands below the targets that have been set. It becomes increasingly important to recognise that all site-based decisions contribute to the condition of a region.

1.1.3 The Region in 100 Years

The targets for quality distribution and quantity fall short of the historic pre-settlement condition, which was likely an "excellent" patch quality (L1 rank) on average, with an even distribution and 100 per cent natural cover. Those historical conditions are not the regional vision any more than 100 per cent urban is desirable; rather, the goal is to promote natural cover in a city region where urban communities, agriculture and natural cover function together as an ecosystem. The targets represent an important move toward the sustainability of regional biodiversity. Achieving the targets would reverse the current trend of declining species and vegetation communities and would improve the system's quality sufficiently to offset many impacts from further urban growth and intensification.

1.1.4 Vegetation Communities and Species

While the targets for the natural heritage system are derived from regional-scale information, the site surveys at the ground-truthing level provide important information

that can be used in conjunction with the targets to plan decisions at the site level. A key component of the ground-truthing surveys is the scoring and ranking of vegetation communities and flora and fauna species to generate L-ranks (L1-L5)(TRCA, 2005). Vegetation community scores and ranks are based on two criteria: *local occurrence* and the number of *geophysical requirements* or factors on which they depend. Flora species are scored using four criteria: *local occurrence*, *population trend*, *habitat dependence*, and *sensitivity to* impacts associated with *development*. Fauna species are scored based on seven criteria: *local occurrence*, *local population trend*, *continent-wide population trend*, *habitat dependence*, *sensitivity to development*, *area-sensitivity*, and *mobility restriction*. With the use of this ranking system, communities or species of *regional concern*, ranked L1-L3, now replace the idea of *rare* communities or species. Rarity (*local occurrence*) is still considered but is now one of many criteria that make up the L-ranks, making it possible to recognize communities or species of regional concern *before* they have become rare.

Conservation efforts need to be exercised ***before*** a vegetation community or species becomes rare, since much of the damage is irreversible once a community or species is considered rare. This is why the regional targets are relevant at the site scale where cumulative impacts occur. In addition to the L1-L3 species, a large number of currently common or secure species at the regional level are considered of concern in the urban context. These are the species identified with a conservation rank of L4. Although L4 species are widespread and frequently occur in relatively intact urban sites, they are vulnerable to long-term declines.

1.2 Inventory Methodology

A biological inventory of the Mimico Creek Survey Area was conducted at the levels of habitat patch, vegetation community, and species (flora and fauna) according to the TRCA data collection methodology (TRCA, 2007a). Habitat patch mapping was excerpted from the regional 2002 mapping of broadly-defined patch categories (forest, wetland, meadow and coastal) and digitized using ArcView GIS software.

Vegetation communities and flora species were surveyed concurrently. Botanical fieldwork for the site was conducted in 2006 (Table 2). Vegetation community designations were based on the Ecological Land Classification (ELC) and determined to the level of vegetation type (Lee et al., 1998). Community boundaries were outlined onto printouts of 2002 digital ortho-rectified photographs (ortho-photos) to a scale of 1:2000 and then digitized in ArcView. Flora regional species of concern (species ranked L1-L3) and species of urban concern (L4) were mapped as point data with approximate number of individuals seen.

Fauna data were collected by the TRCA in June/July, 2006 with three additional data points provided by Suzanne Barrett (2004 and 2006). The TRCA summer surveys were concerned primarily with the mapping of breeding bird species of regional concern. Songbirds are surveyed in June/July in order to obtain breeding bird data and to exclude migrants. The methodology for identifying confirmed and possible breeding

birds follows Cadman et al. (1987). Fauna regional species of concern (species ranked L1-L3) and species of urban concern (L4) were mapped as point data.

Table 2: Schedule of the TRCA Biological Surveys of the Mimico Creek Study Area, 2006

Survey Item	**Dates**	**Time** (hours)
Patch/Landscape	2002 ortho-photos	21 hours
Vegetation Communities & Flora Species	17 May, 1 & 26 June, 26 July, 7 & 29 September 2006	38 hours
Breeding Songbirds	13, 29 June, 10 July 2006.	6 hours

2.0 Results and Discussion of Mimico Creek Study Area

Information pertaining to the study area was collected through both remote-sensing and ground-truthing surveys. This information contains three levels of detail: habitat patch, vegetation community, and species (flora and fauna). Section 2 provides the information collected and its analysis in the context of the TNH strategy. Sub-section 2.1 gives an overview of the site location and general information about the site. Further sub-sections will present the findings and analysis under the headings of *habitat patch, vegetation communities, flora species,* and *fauna species.*

2.1 Site Location; Floristic and Physiographic Regions

The Mimico Creek Study Area lies entirely in the Mimico Creek Watershed within the City of Toronto (Maps 1 & 2). It consists of the creek valley from the Queensway north to Bloor Street, bound to east and west by the top of bank (where residential developments end). There are small fragmented parcels of TRCA property throughout the length of the study area, but much of the land is owned by the City of Toronto. Some lands are private.

The site lies within the Carolinian floristic region, composed of primarily southern deciduous forest. The entire survey area lies on the Iroquois Sand Plain physiographic region which is comprised of sandy to silty sand (Chapman and Putnam, 1984). At Mimico Creek, the underlying Ordovician bedrock (Georgian Bay formation – shale with limestone) is close to the surface and there are numerous exposures along the creek with abundant marine fossils (Eyles & Miall, 2004). The soil is Berrien Sandy Loam, shallow sandy loam over a relatively impermeable calcareous layer (Hoffman & Richards, 1955).

2.2 Habitat Patch Findings for Mimico Creek Study Area

The following details the Mimico Creek Study Area according to the two natural system indicators used in designing the Terrestrial Natural Heritage System Strategy: the *quality distribution* and *quantity* of natural cover. Analysis was based on 2002 ortho-photos.

2.2.1 Quality Distribution of Natural Cover

The Mimico Creek watershed has the least remaining natural cover of any of the nine watersheds within the TRCA jurisdiction with only 11.2% natural cover including meadow and old field; forest cover in the watershed is at 2.2%. The watershed, as with the neighbouring lower Etobicoke and Humber watersheds, is heavily urbanized. The site provides a natural corridor along the lower reaches of the Mimico Creek from just north of the shore of Lake Ontario toward (but not reaching) less urbanized areas to the north and north-east of the watershed, conferring a degree of connectivity of natural cover along the creek as it crosses an area of intense urbanization.

Habitat Patch Size and Shape

At the Mimico Creek Study Area, the average patch size score is surprisingly high with a score of "fair" (i.e. at least 10 ha for forests - see Map 3), despite the fact that the northern reach of the site scores "poor" and the southern reach scores "very poor". It is the extensive patch of "fair" scoring habitat along almost 1500 metres of the middle portion of the site that pushes the average patch size score above what might otherwise be expected. This score is achieved more by length than by width since the riparian corridor at this site is never more than 200 metres wide. This "fair" score applies to the forest components within the study area, implying that there are habitat patches of sufficient size to accommodate some area sensitive fauna species.

Since the site is entirely riparian in character the over all "poor" score for patch shape is to be expected since most of the patches are long and narrow. This same character also diminishes the likelihood for interior forest conditions to exist within the site.

Habitat Patch Matrix Influence

Analysis based on the 2002 ortho-photos shows that the habitat in the study area receives a “very poor” matrix influence (i.e. scores one out of a possible five points, see Maps 4 & 5). This can be attributed to the uninterrupted urban development, largely residential, that surrounds the site.

Habitat Patch Total Score

Map 6, *habitat patch total scores,* shows that the Mimico Creek Study Area achieves a “poor” rating for patch quality, and in fact it is the relatively high score for patch size that maintains the quality score above the lowest rating of “very poor”. The habitat quality of the site is thus roughly equivalent to the average quality in heavily urbanized portions of the TRCA jurisdiction. It would therefore be unlikely to support any Species and Vegetation Communities of Regional Concern (ranked L1 – L3), although there should be a few species and vegetation communities present that are of concern within the urban zone, i.e. ranked L4.

2.2.2 Quantity of Natural Cover

The Mimico Creek Watershed is approximately 7709 hectares in size containing 11.2% natural cover, including 167 hectares as forest (2.2%) and 38 hectares as successional habitat (0.5%). Area calculations based on 2002 orthophotos show that the Mimico Creek Study Area occupies 46.2 hectares. Remote sensing identified 29.5 ha of natural cover on the site; ground-truthed ELC surveys refined this to a total of 24.9 ha. This amounts to 3.2 % of the total natural cover in the Mimico Creek watershed. According to ELC categories, 21.1 ha of the study area is forest, 2.4 ha is successional, 0.1 ha is wetland, 0.5 is dynamic (cliff, bluff,and riparian bar), and 0.8 ha is meadow.

2.3 Vegetation Community Findings for Mimico Creek Study Area

2.3.1 Vegetation Community Representation

A total of 27 different ELC vegetation community types were described for the site (Appendix 1; Map 9). This reflects the past and current land uses of the site (agriculture until around 1950, urban, garden encroachments and other plantings, valley, hydro corridor). At the same time, polygon size is rather small with frequent changes in cover type. Most polygons are well under a hectare in size. One of these vegetation communities was recorded solely as an inclusion within another community.

This site supports 15 types of forest covering 21.1 hectares, entirely deciduous. Mature forests are confined to a few patches on valley slopes. Lowland deciduous forest on the bottomland is the most prevalent; the Fresh-Moist Ash Lowland Deciduous Forest (FOD7-2) makes up 10.1 ha of the total cover. The prevalence of red ash (*Fraxinus*

pennsylvanica) over Manitoba maple (*Acer negundo*) in the lowland forests is an indicator of relatively good floristic quality for an urban site. The forests also include some small but high-conservation concern oak communities, mostly at top-of-slope: Dry-Fresh Red Oak Deciduous Forest (FOD1-1), Dry-Fresh Mixed Oak Deciduous Forest (FOD1-4), Dry-Fresh Oak – Hardwood Deciduous Forest (FOD2-4), and Fresh-Moist Red Oak – Ash Deciduous Forest (FOD9-C)(the latter is transitional between the upland oak forests and the ash bottomlands. Flora species of concern are most concentrated in these forests. Disturbed (and re-planted) areas include some small areas of Norway maple (Acer platanoides) and other exotics (FOD4-d, FOD4-e), and plantations of poplar (*Populus* x *canadensis*)(CUP1-4), black locust (*Robinia pseudoacacia*), and Siberian elm (*Ulmus pumila*)(CUP1-f). With the urbanization and fragmentation of Mimico Creek, invasive species are widespread, notably garlic mustard (*Alliaria petiolata*), hedge parsley (*Torilis japonica*), shrub honeysuckle (*Lonicera tatarica*), and European spindletree (*Euonymus europaeus*). Nonetheless, natives are well-represented in much of the ground layer as well.

Wetlands are virtually absent. There is one tiny polygon (0.1 ha) of Forb Mineral Meadow Marsh (MAM2-10) under the hydro line.

On the other hand, the combination of riparian zone and exposed bedrock results in some landforms that are found almost nowhere else in the City of Toronto: there are small areas of Carbonate Shrub Cliff (CLS1) and Sugar Maple – Ash Treed Carbonate Cliff (CLT1-2), as well as river bars with sand, gravel, and cobble (BBO1-3, BBO1-A).

Areas subjected to past clearing include 2.4 ha of successional or scrub communities and 0.8 ha of exotic cool-season grass meadow (CUM1-b) dominated by smooth brome (*Bromus inermis*). Sumac cultural thicket (CUT1-1) is prominent under the hydro right-of-way.

2.3.2 Vegetation Communities of Concern

The vegetation communities that occur in the TRCA jurisdiction are scored and given a local rank from L1 to L5. Vegetation communities with a rank of L1 to L3 are considered of regional concern in the jurisdiction while L4 communities are considered of concern in the urban portion of the jurisdiction. The ranks are based on two criteria: *local distribution* and *geophysical requirements* (TRCA, 2005). Mimico Creek's urban location brings L4 communities into the discussion.

Six of the 27 vegetation communities found at Mimico Creek are of regional concern, while another four are considered to be of concern in the urban context (Appendix 1; Map 9). Five of the total of ten L1-L4 communities is the various oak forest types: (FOD1-1, FOD1-4, FOD2-4, FOD5-3, and FOD9-C); the first two of these are ranked L2 and have affinities with the oak savannahs of High Park. One forest type is ranked L3 (Fresh-Moist Red Oak – Ash Deciduous Forest (FOD9-C)), while the Dry-Fresh Sugar Maple – Oak Deciduous Forest is ranked L4. The single Forb Mineral Meadow Marsh

(MAM2-10) is ranked L4. The dynamic landform and riparian-based communities are the others of concern; the Carbonate Shrub Cliff and Sugar Maple – Ironwood – Ash Cliff (CLS1 and CLT1-2) are given the highest possible rank of L1, while the stream bars (Reed Canary Grass Open Bar (BBO1-3) and Riparian Gravel Bar (BBO1-A) are ranked L2 and L4.

Most of the communities of conservation concern have restricted *local distribution*; (generally, they are restricted to six or fewer of the forty-four 10x10 km squares that encompass the TRCA jurisdiction). The two carbonate rock cliffs have no other records in the TRCA jurisdiction to date, while the red oak (FOD1-1) and mixed oak (FOD1-4) forests are generally restricted to the Iroquois sand plain.

The *geophysical requirements* of communities in the TRCA jurisdiction make up the second criteria of the community L-rank. Vegetation communities develop under certain site conditions and may be 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). Mimico Creek has a number of unusual features that are associated with its suite of high-ranked communities. Its location on the Iroquois plain with Berrien sandy loam soils supports oak forest on the uplands (FOD1-1, FOD1-4, FOD2-4, and FOD5-3). Relict oak trees can be found in the neighbouring residential neighbourhoods, and small patches of oak forest occur on slopes of the valley just outside the study area, separated from it by houses on a terrace above the floodplain, e.g. Bonnyview Drive (Urban Forest Associates, 2001). The site is part of the belt of oak ecosystems including oak tallgrass savannah that extends across the Iroquois sand plain through High Park to the Beach neighbourhoods and the Danforth.

Secondly, the sandy soils overlie the Georgian Bay formation bedrock, here a mix of shale and limestone layers. Very little bedrock is exposed in the TRCA jurisdiction; thick layers of till cover most of the land. While the Georgian Bay formation is exposed at a few sites in the southwestern TRCA jurisdiction, in most places it is very loose crumbly shale. The higher proportion of limestone layers at exposures along Mimico Creek allows for the formation of true cliffs (CLS1, CLT1-2) on steep portions of the stream bank (as opposed to unconsolidated bluffs). These cliffs are small but perhaps unique in the whole TRCA jurisdiction; they are much more characteristic of the Niagara Escarpment to the west. Small areas of seepage occur along the boundary between the glaciolacustrine sand and the bedrock; one of these supports the meadow-marsh (MAM2-10).

2.4 Flora Findings for Mimico Creek Study Area

2.4.1 Flora Species Representation

A total of 319 flora species were found at the Mimico Creek Study Area during the 2006 field season (Appendix 2). Of these, 54 occurred only in plantings. Of the net 265

naturally-occurring species, 141 are native (53%), while 124 (47%) are exotic. 21 are of regional concern (L1-L3) and 33 are of urban concern (L4)(Map 10). Diversity is relatively high for an urban site of this size, and probably relates to the geological landforms and pre-development vegetation.

Plantings have occurred from urbanization times up to the present in Mimico Creek; they have generally been of small scale and have occurred on both private and public lands. At least one landowner has done naturalized plantings with a range of native and exotic species (many of the latter from the Appalachians of the U.S.A.) Riparian zone plantings in recent years have involved a few native species such as shining willow (*Salix lucida*). Because the plantings are small-scale and not part of an organized restoration effort, they are not included in the site report maps. It is difficult to assess which of the recent plantings will successfully become established.

2.4.2 Flora Species of Concern

As with vegetation communities, flora species are considered of regional concern in the TRCA jurisdiction if they rank L1-L3 based on their scores for four criteria: local occurrence; population trend; habitat dependence; and sensitivity to development impacts. Most of the flora species of concern are not rare plants *per se*, since few of them rank as provincially rare (S1-S3); however, they are of conservation concern due to their sensitivity to development and restriction to certain habitats or certain areas within the TRCA region. L4 ranked communities and species are considered to be of concern within the urban portion of the jurisdiction.

Many of the flora species of concern (47 of the 54) are associated with specific vegetation communities; consequently, they are highly susceptible to changes in these communities. They score relatively high in *habitat dependence* (Appendix 2)(Map 11). Roughly, they are found in 7 or fewer community units (groupings of vegetation communities) (TRCA, 2005). Species of deciduous forests include barren strawberry (*Waldsteinia fragarioides*), maple-leaved viburnum (*Viburnum acerifolium*), and downy false Solomon's seal (*Polygonatum pubescens*). A number of species are more specifically associated with the oak forests and also have more-or-less Carolinian affinities. These include black oak (*Quercus velutina*) and its hybrid with red oak (*Quercus* x *hawkinsii*), white oak (*Quercus alba*), and pasture rose (*Rosa carolina*). The parasitic plant one-flowered cancer-root (*Orobanche uniflora*) was found in some weedy floodplain forest, but is often associated with higher-quality semi-open forests; its parasitism is another habitat dependence factor. Riverbank wild rye (*Elymus riparius*), pink smartweed (*Polygonum pensylvanicum*), and the two species of bulrush (*Scirpus validus*, *S. microcarpus*) are restricted to streambank forests and the meadow-marsh. Canada plum (*Prunus nigra*) and pin cherry (*Prunus pensylvanica*) are characteristic of successional habitats.

Forty-five of the 54 flora species of concern have specific *sensitivity to development* impacts, scoring 3 or more for this criterion (Appendix 2). These impacts are indirect ones emanating from the surrounding land use or *matrix influence*. They tend to occur in the small areas that have had less past land-use disturbance (Map 4). Areas that have

a history of land use disturbance, including agriculture, have fewer sensitive species. Disturbances may be of several kinds. The main issues at Mimico Creek would be suppression of natural dynamics (such as fire in the oak ecosystems), trail proliferation and trampling, and the spread of invasive species.

The oak savannahs, woodlands, and forests of the Iroquois sand plain are fire-dependent, and will eventually convert to a lower-quality closed forest in the absence of fire. Prescribed fire is now used in restoration work at High Park and elsewhere. The oaks at Mimico Creek (especially the black oak and white oak (*Quercus velutina*, *Q. alba*) will not be able to regenerate without fire or perhaps other types of opening the understorey. Many of the species associated with oaks at High Park are currently absent from Mimico Creek. Pasture rose (*Rosa carolina*) and hawthorn (*Cratægus* spp.) also benefit from fire and grazing.

Increased access and use associated with an urban matrix also involves increased trampling and soil compaction. Species that have a delicate stem and/or produce only a single set of leaves per growing season, such as downy Solomon's seal (*Polygonatum pubescens*) and trillium are susceptible to trampling. Many forest ground flora are in this category. Perhaps because access to Mimico Creek is limited by steep slopes, private properties, and roads, it has only moderate trampling issues and there are forest patches with intact ground layers even at this emphatically urban site.

Disturbance caused by development and increased recreational use also facilitates the spread of invasive species. One of the main facilitators of invasives at Mimico Creek is long-term, low-level disturbance caused by small-scale dumping of yard waste and building materials down the ravine slope, occasional brush-clearing, and planting of ornamentals. Garlic mustard (*Alliaria petiolata*) is already abundant in parts of Mimico Creek. Dog-strangling vine (*Cynanchum rossicum*) is only in small infestations (mostly around the hydro corridor), but can be expected to spread rapidly (TRCA, 2007b). Invasive shrubs include European euonymus (*Euonymus europaeus*) and shrub honeysuckle (*Lonicera* x *bella*). The tree Norway maple (*Acer platanoides*) dominates one 0.2 ha polygon and is seeding elsewhere. Many native plants, especially when subjected to other stresses, cannot compete with invasives. For example, northern bedstraw (*Galium boreale*) and many of the woodland sedges (*Carex* spp.) are smaller and slower-growing than a number of invasive alien species. Trees such as the oaks and some shrubs such as maple-leaved viburnum (*Viburnum acerifolium*) are inhibited from regenerating. Butternut (*Juglans cinerea*) is found at Mimico Creek; it is now considered endangered because of an introduced canker disease that is rapidly killing off most individuals across its range.

Pollution of the air or changes to soil through dumping of fill and alkaline materials or nutrient-laden runoff alter the habitat and may affect sensitive species such as red maple (*Acer rubrum*) and oaks.

Finally, a few species are directly targeted by people for collection as edibles or for planting in their gardens. Michigan lily (*Lilium michiganense*) and trillium are showy flowers often collected for garden use. There are both original and planted trilliums at Mimico Creek.

In response to loss of habitat and stresses from land use changes, susceptible flora exhibits a declining *population trend* and may become rare or even extirpated. Because of urbanization, most native flora species in the Toronto area are suspected to be undergoing slight declines as the total land base becomes smaller. Species that are considered rare according to the *local occurrence* criterion are found in fewer than 7 of the 44 10x10 km grid squares that cover the TRCA jurisdiction. Mimico Creek, because of its Carolinian location and geomorphology, actually has its share – about a dozen. Some of these include pasture rose (*Rosa carolina*), one-flowered cancer-root (*Orobanche uniflora*), grey sedge (*Carex grisea*) and Emerson's hawthorn (*Cratægus submollis*).

2.5 Fauna Findings for the Mimico Creek Study Area

2.5.1 Fauna Species Representation

The TRCA fauna surveys at the Mimico Creek Study Area in 2006 documented a total of 33 bird species and five mammal species. Point data for a further two mammal species and a single amphibian species were provided by a local resident (Suzanne Barrett pers comm.). Thus the total number of breeding fauna species is 41. Refer to Appendix 3 for a list of the fauna species and their corresponding L-ranks.

Several additional bird species were recorded during the summer surveys but even though these species were reported within the appropriate time frame to register as potential breeders, it was considered highly unlikely that these species were anything other than late migrants. This would be especially true of the mid-season reports of ovenbird, black-throated blue warbler and black-throated green warbler from the lower to mid-reaches of the site. The presence of wood thrush in early June may be somewhat more significant but these individuals were not relocated on subsequent visits despite the use of tape-playback of the species' song. Nevertheless, the occurrence of the latter species so late in the season suggests that there may well be potential for the species to breed if some of the more negative aspects of the matrix influence on the study area can be mitigated.

2.5.2 Fauna Species of Concern

Fauna species, like vegetation communities and flora species, are considered of regional concern if they rank L1-L3 based on their scores for the seven criteria mentioned in section 1.1.4. As with flora, this is a pro-active, preventive approach, identifying where conservation efforts need to be made before a species becomes rare. Because the Mimico Creek Study Area is an urban site, L4 species are also considered to be of concern and are included in this discussion.

The fauna list for Mimico Creek Study Area includes a total of ten L4 bird species, including eastern screech-owl, great-crested flycatcher, rose-breasted grosbeak and white-breasted nuthatch. In addition there were one L4 amphibian (American toad) and

three mammal species of concern (one L3 species, mink, and two L4), bringing the total to 14 fauna species of regional concern or of concern in an urban area. Locations of these breeding fauna species are depicted on Map 12. Appendix 3 lists all of the fauna species reported from the study area, together with their associated ranks and scores.

Local occurrence is one of seven scoring criteria for fauna and is based on TRCA data and information from the Natural Heritage Information Centre (NHIC) of the Ontario Ministry of Natural Resources (MNR). 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). At the Mimico Creek Study Area there are two species of regional concern or of concern in urban areas (i.e. ranked L1 – L4) that are considered regionally rare: mink and northern rough-winged swallow. It should be noted that the regionally rare orchard oriole breeds within the study area; this species is typically a southern species which breeds successfully in urban and suburban landscapes and is therefore ranked as an L5 species, despite its rarity within the TRCA jurisdiction. The mink was reported from the study area in 2004, but is frequently sited on the lakeshore to the south of the site. This is a species that breeds in relatively undisturbed stretches of riparian habitat and maintains a home range of up to several kilometers along a riparian corridor. As is the case with flora, most regionally rare fauna species have other associated factors that explain their vulnerability and need to be taken into account in conservation strategies.

Sensitivity to development is another criterion used to determine the L-rank of fauna species. A large number of impacts that result from local land use, both urban and agricultural, can affect the local fauna. These impacts - 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 understorey). 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); sensitivity to pesticides.

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. At the Mimico Creek Study Area, eight of the 14 species that are ranked L1-L4 receive this score and are therefore considered sensitive to one or more of the impacts associated with development (Map 5). These species are persisting at this site because the ravine and riparian natural cover affords some protection from the negative influence of the surrounding matrix.

The tendency for local 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. Such cover has been maintained to some extent within the study area and thus species such as gray catbird, and to a much lesser extent, rose-breasted grosbeak, have managed to persist.

None of the L4 bird species found at the study area nest low in the ground vegetation or on the ground since such species 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) resulting in abandonment and failed breeding attempts. Such sensitive forest-bird species would include American woodcock and ovenbird, but also birds of forest edge habitat such as indigo bunting and mourning warbler. Various studies have shown that many bird species react negatively to human intrusion (i.e. the mere presence of people) to the extent that nest-abandonment and decreased nest-attentiveness lead to reduced reproduction and survival. One example of such a study showed that abundance was 48% lower for hermit thrushes (a ground-nesting/foraging species) in intruded sites than in the control sites, a site being a one-hectare circle (Gutzwiller, 1999).

Mink is a highly terrestrial species and as such is likely to be affected by many of the same ground-borne disturbances as sensitive nesting birds. However, mink is much less sedentary in habit than breeding songbirds and is able to avoid disturbance simply by moving to another portion of its home range – up or down stream - when the disturbance becomes too great. This being the case it is possible that the species has its denning location beyond the study area boundary, but there are many such denning opportunities along the bank of the creek; furthermore the species breeds during the winter months (young are born in the spring) and is largely nocturnal, thus avoiding many of the potential human disturbances that affect breeding birds.

Area sensitivity is also used to determine the local rank for fauna. 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 ha in total) score the maximum five points, while species that either show no minimum habitat requirement, or require < 1 ha in total, score one point. Species scoring three points or more (require 5+ ha in total) are deemed area sensitive species. As mentioned in section 2.2.1, 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).

A total of six of the 14 fauna species of regional and urban concern that occur at the Mimico Creek Study Area are considered area sensitive. All of these species are scored as requiring more than 5 ha of natural habitat or 10km of riparian natural habitat – the latter applies to species such as mink. For mink this requirement is not satisfied by the natural cover at the Mimico Creek Study Area alone but the area requirement of mink extends over the greater landscape and the study area contributes to this larger landscape requirement. The other five species – great-crested flycatcher, hairy woodpecker, rose-breasted grosbeak, white-breasted nuthatch and white-tailed deer -

require in excess of 5 ha of natural habitat and the habitat patches at the Mimico Creek Study Area currently satisfy such a requirement. Such patch-size 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 habitat patch of sufficient size, if that block is seriously and frequently disturbed by human intrusion such species will be liable to abandon the site.

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 stage 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 highly vagile mammals such as mink.

Connectivity along riparian corridors is important for resident fauna species such as mink but also serves an extremely important function in providing safe corridors for first year migrant songbirds dispersing from their natal forests to migration staging points such as the Lake Ontario shore. Likewise in the spring, songbirds heading north from their landfall on the lakeshore will use corridors such as these to disperse safely across the otherwise hostile urban landscape. Thus, riparian habitat such as that along Mimico Creek, needs to be viewed in the larger regional picture whereby any deterioration in the extent and quality of such connecting habitat will directly affect the migratory success and therefore the survival of many of the region's breeding birds.

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 at the Mimico Creek Study Area there are two species that score 3 points for Habitat Dependence (Map 13). These species – white-breasted nuthatch and eastern screech-owl - are dependent on fairly specific forest habitat characteristics. Both have a requirement for tree cavities in which to nest, and such cavities are to be found in relatively mature trees. Any changes to the local habitat such as the age characteristics of the forest cover may negatively impact species that are habitat specialists.

Representation is essentially the presence or absence of a species at a site. However, beyond mere representation of single species is the idea that a natural system can be

considered as a healthy functioning system if there is an association of several species thriving within that system. Each habitat type supports particular species associations. As the quality of the habitat patch improves so will the representation of flora and fauna species within that habitat. In this way representative bio-diversity is an excellent measure of the health of a natural system. The paucity of habitat dependent species at the Mimico Creek Study Area, in particular species that are dependent on a healthy forest understory, suggests that the forest habitat remaining on site is functioning at a relatively low level. This is somewhat standard for such narrow riparian forest cover in an urban landscape – compare with similar situations further upstream on the Mimico Creek, and to the east on the lower Humber River; only for one shrub/understory dependent species (gray catbird) does the Mimico Creek Study Area show a comparatively high representation. Over all, the fauna communities associated with the habitat types in the study area are rather sparse.

3.0 Recommendations

The recommendations for the Mimico Creek Study Area are given in relation to the regional targets for natural heritage in the TRCA jurisdiction (see section 1.1.3, also TRCA 2006a, 2006b). To reach the regional targets for quality distribution and quantity of natural cover, every site will require its own individualized plan of action. Following is a short summary of Mimico Creek within the regional context, followed by specific recommendations for the site.

3.1 Summary

Located in a highly urbanized landscape, the Mimico Creek Study Area is actually quite representative of the average conditions for natural cover in the urbanized portion of the TRCA jurisdiction. The forest habitat patch quality is “poor” (L4)(Map 6). The natural cover within the study area forms part of the rather fragmented riparian corridor running north along Mimico Creek from the lakeshore at Humber Bay Park. The study area has 21.1 ha of forest, 2.4 ha of successional, and 0.5 ha of riparian/dynamic vegetation communities. Wetland is minimal.

The Mimico Creek study area under current conditions supports 141 recorded species of native vascular plants, 54 of which are of regional or urban concern. Surveys reported a total of 41 species of breeding fauna, including 14 species of regional or urban concern.

3.2 Site Recommendations

The following table illustrates the contributions made by the Mimico Creek Study Area toward the quality distribution and quantity indicators, along with site-specific recommendations for potential improvements. It is important when considering the

indicators in Table 3 to keep in mind the varying degrees of interdependence between them. These indicators have been selected as a means for describing important aspects of a natural system, a system that exists as a whole, encompassing a network of closely related and inter-dependent factors. It would be incorrect and misleading to view any one of these indicators in isolation from the others.

Table 3: Summary and Recommendations for the Mimico Creek Study Area by Indicator

INDICATOR	MIMICO CREEK STUDY AREA SUMMARY		RECOMMENDATIONS
Quality Distribution	Size and Shape	6 area-sensitive forest-fauna species requiring in excess of 5 ha of forest	• Restore adjacent manicured open space along the corridor to increase size and improve shape attributes, perhaps creating small areas of forest interior. This would improve the opportunities for species such as wood thrush that are already being reported from the site in small numbers as non-breeding migrants.
	Matrix Influence	Matrix is entirely urban resulting in a total matrix influence score of 1 out of 5 (“very poor”). - 94 of the 193 native flora species are sensitive to development - 8 of the 14 fauna species of regional and urban concern are scored as sensitive to development Located in south-west section of TRCA jurisdiction where the landscape is entirely urban.	• Mitigate impacts of public use. - plan any trails to limit damage to species - cluster non-natural land uses to specific nodes on perimeter of area with buffer zones • Convert any currently manicured open spaces within the valley corridor to natural cover. • Target restoration efforts to enhance existing features (i.e. oak forest regeneration, local Carolinian species and geological landform protection). • Prevent further invasive species spread into natural areas. • Encourage stewardship from neighbouring landowners. • Retain and restore natural cover - TRCA region can retain range of flora, fauna, and community types if we protect the relatively diverse parts of jurisdiction such as this one.

Quantity	The study area contains 24.9 ha of natural cover. This contributes 3.2% to the total natural cover within the Mimico watershed. Of this, 21.1 ha is forest and 0.1ha is wetland; the study area includes 13% of the watershed total for forest.	• Maximize natural cover at Mimico Creek. - Vegetation communities and flora and fauna species will have the potential to be protected. • Maintain/enhance continuous links between habitat patches along the Mimico corridor. - recruit local stakeholders to restore riparian natural cover to the north of the study area in order to reconnect the site with riparian natural cover further north in the watershed. • Judicious positioning of restoration projects will have far reaching effects on all other indicator categories.

3.2.1 Quality Distribution Recommendations

If any one of the three landscape measures (size, shape or matrix influence) within the study area were to be augmented, the area would improve in habitat patch total score, perhaps to the extent of introducing “poor” as opposed to “very poor” quality patches (i.e. the next category up) into the area. The expected results from such an improvement in habitat patch score (and therefore quality) would be a subsequent increase in the quality of the local natural system (reflected in the increase and recruitment of more sensitive communities and species).

Optimize Patch Size & Shape, Forest Interior

The larger the habitat block, the more resilient the fauna and flora communities are to developments within the landscape. Restoration of currently open areas adjacent to and within the study area (hydro corridors, manicured areas) will enhance the overall size of the forest habitat on the site. If such small areas of semi-open habitat were reforested or allowed to develop a more closed tree canopy, this would improve the resilience of the natural system within the valley. Increasing the size of habitat patches is an effective way of mitigating the negative effects of human disturbance since the impacts of such disturbance are spread and dissipated over a wider area of natural cover. Since it is unlikely that human disturbance levels will decrease in the future, the only way to restore the area’s natural system (e.g. increased numbers of sensitive breeding fauna) is to take steps to mitigate the impacts. Increasing patch size is the first step in achieving such mitigation.

The riparian corridor at Mimico Creek is rarely more than 150 metres wide, and never widens beyond 200 metres. The potential for creating any forest interior beyond 100

metres through restoration of open habitats along the creek is almost non-existent. Nevertheless, even small increments in the width of the corridor will enhance the viability of the corridor as a conduit for migrating and dispersing fauna. Such small increments might be achieved through local stakeholder residents creating backyard habitat which effectively widens the riparian corridor.

Minimize Negative Matrix Influence

The matrix influence scores for Mimico Creek were calculated using landscape analysis from 2002 ortho-rectified photographs. Urban land uses should be kept from intruding further onto this site and non-natural land uses in general should be kept to specific nodes on the perimeter of the area with wide buffer zones around them. Any further development within or in the vicinity of the study area will exert additional negative matrix influence on the remaining area by the loss of natural cover in the matrix and urbanization of remaining open areas. Serious impacts would inevitably arise from such land use changes but because this part of the City of Toronto is already entirely urbanized, it is unlikely that the local matrix influence can deteriorate much further; any improvement will have to be made through the attitudes and behaviour of local stakeholder residents. Although the area is an established urban neighbourhood, the design of any infill development or redevelopment in the area could have either positive or negative impacts. For example, green roofs could increase net vegetation cover in the vicinity and mitigate local climate and storm water runoff.

Encouraging increased natural cover in adjacent lands/backyards can further enhance the matrix and landowner stewardship could inform neighbouring landowners of the value of natural cover. Community involvement in this local natural area could ensure that some human-influenced impacts on the communities and species would be diminished. It is important to implement such measures to mitigate many of the negative matrix influences associated with an urban matrix.

The largest concentrations of flora species and fauna species of concern occur in the oak and ash forest communities. Every effort should be made to mitigate any negative *matrix influence* on these areas. For example, a long-term planning approach would direct trail development away from such areas. Impacts from adjacent lands can be mitigated through measures such as the removal of invasive exotic species such as dog-strangling vine (*Cynanchum rossicum*) and shrub honeysuckle (*Lonicera x bella*).

3.2.2 Quantity Recommendations

Increase Natural Cover to Achieve Quality Distribution Targets

In order to achieve the target for natural cover quality distribution there needs to be an adequate amount of natural cover. Insufficient natural cover in many urban parts of the TRCA jurisdiction such as the Don Valley has resulted in concentrated impacts on the remaining land base, as well as conflicts between various user groups.

The more natural cover we retain at the Mimico Creek Study Area and vicinity, the better it can support a healthier level of biodiversity. The study area has vegetation communities and flora species representative of the Iroquois sand plain and Carolinian zone that are of concern in the region or in the urbanized portions of the region. Vegetation communities and species of concern are associated both with the oak forest cover and some of the riparian dynamic communities.

Restoration efforts should target the types of vegetation and species that are representative of the area, in whatever ways are possible. For example, oak regeneration should be encouraged. While the configuration of the land base may or may not permit prescribed fire as has been used in High Park or the South Humber, removal of invasives, judicious opening of canopy gaps, and careful plantings may achieve some of the same effects where prescribed fire cannot be implemented. In addition, development or stream channel protection must make every effort to protect the Ordovician cliff exposures.

Improve Connectivity To Nearby Habitat

The Mimico Creek riparian corridor is relatively well connected throughout the study area but then becomes extremely fragmented along the stretch north of Bloor St. as far as Kipling Avenue. Beyond Kipling Avenue, the riparian corridor is then continuous as far as the junction of the 427 and 401 highways. Restoration of the riparian habitat north of Bloor St. would dramatically enhance the function of the entire Mimico corridor. This aspect of habitat connectivity has immense implications at both the watershed and regional levels. Connectivity through natural cover along this corridor should be maintained and enhanced to improve the opportunities for dispersal of breeding and migrating fauna.

It is in this issue of linkage and connectivity that the site acquires particular significance for fauna. The placement of restored habitat can be planned so as to maximize its benefits to habitat quality distribution, as well as connectivity and the protection of existing populations of species of concern.

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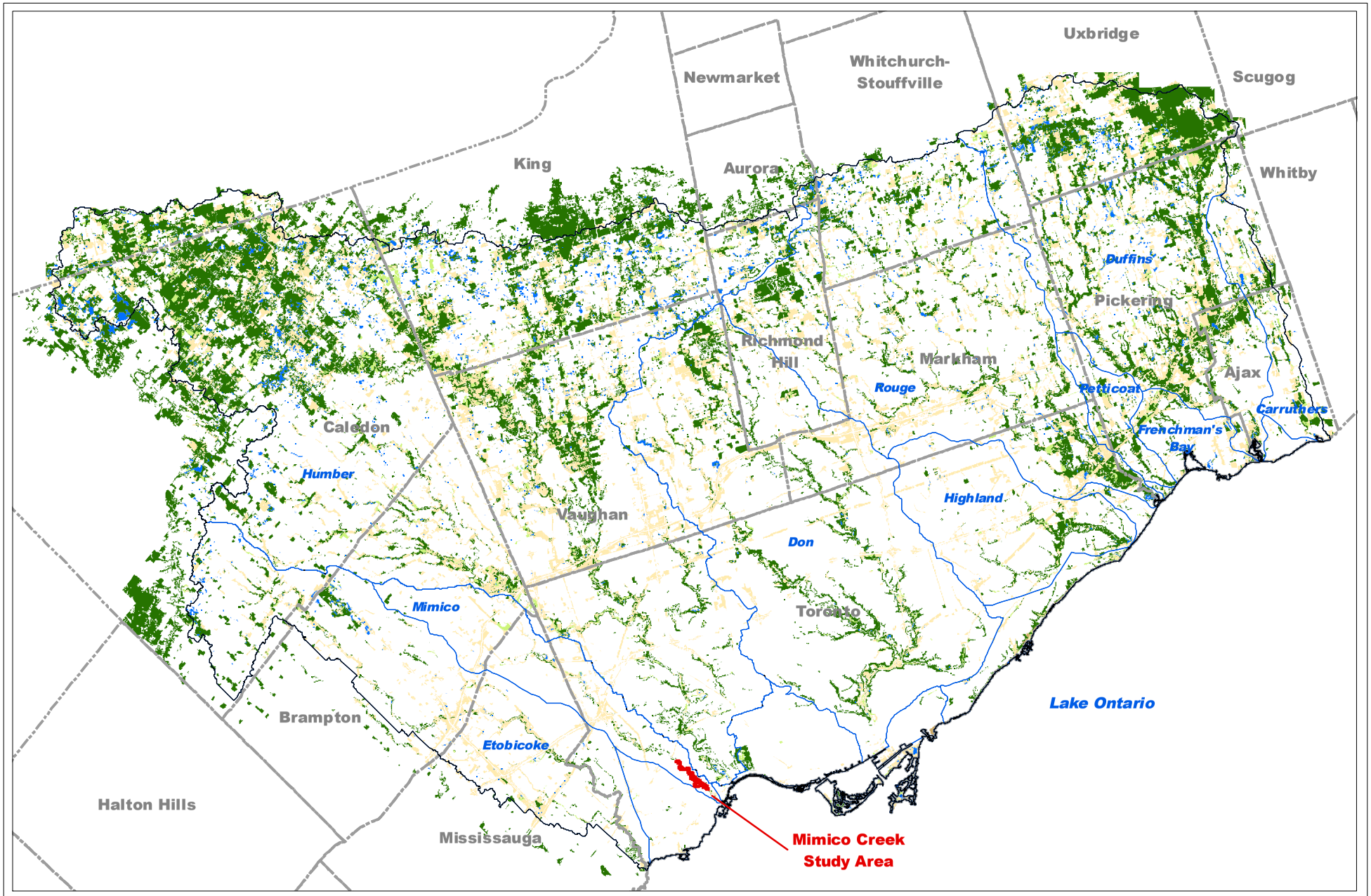


TORONTO AND REGION Conservation for The Living City

N W E S

0 2.5 5 10 Kilometers

Date: December 2007

* Landscape analysis based on 2002 Orthophotography

Map 1:
Mimico Creek Study Area in the Context of Regional Natural Cover

Natural Cover *

- Forest
- Successional
- Meadow
- Wetland
- Beach/Bluff

Legend

- Mimico Creek Study Area
- TRCA Jurisdiction
- Watershed
- Municipal Boundary

TORONTO AND REGION Conservation
for The Living City

N
W E
S

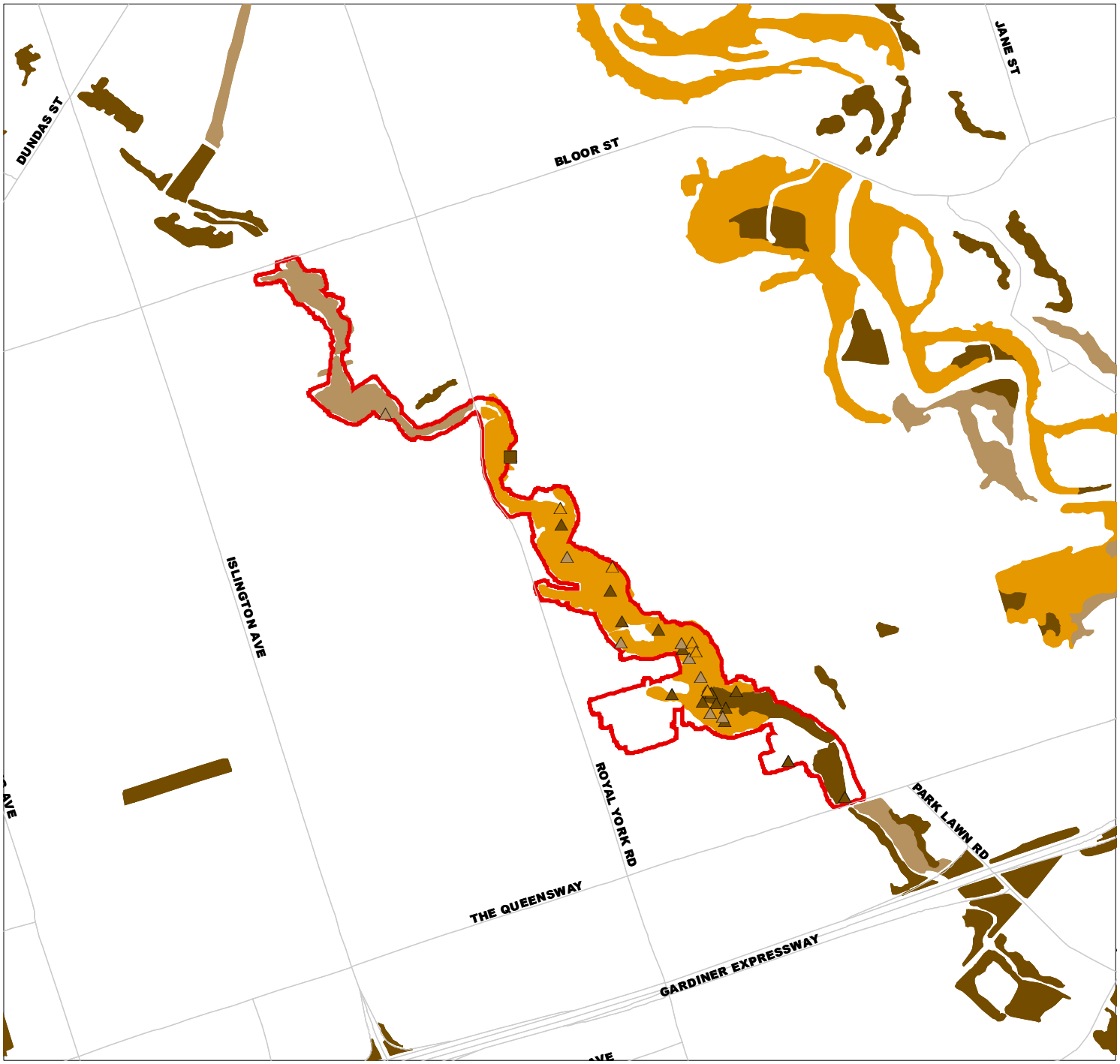
0 100 200 400 600 Meters

Date: December 2007
Orthophoto: Spring 2002

Map 2: Mimico Creek Study Area

Legend

Study Area



Fauna Area Sensitivity Scores

- 5 - >100ha
- 4 - >20ha
- 3 - > 5ha
- 2 - > 1ha
- 1 - < 1ha

△ Fauna Species

(□ Frog Species)

Habitat Patch Size Scores *

- 5 - Excellent
- 4 - Good
- 3 - Fair
- 2 - Poor
- 1 - Very Poor

TORONTO AND REGION Conservation for The Living City

N W E S

0 125 250 500 750 1,000 Meters

Date: December 2007

* Landscape analysis based on 2002 Orthophotography

Map 3: Habitat Patch Size Scores with Fauna Area Sensitivity Scores

Legend

- Mimico Creek Study Area
- Road

NOTE: All fauna species with their associated scores for area sensitivity can be found in Appendix #3.

Flora Sensitivity to Development Scores

- 5 - Species receives severe negative impact from development-related disturbances
- 4 - Species receives moderately severe negative impact from development-related disturbances
- 3 - Species receives significant negative impact from development-related disturbances
- 2 - Species receives slight negative impact from development-related disturbances
- 1 - Species experiences no overall benefit or detriment from development-related disturbances (neutral)
- 0 - Species benefits significantly from development-related disturbances

NOTE: All flora species with their associated scores for sensitivity to development can be found in Appendix #2.

TORONTO AND REGION Conservation for The Living City

N W E S

0 125 250 500 750 1,000 Meters

Date: December 2007

* Landscape analysis based on 2002 Orthophotography

Map 4: Scores for Matrix Influence and Flora Sensitivity to Development

Legend

Habitat Matrix Influence Scores *

- 5 - Excellent
- 4 - Good
- 3 - Fair
- 2 - Poor
- 1 - Very Poor

Mimico Creek Study Area

Fauna Sensitivity to Development Scores

- 5 - Species receives severe negative impact from development-related disturbances
- 4 - Species receives moderately severe negative impact from development-related disturbances
- 3 - Species receives significant negative impact from development-related disturbances
- 2 - Species receives slight negative impact from development-related disturbances
- 1 - Species experiences no overall benefit or detriment from development-related disturbances (neutral)
- 0 - Species benefits significantly from development-related disturbances

NOTE: All fauna species with their associated scores for sensitivity to development can be found in Appendix #3.

△ Fauna Species (□ Frog Species)

TORONTO AND REGION Conservation for The Living City

N W E S

0 125 250 500 750 1,000 Meters

Date: December 2007

* Landscape analysis based on 2002 Orthophotography

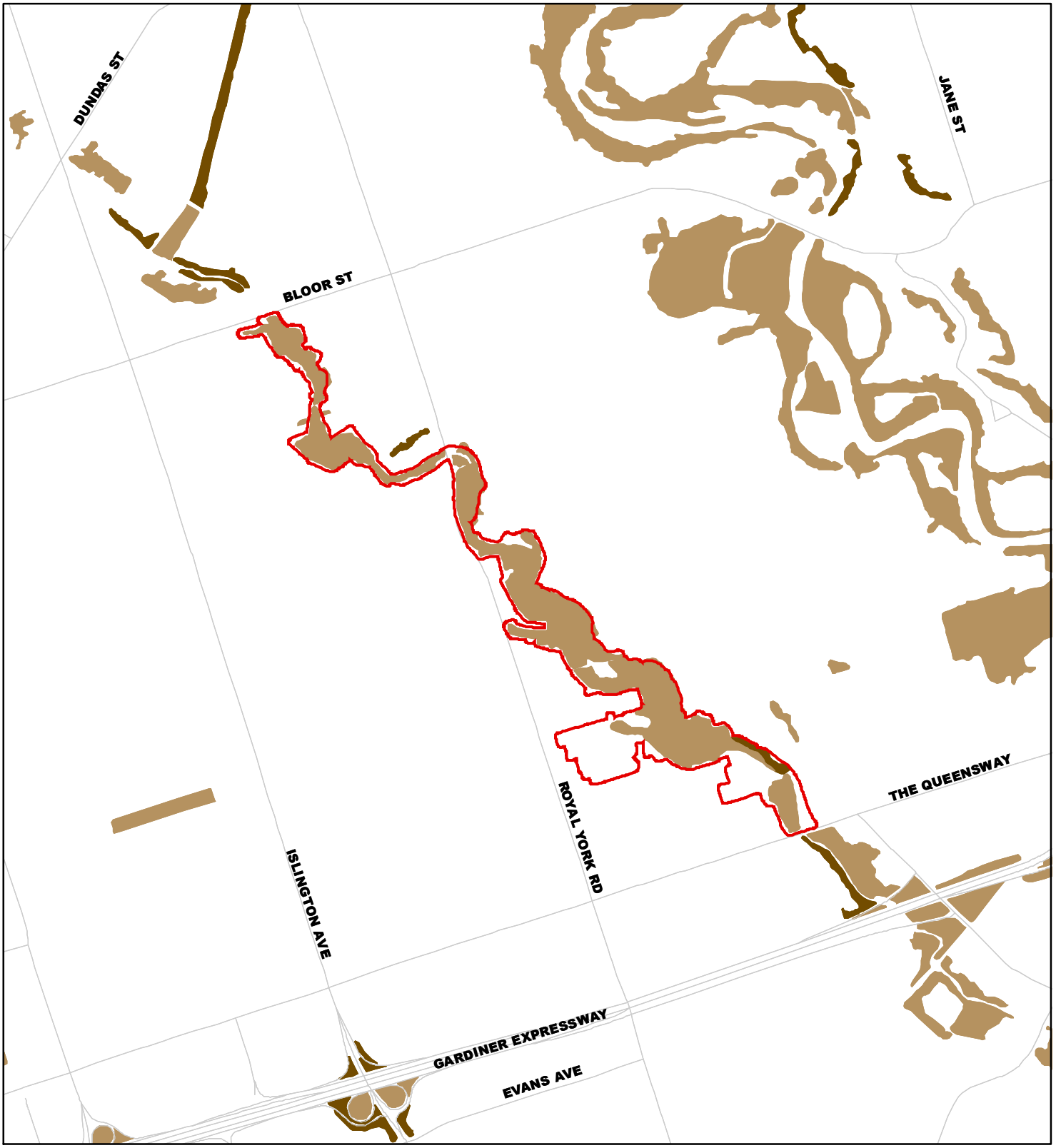
Map 5: Scores for Matrix Influence and Fauna Sensitivity to Development

Legend

Habitat Matrix Influence Scores *

- 5 - Excellent
- 4 - Good
- 3 - Fair
- 2 - Poor
- 1 - Very Poor

Mimico Creek Study Area



TORONTO AND REGION Conservation for The Living City

N W E S

0 125 250 500 750 1,000 Meters

Date: December 2007

* Landscape analysis based on 2002 Orthophotography

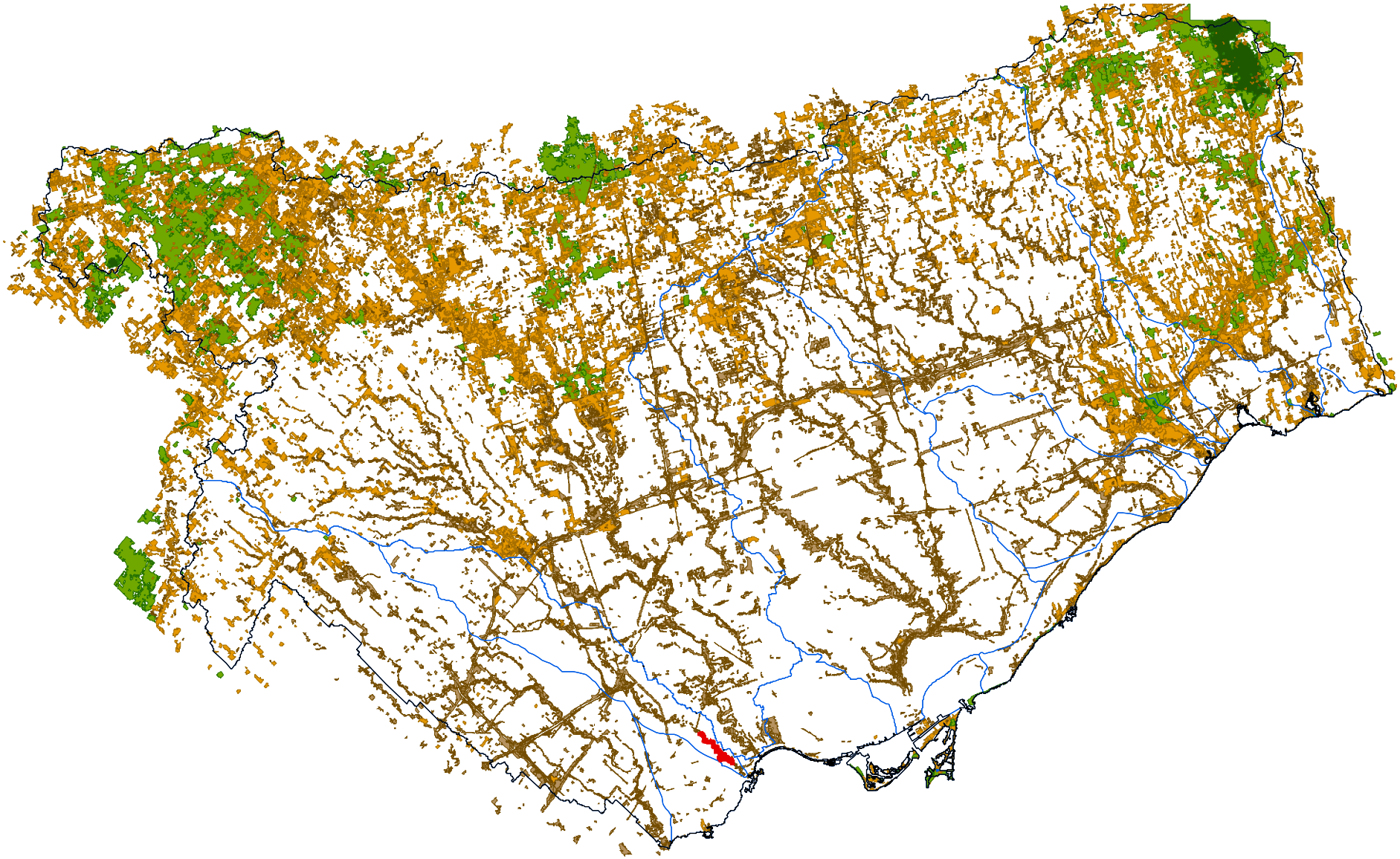
Map 6: Habitat Patch Quality

Legend

Habitat Patch Quality *

- L1 - Excellent
- L2 - Good
- L3 - Fair
- L4 - Poor
- L5 - Very Poor

- Mimico Creek Study Area
- Road



Toronto and Region Conservation for The Living City

N W E S

0 2.5 5 10 15 Kilometers

Date: December 2007
* Landscape analysis based on 2002 Orthophotography

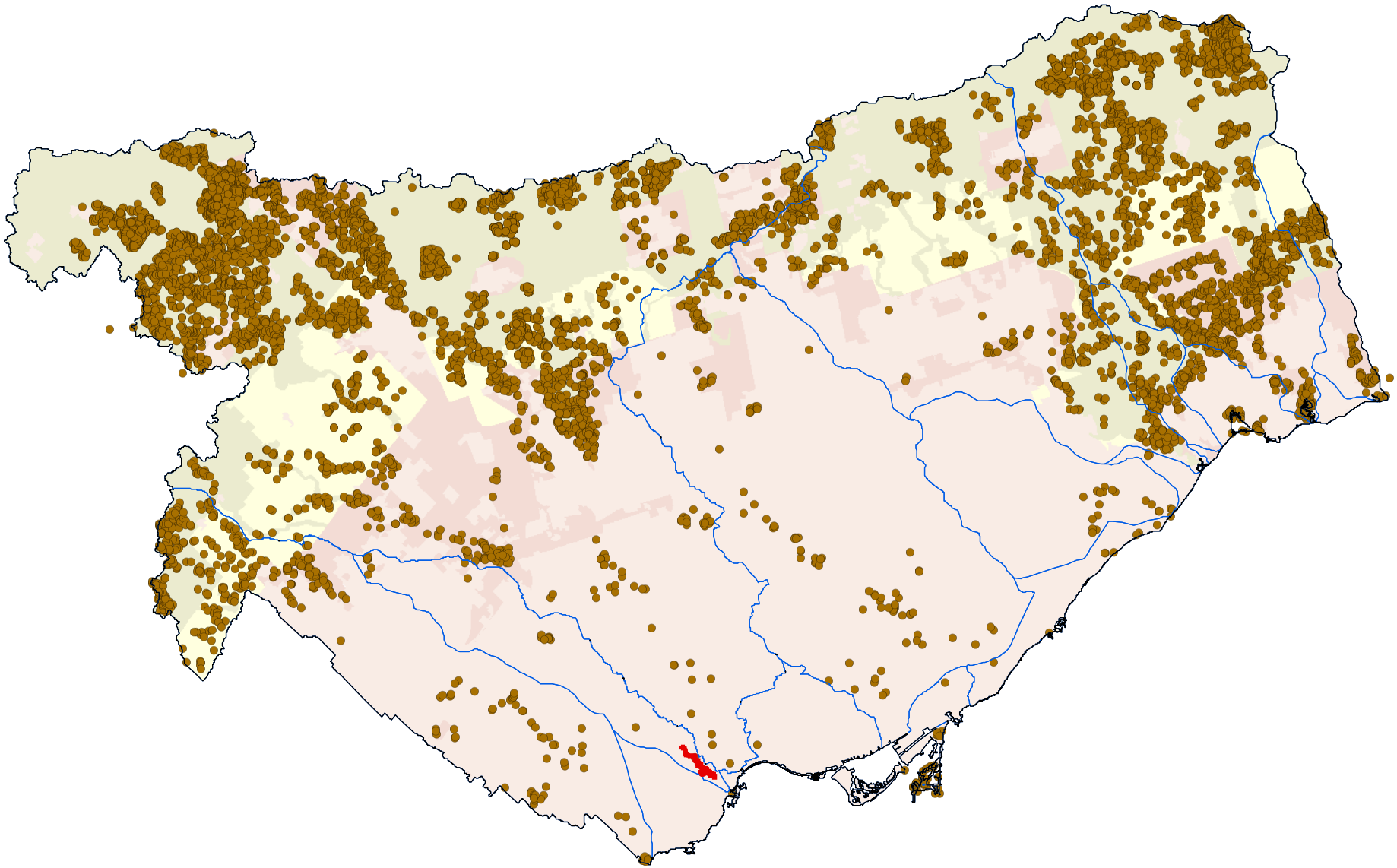
Map 7:
Regional Natural System
Habitat Patch Quality

Legend

Habitat Patch Quality *

- L1 - Excellent
- L2 - Good
- L3 - Fair
- L4 - Poor
- L5 - Very Poor

- Mimico Creek Study Area
- TRCA Jurisdiction
- Watershed



TORONTO AND REGION Conservation for The Living City

0 2.5 5 10 15 Kilometers

Date: December 2007

Map 8:
Distribution of Fauna
Regional Species of Concern

Legend

- Fauna Species of Concern (L1 - L3)
- Mimico Creek Study Area
- TRCA Jurisdiction
- Watershed
- Agricultural & Rural Area
- Built-up Area
- Designated Greenfield Area
- Greenbelt Area

TORONTO AND REGION Conservation for The Living City

N W E S

0 125 250 500 750 1,000 Meters

Date: December 2007

Orthophoto: Spring 2002

Map 9: Vegetation Communities with their Associated Local Ranks

Legend

Vegetation Community Ranks

- L1
- L2
- L3
- L4
- L5
- L+

Mimico Creek Study Area

TORONTO AND REGION Conservation for The Living City

N W E S

0 100 200 400 600 Meters

Date: December 2007
Orthophoto: Spring 2002

Map 10: Location of Flora Species of Concern

Legend

Flora Species of Concern (L1-L4)

- L1
- L2
- L3
- L4

Mimico Creek Study Area

Flora Habitat Dependence Scores

- 5 - Extreme habitat specialist
- 4 - Strong habitat specialist
- 3 - Moderate habitat specialist
- 2 - Moderate habitat generalist
- 1 - Strong habitat generalist
- 0 - Extreme habitat generalist

NOTE: All flora species with their associated scores for habitat dependence can be found in Appendix #2.

Toronto and Region Conservation for The Living City

N W E S

0 100 200 400 600 Meters

Date: December 2007

Orthophoto: Spring 2002

Map 11: Flora Habitat Dependence Scores

Legend

Mimico Creek Study Area

TORONTO AND REGION Conservation for The Living City

N W E S

0 100 200 400 600 Meters

Date: December 2007
Orthophoto: Spring 2002

Map 12: Location of Fauna Species of Concern

Legend

Fauna Species of Concern	Frog Species of Concern
L1	L1
L2	L2
L3	L3
L4	L4

Mimico Creek Study Area

Fauna Habitat Dependence Scores

- 5 - Extreme habitat specialist
- 4 - Strong habitat specialist
- 3 - Moderate habitat specialist
- 2 - Moderate habitat generalist
- 1 - Strong habitat generalist
- 0 - Extreme habitat generalist

NOTE: All fauna species with their associated scores for habitat dependence can be found in Appendix #3.

TORONTO AND REGION Conservation for The Living City

N W E S

0 100 200 400 600 Meters

Date: December 2007
Orthophoto: Spring 2002

Map 13: Fauna Species of Concern Habitat Dependence Scores

Legend

- Mimico Creek Study Area
- △ Fauna Species
- (□ Frog Species)

Appendix 1: List of Vegetation Communities Found in Mimico Creek Study Area in 2006

ELC Code	Vegetation Type (* indicates present as inclusion and/or complex only)	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2002-01)
	Forest	***21.1***				
FOD1-1	Dry-Fresh Red Oak Deciduous Forest	0.9	4	4	8	L2
FOD1-4	Dry-Fresh Mixed Oak Deciduous Forest	0.6	4	3	7	L2
FOD2-4	Dry-Fresh Oak - Hardwood Deciduous Forest	1.2	3	1	4	L4
FOD4-d	Dry-Fresh Norway Maple Deciduous Forest	0.2	4	0	4	L+
FOD4-e	Dry-Fresh Exotic Deciduous Forest	0.9	5	0	5	L+
FOD5-3	Dry-Fresh Sugar Maple - Oak Deciduous Forest	1.2	2	1	3	L4
FOD6-1	Fresh-Moist Sugar Maple - Ash Deciduous Forest	0.4	2	0	2	L5
FOD7-1	Fresh-Moist White Elm Lowland Deciduous Forest	0.2	2	0	2	L5
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest	10.1	2	0	2	L5
FOD7-a	Fresh-Moist Manitoba Maple Lowland Deciduous Forest	3.1	2	0	2	L5
FOD9-C	Fresh-Moist Red Oak - Ash Deciduous Forest	0.8	5	1	6	L3
CUP1-4	Hybrid Poplar Deciduous Plantation	0.6	2	0	2	L+
*CUP1-A	*Restoration Deciduous Plantation		2	0	2	L5
CUP1-c	Black Locust Deciduous Plantation	0.5	3	0	3	L+
CUP1-f	Siberian Elm Deciduous Plantation	0.4	5	0	5	L+
	Successional or Scrub	***2.4***				
CUT1-1	Sumac Cultural Thicket	1.1	1	0	1	L5
CUT1-A1	Native Deciduous Sapling Cultural Thicket	0.2	1	0	1	L5
CUT1-c	Exotic Cultural Thicket	0.6	4	0	4	L+
CUS1-A1	Native Deciduous Cultural Savannah	0.5	2	0	2	L5
	Wetland	***0.1***				
MAM2-10	Forb Mineral Meadow Marsh	0.1	2	1	3	L4
	Aquatic					
OAO1	Open Aquatic (deep or riverine)	2.9				L5
	Dynamic (Bar, Bluff, Cliff, Savannah)	***0.5***				
BBO1-3	Reed Canary Grass Open Bar	0.1	5	2	7	L2
BBO1-A	Riparian Sand / Gravel Bar	0.3	2	2	4	L4
BLT1-c	Exotic Treed Bluff	0.02	4	2	6	L+

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ELC Code	Vegetation Type (* indicates present as inclusion and/or complex only)	area # ha	Local Distrib.	Geophy. Requir.	Total Score	Local Rank (2002-01)
CLS1	Carbonate Shrub Cliff Ecosite	0.02	5	4	9	L1
CLT1-2	Sugar Maple - Ironwood - White Ash Treed Carbonate Cliff	0.1	5	4	9	L1
	Meadow	***0.8***				
CUM1-b	Exotic Cool-season Grass Old Field Meadow	0.8	1	0	1	L+

Appendix 2: List of Flora Species Found in Mimico Creek Study Area in 2006

"cf." in the species name indicates the species found was most likely named correctly but could not be confirmed
"pL…" in the rank column indicates that the species was only found planted and not regenerating

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
Orobanche uniflora	one-flowered cancer-root	5	5	4	4	18	L2
Quercus alba	white oak	3	5	4	5	17	L2
Quercus velutina	black oak	5	4	4	5	18	L2
Rosa carolina	pasture or Carolina rose	5	5	4	3	17	L2
Carex alopecoidea	foxtail or brown-headed wood sedge	3	3	4	4	14	L3
Carex grisea	grey sedge	5	2	4	3	14	L3
Cornus rugosa	round-leaved dogwood	3	4	4	3	14	L3
Crataegus submollis	Emerson's hawthorn	5	2	4	3	14	L3
Euonymus obovata (E. obovatus)	running strawberry-bush	3	4	4	4	15	L3
Galium boreale	northern bedstraw	5	4	4	3	16	L3
Hamamelis virginiana	witch-hazel	2	4	4	4	14	L3
Juglans cinerea	butternut	2	4	4	4	14	L3
Lilium michiganense	Michigan or Turk's cap lily	3	4	3	5	15	L3
Lonicera dioica	wild or glaucous honeysuckle	2	4	4	4	14	L3
Parietaria pensylvanica	Pennsylvania pellitory or false nettle	5	4	4	3	16	L3
Polygonatum pubescens	downy Solomon's seal	2	4	5	5	16	L3
Prunus nigra	Canada plum	4	4	4	3	15	L3
Quercus x hawkinsiae (Q. rubra x velutina)	red-black hybrid or Hawkins' oak	h	h	h	h		LHL3?
Trillium erectum	red trillium or stinking Johnny	2	4	3	5	14	L3
Trillium grandiflorum	white trillium	1	4	4	5	14	L3
Viburnum acerifolium	maple-leaved viburnum	2	3	4	5	14	L3
Acer rubrum	red maple	2	4	2	5	13	L4
Acer saccharinum	silver maple	2	2	4	3	11	L4
Apocynum androsaemifolium	spreading dogbane	2	4	2	3	11	L4
Arisaema triphyllum	Jack-in-the-pulpit	1	3	3	4	11	L4
Asarum canadense	wild ginger	2	3	4	3	12	L4
Betula papyrifera	paper or white birch	1	4	2	4	11	L4
Calystegia sepium (incl. ssp. americanum, angulatum, erraticum)	hedge bindweed	4	2	3	2	11	L4
Carex arctata	nodding wood sedge	2	4	2	3	11	L4
Carex pensylvanica	Pennsylvania sedge	2	4	3	4	13	L4
Carex sprengelii	long-beaked sedge	3	4	4	2	13	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
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 macracantha (C. succulenta var. macracantha)	long-spined hawthorn	2	2	4	3	11	L4
Diervilla lonicera	bush honeysuckle	2	3	2	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
Fagus grandifolia	American beech	1	4	3	4	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
Geranium maculatum	wild geranium or spotted cranesbill	2	3	4	3	12	L4
Glyceria grandis	tall manna grass	2	3	4	2	11	L4
Heracleum lanatum (H. maximum)	cow-parsnip	3	2	3	2	10	L4
Podophyllum peltatum	May-apple	2	3	3	3	11	L4
Polygonum pensylvanicum	pink or Pennsylvania smartweed	4	2	4	1	11	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
Rosa blanda	smooth wild rose	3	2	3	3	11	L4
Scirpus microcarpus (S. rubrotinctus)	barber-pole sedge or bulrush	2	2	4	3	11	L4
Scirpus validus	soft-stemmed bulrush	2	2	5	3	12	L4
Typha latifolia	broad-leaved cattail	1	4	4	4	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
Acer saccharum ssp. saccharum	sugar maple	1	3	0	2	6	L5
Agrimonia gryposepala	agrimony	2	2	0	2	6	L5
Ambrosia artemisiifolia	common ragweed	1	1	4	0	6	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
Bidens frondosus	common or devil's beggarticks	1	1	4	0	6	L5
Carex blanda (C. laxiflora var. blanda)	common wood sedge	2	2	0	2	6	L5
Carex rosea (formerly convoluta)	curly-styled sedge	2	2	3	2	9	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
Cornus alternifolia	alternate-leaved dogwood	2	2	1	2	7	L5
Cornus stolonifera	red osier dogwood	1	2	0	3	6	L5
Crataegus punctata	dotted hawthorn	2	2	3	3	10	L5
Desmodium canadense	showy tick-trefoil	2	2	1	3	8	L5
Elymus virginicus var. virginicus	Virginia wild rye	2	2	3	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
Equisetum arvense	field or common horsetail	1	2	1	1	5	L5
Erigeron annuus	annual or daisy 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
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
Geum canadense	white avens	2	2	1	2	7	L5
Helianthus tuberosus	Jerusalem artichoke	2	1	2	0	5	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 tenuis	path rush	2	2	1	1	6	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 racemosa)	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
Monarda fistulosa	wild bergamot	2	2	2	2	8	L5
Oenothera biennis	common or hairy evening-primrose	2	1	1	1	5	L5
Onoclea sensibilis	sensitive fern	2	3	1	3	9	L5
Ostrya virginiana	ironwood	1	3	2	2	8	L5
Parthenocissus inserta (P. vitacea)	thicket creeper	2	2	0	1	5	L5
Plantago rugelii	red-stemmed or Rugel's plantain	2	2	0	1	5	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
Populus x jackii (P. balsamifera x P. deltoides)	Jack's poplar	h	h	h	h		L5
Prunus serotina	black cherry	1	2	0	2	5	L5
Prunus virginiana ssp. virginiana	choke cherry	1	2	0	1	4	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

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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 racemosa ssp. pubens (S. pubens)	red-berried elder	1	3	2	2	8	L5
Sanguinaria canadensis	bloodroot	1	3	3	3	10	L5
Smilax herbacea	carrion-flower	2	3	2	2	9	L5
Solidago altissima	tall goldenrod	1	2	0	0	3	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
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
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 campestre	hedge 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+
Ailanthus altissima	tree-of-heaven	+	+	+	+		L+
Ajuga genevensis	erect bugle	+	+	+	+		L+
Alliaria petiolata (A. officinalis)	garlic mustard	+	+	+	+		L+
Allium vineale ssp. vineale	field or wild garlic	+	+	+	+		L+
Arctium minus ssp. minus	common burdock	+	+	+	+		L+
Asparagus officinalis	asparagus	+	+	+	+		L+
Betula pendula (B. verrucosa)	European white or silver birch	+	+	+	+		L+
Bromus inermis ssp. inermis	smooth brome grass	+	+	+	+		L+
Caragana arborescens	Siberian pea-shrub	+	+	+	+		L+
Carex spicata	spiked or European meadow sedge	+	+	+	+		L+
Catalpa speciosa	northern catalpa	+	+	+	+		L+
Chelidonium majus	celandine	+	+	+	+		L+
Chenopodium album var. album	lamb's quarters	+	+	+	+		L+
Cichorium intybus	chicory	+	+	+	+		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
Cirsium arvense	creeping (Canada) thistle	+	+	+	+		L+
Commelina communis	Asiatic dayflower	+	+	+	+		L+
Convallaria majalis	lily-of-the-valley	+	+	+	+		L+
Convolvulus arvensis	field bindweed	+	+	+	+		L+
Coronilla varia	crown vetch	+	+	+	+		L+
Cotoneaster acutifolius	Peking cotoneaster	+	+	+	+		L+
Crataegus monogyna	English hawthorn	+	+	+	+		L+
Crataegus monogyna x punctata	English hybrid hawthorn	+	+	+	+		L+
Cynanchum rossicum (C. medium; Vincetoxicum rossicum))	dog-strangling vine or pale swallow-wort	+	+	+	+		L+
Dactylis glomerata	orchard grass	+	+	+	+		L+
Digitaria sanguinalis	hairy crab grass	+	+	+	+		L+
Echinochloa crusgalli	barnyard grass	+	+	+	+		L+
Epilobium hirsutum	hairy or European willow-herb	+	+	+	+		L+
Epipactis helleborine	helleborine	+	+	+	+		L+
Euonymus alatus (E. alata)	winged spindle-tree	+	+	+	+		L+
Euonymus europaea (E. europaeus)	European spindle-tree	+	+	+	+		L+
Euonymus fortunei	wintercreeper euonymus	+	+	+	+		L+
Festuca pratensis (F. elatior var. pratensis)	meadow fescue	+	+	+	+		L+
Galium rivale	riparian bedstraw	+	+	+	+		L+
Geum urbanum	urban avens or herb Bennett	+	+	+	+		L+
Glechoma hederacea	creeping Charlie or ground-ivy	+	+	+	+		L+
Hedera helix	English ivy	+	+	+	+		L+
Helianthus annuus (incl. ssps. annuus & lenticularis)	common sunflower	+	+	+	+		L+
Hemerocallis fulva	orange day-lily	+	+	+	+		L+
Heracleum mantegazzianum	giant hog-weed	+	+	+	+		L+
Hesperis matronalis	dame's rocket	+	+	+	+		L+
Hypericum perforatum	common St. Johnswort	+	+	+	+		L+
Impatiens glandulifera	Himalayan balsam	+	+	+	+		L+
Iris germanica	garden iris	+	+	+	+		L+
Juglans ailantifolia	Japanese walnut	+	+	+	+		L+
Kerria japonica	Japanese kerria or Easter rose	+	+	+	+		L+
Lapsana communis	nipplewort	+	+	+	+		L+
Leonurus cardiaca ssp. cardiaca	motherwort	+	+	+	+		L+
Lilium lancifolium (L. tigrinum)	tiger lily	+	+	+	+		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+
Lycopus europaeus	European water-horehound or bugleweed	+	+	+	+		L+
Lysimachia nummularia	moneywort	+	+	+	+		L+
Lythrum salicaria	purple loosestrife	+	+	+	+		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
Malus pumila (M. domestica; Pyrus malus)	apple	+	+	+	+		L+
Malva moschata	musk mallow	+	+	+	+		L+
Malva neglecta	common mallow or bread &butter	+	+	+	+		L+
Medicago lupulina	black medick	+	+	+	+		L+
Melilotus alba	white sweet clover	+	+	+	+		L+
Morus alba	white mulberry	+	+	+	+		L+
Myosotis scorpioides	true or European forget-me-not	+	+	+	+		L+
Myosotis sylvatica	woodland forget-me-not	+	+	+	+		L+
Nepeta cataria	catnip	+	+	+	+		L+
Ornithogalum umbellatum	summer snowflake	+	+	+	+		L+
Pastinaca sativa	wild parsnip	+	+	+	+		L+
Phleum pratense	timothy grass	+	+	+	+		L+
Plantago lanceolata	English plantain	+	+	+	+		L+
Plantago major	broad-leaved or common plantain	+	+	+	+		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+
Polygonum aviculare (P. monspeliense)	prostrate knotweed	+	+	+	+		L+
Polygonum cuspidatum (Reynoutria japonica)	Japanese knotweed	+	+	+	+		L+
Polygonum persicaria	lady's thumb	+	+	+	+		L+
Populus alba	white poplar (including cultivars)	+	+	+	+		L+
Populus nigra	black poplar	+	+	+	+		L+
Potentilla recta	rough-fruited or sulphur cinquefoil	+	+	+	+		L+
Prunus avium	sweet or mazzard cherry	+	+	+	+		L+
Prunus tomentosa	Manchu or Nanking cherry	+	+	+	+		L+
Ranunculus acris	tall buttercup	+	+	+	+		L+
Rhamnus cathartica	common or European buckthorn	+	+	+	+		L+
Ribes rubrum	garden red currant	+	+	+	+		L+
Robinia pseudoacacia	black locust	+	+	+	+		L+
Rosa canina	dog rose	+	+	+	+		L+
Rosa multiflora	multiflora or Japanese rose	+	+	+	+		L+
Rumex crispus	curly dock	+	+	+	+		L+
Salix alba	white willow	+	+	+	+		L+
Salix fragilis	crack willow	+	+	+	+		L+
Salix x rubens (S. alba x fragilis)	European tree willow	+	+	+	+		L+
Scilla siberica	scilla or Siberian squill	+	+	+	+		L+
Sedum acre	mossy stonecrop	+	+	+	+		L+
Silene pratensis (S. alba; S. latifolia; Lychnis alba)	evening lychnis	+	+	+	+		L+
Solanum dulcamara	bittersweet nightshade	+	+	+	+		L+
Sonchus arvensis ssp. arvensis	glandular perennial or field sow-thistle	+	+	+	+		L+

Appendix 2: List of Flora Species Found in Mimico Creek Study Area in 2006

"cf." in the species name indicates the species found was most likely named correctly but could not be confirmed
"pL…" in the rank column indicates that the species was only found planted and not regenerating

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+
Syringa vulgaris	common lilac	+	+	+	+		L+
Taraxacum officinale	dandelion	+	+	+	+		L+
Taxus cuspidata	Japanese yew	+	+	+	+		L+
Tilia cordata	little-leaf linden	+	+	+	+		L+
Torilis japonica	hedge-parsley	+	+	+	+		L+
Tragopogon pratensis ssp. pratensis	meadow goat's beard	+	+	+	+		L+
Trifolium pratense	red clover	+	+	+	+		L+
Tussilago farfara	coltsfoot	+	+	+	+		L+
Typha angustifolia	narrow-leaved cattail	+	+	+	+		L+
Ulmus glabra	Scotch elm	+	+	+	+		L+
Ulmus pumila	Siberian elm	+	+	+	+		L+
Urtica dioica ssp. dioica	European stinging nettle	+	+	+	+		L+
Verbascum thapsus	common mullein	+	+	+	+		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+?
Geranium robertianum	herb Robert	+?	+?	+?	+?		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+?
Jeffersonia diphylla	twinleaf	5	5	5	5	20	pL1
Anemone americana (Hepatica americana)	round-lobed hepatica	3	5	5	5	18	pL2
Cypripedium calceolus var. parviflorum (C. parviflorum)	smaller yellow lady's slipper	3	4	5	5	17	pL2
Cypripedium calceolus var. pubescens (C. pubescens)	larger yellow lady's slipper	4	4	5	4	17	pL2
Osmunda regalis var. spectabilis	royal fern	3	5	5	5	18	pL2
Cimifuga racemosa	black snakeroot or cohosh	e	e	e	e		pLXL2?
Prunus pumila cf. var. *susquehanae*	sand cherry	e	e	e	e		pLXL2?
Abies balsamea	balsam fir	2	3	4	5	14	pL3
Adiantum pedatum	northern maidenhair fern	2	3	5	5	15	pL3
Anemone acutiloba (Hepatica acutiloba)	sharp-lobed hepatica	2	4	4	5	15	pL3
Phegopteris connectilis	northern or long beech fern	3	3	5	5	16	pL3
Picea glauca	white spruce	3	5	4	3	15	pL3
Polygonum virginianum	jumpseed						pL3?
Polystichum acrostichoides	Christmas fern	2	3	5	5	15	pL3
Rubus cf. *canadensis*	smooth blackberry						pL3?

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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
Salix lucida	shining willow	2	4	5	3	14	pL3
Spiraea alba	meadowsweet or wild spiraea	3	4	4	3	14	pL3
Taxus canadensis	Canada yew or ground hemlock	2	4	4	5	15	pL3
Uvularia grandiflora	large-flowered bellwort	2	4	5	5	16	pL3
Amelanchier cf. *arborea (A. canadensis misapplied)*	downy serviceberry or Juneberry	2	2	4	3	11	pL4
Cystopteris bulbifera	bulblet fern	1	4	4	4	13	pL4
Mitella diphylla	mitrewort	2	3	4	4	13	pL4
Pinus strobus	white pine	1	4	3	4	12	pL4
Salix bebbiana	beaked or Bebb's willow	1	4	4	4	13	pL4
Thuja occidentalis	white cedar	1	4	1	5	11	pL4
Tiarella cordifolia	foam-flower	2	3	3	4	12	pL4
Tsuga canadensis	eastern hemlock	1	4	3	5	13	pL4
Actaea rubra	red baneberry	2	3	2	3	10	pL5
Athyrium filix-femina var. angustum	northeastern lady fern	1	3	1	3	8	pL5
Aquilegia vulgaris	garden or European columbine	+	+	+	+		pL+
Athyrium nipponicum 'Picta'	Japanese painted fern	+	+	+	+		pL+
Campsis radicans	trumpet-creeper	+	+	+	+		pL+
Cercis canadensis	red-bud	+	+	+	+		pL+
Cornus florida	flowering dogwood	+	+	+	+		pL+
Cornus kousa	Korean dogwood	+	+	+	+		pL+
Corylus avellana	European hazelnut	+	+	+	+		pL+
Dodecathon media	shooting-star	+	+	+	+		pL+
Enkianthus campanulatus	red-veined enkianthus	+	+	+	+		pL+
Forsythia suspensa	weeping forsythia	+	+	+	+		pL+
Forsythia viridissima	forsythia	+	+	+	+		pL+
Geranium phaeum	mourning widow geranium	+	+	+	+		pL+
Geranium sanguineum	bloody cranesbill	+	+	+	+		pL+
Gymnocladus dioicus	Kentucky coffee-tree	+	+	+	+		pL+
Halesia caroliniana	Carolina silverbells	+	+	+	+		pL+
Philadelphus coronarius	mock-orange	+	+	+	+		pL+
Picea abies	Norway spruce	+	+	+	+		pL+
Pinus sylvestris	Scots pine	+	+	+	+		pL+
Polygonum aubertii	silver-lace vine	+	+	+	+		pL+
Rhus aromatica	fragrant sumach	+	+	+	+		pL+
Salix caprea	goat or European pussy willow	+	+	+	+		pL+
Salix x sepulcralis (S. alba var. vitellina x babylonica,	weeping willow	+	+	+	+		pL+
Trillium sessile	toad-shade trillium	+	+	+	+		pL+
Rosa virginiana	Virginia rose	+	+	+	+		pL+?
Stylophorum diphyllum	wood-poppy or celandine poppy	+	+	+	+		pL+?

Appendix 3: List of Breeding Fauna Species Found in Mimico Creek Study Area in 2006.

COMMON NAME	CODE	Scientific Name	number of territories	LO	PTn	PTt	HD	AS	MR	STD	+	TS	L-rank
Survey Species: **species for which the TRCA protocol effectively surveys.**													
Birds													
eastern screech-owl	EASO	*Megascops asio*	*1*	1	2	2	3	1	2	3	0	14	L4
eastern wood-pewee	EAWP	*Contopus virens*	*2*	0	4	2	1	2	2	2	0	13	L4
great crested flycatcher	GCFL	*Myiarcyhus crinitus*	*1*	0	2	3	1	3	2	2	0	13	L4
gray catbird	GRCA	*Dumetella carolinensis*	*9*	0	3	1	1	1	2	3	0	11	L4
hairy woodpecker	HAWO	*Picoides villosus*	*1*	0	2	1	2	3	2	2	0	12	L4
northern flicker	NOFL	*Colaptes auratus*	*2*	0	3	2	0	1	2	3	0	11	L4
northern rough-winged swallow	NRWS	*Stelgidopteryx serripennis*	*2*	3	2	3	2	1	1	1	0	13	L4
red-eyed vireo	REVI	*Vireo olivaceus*	*5*	0	2	2	1	2	2	3	0	12	L4
rose-breasted grosbeak	RBGR	*Pheucticus ludovicianus*	*1*	0	2	2	2	3	2	3	0	14	L4
white-breasted nuthatch	WBNU	*Sitta carolinensis*	*1*	1	2	1	3	3	2	2	0	14	L4
American crow	AMCR	*Corvus brachyrhynchos*	*not mapped*	0	2	1	0	1	1	1	0	6	L5
American goldfinch	AMGO	*Carduelis tristis*	*not mapped*	0	2	2	0	1	1	1	0	7	L5
American robin	AMRO	*Turdus migratorius*	*not mapped*	0	1	2	0	1	1	1	0	6	L5
Baltimore oriole	BAOR	*Icterus galbula*	*not mapped*	0	2	2	0	1	1	1	0	7	L5
black-capped chickadee	BCCH	*Poecile atricapillus*	*not mapped*	0	1	1	1	1	2	0	0	6	L5
blue jay	BLJA	*Cyanocitta cristata*	*not mapped*	0	4	2	0	1	1	0	0	8	L5
brown-headed cowbird	BHCO	*Molothrus ater*	*not mapped*	0	2	2	0	1	1	1	0	7	L5
cedar waxwing	CEDW	*Bombycilla cedrorum*	*not mapped*	0	1	2	0	1	1	2	0	7	L5
chimney swift	CHSW	*Chaetura pelagica*	*not mapped*	0	3	3	1	1	1	0	0	9	L5
common grackle	COGR	*Quiscalus quiscula*	*not mapped*	0	3	2	0	1	1	1	0	8	L5
downy woodpecker	DOWO	*Picoides pubescens*	*not mapped*	0	2	1	1	1	2	1	0	8	L5
eastern kingbird	EAKI	*Tyrannus tyrannus*	*3*	0	2	2	1	2	1	1	0	9	L5
house finch	HOFI	*Carpodacus mexicanus*	*not mapped*	0	2	0	0	1	1	0	0	4	L5
mallard	MALL	*Anas platyrhynchos*	*not mapped*	0	1	2	1	1	1	3	0	9	L5
mourning dove	MODO	*Zenaida macroura*	*not mapped*	0	2	1	0	1	1	0	0	5	L5
northern cardinal	NOCA	*Cardinalis cardinalis*	*not mapped*	0	2	1	0	1	2	2	0	8	L5
orchard oriole	OROR	*Icterus spurius*	*1*	3	2	1	0	1	1	1	0	9	L5
red-winged blackbird	RWBL	*Agelaius phoeniceus*	*not mapped*	0	2	2	0	1	1	3	0	9	L5
song sparrow	SOSP	*Melospiza melodia*	*not mapped*	0	2	2	0	1	2	2	0	9	L5
warbling vireo	WAVI	*Vireo gilvus*	*not mapped*	0	1	2	0	1	2	2	0	8	L5
yellow warbler	YWAR	*Dendroica petechia*	*not mapped*	0	1	1	1	1	2	3	0	9	L5
European starling	EUST	*Sturnus vulgaris*	*not mapped*										L+
house sparrow	HOSP	*Passer domesticus*	*not mapped*										L+
Herpetofauna													
American toad	AMTO	*Bufo americanus*	*1*	0	2	2	1	1	2	4	0	12	L4

Appendix 3: List of Breeding Fauna Species Found in Mimico Creek Study Area in 2006.

COMMON NAME	CODE	Scientific Name	number of territories	LO	PTn	PTt	HD	AS	MR	STD	+	TS	L-rank
Incidental Species: **species that are reported on as incidental to the TRCA protocol.**													
Mammals													
mink	MINK	*Mustela vison*	*1*	3	2	2	1	3	2	4	0	17	L3
eastern chipmunk	EACH	*Tamias striatus*	*1*	0	2	2	1	2	2	3	0	12	L4
white-tailed deer	WTDE	*Odocoileus virginianus*	*1*	1	2	2	1	3	1	2	0	12	L4
gray squirrel	GRSQ	*Sciurus carolinensis*	*not mapped*	0	2	2	0	1	2	0	0	7	L5
raccoon	RACC	*Procyon lotor*	*not mapped*	0	2	1	1	1	1	1	0	7	L5
red fox	REFO	*Vulpes vulpes*	*not mapped*	0	2	2	0	1	1	1	0	7	L5
Virginia opossum	VIOP	*Didelphis virginiana*	*1*	1	2	2	0	1	1	2	0	9	L5
LEGEND													
LO = local occurrence		MR = mobility restriction											
PTn = population trend, continent-wide		STD = sensitivity to development											
PTt = population trend, TRCA		AP = additional points											
HD = habitat dependence		TS = total score											
AS = area sensitivity		L-rank = TRCA Rank, April 2003											