Humber Bay Park

Terrestrial Biological Inventory and Assessment

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Toronto and Region Conservation
for The Living City®

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1.0 Introduction

In 2013 the Toronto Region Conservation Authority (TRCA) conducted a flora and fauna inventory of the Humber Bay Park, including both Humber Bay East and West, and the adjacent mainland lakeshore: Humber Bay Shores. In this report these three areas are considered as a single larger study area: Humber Bay Park, an area that has undergone extensive management in the past few years. As shown in Maps 1 and 2, the study area is located on the Lake Ontario shoreline at the mouth of Mimico Creek (please refer to section 2.0 for details).

The TRCA conducted field work within the study area to *assess the results of the management activities* regarding vegetation communities, flora and fauna species and to *estimate the success of plantings and installed habitat features*. The inventory provides background data for the City of Toronto's park revitalization plans for the three sections of Humber Bay Park.

The site features are to be understood within the larger regional context provided by the Terrestrial Natural Heritage Program of the TRCA (see Section 1.1), keeping in mind the question "*How does Humber Bay Park fit within the regional and watershed natural system, and how should its contribution to this system be protected and maximized?"* The important underlying message presented 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.

1.1 TRCA's Terrestrial Natural Heritage Program

Rapid urban expansion in the TRCA jurisdiction has led to continuous and incremental loss of natural cover and species. In a landscape that probably supported 95% forest cover prior to European settlement, current mapping shows that only 17% forest and wetland cover remains. Agricultural and natural lands are increasingly being urbanized while species continue to disappear from a landscape that is less able to support them. This represents a substantial loss of ecological integrity and ecosystem function that will be exacerbated in the future according to current urbanization trends. With the loss of 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. They become even rarer and may eventually be lost.

This trend lowers the ability of the land to support biodiversity and to maintain or enhance human society (e.g. through increased pollution and decreased space for recreation). **The important issue is the *cumulative* loss of natural cover in the TRCA region that has resulted from innumerable site-specific decisions.**

In the late 1990s the TRCA initiated the Terrestrial Natural Heritage Program to address the loss of terrestrial biodiversity within the jurisdiction's nine watersheds. This work is based on

two landscape-level indicators: the quality distribution of natural cover and the quantity of natural cover. These indicators summarize changes that occurred within the historical natural system. The aim of the program is to create a conservation strategy that both protects elements of the natural system (vegetation communities, flora and fauna species) *before* they become rare and promotes greater ecological function of the natural system as a whole. This preventive approach is needed because by the time a community or species has become rare, irreversible damage has often already occurred. A healthy natural system capable of supporting regional biodiversity in the long term is the goal of the Terrestrial Natural Heritage Systems Strategy (TNHSS) by setting targets – both short and long-term (100 years) – for the two landscape indicators in order to provide direction in planning at all scales (TRCA 2007a, TRCA 2007b).

A target system that identifies a land base 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. The two indicators and the targets that have been set for them are explained in Section 3.1. It is important to understand that habitat quality and distribution are interdependent. For example, neither well-distributed poor-quality natural cover nor poorly-distributed good-quality natural cover achieves the desired condition of sustainable biodiversity and social benefits across the watershed.

2.0 Study Area Description

Humber Bay Park lies on the shore of Lake Ontario at the mouth of Mimico Creek (Map 1). The site is within the Carolinian floristic region, which is composed of mainly deciduous forest. Mid-twentieth century soil mapping shows the soils to be Chinguacousy clay loam next to the immediate lakeshore and Berrien sandy loam to the north (Hoffman and Richards 1955). However, the surficial geology and soils at this location have been almost entirely replaced by anthropogenic fill deposited from the mid-twentieth century up to 2007 (in fact the site itself was underwater before fill emplacement). The area used to be known as the Etobicoke Motel Strip because for much of the 20th century, the waterfront was occupied by low-end motels. Since 2000, these lands (now immediately to the north of the fill which comprises the park) have been covered by new condominium development.

The peninsulas that comprise the East and West Parks along with the adjacent main shoreline (Humber Bay Shores) are a result of the depositing of lakefill by the TRCA at the mouth of the Mimico Creek (Map 2). The park was opened to the public in 1984 and since then there have been several initiatives aimed at improving the habitat available on this artificially created landform. The park provides additional recreational space and opportunities for the creation of “natural” habitats. The Park is part of a semi-continuous corridor of natural cover and public

parkland along the Toronto waterfront, including the multi-use Waterfront Trail. The area has high recreational use by hikers and dog-walkers. Yacht clubs cover much of the western peninsula of Humber Bay Park.

3.0 Inventory Methodology

In 2013 the first full biological inventory of the Humber Bay Park study area was conducted. The inventory covered vegetation communities and species (flora and fauna) according to the TRCA methodology for field data collection (TRCA 2007d).

3.1 Landscape Analysis

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" (e.g. air and water quality, recreation, aesthetics) in that region.

Base Mapping

The first step in evaluating a natural system or an individual *habitat patch* is to interpret and map land cover using aerial photographs. The basic unit for the evaluation at all scales is the 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 aerial photo interpretation. The 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 of natural cover. It should not be confused with the more detailed mapping of vegetation communities obtained through field surveys and that is used to ground-truth the evaluation (see Section 3.3).

Quality Distribution of Natural Cover

The quality of each habitat patch is evaluated according to three criteria: *size* (the number of ha occupied by the patch), *shape* (edge-to-area ratio), and *matrix influence* (measure of the positive and negative impacts from surrounding land use) (TRCA 2007c). 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 measure of the 'quality' of a habitat patch and is translated into a local rank (L-rank) ranging from L1 to L5 based on the range of possible total scores from three 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 quality (size, shape and matrix influence) (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).

Table 1: Habitat patch quality, rank and species response

Size, Shape and Matrix Influence	Patch Rank	Fauna Species of Conservation 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 the amount of natural cover which needs to exist in the landscape in order to accommodate and achieve the quality distribution targets described above. The two targets are therefore linked to each other: it will be impossible to achieve the required distribution of natural heritage quality without the appropriate quantity of natural cover. The proportion of the region that needs to be maintained as natural cover in order to achieve the desired quality has been identified as 30%.

3.2 Ranking and Scoring Communities and Species

While the targets for the natural heritage system are derived from regional-scale information, the ground-truthing surveys at the site 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 local "L" ranks (L1 to L5), which were first assigned in 1996-2000. These are reviewed and updated regularly (TRCA 2010). They roughly correspond to the habitat patch ranks. For example, a species ranked L4 may be expected in habitat patches with a quality of L4 or better.

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 *patch isolation sensitivity*. With the use of this ranking system, communities or species of *regional concern*, ranked L1 to 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.

In addition to the L1 to L3 ranked 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 an "L" rank of L4. Although L4 species are widespread and frequently occur in relatively intact urban sites, they are vulnerable to long-term declines.

3.3 Vegetation Community and Species

Vegetation communities and flora and fauna species were surveyed concurrently. Botanical field-work for the site was conducted in the summer of 2013 (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 2007 digital ortho-rectified photographs (ortho-photos) to a scale of 1:2000 and then digitized in ArcView. Flora regional and urban species of concern (species ranked L1 to L4) were mapped as point data with approximate number of individuals seen.

Fauna data were collected by the TRCA in May and June of 2013 (Table 2). These surveys were concerned primarily with the mapping of breeding bird species of regional concern. Songbirds are surveyed in late May to 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*. (2007). Fauna species of regional and urban concern (species ranked L1 to L4) were mapped as point data with each point representing a possible breeding pair.

Table 2: Schedule of the TRCA biological surveys at Humber Bay Park study area

Survey Item	Survey Dates	Survey Effort (hours)
Vegetation Communities and Flora Species	7th , 12th, 20th and 25th June; 31st Jul; 17th and 24th Sep 2013	40 hours
Breeding Songbirds	24th and 29th May and 20th June, 2013.	10 hours

4.0 Results and Discussion

Information pertaining to the Humber Bay Park 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). This section provides the information collected and its analysis in the context of the TNHS Strategy.

4.1 Regional Context

Based on 2007/08 orthophotography, 25% of the land area in the TRCA jurisdiction consists of natural cover but this figure includes meadow and old field. Although historically, the region would have consisted of up to 95% forest cover, today (i.e. 2007/08) only about 17% is covered by forest and wetland. Of the non-natural cover (i.e. the remaining 75%), 48% is urban and 27% is rural / agricultural.

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% of the surface area of the jurisdiction (Map 3). Thus the existing natural system stands below the quantity target that has been set for the region (30%) and also has an unbalanced distribution. The distribution of fauna species of concern is also largely restricted to the northern part of the jurisdiction; fauna species of regional concern are generally absent from the urban matrix (Map 4). The regional picture, being the result of a long history of land use changes, confirms that **all** site-based decisions contribute to the condition of a region.

According to the ground-truthed vegetation surveys, the study area includes a total of 31.8 ha of natural cover (Appendix 1). Of this natural cover, 2.3 ha are identified as meadow, 10.8 ha as successional habitat, 4.4 ha as plantation, 2.7 ha as wetland, 3.5 as vegetated aquatic, and 8.1 ha as "dynamic" (artificial beach or prairie) habitat. The proximity of Lake Ontario complicates attempts to provide accurate patch quality assessment, especially with such small patches. This complication arises because Lake Ontario is assigned a positive matrix influence score (since it is a natural feature) and this incidentally raises the overall patch quality score of any neighbouring habitat patches. Map 5 shows that the habitat patches at the Humber Bay Complex score "very poor" (L5) for patch size, but this score is tempered by the artificially high "good" (L2) score that many of the habitat patches attain (Maps 6 and 7) due to the proximity of Lake Ontario resulting in an over all "poor" patch quality score (Map 8) when in fact a more appropriate score would be "very poor" (L5). However, it is anticipated that part of the sheltered embayment will become wetland over time, and more vegetation may arise spontaneously amid the armour stone and through planting. Any increase in natural cover would improve the site and also increase positive matrix influence on nearby areas such as Mimico Waterfront Linear Park (TRCA 2014).

4.2 Vegetation Community Findings for Humber Bay Park

4.2.1 Vegetation Community Representation

In 2013, 34 vegetation community types were described for Humber Bay Park (Appendix 1). There are 7 "forest" communities (actually all young plantation); 10 successional communities;

7 dynamic communities, 2 meadow communities, 5 wetland communities, and 3 aquatic communities. These communities are all anthropogenic in origin and disturbed in character; the oldest would date from no earlier than the late 1970s.

Plantation communities provide 4.4 ha of natural cover, though because of their young age (maximum about 30 years) and small fragmentary character, should be included functionally with the successional communities, which account for another 10.8 ha. These communities together thus make up about half the site. A blend of woody plants with fragmentary to partial canopy closure is characteristic of these communities, and it is not always apparent how much of the woody material is planted or naturally-regenerating. Prominent vegetation types include Native Deciduous Savannah (CUS1-A1) and Restoration Deciduous Plantation (CUP1-A). The oldest, most closed-canopy communities are Ash-Conifer Mixed Plantation (CUP2-G) and Austrian Pine Coniferous Plantation (CUP3-b). The planted material found in these communities is relatively young and vulnerable to competition from other more aggressive exotic species currently establishing at the site. The lower and ground layers are generally dominated by exotic species such as garlic mustard *(Alliaria petiolata)*, hedge parsley (*Torilis japonica*), and shrub honeysuckles (*Lonicera* spp). Small parts of the site still have few enough trees to be classed as meadow (2.3 ha).

Dynamic communities at natural sites generally are the result of energetic processes (fire, wave and wind erosion) which maintain the community in an open or semi-open condition. At Humber Bay Park however, the processes are artificial (grading and filling), resulting in largely-stabilized shoreline communities on armour stone rock or cobble, along with a couple of prairie plantings and gravelly mud-flats sometimes visible along the estuary of Mimico Creek (these treated as Open Riparian Sand / Gravel Bar).

Wetlands occupy 2.7 ha (9% of the site) and are evenly split between Willow Mineral Thicket Swamp (SWT2-2) forming a fringe around many of the lagoon areas; and marshes, largely Hybrid Cattail Mineral Shallow Marsh (MAS2-1b) and Common Reed Mineral Shallow Marsh (MAS2-a).

4.2.2 Vegetation Communities of Concern

The vegetation communities that occur in the TRCA jurisdiction are scored and given a local rank from L1 to L5 based on the two criteria mentioned in Section 3.2. Community boundaries and ranks are shown on Map 9.

Humber Bay Park has 12 communities of conservation concern (rank L1-L4). They occupy 8.7 ha (28%) of the site. Because of the relatively new character of the site, the ranks may not always perfectly reflect community sensitivity. For example, the Mineral Open Beach (BBO1) (rank L3) and Mineral Treed Beach (BBT1-A) (rank L2) are considered “natural” because they formed on cobble and are subject to wave action. However, they are protected by armour stone areas and do not have much native vegetation at present. The high rank reflects their potential to support coastal vegetation.

On the other hand, there are a couple of patches of Fresh-Moist Cottonwood Tall Treed Woodland (CUW1-A4) (rank L3) which at this time do have a complex structure and support a suite of native coastal plants.

In addition, three of the wetlands have developed into natural communities of conservation concern: Willow Mineral Thicket Swamp (SWT2-2) (rank L4) forming densely along lagoon shorelines; Bur-reed Mineral Shallow Marsh (MAS2-7) (rank L3), and Forb Mineral Shallow Marsh (MAS2-9). The latter is a fairly sparse community on exposed mud, almost better classed as a mudflat but still of conservation interest for its periodic growth of annual plants and provision of bird habitat.

A small amount of the lagoon area has enough vegetation to be considered a Pondweed Submerged Shallow Aquatic Community (SAS1-1) (rank L4). There is also a land-locked but artificially-fed pond and channel system on the east peninsula of Humber Bay Park that is a Water Milfoil Submerged Shallow Aquatic Community (SAS1-4) (rank L4). The aquatic macrophyte growth here is dense; unfortunately most of it is the invasive Eurasian Water-milfoil (*Myriophyllum spicatum*). This community is more contained and isolated from lake influences than the lagoons.

The community of the greatest conservation interest at Humber Bay Park is actually the prairie planting associated with the Humber Bay Butterfly Habitat project, which dates from 1998-2000 (Figure 1). This vegetation type is classified as Fresh-Moist Tallgrass Prairie Planting (TPO2-A) and is ranked L5 because it is planted. However, the project was carefully prepared and planned, using mostly locally-sourced and documented material, and includes many species of conservation concern (see Section 4.3.3). Invasive species are moving into the prairie but many of the natives are abundant.

Figure 1. Humber Bay Butterfly Habitat: Tallgrass prairie planting dating from 1998-2000 (photo by Nettie Lambert, June 2013)

4.3 Flora Findings for Humber Bay Park

4.3.1 Flora Species Representation

Humber Bay Park had a total of 353 species of vascular plants recorded in 2013 (Appendix 2). There are 244 naturally-occurring species and 109 planted species at the site. Of the non-planted species, only 79 are native (32%). These results reflect on the one hand the disturbed landfill origins of the site (low species richness and dominance by exotics among the naturally-colonizing species) and on the other hand, the extensive amount of habitat work and planting over the past 30 years (the large component of species, predominantly native, originating from plantings). For this reason, plantings will be considered separately. It is not always easy at this kind of site to differentiate species that came on their own and which originated from plantings, although it can usually be discerned from placement or pattern, and their known availability from nurseries or popularity for use in planting plans.

4.3.2 Flora Species of Concern

Twenty species of regional (L1-L3) or urban concern (L4) were recorded at Humber Bay Park in 2013. Appendix 2 lists plant species by ranks and locations are shown on Map 10. The ranks are based on sensitivity to human disturbance associated with development; and habitat dependence, as well as on rarity (TRCA 2010). Rarity is defined as being found in six or fewer of the forty-four 10x10 km UTM grid squares that cover the TRCA jurisdiction. In most cases, the species are not currently rare but are at risk of long-term decline due to the other criteria.

There are 5 vascular plant species of regional conservation concern: water star-grass (*Heteranthera dubia*), foxtail wood sedge and troublesome sedge (*Carex alopecoidea* and *C. molesta*), hard-stemmed bulrush (*Schoenoplectus acutus*), and wood sage (*Teucrium canadense*) (with a rank of L3). Three of these are sedges and all are readily dispersed, often by water. An additional 15 species have a rank of L4. Only one species of concern recorded at Humber Bay Park is actually rare (water star-grass); the other two have a low number of records because they have only recently been tracked: heal-all (*Prunella vulgaris* ssp. *lanceolata*) and pink hedge bindweed (*Calystegia sepium* ssp. *americana*).

Eighteen of the 20 species of regional or urban concern are habitat specialists to some extent (Map 11). Half of these, such as peach-leaved willow (*Salix amygdaloides*), boneset (*Eupatorium perfoliatum*), and hard-stemmed bulrush are wetland species associated with the shoreline and inlets. The variegated bulrush (*Equisetum variegatum*) actually tends to be even more restricted, to calcareous wetlands (including coastal thicket swamps) and so reflects the site's proximity to Lake Ontario. There are also 3 aquatic species of concern: the water star-grass, which tends to be specific to Lake Ontario sites; greater duckweed (*Spirodela polyrhiza*), and a water-weed which was likely Canada waterweed (*Elodea canadensis*) but was not accessible for absolute verification. Nuttall's waterweed (*E. nutallii*) also can occur along the lakeshore. There were 5 species of concern typical of successional (or terrestrial shoreline) habitats, such as Emerson's hawthorn (*Crataegus submollis*), pink hedge bindweed and paper birch (*Betula papyrifera*) which had natural as well as planted occurrences. One open-land species was typical of prairie habitats though slightly generalist: sky-blue aster (*Symphyotrichum oolentangiense*).

Vulnerability to impacts caused by nearby development or human land use generally is another factor affecting species of concern. In the case of Humber Bay Park, there are 17 L1 to L4 flora species that have a somewhat elevated score (Map 5). The main risk is from being overrun by invasive exotics, since the flora are fairly disturbance-tolerant in other ways. This is particularly true of the wetland species that are outcompeted by common reed (*Phragmites australis* ssp. *australis*) and hybrid cattail (*Typha* x *glauca*). Foxtail wood sedge and troublesome sedge grow well in disturbed landscapes but do not compete well in the long term with woody invasive species such as buckthorn (*Rhamnus cathartica*) or herbaceous invasives such as dog-strangling vine (*Cynanchum rossicum*) or reed canary grass (*Phalaris arundinacea*). To some extent, the wetland species require fluctuating lake levels to maintain

suitable habitat. Wood sage grows well in areas that are occasionally below the high-water mark, while hard-stemmed bulrush grows in more regularly-inundated areas.

Nutrient loading and sedimentation from storm water runoff, the outflow of Mimico Creek, and Canada geese all contribute to increased growth of invasive species and reduced light penetration in the water; both of which inhibit native wetland plants. Trampling at this highly-used public park is intense, but most of the species present are not particularly sensitive.

4.3.3 Plantings

Numerous habitat creation and planting projects have taken place at Humber Bay Park since the park was established. These range from clusters of trees and shrubs in landscape plantings in the 1980s to expansions of the tree and shrub cover continuing to this day. The most extensive work involved wetland habitat creation in the 1990s and the Humber Bay Butterfly Habitat installation done around 1998-2000. Sixty-eight of the 109 (62%) planted species seen in 2013 were native; this reflects the commitment of the recent landscape design to using native species. Planted species ranked L1 to L4 are shown on Map 10.

Early landscape plantings were mostly of trees and shrubs, with less attention given to native species. For example, the exotic (but not invasive) Austrian pine (*Pinus nigra*) is one of the dominant species in the older plantings, chosen because of its adaptability to disturbed fill soils and urban conditions. Some common native species such as red ash (*Fraxinus pennsylvanica*) and staghorn sumac (*Rhus typhina*) are included; the ash were being treated to prevent emerald ash borer in 2013. The more recent woody plantings, some as recent as 2013, had a slightly wider range of native species, but were still mostly the kind of common, readily-available stock that is adaptable to the fill soils. The recent plantings include a number of trees and shrubs that are not native to Toronto but are found in other parts of southern Ontario, such as swamp white oak (*Quercus bicolor*) and Kentucky coffee-tree (*Gymnocladus dioicus*). Tree and shrub plantings at Humber Bay have generally survived well, but with some invasive species moving into the lower and ground layers.

Wetland plantings, largely in the 1990s, focused on the lagoons and shorelines of both Humber Bay East and West. These plantings have had to contend with disruption by carp (*Cyprinus carpio*) and Canada geese (*Branta canadensis*), as well as the omnipresent and extremely aggressive common reed and hybrid cattail. To some extent, hybrid cattail was actually planted since it provides habitat and was likely to have high success. Certain wetland plants have established successfully and extensively, including greater bur-reed (*Sparganium eurycarpum*), river bulrush (*Bolboschoenus fluviatilis*), soft-stemmed bulrush (*Schoenoplectus tabernaemontani*), and water smartweed (*Persicaria amphibia* var. *stipulacea*). Common arrowhead (*Sagittaria latifolia*) is locally abundant. These have generally either been able to hold their own against the carp, geese, common reed and hybrid cattail, or adapt to slightly deeper water levels. Other wetland plants are established, but only sporadically and in small populations, such as blue flag (*Iris versicolor* and *I. virginica*), Baltic rush (*Juncus arcticus* ssp. balticus), and swamp milkweed (*Asclepias incarnata*). And some, such as the bullhead lily

(*Nuphar variegatum*) transplanted from Heart Lake in 1993 (MTRCA 1994), could not be found in 2013.

The most diverse and experimental planting at Humber Bay Park is the Humber Bay Butterfly Habitat, which focused on prairie species with just a few shrubs and trees. This project extends from the western part of Humber Bay Shores to the base of Humber Bay East. The planting areas were first overlaid with a light, sandy topsoil to counteract the heavy underlying fill, and species were chosen for their value to butterflies. In 2013, a large number of species were still on site and thriving, including New Jersey tea (*Ceanothus americanus*), oxeye (*Heliopsis helianthoides*), foxglove beard-tongue (*Penstemon digitalis*), balsam ragwort (*Packera paupercula*) (Figure 2), smooth aster (*Symphyotrichum laeve*), Indian grass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and short-fruited sedge (*Carex brevior*). Moist prairie species included Canada bluejoint (*Calamagrostis canadensis*) prairie cord-grass (*Spartina pectinata*), and spike blazing-star (*Liatris spicata*). As with the woody species, some native to southern Ontario but not specifically Toronto were included, for example Great Lakes St. John's-wort (*Hypericum kalmianum*) and grey-headed coneflower (*Ratibida pinnata*). Although many native plants are well-established, there is still a considerable matrix of exotic herbs and cool-season grasses so the site is due to receive some maintenance.

Given the intensely urban character of the park, strict adherence to locally-native species is not as important as it would be in restoring a relict natural habitat such as Toronto Island.

Figure 2. Balsam ragwort (rank L2), successfully established at Humber Bay Butterfly Habitat (photo by Gavin Miller, June 2013)

4.3.4 Invasive Species

Many of the exotic plants at Humber Bay Park are non-aggressive species associated with recently-disturbed ground. There are however, some significant invasive exotic plants present. These include several species which are widespread and sometimes dominant in wetland or terrestrial habitats, and also a few which are localized but have the potential to become severe problems if allowed to expand.

The marshes around the lagoon areas are mostly dominated by common reed and hybrid cattail. These wetland invasive species are not likely going anywhere soon, given their rapid growth and the nutrient-rich urban character of the site. However, fluctuations in water level may provide gaps in their growth and promote more diversity. Purple loosestrife (*Lythrum salicaria*) is common but has been kept in check through biological control for the past ten years.

The landlocked pond system in on the east peninsula is dominated by the invasive aquatic plant Eurasian water-milfoil, although this is a more controllable environment than the lagoons directly open to the lake.

Dog-strangling vine (*Cynanchum rossicum*) is of moderate abundance in the terrestrial areas. It is likely to become dominant as a matter of course, and poses a serious medium- and long-term threat to the integrity of the Humber Bay Butterfly Habitat as it will certainly continue to seed in.

Woody exotics such as Siberian elm (*Ulmus pumila*), European alder (*Alnus glutinosa*), Russian-olive (*Elaeagnus angustifolia*), buckthorn (*Rhamnus cathartica*), Norway and Manitoba maples (*Acer platanoides* and *A. negundo*) are likely to seed in and take over any terrestrial plantings and successional areas. Where tree growth has resulted in some shade, for example in the older plantings from the 1980s and 1990s, the understorey is largely shrub honeysuckle and the ground layer occupied by hedge parsley and garlic mustard. All of these are prolific seed-producers and the garlic mustard is known to have a long-lived seed bank.

One invasive plant that is still currently localized is oriental bittersweet (*Celastrus orbiculatus*), growing along a fenceline on the western peninsula where it was planted.

Emerald ash borer (*Agrilus planipennis*) is now spreading through the Toronto area. Most likely it will eventually kill almost all native ash trees (*Fraxinus* spp.) in the jurisdiction unless they are treated with TreeAzin®, a formulation derived from the neem tree (*Azadiracta indica*) that kills larvae that attempt to consume the cambium. Humber Bay Park has many ash, especially red ash (F. pennsylvanica) in plantings. However, in 2013, many of the trees were being treated.

4.4 Fauna Findings for Humber Bay Park

4.4.1 Fauna Species Representation

The TRCA fauna surveys at the site in 2013 documented a total of 37 bird species, 6 mammals, and 1 frog species for a total of 44 possible breeding fauna species. Note that in 2013 a small colony (20 nests) of cliff swallows (*Petrochelidon pyrrhonota*) was reported from the bridge just beyond the northern limit of the study area; this species has been included in the overall total. A handful of incidental records from the past decade add just two extra species to the list: savannah sparrow (*Passerculus sandwichensis*) and white-tailed deer (*Odocoileus virginianus*), were both observed in 2006. Therefore, given the 10 year limit on inclusion of sightings into a current species list for any site, the Humber Bay Park species list totals 46 species. Refer to Appendix 3 for a list of the breeding fauna species at the Humber Bay Park study area and their corresponding L-ranks.

4.4.2 Fauna Species of Concern

Fauna species, like vegetation communities and flora species, are considered of regional concern if they rank L1 to L3 based on their scores for the seven criteria mentioned in Section 3.2. It is important to also document the status of L4 species, i.e. those species that are of concern within the urban portions of the region. As with flora, this is a proactive, preventive approach, identifying where conservation efforts need to be made before a species becomes rare. Map 11 shows locations of fauna from both categories.

Fauna surveys at the Humber Bay Park study area reported two L3 fauna species: hooded merganser (*Lophodytes cucculatus*) and red-necked grebe (*Podiceps grisegena*). Both of these sensitive nesting species were located in the enclosed lagoon on the east side of the entrance to the East Park. The merganser was observed with two fledged young and may have moved into the lagoon from potential nesting locations further up Mimico Creek (or the nearby Humber River); the grebes on the other hand were observed attending a nest in the lagoon.

There was a total of 14 L4 bird species reported in the past decade; in addition there were 5 mammal species and one frog species. Therefore (with the two L3 bird species) the overall total for species of regional and urban concern (L1 – L4) at the study area is 22 species (Table 5). Note that one of these species, the barn swallow, is listed as Threatened at both the Provincial and Federal levels, affording this species special protection. At the Humber Bay Park study area, barn swallows were recorded nesting on buildings and bridges at three locations throughout the area; the species also nests regularly at the neighbouring Mimico Waterfront Linear Park, resulting in fairly large congregations of foraging swallows once the young have fledged in mid to late summer (TRCA 2014).

Table 3: Breakdown of Species of Concern at Humber Bay Park study area

Fauna	# species	# L1–L3: Species of Regional Concern	# L4: Species of Urban Concern	Total # L1-L4: Species of Regional or Urban Concern
birds	38	2	14	16
herps	1	0	1	1
mammals	7	0	5	5
TOTALS	46	2	20	22

Local occurrence is one of seven scoring criteria for fauna species and is based on TRCA data and information from the Natural Heritage Information Centre (NHIC) of the OMNR (NHIC 2008). Using local occurrence as a measure of regional rarity, any species that is reported as a probable or confirmed breeder in fewer than 10 of the forty-four 10x10 km grid squares in the TRCA jurisdiction is considered regionally rare (i.e. scores 3 to 5 points for this criterion) (TRCA 2010). There were 3 regionally rare fauna species reported for the site: red-necked grebe is a fairly recent arrival as a nesting species along this western section of the Toronto

waterfront, readily taking to artificial nest platforms when provided; gadwall (*Anas strepera*) nests sporadically along the entire length of the lakeshore; and purple martin (*Progne subis*) is reported as nesting in just 3 of the 44 regional grid squares, again associated with the lakeshore. 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, *Cyanocitta cristata;* American crows, *Corvus brachyrhynchos;* squirrels, *Sciuridae*; raccoons, *Procyon lotor*; and house cats, *Felis catus*); parasitism (from facilitating the access of brown-headed cowbirds, *Molothrus ater*, a species which prefers more open, edge-type habitat); competition (for nest-cavities with bird species such as house sparrows, *Passer domesticus*; and European starlings, *Sturnus vulgaris*); flushing (causing disturbance and abandonment of nest) and, sensitivity to pesticides.

Fauna species are considered to have a high sensitivity to development if they score three or more points (out of a possible five) for this criterion. Twelve fauna species of regional or urban concern, scoring as sensitive to development, were reported from the study area (Map 6). Only one of these species, savannah sparrow, habitually nests on the ground and as such is highly susceptible to ground-borne disturbance, e.g. off-leash dog-walking. The sole savannah sparrow breeding record at the study area is from 2006, in the vicinity of the tip of the West peninsula; an individual was observed in the same area in 2013, but too early in the season to rule out the possibility of the individual being an actively migrating bird. Interestingly, neither of these records is from one of the patches of natural cover identified as meadow – savannah sparrows' typical nesting habitat. It is highly likely that hiker and dog disturbance in the highly fragmented meadow habitat throughout the study area is too intense to allow such ground-nesting species to attempt nesting on a regular basis.

Of the remaining sensitive bird species at the study area, 2 are particularly well-represented with 9 pairs of grey catbirds (*Dumetella carolinensis*) (Figure 3) and 11 pairs of willow flycatchers (*Empidonax traillii*). These numbers are especially impressive when one considers the actual amount of available habitat for these species at Humber Bay Park, and even more so when compared to other lakeshore situations. Both species nest at medium heights in sparse shrub cover (although grey catbird is more generalist, also nesting in forest edge situations) where ground-borne disturbance is somewhat less of an issue.

It is important to understand that negative matrix influences are not solely associated with the proximity of urban and suburban developments. Extensive public use of a natural habitat can have substantial negative impact through the cumulative effects of hiking, dog-walking and biking on the site. Such impacts are especially important for breeding fauna since repeated disturbances have severe implications for nest attendance and the feeding of vulnerable young; nest productivity in heavily used areas is reduced for all but the most resilient of species (the latter including non-natives such as house sparrow and European starling). The negative impacts are not quite as significant for migrant species particularly in situations where individuals have the opportunity to move on to less disturbed areas. However, in the urban landscape such opportunities are considerably restricted and in recent years the importance of stop-over habitats in the life-cycles of migrant birds has become recognised as a significant issue. It is as stop-over habitat that the vegetation communities at Humber Bay Park become even more important for fauna, providing both foraging and shelter opportunities for migrants passing through the urban landscape.

Figure 3. Grey catbird, (rank L4), was particularly well-represented at Humber Bay (Photo by Paul Prior).

Area sensitivity is a scoring criterion that can be closely related to the issue of a species' need for isolation. 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 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. There were a total of five area sensitive species documented at the site, although the two L3 area sensitive species (hooded merganser and red-necked grebe) should perhaps not really be considered since their local foraging range would include the lower reaches of Mimico Creek or the Humber River, and the near-shore waters of Lake Ontario, i.e. the terrestrial habitat patch size really has little impact on these two species at this site.

The same could be said of two of the remaining three area-sensitive species. Mink (*Mustella vison*) forages in a variety of riparian habitats and such habitats need to be relatively extensive (at least 10 km in length) to provide enough opportunities for denning. The shoreline habitat available at Humber Bay Park falls below the scoring threshold for this species but individuals observed at the study area also have unrestricted access to considerably more shoreline habitat both to the east and west of the site, and also inland along the lower Mimico Creek. Similarly, although white-tailed deer require larger areas than are available at the study area, the species readily moves across the urban landscape in search of appropriate foraging and birthing situations.

The remaining species is great-crested flycatcher (*Myiarchus crinitus*), typically a forest-associated cavity-nesting bird. Although this individual was reported well past the migrant-threshold date used by the TRCA to indicate likelihood of breeding activity, it is probable that this bird was actually a very late migrant. Such belated migrants sometimes summer at coastal stop-over locations and the same is likely true of the red-eyed vireo (*Vireo olivaceus*) – another forest-associated species - from the same area of the park on the same date.

Patch isolation sensitivity in fauna measures the overall response of fauna species to fragmentation and isolation of habitat patches. One of the two main aspects of this scoring criterion is 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. The second main aspect is the potential impact that roads have on fauna species that are known to be mobile. Thus most bird species score fairly low for this criterion (although they prefer to forage and move along connecting corridors) whereas many herpetofauna score very high (since their life cycle requires them to move between different habitat types which may increase likelihood of road-kill). One example of how this criterion affects species populations is the need for adult birds to forage for food during the nestling and fledgling stage of the breeding season. 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 issue of patch isolation sensitivity at the current site has little real impact on the breeding fauna at Humber Bay Park; all four species which score high for this criterion are largely aquatic and therefore have easy access to the near-shore waters of Lake Ontario and to the

lower reaches of both Mimico Creek and the Humber River. Certainly, for the three semi-aquatic mammals, beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*) and mink, such shoreline habitats allow for sufficient movement along the Lake Ontario shoreline, although all three species are somewhat susceptible to road-kill. The fourth species is green frog (*Lithobates clamitans*) which was reported from the ponds on Humber Bay Park East. There is likely relatively easy interchange between populations at the Humber Bay site, Mimico Creek and the lower Humber River, and therefore the urban landscape to the north of the park probably has little impact on the lakeshore populations. There might perhaps be an issue within the park where frogs have to cross heavily used paved surfaces, resulting in a level of road-kill and mortality that restricts the growth of a healthy frog population. It is likely that other non-avian species (specifically snakes) are also impacted by the extent and use of paved surfaces within the park, but there were no snakes reported during the current fauna surveys, and no incidental records in the past ten years.

Patch isolation at Humber Bay Park is potentially more significant regarding migrant songbirds. If foraging and sheltering migrants are repeatedly disturbed then they will need to re-locate to less-disturbed habitats – maintenance and replenishing of energy levels is absolutely crucial for migrating individuals. If there is no viable connection between habitat patches then considerable stress is placed on birds as they struggle to find opportunities to move to other areas on their migration path. In this way, the establishment of a series of natural refuges along the lakeshore and throughout the city's ravine system becomes of considerable importance.

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 their microhabitat (e.g. decaying logs, aquatic vegetation) and requirements for particular moisture conditions, vegetation structure or spatial landscape structures, to preferences for certain community series and macro-habitat types. Red-necked grebe and northern rough-winged swallow are the only fauna species breeding at Humber Bay Park which are considered habitat specialists, both species requiring very specific nesting opportunities. For the red-necked grebe, in the absence of any extensive floating aquatic vegetation, artificial nest-rafts need to be provided. For the swallow, there is a prerequisite of cavities, often over water, for nesting, either natural or man-made.

Migrating birds tend to be somewhat generalist in their habitat selection, even those species that are otherwise extreme habitat specialists in their breeding locations. The most important habitat considerations for migrant songbirds are the availability of food and shelter.

Richness is essentially the presence or absence of species at a site. Beyond mere presence 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 representation biodiversity is an excellent measure of the health of a natural system. The presence of a very

low number of habitat dependent species indicates that the habitat in the study area is functioning at a rather low level. To some extent, this is to be expected given the urban landscape in which the site is embedded, and the artificial nature of the entire peninsula and shoreline. However, for two of the L4 species, grey catbird and willow flycatcher, their numbers indicate that there is at least potential for the area to support a thriving population of these somewhat sensitive open-habitat and shrub-habitat dependent species.

5.0 Recommendations

The recommendations for the Humber Bay Park study area are given in relation to the regional targets for natural heritage in the TRCA jurisdiction. Every site, no matter how small, makes its own contribution to the natural system and will require its own individualized plan of action. Following is a short summary of the site highlights, followed by specific recommendations.

5.1 Site Highlights

1. The site is part of the Lake Ontario shoreline corridor, enhancing the natural connection between the mouths of the Mimico Creek and the Humber River.

2. A total of 244 naturally-occurring and 109 planted flora species were observed, showing relatively low species richness augmented by intensive habitat restoration.

3. Five flora species of regional concern (L1-L3), including water star-grass and troublesome sedge, and 15 species of urban zone concern (L4) were found as naturally-colonized populations.

4. Numerous plantings date from the 1980s to the present, including tree groves, wetlands, and prairie; with fair to good success rates. Tree plantings have largely had good survival, but are being compromised by invasive species, especially in the shrub and ground layers.

5. The Humber Bay Butterfly Habitat planting, which includes a diversity of sensitive tallgrass prairie species, has had successful establishment, although it is due for maintenance to remove invasive species. It is one of the more successful prairie plantings in the Toronto area, having lasted over 10 years.

6. Wetland plantings have been constrained by heavy competition from common reed and hybrid cattail; as well as herbivory by carp and Canada geese; however, patches of robust species such as river bulrush and giant bur-reed have grown well. Two emergent forbs, common arrow-head and water smartweed, have established abundantly.

7. Plantings and restoration work have resulted in several communities of conservation concern on site.

8. There is a landlocked pond and channel feature, fed by a pumping station, on the east peninsula (Humber Bay East). This feature has the potential to provide a different kind of wetland environment, more sheltered from disturbing influences, although it is currently dominated by Eurasian water-milfoil.

9. Invasive species infestations include common reed, Eurasian water-milfoil, dog-strangling vine, hedge parsley, garlic mustard, Norway and Manitoba maples, and oriental bittersweet.

10. A total of 46 fauna species were documented as potentially breeding at Humber Bay Park: overall this is low species richness typical of an urban site.

11. The site provides foraging opportunities for several aerial-foraging bird species such as purple martin and cliff swallow. This suite of species is subject to a well-documented but poorly-understood decline across North America.

12. At least three pairs of barn swallow, a Threatened Species at Risk, nest on man-made structures within the study area.

13. The sheltered lagoon at the base of the peninsula provides opportunities for nesting waterfowl, specifically hooded merganser and the regionally rare red-necked grebe. Overwinter the peninsula affords excellent shelter to many duck species, and therefore has become a regular viewing location for local birdwatchers.

14. The site's location on the lakeshore automatically confers a degree of importance as migratory bird stopover habitat – any vegetation cover on site, native or otherwise – will be utilised by migrant songbirds particularly on mornings when unfavourable weather conditions have forced them to make landfall.

5.2 Site Recommendations

In order to establish and maintain a healthy level of biodiversity at the Humber Bay Park study area, the overall integrity of the natural heritage system that includes the site must be enhanced and protected. Therefore, habitat patch size and shape needs to be optimized so as to provide large enough habitat patches to support sensitive flora and fauna sustainably. In addition, connectivity between natural habitats within and beyond the study area must be improved.

Furthermore, at this urban site, habitat quality and integrity must be protected from the negative matrix influences described in the body of the report. This includes managing public use, allowing healthy dynamic natural processes to proceed, and controlling invasive species.

The following recommendations address the above natural heritage concerns, with perhaps an emphasis upon matrix issues and habitat quality given that opportunities for increasing patch size are limited within the study area. Thus, we recommend overall that 1) existing habitats and features be enhanced and protected; 2) that public use be managed; 3) that invasive species be controlled; and 4) that habitat connectivity be re-established and enhanced along the lake shore.

1) Enhance and Protect Existing Features

The more that natural cover is retained at the study area and vicinity, the better it can support a healthy level of biodiversity. Even though there is no potential for large continuous habitat patches at Humber Bay Park, **any increase in natural cover through strategic plantings and restoration will improve the patch size and shape and facilitate in reducing negative matrix influences**. The landscaping and restoration planting is so far mostly successful but is facing pressure from invasive species and heavy use. To ensure its continued success, further plantings and maintenance will be needed. These should be tailored to the site conditions, which are urban and mostly sheltered from direct coastal influences by the lake-fill peninsulas and shoreline armouring.

a) A general increase in natural cover (especially wetland and thicket) should be a continuing goal for this site.

b) The Humber Bay Butterfly Habitat planting should be the highest priority. In this case, the focus should be less on further planting and more on maintenance. The planting zone should be thoroughly assessed for invasive species and these removed. These would include reed canary grass (*Phalaris arundinacea*) which in this context threatens tallgrass prairie species, as well as dog-strangling vine and any woody invasive plants. Prescribed burns as are done at High Park would also help to maintain the prairie ecosystem, and the site is well-separated by wide paths and roads, which would reduce potential hazards from this treatment. With maintenance, it is hoped that the existing flora will regenerate to maintain the prairie's integrity with minimal need for further planting. Although there is some separation from large patches of invasive species elsewhere on the site, the prairie will require indefinite monitoring and maintenance, though not necessarily at an intensive level.

c) The sheltered pond and channel system on the eastern peninsula should also be considered as a wetland restoration site. Given its contained character, it may be possible to control invasive plants as well as carp and geese to enable a more successful pond and wetland system. Emergent and floating-leaved plants such as the bullhead lily planted in the 1990s that failed in the lake-connected lagoon systems may succeed here.

d) Other plantings should focus on generalist, urban-tolerant species, with maintenance to prevent exotic invasion.

e) Continue monitoring the success of plantings and other restoration work every two years, and provide ongoing recommendations based on findings (adaptive management).

f) Nesting by red-necked grebes in the sheltered bays and lagoons around the peninsula should be encouraged by providing further artificial nesting structures. Hooded merganser and other duck species will benefit from the provision of well-placed and well-maintained nest-boxes. The local presence of two particularly aggressive introduced swan species may have some impact on potential nesting success of native waterfowl, and their impact should be closely monitored.

g) Opportunities to provide artificial nest structures for barn swallow, purple martin and chimney swift should be explored. These three species, plus red-necked grebe, present ideal opportunities for local stewardship.

h) Turtle-basking opportunities both off-shore and within the lagoons should be provided, encouraging common map turtles (*Graptemys geographica*) – a species listed as Special Concern both provincially and nationally. Common map turtle is native to the region and known to occur in the mouth of the Humber.

i) Consider turtle-nesting opportunities within the site. Attention should be paid to the viability given the high degree of foot traffic within the park, and also to the possible exposure to a high population of urban-subsidized nest-predators (raccoons *Procyon lotor*, striped skunks *Mephitis mephitis*, and Virginia possums *Didelphis virginiana*). The potential for creating a nesting-beach on one of the small near-shore islands off the mainland shoreline should be investigated.

2) Manage Public Use

Although Maps 5 and 6 indicate an L4 score for matrix influence it should be noted that in calculating such patch scores any lakeshore habitat patch assumes a positive influence from the adjacent Lake Ontario, when in fact the influence might be better judged as neutral. Human traffic (hikers, bikers, dog-walkers) increases considerably throughout the summer and early fall. ***Controlling disturbance associated with urbanization and public land use is a high priority.***

a) A stewardship program should engage local residents and park visitors in natural heritage restoration activities including removal of invasive species, planting, and maintenance.

b) Trails should be directed to prevent trampling of sensitive restoration features. Interpretive signage describing such features as the recent red-necked grebe nesting, or seasonal features such as the population of overwintering ducks, could foster stewardship among the many local users of the area.

c) Dog-walking should be more carefully managed in this waterfront park. The western peninsula already has a leash-free zone for dogs. The leash laws should be enforced elsewhere in the park, especially near waterfowl breeding and wintering sites, and at the Humber Bay Butterfly Habitat. In addition, some of these sensitive sites should be considered for total exclusion of dogs as occurs at Tommy Thompson Park. On the other hand, there may be an opportunity for installing another leash-free area if it is well-separated from any sensitive habitat feature.

d) Adjacent properties that come up for redevelopment or upgrades should include retrofits of at-source hydrological improvements (permeable pavement, bio-retention swales, and infiltration measures). Local property owners should also be approached with regards to installing nesting structures for the aerial foraging bird species associated with the area.

e) Include further plantings that provide both foraging and shelter opportunities for migrant songbirds, e.g. berry-bearing shrubs and trees, dense thickets.

3) Control Invasive Species

The intense urbanization of the area has resulted in the domination of vegetation communities by exotic plants; the vegetation communities bear almost no resemblance to pre-development conditions with the possible exception of tallgrass prairie remnants. However, efforts need to be directed to those species for which effective control is likely attainable, as well as to particular locations that host existing sensitive features in need of protection. ***It is essential that well-planned and realistic measures be undertaken to control invasive species.***

a) As noted in Recommendation 1 (b) the Humber Bay Butterfly Habitat should be targeted for invasive control because of the sensitive tallgrass prairie established there.

b) The population of oriental bittersweet along the fenceline of the west peninsula is still small enough that it could be eradicated. This should also be a high priority.

c) Woody invasives that produce prolific seed (e.g. Manitoba and Norway maple; shrub honeysuckle, Siberian elm, buckthorn, and European alder) should be removed from the vicinity of restoration areas. It may be possible to clear the understory of older plantings and replace it with native species.

d) Generalized populations of garlic mustard, hedge parsley, and dog-strangling vine are probably not suitable targets for removal unless associated with particular restoration projects such as the Butterfly Habitat.

e) Biological control may be possible for Eurasian water-milfoil in the pond system (Newman and Biesboer 2000), which may make a restoration project there more feasible; and in the near future, dog-strangling vine (Hazlehurst *et al*. 2012).

f) Adjacent properties that come up for redevelopment or upgrades should include removal of exotic species and planting of native species in their landscaping plans.

g) Non-native red-eared sliders (*Trachemys scripta*) are known to occur at the neighbouring Mimico Waterfront Linear Park and it is extremely likely that the same species is therefore present within the Humber Bay Park study area. Attempts should be made to remove the red-eared sliders from the area. Consideration should also be given to the idea of implementing a swan-egg oiling program although the latter may encounter considerable opposition from members of the public.

h) Treatment of ash trees with TreeAzin® to protect them from emerald ash borer should continue.

4) Enhance Habitat Connectivity Along the Lake Shore

The east and west components of the Humber Bay Parks are mainly associated with the mouth of the Mimico Creek; the narrow strip of the current study area, extending to the east toward the mouth of the Humber River, is largely unvegetated, or heavily manicured, and as such provides little real connection between the two rivers. Connectivity along this shoreline is potentially very important for migrating and dispersing fauna, allowing fauna to move between the two watersheds without having to attempt crossing the densely urbanised landscape that dominates the land just 50 metres away from the shoreline. ***The re-establishment of connectivity along this section of lake shore is vital to the enhancement of the jurisdiction's lake shore natural system***.

a) Improve natural habitat plantings along the mainland shoreline section of the study area. Manicured areas should be extensively planted with shrubs and trees to enhance the corridor potential of this area.

b) Encourage native plantings and provision of habitat cover among waterfront landowners through the stewardship program. Such actions will enhance the foraging and shelter opportunities for migrant songbirds.

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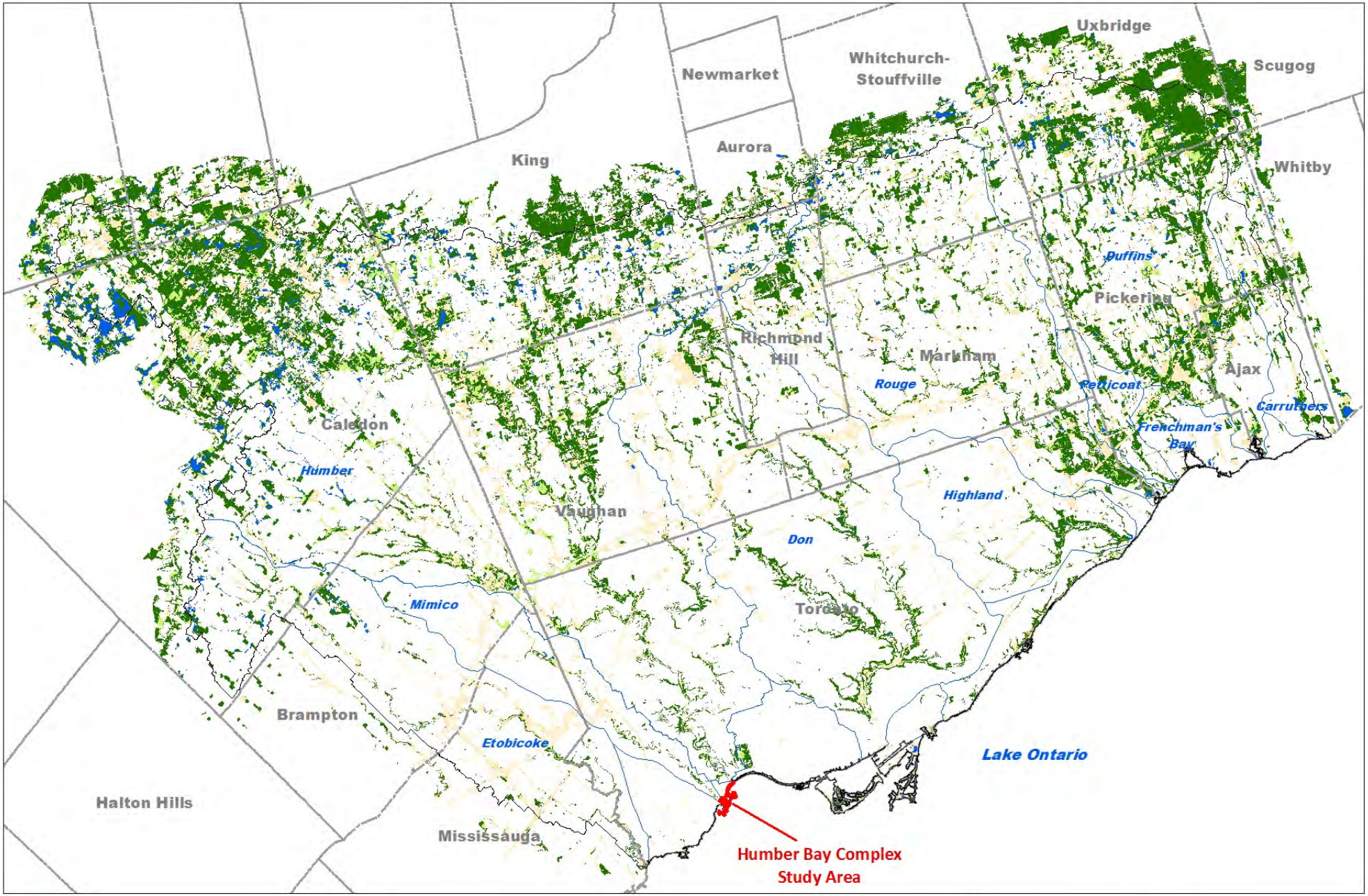


Toronto and Region Conservation for The Living City

N

0 2.5 5 10 15 20 Kilometers

Date: March, 2014

* Landscape analysis based on 2007/2008 Orthophotography

Map 1:
Humber Bay Complex in the Context of Regional Natural Cover

Legend

Natural Cover *
- Forest
- Successional
- Meadow
- Wetland
- Beach/Bluff

- Humber Bay Complex Study Area Boundary
- TRCA Jurisdiction
- Watershed
- Municipal Boundary

Toronto and Region Conservation for The Living City

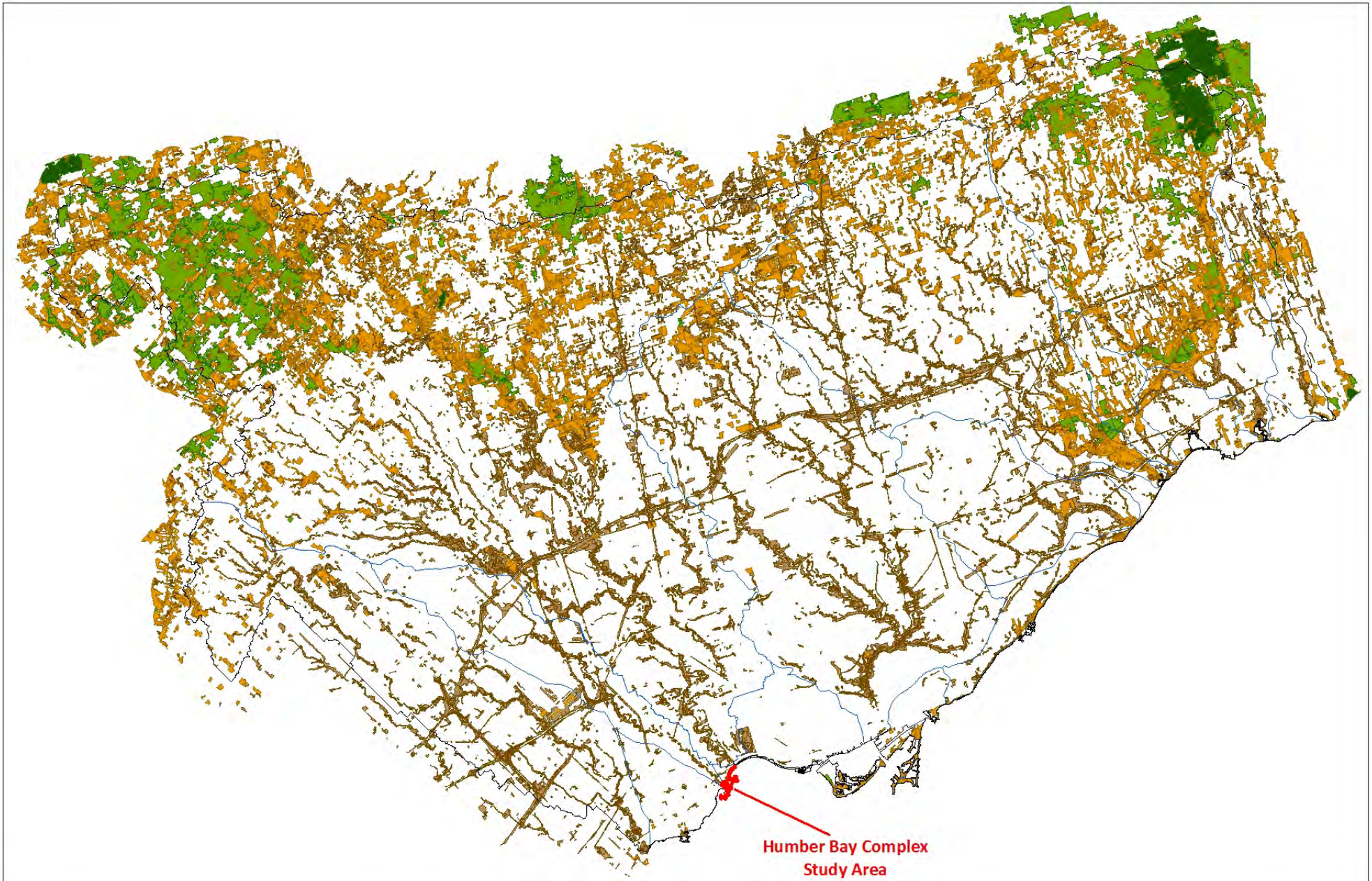
0 50 100 200 300 400 500 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.

Map 2: Humber Bay Complex Study Area

Legend

Humber Bay Complex Study Area Boundary



Toronto and Region Conservation
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0 2.5 5 10 15 20
Kilometers

Date: March, 2014

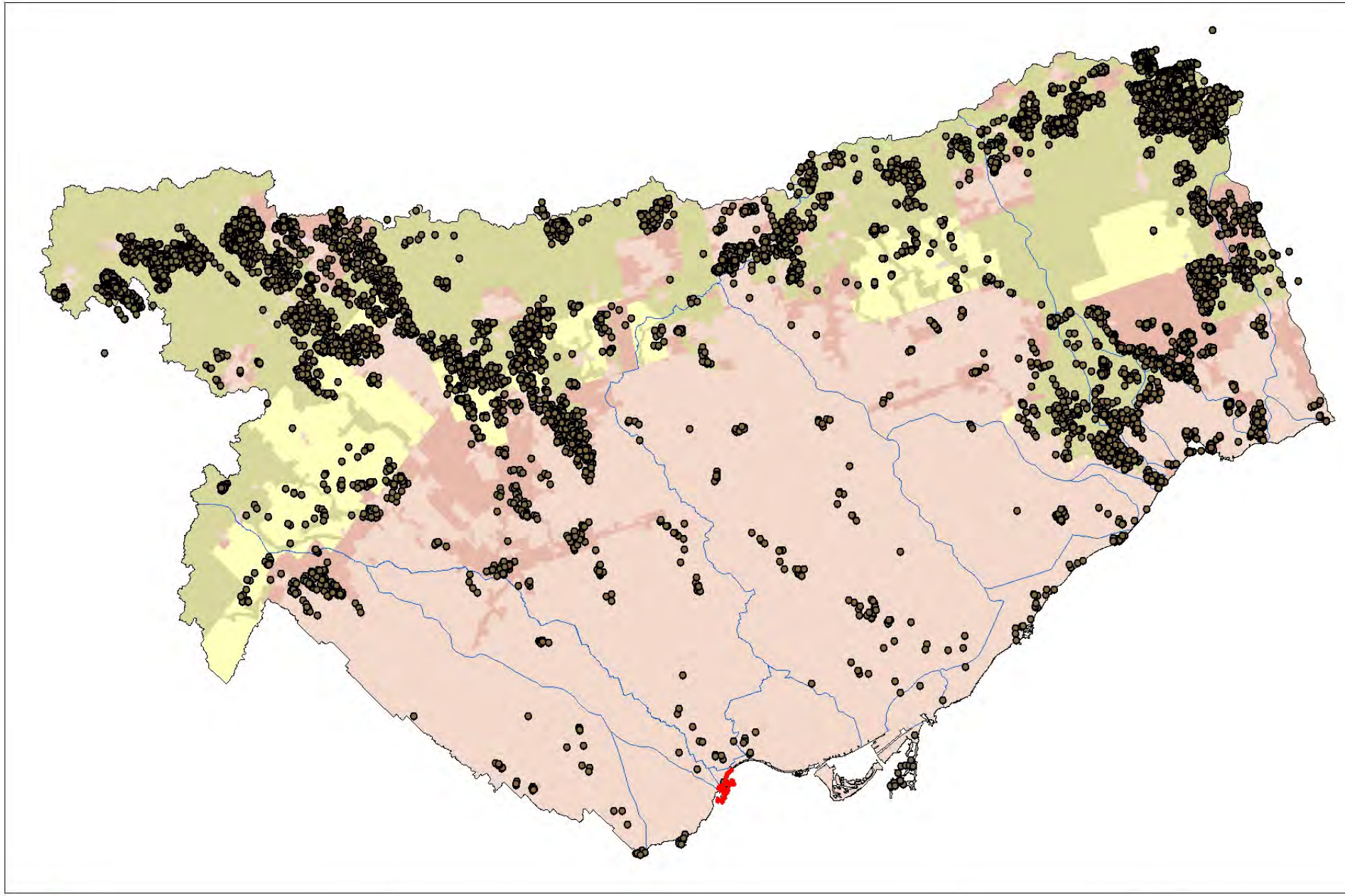
* Landscape analysis based on 20072008 Orthophotography

Map 3:
Regional Natural System
Habitat Patch Quality

Legend

Habitat Patch Quality *
- L1 - Excellent
- L2 - Good
- L3 - Fair
- L4 - Poor
- L5 - Very Poor

- Humber Bay Complex Study Area Boundary
- TRCA Jurisdiction
- Watershed



Toronto and Region Conservation
for The Living City

0 2.5 5 10 15 20
Kilometers

Date: March, 2014

Map 4:
Distribution of Fauna
Regional Species of Concern

Legend

- Fauna Species of Concern (L1 - L3)
- Humber Bay Complex Study Area Boundary
- TRCA Jurisdiction
- Watershed
- Agricultural & Rural Area
- Built-up Area
- Designated Greenfield Area
- Greenbelt 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

0 50 100 200 300 400 500 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.
* Landscape analysis based on 20072008 Orthophotography

Map 5: Habitat Patch Size Scores with Fauna Area Sensitivity Scores

Legend

Humber Bay Complex Study Area Boundary

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.

- Flora Species
- Planted Flora Species

Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.
* Landscape analysis based on 2007/2008 Orthophotography

Map 6: 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

Humber Bay Complex Study Area Boundary

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

0 50 100 200 300 400 500 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.
* Landscape analysis based on 2007-2008 Orthophotography

Map 7: 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

Humber Bay Complex Study Area Boundary

Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.
* Landscape analysis based on 2007/2008 Orthophotography

Map 8: Habitat Patch Quality

Legend

Habitat Patch Quality *

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

Humber Bay Complex Study Area Boundary

Toronto and Region Conservation *for* The Living City

N

0 50 100 200 300 400 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.

Map 9: Vegetation Communities with their Associated Local Ranks

Legend

Vegetation Community Ranks

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

Humber Bay Complex Study Area Boundary

NOTE: All vegetation communities with their associated scores and ranks can be found in Appendix #1.

Toronto and Region Conservation
for The Living City

N

0 50 100 200 300 400
Meters

Date: March, 2014

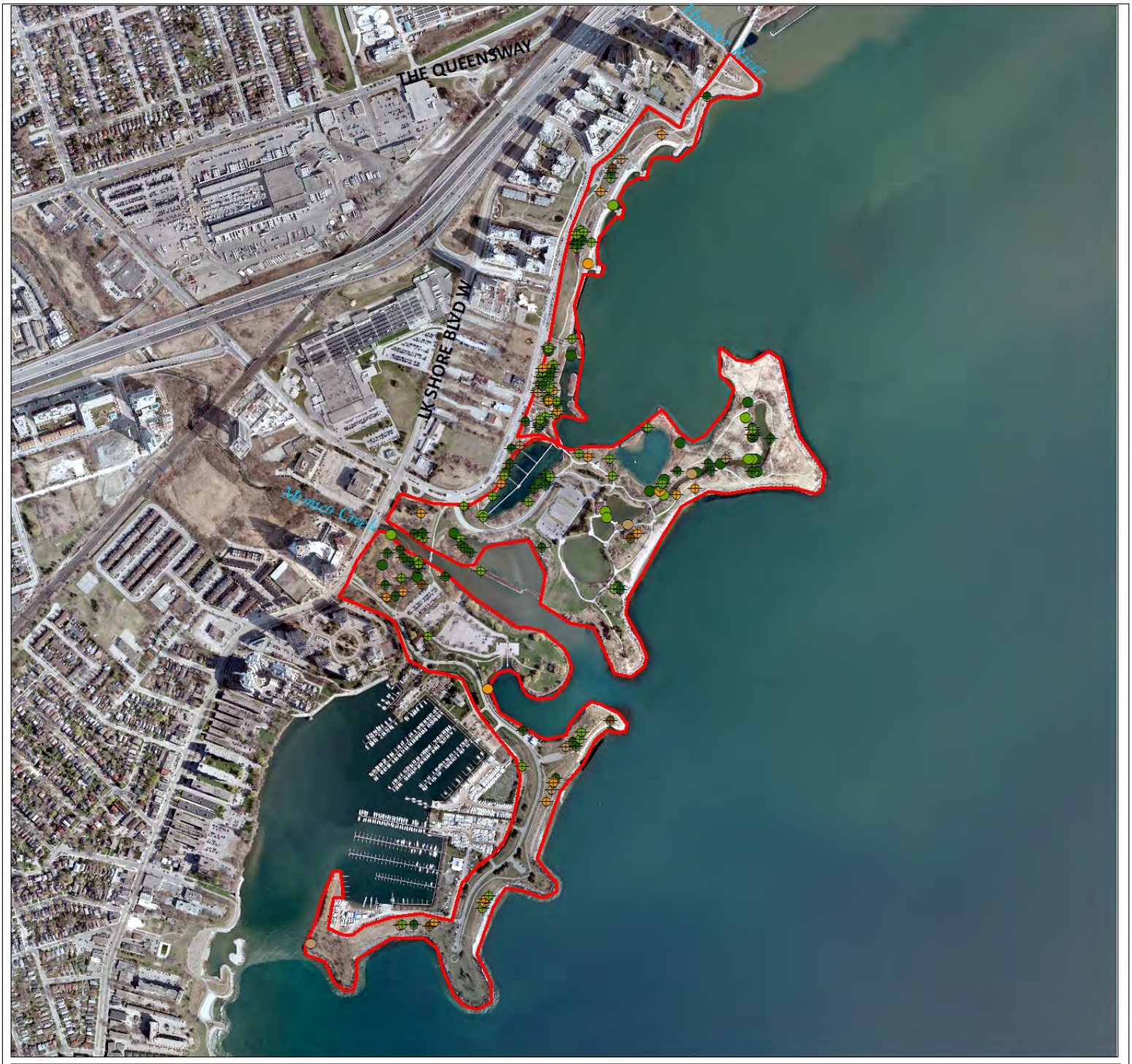
Orthophoto: Spring 2011, First Base Solutions Inc.

Map 10: Location of Flora Species of Concern

Legend

Flora Species of Concern (L1-L4)		Planted Flora Species of Concern (L1-L4)	
L1	L3	L1	L3
L2	L4	L2	L4

Humber Bay Complex Study Area Boundary



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

- Flora Species
- Planted Flora Species

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

0 50 100 200 300 400 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.

Map 11: Flora Species Habitat Dependence Scores

Legend

Humber Bay Complex Study Area Boundary

Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: March, 2014
Orthophoto: Spring 2011, First Base Solutions Inc.

Map 12: Locations of Fauna Species of Concern

Legend

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

Humber Bay Complex Study Area Boundary

Appendix 1: Humber Bay Vegetation Communities (2013)

ELC Code	Vegetation Type (* indicates present as inclusion and/or complex only)	Tot. area # ha	Scores			Local Rank (2012-08)	Occurs at Humber Bay Sections		
			Local Occur.	Geophy. Requir.	Total Score		Shores	East	West
	Forest								
CUP1-4	Poplar Deciduous Plantation	0.1	3.0	0.0	3.0	L5	√		
CUP1-A	Restoration Deciduous Plantation	2.8	2.0	0.0	2.0	L5	√	√	√
*CUP1-c	*Black Locust Deciduous Plantation		2.0	0.0	2.0	L+		√	
CUP1-f	Exotic Elm Deciduous Plantation	0.1	4.0	0.0	4.0	L+		√	
CUP2-G	Ash - Conifer Mixed Plantation	0.6	3.5	0.0	3.5	L5		√	√
CUP3-b	Austrian Pine Coniferous Plantation	0.8	3.5	0.0	3.5	L+		√	√
*CUP3-H	*Mixed Conifer Coniferous Plantation		1.5	0.0	1.5	L5		√	
	Successional								
CUT1-1	Sumac Deciduous Thicket	0.5	2.0	0.0	2.0	L5		√	√
CUT1-4	Grey Dogwood Deciduous Thicket	0.2	4.0	0.0	4.0	L4	√	√	
CUT1-A1	Native Deciduous Sapling Regeneration Thicket	0.6	2.0	0.0	2.0	L5	√	√	
CUT1-c	Exotic Deciduous Thicket	1.2	2.0	0.0	2.0	L+		√	√
CUT1-E	Red Osier Dogwood Deciduous Thicket	0.8	3.0	0.0	3.0	L4	√		√
CUT1-G	Willow Deciduous Thicket	0.6	4.0	0.0	4.0	L4	√	√	√
CUS1-A1	Native Deciduous Successional Savannah	4.1	1.5	0.0	1.5	L5		√	
CUW1-A3	Native Deciduous Successional Woodland	0.8	1.0	0.0	1.0	L5		√	
CUW1-A4	Fresh-Moist Cottonwood Tall Treed Woodland	0.9	4.0	2.0	6.0	L3		√	√
CUW1-b	Exotic Successional Woodland	1.1	1.5	0.0	1.5	L+		√	√
	Wetland								
SWT2-2	Willow Mineral Thicket Swamp	1.4	2.0	2.0	4.0	L4		√	√
MAS2-1b	Hybrid Cattail Mineral Shallow Marsh	0.6	2.0	0.0	2.0	L+		√	√
MAS2-7	Bur-reed Mineral Shallow Marsh	0.2	3.5	2.0	5.5	L3		√	
MAS2-9	Forb Mineral Shallow Marsh	0.1	2.5	1.0	3.5	L4			√
MAS2-a	Common Reed Mineral Shallow Marsh	0.4	3.0	0.0	3.0	L+		√	
	Aquatic								
SAS1-1	Pondweed Submerged Shallow Aquatic	1.4	2.0	2.0	4.0	L4		√	
SAS1-4	Water Milfoil Submerged Shallow Aquatic	2.1	3.0	1.0	4.0	L4		√	
*OAO1-T	*Turbid Open Aquatic (disturbed unvegetated)		2.0	0.0	2.0	L+		√	

Appendix 1: Humber Bay Vegetation Communities (2013)

ELC Code	Vegetation Type (* indicates present as inclusion and/or complex only)	Tot. area # ha	Scores			Local Rank (2012-08)	Occurs at Humber Bay Sections		
			Local Occur.	Geophy. Requir.	Total Score		Shores	East	West
	Dynamic (Beach, Bluff, Barren, Prairie, Savannah)								
BBO1	Mineral Open Beach	0.5	3.5	2.0	5.5	L3	√		√
BBO1-A	Open Riparian Sand / Gravel Bar	0.1	4.0	2.0	6.0	L5			√
BBO2-A	Rubble Open Shoreline	3.1	3.5	0.0	3.5	L5	√	√	√
BBT1-A	Mineral Treed Beach	0.5	4.5	2.0	6.5	L2		√	
BBT2-A	Rubble Treed Shoreline	3.0	5.0	0.0	5.0	L5		√	√
TPO2-A	Fresh-Moist Tallgrass Prairie Planting	1.0	4.0	1.0	5.0	L5	√	√	
	Meadow								
CUM1-A	Native Forb Meadow	2.2	1.5	0.0	1.5	L5	√	√	
CUM1-c	Exotic Forb Meadow	0.1	1.5	0.0	1.5	L+		√	

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Heteranthera dubia	water star-grass	5	3	5	5	18	L2	x		
Carex alopecoidea	foxtail wood sedge	2	3	5	4	14	L3		x	
Carex molesta	troublesome sedge	3	3	4	4	14	L3		x	
Schoenoplectus acutus var. *acutus*	hard-stemmed bulrush	3	3	5	4	15	L3			x
Teucrium canadense ssp. *canadense*	wood-sage	3	3	4	4	14	L3	x	x	
Betula papyrifera	paper birch	1	4	2	4	11	L4		xpr	x
Calystegia sepium ssp. *americana*	pink hedge bindweed	5	2	3	2	12	L4	x	x	x
Carex hystericina	porcupine sedge	2	3	2	5	12	L4		x	
Cicuta bulbifera	bulblet-bearing water-hemlock	2	3	4	3	12	L4		x	
Crataegus submollis	Emerson's hawthorn	2	3	4	3	12	L4		x	
Elodea cf. *canadensis*	common water-weed	2	3	5	3	13	L4		x cf.	
Equisetum variegatum ssp. *variegatum*	variegated scouring-rush	2	2	5	4	13	L4		x	
Eupatorium perfoliatum	boneset	1	3	4	3	11	L4	x	x	x
Prunella vulgaris ssp. *lanceolata*	heal-all (native)	4	2	3	2	11	L4		x	
Rorippa palustris ssp. *palustris*	Fernald's marsh cress	3	2	4	2	11	L4			x
Sagittaria latifolia	common arrowhead	2	2	5	4	13	L4		x	
Salix amygdaloides	peach-leaved willow	1	2	5	3	11	L4	x	x	x
Schoenoplectus pungens var. *pungens*	three-square	3	2	5	3	13	L4		x	xpr
Spirodela polyrhiza	greater duckweed	1	4	5	3	13	L4		x	
Symphyotrichum oolentangiense	sky-blue aster	3	1	4	3	11	L4		x	
Achillea millefolium ssp. *lanulosa*	woolly yarrow	3	2	0	1	6	L5	x		
Ambrosia artemisiifolia	common ragweed	2	1	3	0	6	L5		x	x
Anemone canadensis	Canada anemone	2	2	2	2	8	L5	x	x	xpr
Apocynum cannabinum var. *cannabinum*	hemp dogbane	3	2	2	2	9	L5	x		
Asclepias syriaca	common milkweed	2	2	0	2	6	L5	x	x	x
Bidens frondosa	common beggar's-ticks	2	1	4	0	7	L5	x	x	
Carex bebbii	Bebb's sedge	2	2	3	3	10	L5		x	
Carex cristatella	crested sedge	2	2	4	1	9	L5		x	
Carex granularis	meadow sedge	3	2	1	3	9	L5	x	x	
Carex vulpinoidea	fox sedge	2	2	4	1	9	L5	x	x	
Cornus foemina ssp. *racemosa*	grey dogwood	3	2	3	2	10	L5	xpr	x	xpr
Cornus stolonifera	red osier dogwood	2	2	0	3	7	L5	x	x	x
Eleocharis erythropoda	creeping spike-rush	2	2	4	1	9	L5		x	x
Equisetum arvense	field horsetail	2	2	1	1	6	L5	x	x	x
Equisetum hyemale ssp. *affine*	scouring-rush	2	2	2	2	8	L5		x	
Erigeron annuus	daisy fleabane	2	2	0	1	5	L5	x		
Erigeron canadensis	horse-weed	3	1	2	0	6	L5	x		
Euthamia graminifolia	grass-leaved goldenrod	2	1	4	1	8	L5		x	

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Fraxinus americana	white ash	2	2	0	3	7	L5		x	x
Fraxinus pennsylvanica	red ash	1	2	0	3	6	L5	x	x	x
Galium palustre	marsh bedstraw	2	2	3	3	10	L5		x	x
Helianthus tuberosus	Jerusalem artichoke	3	1	2	0	6	L5		x	
Impatiens capensis	orange touch-me-not	2	2	0	2	6	L5	x	x	x
Juglans nigra	black walnut	2	1	2	1	6	L5		x	x
Juncus dudleyi	Dudley's rush	2	2	3	1	8	L5		x	
Juniperus virginiana	red cedar	2	2	4	2	10	L5	xp	x	xp
Lemna cf. *minor*	common duckweed	2	2	4	2	10	L5		x cf.	x cf.
Oenothera biennis	common evening-primrose	2	1	1	1	5	L5	x	x	
Oxalis stricta	common yellow wood-sorrel	5	1	1	1	8	L5			x
Parthenocissus inserta	thicket creeper	2	2	0	1	5	L5		x	x
Persicaria lapathifolia	pale smartweed	3	1	4	0	8	L5			x
Plantago rugelii	red-stemmed plantain	3	2	0	1	6	L5		x	
Poa palustris	fowl meadow-grass	2	2	3	2	9	L5		x	x
Populus balsamifera	balsam poplar	2	2	3	2	9	L5		x	x
Populus deltoides	cottonwood	2	1	4	1	8	L5	x	x	x
Potentilla anserina ssp. *anserina*	silverweed	3	2	3	2	10	L5	x	x	x
Prunus serotina	black cherry	2	2	0	2	6	L5		x	x
Prunus virginiana var. *virginiana*	choke cherry	2	2	0	1	5	L5	x	x	x
Rhus typhina	staghorn sumach	2	1	2	2	7	L5	xpr	x	x
Rubus odoratus	purple-flowering raspberry	2	2	2	2	8	L5	x		xp
Salix eriocephala	narrow heart-leaved willow	2	1	3	1	7	L5	x	x	
Salix interior	sandbar willow	2	1	5	2	10	L5	x	x	x
Sambucus canadensis	common elderberry	2	3	2	2	9	L5	x	x	
Scirpus atrovirens	black-fruited bulrush	2	2	4	2	10	L5		x	
Scutellaria galericulata	common skullcap	3	2	3	2	10	L5	x		
Solidago altissima	tall goldenrod	2	2	0	0	4	L5	x	x	x
Solidago canadensis var. *canadensis*	Canada goldenrod	2	2	0	1	5	L5		x	
Solidago gigantea	late goldenrod	3	1	1	1	6	L5		x	
Symphyotrichum cordifolium	heart-leaved aster	2	1	0	2	5	L5	x		
Symphyotrichum ericoides var. *ericoides*	heath aster	2	1	2	1	6	L5	x	x	x
Symphyotrichum lanceolatum var. *lanceolatum*	panicled aster	2	2	3	1	8	L5	x	x	x
Symphyotrichum lateriflorum var. *lateriflorum*	calico aster	2	2	3	2	9	L5		x	
Symphyotrichum novae-angliae	New England aster	2	2	2	1	7	L5	x	x	x
Ulmus americana	white elm	2	4	0	2	8	L5		x	x
Urtica dioica ssp. *gracilis*	American stinging nettle	2	3	2	2	9	L5	x		
Verbena hastata	blue vervain	2	2	4	2	10	L5	x		

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Vitis riparia	riverbank grape	2	1	0	0	3	L5	x	x	x
Xanthium strumarium	clotbur	3	1	4	0	8	L5			x
Fragaria virginiana ssp. *virginiana*	common wild strawberry	4		5	0	9	L5?	x		
Acer platanoides	Norway maple	4				4	L+	x	x	x
Achillea millefolium ssp. *millefolium*	European yarrow	4				4	L+	x		
Ailanthus altissima	tree-of-heaven	5				5	L+	x	x	
Alcea rosea	hollyhock	5				5	L+	x		
Alliaria petiolata	garlic mustard	4				4	L+	x	x	x
Alnus glutinosa	European alder	5				5	L+	x	x	
Alnus glutinosa x *incana* ssp. *rugosa*	hybrid European - speckled alder	5				5	L+		x	
Alopecurus pratensis	meadow foxtail	4				4	L+		x	x
Arctium lappa	great burdock	4				4	L+	x	x	
Arctium minus	common burdock	5				5	L+	x	x	x
Arenaria serpyllifolia	thyme-leaved sandwort	4				4	L+	x		x
Artemisia vulgaris	common mugwort	5				5	L+			x
Barbarea vulgaris	winter cress	4				4	L+		x	x
Bromus inermis	smooth brome grass	4				4	L+	x	x	x
Bromus japonicus	Japanese chess	5				5	L+	x		
Bromus tectorum	downy chess	5				5	L+	x	x	x
Campanula rapunculoides	creeping bellflower	4				4	L+	x	x	x
Capsella bursa-pastoris	shepherd's purse	3				3	L+	x		x
Carduus acanthoides	plumeless thistle	5				5	L+	x		
Carduus nutans ssp. *nutans*	nodding thistle	4				4	L+	x	x	
Carex spicata	spiked sedge	5				5	L+		x	
Celastrus orbiculatus	oriental bittersweet	3				3	L+	x	x	x
Centaurea jacea	brown knapweed	5				5	L+	x	x	x
Centaurea stoebe ssp. *micranthos*	spotted knapweed	5				5	L+	x		
Centaurium pulchellum	branching centaury	5				5	L+		x	
Cerastium fontanum	mouse-ear chickweed	3				3	L+	x	x	
Cerastium tomentosum	snow-on-the-mountain	5				5	L+			x
Chenopodium album	lamb's quarters	5				5	L+		x	x
Chenopodium glaucum	oak-leaved goosefoot	4				4	L+			x
Cichorium intybus	chicory	5				5	L+	x	x	x
Cirsium arvense	creeping thistle	4				4	L+	x	x	x
Cirsium vulgare	bull thistle	4				4	L+	x	x	
Convolvulus arvensis	field bindweed	3				3	L+	x	x	x
Cucumis melo	melon	5				5	L+	x		
Cynanchum rossicum	dog-strangling vine	4				4	L+		x	x

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Cynoglossum officinale	hound's tongue	5				5	L+			x
Cyperus fuscus	brown umbrella-sedge	5				5	L+			x
Dactylis glomerata	orchard grass	4				4	L+	x	x	x
Daucus carota	Queen Anne's lace	4				4	L+	x	x	x
Digitaria ischaemum	smooth crab grass	5				5	L+	x		
Dipsacus fullonum	teasel	5				5	L+	x		
Echinochloa crus-galli	barnyard grass	5				5	L+		x	x
Echium vulgare	viper's bugloss	3				3	L+	x	x	x
Elaeagnus angustifolia	Russian olive	4				4	L+	x	x	x
Elaeagnus umbellata	autumn olive	5				5	L+		x	x
Elymus repens	quack grass	5				5	L+	x	x	x
Epilobium hirsutum	European willow-herb	5				5	L+		x	x
Epipactis helleborine	helleborine	5				5	L+		x	
Euonymus europaeus	European spindle-tree	4				4	L+	xp	x	x
Fallopia japonica var. *japonica*	Japanese knotweed	4				4	L+	x	x	
Festuca rubra ssp. *rubra*	red fescue	5				5	L+	x	x	x
Fraxinus excelsior	European ash	4				4	L+			x
Geum urbanum	urban avens	4				4	L+	x	x	x
Glechoma hederacea	creeping Charlie	4				4	L+		x	
Helianthus annuus	common sunflower	5				5	L+	x		
Hemerocallis fulva	orange day-lily	5				5	L+		x	x
Hesperis matronalis	dame's rocket	4				4	L+		x	x
Hordeum jubatum ssp. *jubatum*	squirrel-tail barley	4				4	L+	x	x	
Hypericum perforatum	common St. John's-wort	4				4	L+	x	x	x
Iris pseudacorus	yellow flag	5				5	L+	x	x	x
Juncus compressus	round-fruited rush	4				4	L+		x	x
Lactuca serriola	prickly lettuce	3				3	L+	x		x
Lathyrus latifolius	everlasting pea	5				5	L+		x	
Leonurus cardiaca ssp. *cardiaca*	motherwort	4				4	L+		x	x
Lepidium campestre	field pepper-grass	5				5	L+	x	x	x
Leucanthemum vulgare	ox-eye daisy	2				2	L+	x		x
Linaria vulgaris	butter-and-eggs	5				5	L+	x		x
Lolium perenne	perennial rye	4				4	L+	x	x	
Lonicera morrowii	Morrow's honeysuckle	5				5	L+	x	x	x
Lonicera x *bella*	shrub honeysuckle	4				4	L+	x	x	x
Lonicera xylosteum	European fly honeysuckle	4				4	L+	x	x	x
Lotus corniculatus	bird's foot trefoil	4				4	L+	x	x	x
Lycopus europaeus	European water-horehound	5				5	L+	x	x	x

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Lythrum salicaria	purple loosestrife	4				4	L+	x	x	x
Malus pumila	apple	4				4	L+	x	x	x
Malus sp.	ornamental crabapple						L+			x
Matricaria discoidea	pineappleweed	4				4	L+		x	x
Medicago lupulina	black medick	5				5	L+	x	x	x
Medicago sativa ssp. *sativa*	alfalfa	5				5	L+	x		
Melilotus albus	white sweet clover	4				4	L+	x	x	x
Melilotus officinalis	yellow sweet clover	5				5	L+	x	x	
Mentha spicata	spear mint	4				4	L+			x
Mentha x *gentilis*	red mint	5				5	L+		x	x
Morus alba	white mulberry	5				5	L+		x	x
Myosotis scorpioides	true forget-me-not	4				4	L+		x	x
Myosotis sylvatica	woodland forget-me-not	3				3	L+	x	x	x
Myriophyllum spicatum	Eurasian water-milfoil	5				5	L+	x	x	x
Nepeta cataria	catnip	5				5	L+	x		x
Panicum dichotomiflorum	fall panic grass	5				5	L+		x	
Pastinaca sativa	wild parsnip	5				5	L+	x		
Persicaria maculosa	lady's thumb	5				5	L+			x
Phleum pratense	Timothy grass	4				4	L+	x	x	x
Phragmites australis ssp. *australis*	common reed	4				4	L+	x	x	x
Pilosella caespitosa	yellow hawkweed	5				5	L+		x	
Plantago lanceolata	English plantain	5				5	L+	x	x	x
Plantago major	common plantain	2				2	L+	x	x	x
Poa compressa	flat-stemmed blue grass	4				4	L+	x	x	
Poa pratensis ssp. *pratensis*	Kentucky blue grass	4				4	L+	x	x	x
Polygonum achoreum	striate knotweed	5				5	L+		x	
Polygonum aviculare	prostrate knotweed	5				5	L+	x	x	x
Populus alba	white poplar	5				5	L+	x		
Potamogeton crispus	curly pondweed	5				5	L+		x	
Potentilla argentea	silvery cinquefoil	5				5	L+	x	x	
Potentilla inclinata	lintermediate cinquefoil	5				5	L+		x	x
Potentilla recta	sulphur cinquefoil	5				5	L+	x	x	x
Prunella vulgaris ssp. *vulgaris*	heal-all (European)	5				5	L+			x
Prunus avium	mazzard cherry	4				4	L+	x		x
Prunus tomentosa	Manchu cherry	5				5	L+			x
Puccinellia distans	alkali grass	4				4	L+		x	
Pyrus communis	pear	3				3	L+			x
Ranunculus acris	tall buttercup	4				4	L+		x	

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Rhamnus cathartica	common buckthorn	4				4	L+	x	x	x
Robinia pseudoacacia	black locust	3				3	L+	x	x	
Rosa canina	dog rose	4				4	L+	x	x	x
Rosa multiflora	multiflora rose	4				4	L+			x
Rumex crispus	curly dock	5				5	L+	x	x	x
Rumex maritimus	golden dock	5				5	L+		x	
Salix alba	white willow	5				5	L+	x	x	x
Salix matsudana	corkscrew willow	5				5	L+	x		x
Salix purpurea	purple-osier willow	4				4	L+	x		x
Salix viminalis	basket willow	5				5	L+	x		
Salix x *fragilis*	crack willow	3				3	L+	x	x	x
Salix x *sepulcralis*	weeping willow	5				5	L+		x	xpr
Schedonorus pratensis	meadow fescue	4				4	L+	x	x	x
Scrophularia nodosa	European figwort	5				5	L+	x		
Securigera varia	crown vetch	5				5	L+	x	x	
Sedum acre	mossy stonecrop	4				4	L+			x
Silene latifolia	evening lychnis	4				4	L+			x
Silene vulgaris	bladder campion	3				3	L+	x		
Sisymbrium altissimum	tumble mustard	5				5	L+	x		
Solanum dulcamara	bittersweet nightshade	4				4	L+	x	x	x
Sonchus arvensis ssp. *arvensis*	glandular perennial sow-thistle	5				5	L+		x	x
Sorbaria sorbifolia	false spiraea	4				4	L+		x	
Sorbus aucuparia	European mountain-ash	5				5	L+		x	x
Stachys cf. *palustris*	marsh hedge-nettle	3	3	4	3	13	L+		x cf.	x cf.
Stellaria graminea	grass-leaved chickweed	5				5	L+		x	
Syringa vulgaris	common lilac	4				4	L+		x	xpr
Tanacetum vulgare	tansy	5				5	L+	x	x	
Taraxacum officinale	dandelion	4				4	L+	x	x	x
Thlaspi arvense	penny-cress	5				5	L+			x
Tilia cordata	little-leaf linden	5				5	L+	xp		x
Torilis japonica	hedge-parsley	5				5	L+	x	x	x
Tragopogon dubius	lemon-yellow goat's beard	3				3	L+	x		x
Tragopogon pratensis	meadow goat's beard	3				3	L+	x	x	x
Trifolium hybridum	alsike clover	3				3	L+	x	x	
Trifolium pratense	red clover	5				5	L+	x	x	x
Trifolium repens	white clover	5				5	L+	x	x	x
Tripleurospermum inodorum	scentless chamomile	5				5	L+	x		x
Tussilago farfara	coltsfoot	4				4	L+			x

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Typha angustifolia	narrow-leaved cattail	3				3	L+		x	x
Typha x *glauca*	hybrid cattail	3				3	L+		x	x
Ulmus glabra	Scotch elm	5				5	L+	x	x	x
Ulmus pumila	Siberian elm	4				4	L+	x	x	x
Verbascum thapsus	common mullein	4				4	L+			x
Veronica arvensis	corn speedwell	4				4	L+		x	x
Veronica chamaedrys	germander speedwell	5				5	L+		x	
Veronica serpyllifolia ssp. *serpyllifolia*	thyme-leaved speedwell	5				5	L+			x
Viburnum lantana	wayfaring tree	3				3	L+	x	x	
Viburnum opulus ssp. *opulus*	European highbush cranberry	4				4	L+	x	x	x
Vicia cracca	cow vetch	4				4	L+	x	x	x
Acer negundo	Manitoba maple	4	0	0	2	6	L+?	x	x	x
Agrostis stolonifera	creeping bent grass	5				5	L+?		x	x
Atriplex prostrata	spreading orache	5				5	L+?		x	
Lepidium densiflorum	common pepper-grass	4				4	L+?	x		
Phalaris arundinacea	reed canary grass	3				3	L+?	x	x	x
Aronia melanocarpa	black choke-berry	3	5	5	4	17	pL2			xp
Pinus resinosa	red pine	2	5	5	5	17	pL2			xp
Schizachyrium scoparium	little bluestem	4	4	5	5	18	pL2	xp		
Anaphalis margaritacea	pearly everlasting	3	4	4	3	14	pL3	xp		
Hamamelis virginiana	witch-hazel	2	4	4	4	14	pL3			xp
Physocarpus opulifolius	ninebark	3	2	5	4	14	pL3	xp		xp
Picea glauca	white spruce	1	5	4	4	14	pL3		xp	xp
Salix lucida	shining willow	2	4	5	3	14	pL3		xp	
Acer rubrum	red maple	2	4	1	5	12	pL4	xp		
Acer saccharum ssp. *nigrum*	black maple	2	3	4	2	11	pL4			xp
Amelanchier arborea	downy serviceberry	3	2	4	3	12	pL4	xp		xp
Pinus strobus	white pine	1	4	3	4	12	pL4	xp	xp	xp
Quercus macrocarpa	bur oak	2	4	3	3	12	pL4	xp	xp	xp
Quercus rubra	red oak	1	4	2	4	11	pL4	xp		
Salix bebbiana	Bebb's willow	2	3	3	4	12	pL4		xp	
Salix discolor	pussy willow	2	3	4	3	12	pL4		xp	
Thuja occidentalis	white cedar	1	4	1	5	11	pL4		xp	xp
Typha latifolia	broad-leaved cattail	1	4	4	4	13	pL4		xp	
Acer saccharum ssp. *saccharum*	sugar maple	2	3	0	2	7	pL5			xp
Ostrya virginiana	ironwood	2	3	2	2	9	pL5	xp		
Asclepias tuberosa	butterfly milkweed	5	2	5	5	17	pLX	xp		
Acer tataricum ssp. *ginnala*	Amur maple	4	0	0	2	6	pL+			xp

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Celtis occidentalis	hackberry	5				5	pL+	xp		
Coreopsis lanceolata	lance-leaved coreopsis	5				5	pL+	xp		
Gleditsia triacanthos	honey locust	5				5	pL+	xp		xp
Gymnocladus dioicus	Kentucky coffee-tree	5				5	pL+		xp	
Hibiscus moscheutos	swamp rose-mallow	5	4	5	4	18	pL+?	xp		
Hypericum kalmianum	Great Lakes St. John's-wort						pL+		xp	
Morella pensylvanica	bayberry	5				5	pL+	xp	xp	
Picea abies	Norway spruce	5				5	pL+		xp	xp
Picea pungens	Colorado spruce	5				5	pL+			xp
Pinus nigra	Austrian pine	5				5	pL+		xp	xp
Potentilla fruticosa	shrubby cinquefoil						pL+		xp	
Quercus bicolor	swamp white oak						pL+	xp		
Quercus palustris	pin oak						pL+	xp	xp	
Salix caprea	goat willow	5				5	pL+	xp		xp
Salix cinerea	grey willow	5				5	pL+		xp	
Salix pentandra	laurel willow	5				5	pL+		xp	xp
Syringa cf. x *prestoniae*	Preston lilac	5				5	pL+			xp cf.
Taxus x *media*	hybrid yew						pL+		xp	
Tulipa x *hybrida*	garden tulip	5				5	pL+	xp		
Ulmus minor ssp. *minor*	smooth-leaved elm						pL+		xp	
Viburnum recognitum	southern arrow-wood	5				5	pL+		xp	
Ceanothus americanus	New Jersey tea	5	5	4	5	19	prL1	xpr		
Heliopsis helianthoides	ox-eye	5	5	4	4	18	prL2	xpr		
Liatris spicata	spike blazing-star	5	3	5	5	18	prL2	xpr		
Packera paupercula	balsam ragwort	5	3	4	5	17	prL2	xpr		
Rosa carolina	pasture rose	5	5	4	3	17	prL2	xpr	xpr	
Sorghastrum nutans	Indian grass	4	4	5	4	17	prL2	xpr	xpr	
Acorus americanus	sweet flag	3	3	5	4	15	prL3		xpr	
Andropogon gerardii	big bluestem	3	3	4	4	14	prL3	xpr	xpr	
Bolboschoenus fluviatilis	river bulrush	3	2	5	4	14	prL3		xpr	
Carex brevior	short-fruited sedge	3	3	4	4	14	prL3	xpr		
Cornus amomum ssp. *obliqua*	silky dogwood	3	3	5	3	14	prL3	xpr		xpr
Helianthus divaricatus	woodland sunflower	4	3	4	4	15	prL3	xpr		xp
Hypericum ascyron	great St. John's-wort	3	4	5	2	14	prL3	xpr		
Iris versicolor	blue flag	2	5	4	5	16	prL3		xpr	
Iris virginica var. *shrevei*	southern blue flag	5	2	4	3	14	prL3	xpr		xp
Panicum virgatum	switch grass	3	2	5	5	15	prL3	xpr	xpr	
Penstemon digitalis	foxglove beard-tongue	3	3	4	4	14	prL3	xpr		

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Persicaria amphibia var. *stipulacea*	water smartweed	5	2	4	4	15	prL3		xpr	xpr
Pycnanthemum virginianum	Virginia mountain-mint	5	2	5	3	15	prL3	xpr		
Scirpus pendulus	drooping bulrush	3	4	5	4	16	prL3	xpr		
Sparganium eurycarpum	great bur-reed	2	4	5	4	15	prL3		xpr	xpr
Spartina pectinata	prairie cord grass	4	3	5	3	15	prL3		xpr	
Symphyotrichum laeve var. *laeve*	smooth aster	4	4	4	2	14	prL3	xpr		
Verbena stricta	hoary vervain	3	5	4	4	16	prL3	xpr		
Acer saccharinum	silver maple	1	2	5	3	11	prL4	xp	xpr	xpr
Apocynum androsaemifolium	spreading dogbane	2	3	2	4	11	prL4	xpr	xpr	
Asclepias incarnata ssp. *incarnata*	swamp milkweed	2	3	4	4	13	prL4		xpr	
Calamagrostis canadensis	Canada blue joint	2	3	4	4	13	prL4	xpr		
Carex lacustris	lake-bank sedge	2	3	3	4	12	prL4	xpr		
Desmodium canadense	showy tick-trefoil	3	2	3	3	11	prL4	xpr		
Diervilla lonicera	bush honeysuckle	2	3	2	4	11	prL4	xpr		xp
Elymus canadensis	Canada wild rye	3	2	5	3	13	prL4	xpr		
Juncus arcticus ssp. *balticus*	Baltic rush	3	2	5	2	12	prL4	xpr		
Juncus effusus	soft rush	1	4	4	3	12	prL4		xpr	
Prunus pensylvanica	pin cherry	2	4	3	3	12	prL4			xpr
Rosa blanda	smooth wild rose	2	3	3	4	12	prL4	xpr		
Rudbeckia hirta	black-eyed Susan	1	4	4	3	12	prL4	xpr	xpr	
Salix petiolaris	slender willow	2	3	5	3	13	prL4		xpr	
Schoenoplectus tabernaemontani	soft-stemmed bulrush	1	2	5	3	11	prL4		xpr	
Spiraea alba	wild spiraea	2	4	4	3	13	prL4	xp	xpr	
Monarda fistulosa	wild bergamot	2	3	2	3	10	prL5	xpr	xpr	
Populus tremuloides	trembling aspen	2	3	1	3	9	prL5	xpr	xpr	xpr
Silphium perfoliatum	cup-plant	4	1	3	2	10	prL5	xpr	xpr	
Tilia americana	basswood	2	3	2	3	10	prL5		xpr	xp
Viburnum lentago	nannyberry	2	3	1	2	8	prL5	xpr	xpr	xp
Helianthus giganteus	tall sunflower	5	2	4	3	14	prLX	xpr		
Solidago rigida ssp. *rigida*	stiff goldenrod	5	5	5	4	19	prLX	xpr		
Bouteloua curtipendula	side-oats grama						prL+		xpr	
Caragana arborescens	Siberian pea-shrub	5				5	prL+			xpr
Coreopsis tripteris	tall tickseed						prL+	xpr		
Cotoneaster acutifolius	Peking cotoneaster	5				5	prL+			xpr
Cotoneaster dammeri	bearberry cotoneaster						prL+			xpr
Elaeagnus commutata	silver-berry	5				5	prL+			xpr
Geum triflorum	prairie smoke						prL+	xpr		
Hippophae rhamnoides	sea-buckthorn	5				5	prL+		xpr	

Appendix 2: Humber Bay Flora Species (2013)		Local	Popn.	Hab.	Sens.	Total	Rank	Occurs at		
		Occur.	Trend	Dep.	Dev.	Score	TRCA	Humber Bay Sections		
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(08/2012)	Shores	East	West
Persicaria orientalis	prince's feather	5				5	prL+		xpr	
Populus x *canadensis*	Carolina poplar	4				4	prL+		xpr	
Ratibida columnifera	prairie coneflower	5				5	prL+	xpr		
Ratibida pinnata	grey-headed coneflower	5				5	prL+	xpr	xpr	
Rhus aromatica	fragrant sumach	5				5	prL+	xpr	xpr	xp
Rhus glabra	smooth sumach	5				5	prL+			xpr
Rosa rugosa	wrinkled rose	5				5	prL+	xpr		
Silphium integrifolium	rosinweed						prL+	xpr		
Vernonia gigantea	tall ironweed						prL+	xpr		
Physalis longifolia var. *subglabrata*	smooth ground-cherry	5	5	3	4	17	prL+?		xpr	
Rosa virginiana	Virginia rose	5				5	prL+?	xpr	xpr	xpr

Appendix 3: Fauna List for Humber Bay Complex, 2004 - 2013.

Common Name	Code	Scientific Name	East	West	Shore	LO	PTn	PTt	AS	PIS	HD	StD	+	TS	Rank
Survey Species: species for which the TRCA protocol effectively surveys.															
Birds															
hooded merganser	HOME	*Lophodytes cucullatus*	1			2	2	2	4	2	2	2	0	16	**L3**
red-necked grebe	RNGR	*Podiceps grisegena*	1			5	2	1	3	1	3	4	0	19	**L3**
barn swallow	BARS	*Hirundo rustica*	1	2		0	2	3	1	1	2	1	0	10	**L4**
belted kingfisher	BEKI	*Ceryle alcyon*		1		0	3	2	2	1	2	2	0	12	**L4**
cliff swallow	CLSW	*Petrochelidon pyrrhonota*			off-site	1	2	2	1	1	2	1	0	10	**L4**
eastern kingbird	EAKI	*Tyrannus tyrannus*	2	2		0	4	2	2	1	1	3	0	13	**L4**
gadwall	GADW	*Anas strepera*	1		1	4	1	2	1	2	1	3	0	14	**L4**
great-crested flycatcher	GCFL	*Myiarchus crinitus*	1			0	2	2	3	1	2	2	0	12	**L4**
grey catbird	GRCA	*Dumetella carolinensis*	8		1	0	2	2	1	1	1	3	0	10	**L4**
northern flicker	NOFL	*Colaptes auratus*	1	1		0	3	2	1	1	2	3	0	12	**L4**
northern rough-winged swallow	NRWS	*Stelgidoptery x serripennis*	1	1	1	0	1	2	1	1	3	2	0	10	**L4**
purple martin	PUMA	*Progne subis*		1		4	2	3	1	1	2	1	0	14	**L4**
red-eyed vireo	REVI	*Vireo olivaceus*	1			0	2	2	2	1	1	3	0	11	**L4**
savannah sparrow	SAVS	*Passerculus sandwichensis*		1 (2006)		0	3	2	1	1	1	4	0	12	**L4**
tree swallow	TRES	*Tachycineta bicolor*	1	1		0	2	2	1	1	2	2	0	10	**L4**
willow flycatcher	WIFL	*Empidonax traillii*	9	1	1	0	4	2	1	1	1	3	0	12	**L4**
American goldfinch	AMGO	*Carduelis tristis*	x	x	x	0	2	2	1	1	0	1	0	7	**L5**
American robin	AMRO	*Turdus migratorius*	x	x	x	0	1	2	1	1	0	1	0	6	**L5**
Baltimore oriole	BAOR	*Icterus galbula*	x	x		0	2	2	1	1	0	1	0	7	**L5**
black-capped chickadee	BCCH	*Parus atricapillus*	x			0	1	2	1	1	0	1	0	6	**L5**
brown-headed cowbird	BHCO	*Molothrus ater*	x	x	x	0	2	2	1	1	0	1	0	7	**L5**
Canada goose	CANG	*Branta canadensis*	x	x	x	0	1	1	1	2	1	0	0	6	**L5**
cedar waxwing	CEDW	*Bombycilla cedrorum*	x	x		0	1	2	1	1	0	1	0	6	**L5**
common grackle	COGR	*Quiscalus quiscula*	x	x	x	0	3	2	1	1	0	1	0	8	**L5**
downy woodpecker	DOWO	*Picoides pubescens*	x			0	3	2	1	1	1	1	0	9	**L5**
killdeer	KILL	*Charadrius vociferus*		x		0	2	2	1	2	0	2	0	9	**L5**
mallard	MALL	*Anas platyrhynchos*	x	x	x	0	2	2	1	2	0	1	0	8	**L5**
mourning dove	MODO	*Zenaida macroura*	x	x	x	0	2	2	1	1	0	0	0	6	**L5**
northern cardinal	NOCA	*Cardinalis cardinalis*	x	x	x	0	2	2	1	1	1	2	0	9	**L5**
northern mockingbird	NOMO	*Mimus polyglottos*		x		0	2	0	1	1	1	1	0	6	**L5**
red-winged blackbird	RWBL	*Agelaius phoeniceus*	x	x	x	0	2	2	1	1	0	2	0	8	**L5**
song sparrow	SOSP	*Melospiza melodia*	x	x	x	0	2	2	1	2	0	2	0	9	**L5**
warbling vireo	WAVI	*Vireo gilvus*	x	x		0	1	2	1	1	1	2	0	8	**L5**

Appendix 3: Fauna List for Humber Bay Complex, 2004 - 2013.

Common Name	Code	Scientific Name	East	West	Shore	LO	PTn	PTt	AS	PIS	HD	StD	+	TS	Rank
yellow warbler	YWAR	*Setophaga petechia*	x	x	x	0	1	2	1	1	1	3	0	9	**L5**
European starling	EUST	*Sturnus vulgaris*	x	x											**L+**
house finch	HOFI	*Carpodacus mexicanus*	x	x											**L+**
house sparrow	HOSP	*Passer domesticus*	x	x	x										**L+**
mute swan	MUSW	*Cygnus olor*	x	x	x										**L+**
Herpetofauna															
green frog	GRFR	*Lithobates clamitans*	1			0	2	2	1	3	1	4	0	13	**L4**
Incidental Species: **species that are reported on as incidental to the TRCA protocol.**															
Mammals															
beaver	BEAV	*Castor canadensis*			1	1	2	1	2	3	1	3	0	13	**L4**
meadow vole	MEVO	*Microtus pennsylvanicus*			1	2	2	2	1	2	1	2	0	12	**L4**
mink	MINK	*Mustela vison*		1 (2007)	1	1	2	2	3	3	0	3	0	14	**L4**
muskrat	MUSK	*Ondatra zibethicus*	1			0	2	2	1	3	1	3	0	12	**L4**
white-tailed deer	WTDE	*Odocoileus virginianus*	1 (2006)			0	2	1	3	2	2	1	0	11	**L4**
grey squirrel	GRSQ	*Sciurus carolinensis*	x	x		0	2	2	1	3	0	0	0	8	**L5**
raccoon	RACC	*Procyon lotor*	x			0	2	2	1	3	1	0	0	9	**L5**
LEGEND															
LO = local occurrence		PIS = Patch Isolation Sensitivity				LX = extirpated									
PTn = population trend, continent-wide		STD = sensitivity to development				L+= non-native/introduced									
PTt = population trend, TRCA		+ = additional points													
HD = habitat dependence		TS = total score													
AS = area sensitivity		L-rank = TRCA Rank, October, 2008													