



Toogood Pond

Terrestrial Biological Inventory and Assessment

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Table of Contents

| | page |
|--|-----------|
| 1.0 Introduction..... | 1 |
| 1.1 TRCA’s Terrestrial Natural Heritage Program | 1 |
| 2.0 Study Area Description | 2 |
| 3.0 Inventory Methodology | 3 |
| 3.1 Landscape Analysis | 4 |
| 3.2 Vegetation Communities, Flora and Fauna Species | 5 |
| 4.0 Results and Discussion..... | 6 |
| 4.1 Regional Context..... | 7 |
| 4.2 Habitat Patch Findings for the Toogood Pond Study Area..... | 7 |
| 4.2.1 Quantity of Natural Cover..... | 7 |
| 4.2.2. Quality Distribution of Natural Cover..... | 8 |
| 4.3 Vegetation Community Findings for the Toogood Pond Study Area..... | 9 |
| 4.3.1 Vegetation Community Representation | 9 |
| 4.3.2 Vegetation Communities of Concern..... | 11 |
| 4.4 Flora Findings for the Toogood Pond Study Area | 12 |
| 4.4.1 Flora Species Representation..... | 12 |
| 4.4.2 Flora Species of Concern | 12 |
| 4.5 Fauna Species Findings for the Toogood Pond Study Area | 15 |
| 4.5.1 Fauna Species Representation..... | 15 |
| 4.5.2 Fauna Species of Concern | 16 |
| 5.0 Summary and Recommendations | 21 |
| 5.1 Site Summary..... | 21 |
| 5.2 Site Recommendations | 22 |
| 6.0 References | 27 |

List of Tables

| | |
|---|----|
| Table 1: Habitat patch quality, rank and species response..... | 5 |
| Table 2: Schedule of the TRCA biological surveys at the Toogood Pond Study Area | 6 |
| Table 3: Summary of Vegetation Communities, Toogood Pond Study Area..... | 9 |
| Table 4: Summary of Flora Species, Toogood Pond Study Area..... | 12 |
| Table 5: Summary of Fauna Species of Concern, Toogood Pond Study Area | 16 |

List of Figures

| | |
|--|----|
| Figure 1: Toogood Pond: park area and marsh habitat..... | 3 |
| Figure 2: Three wetland communities..... | 10 |
| Figure 3: Turtles at Toogood Pond..... | 19 |

List of Maps

| | |
|---|----|
| Map 1: Toogood Pond Study Area in the Context of Regional Natural Cover | 29 |
| Map 2: Toogood Pond (aerial view) | 30 |
| Map 3: Regional Natural System Habitat Patch Quality..... | 31 |
| Map 4: Distribution of Fauna Regional Species of Concern..... | 32 |
| Map 5: Habitat Patch Size Scores with Fauna Area Sensitivity Scores..... | 33 |
| Map 6: Scores for Matrix Influence and Flora Sensitivity to Development | 34 |
| Map 7: Scores for Matrix Influence and Fauna Sensitivity to Development | 35 |
| Map 8: Habitat Patch Quality | 36 |
| Map 9: Vegetation Communities with their Associated Local Ranks..... | 37 |
| Map 10: Location of Flora Species of Concern..... | 38 |
| Map 11: Flora Habitat Dependence Scores | 39 |
| Map 12: Location of Fauna Species of Concern..... | 40 |
| Map 13: Fauna Species of Concern Habitat Dependence Scores..... | 41 |

List of Appendices

| | |
|---|----|
| Appendix 1: List of Vegetation Communities..... | 42 |
| Appendix 2: List of Flora Species | 44 |
| Appendix 3: List of Fauna Species | 52 |

1.0 Introduction

In 2012 the Toronto Region Conservation Authority (TRCA) conducted fauna and flora inventories of Toogood Pond. These inventories were undertaken primarily to address a gap in the regional database, but also to provide local context for the regional long term monitoring stations that were initiated at the site in 2008. These fixed plots are monitored annually for wetland birds, frogs, and vegetation. They provide valuable supplementary data that can be used to assess the current quality and condition of the site.

At the larger scale, the purpose of the work conducted by the TRCA during the 2012 field season was to *characterize the terrestrial natural heritage features* of the Toogood Pond Study Area. Once characterized, the site features can then be understood within the larger Rouge watershed and regional contexts of the Terrestrial Natural Heritage Program, enabling a better understanding of biodiversity across the jurisdiction, thereby helping to improve the Terrestrial Natural Heritage System Strategy (TNHSS) targets. The question that the inventory addresses is “*How does the area surveyed at Toogood Pond Study Area fit within the regional and watershed natural system, and how should its contribution to this system be protected and maximized?*” The important underlying message offered 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. 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 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.

The natural habitat at Toogood Pond acts as an important link along the riparian corridor of two tributaries of the Rouge River - Berczy and Bruce Creeks - connecting the Oak Ridges Moraine to the large area of natural cover of Rouge Park to the south. The persistence of natural cover at sites such as this is extremely important in maintaining effective migration and dispersal routes across the rapidly expanding urban landscape.

2.0 Study Area Description

The TRCA study area in 2012 incorporated the riparian corridors associated with the two creeks, Berczy and Bruce, as they run south into the main Toogood Pond, emerging as Bruce Creek at the south end of that large artificial body of water. The site is bound to the north by 16th Avenue, and to the south by Unionville's Main Street (Maps 1 and 2).

The site is situated in the middle reaches of the Rouge River watershed, within the Municipality of Markham, York Region, and covers a total of 37.4 ha. It lies entirely within the Great Lakes – St. Lawrence floristic region, a region which is composed primarily of mixed coniferous-deciduous forest. At the coarse physiographic level, the site is situated on the eastern portion of the Peel Plain physiographic zone, but is restricted to the Berczy and Bruce Creek valleys where surface geology is dominated by gravel sand river deposits. Soil samples taken during the 2012 field surveys showed quite a bit of variation, ranging from very fine sandy loam to silty clay loam.

The Berczy Creek valley coming in from the northwest has more forest cover, which appears to be deteriorating perhaps through the general urban matrix influence; Bruce Creek, which comes from

the north, has more open areas. The pond itself dates back to the 19th century settlement of Unionville. In the early 1980s, urban development encompassed Unionville and the pond and valleys became a municipal park for Markham (Figure 1). At the same time, the pond dam was repaired, trails were installed, and the old centre of Unionville became a tony heritage district including shops and an art gallery dedicated to Group of Seven member Fred Varley, located near his original studio. The landscape around the pond is largely manicured, although wetlands extend from its upstream end along the two feeder streams.



Figure 1: Toogood Pond with marshy edge (photo by Gavin Miller, Aug 2012)

3.0 Inventory Methodology

A biological inventory of the Toogood Pond Study Area was conducted at the levels of habitat patch (landscape analysis), vegetation community, and species (flora and fauna) according to the TRCA methodologies for landscape evaluation (TRCA 2007c) and field data collection (TRCA 2007d). Habitat patch mapping was taken from the regional 2007/08 mapping of broadly-defined patch categories (forest, wetland, meadow and coastal) and digitized using ArcView GIS software.

A key component of the field data collection is the scoring and ranking of vegetation communities and flora and fauna species to generate local “L” ranks (L1 to L5); this process was undertaken in 1996-2000 and ranks are reviewed regularly (TRCA 2010). 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 as 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.

3.1 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 3.2).

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 3 to 15 points. Of these L-ranks, L1 represents the highest quality habitat and L5 the poorest.

Species presence or absence correlates to habitat patch 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, 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 |

Quantity

The amount of natural cover needed in the landscape is based on the quantity required 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 Vegetation Communities, Flora and Fauna Species

Vegetation community and flora and fauna species data were collected through field surveys. These surveys were done during the appropriate times of year to capture breeding status in the case of amphibians and birds, and during the optimal growing period of the various plant species and communities. Vegetation communities and flora species were surveyed concurrently.

Botanical field-work was conducted from spring to early fall of 2012 (Table 2). Botanical data also includes incidental records obtained from the long-term fixed monitoring transect that was first established at the site in 2008.

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 species of concern (species ranked L1 to L3) were

mapped as point data with approximate number of individuals seen. A list of all other species observed was documented for the site.

The most complete fauna survey of the site was conducted by the TRCA in March, May and June of 2012. The spring surveys searched primarily for frog species of regional concern but recorded incidentally the presence of any early-spring nocturnal bird species (owls and American woodcocks). Surveys in May and June were concerned primarily with the mapping of breeding bird species of regional concern. As per the TRCA data collection protocol, breeding bird surveys were carried out by visiting all parts of the site at least twice during the breeding season (last week of May to mid-July) to determine the breeding status of each mapped point. The methodology for identifying confirmed and possible breeding birds follows Cadman *et al.* (2007). All initial visits were completed by the end of the third week of June. The field-season is to be organized so that by late June only repeat visits are being conducted. It is imperative that any visit made in the first half of June is subsequently validated by a second visit later in the season. Fauna species of regional and urban concern (species ranked L1 to L4) were mapped as point data with each point representing a possible breeding territory.

In addition to the 2012 data, this inventory considers the incidental fauna observations mapped during the annual long term monitoring plot counts initiated in 2009 (wetland bird and frog station). Note that the fauna data management protocol imposes a 10 year threshold on use of historical data, and therefore observations made prior to 2003 are not included in the current fauna inventory.

Table 2. Schedule of TRCA biological surveys at the Toogood Pond Study Area

| Survey Item | Survey Dates | Survey Effort (hours) |
|--|--|-----------------------|
| Patch / Landscape | 2007/08: ortho-photos | 21 hours |
| Vegetation Communities and Flora Species | 2012: May 14 th , June 5 th , 26 th ; Aug 17 th , 20 th ; Sep 14 th , 27 th , 28 th . 2007: Oct 2 nd . | 35 hours |
| Terrestrial long-term monitoring plot | 2008-2012: spring and summer (various) | ~20.5 hours |
| Frogs and Nocturnal Spring Birds | 2012: March 23 rd | 0.75 hours |
| Breeding Songbirds | 2012: May 28 th and June 20 th | 7 hours |

4.0 Results and Discussion

Information pertaining to the Toogood Pond 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 ortho-photography, 25% of the land area in the TRCA jurisdiction consists of natural cover but this figure includes meadow. Although historically, the region would have consisted of up to 95% forest cover, currently (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 16.7% of the surface area of the jurisdiction (Map 3). In addition, meadow cover stands at 8.1% of the region. 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.

The riparian natural cover at the Toogood Pond Study Area provides continuity in an important migration and dispersal route between the more rural areas to the north (e.g. the Oak Ridges Moraine) and significant migrant staging areas in the lower reaches of the Rouge River (Rouge Park) and along the Lake Ontario shoreline.

4.2 Habitat Patch Findings for the Toogood Pond Study Area

The following details the site according to the two natural system indicators used in designing the Terrestrial Natural Heritage System Strategy: the *quality distribution* and *quantity* of natural cover. Analysis was based on 2007/08 ortho-photos.

4.2.1 Quantity of Natural Cover

The area of the Rouge watershed is approximately 33,288 ha containing 23.8% natural cover (2007/08), including 4442 ha as forest (13.3%, including successional), 2840.9 ha as meadow (8.5%) and 242.6 ha as wetland (0.73%). The Toogood Pond Study Area is 37.4 ha in size and contains 32.7 ha of natural habitat (Table 3; Appendix 1), which amounts to 0.43% of the total natural cover in the Rouge watershed (7527.1 ha). Although this is not a large proportion of the watershed’s natural cover, the location at the confluence of two of the larger Rouge tributaries confers a high degree of importance to the area from a connectivity perspective. The natural cover

includes 13.5 ha of forest, 2.6 ha of successional, 2.8 ha of meadow, 5.4 ha of aquatic and 8.4 ha of wetland.

4.2.2. Quality Distribution of Natural Cover

The results for quality distribution are reported below under the headings of habitat patch size and shape, matrix influence and total score.

Habitat Patch Size and Shape

The study area is highly linear, running along the riparian corridors of the Rouge tributaries. The north-west tributary (Berczy Creek) is dominated by relatively mature riparian forest cover, whereas the opposite arm of the study area, the north-west extension along the upstream stretch of Bruce Creek, is largely open habitat (meadow). Much of the remainder of the site (the southern extension downstream along Bruce Creek) is dominated by Toogood Pond itself. This highly linear aspect of the site results in low scores for patch shape, and also, given the division of habitat blocks by the watercourses, a rather low score for patch size, ranging from “very poor” to “fair”. The most extensive forest cover on site has an area of 11.2 ha, while the most extensive open habitat covers 3.7 ha, corresponding to fair and poor scores for patch size respectively (Map 5). Accordingly, there is no habitat interior feature within the study area; this would require at least a 100 metre distance in any one direction to the closest habitat edge.

Habitat Patch Matrix Influence

Analysis based on the 2007/08 ortho-photos shows that the matrix influence score for habitat in the study area is “very poor” (Maps 6 and 7). This score is as expected given that the study area is completely enveloped by development: residential housing to the east, west and south; and a large golf course to the north on the far-side of 16th Avenue. The TRCA measures matrix influence at the landscape level by assigning set values; positive, neutral and negative, to the type of landscape use occurring within 2 km of the subject site. This urban landscape exerts a negative matrix influence on the site.

Habitat Patch Total Score

The combination of “very poor” matrix influence on the site, and the mix of “very poor” to “fair” habitat patch size with “very poor” patch shape, results in an overall “poor” or L4 habitat patch quality (Map 8). Landscape scores are intended to be applied at the broader landscape level and therefore caution needs to be exercised when referring to such measures at the more refined site level. However, in this particular case, it appears that the landscape scores are in keeping with the ground-truthed fauna representation, with only two L3 bird species reported (and none at all from the 2012 inventory). Considerably more L3 flora points were mapped, and a total of six L2/L3 herpetofauna were mapped, but this is typical in an urban setting where sensitive flora populations persist longer than sensitive bird populations – plant populations do not have the opportunity to vacate a deteriorating habitat in the same way that bird species do. For the same reason, less

mobile fauna taxa such as herpetofauna lag behind highly mobile birds in the exodus of sensitive fauna that occurs as urbanization encroaches.

4.3 Vegetation Community Findings for the Toogood Pond Study Area

4.3.1 Vegetation Community Representation

Toogood Pond has a total of 40 different vegetation communities, 3 of which are found solely as an inclusion or complex within a larger community. Forest and wetland predominate both in terms of diversity of types and total cover; this reflects the riparian character of the site (Table 3).

Table 3. Summary of Vegetation Communities, Toogood Pond Study Area

| Class | Number of Types | Area (hectares) |
|--------------------------------|-----------------|-----------------|
| Forest | 19 | 13.5 |
| Successional | 5 | 2.6 |
| Meadow | 1 | 2.8 |
| Wetland | 12 | 8.4 |
| Aquatic | 3 | 5.4 |
| Dynamic (beach, bluff, barren) | 0 | - |
| <i>Total</i> | <i>40</i> | <i>32.7</i> |

There are 13.5 ha of forest, just over 41% of the whole study area. These forested areas are largely floodplain deciduous forest, much of it occurring along Berczy Creek. Fresh-Moist Willow Lowland Deciduous Forest (FOD7-3) and Fresh-Moist Manitoba Maple Deciduous Forest (FOD7-a) account for 8.5 ha. Associated with crack willow (*Salix x fragilis*) and Manitoba maple (*Acer negundo*) and occasional basswood (*Tilia americana*), white and red ash (*Fraxinus americana* and *F. pennsylvanica*), and balsam poplar (*Populus balsamifera*). In a few places the ash and the poplar form dominant stands: Fresh-Moist Ash Deciduous Forest (FOD7-2) and Fresh-Moist Poplar Deciduous Forest (FOD8-1). There are also small areas of Dry-Fresh Sugar Maple – Basswood Deciduous Forest (FOD5-6), Fresh-Moist Oak – Sugar Maple Deciduous Forest (FOD9-1), and Fresh-Moist Bur Oak Deciduous Forest (FOD9-3) on the slopes. Associated with the floodplain deciduous forest along Berczy Creek are patches of cedar (*Thuja occidentalis*): Fresh-Moist White Cedar Coniferous Forest (FOC4-1) and Fresh-Moist White Cedar – Hardwood Mixed Forest (FOM7-2). Finally, there are several types of plantation occurring in very small patches – often just a couple of rows or a cluster of trees. Some of these are older plantings from the rural era, while others date from the 1980s when the Toogood Pond became a park.

Successional communities are represented by five deciduous regenerating communities totalling 2.6 ha. These are Sumac Deciduous Thicket (CUT1-1), Native Deciduous Successional Savannah (CUS1-A1), Native Deciduous Successional Woodland (CUW1-A3), Hawthorn Successional Woodland (CUW1-D), and Exotic Deciduous Woodland (CUW1-b). These are dominated by varying mixes of trees and shrubs including those found in the lowland deciduous forests, as well

as white elm (*Ulmus americana*), riverbank grape (*Vitis riparia*), staghorn sumac (*Rhus typhina*), and buckthorn (*Rhamnus cathartica*).

Open meadow covers just 2.8 ha and occurs on the floodplains of both Berczy and Bruce Creek northward toward 16th Avenue. The meadow at Toogood Pond is Native Forb Meadow (CUM1-A), dominated by tall goldenrod (*Solidago altissima*) and asters (*Symphyotrichum* spp).

Wetlands account for 8.4 ha (25.7%) of the natural cover. These are divided between swamp (5 types) and marsh (7 types) (Figure 2). The main swamp type is Willow Mineral Deciduous Swamp (SWD4-1), associated with more consistently wet parts of the floodplain. There are also very small patches of Red Ash Mineral Deciduous Swamp (SWD2-2) and Poplar Mineral Deciduous Swamp (SWD4-3). A seepage area with White Cedar - Hardwood Mineral Mixed Swamp (SWM1-1) occurs on the south side of Berczy Creek near Pennock Crescent. Finally, the fringe of Toogood Pond itself has a narrow strip of Exotic Mineral Thicket Swamp (SWT2-a) with a mix of Manitoba maple, oriental bittersweet (*Celastrus orbiculatus*) and dogwoods (*Cornus* spp) among other planted species.



Figure 2: Three wetland communities at Toogood Pond: Willow Deciduous Swamp, Cattail Marsh, and Forb Meadow Marsh (photo by Gavin Miller, Sept. 2012).

Marshes are associated with the shoreline of Toogood Pond and upstream where water level fluctuations ensure frequent saturation. The most prevalent marsh is Hybrid Cattail Mineral Shallow Marsh (MAS2-1b) covering 2.6 ha; but Mineral Forb Meadow Marsh (MAM2-10) covers almost as much land (2.5 ha). The Mineral Forb Meadow Marsh is dominated by native species such as spotted Joe-Pye weed (*Eutrochium maculatum*), swamp aster (*Symphotrichum puniceum*), and panicked aster (*S. lanceolatum*). There are also Broad-leaved Sedge Mineral Meadow Marsh (MAM2-6) and Shallow Marsh (MAS2-4) dominated by lake-bank sedge (*Carex lacustris*) and awned sedge (*Carex atherodes*); and a patch of Common Reed Mineral Shallow Marsh (MAS2-a).

Disturbance to the vegetation communities is mostly from two sources: pedestrian and dog traffic, and invasive species. The latter are encouraged by dumping of yard waste from back yards, and storm water runoff.

4.3.2 Vegetation Communities of Concern

The vegetation communities that occur in the TRCA jurisdiction are scored and given a local rank from L1 to L5 based on the two criteria mentioned in Section 3.2. Vegetation communities with a rank of L1 to L3 are considered of concern across the entire jurisdiction while L4 communities are considered of concern in the urban portion of the jurisdiction. The Toogood Pond Study Area lies within the urban landscape and so L4 communities are considered along with L1 to L3 communities as being of conservation concern. In addition, community ranks do not take into account the intactness or quality of individual examples of communities; thus, a common type of vegetation community may be of conservation concern at a particular site because of its age, intact native ground layer, or other considerations aside from rank. For example, an old-growth sugar maple forest may belong to a relatively common and adaptable vegetation type but should still be considered of high conservation concern.

There are 4 vegetation communities at Toogood Pond with a rank of L3 and 11 that are ranked L4 (communities are listed with ranks in Appendix 1; location and boundaries shown on Map 9). The communities of conservation concern (L3 to L4) occupy 9.1 ha, 28.1% of the total natural cover.

The L3 communities include Fresh-Moist Oak – Sugar Maple Deciduous Forest (FOD9-3), Broad-leaved Sedge Mineral Meadow Marsh (MAM2-6), Broad-leaved Sedge Mineral Shallow Marsh (MAS2-4), and Duckweed Mixed Shallow Aquatic (SAM1-2). The L4 communities include all the other native species-dominated wetlands, plus four of the forest types: notably the relict cedar stands (Fresh-Moist White Cedar Coniferous Forest – FOC4-1 and Fresh-Moist White Cedar – Hardwood Mixed Forest – FOM7-2). All of these communities, while not rare, are somewhat vulnerable to changes in the environment, resulting in change years later. For example, the cedar-dominated communities (forest and swamp) are common in TRCA in areas with intact hydrology and rural matrix. However, trampling, drainage alteration (e.g. loss of ground water) due to urbanization, and urban heat island effects (exacerbated by broader-scale climate change) can send these communities into decline, to be replaced by weedier deciduous communities such as

Fresh-Moist Manitoba Maple Lowland Deciduous Forest (FOD7-a) with a high loading of exotic species. The White Cedar Mineral Mixed Swamp (SWM1-1) community at Toogood Pond shows some evidence of such disturbance: tree roots are exposed possibly due to oxidation of an organic layer exposed to drier conditions, and the soil moisture regime was borderline for wetland classification. Scattered older cedars can be found in the Manitoba maple and willow-dominated forests, suggesting that they were more prevalent in the past.

Native-dominated wetlands (e.g. with *Carex* spp) can be affected by storm water, nutrient and silt loading to the extent that they are replaced by the exotic hybrid cattail (*Typha x glauca*).

4.4 Flora Findings for the Toogood Pond Study Area

4.4.1 Flora Species Representation

Floristic surveys conducted by TRCA in 2012 in addition to a small amount of supplementary data from the wetland vegetation monitoring transect (2008-12), identified a total of 320 species of vascular plants (Table 4; Appendix 2). Of these, 292 species recorded were naturally occurring; there were also a sizeable number of planted species associated with the parkland. Of the non-planted species recorded, 158 are native (54%). Biodiversity of this site is moderately high given the study area size, and reflects the presence of forest and wetland communities; each with their own unique suite of species. The relatively high proportion of exotic species (46%) is consistent with an urban natural area (typically exotics comprise only about 25% of a rural natural area in TRCA).

Table 4. Summary of Flora Species, Toogood Pond Study Area

| | |
|--------------------------------------|-----|
| Total # of species | 320 |
| Naturally-occurring species | 292 |
| Planted species | 28 |
| Native (naturally-occurring) species | 158 |
| Number of L1 - L3 species | 10 |
| Number of L4 species | 45 |
| Exotic species (established) | 134 |

4.4.2 Flora Species of Concern

There are 55 vascular plant species of regional and urban conservation concern (rank L1 to L4) at Toogood Pond; of these, 10 are ranked L3. 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). In fact, the higher-ranked species at Toogood are not currently rare but are at risk of long-term decline due to the other criteria. (The three species with high Local Occurrence scores are simply under-reported, or

have only recently been recognized as separate taxa: for example, pink hedge bindweed now recognized as a subspecies, *Calystegia sepium* ssp. *americanum*).

The majority (49 or 89% of the total) of the flora species of concern at Toogood Pond are sensitive to development, being vulnerable to at least one kind of disturbance that is associated with land use changes (see Map 6 for sensitivity to development scores). A likely issue at this site is vulnerability to hydrological changes resulting from urbanization in recent decades. The impact of these changes at the community level has already been discussed (Section 4.3.2). At the level of individual species, plants of swamps and mixed forests such as dwarf enchanter's nightshade (*Circaea alpina*), yellow birch (*Betula alleghaniensis*) and bulblet fern (*Cystopteris bulbifera*) require cool, moist, sheltered conditions, often with groundwater close to the surface. Increasing warmth and dryness (more pavement meaning impermeability, reduced ground water recharge, and higher temperatures) will cause these species to decline. Their populations are already lower than in many comparable landscapes in the rural zone.

Hydrological and nutrient disturbances can also encourage invasive species that displace some of the smaller and more sensitive species. In wetter areas, common reed (*Phragmites australis*) and reed canary grass (*Phalaris arundinacea*) can exclude less-competitive natives such as turtlehead (*Chelone glabra*), cut-leaved water horehound (*Lycopus americana*), and awned sedge (*Carex atherodes*). Upland species may be affected by dog-strangling vine (*Cynanchum rossicum*), which is one exotic that is gradually spreading through the site, especially in the successional areas toward 16th Avenue. Its ability to spread rapidly through disturbed habitats along various pathways such as trails can have dire consequence for the less aggressive natives that currently exist at the site.

Increased human traffic into a natural area results in disturbance caused by trampling and also facilitates incursion of invasive species that compete with the existing native flora. The park receives heavy public use and is interlaced with a network of both formal and informal trails. This is of concern particularly to forest ground layer species such as the bulblet fern and toothworts (*Cardamine* spp). Their roots and stems are not resilient enough to withstand soil compaction resulting from constant treading.

Some species may be deliberately removed if they are seen. Michigan lily (*Lilium michiganense*) may get picked or dug for inclusion in gardens and/or homes due to its spectacular showy flowers. Edible species are also at risk of being taken from the wild. The unfurled fronds of the native ostrich fern (*Matteucia struthiopteris*) are edible and the pressure from wild collection (if intense) can result in a localized population decline even for this L5-ranked species.

Habitat fragmentation can lead to increased populations of herbivores such as white-tailed deer (*Odocoileus virginianus*); deer have had significant impacts in parts of the TRCA jurisdiction such as the main part of Rouge Park south of Steeles. Evidence of deer browse is not intense at Toogood Pond, however.

Likewise 49 of the 55 (89%) species of concern can also be considered habitat specialists, scoring relatively high in *habitat dependence*. Habitat dependence scores are shown on Map 11. Roughly, they are found in seven or fewer vegetation cohorts (groupings of vegetation types with similar floristic characteristics) (TRCA 2010). They will not readily recover when these habitats are lost or altered. Toogood Pond has habitat specialists corresponding to forest, swamp, marsh, aquatic, and successional habitats.

Forest species are found in the more mature mixed and deciduous forests. They include broad-leaved toothwort (*Cardamine diphylla*), hybrid toothwort (*C. maxima*), and white grass (*Leersia virginica*).

Wetland species are particularly well-represented. Clinton's wood fern (*Dryopteris clintoniana*), swamp red currant (*Ribes triste*), and marsh marigold (*Caltha palustris*) occur in the remnant seepage swamp. Semi-open swamp areas grading into marsh include spring clearweed (*Pilea fontana*), germander (*Teucrium canadense* ssp. *canadense*), and turtlehead (*Chelone glabra*). The meadow and shallow marshes contain awned sedge (*Carex atherodes*) and lake-bank sedge (*C. lacustris*). Mud flats created by small fluctuations in the water level of Toogood Pond support a population of two-parted umbrella-sedge (*Cyperus bipartitus*). Where there is enough light penetration, the creeks and ponds have leafy pondweed (*Potamogeton foliosus*) and greater duckweed (*Spirodela polyrhiza*). The meadow and successional areas have a number of wildflowers and shrubs; Canada plum (*Prunus nigra*) grows there and has a rank of L3.

Invasive Species

Dog-strangling vine is abundant in the open meadows and semi-open successional habitats to the north near 16th Avenue. The trail system running through the site could act as a pathway for which this aggressive exotic vine can easily spread into the interior reaches of the study area. This species is particularly problematic in the TRCA jurisdiction and other parts of the Lower Great Lakes (TRCA 2008). The best hope to control this species is through a regional biological control program, research for which is currently under way. In the meantime, trail disturbance should be monitored and mitigated.

Oriental bittersweet is planted along the eastern shore of Toogood Pond itself, and on the embankment forming the dam for the pond. This extremely aggressive woody vine should be removed while its numbers are still low enough that this is a feasible possibility.

Garlic mustard (*Alliaria petiolata*) and dame's rocket (*Hesperis matronalis*) are locally abundant in floodplain forests. The best approach is to minimize trampling disturbance to allow the existing vigorous native species to hold their own against these species; to maintain and restore hydrology, and to prevent yard waste dumping.

Common reed is invading a wetland in the northeast part of the park near Aitken Circle. It is currently a large but single and relatively local population. It may be possible to contain this

infestation with wick application of herbicide; otherwise, this huge grass may take over the entire wetland complex and pond edge.

Hybrid cattail (*Typha x glauca*) dominates the open marshes but does not at this point monopolize them. Some wetland communities, including the one containing the wetland transect, have very low diversity due to the prevalence of hybrid cattail. However, there appears to be enough variability in topography and water level to allow for other species to coexist.

Plantings

Toogood Pond has a large number of plantings, as might be expected for a high-profile urban or suburban park. There are 28 species listed as being exclusively planted. These include 13 species of regional or urban concern associated directly with restoration plantings or garden extensions from backyards into the park. Some, such as the river bulrush (*Bolboschoenus fluviatilis*) are well-matched to the environment in which they were planted; while others, such as red pine (*Pinus resinosa*) are less likely to succeed in the long term. There are some unusual (non-native) trees planted adjacent to the east side of the pond, notably Manchurian ash (*Fraxinus mandshurica*) and bald cypress (*Taxodium distichum*). The bald cypress, native to the southern United States, is hardy when planted here and the specimen along the pond shoreline shows the characteristic “knees”.

4.5 Fauna Species Findings for the Toogood Pond Study Area

4.5.1 Fauna Species Representation

The TRCA fauna surveys at the Toogood Pond Study Area in 2012 documented a total of 39 bird species, 7 mammals, and 8 herpetofauna species, bringing the total number of possible breeding vertebrate fauna species identified by the TRCA to 54. Four additional bird species can be added from incidental observations made during the long term monitoring project initiated in 2009: sora (*Porzana carolina*), common yellowthroat (*Geothlypis trichas*), and indigo bunting (*Passerina cyanea*), reported in 2009; and Virginia rail (*Rallus limicola*) reported in 2011. Furthermore, grey treefrog (*Hyla versicolor*) was reported in 2011, and a single wood frog (*Lithobates sylvatica*) was heard at the monitoring station in 2010, although it is suspected that the latter probably referred to a vagrant individual from known sites for this species further upstream in both the Berczy and Bruce Creek subwatersheds. These additional sightings bring the possible breeding fauna total for the past decade to 60 species.

This total is similar to those from several other study areas in the same urban-rural interface zone. For example, the fauna list for the Altona Forest study area (64 ha), surveyed in 2012, is 58 species; Milne CA (121 ha) has a list of 66 vertebrate fauna species; and the considerably larger but more urban Morningside Park (164 ha) lists a total of 64 breeding vertebrate fauna. Refer to Appendix 3 for a list of the fauna species and their corresponding L-ranks.

4.5.2 Fauna Species of Concern

Fauna species, like vegetation communities and flora species are considered of regional conservation concern if they rank L1 to L3 based on their scores for the seven criteria mentioned in Section 3.2. Since the subject site is situated within the urban zone this report also considers those species ranked as L4, i.e. those species that are of concern in urban landscapes. As with flora, this is a proactive, preventive approach, identifying where conservation efforts need to be made before a species becomes rare.

Fauna surveys at Toogood Pond in 2012 reported 16 bird species of urban concern (L4), but none of regional concern (L1 to L3). In addition, there were seven herpetofauna and four mammal species of regional and urban concern, including two L2 species (common snapping turtle, *Chelydra serpentina*; and bullfrog, *Lithobates catesbeiana*) and two L3 herp species (midland painted turtle, *Chrysemys picta marginata*; and leopard frog, *Lithobates pipiens*). Two L3 ranked bird species (sora and Virginia rail) and a further two L4 species (common yellowthroat and indigo bunting) can be added from the incidental observations over the past decade, along with two L2 herp species. These additional records bring the total to 31 fauna species of regional and urban concern (Table 5). Locations of these breeding fauna are depicted on Map 12. One of the herp species of concern is also listed as a Species at Risk: common snapping turtle is assessed as Special Concern at both the Federal and Provincial levels.

Table 5. Summary of Fauna Species of Regional and Urban Concern, Toogood Pond

| Fauna | Number of Species | Number of Species of Regional and Urban Concern (L1 to L4 rank) |
|---------------|-------------------|---|
| birds | 43 | 18 |
| herps | 10 | 9 |
| mammals | 7 | 4 |
| TOTALS | 60 | 31 |

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 Ontario Ministry of Natural Resources (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 UTM grid squares in the TRCA jurisdiction is considered regionally rare (i.e. scores three to five points for this criterion) (TRCA, 2010).

The fauna surveys at Toogood Pond documented one fauna species considered regionally rare: a lone bullfrog was observed in the small pond just below Normandale Road (along the Berczy Creek portion of the site). As with the other two L2 frog species at Toogood, both of which have been observed just once in recent years, the origin of this particular individual is a little suspect. There are no known populations of bullfrog within 5 km of this site and this species is frequently released by pet owners. Even if the individual has managed to reach Toogood under its own steam it may be the only one of its kind in the vicinity. Intentional releasing of bullfrogs into ponds

across the region is potentially a huge problem for any frogs that are native to those ponds. Although bullfrog is native to southern Ontario, moving this voracious predator into areas where they do not naturally occur jeopardizes whole aquatic fauna systems.

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. At the study area many of the species that are ranked L1 to L4 receive this score (24 of the 31 species) and are therefore considered sensitive to one or more of the impacts associated with development (Map 8).

Six of the L1 to L4 ranked bird species habitually nest on or near to the ground and as such are highly susceptible to ground-borne disturbance, e.g. off-leash dog-walking. However, four of these species nest in wetlands, a habitat that is not as much visited by such disturbances; the fact that there were five pairs of swamp sparrows (*Melospiza georgiana*) nesting at the site's wetland patches supports this. Of the remaining two species – spotted sandpiper (*Actitis macularia*) and indigo bunting – the latter is represented by just one report of a territorial bird in 2009 and was not reported in the extensive inventory conducted in 2012.

Ground-nesting birds are highly susceptible both to increased predation from ground-foraging predators that are subsidized by local residences (house cats, raccoons) and to repeated flushing from the nest (by pedestrians, off-trail bikers and dogs) resulting in abandonment and failed breeding attempts. The width of the study area is generally less than 150 metres which means, since a substantial formal trail runs along the length of each of the three spokes constituting the site, that there is very little habitat unaffected by the traffic on these trails, be it hikers, bikers or dog walkers. With the proximity of busy trails and the fact that the site is surrounded by residential development which imposes additional predator pressures upon the native fauna, it is really of very little surprise that sensitive ground-nesting species (at least away from wetland habitats) are so poorly represented at the site.

Many of the negative influences associated with urbanization can be transferred deep within an otherwise intact natural matrix by extensive trail networks used by large numbers of people originating from quite distant urban and suburban centres. 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. Similarly, clearing of forest understory to accommodate trails displaces sensitive low-nesting species.

Various studies have shown that many bird species react negatively to human intrusion (i.e. the mere presence of people) to the extent that nest-abandonment and decreased nest-attentiveness lead to reduced reproduction and survival. One example of such a study showed that abundance was 48% lower for hermit thrushes (a ground-nesting/foraging species) in intruded sites than in the control sites (Gutzwiller and Anderson 1999). Elsewhere, a recent study reported that dog-walking in natural habitats caused a 35% reduction in bird diversity and a 41% reduction in abundance, with even higher impacts on ground-nesting species (Banks and Bryant 2007).

The three sensitive, non-wetland L4 species which are fairly well-represented at the site – eastern wood-pewee (*Contopus virens*, 4 territories), red-eyed vireo (*Vireo olivaceus*, 5 territories), and blue-grey gnatcatcher (*Polioptila caerulea*, 3 territories) - are all canopy nesters and as such are less effected by trail use, although are still susceptible to artificially high densities of predators subsidized by backyard feeders and poor garbage management. It should be noted that the TRCA fauna inventory assesses the presence of species, i.e. the number of territories of each species at the site, but does not give any indication of the success of nesting attempts.

As far as the non-avian species are concerned, all but one of the 10 herpetofauna species are considered very sensitive to development. The sensitivity of these species varies considerably but again the majority of them are impacted by ground-borne disturbances at some stage of their life cycles. The two native turtle species – common snapping turtle and midland painted turtle – both nest in terrestrial situations, and in both cases their eggs are very vulnerable to predation by artificially elevated populations of predators such as racoons and Virginia opossums (*Didelphis virginiana*). Another impact from the local urban matrix is the introduction of a third species of turtle, the red-eared slider (*Trachemys scripta elegans*). Large numbers of this non-native competitor were observed in the main Toogood Pond in 2012, indicative of an ongoing series of releases made by local pet-owners. This larger species (which as yet has not been proved to successfully overwinter as young – and therefore populations consist solely of released adults) competes with the smaller native painted turtles for food resources. Finally, the aquatic species are very sensitive to water quality in their native wetlands: run-off from gardens conduct chemicals into the wetlands, while run-off from roads and trails can carry road-salt and oils into the breeding habitats.



Figure 3: Group of introduced red-eared sliders basking at Toogood Pond – note the smaller, native painted turtle at the extreme left of the log (photo by Paul Prior, June 2012).

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 either show no minimum habitat requirement, or require <1 ha in total, score one point. Species scoring three points or more (require ≥ 5 ha in total) are deemed area sensitive species. Researchers have shown that for some species of birds, area sensitivity is a rather fluid factor, dependent and varying inversely with the overall percentage forest cover within the landscape surrounding the site where those species are found (Rosenburg *et al.* 1999).

Nine of the fauna species of regional and urban concern that were identified at Toogood Pond are considered area sensitive; all of these species – 6 birds, 2 frogs and 1 mammal - require at least 10 ha of habitat. All of these area sensitive species are forest and forest-edge species and as such are well-accommodated by the largest continuous patch of forest (11 ha) which constitutes the bulk of the study area (Map 5) – the majority of the 10 territories occupied by the area-sensitive birds are located in or adjacent to this largest forest block. The two area sensitive frog species (wood frog and grey treefrog) which occur at Toogood are represented by just two reports over the past decade. Both species have a requirement for both forest and wetland elements in order to complete their life-cycles - wetlands for breeding and forest habitat for foraging and overwintering - a requirement which is more likely to be satisfied across larger habitat blocks. For both of these species, the upland forest element is lacking and the opportunities for at least the wood frog to complete its life cycle successfully are very limited within the study area.

Species' patch-size constraints are due to a variety of factors including foraging requirements and the need for isolation within a habitat block during nesting. In the latter case, regardless of the

provision of a habitat patch of sufficient size, if that block is seriously and frequently disturbed by human intrusion, such species will be liable to abandon the site. Such a variety of habitat needs are more likely satisfied within a larger extent of natural cover. The amount of forest cover at the study area accommodates multiple territories of area-sensitive species and other species that spend their time in the forest canopy – e.g. the five pairs of red-eyed vireo.

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.

Fourteen fauna species of regional and urban concern reported from the study area are considered sensitive to patch isolation: two birds, nine herps and three mammals. For many of the herp species their passage across the landscape, from one corner of the site to the other, is facilitated by the presence of extensive aquatic habitats – the two creeks and Toogood Pond itself. This is perhaps why, despite the poor matrix influence, so many herpetofauna are persisting at this site, including the Special Concern common snapping turtle. However, within such an urban landscape, road-kill has the potential to gradually diminish local populations of these species and, if the species are to persist at the site, measures need to be taken to enable safe passage for these fauna elements throughout the site; in other parts of the Toronto region it has become clear that road-kill applies to paved and un-paved trails frequented by bicycles.

Fauna species that score greater than three points under the **habitat dependence** criterion are considered habitat specialists (Map 13). These species exhibit a combination of very specific habitat requirements that range from the 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. Only three fauna species that occur in the study area are considered habitat specialists: sora, Virginia rail and wood frog. None of these species appears to maintain a consistent presence at the site, all having been reported only once, as incidentals from the long term monitoring station in the wetland at the centre of the site (just north of the confluence of the two streams). This lack of habitat dependent species is in keeping with the rather low quality of both the forest and meadow habitats on site. Both sora and Virginia rail are dependent on wetland habitats and their occasional presence suggests that the wetland at Toogood has the potential to accommodate such specialists but matrix influence may be too negative.

A site's species list presents only the species' richness, i.e. it indicates only the presence or absence of species at a site but indicates neither the breeding success nor the population stability of each species at the site. A healthy functioning system will accommodate a whole suite of species that are adapted to the habitat types at the site, and will allow those particular species to thrive and breed successfully. As the quality of the habitat patch improves so will the representation of flora and fauna species associated with that habitat. In this way, representation biodiversity is an excellent measure of the health of a natural system. Degraded forest habitats in urban landscapes often accommodate only generalist species with the more sensitive forest-dependent species entirely absent. Although there are no highly sensitive forest bird species nesting at Toogood, there is fairly good representation of less demanding forest species such as red-eyed vireo and eastern wood-pewee, suggesting that the forest habitat in the study area is still functioning but at a reduced level. This is to be expected given the urban landscape in which the site is embedded.

5.0 Summary and Recommendations

The recommendations for the Toogood Pond Study Area are given in relation to the regional targets for natural heritage in the TRCA jurisdiction. To reach the regional targets for quality distribution and quantity of natural cover, every site will require its own individualized plan of action. Following is a short summary of the study area within the regional context, followed by specific recommendations.

5.1 Site Summary

1. The site is located in the middle reaches of the Rouge watershed, at the confluence of two tributaries: Berczy Creek and Bruce Creek. As such the natural cover at the site fills an important function in helping to maintain a viable connection between the rural landscape to the north of the city and important staging areas for migrant birds located in the lower reaches of the Rouge River and the Lake Ontario shoreline.
2. Forty vegetation types were observed, ranging from mature mixed and deciduous forest to shallow marsh and aquatic communities. The site includes 19 forest, 12 wetland, 3 aquatic, 5 successional and 1 meadow vegetation community types. This is a rather high community diversity given the size of the site (34 ha) and reflects the presence of pre-existing fragments of older vegetation types, more recent plantings and natural regeneration, and especially, streams and ponds.
3. Several small wetlands (natural and created) are located throughout the site providing breeding opportunities for small but persistent populations of two frog and one toad species, and the potential for two additional species – such populations are significant in this urbanizing landscape.

4. The wetlands and aquatic habitat at the site provide habitat opportunities for two native turtle species, including the common snapping turtle, a Species at Risk. Unfortunately, the largest pond has also been stocked with the non-native red-eared slider – a species that competes with the smaller, native midland painted turtle for food and important basking space.
5. Three hundred and twenty flora species were observed including 10 plants ranked L3 considered flora species of regional concern, plus an additional 45 species of concern in urban areas (L4). Many of these species are associated with the forest and wetland vegetation communities. Total species richness is rather high for the size of the site but it includes a large component of exotic species (L+) that reflect the surrounding urban land use.
6. There is good representation of wetland species typical of both open marsh such as awned sedge and shaded swamp such as Clinton's wood fern. The wetland species persist in spite of being sensitive to urban impacts.
7. Plantings include a range of species from desirable natives such as river bulrush to interesting arboretum plantings such as bald cypress, to aggressive invasive exotics such as oriental bittersweet.
8. The 60 species of vertebrate fauna observed is a total which is to be expected for a medium sized forest patch embedded at the edge of the urban landscape within the Toronto region. At just 34 ha Toogood Pond might be considered to be a little better than expected.
9. The forest canopy at Toogood Pond supports several pairs of forest-dependent bird species: five pairs of red-eyed vireos, three pairs of blue-grey graycatchers, and four pairs of eastern wood-pewees.
10. Despite the low richness and representation in the breeding bird population, the site is potentially important for migrating songbirds moving to and from migrant staging areas on the Lake Ontario shoreline.
11. Given the site's urban location there is considerable potential to use the natural habitats at Toogood Pond as interpretive and educational opportunities in this growing urban community.

5.2 Site Recommendations

The recommendations primarily address objectives of protecting regional biodiversity in the TRCA jurisdiction. In order to maintain or enhance the current level of biodiversity at the Toogood Pond Study Area, the overall integrity of the natural heritage system that includes the site must be protected. Therefore, at the landscape scale, in keeping with the TNHSS, connections to other natural habitat patches in the landscape need to be created and maintained. Furthermore, the

recommendations identify the issues that may occur with any increased public use of the Study Area as the urban landscape continues to expand. Local community stewardship needs to address this potential increase in negative matrix influence and ensure that effective mitigation is included as part of any future management of the site. This includes strategic placement of any interpretive signage, managing public use, allowing healthy dynamic natural processes to proceed, and controlling invasive species.

The following recommendations address the above natural heritage concerns, with an emphasis upon bolstering the existing natural features on site. Thus, we recommend overall that 1) existing habitats and features be protected and enhanced; 2) that public use be managed; and 3) that invasive species be controlled.

1. Protect and Enhance Existing Features

The first priority should be to focus on ***maintaining conditions that allow existing communities or species of conservation concern to thrive***. This is especially true of the wetlands and aquatic habitats throughout the site.

- a. Currently, the main pond is used extensively by local anglers and is therefore considered a valuable recreational facility. However, without diminishing this use there are opportunities to manage this water-body to better accommodate a more natural system. There is very little natural shoreline vegetation around much of the east, west and south sides of the pond. There is an opportunity for extensive native plantings along these shorelines which would serve as an effective buffer against run-off (primarily from goose droppings) from the manicured land that surrounds much of the pond.
- b. An investigation should be conducted into opportunities to extend the wetland component that is currently restricted to the north end of the pond along either shoreline. This management and restoration of wetland features associated with the pond may require drawing down the pond to re-grade the profile (taking care to ensure that this is done at a time when frog and turtle populations will be least affected), or perhaps the use of floating rafts seeded with native submergents.
- c. Away from the main pond, the wetland that appears to be in the worst condition is the monoculture of non-native cattail on the north side of Bruce Creek, upstream of the confluence with Berczy. This area should be investigated for the possibility of wetland restoration which in this case may require the excavation of new depressions within the cattail marsh.
- d. While it is important at this site to maintain the diversity of habitats, there are opportunities for extending the forest canopy along Berczy Creek towards 16th

Avenue. It should be noted that there is no expectation that sensitive low-nesting species will return to breed in the area but by enhancing the canopy there may be added opportunities for canopy-nesting species.

- e. Open habitat on the east side of Bruce Creek, north of the confluence of the two creeks, should be managed as a native meadow community, providing foraging opportunities for migrating monarch butterflies (*Danaus plexippus*) and migrant songbirds in the fall (primarily sparrows).
- f. Areas selected for restoration should have soil and moisture assessments conducted in order to help determine suitable lists of species for planting. If soil conditions are suitable consideration should be given to adding vernal pool features.
- g. Ensure effective and adequate passage (e.g. tunnels and culverts) for frogs, snakes and mammals across or under trails.
- h. Given the management requirement to remove hazard trees in the vicinity of trails, providing properly constructed and fully-monitored nest-boxes would enhance opportunities for species such as great-crested flycatcher (*Myiarchus crinitus*), and increase the likelihood of recruitment of other cavity-nesters such as eastern screech-owl (*Megascops asio*).
- i. Hydrology should be restored in the valley areas upstream of the pond, especially the mixed forest and swamp communities. Measures that would help toward this end would be the disconnection of roof leaders and adding soak-away pits in the adjacent residential neighbourhoods, and blocking any drains or ditches that might convey ground water away from the seepage areas.

2. Manage Public Use

Landscape metrics indicate that the existing matrix influence at this urban-edge site is largely negative. The impact of these urban influences is undoubtedly exacerbated by the disturbance that occurs along the trails. Visitor pressure is likely to increase in the future, and it is important that this increase in use does not impact sensitive habitat features such as the wetlands.

- a. Extensive use of interpretive signs, augmenting the already impressive series of signs posted throughout the northern section of the trail system, should serve to foster greater community involvement and awareness of the natural history of the

site. For example, signage along the pond shoreline describing the negative impacts of releasing non-native turtles and frogs into the natural system.

- b. Given the highly urbanized landscape and the small size of the habitat blocks, dogs are currently probably having little additional impact on the site. As in all urban open spaces dogs are frequently allowed to roam off-leash – despite local by-laws to the contrary - but other than the potential disturbance of wetland habitats this is probably more of a human safety issue than a significant threat to the wildlife on site. Wetlands should be clearly signposted regarding the need to keep dogs out of water-bodies and out of sensitive wetland vegetation. Ideally, the leash-by-law should be properly enforced.
- c. Involving the local community in any restoration efforts at Toogood Pond will enhance feelings of good stewardship, which in turn will result in more ecologically positive behaviour, e.g. responsible gardening practices including proper disposal of yard waste; diminished use of salt on paved surfaces in close proximity to the site; responsible dog-ownership; proper treatment of unwanted pets (i.e. red-eared slider). The stewardship could be implemented as part of a Sustainable Neighbourhood Action Plan (SNAP).

3. Control Invasive Species

Several invasive plant species are threats to the native biodiversity at Toogood Pond. ***It is essential that well-planned and realistic measures be undertaken to control invasive species.*** Management for invasive species will need to be tailored to the individual species in question, depending on how wide-spread and established they are.

- a. Since most of the invasive species at the site have large and/or diffuse populations, the best approach is to control disturbance that would aid their further spread rather than eradication efforts. For example, trailside plantings of competitive native ground covers such as bloodroot (*Sanguinaria canadensis*) and discouraging dumping would reduce the disturbance that encourages garlic mustard.
- b. Oriental bittersweet and common reed might be realistic candidates for eradication efforts from Toogood Pond. These two species are currently present in discrete populations but have a high potential for spread. Their removal would thus be both feasible and have a highly protective effect on biodiversity.
- c. Invasive species control should be undertaken as a proactive maintenance measure along the trail corridors as well as to any other areas targeted for restoration planting. This would include local removal of dog-strangling vine,

buckthorn, multiflora rose, and other species that are widespread across the site as a whole.

- d. The population of introduced red-eared sliders in the main Toogood Pond should be trapped and removed, preferably transferred to a turtle rescue facility. The local community should be informed of the reason behind such management, and perhaps even involved in the actual removal of sliders. Such involvement will perhaps reduce the likelihood of further releases.
- e. Research should be conducted into the origin and status of the local bullfrog population. If it is determined that the species was introduced into the area, steps should be taken to remove the species from the site and a program of local community education should be initiated to prevent further releases.
- f. Emerald ash borer is now in Scarborough, very close to Toogood Pond. This insect is likely to arrive imminently and will kill many ash trees. Dead trees near trails will become hazards and expensive to remove. Trail alignments should be directed away from dense ash populations. At the same time, areas with ash should be targeted for control of other invasive species that are likely to take advantage of the increased light resulting from loss of ash in the canopy.

6.0 References

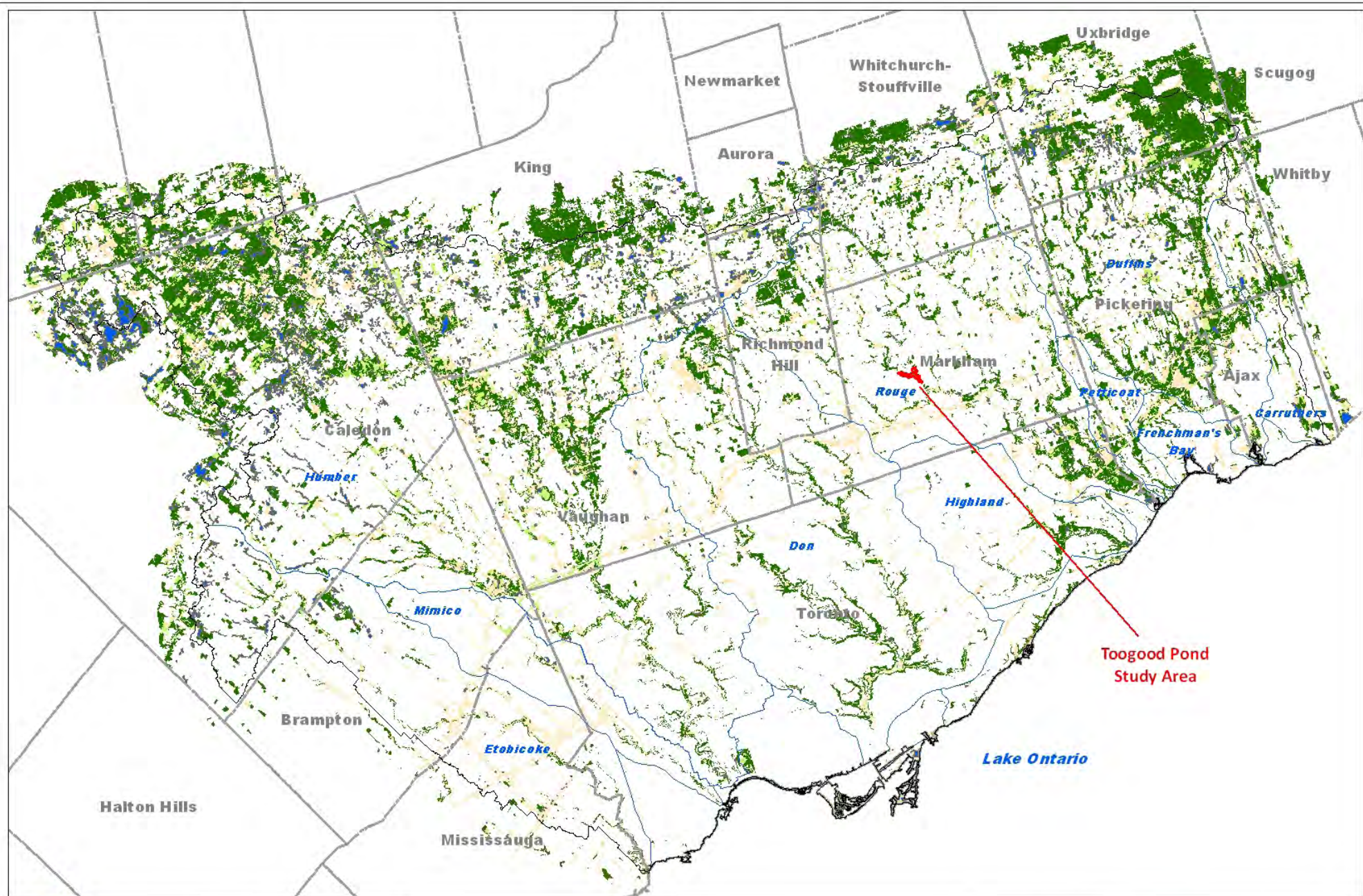
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Date: February 2013
 * Landscape analysis based on 2007/2008 Orthophotography

Map 1:
Toogood Pond in the
Context of Regional Natural Cover

| Natural Cover * | | Legend | |
|---|--------------|---|----------------------------------|
|  | Forest |  | Toogood Pond Study Area Boundary |
|  | Successional |  | TRCA Jurisdiction |
|  | Meadow |  | Watershed |
|  | Wetland |  | Municipal Boundary |
|  | Beach/Bluff | | |




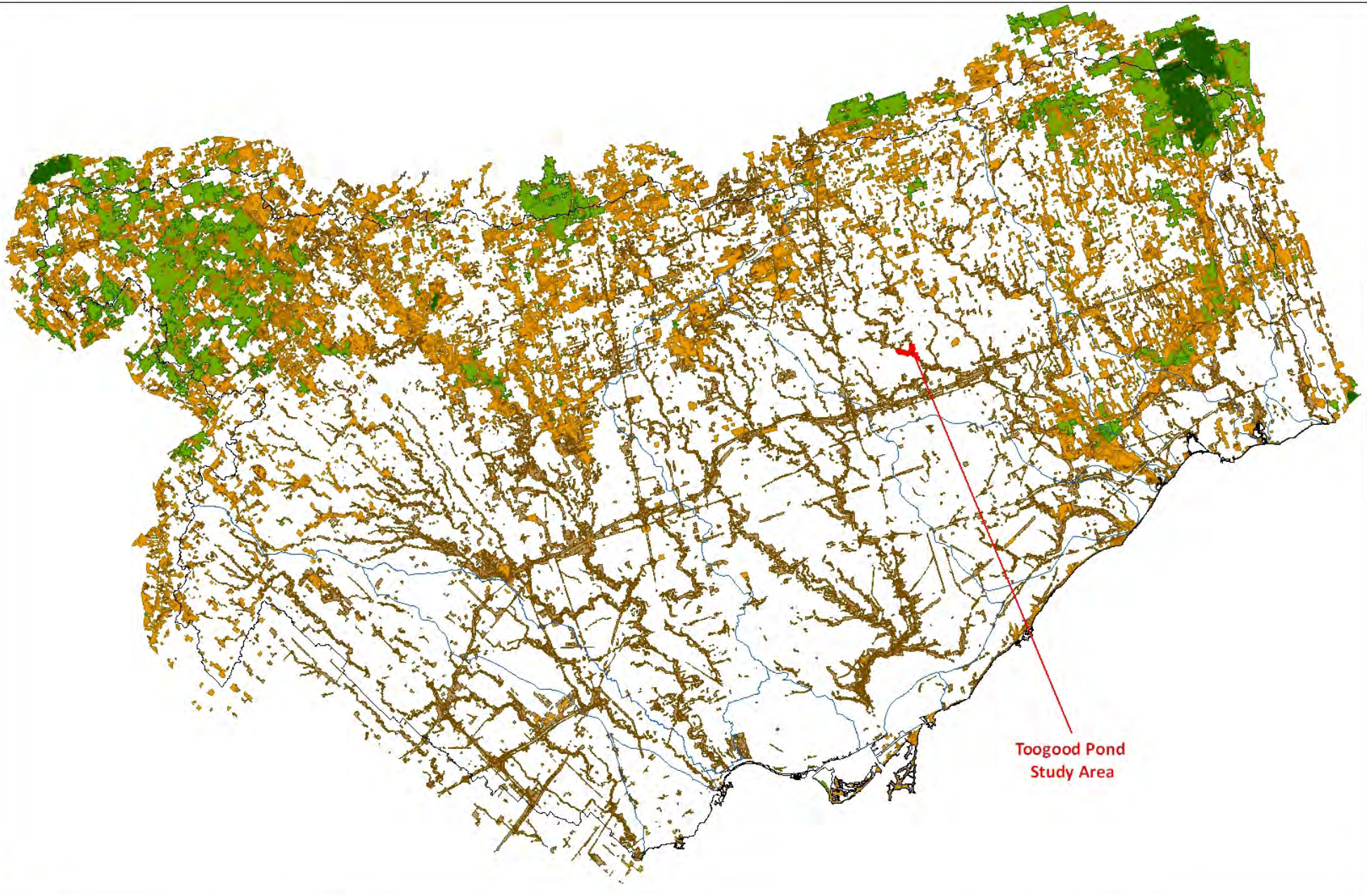
0 50 100 200 300 400
Meters

Date: February 2013
Orthophoto: Spring 2011, First Base
Solutions Inc.

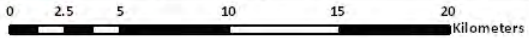
Map 2: Toogood Pond Study Area

Legend

 Toogood Pond Study Area Boundary



Toogood Pond Study Area

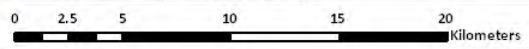
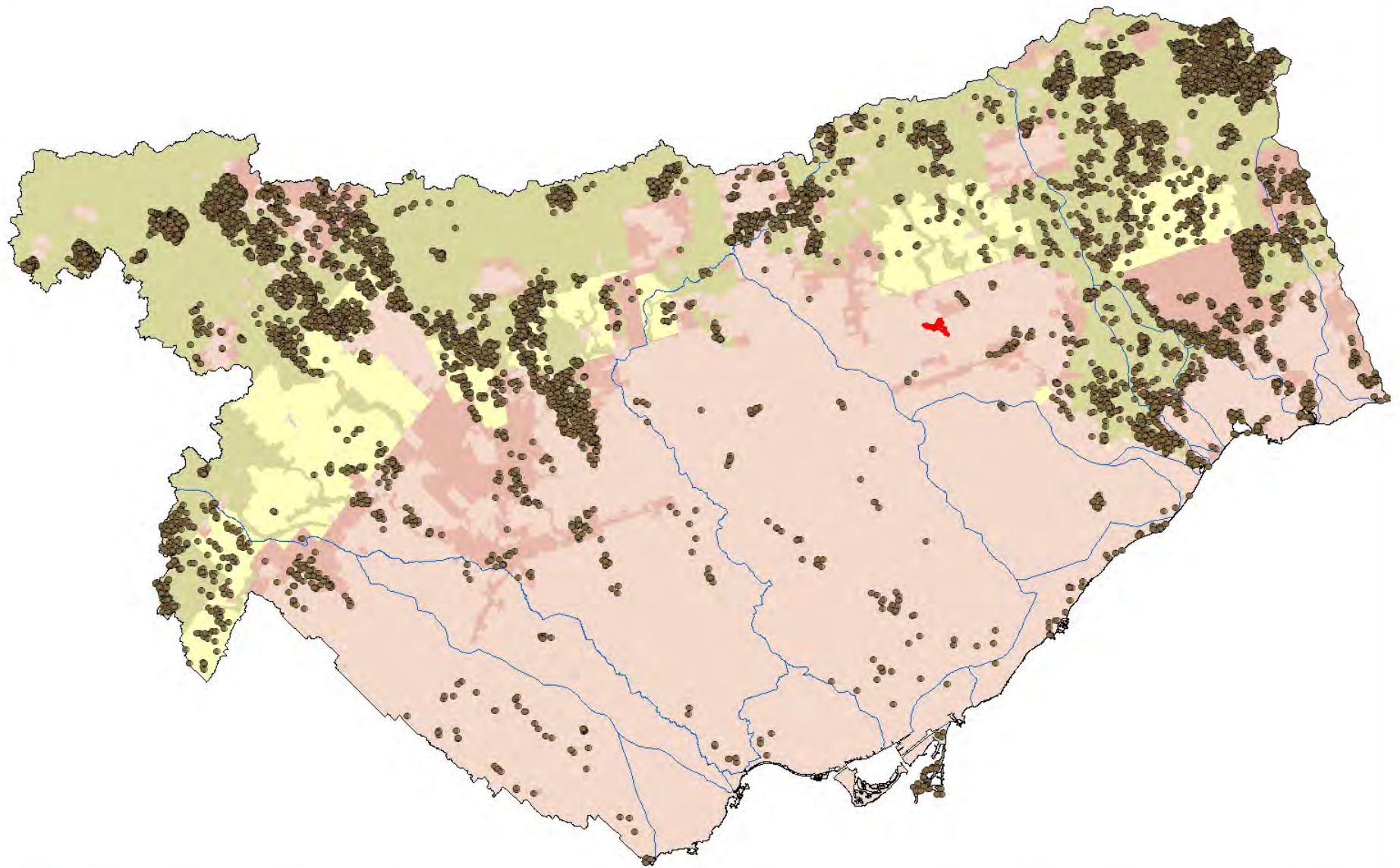


Date: February 2013

* Landscape analysis based on 2007/2008 Orthophotography

Map 3: Regional Natural System Habitat Patch Quality









| Habitat Patch Quality * | | Legend | |
|-------------------------|----------------|--------|----------------------------------|
| | L1 - Excellent | | Toogood Pond Study Area Boundary |
| | L2 - Good | | TRCA Jurisdiction |
| | L3 - Fair | | Watershed |
| | L4 - Poor | | |
| | L5 - Very Poor | | |

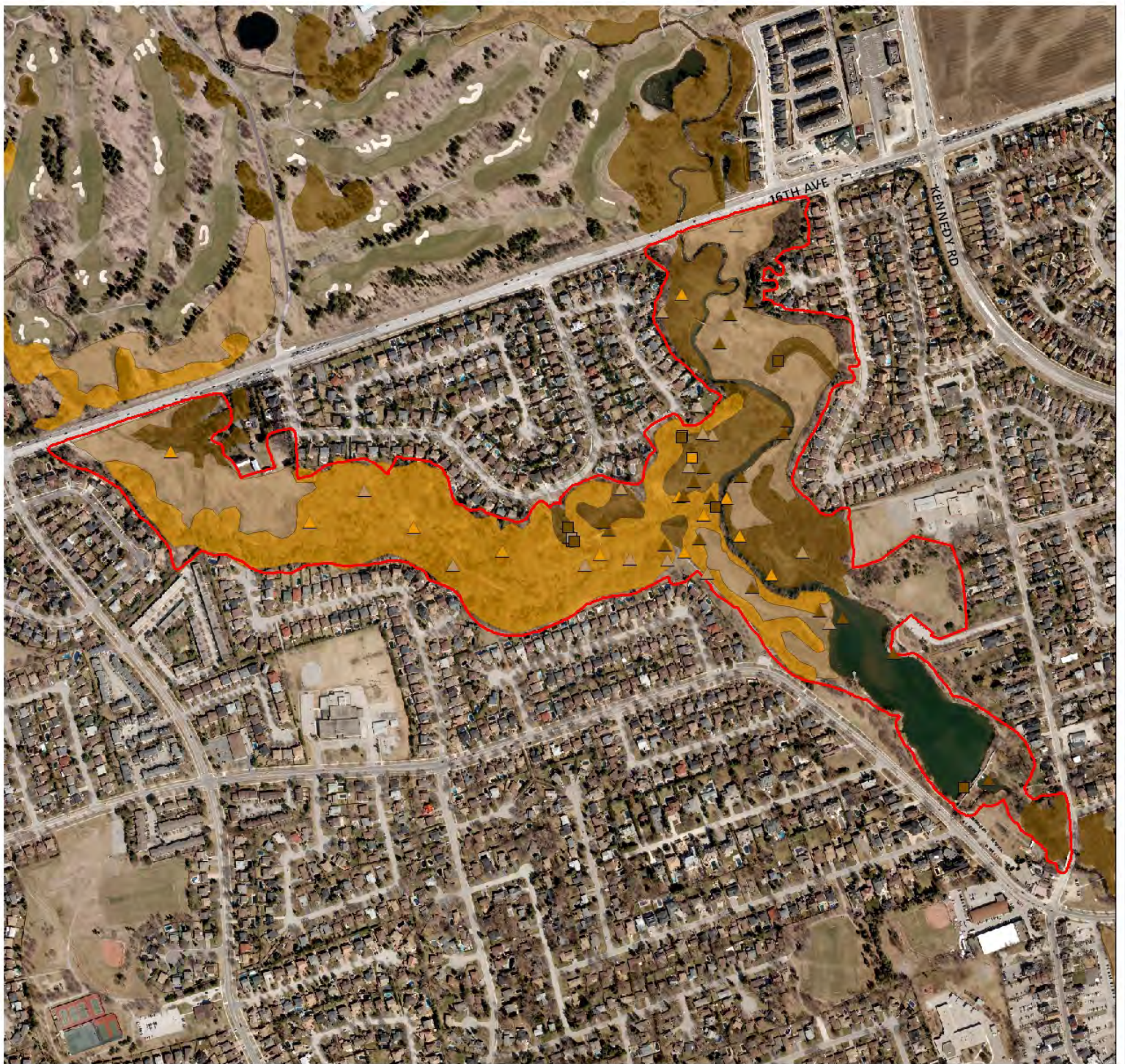


Date: February 2013

Map 4: Distribution of Fauna Regional Species of Concern

Legend

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



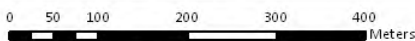
Fauna Area Sensitivity Scores

- ▲ 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



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Orthophoto: Spring 2011, First Base Solutions Inc.

* Landscape analysis based on 2007/2008 Orthophotography

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

Legend

- Toogood Pond 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



0 50 100 200 300 400 Meters

Date: February 2013

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

□ Toogood Pond Study Area Boundary

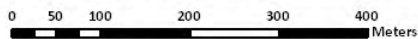


Fauna Sensitivity to Development Scores

- ▲ ■ 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



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

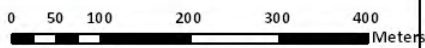
**Map 7:
 Scores for Matrix Influence
 and Fauna Sensitivity to
 Development**

Legend

Habitat Matrix Influence Scores *

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

□ Toogood Pond Study Area Boundary



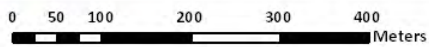
Date: February 2103
 Orthophoto: Spring 2011, First Base Solutions Inc.
 * Landscape analysis based on 2007/2008
 Orthophotography

Map 8: Habitat Patch Quality

Legend

Habitat Patch Quality *

- L1 - Excellent
 - L2 - Good
 - L3 - Fair
 - L4 - Poor
 - L5 - Very Poor
- Toogood Pond Study Area Boundary










Date: February 2013
Orthophoto: Spring 2011, First Base
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Map 9: Vegetation Communities with their Associated Local Ranks

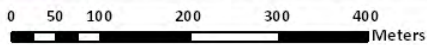
Legend

Vegetation Community Ranks

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

 Toogood Pond Study Area Boundary

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



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Map 10: Location of Flora Species of Concern

Legend

Flora Species of Concern (L1-L4)

- L1
- L2

Planted Flora Species of Concern (L1-L4)

- L3
- L4

Toogood Pond Study Area Boundary

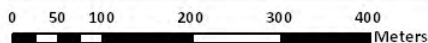
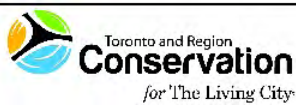


Flora Habitat Dependence Scores

- 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.

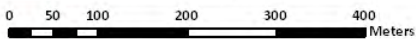


Date: February 2013
 Orthophoto: Spring 2011, First Base Solutions Inc.

**Map 11:
 Flora Species Habitat
 Dependence Scores**

Legend

- Toogood Pond Study Area Boundary



Date: February 2013
 Orthophoto: Spring 2011, First Base
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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 |
| Toogood Pond Study Area Boundary | | | |



Fauna Habitat Dependence Scores

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

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



0 50 100 200 300 400 Meters

Date: February 2013
 Orthophoto: Spring 2011, First Base Solutions Inc.

**Map 14:
 Fauna Species
 Habitat Dependence
 Scores**

Legend

- Toogood Pond Study Area Boundary
- △ Fauna Species
- Frog Species

| Appendix 1: Toogood Pond Vegetation Communities (2012) | | | | | | |
|---|---|----------------------|-----------------|--------------------|----------------|----------------------------|
| ELC Code | Vegetation Type (* indicates present as inclusion and/or complex only) | Tot. area # ha | Scores | | | Local Rank (2012-08) |
| | | | Local Occur. | Geophy. Requir. | Total Score | |
| Forest | | | | | | |
| FOC4-1 | Fresh-Moist White Cedar Coniferous Forest | 0.7 | 2.0 | 2.0 | 4.0 | L4 |
| FOM7-2 | Fresh-Moist White Cedar - Hardwood Mixed Forest | 1.4 | 1.5 | 2.0 | 3.5 | L4 |
| FOD5-6 | Dry-Fresh Sugar Maple - Basswood Deciduous Forest | 0.4 | 2.5 | 0.0 | 2.5 | L5 |
| FOD7-2 | Fresh-Moist Ash Deciduous Forest | 0.3 | 2.0 | 1.0 | 3.0 | L4 |
| FOD7-3 | Fresh-Moist Willow Lowland Deciduous Forest | 2.3 | 2.0 | 0.0 | 2.0 | L5 |
| FOD7-a | Fresh-Moist Manitoba Maple Lowland Deciduous Forest | 6.2 | 1.5 | 0.0 | 1.5 | L5 |
| FOD7-E | Fresh-Moist Hawthorn - Apple Deciduous Forest | 0.2 | 2.5 | 0.0 | 2.5 | L5 |
| FOD8-1 | Fresh-Moist Poplar Deciduous Forest | 0.1 | 1.0 | 0.0 | 1.0 | L5 |
| FOD9-1 | Fresh-Moist Oak - Sugar Maple Deciduous Forest | 0.4 | 3.0 | 2.0 | 5.0 | L3 |
| FOD9-3 | Fresh-Moist Bur Oak Deciduous Forest | 0.3 | 3.0 | 1.0 | 4.0 | L4 |
| CUP1-4 | Hybrid Poplar Deciduous Plantation | 0.1 | 3.0 | 0.0 | 3.0 | L5 |
| CUP1-5 | Silver Maple Deciduous Plantation | 0.03 | 3.0 | 0.0 | 3.0 | L5 |
| *CUP1-7 | *Red (Green) Ash Deciduous Plantation | | 3.0 | 0.0 | 3.0 | L5 |
| CUP1-A | Restoration Deciduous Plantation | 0.1 | 2.0 | 0.0 | 2.0 | L5 |
| CUP1-b | Willow Deciduous Plantation | 0.1 | 3.0 | 0.0 | 3.0 | L5 |
| CUP2-A | Restoration Mixed Plantation | 0.5 | 2.5 | 0.0 | 2.5 | L5 |
| CUP3-3 | Scotch Pine Coniferous Plantation | 0.2 | 2.0 | 0.0 | 2.0 | L+ |
| CUP3-e | Norway Spruce Coniferous Plantation | 0.1 | 2.0 | 0.0 | 2.0 | L+ |
| *CUP3-H | *Mixed Conifer Coniferous Plantation | | 1.5 | 0.0 | 1.5 | L5 |
| Successional | | | | | | |
| CUT1-1 | Sumac Deciduous Thicket | 0.1 | 2.0 | 0.0 | 2.0 | L5 |
| CUS1-A1 | Native Deciduous Successional Savannah | 1.2 | 1.5 | 0.0 | 1.5 | L5 |
| CUW1-A3 | Native Deciduous Successional Woodland | 0.2 | 1.0 | 0.0 | 1.0 | L5 |
| CUW1-b | Exotic Successional Woodland | 0.7 | 1.5 | 0.0 | 1.5 | L+ |
| CUW1-D | Hawthorn Successional Woodland | 0.3 | 2.5 | 0.0 | 2.5 | L5 |
| Wetland | | | | | | |
| SWM1-1 | White Cedar - Hardwood Mineral Mixed Swamp | 0.2 | 2.5 | 2.0 | 4.5 | L4 |
| SWD2-2 | Red (Green) Ash Mineral Deciduous Swamp | 0.1 | 2.5 | 2.0 | 4.5 | L4 |
| SWD4-1 | Willow Mineral Deciduous Swamp | 3.4 | 2.0 | 1.0 | 3.0 | L4 |
| SWD4-3 | Paper Birch - Poplar Mineral Deciduous Swamp | | 2.0 | 2.0 | 4.0 | L4 |

Appendix 1: Toogood Pond Vegetation Communities (2012)

| ELC Code | Vegetation Type (* indicates present as inclusion and/or complex only) | Tot. area # ha | Scores | | | Local Rank (2012-08) |
|----------------|---|----------------------|-----------------|--------------------|----------------|----------------------------|
| | | | Local Occur. | Geophy. Requir. | Total Score | |
| SWT2-a | Exotic Mineral Thicket Swamp | 0.1 | 3.5 | 1.0 | 4.5 | L+ |
| MAM2-2 | Reed Canary Grass Mineral Meadow Marsh | 0.7 | 1.0 | 1.0 | 2.0 | L+ |
| MAM2-6 | Broad-leaved Sedge Mineral Meadow Marsh | 0.5 | 3.0 | 2.0 | 5.0 | L3 |
| MAM2-10 | Forb Mineral Meadow Marsh | 1.5 | 2.0 | 1.0 | 3.0 | L4 |
| MAS2-1A | Broad-leaved Cattail Mineral Shallow Marsh | 0.2 | 2.0 | 1.0 | 3.0 | L4 |
| MAS2-1b | Narrow-Leaved Cattail Mineral Shallow Marsh | 1.6 | 2.0 | 0.0 | 2.0 | L+ |
| MAS2-4 | Broad-leaved Sedge Mineral Shallow Marsh | 0.1 | 3.5 | 2.0 | 5.5 | L3 |
| MAS2-a | Common Reed Mineral Shallow Marsh | 0.1 | 3.0 | 0.0 | 3.0 | L+ |
| Aquatic | | | | | | |
| SAM1-2 | Duckweed Mixed Shallow Aquatic | 0.1 | 3.0 | 2.0 | 5.0 | L3 |
| SAF1-3 | Duckweed Floating-leaved Shallow Aquatic | 0.1 | 2.5 | 1.0 | 3.5 | L4 |
| OAO1-T | Turbid Open Aquatic (disturbed unvegetated) | 5.3 | 2.0 | 0.0 | 2.0 | L+ |
| Meadow | | | | | | |
| CUM1-A | Native Forb Meadow | 2.8 | 1.5 | 0.0 | 1.5 | L5 |

| Appendix 2: Toogood Pond Flora Species (2012) | | Local | Popn. | Hab. | Sens. | Total | Rank |
|---|--------------------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Carex alopecoidea</i> | foxtail wood sedge | 2 | 3 | 5 | 4 | 14 | L3 |
| <i>Carex atherodes</i> | awned sedge | 3 | 3 | 5 | 4 | 15 | L3 |
| <i>Chelone glabra</i> | turtlehead | 2 | 3 | 4 | 5 | 14 | L3 |
| <i>Circaea alpina</i> | smaller enchanter's nightshade | 2 | 4 | 5 | 4 | 15 | L3 |
| <i>Cyperus bipartitus</i> | two-parted umbrella-sedge | 3 | 3 | 4 | 4 | 14 | L3 |
| <i>Dryopteris clintoniana</i> | Clinton's wood fern | 2 | 4 | 5 | 4 | 15 | L3 |
| <i>Pilea fontana</i> | spring clearweed | 2 | 4 | 4 | 4 | 14 | L3 |
| <i>Prunus nigra</i> | Canada plum | 2 | 4 | 4 | 4 | 14 | L3 |
| <i>Ribes triste</i> | swamp red currant | 2 | 4 | 4 | 5 | 15 | L3 |
| <i>Teucrium canadense</i> ssp. <i>canadense</i> | wood-sage | 3 | 3 | 4 | 4 | 14 | L3 |
| <i>Acer rubrum</i> | red maple | 2 | 4 | 1 | 5 | 12 | L4 |
| <i>Acer saccharum</i> ssp. <i>nigrum</i> | black maple | 2 | 3 | 4 | 2 | 11 | L4 |
| <i>Acer spicatum</i> | mountain maple | 2 | 3 | 4 | 4 | 13 | L4 |
| <i>Betula alleghaniensis</i> | yellow birch | 1 | 4 | 3 | 5 | 13 | L4 |
| <i>Betula papyrifera</i> | paper birch | 1 | 4 | 2 | 4 | 11 | L4 |
| <i>Bidens tripartita</i> | three-parted beggar's-ticks | 3 | 2 | 4 | 2 | 11 | L4 |
| <i>Caltha palustris</i> | marsh marigold | 2 | 4 | 3 | 4 | 13 | L4 |
| <i>Calystegia sepium</i> ssp. <i>americanum</i> | pink hedge bindweed | 5 | 2 | 3 | 2 | 12 | L4 |
| <i>Cardamine diphylla</i> | broad-leaved toothwort | 2 | 3 | 4 | 4 | 13 | L4 |
| <i>Cardamine maxima</i> | hybrid toothwort | 3 | 3 | 3 | 3 | 12 | L4 |
| <i>Carex aurea</i> | golden-fruited sedge | 2 | 2 | 4 | 4 | 12 | L4 |
| <i>Carex deweyana</i> | Dewey's sedge | 2 | 4 | 3 | 3 | 12 | L4 |
| <i>Carex gracillima</i> | graceful sedge | 2 | 3 | 4 | 2 | 11 | L4 |
| <i>Carex lacustris</i> | lake-bank sedge | 2 | 3 | 3 | 4 | 12 | L4 |
| <i>Cicuta bulbifera</i> | bulblet-bearing water-hemlock | 2 | 3 | 4 | 3 | 12 | L4 |
| <i>Corylus cornuta</i> | beaked hazel | 2 | 4 | 3 | 4 | 13 | L4 |
| <i>Crataegus</i> cf. <i>coccinea</i> var. <i>coccinea</i> | scarlet hawthorn | 3 | 2 | 3 | 3 | 11 | L4 |
| <i>Crataegus macracantha</i> | long-spined hawthorn | 2 | 2 | 4 | 3 | 11 | L4 |
| <i>Cuscuta gronovii</i> | swamp dodder | 2 | 3 | 3 | 3 | 11 | L4 |
| <i>Cystopteris bulbifera</i> | bulblet fern | 1 | 3 | 4 | 4 | 12 | L4 |
| <i>Equisetum variegatum</i> ssp. <i>variegatum</i> | variegated scouring-rush | 2 | 2 | 5 | 4 | 13 | L4 |
| <i>Eupatorium perfoliatum</i> | boneset | 1 | 3 | 4 | 3 | 11 | L4 |
| <i>Fraxinus nigra</i> | black ash | 1 | 4 | 4 | 3 | 12 | L4 |
| <i>Lactuca biennis</i> | tall blue lettuce | 3 | 4 | 2 | 4 | 13 | L4 |
| <i>Leersia virginica</i> | white grass | 3 | 2 | 5 | 3 | 13 | L4 |
| <i>Lilium michiganense</i> | Michigan lily | 1 | 4 | 3 | 5 | 13 | L4 |
| <i>Lycopus americanus</i> | cut-leaved water-horehound | 1 | 4 | 3 | 3 | 11 | L4 |
| <i>Lycopus uniflorus</i> | northern water-horehound | 2 | 3 | 3 | 3 | 11 | L4 |
| <i>Pinus strobus</i> | white pine | 1 | 4 | 3 | 4 | 12 | L4 |
| <i>Populus grandidentata</i> | large-toothed aspen | 1 | 3 | 4 | 3 | 11 | L4 |
| <i>Potamogeton foliosus</i> | leafy pondweed | 1 | 3 | 5 | 4 | 13 | L4 |

| Appendix 2: Toogood Pond Flora Species (2012) | | Local | Popn. | Hab. | Sens. | Total | Rank |
|---|--------------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Prunella vulgaris</i> ssp. <i>lanceolata</i> | heal-all (native) | 4 | 2 | 3 | 2 | 11 | L4 |
| <i>Quercus macrocarpa</i> | bur oak | 2 | 4 | 3 | 3 | 12 | L4 |
| <i>Ranunculus hispidus</i> var. <i>caricetorum</i> | swamp buttercup | 2 | 4 | 4 | 3 | 13 | L4 |
| <i>Ranunculus recurvatus</i> var. <i>recurvatus</i> | hooked buttercup | 3 | 3 | 2 | 3 | 11 | L4 |
| <i>Rosa blanda</i> | smooth wild rose | 2 | 3 | 3 | 4 | 12 | L4 |
| <i>Rubus pubescens</i> | dwarf raspberry | 2 | 3 | 3 | 5 | 13 | L4 |
| <i>Rudbeckia hirta</i> | black-eyed Susan | 1 | 4 | 4 | 3 | 12 | L4 |
| <i>Sagittaria latifolia</i> | common arrowhead | 2 | 2 | 5 | 4 | 13 | L4 |
| <i>Salix bebbiana</i> | Bebb's willow | 2 | 3 | 3 | 4 | 12 | L4 |
| <i>Schoenoplectus tabernaemontani</i> | soft-stemmed bulrush | 1 | 2 | 5 | 3 | 11 | L4 |
| <i>Spirodela polyrhiza</i> | greater duckweed | 1 | 4 | 5 | 3 | 13 | L4 |
| <i>Thuja occidentalis</i> | white cedar | 1 | 4 | 1 | 5 | 11 | L4 |
| <i>Typha latifolia</i> | broad-leaved cattail | 1 | 4 | 4 | 4 | 13 | L4 |
| <i>Viola pubescens</i> var. <i>scabriuscula</i> | smooth yellow violet | 5 | 4 | 1 | 2 | 12 | L4 |
| <i>Acalypha rhomboidea</i> | three-seeded mercury | 4 | 1 | 2 | 0 | 7 | L5 |
| <i>Acer saccharum</i> ssp. <i>saccharum</i> | sugar maple | 2 | 3 | 0 | 2 | 7 | L5 |
| <i>Achillea millefolium</i> ssp. <i>lanulosa</i> | woolly yarrow | 3 | 2 | 0 | 1 | 6 | L5 |
| <i>Actaea rubra</i> ssp. <i>rubra</i> | red baneberry | 2 | 3 | 1 | 3 | 9 | L5 |
| <i>Ageratina altissima</i> var. <i>altissima</i> | white snakeroot | 2 | 2 | 2 | 1 | 7 | L5 |
| <i>Ambrosia artemisiifolia</i> | common ragweed | 2 | 1 | 3 | 0 | 6 | L5 |
| <i>Amphicarpaea bracteata</i> | hog-peanut | 2 | 2 | 2 | 2 | 8 | L5 |
| <i>Anemone canadensis</i> | Canada anemone | 2 | 2 | 2 | 2 | 8 | L5 |
| <i>Anemone virginiana</i> | common thimbleweed | 3 | 3 | 0 | 3 | 9 | L5 |
| <i>Arisaema triphyllum</i> | Jack-in-the-pulpit | 1 | 3 | 2 | 3 | 9 | L5 |
| <i>Asclepias syriaca</i> | common milkweed | 2 | 2 | 0 | 2 | 6 | L5 |
| <i>Athyrium filix-femina</i> var. <i>angustum</i> | northeastern lady fern | 2 | 3 | 1 | 3 | 9 | L5 |
| <i>Bidens cernua</i> | nodding bur-marigold | 2 | 2 | 3 | 3 | 10 | L5 |
| <i>Bidens frondosa</i> | common beggar's-ticks | 2 | 1 | 4 | 0 | 7 | L5 |
| <i>Carex blanda</i> | common wood sedge | 2 | 2 | 1 | 2 | 7 | L5 |
| <i>Carex granularis</i> | meadow sedge | 3 | 2 | 1 | 3 | 9 | L5 |
| <i>Carex vulpinoidea</i> | fox sedge | 2 | 2 | 4 | 1 | 9 | L5 |
| <i>Cicuta maculata</i> | spotted water-hemlock | 2 | 2 | 2 | 2 | 8 | L5 |
| <i>Circaea canadensis</i> ssp. <i>canadensis</i> | enchanter's nightshade | 2 | 1 | 1 | 1 | 5 | L5 |
| <i>Clematis virginiana</i> | virgin's bower | 2 | 2 | 2 | 3 | 9 | L5 |
| <i>Cornus alternifolia</i> | alternate-leaved dogwood | 2 | 2 | 1 | 2 | 7 | L5 |
| <i>Cornus stolonifera</i> | red osier dogwood | 2 | 2 | 0 | 3 | 7 | L5 |
| <i>Crataegus punctata</i> | dotted hawthorn | 2 | 2 | 3 | 3 | 10 | L5 |
| <i>Cryptotaenia canadensis</i> | honestwort | 2 | 2 | 4 | 1 | 9 | L5 |
| <i>Dryopteris carthusiana</i> | spinulose wood fern | 2 | 3 | 2 | 2 | 9 | L5 |
| <i>Echinocystis lobata</i> | wild cucumber | 2 | 2 | 3 | 1 | 8 | L5 |
| <i>Eleocharis erythropoda</i> | creeping spike-rush | 2 | 2 | 4 | 1 | 9 | L5 |

| Appendix 2: Toogood Pond Flora Species (2012) | | Local | Popn. | Hab. | Sens. | Total | Rank |
|--|---------------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Elymus virginicus</i> var. <i>virginicus</i> | Virginia wild rye | 3 | 2 | 3 | 2 | 10 | L5 |
| <i>Epilobium ciliatum</i> ssp. <i>ciliatum</i> | sticky willow-herb | 3 | 2 | 2 | 2 | 9 | L5 |
| <i>Equisetum arvense</i> | field horsetail | 2 | 2 | 1 | 1 | 6 | L5 |
| <i>Erigeron annuus</i> | daisy fleabane | 2 | 2 | 0 | 1 | 5 | L5 |
| <i>Erigeron canadensis</i> | horse-weed | 3 | 1 | 2 | 0 | 6 | L5 |
| <i>Erigeron philadelphicus</i> var. <i>philadelphicus</i> | Philadelphia fleabane | 3 | 2 | 0 | 1 | 6 | L5 |
| <i>Erythronium americanum</i> ssp. <i>americanum</i> | yellow trout-lily | 2 | 3 | 3 | 2 | 10 | L5 |
| <i>Euthamia graminifolia</i> | grass-leaved goldenrod | 2 | 1 | 4 | 1 | 8 | L5 |
| <i>Eutrochium maculatum</i> var. <i>maculatum</i> | spotted Joe-Pye weed | 2 | 2 | 3 | 3 | 10 | L5 |
| <i>Fragaria virginiana</i> | wild strawberry | 2 | 2 | 0 | 2 | 6 | L5 |
| <i>Fraxinus americana</i> | white ash | 2 | 2 | 0 | 3 | 7 | L5 |
| <i>Fraxinus pennsylvanica</i> | red ash | 1 | 2 | 0 | 3 | 6 | L5 |
| <i>Galium aparine</i> | cleavers | 3 | 1 | 3 | 2 | 9 | L5 |
| <i>Galium palustre</i> | marsh bedstraw | 2 | 2 | 3 | 3 | 10 | L5 |
| <i>Geum canadense</i> | white avens | 2 | 2 | 1 | 2 | 7 | L5 |
| <i>Hackelia virginiana</i> | Virginia stickseed | 2 | 2 | 0 | 2 | 6 | L5 |
| <i>Heracleum maximum</i> | cow-parsnip | 3 | 2 | 3 | 2 | 10 | L5 |
| <i>Hydrophyllum virginianum</i> | Virginia waterleaf | 2 | 2 | 1 | 2 | 7 | L5 |
| <i>Impatiens capensis</i> | orange touch-me-not | 2 | 2 | 0 | 2 | 6 | L5 |
| <i>Juglans nigra</i> | black walnut | 2 | 1 | 2 | 1 | 6 | L5 |
| <i>Juncus dudleyi</i> | Dudley's rush | 2 | 2 | 3 | 1 | 8 | L5 |
| <i>Juncus tenuis</i> | path rush | 3 | 2 | 1 | 1 | 7 | L5 |
| <i>Laportea canadensis</i> | wood nettle | 2 | 3 | 2 | 2 | 9 | L5 |
| <i>Leersia oryzoides</i> | rice cut grass | 2 | 2 | 3 | 2 | 9 | L5 |
| <i>Lemna minor</i> | common duckweed | 2 | 2 | 4 | 2 | 10 | L5 |
| <i>Lysimachia ciliata</i> | fringed loosestrife | 2 | 2 | 2 | 2 | 8 | L5 |
| <i>Maianthemum racemosum</i> ssp. <i>racemosum</i> | false Solomon's seal | 2 | 3 | 2 | 3 | 10 | L5 |
| <i>Matteuccia struthiopteris</i> var. <i>pennsylvanica</i> | ostrich fern | 2 | 2 | 2 | 2 | 8 | L5 |
| <i>Mentha arvensis</i> ssp. <i>borealis</i> | wild mint | 2 | 2 | 3 | 2 | 9 | L5 |
| <i>Monarda fistulosa</i> | wild bergamot | 2 | 3 | 2 | 3 | 10 | L5 |
| <i>Oenothera biennis</i> | common evening-primrose | 2 | 1 | 1 | 1 | 5 | L5 |
| <i>Onoclea sensibilis</i> | sensitive fern | 2 | 3 | 1 | 3 | 9 | L5 |
| <i>Oxalis stricta</i> | common yellow wood-sorrel | 5 | 1 | 1 | 1 | 8 | L5 |
| <i>Parthenocissus inserta</i> | thicket creeper | 2 | 2 | 0 | 1 | 5 | L5 |
| <i>Persicaria lapathifolia</i> | pale smartweed | 3 | 1 | 4 | 0 | 8 | L5 |
| <i>Physalis heterophylla</i> | clammy ground-cherry | 2 | 2 | 3 | 3 | 10 | L5 |
| <i>Pilea pumila</i> | dwarf clearweed | 2 | 2 | 1 | 1 | 6 | L5 |
| <i>Plantago rugelii</i> | red-stemmed plantain | 3 | 2 | 0 | 1 | 6 | L5 |
| <i>Poa palustris</i> | fowl meadow-grass | 2 | 2 | 3 | 2 | 9 | L5 |
| <i>Populus balsamifera</i> | balsam poplar | 2 | 2 | 3 | 2 | 9 | L5 |
| <i>Populus deltoides</i> | cottonwood | 2 | 1 | 4 | 1 | 8 | L5 |

| Appendix 2: Toogood Pond Flora Species (2012) | | Local | Popn. | Hab. | Sens. | Total | Rank |
|--|--------------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Populus tremuloides</i> | trembling aspen | 2 | 3 | 1 | 3 | 9 | L5 |
| <i>Prunus serotina</i> | black cherry | 2 | 2 | 0 | 2 | 6 | L5 |
| <i>Prunus virginiana</i> var. <i>virginiana</i> | choke cherry | 2 | 2 | 0 | 1 | 5 | L5 |
| <i>Ranunculus abortivus</i> | kidney-leaved buttercup | 2 | 3 | 1 | 2 | 8 | L5 |
| <i>Rhus typhina</i> | staghorn sumach | 2 | 1 | 2 | 2 | 7 | L5 |
| <i>Ribes americanum</i> | wild black currant | 2 | 3 | 2 | 2 | 9 | L5 |
| <i>Rubus idaeus</i> ssp. <i>strigosus</i> | wild red raspberry | 1 | 1 | 0 | 1 | 3 | L5 |
| <i>Rubus occidentalis</i> | wild black raspberry | 2 | 1 | 0 | 1 | 4 | L5 |
| <i>Salix interior</i> | sandbar willow | 2 | 1 | 5 | 2 | 10 | L5 |
| <i>Sambucus canadensis</i> | common elderberry | 2 | 3 | 2 | 2 | 9 | L5 |
| <i>Sambucus racemosa</i> ssp. <i>pubens</i> | red-berried elder | 2 | 3 | 2 | 2 | 9 | L5 |
| <i>Scirpus microcarpus</i> | barber-pole bulrush | 1 | 2 | 4 | 3 | 10 | L5 |
| <i>Scutellaria galericulata</i> | common skullcap | 3 | 2 | 3 | 2 | 10 | L5 |
| <i>Solidago altissima</i> | tall goldenrod | 2 | 2 | 0 | 0 | 4 | L5 |
| <i>Solidago canadensis</i> var. <i>canadensis</i> | Canada goldenrod | 2 | 2 | 0 | 1 | 5 | L5 |
| <i>Solidago flexicaulis</i> | zig-zag goldenrod | 2 | 1 | 3 | 2 | 8 | L5 |
| <i>Solidago gigantea</i> | late goldenrod | 3 | 1 | 1 | 1 | 6 | L5 |
| <i>Solidago nemoralis</i> ssp. <i>nemoralis</i> | grey goldenrod | 3 | 2 | 2 | 2 | 9 | L5 |
| <i>Symphotrichum cordifolium</i> | heart-leaved aster | 2 | 1 | 0 | 2 | 5 | L5 |
| <i>Symphotrichum ericoides</i> var. <i>ericoides</i> | heath aster | 2 | 1 | 2 | 1 | 6 | L5 |
| <i>Symphotrichum lanceolatum</i> var. <i>lanceolatum</i> | panicked aster | 2 | 2 | 3 | 1 | 8 | L5 |
| <i>Symphotrichum lateriflorum</i> var. <i>lateriflorum</i> | calico aster | 2 | 2 | 3 | 2 | 9 | L5 |
| <i>Symphotrichum novae-angliae</i> | New England aster | 2 | 2 | 2 | 1 | 7 | L5 |
| <i>Symphotrichum puniceum</i> var. <i>puniceum</i> | swamp aster | 2 | 2 | 2 | 2 | 8 | L5 |
| <i>Thalictrum pubescens</i> | tall meadow rue | 2 | 3 | 2 | 2 | 9 | L5 |
| <i>Tilia americana</i> | basswood | 2 | 3 | 2 | 3 | 10 | L5 |
| <i>Toxicodendron radicans</i> var. <i>rydbergii</i> | poison ivy (shrub form) | 2 | 2 | 0 | 2 | 6 | L5 |
| <i>Ulmus americana</i> | white elm | 2 | 4 | 0 | 2 | 8 | L5 |
| <i>Urtica dioica</i> ssp. <i>gracilis</i> | American stinging nettle | 2 | 3 | 2 | 2 | 9 | L5 |
| <i>Verbena hastata</i> | blue vervain | 2 | 2 | 4 | 2 | 10 | L5 |
| <i>Verbena urticifolia</i> | white vervain | 2 | 2 | 2 | 2 | 8 | L5 |
| <i>Viburnum lentago</i> | nannyberry | 2 | 3 | 1 | 2 | 8 | L5 |
| <i>Viola sororia</i> | common blue violet | 2 | 2 | 0 | 2 | 6 | L5 |
| <i>Vitis riparia</i> | riverbank grape | 2 | 1 | 0 | 0 | 3 | L5 |
| <i>Xanthium strumarium</i> | clotbur | 3 | 1 | 4 | 0 | 8 | L5 |
| <i>Acer platanoides</i> | Norway maple | 4 | | | | 4 | L+ |
| <i>Acer tataricum</i> ssp. <i>ginnala</i> | Amur maple | 4 | 0 | 0 | 2 | 6 | L+ |
| <i>Aegopodium podagraria</i> | goutweed | 5 | | | | 5 | L+ |
| <i>Aesculus hippocastanum</i> | horse-chestnut | 3 | | | | 3 | L+ |
| <i>Ajuga reptans</i> | common bugle | 4 | | | | 4 | L+ |
| <i>Alliaria petiolata</i> | garlic mustard | 4 | | | | 4 | L+ |

| Appendix 2: Toogood Pond Flora Species (2012) | | Local | Popn. | Hab. | Sens. | Total | Rank |
|---|------------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Alopecurus pratensis</i> | meadow foxtail | 4 | | | | 4 | L+ |
| <i>Aquilegia vulgaris</i> | garden columbine | 5 | | | | 5 | L+ |
| <i>Arctium minus</i> | common burdock | 5 | | | | 5 | L+ |
| <i>Barbarea vulgaris</i> | winter cress | 4 | | | | 4 | L+ |
| <i>Berberis thunbergii</i> | Japanese barberry | 4 | | | | 4 | L+ |
| <i>Bromus inermis</i> | smooth brome grass | 4 | | | | 4 | L+ |
| <i>Campanula rapunculoides</i> | creeping bellflower | 4 | | | | 4 | L+ |
| <i>Carex spicata</i> | spiked sedge | 5 | | | | 5 | L+ |
| <i>Catalpa speciosa</i> | northern catalpa | 4 | | | | 4 | L+ |
| <i>Celastrus orbiculatus</i> | oriental bittersweet | 3 | | | | 3 | L+ |
| <i>Cerastium fontanum</i> | mouse-ear chickweed | 3 | | | | 3 | L+ |
| <i>Chelidonium majus</i> | celandine | 5 | | | | 5 | L+ |
| <i>Chenopodium album</i> | lamb's quarters | 5 | | | | 5 | L+ |
| <i>Cichorium intybus</i> | chicory | 5 | | | | 5 | L+ |
| <i>Cirsium arvense</i> | creeping thistle | 4 | | | | 4 | L+ |
| <i>Cirsium vulgare</i> | bull thistle | 4 | | | | 4 | L+ |
| <i>Convolvulus arvensis</i> | field bindweed | 3 | | | | 3 | L+ |
| <i>Cynanchum rossicum</i> | dog-strangling vine | 4 | | | | 4 | L+ |
| <i>Cynoglossum officinale</i> | hound's tongue | 5 | | | | 5 | L+ |
| <i>Dactylis glomerata</i> | orchard grass | 4 | | | | 4 | L+ |
| <i>Daucus carota</i> | Queen Anne's lace | 4 | | | | 4 | L+ |
| <i>Digitaria ischaemum</i> | smooth crab grass | 5 | | | | 5 | L+ |
| <i>Duchesnea indica</i> var. <i>indica</i> | mock strawberry | 5 | | | | 5 | L+ |
| <i>Elaeagnus angustifolia</i> | Russian olive | 4 | | | | 4 | L+ |
| <i>Elaeagnus umbellata</i> | autumn olive | 5 | | | | 5 | L+ |
| <i>Elymus repens</i> | quack grass | 5 | | | | 5 | L+ |
| <i>Epipactis helleborine</i> | helleborine | 5 | | | | 5 | L+ |
| <i>Erysimum cheiranthoides</i> | wormseed mustard | 5 | | | | 5 | L+ |
| <i>Euonymus alatus</i> | winged spindle-tree | 4 | | | | 4 | L+ |
| <i>Euonymus europaeus</i> | European spindle-tree | 4 | | | | 4 | L+ |
| <i>Euonymus fortunei</i> | wintercreeper euonymus | 4 | | | | 4 | L+ |
| <i>Festuca rubra</i> ssp. <i>rubra</i> | red fescue | 5 | | | | 5 | L+ |
| <i>Frangula alnus</i> | glossy buckthorn | 5 | | | | 5 | L+ |
| <i>Galium mollugo</i> | white bedstraw | 5 | | | | 5 | L+ |
| <i>Galium verum</i> | yellow bedstraw | 5 | | | | 5 | L+ |
| <i>Geum urbanum</i> | urban avens | 4 | | | | 4 | L+ |
| <i>Glechoma hederacea</i> | creeping Charlie | 4 | | | | 4 | L+ |
| <i>Hedera helix</i> | English ivy | 5 | | | | 5 | L+ |
| <i>Hemerocallis fulva</i> | orange day-lily | 5 | | | | 5 | L+ |
| <i>Hesperis matronalis</i> | dame's rocket | 4 | | | | 4 | L+ |
| <i>Inula helenium</i> | elecampane | 4 | | | | 4 | L+ |

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|---|-------------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Iris germanica</i> | garden iris | 4 | | | | 4 | L+ |
| <i>Iris pseudacorus</i> | yellow flag | 5 | | | | 5 | L+ |
| <i>Lamium maculatum</i> | spotted dead-nettle | 5 | | | | 5 | L+ |
| <i>Lapsana communis</i> | nipplewort | 4 | | | | 4 | L+ |
| <i>Larix decidua</i> | European larch | 4 | | | | 4 | L+ |
| <i>Leonurus cardiaca</i> ssp. <i>cardiaca</i> | motherwort | 4 | | | | 4 | L+ |
| <i>Leucanthemum vulgare</i> | ox-eye daisy | 2 | | | | 2 | L+ |
| <i>Ligustrum vulgare</i> | privet | 5 | | | | 5 | L+ |
| <i>Linaria vulgaris</i> | butter-and-eggs | 5 | | | | 5 | L+ |
| <i>Lonicera morrowii</i> | Morrow's honeysuckle | 5 | | | | 5 | L+ |
| <i>Lonicera tatarica</i> | Tartarian honeysuckle | 5 | | | | 5 | L+ |
| <i>Lonicera x bella</i> | shrub honeysuckle | 4 | | | | 4 | L+ |
| <i>Lotus corniculatus</i> | bird's foot trefoil | 4 | | | | 4 | L+ |
| <i>Lysimachia nummularia</i> | moneywort | 4 | | | | 4 | L+ |
| <i>Lythrum salicaria</i> | purple loosestrife | 4 | | | | 4 | L+ |
| <i>Malus</i> cf. <i>baccata</i> | Siberian crab-apple | 5 | | | | 5 | L+ |
| <i>Malus pumila</i> | apple | 4 | | | | 4 | L+ |
| <i>Malva neglecta</i> | common mallow | 4 | | | | 4 | L+ |
| <i>Medicago lupulina</i> | black medick | 5 | | | | 5 | L+ |
| <i>Medicago sativa</i> ssp. <i>sativa</i> | alfalfa | 5 | | | | 5 | L+ |
| <i>Melilotus albus</i> | white sweet clover | 4 | | | | 4 | L+ |
| <i>Mentha spicata</i> | spear mint | 4 | | | | 4 | L+ |
| <i>Morus alba</i> | white mulberry | 5 | | | | 5 | L+ |
| <i>Myosotis scorpioides</i> | true forget-me-not | 4 | | | | 4 | L+ |
| <i>Nasturtium microphyllum</i> | small-leaved watercress | 5 | | | | 5 | L+ |
| <i>Nepeta cataria</i> | catnip | 5 | | | | 5 | L+ |
| <i>Parthenocissus tricuspidata</i> | Boston-ivy | 5 | | | | 5 | L+ |
| <i>Pastinaca sativa</i> | wild parsnip | 5 | | | | 5 | L+ |
| <i>Persicaria maculosa</i> | lady's thumb | 5 | | | | 5 | L+ |
| <i>Phleum pratense</i> | Timothy grass | 4 | | | | 4 | L+ |
| <i>Phlox paniculata</i> | garden phlox | 5 | | | | 5 | L+ |
| <i>Phragmites australis</i> ssp. <i>australis</i> | common reed | 4 | | | | 4 | L+ |
| <i>Pilosella officinarum</i> | mouse-ear hawkweed | 4 | | | | 4 | L+ |
| <i>Pinus sylvestris</i> | Scots pine | 4 | | | | 4 | L+ |
| <i>Plantago lanceolata</i> | English plantain | 5 | | | | 5 | L+ |
| <i>Plantago major</i> | common plantain | 2 | | | | 2 | L+ |
| <i>Poa compressa</i> | flat-stemmed blue grass | 4 | | | | 4 | L+ |
| <i>Poa pratensis</i> ssp. <i>pratensis</i> | Kentucky blue grass | 4 | | | | 4 | L+ |
| <i>Polygonum aviculare</i> | prostrate knotweed | 5 | | | | 5 | L+ |
| <i>Populus alba</i> | white poplar | 5 | | | | 5 | L+ |
| <i>Potamogeton crispus</i> | curly pondweed | 5 | | | | 5 | L+ |

| Appendix 2: Toogood Pond Flora Species (2012) | | Local | Popn. | Hab. | Sens. | Total | Rank |
|---|-----------------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Potentilla recta</i> | sulphur cinquefoil | 5 | | | | 5 | L+ |
| <i>Prunella vulgaris</i> ssp. <i>vulgaris</i> | heal-all (European) | 5 | | | | 5 | L+ |
| <i>Ranunculus acris</i> | tall buttercup | 4 | | | | 4 | L+ |
| <i>Ranunculus repens</i> | creeping buttercup | 4 | | | | 4 | L+ |
| <i>Rhamnus cathartica</i> | common buckthorn | 4 | | | | 4 | L+ |
| <i>Ribes rubrum</i> | garden red currant | 4 | | | | 4 | L+ |
| <i>Robinia pseudoacacia</i> | black locust | 3 | | | | 3 | L+ |
| <i>Rosa multiflora</i> | multiflora rose | 4 | | | | 4 | L+ |
| <i>Rudbeckia fulgida</i> | orange coneflower | 5 | | | | 5 | L+ |
| <i>Rumex crispus</i> | curly dock | 5 | | | | 5 | L+ |
| <i>Salix alba</i> | white willow | 5 | | | | 5 | L+ |
| <i>Salix x fragilis</i> | crack willow | 3 | | | | 3 | L+ |
| <i>Salix x sepulcralis</i> | weeping willow | 5 | | | | 5 | L+ |
| <i>Schedonorus arundinaceus</i> | tall fescue | 4 | | | | 4 | L+ |
| <i>Schedonorus pratensis</i> | meadow fescue | 4 | | | | 4 | L+ |
| <i>Scilla siberica</i> | Siberian squill | 4 | | | | 4 | L+ |
| <i>Sedum acre</i> | mossy stonecrop | 4 | | | | 4 | L+ |
| <i>Setaria viridis</i> | green foxtail | 3 | | | | 3 | L+ |
| <i>Solanum dulcamara</i> | bittersweet nightshade | 4 | | | | 4 | L+ |
| <i>Sorbus aucuparia</i> | European mountain-ash | 5 | | | | 5 | L+ |
| <i>Syringa vulgaris</i> | common lilac | 4 | | | | 4 | L+ |
| <i>Syringa</i> cf. <i>x prestoniae</i> | Preston lilac | 5 | | | | 5 | L+ |
| <i>Taraxacum officinale</i> | dandelion | 4 | | | | 4 | L+ |
| <i>Taxus cuspidata</i> | Japanese yew | 4 | | | | 4 | L+ |
| <i>Tilia cordata</i> | little-leaf linden | 5 | | | | 5 | L+ |
| <i>Tilia x flavescens</i> | hybrid linden | 5 | | | | 5 | L+ |
| <i>Tragopogon pratensis</i> | meadow goat's beard | 3 | | | | 3 | L+ |
| <i>Trifolium repens</i> | white clover | 5 | | | | 5 | L+ |
| <i>Tussilago farfara</i> | coltsfoot | 4 | | | | 4 | L+ |
| <i>Typha angustifolia</i> | narrow-leaved cattail | 3 | | | | 3 | L+ |
| <i>Typha x glauca</i> | hybrid cattail | 3 | | | | 3 | L+ |
| <i>Ulmus pumila</i> | Siberian elm | 4 | | | | 4 | L+ |
| <i>Verbascum thapsus</i> | common mullein | 4 | | | | 4 | L+ |
| <i>Veronica arvensis</i> | corn speedwell | 4 | | | | 4 | L+ |
| <i>Veronica serpyllifolia</i> ssp. <i>serpyllifolia</i> | thyme-leaved speedwell | 5 | | | | 5 | L+ |
| <i>Viburnum opulus</i> ssp. <i>opulus</i> | European highbush cranberry | 4 | | | | 4 | L+ |
| <i>Vicia cracca</i> | cow vetch | 4 | | | | 4 | L+ |
| <i>Vinca minor</i> | periwinkle | 5 | | | | 5 | L+ |
| <i>Acer negundo</i> | Manitoba maple | 4 | 0 | 0 | 2 | 6 | L+? |
| <i>Agrostis stolonifera</i> | creeping bent grass | 5 | | | | 5 | L+? |
| <i>Atriplex prostrata</i> | spreading orache | 5 | | | | 5 | L+? |

| Appendix 2: Toogood Pond Flora Species (2012) | | Local | Popn. | Hab. | Sens. | Total | Rank |
|--|----------------------|--------|-------|------|-------|-------|-----------|
| New Scientific Name | New Common Name | Occur. | Trend | Dep. | Dev. | Score | TRCA |
| | | 1-5 | 1-5 | 0-5 | 0-5 | 2-20 | (08/2012) |
| <i>Geranium robertianum</i> | herb Robert | 4 | | | | 4 | L+? |
| <i>Persicaria hydropiper</i> | water-pepper | 3 | | | | 3 | L+? |
| <i>Phalaris arundinacea</i> | reed canary grass | 3 | | | | 3 | L+? |
| <i>Potentilla norvegica</i> | rough cinquefoil | 3 | | | | 3 | L+? |
| <i>Veronica</i> sp. | veronica sp. | | | | | | L+? |
| <i>Aronia melanocarpa</i> | black choke-berry | 3 | 5 | 5 | 4 | 17 | pL2 |
| <i>Bolboschoenus fluviatilis</i> | river bulrush | 3 | 2 | 5 | 4 | 14 | pL3 |
| <i>Pinus resinosa</i> | red pine | 2 | 5 | 5 | 5 | 17 | pL2 |
| <i>Cornus amomum</i> ssp. <i>obliqua</i> | silky dogwood | 3 | 3 | 5 | 3 | 14 | pL3 |
| <i>Picea glauca</i> | white spruce | 1 | 5 | 4 | 4 | 14 | pL3 |
| <i>Abies balsamea</i> | balsam fir | 1 | 3 | 4 | 5 | 13 | pL4 |
| <i>Acer saccharinum</i> | silver maple | 1 | 2 | 5 | 3 | 11 | pL4 |
| <i>Amelanchier arborea</i> | downy serviceberry | 3 | 2 | 4 | 3 | 12 | pL4 |
| <i>Diervilla lonicera</i> | bush honeysuckle | 2 | 3 | 2 | 4 | 11 | pL4 |
| <i>Fagus grandifolia</i> | American beech | 1 | 4 | 3 | 4 | 12 | pL4 |
| <i>Quercus rubra</i> | red oak | 1 | 4 | 2 | 4 | 11 | pL4 |
| <i>Spiraea alba</i> | wild spiraea | 2 | 4 | 4 | 3 | 13 | pL4 |
| <i>Cornus foemina</i> ssp. <i>racemosa</i> | grey dogwood | 3 | 2 | 3 | 2 | 10 | pL5 |
| <i>Juniperus virginiana</i> | red cedar | 2 | 2 | 4 | 2 | 10 | pL5 |
| <i>Caragana arborescens</i> | Siberian pea-shrub | 5 | | | | 5 | pL+ |
| <i>Dipsacus fullonum</i> | teasel | 5 | | | | 5 | pL+ |
| <i>Eleutherococcus sieboldianus</i> | five-fingered aralia | 5 | | | | | pL+ |
| <i>Forsythia viridissima</i> | forsythia | 4 | | | | 4 | pL+ |
| <i>Fraxinus mandshurica</i> | Manchurian ash | 5 | | | | | pL+ |
| <i>Picea abies</i> | Norway spruce | 5 | | | | 5 | pL+ |
| <i>Picea pungens</i> | Colorado spruce | 5 | | | | 5 | pL+ |
| <i>Pinus banksiana</i> | Jack pine | 5 | | | | 5 | pL+ |
| <i>Pinus nigra</i> | Austrian pine | 5 | | | | 5 | pL+ |
| <i>Populus x canadensis</i> | Carolina poplar | 4 | | | | 4 | pL+ |
| <i>Rhus aromatica</i> | fragrant sumach | 5 | | | | 5 | pL+ |
| <i>Taxodium distichum</i> | bald cypress | 5 | | | | | pL+ |
| <i>Physostegia virginiana</i> ssp. <i>virginiana</i> | false dragonhead | 4 | 3 | 4 | 4 | 15 | prL3 |
| <i>Sorbaria sorbifolia</i> | false spiraea | 4 | | | | 4 | prL+ |

Appendix 3: List of Breeding Fauna Species at Toogood Pond (2003 to 2012).

| Common Name | Code | Scientific Name | count | LO | PTn | PTt | AS | PIS | HD | StD | + | TS | L-Rank |
|---|------|--------------------------------|----------|----|-----|-----|----|-----|----|-----|---|----|--------|
| Survey Species: species for which the TRCA protocol effectively surveys. | | | | | | | | | | | | | |
| Birds | | | | | | | | | | | | | |
| sora | SORA | <i>Porzana carolina</i> | 1 (2009) | 1 | 2 | 2 | 2 | 3 | 3 | 4 | 0 | 17 | L3 |
| Virginia Rail | VIRA | <i>Rallus limicola</i> | 1 (2011) | 0 | 2 | 2 | 2 | 3 | 3 | 4 | 0 | 16 | L3 |
| American redstart | AMRE | <i>Setophaga ruticilla</i> | 1 | 0 | 2 | 2 | 3 | 1 | 2 | 4 | 0 | 14 | L4 |
| barn swallow | BARS | <i>Hirundo rustica</i> | 1 | 0 | 2 | 3 | 1 | 1 | 2 | 1 | 0 | 10 | L4 |
| belted kingfisher | BEKI | <i>Ceryle alcyon</i> | ? | 0 | 3 | 2 | 2 | 1 | 2 | 2 | 0 | 12 | L4 |
| blue-grey gnatcatcher | BGGN | <i>Poliophtila caerulea</i> | 3 | 0 | 1 | 1 | 3 | 1 | 1 | 3 | 0 | 10 | L4 |
| common yellowthroat | COYE | <i>Geothlypis trichas</i> | 1 (2009) | 0 | 2 | 2 | 1 | 2 | 1 | 4 | 0 | 12 | L4 |
| eastern kingbird | EAKI | <i>Tyrannus tyrannus</i> | 1 | 0 | 4 | 2 | 2 | 1 | 1 | 3 | 0 | 13 | L4 |
| eastern wood-pewee | EAWP | <i>Contopus virens</i> | 4 | 0 | 4 | 2 | 2 | 1 | 1 | 3 | 0 | 13 | L4 |
| grey catbird | GRCA | <i>Dumetella carolinensis</i> | 3 | 0 | 2 | 2 | 1 | 1 | 1 | 3 | 0 | 10 | L4 |
| hairy woodpecker | HAWO | <i>Picoides villosus</i> | 1 | 0 | 2 | 2 | 3 | 1 | 2 | 2 | 0 | 12 | L4 |
| indigo bunting | INBU | <i>Passerina cyanea</i> | 1 (2009) | 0 | 2 | 2 | 1 | 1 | 2 | 4 | 0 | 12 | L4 |
| red-breasted nuthatch | RBNU | <i>Sitta canadensis</i> | 2 | 0 | 1 | 2 | 3 | 1 | 1 | 2 | 0 | 10 | L4 |
| red-eyed vireo | REVI | <i>Vireo olivaceus</i> | 5 | 0 | 2 | 2 | 2 | 1 | 1 | 3 | 0 | 11 | L4 |
| rose-breasted grosbeak | RBGR | <i>Pheucticus ludovicianus</i> | 2 | 0 | 2 | 2 | 3 | 1 | 2 | 3 | 0 | 13 | L4 |
| ruby-throated hummingbird | RTHU | <i>Archilochus colubris</i> | 1 | 0 | 2 | 2 | 1 | 1 | 2 | 2 | 0 | 10 | L4 |
| spotted sandpiper | SPSA | <i>Actitis macularia</i> | 2 | 0 | 2 | 3 | 1 | 2 | 1 | 4 | 0 | 13 | L4 |
| swamp sparrow | SWSP | <i>Melospiza georgiana</i> | 5 | 0 | 1 | 2 | 1 | 2 | 1 | 5 | 1 | 13 | L4 |
| tree swallow | TRES | <i>Tachycineta bicolor</i> | 2 | 0 | 2 | 2 | 1 | 1 | 2 | 2 | 0 | 10 | L4 |
| white-breasted nuthatch | WBNU | <i>Sitta carolinensis</i> | 2 | 0 | 2 | 2 | 3 | 1 | 2 | 2 | 0 | 12 | L4 |
| American Crow | AMCR | <i>Corvus brachyrhynchos</i> | x | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 5 | L5 |
| American goldfinch | AMGO | <i>Carduelis tristis</i> | x | 0 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 7 | L5 |
| American robin | AMRO | <i>Turdus migratorius</i> | x | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 6 | L5 |
| Baltimore oriole | BAOR | <i>Icterus galbula</i> | x | 0 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 7 | L5 |
| black-capped chickadee | BCCH | <i>Parus atricapillus</i> | x | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 6 | L5 |
| blue jay | BLJA | <i>Cyanocitta cristata</i> | x | 0 | 4 | 2 | 1 | 1 | 0 | 1 | 0 | 9 | L5 |
| brown-headed cowbird | BHCO | <i>Molothrus ater</i> | x | 0 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 7 | L5 |
| Canada goose | CANG | <i>Branta canadensis</i> | x | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 6 | L5 |
| cedar waxwing | CEDW | <i>Bombycilla cedrorum</i> | x | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 6 | L5 |
| chipping sparrow | CHSP | <i>Spizella passerina</i> | x | 0 | 2 | 2 | 1 | 1 | 0 | 2 | 0 | 8 | L5 |
| common grackle | COGR | <i>Quiscalus quiscula</i> | x | 0 | 3 | 2 | 1 | 1 | 0 | 1 | 0 | 8 | L5 |
| downy woodpecker | DOWO | <i>Picoides pubescens</i> | x | 0 | 3 | 2 | 1 | 1 | 1 | 1 | 0 | 9 | L5 |
| house wren | HOWR | <i>Troglodytes aedon</i> | x | 0 | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 9 | L5 |

Appendix 3: List of Breeding Fauna Species at Toogood Pond (2003 to 2012).

| Common Name | Code | Scientific Name | count | LO | PTn | PTt | AS | PIS | HD | StD | + | TS | L-Rank |
|---|------|---------------------------------------|----------|----|-----|-----|----|-----|----|-----|---|----|--------|
| mallard | MALL | <i>Anas platyrhynchos</i> | x | 0 | 2 | 2 | 1 | 2 | 0 | 1 | 0 | 8 | L5 |
| mourning dove | MODO | <i>Zenaida macroura</i> | x | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 6 | L5 |
| northern cardinal | NOCA | <i>Cardinalis cardinalis</i> | x | 0 | 2 | 2 | 1 | 1 | 1 | 2 | 0 | 9 | L5 |
| red-winged blackbird | RWBL | <i>Agelaius phoeniceus</i> | x | 0 | 2 | 2 | 1 | 1 | 0 | 2 | 0 | 8 | L5 |
| song sparrow | SOSP | <i>Melospiza melodia</i> | x | 0 | 2 | 2 | 1 | 2 | 0 | 2 | 0 | 9 | L5 |
| warbling vireo | WAVI | <i>Vireo gilvus</i> | x | 0 | 1 | 2 | 1 | 1 | 1 | 2 | 0 | 8 | L5 |
| yellow warbler | YWAR | <i>Setophaga petechia</i> | x | 0 | 1 | 2 | 1 | 1 | 1 | 3 | 0 | 9 | L5 |
| European starling | EUST | <i>Sturnus vulgaris</i> | x | | | | | | | | | | L+ |
| house finch | HOFI | <i>Carpodacus mexicanus</i> | x | | | | | | | | | | L+ |
| house sparrow | HOSP | <i>Passer domesticus</i> | x | | | | | | | | | | L+ |
| Herpetofauna | | | | | | | | | | | | | |
| bullfrog | BUFR | <i>Lithobates catesbeiana</i> | 1 | 3 | 3 | 2 | 2 | 4 | 2 | 5 | 1 | 22 | L2 |
| grey treefrog | TGTF | <i>Hyla versicolor</i> | 1 (2011) | 0 | 3 | 3 | 3 | 4 | 2 | 5 | 1 | 21 | L2 |
| wood frog | WOFR | <i>Lithobates sylvatica</i> | 1 (2010) | 0 | 2 | 3 | 3 | 4 | 3 | 5 | 1 | 21 | L2 |
| northern leopard frog | LEFR | <i>Lithobates pipiens</i> | 1 | 0 | 3 | 2 | 1 | 4 | 2 | 5 | 1 | 18 | L3 |
| American toad | AMTO | <i>Anaxyrus americanus</i> | x | 0 | 3 | 2 | 1 | 4 | 0 | 4 | 0 | 14 | L4 |
| green frog | GRFR | <i>Lithobates clamitans</i> | x | 0 | 2 | 2 | 1 | 3 | 1 | 4 | 0 | 13 | L4 |
| Incidental Species: species that are reported on as incidental to the TRCA protocol. | | | | | | | | | | | | | |
| Mammals | | | | | | | | | | | | | |
| eastern chipmunk | EACH | <i>Tamias striatus</i> | x | 0 | 2 | 2 | 2 | 3 | 1 | 3 | 0 | 13 | L4 |
| muskrat | MUSK | <i>Ondatra zibethicus</i> | x | 0 | 2 | 2 | 1 | 3 | 1 | 3 | 0 | 12 | L4 |
| red squirrel | RESQ | <i>Tamiasciurus hudsonicus</i> | x | 0 | 2 | 2 | 1 | 3 | 1 | 2 | 0 | 11 | L4 |
| white-tailed deer | WTDE | <i>Odocoileus virginianus</i> | x | 0 | 2 | 1 | 3 | 2 | 2 | 1 | 0 | 11 | L4 |
| coyote | COYO | <i>Canis latrans</i> | x | 0 | 2 | 2 | 1 | 3 | 0 | 1 | 0 | 9 | L5 |
| grey squirrel | GRSQ | <i>Sciurus carolinensis</i> | x | 0 | 2 | 2 | 1 | 3 | 0 | 0 | 0 | 8 | L5 |
| raccoon | RACC | <i>Procyon lotor</i> | x | 0 | 2 | 2 | 1 | 3 | 1 | 0 | 0 | 9 | L5 |
| Herpetofauna | | | | | | | | | | | | | |
| common snapping turtle | SNTU | <i>Chelydra serpentina serpentina</i> | x | 0 | 3 | 3 | 1 | 5 | 2 | 5 | 2 | 21 | L2 |
| midland painted turtle | MPTU | <i>Chrysemys picta marginata</i> | x | 0 | 2 | 2 | 1 | 5 | 1 | 4 | 1 | 16 | L3 |
| eastern gartersnake | EAGA | <i>Thamnophis sirtalis sirtalis</i> | x | 0 | 2 | 2 | 1 | 3 | 0 | 3 | 0 | 11 | L4 |

Appendix 3: List of Breeding Fauna Species at Toogood Pond (2003 to 2012).

| Common Name | Code | Scientific Name | count | LO | PTn | PTt | AS | PIS | HD | StD | + | TS | L-Rank |
|--|------|-----------------------------------|-------|----------------------------|-----|-----|----|-----|----|-----|---|----|--------|
| red-eared slider | SLID | <i>Trachemys scripta elegans</i> | x | | | | | | | | | | L+ |
| 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 | | | | | | | | | | | |
| | | | | | | | | | | | | | |