Goodwood Resource Management Tract

Terrestrial Biological Inventory and Assessment

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Toronto and Region Conservation for The Living City®

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Table of Contents

page

List of Tables

List of Maps

List of Appendices

1.0 Introduction

In 2005, the Toronto Region Conservation Authority (TRCA) conducted flora and fauna inventories of the natural cover associated with the Goodwood Resource Management Tract (GRMT) (Map 1). This site had been initially selected for flora and fauna inventory as it was identified as a high priority area for the Habitat Implementation Plan (HIP) program. In order to fulfill the requirements under the HIP, a detailed field inventory was needed in order to better understand the then current conditions of the site. The more recent request for a report on available inventory data from the site is driven by the upcoming update to the management plan for the entire West Duffins Headwaters. The baseline inventory information will be used to guide land management decisions such as the designation of management zones and appropriate trail placement. For the purpose of this report, additional fauna and flora data collected over the past decade, primarily as incidental observations made during the annual Long Term Monitoring Project (LTMP) station visits (collected at GRMT between 2008 and 2012), are included.

The purpose of the work conducted by the TRCA during the 2005 field season was to *characterize the terrestrial natural heritage features* of the GRMT. Once characterized, the site features can then be understood within the larger regional context of the Terrestrial Natural Heritage Program of the TRCA. The question that the inventory addresses is "*How does the area surveyed at GRMT 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 (TNHSS) by setting targets – both short- and long-term (100 years) – for the two landscape indicators in order to provide direction in planning at all scales (TRCA 2007a, TRCA 2007b).

A target system that identifies a land base where natural cover should be restored is a key component of the Strategy. Although the objectives of the Strategy are based on making positive changes at all scales, the evaluation models were developed at the landscape scale using a combination of digital land cover mapping and field-collected data. Field-collected data also provides ground-level information in the application of the landscape models at the site scale. The two indicators and the targets that have been set for them are explained in Section 3.1. It is important to understand that habitat quality and distribution are interdependent. For example, neither well-distributed poor-quality natural cover nor poorly-distributed good-quality natural cover achieves the desired condition of sustainable biodiversity and social benefits across the watershed.

2.0 Study Area Description

As shown in Maps 1 and 2, the study area is located in the north-east corner of the jurisdiction in the headwaters of the Duffins Creek watershed in the township of Uxbridge. It consists entirely of the TRCA property situated between Concessions 2 and 3, north of Webb Road. The study area is part of a larger forest network stretching to the north and east; this network includes the neighbouring Secord property and a portion of the Goodwood/Glasgow Wetland Complex and the Duffins Headwaters Area of Natural and Scientific Interest (ANSI). To the south, east and west, much of the landscape is agricultural interspersed with smaller fragments of forest cover and with relatively extensive forest cover remaining in riparian corridors.

The site lies entirely on the Oak Ridges Moraine (ORM) within the Great Lakes – St. Lawrence floristic region, the latter historically composed of mixed coniferous-deciduous forest. The ORM is a ridge of sand and gravel deposited approximately 12,000 years ago. The unconfined aquifer systems overlying the bedrock are responsible for the groundwater seepage that occurs in parts of the site.

3.0 Inventory Methodology

A biological inventory of the GRMT 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

In addition to the three criteria that make up the total habitat patch score, another important measure to consider in assessing habitat patch quality is forest interior, i.e. the amount of forest habitat that is greater than 100 m from the edge of the forest patch, using 100 m increments. A recognized distance for deep interior conditions occurs at 400 m from the patch edge. Such conditions are a habitat requirement for several sensitive fauna species.

Quantity of Natural Cover

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 in 2005. 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 (Table 2). Vegetation communities and flora species were surveyed concurrently.

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 2007/08 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 results from this survey have been augmented with earlier vegetation surveys conducted by the TRCA in 1998 in the analysis of this report.

The most recent formal fauna survey of the site was conducted by the TRCA in April, June and July of 2005. The threshold for inclusion of fauna data in TRCA reports is 10 years and therefore only incidental records from 2003 and later are included in the analysis of fauna data for this report. The spring surveys searched primarily for frog species of regional concern but recorded incidentally presence of any early-spring nocturnal bird species (owls and American woodcocks). Surveys in June and the July 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*. (1987). All initial visits were completed by the end of the third week of June. The field-season is 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 regional species of concern (species ranked L1 to L3) were mapped as point data with each point representing a possible breeding bird. In addition, data collected from regional long-term monitoring plots (LTMP) located within the GRMT provided supplementary flora and fauna species records for the site from 2008 - 2012.

Table 2. Schedule of TRCA biological surveys at the Goodwood Resource Management Tract in 2005 - 2012

Survey Item	Survey Dates	Survey Effort (hours)
Patch / Landscape	2007/08: ortho-photos	21 hours
Vegetation Communities and Flora Species	2005: May 16th, 30th, June 7th, 8th, 27th, July 15th, 17th, 18th, 23rd , September 2nd	70 hours
Frogs and Nocturnal Spring Birds	2005: April 14th and 18th	6 hours
Breeding Songbirds	2005: June 2nd, 3rd, 20th – 22nd, July 14th	24 hours
Long-term Monitoring Stations (Vegetation, Salamander and Bird)	2008 – 2012: Various. Annual spring and summer visits	~ 45 hours

4.0 Results and Discussion

Information pertaining to the GRMT 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 and old field. 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.

4.2 Habitat Patch Findings for the Goodwood Resource Management Tract

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

4.2.1 Quantity of Natural Cover

The area of the Duffins Creek watershed is approximately 28,653 ha containing 40.7% natural cover, including 8,157 ha as forest (28.5%), 3002 ha as meadow (10.5%), 505 ha as wetland (1.8%). Goodwood Resource Management Tract contains 0.4% of the total natural cover in the Duffins Creek watershed.

The GRMT itself covers about 127.5 ha, all of which is natural cover (Appendix 1). The natural cover includes 79.3 ha of forest (52.7 ha of which is plantation), 10.5 ha of successional, 24.2 ha of wetland (including 15.1 ha of treed swamp), 1.6 ha aquatic and 11.8 ha of meadow.

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

Within the GRMT the majority of the forest habitat is well connected and thus scores as one large patch, resulting in the maximum score of 5 points, or "excellent" (Map 5). Since much of the study area is forest this score is the average score for the entire study area; other habitat types such as wetland are present as smaller patches but still score "fair". In addition there are smaller patches of meadow and successional habitat scoring as low as 1 and 2 points, "very poor" and "poor".

In terms of shape, the habitat patches score "very poor". This is actually a reflection of the network of forest corridors connecting the forest as one large patch but contains many holes and gaps. This emphasizes the fact that neither size nor shape attributes should be considered in isolation from each other. A further understanding of the condition of the forest patch on the site can be gained by considering forest interior (Map 6). There is one large patch of forest interior (forest habitat situated more than 100 metres from the forest edge) in the western half of the site with two smaller patches in the east and south. The amount of forest interior is limited by the very convoluted edge of the forest habitat as the Duffins headwater stream winds its way, flanked by open meadow marsh habitat, through the centre of the site.

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 "good" matrix influence (i.e. scores four out of a possible five points, see Maps 7 and 8). This can be attributed to the mix of natural and agricultural land surrounding the site. These scores are as expected given the rural setting, with a mix of natural and agricultural land-types in the vicinity.

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. It is important, however, to also understand and consider the matrix influence that occurs at the site and patch level. Such influences include those transferred to an otherwise remote natural habitat patch from a distant urban or suburban development, for example via a trail system.

Habitat Patch Total Score

The high scores for habitat patch size and matrix influence combine to counteract the "very poor" patch shape score, resulting in an overall "good" habitat patch quality (Map 9). The forested landscape that continues to the north of the study area scores similarly as high for habitat patch quality. The fact that the landscape local to the GRMT is of such high quality should result in the presence of an equally high quality biodiversity with a high incidence of Species of Regional

Concern throughout the forested landscape. It is important to understand the reciprocal interaction between the study area and the landscape in which the study area is embedded: each in their turn positively affects the other.

4.3 Vegetation Community Findings for the Goodwood Resource Management Tract

4.3.1 Vegetation Community Representation

The complex geology and topography of the study area and restoration efforts are reflected in a diverse mosaic of vegetation communities (Appendix 1; Map 10). A total of 60 different ELC vegetation community types were described for the site including 11 complexes and inclusions within larger communities. There are 24 forest communities, 10 successional communities, 21 wetlands, 1 vegetated aquatic (plus 1 non-vegetated aquatic), and 3 meadows. A total of 11 communities were recorded solely as complexes and/or inclusions within other communities (2 forest types, 2 successional types, 4 wetland types, 1 aquatic type and 2 meadow types).

Table 3. Summary of Vegetation Communities, Goodwood Resource Management Tract

Class	Number of Types	Area (hectares)
Forest	24	79.3
Successional	10	10.5
Meadow	3	11.8
Wetland	21	24.2
Aquatic	2	1.6
Total	*60*	*127.4*

The GRMT supports 24 types of forest covering almost 80 hectares, with twice the amount of coniferous plantation compared to naturally occurring forest. Mature forests are confined to a patch in the north-centre and one in the south-centre. Sugar Maple Deciduous Forest (FOD5-1) and Fresh-Moist White Cedar - Hardwood Mixed Forest (FOM7-2) are the best represented types and occur along one of the valleys in the middle of the site extending in some places to the tablelands. There are over 50 hectares of plantations, half of which are Red Pine Coniferous Plantations (CUP3-1). There is little to no understorey growth of later successional species such as white ash (*Fraxinus americana*) and sugar maple (*Acer saccharum ssp saccharum*) likely because of the high density of planted trees.

Wetlands occupy 24 hectares of the site, the section of Goodwood/Glasgow Wetland Complex accounting for virtually all of this. There are some small kettle depressions, more so in the eastern half of the study area that support many species of concern. White Cedar - Hardwood Organic Mixed Swamp (SWM4-1) is found in six polygons and is the wetland best represented followed by White Cedar - Hardwood Mineral Mixed Swamp (SWM1-1) covering about half as much land. Overall, wetland communities are diverse including organic thicket swamps (SWT3-1), mineral

meadow marshes (MAM3-1), shallow marshes (MAS2-2) and deciduous swamps (SWD4-3). The beaver activity in one of the rivers has altered some of the wetland communities nearby that at one time likely were deciduous swamps or lowland forest including white elm. Now most is Reed Canary Grass Mineral Meadow Marsh (MAM2-2) and Forb Organic Meadow Marsh (MAM3-9) with dead eastern white cedar, white elm and other deciduous snags. There are also human-made dams just outside of the site boundary that affect the state of the wetlands at the western edge. The only aquatic polygon (OAO1) is part of the pond created by one of these dams.

Areas subjected to past clearing include 11.8 hectares of meadow (CUM1-A) dominated by tall goldenrod (*Solidago altissima*) with an admixture of smooth brome (*Bromus inermis*) and other European cool-season grasses. Another 10.5 hectares are in various stages of succession. There is one 4.3 hectare Coniferous Sapling Cultural Thicket (CUT1-A3) dominated by Scots pine (*Pinus sylvestris)*. It is a result of a regenerating plantation nearby that is actually smaller than the thicket. Manitoba maple (*Acer negundo*) is another invasive non-native species at GRMT. Poplar species (*P. tremuloides* and *P. balsamifera*) are also common forming woodlands and thickets.

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 3.0. 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 GRMT lies within the rural landscape and so L1 to L3 communities are identified as being of conservation concern. On the other hand, 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. This is clearly the case for the older forest communities at the GRMT, most of which have a rank of L4 or even L5 but are high-quality examples of their types. 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.

Thirteen of the 60 vegetation communities found at the GRMT are of regional concern; 4 of these are only found as complexes or inclusions and are ranked as either L2 or L3 (Appendix 1; Map 10). There are 11 organic wetland types in the study area, 5 of which are ranked L2. The other six are ranked L3 as is the Fresh-Moist Hemlock - Hardwood Mixed Forest (FOM6-2) and Dry-Fresh White Cedar – Poplar Mixed Forest (FOM4-2).

Ten community types have restricted *local distribution* (generally, they are restricted to six or fewer of the forty-four 10x10 km squares that encompass the TRCA jurisdiction). White pine is usually less prominent in succession (at least in recent decades) than are deciduous trees such as ash species partly explaining why White Pine Cultural Savannah (CUS1-A2) scores high. Basswood (*Tilia Americana*) is usually found associated with other deciduous trees and not on its own as a Dry-Fresh Basswood Deciduous Forest (FOD4-G) giving it also a higher score.

The *geophysical requirements* of communities in the TRCA jurisdiction make up the second criteria of the community L-rank. Vegetation communities develop under certain site conditions and may be restricted to particular locations based on slope aspect, hydrology, soil character (e.g. structure and nutrient status), and dynamic processes (e.g. erosion and flooding). The vegetation communities at the GRMT tend to score low to moderate in this respect. However, the forests that have a coniferous component of eastern hemlock (*Tsuga canadensis*) or white cedar (*Thuja occidentalis*) (FOC2-2, FOC4-1, FOM4-2, FOM6-2, FOM7-2) are associated with cool, sheltered exposures, often a northerly or easterly aspect. To some extent, these forests are associated with groundwater. Increased exposure and drying does cause decline of these forest communities.

The wetlands at the GRMT are dependent upon ground water and surface water (the kettle wetlands only receive water from rainfall). The wetlands that have organic soils score higher in this category, having a minimum of three geophysical requirements. Organic wetlands are typically associated with cool, shaded microclimates at lower elevations with groundwater seepage and sufficient time for organic matter to have accumulated.

4.4 Flora Findings for the Goodwood Resource Management Tract

4.4.1 Flora Species Representation

With the inclusion of the LTMP data, a total of 318 naturally-occurring flora species were found at the GRMT between 2005 and 2012 (Appendix 2). Of the 252 native species, 73 are of regional conservation concern (8 L2 ranked and 65 L3 ranked species) (Map 11). Three additional species: red pine (*Pinus resinosa*), white pine (*Pinus strobus*), and Norway spruce (*Picea abies*) exist in plantations only. The high biodiversity of this site (quite notable given the study area size) is due to the presence of so many different types of vegetation community, soil types, and age. In particular, the aquatic, marsh, treed swamp, and forest communities all have their own suite of species. The conifer plantations tend to have lower species richness. However, these plantings can create conditions favourable for certain native species, e.g. through the production of a slow-to-decay duff layer.

Table 4. Summary of Flora Species, Goodwood Resource Management Tract

Total # of species	321
Naturally-occurring species	318
Planted species	3
Native (naturally-occurring) species	252
Number of L1 - L3 species	73

4.4.2 Flora Species of Concern

All of the flora species of concern are associated with specific vegetation communities; consequently, they are highly susceptible to changes in these communities. They score relatively high in *habitat dependence* (Appendix 2) (Map 12). Roughly, they are found in fewer than seven ecosites or habitat types according to the ELC (TRCA, 2005a). There is a clustering of highly sensitive plants in the organic swamps, kettle wetlands, and more mature forests. For example, shinleaf (*Pyrola elliptica*), Indian pipe (*Monotropa uniflora*), Dutchman's breeches (*Dicentra cucullaria*), and partridgeberry (*Mitchella repens*) are found in the mature upland forests. Wetland obligates include bulrushes (*Scirpus* spp.) and great water dock (*Rumex orbiculatus*). Crested wood fern (*Dryopteris cristata)* and pink wood-sorrel (*Oxalis montana*) are generally in swamps but sometimes in rich forests. Long-fruited thimbleweed (*Anemone cylindrica*) and pearly everlasting (*Anaphalis margaritacea*) are characteristic of the dry, open or semi-open habitats.

Virtually all the flora species of concern at the GRMT would be severely negatively affected by specific *sensitivity to development* impacts, scoring three or more for this criterion (Appendix 2). These impacts are indirect ones emanating from the surrounding land use or *matrix influence*. Generally, with a “good” matrix influence as exists at the GRMT, communities and species of concern have a higher chance of thriving (Map 7). This is due to the relative isolation of the forests and swamps and the low recreational pressure. Areas that have a history of land use disturbance, including agriculture, have fewer sensitive species. Several disturbances warrant further discussion because of the possible impacts they may have on the site.

Hydrological changes from nearby development can result in changes to drainage patterns and increased stormwater. Most of the species of regional concern are sensitive to subtle changes in hydrological regime. Horsetails (*Equisetum scirpoides* and *Equisetum fluviatile*), ferns, and other primitive species are especially tied to specific hydrology. Delicate swamp species such as goldthread (*Coptis trifolia*) are also very sensitive.

Air pollution or changes to soil composition alter the habitat and affect sensitive species such as many of the ferns and coniferous trees. Fertilizers and herbicides and sediment from agriculture and golf courses can pollute both air and surface water run-off.

Disturbance caused by development and increased recreational use also facilitates the spread of invasive species. Dog-strangling vine (*Cynanchum rossicum*) and European buckthorn (*Rhamnus cathartica*) are already present in parts of the GRMT. Although, dog-strangling vine is currently not prevalent, it’s aggressive and highly prolific nature increases its ability to spread and establish at a site. Garlic mustard (*Alliaria petiolata*) has not been introduced to the site but can be expected to spread rapidly with trails and recreational use if seeds are brought in by visitors. Many native plants, especially when subjected to other stresses, cannot compete with invasives. For example, thin-leaved cotton grass (*Eriophorum viridi-carinatum*) and many of the marsh species cannot compete as well as reed canary grass in wetlands that become exposed to high levels of nutrients (e.g. agricultural run-off). Woodland sedges (*Carex* spp.) are smaller and slower-growing than a

number of invasive alien species. Increased populations of deer often occur in areas with light to moderate amounts of development. The deer over-browse many native species.

Alteration of disturbance regimes can lead to the extirpation of species that require some kinds of disturbance. For example, Howell's pussytoes (*Antennaria howellii ssp. howellii*) and common juniper (*Juniperus communis*) require open habitats that may result from either anthropogenic grazing or natural fire. On the other hand, the saprophytic Indian pipe and pinesap (*Monotropa* spp.) require natural and undisturbed litter accumulation.
Increased access and use associated with an urban matrix also involves increased trampling and soil compaction. Species that have a delicate stem and/or produce only a single set of leaves per growing season, such as starflower (*Trientalis borealis*), bunchberry (*Cornus canadensis*) and trillium are susceptible to trampling. Many forest ground flora are in this category.

Finally, a few species are directly targeted by people for collection as edibles or for planting in their gardens. Wild leek (*Allium tricoccum*) is often eaten, and orchids (*Cypripedium* ssp.) and trillium are showy flowers often collected for garden use.

In response to loss of habitat and stresses from land use changes, susceptible flora exhibits a declining *population trend* and may become rare or even extirpated. Because of urbanization, most native flora species in the Toronto area are suspected to be undergoing slight declines as the total land base becomes smaller. Species that are considered rare according to the *local occurrence* criterion are found in fewer than seven of the forty-four 10x10 km grid squares that cover the TRCA jurisdiction. Some of these include slender woolly sedge, (*Carex lasiocarpa*), pink wood sorrel (*Oxalis montana*), and pink pyrola (*Pyrola asarifolia*).

4.5 Fauna Species Findings for the Goodwood Resource Management Tract

4.5.1 Fauna Species Representation

Over the past decade the TRCA has documented a total of 70 bird species, 12 mammals, and 6 herpetofauna species for a total of 88 breeding fauna species. The vast majority of these species were reported from the extensive inventory conducted in 2005, with just a handful of species added as incidental observations made during the ongoing long-term monitoring project which established three forest stations at the GRMT in 2008. 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 3.0. Since the subject site is situated within the rural zone this report does not consider in detail 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 the GRMT reported a total of 31 L1 to L3 ranked bird species: 5 L2 species (broad-winged hawk, *Buteo platypterus*; red-shouldered hawk, *Buteo lineatus*, northern goshawk, *Accipiter gentilis;* black and white warbler, *Mniotilta varia;* and ruffed grouse, *Bonasa umbellus)* and 26 L3 species (including magnolia warbler, *Setophaga magnolia:;* golden-crowned kinglet, *Regulus satrapa;* and scarlet tanager, *Piranga olivacea*). In addition, there were 4 herpetofauna of concern (all ranked L2) and 4 mammal species of concern (including two L2 species: river otter, *Lutra canadensis* and porcupine, *Erithizon dorsatum*), bringing the total to 39 fauna species of regional concern. Locations of these breeding fauna species are depicted on Map 13. Appendix 3 lists all of the fauna species reported from the study area, together with their associated ranks and scores.

Table 5. Summary of Fauna Species of Regional Concern, Goodwood Resource Management Tract

Fauna	Number of Species	Number of Species of Regional Concern (L1 to L3 rank)
birds	70	31
herps	6	4
mammals	12	4
TOTALS	88	39

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).

At the GRMT there are 14 species of regional concern (i.e. ranked L1 to L3) that are considered regionally rare, including 6 species that have been reported from fewer than 5 of the jurisdictions 10 km squares: river otter, hairy-tailed mole (*Parascalops breweri*), red-shouldered hawk, northern goshawk, hermit thrush (*Catharus guttatus*) and magnolia warbler (*Setophaga magnolia*). As is the case with flora, most regionally rare fauna species have other associated factors that explain their vulnerability and need to be taken into account in conservation strategies.

Sensitivity to development is another criterion used to determine the L-rank of fauna species. A large number of impacts that result from local land use, both urban and agricultural, can affect the local fauna. These impacts – considered separately from the issue of actual habitat loss – can be divided into two distinct categories. The first category involves changes that arise from local urbanization that directly affect the breeding habitat of the species in question. These changes alter the composition and structure of the vegetation communities; for example, the clearing and manicuring of the habitat (e.g. by removal of dead wood and clearance of shrub understorey). The second category of impacts involves changes that directly affect individuals of the species in

question. Examples include increased predation from an increase in the local population of predator species that thrive alongside human developments (e.g. blue jays, *Cyanocitta cristata;* American crows, *Corvus brachyrhynchos;* squirrels, *Sciuridae*; raccoons, *Procyon lotor*; and house cats, *Felis catus*); parasitism (from facilitating the access of brown-headed cowbirds, *Molothrus ater*, a species which prefers more open, edge-type habitat); competition (for nest-cavities with bird species such as house sparrows, *Passer domesticus*; and European starlings, *Sturnus vulgaris*); flushing (causing disturbance and abandonment of nest) and, sensitivity to pesticides. Fauna species are considered to have a high sensitivity to development if they score three or more points (out of a possible five) for this criterion. At the GRMT all of the 39 species that are ranked L1 to L3 receive this score and are therefore considered sensitive to one or more of the impacts associated with development or intensification of public use (Map 6). These species are currently at this site because the surrounding matrix is largely natural and agricultural, and public use is relatively low and concentrated along a small number of formal trails.

The tendency for local urbanization to be accompanied by the clearing and tidying of woodlands and thickets in the vicinity would dramatically disrupt any species that are dependent on such scrub cover for nesting or foraging, and certainly many of the sensitive species have such specific requirements (e.g. eastern towhee, *Pipilo erythropthalmus;* veery, Catharus fuscescens; white-throated sparrow, *Zonotrichia albicollis*).

Several of the bird species found at the study area nest low in the ground vegetation or on the ground and as such are highly susceptible both to increased predation from ground-foraging predators (house cats, raccoons) and to repeated flushing from the nest (by pedestrians, off-trail bikers and dogs) resulting in abandonment and failed breeding attempts. Such sensitive forest-bird species include ovenbird (*Seiurus aurocapillus),* wild turkey (*Meleagris gallopavo*), American woodcock (*Scolopax mino),* and ruffed grouse. In addition, open habitat species such as the L4 ranked field sparrow (*Spizella pusilla)* are ground-nesters and would likewise be severely affected by any increase in pedestrian or dog traffic within their habitat.

Changes in the hydrology of the site will affect the suitability of the habitat for bird species - such as veery and northern waterthrush (*Parkesia noveboracensis)* - that prefer more moist conditions. The study area presently supports healthy populations of wood frogs (*Rana sylvatica)* and spring peepers (*Pseudacris crucifer)* together with smaller populations of gray treefrogs (*Hyla versicolor)* and western chorus frogs (*Pseudacris triseriata)*. All of these species would be negatively affected by any changes in hydrology that decrease the breeding opportunities within the site.

Higher ranked species are persisting at this site because the landscape is still entirely rural. However, it is important to understand that negative matrix influences are not solely associated with the proximity of urban and suburban developments; many of the negative influences 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 will displace such sensitive 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).

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).

A total of 29 of the 39 fauna species of regional concern that occur at the GRMT are considered area sensitive. Four of these species (river otter, broad-winged hawk, northern goshawk and red-shouldered hawk) are scored as requiring more than 100 ha of natural habitat. This requirement is barely satisfied by the patch size attributes of natural cover within the study area but the continuity with large tracts of forest to the north (including the extensive forest cover at Secord) provides adequate forest cover at the landscape level to support populations of all of these area sensitive species. A further eight fauna species (including porcupine, *Erithizon dorsatum*; ovenbird, scarlet tanager and sharp-shinned hawk, *Accipter striatus*) all require in excess of 20 ha of forest cover.

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. Many of the forest bird species which are well-represented on the site benefit considerably from the extent of their potential nesting habitat, ensuring that, despite some degree of disturbance from the small number of visitors and dogs, there are currently probably enough successful nestings for populations of these species to be maintained. This is particularly true of ground-nesting and foraging species such as ovenbird, American woodcock, ruffed grouse and wild turkey, but also is very true of large raptor species (northern goshawk, red-shouldered hawk, broad-winged hawk) that are extremely prone to disturbance at the nest site.

Three non-avian species which certainly benefit from the extensive areas of natural cover at the site are the frog species: gray treefrog, wood frog and spring peeper. These species are considered area sensitive primarily due to their requirement for two distinct habitat elements in

order to complete their life-cycles. All three species overwinter in upland forested habitat and then migrate to nearby wetlands in the early spring to breed, returning to forest habitats to forage throughout the summer and fall months. The complex mosaic of wetlands embedded in meadow and forest habitat presents excellent opportunities for these species of regional concern.

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.

Nine of the species of regional concern that occur at the GRMT score high for patch isolation sensitivity: one bird species, four frog species and four mammal species. The frog species along with the mammal species are highly mobile and susceptible to road-kill. The frog species migrate seasonally between upland forest summer/winter habitat and vernal wetland spring breeding habitat. Imposing higher vehicular traffic densities within the “home-range” of such dispersing frog species will certainly lead to a higher incidence of road-kill. Likewise, mammal species such as river otter and porcupine, move quite freely across the landscape and are therefore prone to a higher incidence of road-kill as traffic density intensifies.

Species such as wood frog and spring peeper have effectively been extirpated from much of the natural cover within the urbanized portions of the jurisdiction, but are still thriving in rural areas, even where agriculture has fragmented much of the forest cover. As long as the total percentage natural cover within the agricultural rural areas remains relatively high, and obstacles such as heavily used roads do not proliferate, it appears that these frog species are still able to successfully migrate and disperse between separate patches of forest and wetland.

Fauna species that score greater than three points under the ***habitat dependence*** criterion are considered habitat specialists (Map 14). 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. Sixteen fauna species that occur in the study area are considered habitat specialists.

Almost all of the habitat dependent species that occur at the GRMT are associated with forest habitat, the only exception being western chorus frog. Mature deciduous or mixed forest is the

preferred forest type for the majority of the species (wild turkey has a very specific requirement for mast-bearing trees – oak and beech) although the conifer plantations on the site provide nesting opportunities for northern goshawk and sharp-shinned hawk. Many of the less habitat dependent species also exhibit a preference for conifer plantations (hermit thrush and yellow-rumped warbler, *Setophaga coronata*). Certainly, the large variety of forest habitats within the study area accounts for the high forest-fauna biodiversity.

Specific habitat requirements vary from ovenbirds' need for intact and healthy leaf litter and forest floor debris, to northern goshawks' need for mature trees and a degree of isolation. The common requirement for many of the bird species is for mature upland forest; veery on the other hand, fares well in more lowland, earlier succession forest types.

Wood frog and spring peeper bring the number of *habitat dependent* species occurring at the GRMT to a total of 22. These two frog species are considered *habitat dependent* primarily due to their absolute requirement for two distinct habitat types within the landscape: ephemeral wetlands for breeding, and upland forest for foraging and hibernating. Deterioration of one of these two elements within the landscape will result in the decline of these two species. Any changes to the local habitat such as the age characteristics of a forest or changes in hydrology may negatively impact species that are habitat specialists.

Representation is essentially the presence or absence of a species at a site. However, beyond mere representation of single species is the idea that a natural system can be considered as a healthy functioning system if there is an association of several species thriving within that system. Each habitat type supports particular species associations. As the quality of the habitat patch improves so will the representation of flora and fauna species within that habitat. In this way representative biodiversity is an excellent measure of the health of a natural system. The presence at the GRMT of many habitat dependent species, in particular species that are dependent on mature forest, indicates that the forest habitat is functioning at a high level. Representation of many of these species is particularly high – 12 black-throated green warbler (*Setophaga virens)* territories, 24 ovenbird territories, 17 veery territories – which constitutes further indication of the quality of the natural system at the GRMT (and within the surrounding landscape).

5.0 Summary and Recommendations

The recommendations for the GRMT 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 GRMT within the regional context, followed by specific recommendations.

5.1 Site Summary

1. The GRMT is a large block of natural cover (~128ha) in the Duffins Creek watershed; it is part of a larger forest network to the north and east.

2. The natural cover on the site supports an above average number of species that are of conservation concern in the TRCA jurisdiction.
3. Sixty vegetation types were observed, ranging from forest and swamp to submerged aquatic communities. The site includes 24 forest, 10 successional, 21 wetland, 2 aquatic, and 3 meadow vegetation community types.

4. The diversity of flora species remains relatively high at GRMT; this is primarily attributed to the wide range of vegetation communities, soil types, and community ages that exist at the site. A total of 321 flora species (including 73 flora species of concern (ranked L1 to L3) were observed between 2007 to 2012. The vast majority (80%) were native in origin.

5. A high total of 88 vertebrate fauna species have been documented at the GRMT over the past decade with 39 of these being species of conservation concern – a total which compares favourably to several other larger rural sites within the jurisdiction.

6. Twenty-nine area sensitive fauna species were identified on site, four of which require in excess of 100 ha of natural cover including three large hawk species: northern goshawk, red-shouldered hawk and broad-winged hawk. The only other site within the region that accommodates all three large hawk species is the considerably more extensive forest complex at Glen Major.

7. One Species at Risk has been documented for the study area – a small population of western chorus frogs was reported from one of the forest wetland pools in 2005.

5.2 Site Recommendations

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

The following recommendations address the above natural heritage concerns, with an emphasis upon bolstering the existing high-quality 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***.

a. Management zones should be delineated for the study area in the management plan that emphasizes protection of existing natural heritage features, i.e. vegetation communities, and plant or animal species of high conservation rank.

b. The high quality forest fauna and flora communities are best protected by setting aside large areas of the property where trail access is completely restricted, allowing such areas to provide multiple opportunities for sensitive species to flourish, potentially acting as source populations for the wider local landscape.

c. Although the GRMT has limited opportunities for large scale restoration there are situations where gaps in the forest cover may provide small scale opportunities. However, it is important to note that small gaps within a forest system provide specific nesting and foraging opportunities for a whole suite of species that are not best served by a continuous canopy (see (d) below).

d. Judicious management of the existing conifer plantations, including thinning and gap-creation, will provide a wide variety of niche habitats which will accommodate a number of habitat-dependent species which are currently excluded by the rather uniform structure of the plantations.

e. Areas selected for restoration should have soil and moisture assessment in order to help determine suitable lists of species for planting.

f. Ensure effective and adequate passage (e.g. tunnels) for amphibians and mammals across or under roads and trails particularly any that cross wetlands; for example, when the roads bordering the site create an obstruction for animals using adjacent wetlands.

2. Manage Public Use

Although landscape metrics indicate that the matrix influence at this rural site is largely positive, this does not take into account the disturbance that occurs along the extensive network of roads and trails. Visitor pressure is likely to increase and ***it is important to pre-empt any potential increase in user pressure by designing the trail network to minimize negative impacts on sensitive forest species***.

a. Any future trail planning needs to consider the locations of flora and fauna species of concern and to direct visitor pressure away from these areas. Likewise, restoration activities should target non-sensitive areas.

b. Installation of board-walks, where possible, as opposed to typical ground-borne trails should be considered as a means of protecting the sensitive flora and fauna species that occur throughout the various habitat patches on the site.

c. Dogs should be either excluded from the site or, at the very least; the leash-by-law should be properly enforced, bolstered by effective interpretive signs, and occasional enforcement staff patrols.

d. Discourage negative and destructive behaviours/activities by site users (i.e. harvesting of sensitive flora, going off-trail) through the use of educational signage and/or possible fines.

3. Control Invasive Species

It is essential that well-planned and realistic measures be undertaken to control invasive species. A few invasive plant species pose a considerable threat to the native biodiversity at the GRMT. Management for these invasive species will need to be tailored to the individual species and will depend on how wide-spread and established they are.

a. The highest-priority invasive species at the GRMT are buckthorn, Manitoba maple, reed canary grass, purple loosestrife, dog-strangling vine, and Scots pine. Of the species listed, buckthorn and Manitoba maple are the most pervasive of the forested communities while reed canary grass and purple loosestrife have infiltrated most of the wetland and moist meadow areas across the site. Small patches of these species may be managed through mechanical and/or chemical control but larger, well-established populations may require a more integrated and long-term approach.

b. Existing Scots pine plantations are in close proximity to hardwood and mixed forest seed sources; consider the possibility of converting these exotic communities to a more natural mixed or hardwood forest. To facilitate the natural succession process, the more densely spaced plantations can be selectively thinned to allow desirable native tree species such as paper birch, sugar maple and basswood to move into the understorey (via natural processes or through active plantings). Where feasible, efforts should also focus on controlling the regeneration and further spread of these highly prolific exotics into the surrounding landscape through the selective removal of all seedlings, saplings and seed producing plants from adjacent field and meadow communities.

c. Invasive species control should be undertaken as a proactive measure prior to planting around any fields that are being targeted for restoration. This would

include removal of Manitoba maple (*Acer negundo*) along with the other priority species.

6.0 References

Banks P.B. and Bryant J.V. 2007. ***Four-legged friend or foe? Dog walking displaces native birds from natural areas***. Biology Letters (2007) 3. 611-613. Available on-line at: http://rsbl.royalsocietypublishing.org/content/3/6/611.full.pdf [Accessed 8 January 2010].

Cadman M.D., Sutherland D.A., Beck G.G., Lepage D., and Couturier A.R. (eds). 2007. ***Atlas of the Breeding Birds of Ontario, 2001 – 2005***. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706pp.

Gutzwiller K.J. and Anderson S.H. 1999. ***Spatial extent of human-intrusion effects on subalpine bird distributions***. Condor 101:378-389.

Kilgour B. 2003. ***Landscape and patch character as a determinant of occurrence of eighty selected bird species in the Toronto area.*** A report prepared for the TRCA. Jacques-Whitford Ltd.,2003

Lee H., Bakowsky W.D., Riley J., Bowles J., Puddister M., Uhlig P. and McMurray S. 1998. ***Ecological land classification for southern Ontario: first approximation and its application.*** Peterborough, Ontario: Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch.

OMNR [Ontario Ministry of Natural Resources]. 1999. ***Provincially Significant Eaton Hall-Mary-Hackett Lakes Wetland Complex***, Aurora, Ontario: Ontario Ministry of Natural Resources.

NHIC [Ontario Natural Heritage Information Centre] 2008. Natural Heritage Information website. Available on-line at: http://nhic.mnr.gov.on.ca/nhic_.cfm [Accessed 14 February 2011].

Newman, R.M. and Biesboer, D.D. 2000. ***A decline of Eurasian watermilfoil associated with the milfoil weevil,*** **Euhrychiopis lecontei.** J. Aquatic Plant Management 38: 105-111.

Oak Ridges Moraine Foundation. 2011. ***Achievements in Land Stewardship since the Establishment of the Oak Ridges Moraine Foundation***. King City, Ontario: Oak Ridges Moraine Foundation. Available on-line at: http://www.moraineforlife.org/resources/documents/05_ORMF-LandStewardshipReport-WEB.pdf [Accessed 5 January 2012].

Rosenburg K.V., Rohrbaugh R.W. Jr., Barker S.E., Hames R.S. and Dhondt A.A. 1999. ***A land manager's guide to improving habitat for scarlet tanagers and other forest-interior birds***. Ithaca, NY: The Cornfell Lab of Ornithology.

TRCA 2007a. ***The Terrestrial Natural Heritage System Strategy***. Toronto Region Conservation Authority.

TRCA 2007b. ***Setting Terrestrial Natural Heritage System Targets.*** Toronto Region Conservation Authority.

TRCA 2007c. ***Evaluating and Designing Terrestrial Natural Heritage Systems***. Toronto Region Conservation Authority.

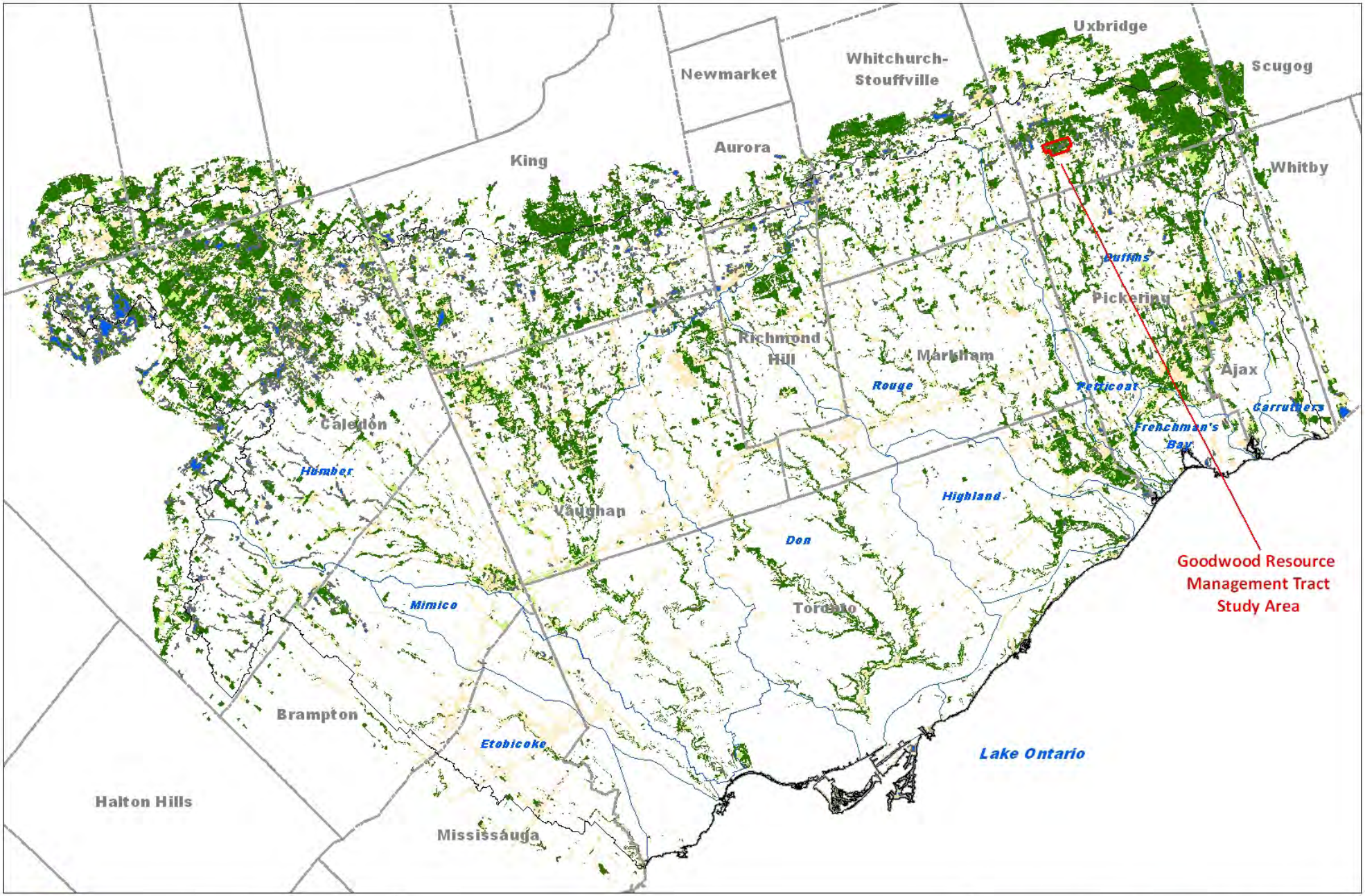
TRCA 2007d. ***Terrestrial Natural Heritage Program Data Collection Methodology***. Toronto Region Conservation Authority.

TRCA 2008. ***Dog-strangling vine* – Cynanchum rossicum *(Kleopow) Borhidi: a review of distribution, ecology and control of this invasive plant***. Toronto and Region Conservation Authority and Rouge Park. Available on-line at: http://www.rougepark.com/unique/reports.php [Accessed 6 January 2012].

TRCA 2010. ***Vegetation Community and Species Ranking and Scoring method***. Toronto Region Conservation Authority.

TRCA 2012. ***Scarborough Shoreline: terrestrial biological inventory and assessment***. Toronto Region Conservation Authority.

Watchorn M.A., Hamilton P.B., Anderson T.W., Roe H.M. and Patterson R.T. 2008. ***Diatoms and pollen as indicators of water quality and land-use change: a case study from the Oak Ridges Moraine, Southern Ontario, Canada***. J Paleolimnology 39: 491–509.



Toronto and Region Conservation for The Living City

N

0 2.5 5 10 15 20 Kilometers

Date: December 2012

* Landscape analysis based on 2007/2008 Orthophotography

Map 1:
Goodwood Resource Management Tract in the Context of Regional Natural Cover

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

Legend
- Goodwood Resource Management Tract Study Area Boundary
- TRCA Jurisdiction
- Watershed
- Municipal Boundary

Toronto and Region Conservation
for The Living City

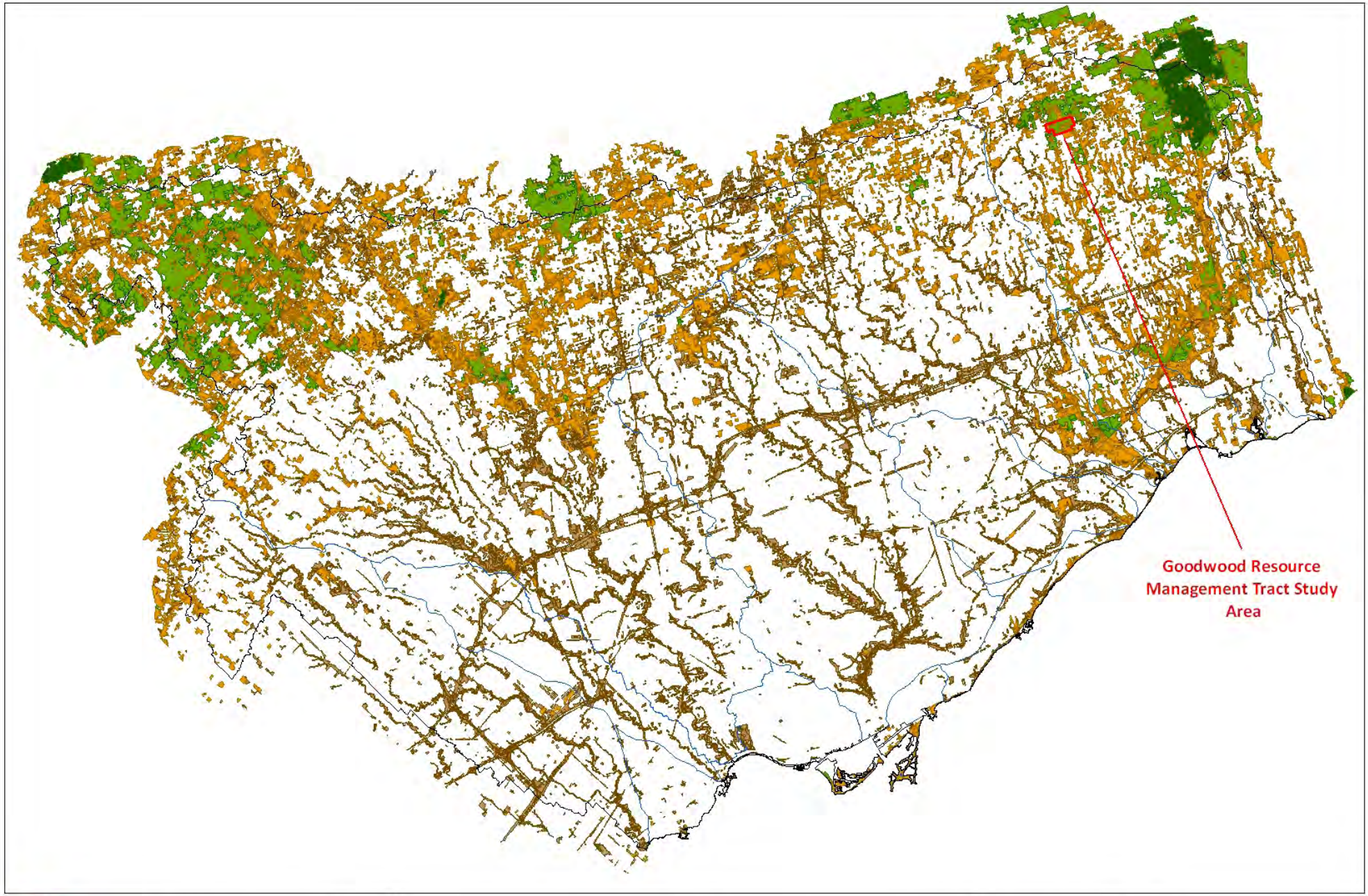
0 50 100 200 300 400
Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.

Map 2: Goodwood Resource Management Tract Study Area

Legend

Goodwood Resource Management Tract Study Area Boundary



Toronto and Region Conservation
for The Living City

N

0 2.5 5 10 15 20 Kilometers

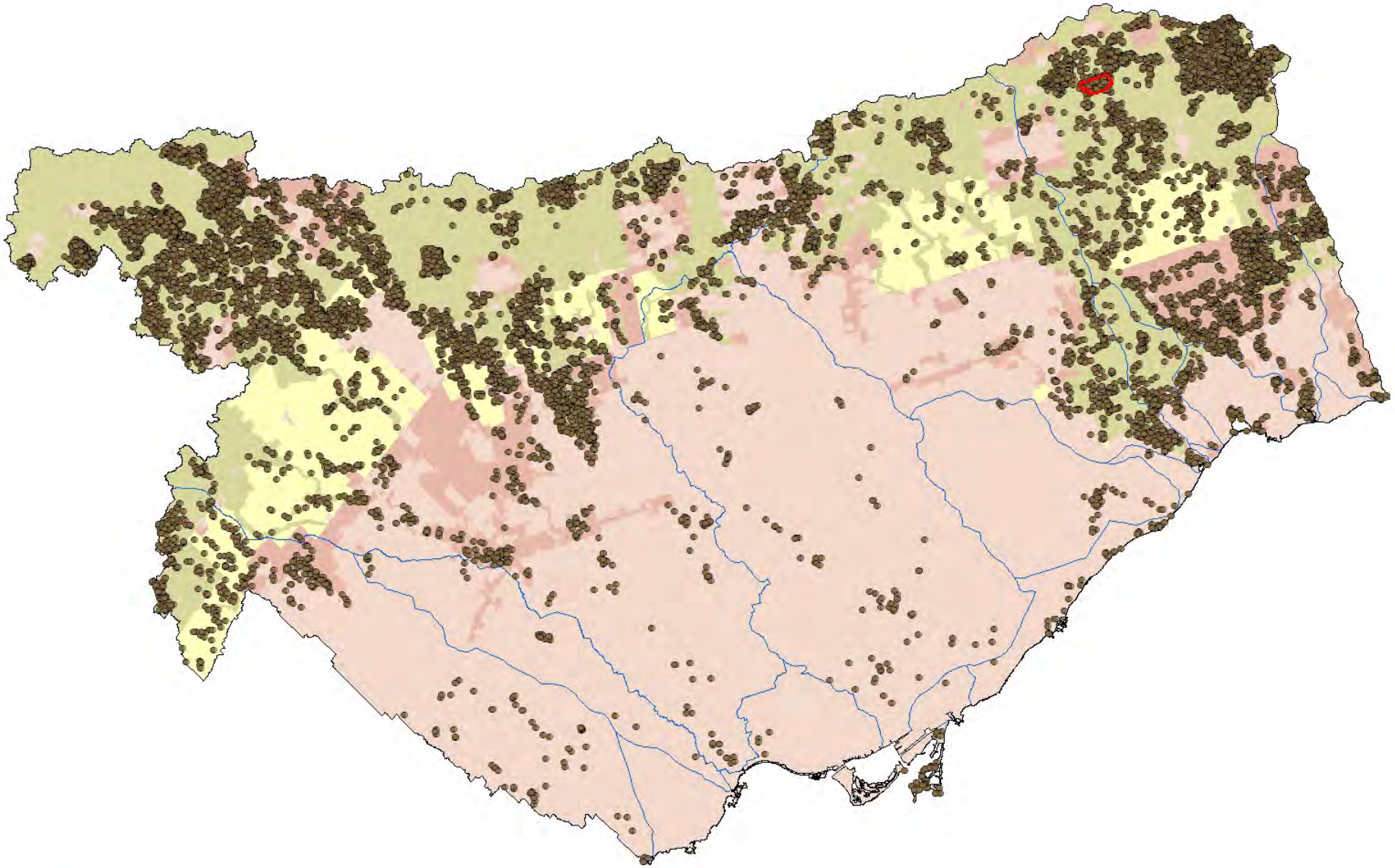
Date: December 2012
* Landscape analysis based on 20072008 Orthophotography

Map 3:
Regional Natural System
Habitat Patch Quality

Legend

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

- Goodwood Resource Management Tract Study Area Boundary
- TRCA Jurisdiction
- Watershed



Toronto and Region Conservation
for The Living City

0 2.5 5 10 15 20
Kilometers

Date: December 2012

Map 4:
Distribution of Fauna
Regional Species of Concern

Legend

- Fauna Species of Concern (L1 - L3)
- Goodwood Resource Management Tract Study Area Boundary
- TRCA Jurisdiction
- Watershed
- Agricultural & Rural Area
- Built-up Area
- Designated Greenfield Area
- Greenbelt Area

Fauna Area Sensitivity Scores

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

- Fauna Species
- Frog Species

Habitat Patch Size Scores *

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

Toronto and Region Conservation *for* The Living City

N

0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.
* Landscape analysis based on 20072008 Orthophotography

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

Legend

- Goodwood Resource Management Tract Study Area Boundary

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

Toronto and Region Conservation
for The Living City

0 50 100 200 300 400
Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.
* Landscape analysis based on 2007/2008 Orthophotography

Map 6:
Interior Forest at Goodwood Resource Management Tract

Legend

- Goodwood Resource Management Tract Study Area Boundary
- Forest

Forest Interior

- 100m-200m
- 200m-300m
- 300m-400m
- 400m-500m
- 500m-600m
- 600m-700m

Flora Sensitivity to Development Scores

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

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

- Flora Species
- Planted Flora Species

Toronto and Region Conservation *for* The Living City

N

0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.
* Landscape analysis based on 2007/2008 Orthophotography

Map 7: 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

Goodwood Resource Management Tract Study Area Boundary

Fauna Sensitivity to Development Scores

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

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

△ Fauna Species

□ Frog Species

Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2011, First Base Solutions Inc.
* Landscape analysis based on 2007-2008 Orthophotography

Map 8: 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

Goodwood Resource Management Tract Study Area Boundary

Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.
* Landscape analysis based on 2007/2008 Orthophotography

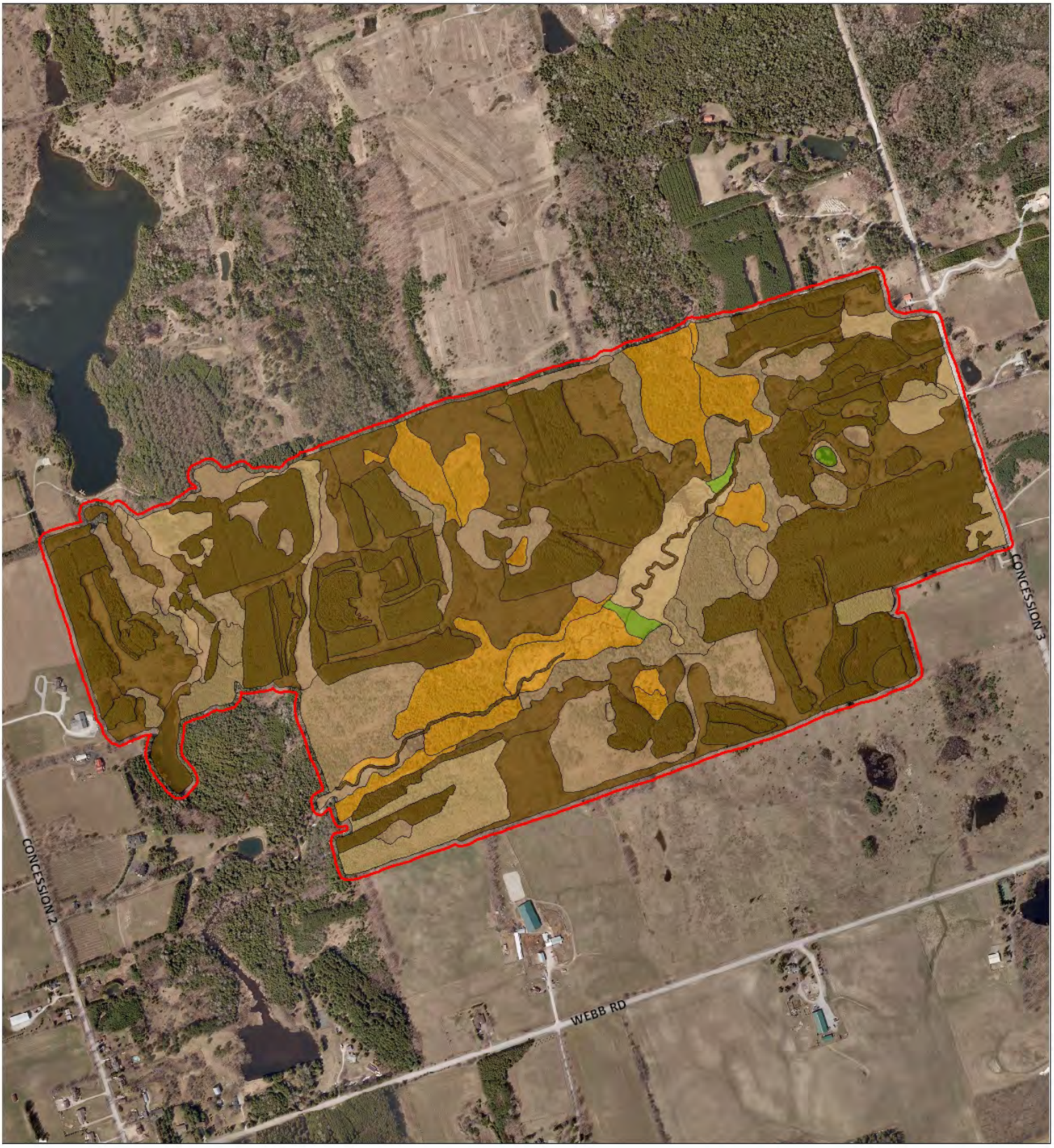
Map 9: Habitat Patch Quality

Legend

Habitat Patch Quality *

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

Goodwood Resource Management Tract Study Area Boundary



Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.

Map 10: Vegetation Communities with their Associated Local Ranks

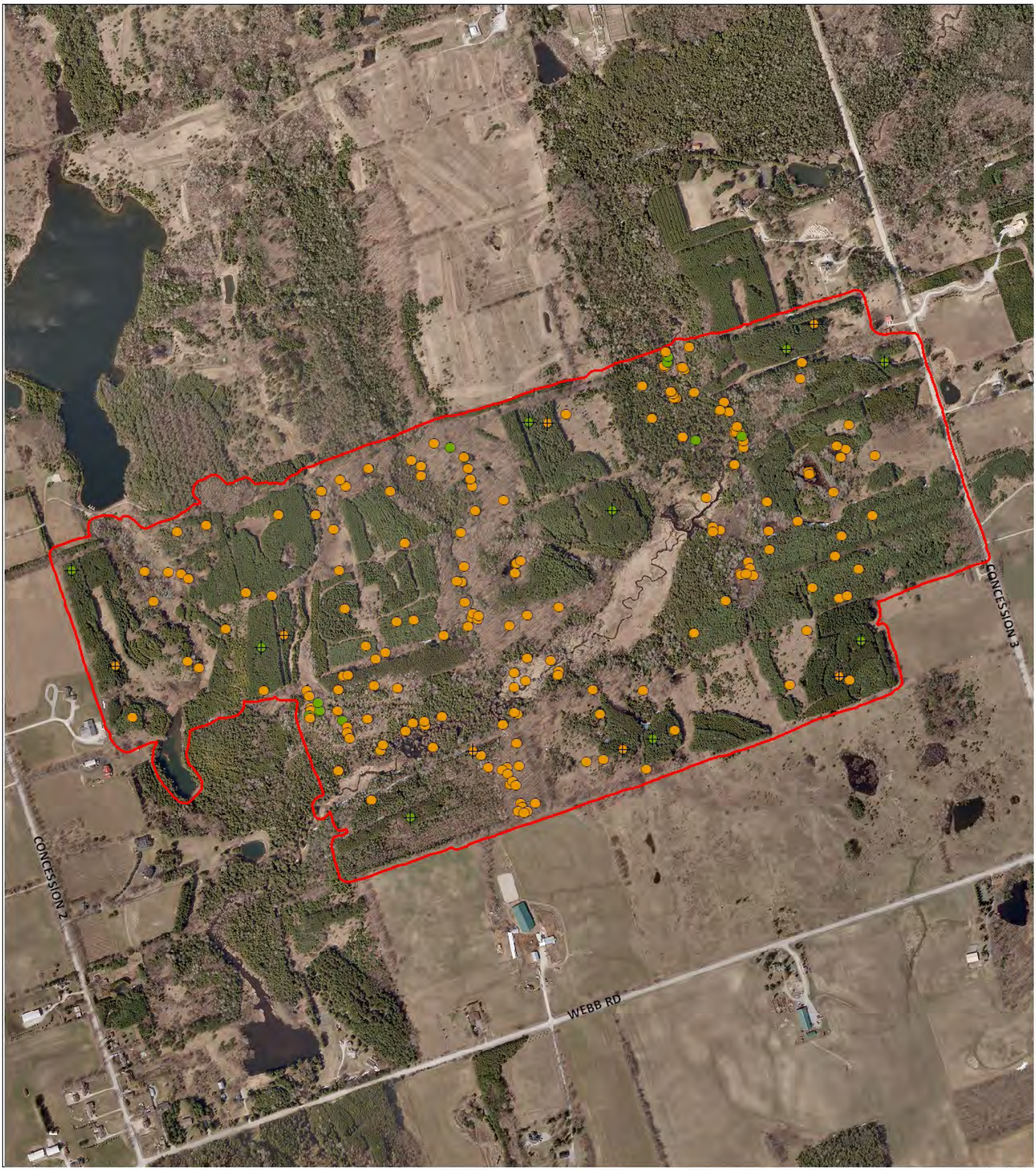
Legend

Vegetation Community Ranks

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

Goodwood Resource Management Tract Study Area Boundary

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



Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: Decmeber 2012
Orthophoto: Spring 2008, First Base Solutions Inc.

Map 11: Location of Flora Species of Concern

Legend

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

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

Goodwood Resource Management Tract Study Area Boundary

Flora Habitat Dependence Scores

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

- Flora Species
- Planted Flora Species

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

Toronto and Region Conservation *for* The Living City

N

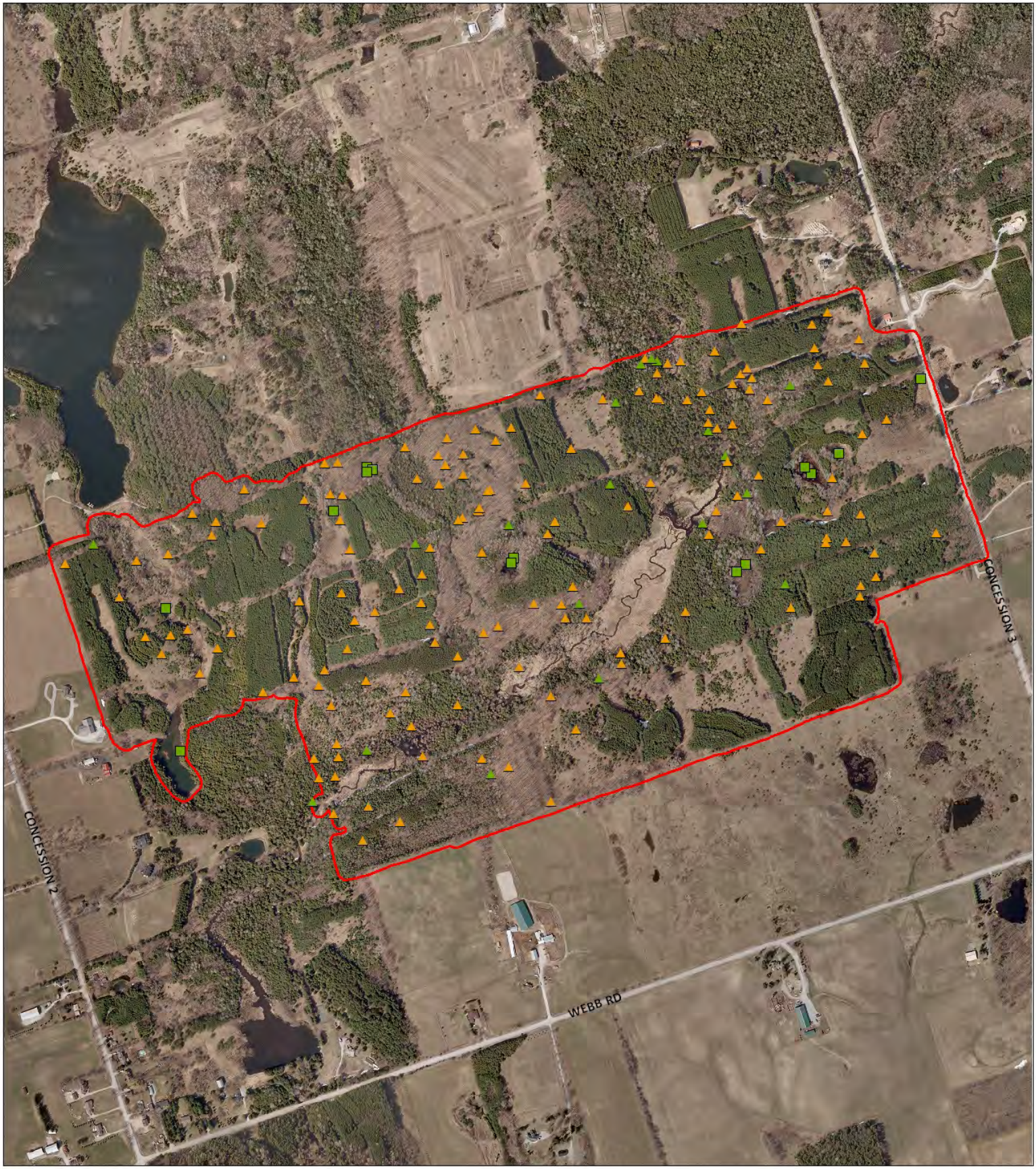
0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.

Map 12: Flora Species Habitat Dependence Scores

Legend

- Goodwood Resource Management Tract Study Area Boundary



Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.

Map 13: Locations of Fauna Species of Concern

Legend

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

Goodwood Resource Management Tract 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.

Toronto and Region Conservation for The Living City

N

0 50 100 200 300 400 Meters

Date: December 2012
Orthophoto: Spring 2008, First Base Solutions Inc.

Map 14: Fauna Species Habitat Dependence Scores

Legend

- Goodwood Resource Management Tract Study Area Boundary
- Fauna Species
- Frog Species

Appendix 1: List of Vegetation Communities at Goodwood Resource Management Tract (2005)

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					
FOM4-2	Dry-Fresh White Cedar - Poplar Mixed Forest	0.6	3.0	2.0	5.0	L3
FOM6-2	Fresh-Moist Hemlock - Hardwood Mixed Forest	1.0	2.0	3.0	5.0	L3
FOC2-2	Dry-Fresh White Cedar Coniferous Forest	1.2	2.5	2.0	4.5	L4
FOC3-1	Fresh-Moist Hemlock Coniferous Forest	0.0	2.5	2.0	4.5	L4
FOC4-1	Fresh-Moist White Cedar Coniferous Forest	2.8	2.0	2.0	4.0	L4
FOM7-2	Fresh-Moist White Cedar - Hardwood Mixed Forest	5.2	1.5	2.0	3.5	L4
FOD3-1	Dry-Fresh Poplar Deciduous Forest	0.9	2.0	2.0	4.0	L4
FOD3-2	Dry-Fresh Paper Birch Deciduous Forest	0.4	2.5	1.0	3.5	L4
FOD4-G	Dry-Fresh Basswood Deciduous Forest	0.4	3.0	0.0	3.0	L4
FOD5-10	Dry-Fresh Sugar Maple - Paper Birch - Poplar Deciduous Forest	1.2	2.5	1.0	3.5	L4
FOD5-1	Dry-Fresh Sugar Maple Deciduous Forest	8.8	1.5	0.0	1.5	L5
FOD6-5	Fresh-Moist Sugar Maple - Hardwood Deciduous Forest	1.7	1.5	0.0	1.5	L5
FOD8-1	Fresh-Moist Poplar Deciduous Forest	1.6	1.0	0.0	1.0	L5
CUP1-1	Sugar Maple Deciduous Plantation	0.3	4.0	0.0	4.0	L5
CUP3-1	Red Pine Coniferous Plantation	24.8	1.5	0.0	1.5	L5
CUP3-2	White Pine Coniferous Plantation	15.2	1.5	0.0	1.5	L5
CUP3-C	White Spruce Coniferous Plantation	4.6	2.0	0.0	2.0	L5
CUP3-G	White Cedar Coniferous Plantation	2.9	2.5	0.0	2.5	L5
FOD4-b	Dry-Fresh Manitoba Maple Deciduous Forest	0.0	2.5	0.0	2.5	L+
FOD7-c	Fresh-Moist Exotic Lowland Deciduous Forest	0.8	2.5	0.0	2.5	L+
CUP1-c	Black Locust Deciduous Plantation	0.5	2.0	0.0	2.0	L+
CUP2-b	Black Locust - Conifer Mixed Plantation	0.3	3.0	0.0	3.0	L+
CUP3-3	Scotch Pine Coniferous Plantation	3.5	2.0	0.0	2.0	L+
CUP3-e	Norway Spruce Coniferous Plantation	0.6	2.0	0.0	2.0	L+
	Successional					
CUT1-3	Chokecherry Deciduous Thicket	0.8	4.0	0.0	4.0	L4
CUT1-A3	Coniferous Sapling Regeneration Thicket	4.3	2.5	1.0	3.5	L4
CUS1-A2	White Pine Successional Savannah	0.8	2.5	1.0	3.5	L4
CUW1-A1	White Cedar Successional Woodland	0.7	2.5	1.0	3.5	L4
CUT1-1	Sumac Deciduous Thicket	0.0	2.0	0.0	2.0	L5
CUS1-A1	Native Deciduous Successional Savannah	0.8	1.5	0.0	1.5	L5
CUW1-A3	Native Deciduous Successional Woodland	1.0	1.0	0.0	1.0	L5
CUT1-b	Buckthorn Deciduous Thicket	0.0	2.5	0.0	2.5	L+
CUS1-b	Exotic Successional Savannah	1.6	2.0	0.0	2.0	L+
CUW1-b	Exotic Successional Woodland	0.5	1.5	0.0	1.5	L+

Appendix 1: List of Vegetation Communities at Goodwood Resource Management Tract (2005)

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	
	Wetland					
SWCA-A	Hemlock Organic Coniferous Swamp	0.0	3.5	3.0	6.5	L2
MAM3-1	Bluejoint Organic Meadow Marsh	0.5	3.5	3.0	6.5	L2
MAS3-2	Bulrush Organic Shallow Marsh	0.1	4.0	3.0	7.0	L2
MAS3-4	Broad-leaved Sedge Organic Shallow Marsh	0.0	4.0	3.0	7.0	L2
MAS3-C	Manna Grass Organic Shallow Marsh	0.0	4.0	3.0	7.0	L2
SWM4-1	White Cedar - Hardwood Organic Mixed Swamp	9.0	2.0	3.0	5.0	L3
SWM6-1	Birch - Conifer Organic Mixed Swamp	0.0	2.5	3.0	5.5	L3
SWD5-1	Black Ash Organic Deciduous Swamp	0.0	3.0	3.0	6.0	L3
SWT3-1	Alder Organic Thicket Swamp	0.8	3.0	3.0	6.0	L3
MAM3-9	Forb Organic Meadow Marsh	2.0	3.0	3.0	6.0	L3
MAS3-1A	Broad-leaved Cattail Organic Shallow Marsh	0.3	2.5	3.0	5.5	L3
SWM1-1	White Cedar - Hardwood Mineral Mixed Swamp	4.3	2.5	2.0	4.5	L4
SWD4-3	Paper Birch - Poplar Mineral Deciduous Swamp	0.7	2.0	2.0	4.0	L4
SWT2-5	Red-osier Mineral Thicket Swamp	0.3	2.0	2.0	4.0	L4
MAM2-3	Red-top Mineral Meadow Marsh	0.1	3.0	0.0	3.0	L4
MAM2-10	Forb Mineral Meadow Marsh	1.7	2.0	1.0	3.0	L4
MAS2-1A	Broad-leaved Cattail Mineral Shallow Marsh	0.1	2.0	1.0	3.0	L4
MAS2-2	Bulrush Mineral Shallow Marsh	0.9	3.0	1.0	4.0	L4
MAS2-9	Forb Mineral Shallow Marsh	0.1	2.5	1.0	3.5	L4
MAM2-2	Reed Canary Grass Mineral Meadow Marsh	3.2	1.0	1.0	2.0	L+
MAS2-1b	Narrow-Leaved Cattail Mineral Shallow Marsh	0.2	2.0	0.0	2.0	L+
	Aquatic					
SAF1-3	Duckweed Floating-leaved Shallow Aquatic	0.0	2.5	1.0	3.5	L4
OAO1	Open Aquatic (deep or riverine unvegetated)	1.6	2.0	0.0	2.0	L5
	Meadow					
CUM1-A	Native Forb Meadow	11.8	1.5	0.0	1.5	L5
CUM1-b	Exotic Cool-season Grass Graminoid Meadow	0.0	1.0	0.0	1.0	L+
CUM1-c	Exotic Forb Meadow	0.0	1.5	0.0	1.5	L+

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Carex lasiocarpa	slender woolly sedge	3	4	5	5	17	L2
Coptis trifolia	goldthread	2	5	5	5	17	L2
Cornus canadensis	bunchberry	3	5	5	5	18	L2
Cypripedium reginae	showy lady's slipper	3	4	5	5	17	L2
Dulichium arundinaceum	three-way sedge	3	4	5	5	17	L2
Eriophorum viridicarinatum	thin-leaved cotton-grass	4	4	5	5	18	L2
Oxalis montana	pink wood sorrel	4	4	5	4	17	L2
Pyrola asarifolia	pink pyrola	3	4	5	5	17	L2
Acorus americanus	sweet flag	3	3	5	4	15	L3
Agrostis scabra	ticklegrass	3	3	4	4	14	L3
Alnus incana ssp. *rugosa*	speckled alder	1	4	4	5	14	L3
Anaphalis margaritacea	pearly everlasting	3	4	4	3	14	L3
Anemone acutiloba	sharp-lobed hepatica	1	4	4	5	14	L3
Anemone cylindrica	long-fruited thimbleweed	3	4	3	4	14	L3
Botrychium virginianum	rattlesnake fern	2	5	4	5	16	L3
Bromus ciliatus	fringed brome grass	2	4	4	5	15	L3
Carex albursina	white bear sedge	2	3	5	4	14	L3
Carex atherodes	awned sedge	3	3	5	4	15	L3
Carex comosa	bristly sedge	3	3	5	4	15	L3
Carex disperma	two-seeded sedge	2	3	5	4	14	L3
Carex flava	yellow sedge	3	3	5	4	15	L3
Carex interior	fen star sedge	2	4	4	4	14	L3
Carex laevivaginata	smooth-sheathed sedge	2	4	4	4	14	L3
Carex leptalea	bristle-stalked sedge	2	3	5	4	14	L3
Carex plantaginea	plantain-leaved sedge	2	4	5	4	15	L3
Carex tuckermanii	Tuckerman's sedge	2	4	4	4	14	L3
Carex utriculata	beaked sedge	2	3	4	5	14	L3
Chelone glabra	turtlehead	2	3	4	5	14	L3
Circaea alpina	smaller enchanter's nightshade	2	4	5	4	15	L3
Claytonia caroliniana	broad-leaved spring beauty	2	4	5	5	16	L3
Claytonia virginica	narrow-leaved spring beauty	2	4	4	5	15	L3
Clintonia borealis	bluebead lily	2	5	4	5	16	L3
Cypripedium parviflorum var. *makasin*	smaller yellow lady's slipper	2	4	4	5	15	L3
Cystopteris tenuis	Mackay's fragile fern	2	4	5	5	16	L3
Dicentra canadensis	squirrel-corn	2	4	5	4	15	L3

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Dicentra cucullaria	Dutchman's breeches	2	4	4	5	15	L3
Epilobium leptophyllum	narrow-leaved willow-herb	2	5	4	4	15	L3
Equisetum fluviatile	water horsetail	2	4	5	4	15	L3
Equisetum scirpoides	dwarf scouring-rush	2	4	5	5	16	L3
Geum rivale	water avens	3	4	5	4	16	L3
Glyceria borealis	northern manna grass	2	3	5	5	15	L3
Glyceria septentrionalis	eastern manna grass	2	3	5	4	14	L3
Gymnocarpium dryopteris	oak fern	1	3	5	5	14	L3
Hydrocotyle americana	marsh pennywort	2	4	4	4	14	L3
Hypericum ascyron	great St. John's-wort	3	4	5	2	14	L3
Hypopitys monotropa	pinesap	2	4	5	5	16	L3
Juglans cinerea	butternut	1	5	4	4	14	L3
Juniperus communis var. *depressa*	common juniper	2	3	4	5	14	L3
Larix laricina	tamarack	2	4	4	4	14	L3
Liparis loeselii	Loesel's twayblade	2	3	5	5	15	L3
Lobelia siphilitica	great blue lobelia	2	3	4	5	14	L3
Mitchella repens	partridgeberry	2	4	4	5	15	L3
Mitella diphylla	mitrewort	2	3	4	5	14	L3
Mitella nuda	naked mitrewort	2	4	5	5	16	L3
Monotropa uniflora	Indian-pipe	2	4	5	5	16	L3
Osmunda regalis var. *spectabilis*	royal fern	2	4	5	5	16	L3
Osmundastrum cinnamomeum	cinnamon fern	2	4	5	5	16	L3
Phegopteris connectilis	northern beech fern	2	3	5	5	15	L3
Picea glauca	white spruce	1	5	4	4	14	L3
Pilea fontana	spring clearweed	2	4	4	4	14	L3
Poa alsodes	grove meadow grass	3	3	5	3	14	L3
Poa saltuensis ssp. *languida*	languid spear grass	5	2	4	3	14	L3
Ribes triste	swamp red currant	2	4	4	5	15	L3
Rumex britannica	great water dock	3	3	4	4	14	L3
Salix lucida	shining willow	2	4	5	3	14	L3
Sisyrinchium montanum	blue-eyed grass	2	3	4	5	14	L3
Streptopus lanceolatus var. *lanceolatus*	rose twisted-stalk	2	4	4	5	15	L3
Symphyotrichum urophyllum	arrow-leaved aster	3	3	4	4	14	L3
Taxus canadensis	Canada yew	1	4	4	5	14	L3

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Trientalis borealis	star-flower	1	4	4	5	14	L3
Uvularia grandiflora	large-flowered bellwort	1	4	5	5	15	L3
Verbena stricta	hoary vervain	3	5	4	4	16	L3
Viola canadensis	Canada violet	2	4	4	4	14	L3
Abies balsamea	balsam fir	1	3	4	5	13	L4
Acer rubrum	red maple	2	4	1	5	12	L4
Acer spicatum	mountain maple	2	3	4	4	13	L4
Actaea pachypoda	white baneberry	2	3	4	3	12	L4
Allium tricoccum	wild leek	1	3	4	4	12	L4
Amelanchier interior	hybrid serviceberry complex	3	3	3	3	12	L4
Antennaria howellii ssp. *howellii*	Howell's pussytoes	3	2	3	3	11	L4
Apocynum androsaemifolium	spreading dogbane	2	3	2	4	11	L4
Aquilegia canadensis	wild columbine	1	4	3	5	13	L4
Asarum canadense	wild ginger	2	3	4	3	12	L4
Asclepias incarnata ssp. *incarnata*	swamp milkweed	2	3	4	4	13	L4
Betula alleghaniensis	yellow birch	1	4	3	5	13	L4
Betula papyrifera	paper birch	1	4	2	4	11	L4
Bidens vulgata	tall beggar's-ticks	3	2	3	4	12	L4
Calamagrostis canadensis	Canada blue joint	2	3	4	4	13	L4
Caltha palustris	marsh marigold	2	4	3	4	13	L4
Cardamine diphylla	broad-leaved toothwort	2	3	4	4	13	L4
Cardamine pensylvanica	bitter cress	3	2	4	4	13	L4
Carex arctata	nodding wood sedge	2	4	2	3	11	L4
Carex bromoides	brome-like sedge	3	3	4	3	13	L4
Carex communis	fibrous-rooted sedge	2	4	3	3	12	L4
Carex deweyana	Dewey's sedge	2	4	3	3	12	L4
Carex gracillima	graceful sedge	2	3	4	2	11	L4
Carex hystericina	porcupine sedge	2	3	2	5	12	L4
Carex intumescens	bladder sedge	2	4	4	2	12	L4
Carex lacustris	lake-bank sedge	2	3	3	4	12	L4
Carex laxiflora	loose-flowered sedge	2	3	4	3	12	L4
Carex lupulina	hop sedge	1	4	4	4	13	L4
Carex peckii	Peck's sedge	2	3	4	3	12	L4
Carex pedunculata	early-flowering sedge	2	3	3	3	11	L4
Carex pensylvanica	Pennsylvania sedge	2	4	3	4	13	L4

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Carex projecta	necklace sedge	3	2	4	3	12	L4
Carex retrorsa	retrorse sedge	1	3	3	4	11	L4
Carex scabrata	rough sedge	2	3	4	3	12	L4
Carex sparganioides	bur-reed sedge	2	2	5	2	11	L4
Carex stricta	tussock sedge	2	3	3	4	12	L4
Caulophyllum giganteum	long-styled blue cohosh	1	3	4	4	12	L4
Cicuta bulbifera	bulblet-bearing water-hemlock	2	3	4	3	12	L4
Cystopteris bulbifera	bulblet fern	1	3	4	4	12	L4
Dryopteris cristata	crested wood fern	1	4	4	4	13	L4
Dryopteris intermedia	evergreen wood fern	2	4	4	3	13	L4
Dryopteris marginalis	marginal wood fern	1	3	3	4	11	L4
Eupatorium perfoliatum	boneset	1	3	4	3	11	L4
Eurybia macrophylla	big-leaved aster	2	3	2	4	11	L4
Fagus grandifolia	American beech	1	4	3	4	12	L4
Fraxinus nigra	black ash	1	4	4	3	12	L4
Galium asprellum	rough bedstraw	3	2	4	2	11	L4
Glyceria grandis	tall manna grass	2	3	4	2	11	L4
Juncus articulatus	jointed rush	3	2	4	2	11	L4
Lycopus americanus	cut-leaved water-horehound	1	4	3	3	11	L4
Lycopus uniflorus	northern water-horehound	2	3	3	3	11	L4
Maianthemum canadense	Canada May-flower	1	4	1	5	11	L4
Mimulus ringens	square-stemmed monkey-flower	2	3	3	4	12	L4
Myosotis laxa	smaller forget-me-not	2	4	3	4	13	L4
Oryzopsis asperifolia	white-fruited mountain-rice	2	4	3	4	13	L4
Osmorhiza claytonii	woolly sweet cicely	2	3	4	3	12	L4
Persicaria amphibia	swamp smartweed (sensu lato)	2	3	4	4	13	L4
Polygonatum pubescens	downy Solomon's seal	1	4	2	5	12	L4
Polystichum acrostichoides	Christmas fern	1	3	5	4	13	L4
Populus grandidentata	large-toothed aspen	1	3	4	3	11	L4
Pteridium aquilinum var. *latiusculum*	eastern bracken	2	4	2	4	12	L4
Pyrola elliptica	shinleaf	1	4	4	4	13	L4
Rubus pubescens	dwarf raspberry	2	3	3	5	13	L4
Rudbeckia hirta	black-eyed Susan	1	4	4	3	12	L4
Sagittaria latifolia	common arrowhead	2	2	5	4	13	L4
Salix amygdaloides	peach-leaved willow	1	2	5	3	11	L4

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Salix bebbiana	Bebb's willow	2	3	3	4	12	L4
Salix petiolaris	slender willow	2	3	5	3	13	L4
Schizachne purpurascens	purple melic grass	2	3	3	5	13	L4
Schoenoplectus tabernaemontani	soft-stemmed bulrush	1	2	5	3	11	L4
Scirpus cyperinus	woolly bulrush	1	3	4	5	13	L4
Sium suave	water-parsnip	2	2	4	4	12	L4
Solidago rugosa ssp. *rugosa*	rough-stemmed goldenrod	3	3	2	3	11	L4
Spiraea alba	wild spiraea	2	4	4	3	13	L4
Thelypteris palustris var. *pubescens*	marsh fern	2	4	2	4	12	L4
Thuja occidentalis	white cedar	1	4	1	5	11	L4
Tiarella cordifolia	foam-flower	1	3	3	4	11	L4
Trillium erectum	red trillium	1	4	3	5	13	L4
Trillium grandiflorum	white trillium	1	3	4	5	13	L4
Tsuga canadensis	eastern hemlock	1	4	3	5	13	L4
Typha latifolia	broad-leaved cattail	1	4	4	4	13	L4
Veronica americana	American speedwell	2	3	4	4	13	L4
Acer saccharum	sugar maple	2	3	0	2	7	L5
Actaea rubra ssp. *rubra*	red baneberry	2	3	1	3	9	L5
Agrimonia gryposepala	agrimony	2	2	0	2	6	L5
Anemone canadensis	Canada anemone	2	2	2	2	8	L5
Anemone virginiana	common thimbleweed	3	3	0	3	9	L5
Aralia nudicaulis	wild sarsaparilla	2	3	1	4	10	L5
Arisaema triphyllum	Jack-in-the-pulpit	1	3	2	3	9	L5
Asclepias syriaca	common milkweed	2	2	0	2	6	L5
Athyrium filix-femina var. *angustum*	northeastern lady fern	2	3	1	3	9	L5
Bidens cernua	nodding bur-marigold	2	2	3	3	10	L5
Bidens frondosa	common beggar's-ticks	2	1	4	0	7	L5
Carex cristatella	crested sedge	2	2	4	1	9	L5
Carex radiata	straight-styled sedge	2	2	2	2	8	L5
Carex rosea	curly-styled sedge	2	2	3	2	9	L5
Carex stipata	awl-fruited sedge	2	3	2	3	10	L5
Carex vulpinoidea	fox sedge	2	2	4	1	9	L5
Circaea canadensis ssp. *canadensis*	enchanter's nightshade	2	1	1	1	5	L5
Clematis virginiana	virgin's bower	2	2	2	3	9	L5
Cornus alternifolia	alternate-leaved dogwood	2	2	1	2	7	L5

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Cornus stolonifera	red osier dogwood	2	2	0	3	7	L5
Dryopteris carthusiana	spinulose wood fern	2	3	2	2	9	L5
Elymus virginicus var. *virginicus*	Virginia wild rye	3	2	3	2	10	L5
Equisetum arvense	field horsetail	2	2	1	1	6	L5
Equisetum hyemale ssp. *affine*	scouring-rush	2	2	2	2	8	L5
Erigeron annuus	daisy fleabane	2	2	0	1	5	L5
Erigeron philadelphicus var. *philadelphicus*	Philadelphia fleabane	3	2	0	1	6	L5
Erythronium americanum ssp. *americanum*	yellow trout-lily	2	3	3	2	10	L5
Euthamia graminifolia	grass-leaved goldenrod	2	1	4	1	8	L5
Eutrochium maculatum var. *maculatum*	spotted Joe-Pye weed	2	2	3	3	10	L5
Fragaria virginiana	wild strawberry	2	2	0	2	6	L5
Fraxinus americana	white ash	2	2	0	3	7	L5
Fraxinus pennsylvanica	red ash	1	2	0	3	6	L5
Geum canadense	white avens	2	2	1	2	7	L5
Glyceria striata	fowl manna grass	2	2	1	2	7	L5
Hackelia virginiana	Virginia stickseed	2	2	0	2	6	L5
Hydrophyllum virginianum	Virginia waterleaf	2	2	1	2	7	L5
Impatiens capensis	orange touch-me-not	2	2	0	2	6	L5
Juncus dudleyi	Dudley's rush	2	2	3	1	8	L5
Juncus tenuis	path rush	3	2	1	1	7	L5
Laportea canadensis	wood nettle	2	3	2	2	9	L5
Leersia oryzoides	rice cut grass	2	2	3	2	9	L5
Lemna minor	common duckweed	2	2	4	2	10	L5
Lysimachia ciliata	fringed loosestrife	2	2	2	2	8	L5
Maianthemum racemosum ssp. *racemosum*	false Solomon's seal	2	3	2	3	10	L5
Maianthemum stellatum	starry false Solomon's seal	2	2	1	3	8	L5
Matteuccia struthiopteris var. *pensylvanica*	ostrich fern	2	2	2	2	8	L5
Mentha arvensis ssp. *borealis*	wild mint	2	2	3	2	9	L5
Muhlenbergia mexicana var. *mexicana*	common muhly grass	3	2	0	1	6	L5
Nabalus altissimus	tall wood lettuce	3	3	2	2	10	L5
Oenothera biennis	common evening-primrose	2	1	1	1	5	L5
Onoclea sensibilis	sensitive fern	2	3	1	3	9	L5
Ostrya virginiana	ironwood	2	3	2	2	9	L5
Oxalis stricta	common yellow wood-sorrel	5	1	1	1	8	L5
Parthenocissus inserta	thicket creeper	2	2	0	1	5	L5

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Persicaria lapathifolia	pale smartweed	3	1	4	0	8	L5
Physalis heterophylla	clammy ground-cherry	2	2	3	3	10	L5
Plantago rugelii	red-stemmed plantain	3	2	0	1	6	L5
Populus balsamifera	balsam poplar	2	2	3	2	9	L5
Populus deltoides	cottonwood	2	1	4	1	8	L5
Populus tremuloides	trembling aspen	2	3	1	3	9	L5
Prunus serotina	black cherry	2	2	0	2	6	L5
Prunus virginiana var. *virginiana*	choke cherry	2	2	0	1	5	L5
Ranunculus abortivus	kidney-leaved buttercup	2	3	1	2	8	L5
Rhus typhina	staghorn sumach	2	1	2	2	7	L5
Ribes americanum	wild black currant	2	3	2	2	9	L5
Ribes cynosbati	prickly gooseberry	2	3	2	2	9	L5
Rubus idaeus ssp. *strigosus*	wild red raspberry	1	1	0	1	3	L5
Rubus odoratus	purple-flowering raspberry	2	2	2	2	8	L5
Salix eriocephala	narrow heart-leaved willow	2	1	3	1	7	L5
Sambucus racemosa ssp. *pubens*	red-berried elder	2	3	2	2	9	L5
Sanguinaria canadensis	bloodroot	2	3	0	3	8	L5
Scirpus atrovirens	black-fruited bulrush	2	2	4	2	10	L5
Scirpus microcarpus	barber-pole bulrush	1	2	4	3	10	L5
Scutellaria galericulata	common skullcap	3	2	3	2	10	L5
Scutellaria lateriflora	mad-dog skullcap	2	2	3	3	10	L5
Solidago altissima	tall goldenrod	2	2	0	0	4	L5
Solidago caesia	blue-stemmed goldenrod	2	2	4	2	10	L5
Solidago canadensis var. *canadensis*	Canada goldenrod	2	2	0	1	5	L5
Solidago flexicaulis	zig-zag goldenrod	2	1	3	2	8	L5
Solidago nemoralis ssp. *nemoralis*	grey goldenrod	3	2	2	2	9	L5
Symphyotrichum cordifolium	heart-leaved aster	2	1	0	2	5	L5
Symphyotrichum ericoides var. *ericoides*	heath aster	2	1	2	1	6	L5
Symphyotrichum lanceolatum var. *lanceolatum*	panicled aster	2	2	3	1	8	L5
Symphyotrichum lateriflorum var. *lateriflorum*	calico aster	2	2	3	2	9	L5
Symphyotrichum novae-angliae	New England aster	2	2	2	1	7	L5
Symphyotrichum puniceum var. *puniceum*	swamp aster	2	2	2	2	8	L5
Thalictrum dioicum	early meadow rue	2	3	3	2	10	L5
Tilia americana	basswood	2	3	2	3	10	L5
Ulmus americana	white elm	2	4	0	2	8	L5

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Urtica dioica ssp. *gracilis*	American stinging nettle	2	3	2	2	9	L5
Verbena hastata	blue vervain	2	2	4	2	10	L5
Verbena urticifolia	white vervain	2	2	2	2	8	L5
Viburnum lentago	nannyberry	2	3	1	2	8	L5
Viola labradorica	dog violet	3	2	0	2	7	L5
Viola pubescens	stemmed yellow violet (sensu lato)	2	3	1	2	8	L5
Viola sororia	common blue violet	2	2	0	2	6	L5
Vitis riparia	riverbank grape	2	1	0	0	3	L5
Acer negundo	Manitoba maple	4	0	0	2	6	L+?
Geranium robertianum	herb Robert	4				4	L+?
Phalaris arundinacea	reed canary grass	3				3	L+?
Potentilla norvegica	rough cinquefoil	3				3	L+?
Prunella vulgaris	heal-all	5				5	L+?
Achillea millefolium ssp. *millefolium*	European yarrow	4				4	L+
Agrostis gigantea	redtop	4				4	L+
Arctium minus	common burdock	5				5	L+
Bromus inermis	smooth brome grass	4				4	L+
Caragana arborescens	Siberian pea-shrub	5				5	L+
Cerastium fontanum	mouse-ear chickweed	3				3	L+
Chelidonium majus	celandine	5				5	L+
Cirsium arvense	creeping thistle	4				4	L+
Cynanchum rossicum	dog-strangling vine	4				4	L+
Dactylis glomerata	orchard grass	4				4	L+
Daucus carota	Queen Anne's lace	4				4	L+
Dianthus armeria	Deptford pink	4				4	L+
Dipsacus fullonum	teasel	5				5	L+
Echium vulgare	viper's bugloss	3				3	L+
Elaeagnus umbellata	autumn olive	5				5	L+
Epilobium hirsutum	European willow-herb	5				5	L+
Epilobium parviflorum	small-flowered willow-herb	5				5	L+
Epipactis helleborine	helleborine	5				5	L+
Galeopsis tetrahit	hemp-nettle	5				5	L+
Hypericum perforatum	common St. John's-wort	4				4	L+
Leonurus cardiaca ssp. *cardiaca*	motherwort	4				4	L+
Leucanthemum vulgare	ox-eye daisy	2				2	L+

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Linaria vulgaris	butter-and-eggs	5				5	L+
Lithospermum officinale	Eurasian gromwell	5				5	L+
Lonicera x *bella*	shrub honeysuckle	4				4	L+
Lythrum salicaria	purple loosestrife	4				4	L+
Malus pumila	apple	4				4	L+
Medicago lupulina	black medick	5				5	L+
Melilotus albus	white sweet clover	4				4	L+
Mycelis muralis	wall lettuce	5				5	L+
Myosoton aquaticum	giant chickweed	4				4	L+
Phleum pratense	Timothy grass	4				4	L+
Pilosella aurantiaca	orange hawkweed	3				3	L+
Pilosella caespitosa	yellow hawkweed	5				5	L+
Pinus sylvestris	Scots pine	4				4	L+
Plantago major	common plantain	2				2	L+
Poa compressa	flat-stemmed blue grass	4				4	L+
Poa nemoralis	woodland spear grass	3				3	L+
Poa pratensis ssp. *pratensis*	Kentucky blue grass	4				4	L+
Potentilla recta	sulphur cinquefoil	5				5	L+
Ranunculus acris	tall buttercup	4				4	L+
Rhamnus cathartica	common buckthorn	4				4	L+
Ribes rubrum	garden red currant	4				4	L+
Robinia pseudoacacia	black locust	3				3	L+
Saponaria officinalis	bouncing Bet	5				5	L+
Silene vulgaris	bladder campion	3				3	L+
Solanum dulcamara	bittersweet nightshade	4				4	L+
Sonchus arvensis ssp. *arvensis*	glandular perennial sow-thistle	5				5	L+
Sorbus aucuparia	European mountain-ash	5				5	L+
Symphytum officinale	common comfrey	4				4	L+
Syringa vulgaris	common lilac	4				4	L+
Tanacetum vulgare	tansy	5				5	L+
Taraxacum officinale	dandelion	4				4	L+
Tragopogon pratensis	meadow goat's beard	3				3	L+
Trifolium pratense	red clover	5				5	L+
Typha angustifolia	narrow-leaved cattail	3				3	L+
Urtica dioica ssp. *dioica*	European stinging nettle	4				4	L+

Appendix 2: Goodwood Resource Management Tract Flora Species (2005 - 2012)

Scientific Name	Common Name	Local Occur. 1-5	Popn. Trend 1-5	Hab. Dep. 0-5	Sens. Dev. 0-5	Total Score 2-20	Rank TRCA (08/2012)
Verbascum thapsus	common mullein	4				4	L+
Veronica officinalis	common speedwell	5				5	L+
Viburnum opulus	European highbush cranberry	4				4	L+
Vicia cracca	cow vetch	4				4	L+
Pinus resinosa	red pine	2	5	5	5	17	pL2
Pinus strobus	white pine	1	4	3	4	12	pL4
Picea abies	Norway spruce	5				5	pL+

Appendix 3: List of Breeding Fauna Species for Goodwood Resource Management Tract.

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													
black and white warbler	BAWW	*Mniotilta varia*	8	1	3	2	4	2	2	5	1	20	**L2**
broad-winged hawk	BWHA	*Buteo platypterus*	1	3	2	3	5	1	4	3	1	22	**L2**
northern goshawk	NOGO	*Accipiter gentilis*	1	4	2	2	5	1	3	3	1	21	**L2**
red-shouldered hawk	RSHA	*Buteo lineatus*	1	4	2	3	5	1	4	3	1	23	**L2**
ruffed grouse	RUGR	*Bonasa umbellus*	4	1	3	3	3	2	2	5	1	20	**L2**
American woodcock	AMWO	*Scolopax minor*	4	0	2	3	3	2	2	4	0	16	**L3**
black-billed cuckoo	BBCU	*Coccyzus erythropthalmus*	2	0	3	2	3	1	3	3	0	15	**L3**
Blackburnian warbler	BLBW	*Setophaga fusca*	1	3	1	2	3	1	4	4	0	18	**L3**
black-throated green warbler	BTNW	*Setophaga virens*	12	1	4	2	3	1	3	4	0	18	**L3**
brown creeper	BRCR	*Certhia americana*	3	1	2	2	3	2	2	4	0	16	**L3**
common nighthawk	CONI	*Chordeiles minor*	1	3	3	4	1	1	2	4	0	18	**L3**
common raven	CORA	*Corvus corax*	1	3	1	1	2	1	4	3	0	15	**L3**
eastern towhee	EATO	*Piplio erythrophthalmus*	1	2	3	2	2	2	1	4	0	16	**L3**
golden-crowned kinglet	GCKI	*Regulus satrapa*	4	3	2	2	3	1	3	3	0	17	**L3**
hermit thrush	HETH	*Catharus guttatus*	1	4	1	2	3	1	1	5	1	18	**L3**
magnolia warbler	MAWA	*Setophaga magnolia*	6	4	2	2	2	1	3	3	0	17	**L3**
mourning warbler	MOWA	*Geothlypis philadelphia*	2	0	3	2	2	2	2	4	0	15	**L3**
Nashville warbler	NAWA	*Oreothlypis ruficapilla*	12	2	1	2	2	1	2	5	1	16	**L3**
northern waterthrush	NOWA	*Parkesia noveboracensis*	2	1	2	2	3	1	4	5	1	19	**L3**
ovenbird	OVEN	*Seiurus aurocapillus*	24	0	2	3	4	2	4	4	0	19	**L3**
pileated woodpecker	PIWO	*Dryocopus pileatus*	1	0	2	2	4	1	3	3	0	15	**L3**
pine warbler	PIWA	*Setophaga pinus*	10	0	2	2	4	1	3	3	0	15	**L3**
scarlet tanager	SCTA	*Piranga olivacea*	5	0	2	2	4	1	3	4	0	16	**L3**
sharp-shinned hawk	SSHA	*Accipiter striatus*	1	1	2	2	4	1	3	3	0	16	**L3**
veery	VEER	*Catharus fuscescens*	17	2	3	2	3	1	2	5	1	19	**L3**
white-throated sparrow	WTSP	*Zonotrichia albicollis*	2	2	3	2	2	2	1	4	0	16	**L3**
wild turkey	WITU	*Meleagris gallopavo*	4	0	1	0	4	3	4	3	0	15	**L3**
winter wren	WIWR	*Troglodytes troglodytes*	1	1	2	2	3	2	3	5	1	19	**L3**
wood thrush	WOTH	*Hylocichla mustelina*	11	0	3	2	3	2	2	4	0	16	**L3**
yellow-billed cuckoo	YBCU	*Coccyzus americanus*	1	1	3	2	3	1	3	3	0	16	**L3**
yellow-rumped warbler	YRWA	*Setophaga coronata*	9	3	1	2	3	1	2	4	0	16	**L3**
belted kingfisher	BEKI	*Ceryle alcyon*	x	0	3	2	2	1	2	2	0	12	**L4**
common yellowthroat	COYE	*Geothlypis trichas*	x	0	2	2	1	2	1	4	0	12	**L4**

Appendix 3: List of Breeding Fauna Species for Goodwood Resource Management Tract.

Common Name	Code	Scientific Name	count	LO	PTn	PTt	AS	PIS	HD	StD	+	TS	L-Rank
eastern kingbird	EAKI	*Tyrannus tyrannus*	x	0	4	2	2	1	1	3	0	13	**L4**
eastern wood-pewee	EAWP	*Contopus virens*	x	0	4	2	2	1	1	3	0	13	**L4**
field sparrow	FISP	*Spizella pusilla*	6	0	3	2	2	1	1	4	0	13	**L4**
great-crested flycatcher	GCFL	*Myiarchus crinitus*	x	0	2	2	3	1	2	2	0	12	**L4**
grey catbird	GRCA	*Dumetella carolinensis*	x	0	2	2	1	1	1	3	0	10	**L4**
hairy woodpecker	HAWO	*Picoides villosus*	x	0	2	2	3	1	2	2	0	12	**L4**
indigo bunting	INBU	*Passerina cyanea*	x	0	2	2	1	1	2	4	0	12	**L4**
northern flicker	NOFL	*Colaptes auratus*	x	0	3	2	1	1	2	3	0	12	**L4**
pine siskin	PISI	*Carduelis pinus*	1	3	3	2	3	1	1	1	0	14	**L4**
purple finch	PUFI	*Carpodacus purpureus*	1	3	4	2	1	1	0	1	0	12	**L4**
red-breasted nuthatch	RBNU	*Sitta canadensis*	x	0	1	2	3	1	1	2	0	10	**L4**
red-eyed vireo	REVI	*Vireo olivaceus*	x	0	2	2	2	1	1	3	0	11	**L4**
rose-breasted grosbeak	RBGR	*Pheucticus ludovicianus*	x	0	2	2	3	1	2	3	0	13	**L4**
savannah sparrow	SAVS	*Passerculus sandwichensis*	x	0	3	2	1	1	1	4	0	12	**L4**
swamp sparrow	SWSP	*Melospiza georgiana*	x	0	1	2	1	2	1	5	1	13	**L4**
white-breasted nuthatch	WBNU	*Sitta carolinensis*	x	0	2	2	3	1	2	2	0	12	**L4**
wood duck	WODU	*Aix sponsa*	x	0	2	1	3	2	2	4	0	14	**L4**
American Crow	AMCR	*Corvus brachyrhynchos*	x	0	1	2	1	1	0	0	0	5	**L5**
American goldfinch	AMGO	*Carduelis tristis*	x	0	2	2	1	1	0	1	0	7	**L5**
American robin	AMRO	*Turdus migratorius*	x	0	1	2	1	1	0	1	0	6	**L5**
Baltimore oriole	BAOR	*Icterus galbula*	x	0	2	2	1	1	0	1	0	7	**L5**
black-capped chickadee	BCCH	*Parus atricapillus*	x	0	1	2	1	1	0	1	0	6	**L5**
blue jay	BLJA	*Cyanocitta cristata*	x	0	4	2	1	1	0	1	0	9	**L5**
brown-headed cowbird	BHCO	*Molothrus ater*	x	0	2	2	1	1	0	1	0	7	**L5**
Canada goose	CANG	*Branta canadensis*	x	0	1	1	1	2	1	0	0	6	**L5**
cedar waxwing	CEDW	*Bombycilla cedrorum*	x	0	1	2	1	1	0	1	0	6	**L5**
chipping sparrow	CHSP	*Spizella passerina*	x	0	2	2	1	1	0	2	0	8	**L5**
common grackle	COGR	*Quiscalus quiscula*	x	0	3	2	1	1	0	1	0	8	**L5**
downy woodpecker	DOWO	*Picoides pubescens*	x	0	3	2	1	1	1	1	0	9	**L5**
eastern phoebe	EAPH	*Sayornis phoebe*	x	0	2	2	1	1	2	1	0	9	**L5**
house wren	HOWR	*Troglodytes aedon*	x	0	2	2	1	2	1	1	0	9	**L5**
mallard	MALL	*Anas platyrhynchos*	x	0	2	2	1	2	0	1	0	8	**L5**
mourning dove	MODO	*Zenaida macroura*	x	0	2	2	1	1	0	0	0	6	**L5**
northern cardinal	NOCA	*Cardinalis cardinalis*	x	0	2	2	1	1	1	2	0	9	**L5**
red-tailed hawk	RTHA	*Buteo jamaicensis*	x	0	2	2	2	1	1	1	0	9	**L5**

Appendix 3: List of Breeding Fauna Species for Goodwood Resource Management Tract.

Common Name	Code	Scientific Name	count	LO	PTn	PTt	AS	PIS	HD	StD	+	TS	L-Rank
red-winged blackbird	RWBL	*Agelaius phoeniceus*	x	0	2	2	1	1	0	2	0	8	**L5**
song sparrow	SOSP	*Melospiza melodia*	x	0	2	2	1	2	0	2	0	9	**L5**
Herpetofauna													
grey treefrog	TGTF	*Hyla versicolor*	1	0	3	3	3	4	2	5	1	21	**L2**
northern spring peeper	SPPE	*Pseudacris crucifer crucifer*	x	0	2	3	3	4	3	5	1	21	**L2**
striped chorus frog	MICF	*Pseudacris triseriata*	2	3	3	3	2	4	3	5	1	24	**L2**
wood frog	WOFR	*Lithobates sylvatica*	x	0	2	3	3	4	3	5	1	21	**L2**
American toad	AMTO	*Anaxyrus americanus*	x	0	3	2	1	4	0	4	0	14	**L4**
green frog	GRFR	*Lithobates clamitans*	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													
porcupine	PORC	*Erethizon dorsatum*	1	2	2	2	4	4	3	3	0	20	**L2**
river otter	RIOT	*Lutra canadensis*	1	4	2	1	5	3	2	5	2	24	**L2**
hairy-tailed mole	HTMO	*Parascalops breweri*	2	4	2	2	1	4	1	4	0	18	**L3**
meadow jumping mouse	MJMO	*Zapus hudsonius*	1	3	2	2	2	3	2	3	0	17	**L3**
beaver	BEAV	*Castor canadensis*	1	1	2	1	2	3	1	3	0	13	**L4**
eastern chipmunk	EACH	*Tamias striatus*	x	0	2	2	2	3	1	3	0	13	**L4**
mink	MINK	*Mustela vison*	1	1	2	2	3	3	0	3	0	14	**L4**
red fox	REFO	*Vulpes vulpes*	x	1	2	2	1	3	0	1	0	10	**L4**
red squirrel	RESQ	*Tamiasciurus hudsonicus*	x	0	2	2	1	3	1	2	0	11	**L4**
white-tailed deer	WTDE	*Odocoileus virginianus*	x	0	2	1	3	2	2	1	0	11	**L4**
raccoon	RACC	*Procyon lotor*	x	0	2	2	1	3	1	0	0	9	**L5**
striped skunk	STSK	*Mephitis mephitis*	x	1	2	2	1	3	0	0	0	9	**L5**
LEGEND													
LO = local occurrence		PIS = Patch Isolation Sensitivity	LX = extirpated										
PTn = population trend, continent-wide		STD = sensitivity to development	L+= non-native/introduced										
PTt = population trend, TRCA		+ = additional points											
HD = habitat dependence		TS = total score											
AS = area sensitivity		L-rank = TRCA Rank, October, 2008											