

Albion Hills Conservation Area

Terrestrial Biological Inventory and Assessment

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1.0 Introduction

This report describes the Albion Hills Conservation Area in the context of the Terrestrial Natural Heritage Program of the Toronto and Region Conservation Authority (TRCA). The question that the report addresses is **“How does the area surveyed at the Albion Hills site fit within the regional natural system, and how should its contribution to this system be protected and maximized?”** The important message outlined by this question is that the health of the natural system is measured at the *regional* scale and specific sites must be considered together for their benefits at all scales, from the site to the larger system. The TRCA has developed a Terrestrial Natural Heritage Systems Strategy for retaining and recovering natural heritage within its jurisdiction that incorporates target-setting at the regional level (TRCA, 2007d). 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. This report explains the results of vegetation community and flora and fauna species inventories conducted at Albion Hills and, more importantly, will explain how this site-specific information fits into the regional Natural Heritage Strategy and targets.

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

1.1 The Terrestrial Natural Heritage Program

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

In the late 1990s the TRCA initiated the Terrestrial Natural Heritage (TNH) Program to address terrestrial biodiversity loss in the nine watersheds that compose its jurisdiction. It based this work on two landscape-level indicators: the quality distribution of natural cover and the quantity of natural cover. These indicators summarize changes that occurred in the historical natural system. The aim of the program is to create a conservation strategy that both protects

elements of the natural system (vegetation communities, flora and fauna species) *before* they become rare and promotes greater ecological function of the natural system as a whole. This aim is accomplished through the TNH Strategy by setting targets – both short and long term (100 years) - for the two “indicators” to provide direction in planning at all scales (TRCA, 2007b). The two indicators and the targets that have been set for them are explained below. It is important to understand that each of the two indicators is interdependent, for example, neither well-distributed, poor-quality natural cover, nor poorly-distributed good quality natural cover, achieves the desired conditions.

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

1.1.1 Landscape Indicators

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

Base Mapping

The first step in evaluating a natural system or an individual patch is to interpret and map land cover using aerial photographs. The basic unit for the evaluation at all scales is the individual *habitat patch* in the region, which are then combined and evaluated as a system at any scale. A habitat patch is a continuous piece of habitat, as determined from aerial photo interpretation. TRCA maps habitat according to four broad categories: *forest*, *wetland*, *meadow*, and *coastal* (beach, dune, or bluff). At the regional level, the TRCA jurisdiction is made up of thousands of *habitat patches*. This mapping of habitat patches in broad categories is conducted through remote-sensing and is used in the evaluation of quality, distribution and quantity. It should not be confused with the more detailed mapping of vegetation communities obtained through field-surveys and that is used to ground-truth the evaluation (the latter follows in Section 2).

Quality Distribution of Natural Cover

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

Each habitat patch is evaluated according to three criteria: *size* (the number of hectares occupied by the patch), *shape* (edge-to-area ratio), and *matrix influence* (measure of the positive and negative impacts from surrounding land use) (TRCA, 2007a). A total score for each patch is obtained through a weighted average of the scores for the three criteria. This total score is used as a surrogate for the 'quality' of a habitat patch and is translated into a local rank (L-rank) ranging from L1-L5 based on the range of possible total scores from 3 to 15 points. Of these L-ranks, L1 represents the highest quality habitat and L5 the poorest.

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

Table 1: Habitat Patch Quality, Rank and Species Response

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

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

Quantity

Based on 2002 orthophotography, 25% of the land area in the TRCA jurisdiction consists of natural cover but this figure includes meadow and old field. Although historically, the region would have consisted of up to 95% forest cover, today only about 16% is covered by forest and wetland. Of the non-natural cover (i.e. the remaining 75%), 48% is urban and 27% is rural/agricultural.

1.1.2 The Region Today

The region-level analysis of habitat patches shows that the present average patch quality across the TRCA jurisdiction is “fair” (L3); forest and wetland cover is contained largely in the northern half of the TRCA jurisdiction, especially on the Oak Ridges Moraine; and the quantity is 16% of the surface area of the TRCA jurisdiction (Map 8). Thus the existing system stands below the target that has been set for the region (30%). It becomes increasingly important to recognise that **all** site-based decisions contribute to the condition of a region.

1.1.3 The Region in 100 Years

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

1.1.4 Vegetation Communities and Species

While the targets for the natural heritage system are derived from regional-scale information, the site surveys at the ground-truthing level provide important information that can be used in conjunction with the targets to plan decisions at the site level. A key component of the ground-truthing surveys is the scoring and ranking of vegetation communities and flora and fauna species to generate local (L) ranks (L1-L5) (TRCA, 2007e). 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 distribution*, *population trend*, *habitat dependence*, and *sensitivity to impacts associated with development*. Fauna species are scored based on seven criteria: *local occurrence*, *local population trend*, *continent-wide population trend*, *habitat dependence*, *sensitivity to development*, *area-sensitivity*, and *mobility restriction*. With the use of this ranking system, communities or species of *regional concern*, ranked L1-L3, now replace the idea of *rare* communities or species. Rarity (*local occurrence*) is still considered but is now one of many criteria that make up the L-ranks, making it possible to recognize communities or species of regional concern *before* they have become rare. As shown in Map 9, fauna species of regional concern are generally absent from the urban matrix.

Conservation efforts need to be exercised **before** a vegetation community or species becomes rare, since much of the damage is irreversible once a community or species is considered rare. This is why the regional targets are relevant at the site scale where cumulative impacts occur. In addition to the L1-L3 species, a large number of currently common or secure species at the regional level are considered of concern in the urban context. These are the species identified

with a conservation rank of L4. Although L4 species are widespread and frequently occur in relatively intact urban sites, they are vulnerable to long-term declines.

1.2 Inventory Methodology

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

Vegetation communities and flora species were surveyed concurrently. Botanical field work was conducted in the spring and summer of 2001 (Table 2). Vegetation communities are based on the Ecological Land Classification (ELC) (Lee *et al.*, 1998) and determined to vegetation type. Vegetation types not identified in the ELC manual are designated with an alphabetic code. Communities were mapped as polygons onto printouts of 1999 digital ortho-rectified photographs (ortho photos) to a scale of 1:2000, and then digitized on ArcView. Flora species of regional concern (species ranked L1-L3) were mapped as points with date and approximate number of individuals seen. Major deciduous forest blocks were surveyed in May in order to collect information on spring ephemerals, while the rest of the site was surveyed through the remainder of the period.

Fauna data were collected by the TRCA in April and June/July, 2001 and 2008. The spring surveys searched primarily for frog species of regional concern, but recorded incidentally the presence of any early-spring nocturnal bird species (owls and American woodcocks). The summer surveys were concerned primarily with the mapping of breeding bird species of regional concern. Songbirds are surveyed in June/July in order to obtain breeding bird data and to exclude migrants. The methodology for identifying confirmed and possible breeding birds follows Cadman *et al.* (1987). Fauna regional species of concern (species ranked L1-L3) were mapped as point data.

Table 2: Schedule of the TRCA Biological Surveys of Albion Hills Conservation Area, 2001 - 2008

Survey Item	Dates	Time (hours)
Patch/Landscape	2002 ortho-photos	21 hours
Vegetation Communities and Flora Species	14 May to 19 July, 2001	210 hours
Frogs and Spring Birds	9, 11, 17 and 20 April, 2001. 16 and 21 April, 2008.	13.5 hours
Breeding Songbirds	24, 25, 27, 28 June, 2 July, 2001. 9 – 11 June, 2 – 4, and 7 July, 2008.	66.25 hours

2.0 Results and Discussion

Information pertaining to Albion Hills was collected through both remote-sensing and ground-truthing surveys. This information contains three levels of detail: habitat patch, vegetation community, and species (flora and fauna). Section 2 provides the information collected and its analysis in the context of the TNH strategy. Sub-section 2.1 gives an overview of the site location and general information about the site. Further sub-sections will present the findings and analysis under the headings of *habitat patch*, *vegetation communities*, *flora species*, and *fauna species*. Given that the field surveys for vegetation and flora were undertaken in 2001, minor changes may have occurred to some of the landscape since the survey was taken, e.g. increased woody growth in successional areas.

2.1 Site Context

2.1.1 Location; Floristic and Physiographic Regions

The Albion Hills Conservation Area is located in the upper reaches of the main Humber River in the town of Caledon (Map 1). A good portion of the area lies within the Centreville Creek subwatershed, as the creek flows through the west-central portion of the Conservation Area before its confluence with the Humber. The site lies entirely on the western portion of the Oak Ridges Moraine, which was deposited between two lobes of the Wisconsin ice sheet. The deposits on the moraine vary enormously, with sand and gravel forming the core (Chapman and Putnam, 1984).

In Albion Hills, sand deposits are exposed in the upland areas, especially to the north of Centreville Creek, allowing infiltration of precipitation and recharge of ground water. Lowland areas receive much seepage, enabling wetland communities to develop. An area of classic kame and kettle topography lies south of Centreville Creek (and to some extent east of the Humber River), with numerous kettle wetlands on finer deposits in the depressions (Map 2). There is a general trend toward light sandy soils (Pontypool Sandy Loam) across the north-western two-thirds of the site; and heavier stony clay soil (King Clay Loam) across the south-eastern third (MTRCA, 1983). The wetlands are the source of high-quality ground-water which feeds the upper Humber River. The Humber flows through the eastern part of the site, while Centreville Creek bisects the Conservation Area from south-west to north-east. Hence, there is enormous topographic diversity ranging from steep valley slopes and flood-plain to dry sandy upland to seepage and kettle wetlands.

The site lies entirely within the Great Lakes - St. Lawrence floristic region, composed of mixed coniferous-deciduous forest.

2.1.2 Historical Context

Prior to European settlement, forests and wetlands occupied virtually the entire land surface of eastern North America. Only in the last two hundred years has European settlement (and later, urbanization) been a major influence on the natural systems of southern Ontario, including that portion which lies within the TRCA jurisdiction. With settlement came the clearing of forests and the draining of wetlands to accommodate agriculture, hence the reduction of the current regional natural system to mostly isolated patches of natural cover.

Unlike many other parts of southern Ontario, however, the sandy soils and rolling topography typical on much of the Oak Ridges Moraine were not suitable for agriculture, and severe wind erosion resulted in the early 20th century. Agricultural land was often abandoned. Large areas were reforested with conifer plantations, and natural regeneration also restored much natural cover with communities ranging from sand barren to successional forest (Varga, 2001). The result is that the Oak Ridges Moraine is a refuge where natural cover and its associated functions remain to an extent that is in stark contrast to much of the rest of the TRCA jurisdiction.

In recent decades, urban expansion has been a second major pressure in southern Ontario, especially in the Toronto area. Perhaps the greatest change has occurred since the 1950s when some fauna species began to decline rapidly (Cadman *et al.*, 1987). This corresponds with the post World War II development boom that has continued with only short interruptions to this day. Land conversion from rural to urban causes a significant increase in negative impact on the remaining habitats, despite their being set aside for "protection". Indirect impacts of urban land use include light, noise, increased human access, predation by household pets, and the invasion of non-native plant species. An urban matrix creates a greater barrier to the dispersal and mobility of flora and fauna species. This phenomenon is evident in most habitat patches in urban areas, where natural cover exists but the expected fauna species are not present.

Surprisingly, considering its size and diversity of high-quality habitats, Albion Hills has received relatively little natural heritage attention in the past, although forest surveys based upon timber management have been done (MTRCA, 1978; MTRCA,1983). Two small Environmentally Significant Areas were designated in the early 1980's, based upon site occurrences of individual species: hairy honeysuckle (*Lonicera hirsuta*) and Tuckerman's sedge (*Carex tuckermannii*) (MTRCA, 1982). The Hockley Valley and Centreville Creek Wetland Complexes, designated provincially-significant, are located just south and west of the Conservation Area (Varga, 2001). There is a strong case to be made that the kettle wetlands in the southern part of Albion Hills are in fact part of the same cluster of kettles that includes the Hockley Valley wetlands. This type of piecemeal coverage emphasizes the value of having an integrated, standardized regional Natural Heritage Strategy.

2.1.3 Site Issues

Albion Hills Conservation Area is a public park with abundant natural habitat (Map 2). The Conservation Area is subject to many types of recreational use, with users ranging from students staying at the field centre for environmental education, to casual day-time hikers and cross-country skiers, to campers staying in the camp ground. The camp grounds cover a significant portion of the Conservation Area. Since the site is not only a publicly-owned property, but also within a Natural Core Area of the Oak Ridges Moraine, development is not an immediate issue of concern. However, there are likely to be increasing numbers of people seeking recreation in coming years.

More immediately, the recreational pressure of the network of mountain bike trails that have been developed at Albion Hills over the past few years has brought into focus the need for a natural heritage study. Although mountain biking itself constitutes a non-polluting form of outdoor recreation with less landscape alteration than other forms of sport such as golf or team field-sports, uncontrolled mountain bike use has led to serious loss of vegetation and erosion, particularly where too many users cut unregulated trails in small, vulnerable habitat patches. This pattern has been evident in sections of the Don Valley and other ravine systems in the City of Toronto. At Albion Hills, mountain biking has been more carefully regulated, with designated trails that are maintained.

A dairy farm on the property was in operation until 2008. Although the livestock operation was discontinued, the intention of keeping most of the farmland under some kind of agriculture is currently under review. About two hectares are scheduled for reforestation in 2009 and it is possible, that additional farmland may be naturalized, and this possibility is considered in the recommendations. There are a few agricultural impacts on some of the natural systems. There are also invasive exotic shrubs spreading from well-intentioned conservation plantings of previous decades.

2.2 Habitat Patch Findings for Albion Hills Conservation Area

The following describes the Albion Hills site according to the two natural system indicators used in designing the Terrestrial Natural Heritage System Strategy: the *quality distribution* and *quantity* of natural cover. Analysis was based on 2002 ortho-photos.

2.2.1 Quality Distribution of Natural Cover

The Humber watershed, being the largest watershed in the TRCA jurisdiction, has extensive natural cover in the upper reaches, but the lower half of the watershed is heavily urbanized. The 32% natural cover of the watershed is relatively high but poorly distributed.

Regional Target: The target for quality distribution is to increase the quality of patches in all subwatersheds while promoting the “good quality” (L2) average regionally (TRCA, 2007b; TRCA, 2007d).

Humber Watershed Target: Currently, the average quality of natural cover patches in the Humber watershed is ranked as L3; the refined target system for the watershed seeks to increase this to an L2 average (by hectare of whole watershed) (TRCA, 2008b).

Habitat Patch Size and Shape

Albion Hills is largely forested and as such consists of several more or less connected “good” sized patches of natural cover, interspersed with smaller meadow, successional and wetland areas (scoring “very poor” to “fair”). “Good” size patches score four out of a possible five points (i.e. at least 50 ha for forests or 10 ha for wetlands - see Map 3). This implies that there are habitat patches of sufficient size to accommodate many area sensitive fauna species.

The majority of the habitat patches have rather uneven boundaries and shapes; this results in a comparatively low incidence of forest interior habitat despite the large area of many of the forest patches. However, there are three locations where forest interior exceeds 200 metres from the patch edge, the largest expanse being in the northwest forest patch (see Map 4).

Habitat Patch Matrix Influence

Analysis based on the 2002 ortho-photos shows that all the habitat blocks within Albion Hills Conservation Area score four out of a possible five points for matrix influence (a “good” matrix influence score, see Maps 5 and 6). This can be attributed to the surrounding natural and agricultural matrix which confers effective buffering against many of the urban influences associated with nearby towns of Bolton and Palgrave.

Habitat Patch Total Score

Map 7 shows that for habitat patch total score the Albion Hills Conservation Area is split in half with the more southwest half scoring primarily “good” quality, while the more northeastern half scores largely “fair” for patch quality. This unevenness can be attributed to the more

convoluted shapes of patches in the northeastern half. The habitat quality of the forest component of Albion Hills is thus roughly equivalent to the average condition in the rural portion of the TRCA jurisdiction and should support fairly secure populations of Species and Vegetation Communities of Concern, although not to the extent of higher quality sites such as Glen Major and Palgrave.

2.2.2 Quantity of Natural Cover

The Humber watershed is approximately 91,078 ha in size containing 26,928 ha of natural cover (32.1%), including 18,208 ha as forest (20%, including successional) and 1413.4 hectares as wetland (1.55%). Albion Hills occupies about 500 ha. Based on ground-truthed ELC field data, about 289 ha (58%) is forest; 38 ha (8%) is wetland, 21 ha (4%) aquatic; 48 ha (10%) successional, and 23 ha (5%) is meadow. A tiny area (just under 1 ha) is occupied by sand barren and bluff. Agriculture occupies about 52 hectares of Albion Hills and manicured lands 29 ha.

The *quantity target* is largely the amount of forest and wetland cover necessary to achieve the quality distribution targets. This illustrates how the two targets are dependent on each other.

Regional Target: the quantity target of 30% is the minimum forest and wetland cover required for the “good quality” average to be distributed where possible in the TRCA jurisdiction (TRCA, 2007d).

Humber Watershed Target: the Humber watershed covers 91,077 ha, and currently 29,089 ha – 31.9% - of this is natural cover (again, including meadow and old field, 2007 figures). TRCA technicians have identified and refined a target natural heritage system that results in 35,493 ha of natural cover – 39% of the total watershed area (TRCA, 2008b).

2.3 Vegetation Community Findings for Albion Hills Conservation Area

2.3.1 Vegetation Community Representation

There were 119 vegetation communities (including 11 occurring only as inclusions and complexes within larger polygons) identified in the 2001 field season in the Albion Hills Conservation Area (Appendix 1; Map 10). This is an outstanding figure considering that the site covers such a small portion of the TRCA jurisdiction. The reason for the diversity is the highly variable topography and soils described above (Section 2.1.1) as well as the patchwork land use history (section 2.1.2). Vegetation types at Albion Hills can be classified under the categories of forest (including plantation), successional, wetland, aquatic, dynamic (bluff / barren), and meadow (very roughly following the Community Classes of the ELC).

Forest and Plantation

Over half of Albion Hills is forest. Coniferous and mixed forests with a high component of white cedar (*Thuja occidentalis*) occur largely along the valley slopes and in the floodplains of the Humber River and Centreville Creek. These include sizeable areas of the types Fresh-Moist White Cedar Coniferous Forest (FOC4-1), Fresh-Moist White Cedar Sugar Maple Mixed Forest (FOM7-1), and Fresh-Moist White Cedar – Hardwood Mixed Forest (FOM7-2) along with several other related but less abundant forest types. Smaller areas of disturbed lowland have Fresh-Moist White Elm Lowland Deciduous Forest (FOD7-1), Fresh-Moist Ash Lowland Deciduous Forest (FOD7-2), and Fresh-Moist Manitoba Maple Lowland Deciduous Forest (FOD7-a).

Mature deciduous forests dominated by sugar maple (*Acer saccharum* ssp. *saccharum*) are the most prevalent climax forest in the Toronto area; at Albion Hills, they are mostly restricted to uplands (tableland and kame) in the southern and eastern parts of the site. Several decades ago, they would have been woodlots in an agricultural matrix. In 2001, the most prevalent vegetation types in this group were Dry-Fresh Sugar Maple – Beech Deciduous Forest (FOD5-2) and Dry-Fresh Sugar Maple – Ash Deciduous Forest (FOD5-8). Since 2001, the incidence of beech bark disease (a syndrome of decline caused by introduced and native scale insects and fungi) has accelerated. It is likely that beech has declined in numbers and importance at Albion Hills. There is also some mature Fresh-Moist Sugar Maple – Hemlock Mixed Forest (FOM6-1). These forest types at Albion Hills have an intact ground layer with abundant spring ephemerals and several fern species.

A few more unusual forest types such as those dominated by bitternut (*Carya cordiformis*)(FOD9-5), red maple (*Acer rubrum*)(FOD4-l), or a mix of ash (*Fraxinus* spp.) and conifers (mostly balsam fir, *Abies balsamea*) (FOM8-B) also occur.

Plantations cover a large proportion of Albion Hills, with a huge block in the northwestern quarter of the Conservation Area that was planted on sandy, erosion-prone soils. In fact, there is more plantation coverage than of all other forest combined. Most of these are conifer plantations; although in some cases they include deciduous trees. Plantations of red pine (*Pinus resinosa*)(CUP3-1) and white pine (*Pinus strobus*)(CUP3-2) occupy 83 ha. Although they are less diverse than natural forests, plantations provide forest cover and habitat for some flora and fauna species of concern. Some of the plantation was likely sand barren at the time of planting.

Meadow and Successional

Albion Hills has relatively little meadow area, with most of the open areas having undergone succession to some form of thicket, cultural savannah or woodland. Successional areas are scattered across the Conservation Area. Unfortunately, exotic shrubs originating from earlier plantings are often concentrated in these places. Two hectares are Exotic Cultural Thicket (CUT1-c) and 5.9 ha are Exotic Cultural Savannah (CUS1-b), although exotic species certainly penetrate into other community types. There are also a few species of concern that occur in the drier successional areas, such as Robin's plantain (*Erigeron pulchellus*).

Wetland and Aquatic

Wetlands occupy 38.3 ha at Albion Hills (about 8% of the Conservation Area), but they are particularly prominent and diverse. Numerous kettle depressions are concentrated mostly in

the southern portion of the area; as well as seepage zones on the lower slopes and bottom lands of the valleys of the Humber River, Centreville Creek, and a couple of smaller tributaries. Hence, Albion Hills has 45 different wetland vegetation types: 20 swamps, two fens (found in kettles), and 23 types of marsh and meadow-marsh. The kettle wetlands tend to support thicket swamps and marshes, sometimes with an aquatic community in the moat or “lag zone” around the perimeter of the kettle. Treed swamps, especially the cedar-dominated types, are mostly in seepage zones associated with the Humber River.

Aquatic habitats are associated with the two main streams at Albion Hills, a couple of artificial reservoirs, and some of the deeper kettle wetlands. Vegetated aquatic habitats are restricted to the smaller ponds such as the one behind the field centre, and to the kettles.

Bluff and Barren

Small areas on the sandy knolls (kames) in the conservation area support Treed Sand Barren (SBT1), and in one case where the slope is steep, a White Cedar Treed Bluff (BLT1-A). It is likely that the area of sand barren was larger in the early 20th century, before the plantations were established.

2.3.2 Vegetation Communities of Concern

The vegetation communities that occur in the TRCA jurisdiction are scored and given a local rank from L1 to L5. Vegetation communities with a rank of L1 to L3 are considered of regional concern in the jurisdiction. The ranks are based on two criteria: *local occurrence* and *geophysical requirements* (TRCA, 2007e). The local occurrence score is based on the total area occupied by a vegetation type (in hectares) combined with how well distributed it is across the jurisdiction (number of 10x10 km squares in which it is found). Thus, the higher local occurrence scores would be for communities that have both low coverage and very restricted distribution. For details on how the local occurrence score is calculated, please refer to TRCA (2007e). A community is considered regionally rare if it has a local occurrence score of 4 or higher. Seven communities (not including plantations) meet this criterion. The significance of rarity varies; the community may be a genuinely scarce and perhaps endangered association such as a Slender Sedge Open Fen (FEO1-2), or it may simply be unusual because it is dominated by a very common species that is usually associated with other common species, such as Choke Cherry Deciduous Thicket (CUT1-3). Choke cherry (*Prunus virginiana*) is extremely abundant but usually occurs in the shrub layer of forests or part of a successional habitat rather than being dominant in the main vegetation layer. Thus we look to another factor in assessing the conservation concern of a community type.

The geophysical requirements of communities make up the second criterion in determining 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 wetlands and barrens at Albion Hills tend to be the most restricted in this respect; for example, requiring organic or sandy soils, or a particular hydrological regime. Others, such as sugar maple forests, occur on a wide range of sites under a variety of conditions. Geophysical requirements at the community

level correspond to habitat specialization at the species level. Communities with a high degree of geophysical restriction rank higher for conservation concern because:

- there are fewer sites on which they can occur naturally
- they are more readily altered by changes in land use that affect the conditions on which they depend; and
- they are generally more difficult, if not impossible, to restore. Restoration by its very nature involves establishing communities on disturbed sites, usually with early-successional species and varying site conditions.

Thirty-five of the 119 vegetation communities observed at Albion Hills Conservation Area in 2001 are considered to be of regional concern, with ranks ranging from L1 to L3 (Appendix 1; Map 10). Most of these (27) are wetland or aquatic communities. The outstanding diversity of wetland types is related to the occurrence both of numerous kettle wetlands and seepage-based communities. The wetland communities of concern include kettle peatlands, which according to the Ecological Land Classification, were designated here as Beaked Sedge Open Fen (FEO1-5); Slender Sedge Open Fen (FEO1-2, present as an inclusion); and various organic thicket swamps and marshes. The Winterberry Organic Thicket Swamp (SWT3-7) has a local rank of L2 and is characteristic of undisturbed kettle features. Four types of aquatic macrophyte communities were also observed in kettle ponds and even in a couple of artificial ponds. Seepage zones support a number of swamps, mostly dominated by white cedar in pure stands or with associated conifers and hardwoods, although there is also an unusual hemlock-dominated swamp (SWC2-2) (rank L3) in the Centreville Creek ravine.

The generally forested surroundings of the wetlands protect their diversity. Wetlands with altered chemistry, especially high levels of nutrients and silt from runoff, tend to be taken over by aggressive species that take advantage of the high fertility, such as reed canary grass (*Phalaris arundinacea*). This appears to have happened in the case of some small kettle depressions in the north-eastern part of the Conservation Area that are now surrounded by conifer plantation. They support a virtual monoculture of reed canary grass on organic soils with some bands of mineral soil near the surface². This suggests a history of erosional deposition of sediment during an agricultural period followed by invasion by reed canary grass. These altered kettle wetlands are classified as Reed Canary Grass Organic Meadow Marsh (MAM3-2).

Upland communities of concern include small areas of Treed Sand Barren (SBT1), and White Cedar Treed Bluff, where drought and erosion have retarded succession to closed forest. Reforestation, particularly the establishment of plantations, has probably reduced the amount of such habitat. While the “dust bowl” conditions that occurred on the Oak Ridges Moraine in the early 20th century were an ecological disaster brought about by unsustainable agricultural practices, a modest amount of wind erosion is natural and there would always have been some areas of open habitat affected by fire and wind. These provide refuges for specialized flora and

²It is believed that reed canary grass is native to both North America and Europe, and that introduced populations are more aggressive. Proving this theory or distinguishing between the native and introduced ecotypes is impossible. In any case, this robust grass seems to become aggressive under disturbed, silty conditions, and is less so where silt and nutrients are limited.

fauna species that depend on them. Hydrologically, the dry, sandy uplands (plantation, dry forest, and barren) act as recharge zones while the seepage wetlands are discharge zones.

Successional habitats are also dependent on disturbance for their formation, but the disturbance is of strictly anthropogenic origin.

Unusual forest associations also occur, such as a Dry-Fresh Red Maple Deciduous Forest (FOD4-I); a Fresh-Moist Ash Mixed Forest (FOM8-B) where balsam fir, white pine, and hemlock are regenerating under white ash; and a Fresh-Moist Bitternut Hickory Deciduous Forest (FOD9-5). Many of the upland forests, which may as communities rank as L4 or L5, are of very high quality, with many species of concern. Thus, their conservation importance may be higher than what is suggested by the community L-rank alone.

2.4 Flora Findings for Albion Hills Conservation Area

2.4.1 Flora Species Representation

There were 508 taxa of vascular plants identified during the 2001 summer survey. Of these, 12 occurred as planted specimens only, with no evidence of reproduction. Of the remaining 496, 384 are native, and 112 are exotic or possibly exotic. A total of over 75% of the taxa, then, are native, which attests to the high quality of the site. One hundred and fifty-nine of the native species are species of regional concern. These figures are comparable to other high-quality sites of similar size on the Oak Ridges Moraine. For further details on the species list, please refer to Appendix 2.

2.4.2 Flora Species of Concern

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

There are 159 flora taxa of regional concern ranked L1 to L3 found at Albion Hills Conservation Area (Appendix 2; Map 11)¹. Downy rattlesnake-plantain (*Goodyera pubescens*), which is given the highest rank of L1, is an excellent example of a highly vulnerable plant in the TRCA jurisdiction. This plant of rich mixed forests used to occur in the City of Toronto (Varga, 2000). Now it is only known from four sites on the moraine. Most of its habitat has been altered or fragmented, and it is vulnerable to multiple indirect impacts from nearby land uses.

¹N.B. The site was surveyed in 2001, and those species that were considered to be of concern at that time were mapped. Some of the scores and ranks have changed since then, so the map reflects the new ranks but does not include species that were ranked L4 at that time but have since changed to L3. They were not mapped. Nor does the map include species that were ranked L3 in 2001 but are now L4. These no longer qualify as being of regional concern.

Significant impacts on flora species associated with development include hydrological changes; trampling with its associated plant tissue damage and soil compaction; competition from invasive exotic species that readily move into disturbed or fragmented habitats from gardens or trails; the interruption of natural dynamic forces that maintain certain habitats; herbivory by increased populations of opportunistic fauna such as Canada geese, deer, and squirrels that thrive in fragmented landscapes; collection and picking; and soil, water, and air pollution. These factors are all included in the scoring for sensitivity to development of flora species (TRCA, 2007e). The high quality of the habitat at Albion Hills is attested to by the fact that over half - 272 - of the total species in the Conservation Area are fairly to extremely sensitive to development (Appendix 2). They score 3-5 in this criterion. This includes all but two of the flora of concern (i.e. 157 flora of concern). The sensitivities of the species of regional concern found at Albion Hills are displayed on Map 5.

Wetland species - especially those of swamps and kettle wetlands - such as marsh cinquefoil (*Potentilla palustris*), royal fern (*Osmunda regalis*), beaked sedge (*Carex utriculata*), thicket horsetail (*Equisetum pratense*) and tamarack (*Larix laricina*), are highly vulnerable to changes in hydrology. Many of these require a steady seepage of cold ground water. Hence, interference with the ground water seepage through drainage or diversion will have a serious impact on these species. Other species, though not restricted strictly to swamps, such as beech fern (*Phegopteris connectilis*) - and even hemlock (*Tsuga canadensis*) which ranks as L4, still require a moist, sheltered environment and would suffer from increased drying especially with canopy opening and exposure to wind and sun.

Trampling and soil compaction affect many native plant species that have delicate root systems and stems. Squirrel-corn (*Dicentra canadensis*), smooth sweet cicely (*Osmorhiza longistylis*), and club mosses (*Lycopodium*, *Diphasiastrum*, and *Huperzia*) are examples of such plants. Other species, notably many of the showy monocots such as rose twisted-stalk (*Streptopus roseus*) and downy rattlesnake-plantain (*Goodyera pubescens*), have a determinate growth pattern. All of the year's growth is contained in the initial bud and will not be replaced until the next growing season if the shoot is broken off by trampling. Hikers and unregulated mountain bikes often leave defined trails and create a network of informal paths, especially in mature upland forests which are attractive, easily penetrated, and have many vulnerable forest floor species. The most serious source of trampling at Albion Hills is mountain bikes, although other recreational users such as campers, hikers, and field centre students also contribute.

Invasive species have spread from disturbed areas and have also been deliberately introduced at Albion Hills. The former include garlic mustard (*Alliaria petiolata*), dog-strangling vine (*Cynanchum rossicum*), and European buckthorn (*Rhamnus cathartica*), which are spreading from agricultural edges and abandoned successional areas. The latter include certain shrubs that were planted for wildlife or landscape purposes in the past but whose harmful effect has been recognized in recent years. Examples include autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), shrub honeysuckle (*Lonicera x bella*), Norway maple (*Acer platanoides*) and Asiatic bittersweet (*Celastrus orbiculatus*). These plants can often out-compete native species, especially if the latter are small in stature, slow-growing and if there is even slight disturbance. For example, fire-weed (*Epilobium angustifolium*) and Robin's plantain are likely to be replaced in open or semi-open successional habitats by dog-strangling vine and shrub honeysuckle; and spring ephemerals such as squirrel-corn (*Dicentra canadensis*)

and broad-leaved spring beauty (*Claytonia caroliniana*) are liable to be ousted by garlic mustard on the forest floor. Invasion is facilitated by trampling, hydrological changes, and other disturbances; but the worst invasive species are capable of moving into intact habitat patches.

Other species *require* certain natural patterns of disturbance to maintain the conditions suitable for their growth. Interference with natural dynamic patterns often occurs as a result of agricultural or urban development, and land management practices such as production-oriented forestry. For example, species typical of sand barrens such as slender vervain (*Verbena simplex*) or long-headed thimbleweed (*Anemone cylindrica*), require occasional disturbance such as fire, clearing, or erosion, to maintain their open, early-successional habitat. If the open areas that they inhabit are converted to forest, these species will disappear. The population of slender vervain found in 2001 is very small and a quick visit to the area in 2006 only revealed a couple of plants (the visit was cursory, however).

Forest management, be it for the purpose of timber-production or even “tidying up”, can disrupt the natural dynamics of woody debris accumulation or wind-throw mounding. Club mosses such as crowfoot club-moss (*Diphasiastrum digitatum*) and running club-moss (*Lycopodium clavatum*); and saprophytes such as pinesap (*Monotropa hypopithys*) require an intact forest floor with its intricate litter food web. Pinesap appears to require dense, young stands of conifers such as fairly young plantations or stands of cedar. There is evidence of logging in the not-too-distant past in the mature mixed forests in the south-central part of Albion Hills; and indeed, forestry management plans related to logging have been devised (MTRCA, 1978; MTRCA, 1983). The mature mixed forest was managed by the Ontario Ministry of Natural Resources, at least in the past. Plantations are thinned as a matter of course, which can encourage native diversification but also provide opportunities for exotic invasion, depending upon the seed sources available (which at Albion Hills include many invasive shrubs as noted above).

Elevated numbers of herbivores associated with settlement patterns can result in the decline of certain plant species (Sauer, 1998). This is due to the fragmentation of the large areas of habitat that are required by higher-order predators that normally control herbivores, as well as by the provision of ample food sources with “edge” habitat. White-tailed deer have had a serious impact in some areas of the U.S. and in some southern Ontario parks such as Rondeau. There is some concern that they could become a moraine-wide issue, though not specific to the Albion Hills area. Deer favour edge habitats and large landscaped areas with lush, managed vegetation such as estate gardens. Manicured areas such as those around the campgrounds and picnic areas encourage Canada geese which, if they proliferate, prevent the establishment of wetland plants. This is a particular problem when manicured lands abut ponds and lakes.

Increased users of the area resulting from intensified recreation may lead to increased pressure for picking and collection of showy plants. Eye-catching flowers such as the showy orchis (*Galearis spectabilis*) and sharp-lobed hepatica (*Anemone acutiloba*) are prime targets for collectors; and attractive ferns such as Christmas fern (*Polystichum acrostichoides*) may also face some pressure. Downy rattlesnake-plantain is another orchid that might be collected for its spectacular, variegated leaves, rather than its flowers. It would be best if the orchids particularly, were kept invisible, with no trails within viewing distance.

Pollution and other forms of chemical alteration of habitat may affect certain plants. While air pollution tends to be a regional rather than a site-specific issue, alterations to soil and ground-water are a frequent threat arising from development. For example, runoff from agricultural fields, lawns and streets is often laden with silt, nutrients, and pesticides. This runoff enters nearby wetlands and other natural habitats. Many native plants, especially those of wetlands, require natural water input which is relatively low in silt and nutrients. Subsoil and concrete that are dumped in fill are usually highly alkaline, and the resultant alterations in soil chemistry would be harmful to ericaceous plants such as creeping snowberry (*Gaultheria hispidula*) and leatherleaf (*Chamaedaphne calyculata*) found at Albion Hills on organic soils. Wetlands with altered chemistry, especially high levels of nutrients and silt, tend to lose their original species and be taken over by aggressive species that take advantage of the high fertility, such as reed canary grass (*Phalaris arundinacea*).

At Albion Hills, soil and water alteration has not been a serious problem in recent years, being restricted locally to the farm.

Albion Hills has 32 regionally-rare plants, 27 of which also are of regional concern (Appendix 2). Rarity in the TRCA jurisdiction is defined as being known from less than seven of the 44 10x10 kilometre grid squares that encompass the jurisdiction. Four species found at Albion Hills in 2001 have extant records nowhere else in the TRCA jurisdiction (the latter three of them being unique records for the Oak Ridges Moraine): slender cotton-grass (*Eriophorum gracile*), white-edged sedge (*Carex debilis* var. *rudgei*), slender vervain and burnweed (*Erechtites hieracifolia*) (Varga, 2001). The high number of rare species at Albion Hills indicates the high quality of the habitat, and reflects the site's location on the moraine. This rarity could be the result of natural factors such as limited habitat or range, or it could be due to loss or alteration of habitat due to development pressures.

Rarity considers the state of the species as a whole, over and above their intrinsic sensitivity. It is one of four criteria taken into account in assessing the conservation concern of a plant. Most of the rare or declining plants found at Albion Hills have factors associated with their status that are related to habitat dependence or sensitivity to impacts of development. To maintain and improve populations of these rare species through individual recovery plans, and to maintain and improve the natural system as a whole through the Natural Heritage Approach, it is essential to take these causal factors into account. By the time a species becomes rare, the process of decline and habitat degradation is often far-advanced. (Due to urbanization and the direct loss of habitat and using the experience of the TRCA jurisdiction natural system, it is assumed that most native plants in the region are undergoing at least slight declines).

All 159 flora species of regional concern (282 of the total species on site including L4 and L5) are considered to be habitat specialists, with a score of four-five in habitat dependence (Appendix 2). In general, they are found in five or fewer habitat types (loosely based on the ecosite level of the ELC). Extra points are added for special associations with other species or ephemeral substrate requirements at germination.

The greater number of habitat specialists occurs in the wetlands (especially the kettle depressions and organic conifer swamps). Other concentrations occur in the sand barren areas and the mature deciduous or mixed forest blocks (Map 12). A few examples of habitat specialists occurring at Albion Hills include mountain holly (*Nemopanthus mucronatus*) and

stunted sedge (*Carex magellanica* ssp. *irrigua*), which live in kettle peatlands or thicket swamps; large-leaved and flat-stemmed pondweeds (*Potamogeton amplifolius* and *P. zosteriformis*), restricted to high-quality shallow aquatic habitats; slender vervain, restricted to sand barrens and prairies (including inclusions within dry old-fields); and broad-leaved spring beauty (*Claytonia caroliniana*), restricted to upland sugar maple forests.

Every community type, including successional areas, has specialist species associated with that community. Preservation of these habitat specialists requires preserving their particular habitats.

2.5 Fauna Findings for the Albion Hills Conservation Area

2.5.1 Fauna Species Representation

The TRCA fauna surveys at Albion Hills in 2001 and 2008, documented a large total of 83 bird species, twelve mammals, and twelve herpetofauna species, bringing the total number of fauna species identified by the TRCA to 107. This total compares well with other high quality sites within the northern reaches of the TRCA jurisdiction such as Palgrave and Glen Major properties. Refer to Appendix 3 for a list of the fauna species and their corresponding L-ranks.

2.5.2 Fauna Species of Concern

Fauna species, like vegetation communities and flora species, are considered of regional concern if they rank L1-L3 based on their scores for the seven criteria mentioned in Section 1.1.4. As with flora, this is a pro-active, preventive approach, identifying where conservation efforts need to be made before a species becomes rare.

Fauna surveys at Albion Hills have reported a total of 31 L1- L3 bird species including four L2 species (broad-winged hawk, *Buteo platypterus*; blue-winged warbler, *Vermivora pinus*; black-and-white warbler, *Mniotilta varia*; and ruffed grouse, *Bonasa umbellus*) and 27 L3 species. In addition there were ten herpetofauna (one L1, seven L2 and two L3) and one mammal species (L2) of concern, bringing the total to 42 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 Albion Hills, together with their associated ranks and scores.

Local occurrence is one of seven scoring criteria for fauna and is based on TRCA data and information from the Natural Heritage Information Centre (NHIC) of the Ontario Ministry of Natural Resources (OMNR). 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 44 10x10 km grid squares in the TRCA jurisdiction is considered regionally rare (i.e. scores three -five points for this criterion). At the Albion Hills Conservation Area there are 12 species of regional concern (i.e. ranked L1 – L3) that are considered regionally rare (including yellow-bellied sapsucker, *Sphyrapicus varius*; hermit thrush, *Catharus guttatus*; blue-headed vireo, *Vireo solitarius*; and spotted salamander, *Ambystoma maculatum*); this is a high total and is close to the totals given for Glen Major and Palgrave properties. 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, raccoons and house cats); parasitism (from the facilitating the access of brown-headed cowbird, *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); 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 Albion Hills, all 42 of the species that are ranked L1-L3 receive this score and are therefore considered sensitive to one or more of the impacts associated with development (Map 6). These species are currently at this site because the surrounding matrix is largely agricultural or natural.

The tendency for local urbanization to be accompanied by the clearing and tidying of woodlands and thickets in the vicinity dramatically disrupts any species that is dependent on such scrub cover for nesting or foraging. Although it is unlikely that there will be residential development in the immediate vicinity of Albion Hills for the foreseeable future, there will be considerable urban expansion in nearby Bolton and across the TRCA jurisdiction generally. Therefore we can expect more pressure on the natural system from increased users. Trails of any sort, within a natural system impose their own particular matrix influences that are somewhat related to the more negative influences of urbanization. Through the fact of increased human intrusion several of the influences listed above will arise despite the lack of local urbanization.

The construction of new trails often requires the clearance of understorey for a short distance on either side of the trail. Such clearance would affect any fauna species that rely on scrub cover for nesting or foraging. This would include a large proportion of the sensitive species that occur at Albion Hills, for example, wood thrush (*Hylocichla mustelina*), white-throated sparrow (*Zonotrichia albicollis*), black-throated green warbler (*Dendroica virens*; which has a specific habitat requirement for a layered vegetation community), ovenbird (*Seiurus aurocapillus*; predominantly a terrestrial species foraging for food and nesting on the forest-floor, under cover of the understorey) and black and white warbler. Clearance of fallen logs and dead wood would be seriously detrimental to at least two of the five frog species on the site, wood frog (*Rana sylvatica*) and gray treefrog (*Hyla versicolor*), which require such debris and rotting logs for protective cover. These same trail management policies may also require the removal of diseased trees for user safety and this would seriously reduce the nesting opportunities for

yellow-bellied sapsucker which has a specific requirement for birch, poplar or aspen that have been affected by the heart-softening “tinder fungus”.

The influences outlined above tend to directly affect the habitat and might easily be avoided through trail design. Somewhat more insidious are the affects on the fauna species themselves through less controllable influences such as disturbance. Several of the bird species found at Albion Hills 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 ruffed grouse, wild turkey (*Meleagris gallopavo*), hermit thrush, ovenbird, black-and-white warbler and white-throated sparrow. Several of these species already appear to be showing signs of decline at Albion Hills (there were no hermit thrush reported in 2008). Two of the open habitat species – bobolink (*Dolichonyx oryzivorus*) and eastern meadowlark (*Sturnella magna*) - are ground-nesters and would be severely affected by any increase in pedestrian, vehicular or dog traffic within their habitat.

It is readily observable on many trail systems that signage requesting good stewardship on the part of trail users is frequently ignored. It has been suggested that self-policing by the users of trail systems can mitigate any potential impact problems from dogs running loose off-trail. In any situation that currently receives no visitor (and dog) intrusions, even a handful of dog-flushing incidents would be sufficient to completely disrupt the breeding season of ground-nesting species within that currently secluded forest interior. It is unreasonable to expect that a trail system on such a large property would be subject to the amount of policing that would be required to prevent all such incidents.

The whole point of a trail system being developed through a natural habitat is to enhance the public’s enjoyment of that habitat and the nature therein. 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. More importantly with respect to the species in question at Albion Hills it has been shown that species that habitually forage and nest lower to the ground will flush and show other anxiety behaviours at a greater distance from the point of intrusion than other species (Gutzwiller *et al.*, 1998). One example of such studies showed that abundance was 48% lower for hermit thrushes (a ground-nesting/foraging species) in intruded sites than in the control sites, a site being a one hectare circle (Gutzwiller and Anderson, 1999). Another study has shown that species composition is altered adjacent to trails such that generalist species are more abundant near trails while specialist species are less common (Miller *et al.*, 1998) - Albion Hill’s fauna is important because of the high proportion of specialist species. The same study found that nest predation is higher near trails, and that for most of the species that are negatively influenced by trails the trails’ zone of influence seems to be approximately 75 metres. 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 (University of New South Wales, 2007).

Changes in the hydrology of the site will affect the suitability of the habitat for fauna that prefer more moist conditions. Albion Hills supports healthy populations of spotted salamanders, eastern newts (*Notophthalmus viridescens*), wood frog, spring peepers (*Pseudacris crucifer*)

and gray treefrogs that would be negatively affected by any changes in hydrology that decrease the breeding opportunities within the site. These are species that have effectively been extirpated from much of the natural cover within the urbanized portions of the jurisdiction. The water quality and the level of disturbance in larger, more permanent bodies of water is of considerable consequence to several sensitive species that use such open aquatic habitats within the area – midland painted turtle (*Chrysemys picta marginata*), common snapping turtle (*Chelydra serpentina*), American bullfrog (*Rana catesbeiana*) and northern leopard frog (*Rana pipiens*) all breed on site, and the ponds are of particular importance for the small colony of great blue herons (*Ardea herodias*) and to nesting waterfowl such as hooded merganser (*Lophodytes cucullatus*) and wood duck (*Aix sponsa*).

Area sensitivity is another of the seven criteria that are used to determine the local rank for fauna. Fauna species are scored for *area sensitivity* based on their requirement for a certain minimum size of preferred habitat. Species that require large tracts of habitat (>100 ha in total) score the maximum five points, while species that either show no minimum habitat requirement, or require < 1 ha in total, score one point. Species scoring three points or more (require 5+ ha in total) are deemed area sensitive species. As mentioned in section 1.1, researchers have shown that for some species of birds area sensitivity is a rather fluid factor, dependent and varying inversely with the overall percentage forest cover within the landscape surrounding the site where those species are found (Rosenburg *et al.*, 1999).

A total of 29 of the 41 fauna species of regional concern that occur at Albion Hills are considered area sensitive. Nine of these species – including broad-winged hawk, hooded merganser, wild turkey and porcupine (*Erithizon dorsatum*) - are scored as requiring more than 20 ha of natural habitat. Currently, according to the TRCA landscape analysis of Albion Hills, the largest patch class represented on the site is considerably larger than 100 ha (the expanse of forest in the southern half of the site extends for 174 ha, a small part falling outside of the site), and it was from this patch that the most area sensitive species – broad-winged hawk, requiring in excess of 100 ha – was reported in 2008. The area requirements of this species and of other area sensitive species extend over the greater landscape and the site contributes to this larger landscape requirement. The fact that there are large areas of additional forest within the landscape – particularly to the west – means that even highly sensitive species are able to nest at Albion Hills.

The other 20 species require in excess of five ha of natural habitat and the site's habitat patches certainly fulfill such a requirement. Patch-size constraints are due to a variety of factors including foraging requirements and the need for isolation within a habitat block. In the latter case, regardless of the provision of a habitat patch of sufficient size, if that block is seriously and frequently disturbed by human intrusion such species will be liable to abandon the site. This is particularly true of ground-nesting and foraging species such as wild turkey, ruffed grouse and ovenbird, and of the larger raptors.

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 *patch isolation sensitivity* (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 expose them to roadkill).

At Albion Hills there are 14 fauna species that have been scored as sensitive to patch isolation (three or more points). Several of these high-scoring species will readily cross open ground but, in so doing, expose themselves to potentially fatal encounters with predators and vehicular traffic. This is particularly true of midland painted turtles that move seasonally between their aquatic foraging habitat and terrestrial breeding habitat; and similarly for amphibian species such as spotted salamander, eastern newt, wood frog and spring peeper, moving between spring breeding pools and more upland summer/winter habitats.

Species such as these have effectively been extirpated from much of the natural cover within the urbanized portions of the jurisdiction, but are still thriving in rural areas. As long as wetland habitat exists within the agricultural rural areas, and obstacles such as heavily used roads do not proliferate, it appears that species such as midland painted turtles, common snapping turtles and wood frogs are still able to successfully find appropriate nesting locations. Populations within the more urbanized portion of the jurisdiction will be unlikely to sustain themselves if access to breeding habitat and opportunities for recruitment from healthier neighbouring populations is not available.

Fauna species that score greater than three points under the habitat dependence criterion are considered habitat specialists. These species exhibit a combination of very specific habitat requirements that range from the microhabitat (e.g. decaying logs, aquatic vegetation), through requirements for particular moisture conditions, vegetation structure or spatial landscape structures, to preferences for certain community series and macro-habitat types.

Within the list of L1- L3 fauna species occurring at Albion Hills there are 17 species that score three or more points for *habitat dependence* (Map 14). All eleven of the habitat dependent bird species have requirements for fairly specific forest habitat characteristics. Several species are highly dependant on mature mixed or deciduous forests with fairly extensive interior components and these species are well-represented with fairly high numbers of breeding pairs – black-throated green warbler (10 territories), ovenbird (22 territories), scarlet tanager (6 territories) and wood thrush (four territories). Another very well-represented suite of habitat dependent species are those birds that require extensive tracts of coniferous forest (including plantation); at Albion Hills this suite is well-represented by species such as golden-crowned kinglet (*Regulus satrapa*), pine warbler (*Dendroica pinus*), and yellow-rumped warbler (*Dendroica coronata*). 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 bio-diversity is an excellent measure of the health of a natural system. The presence at the Albion Hills Conservation Area of several habitat dependent species in good

numbers, in particular species that are dependent on mature forest, indicates that the forest habitat is functioning at a relatively high level.

Since this site has been inventoried on two different dates separated by six years, it is very tempting to compare and contrast the results from the two surveys. Great care should be exercised in embarking on such analysis as the conclusions drawn are at best speculative. Nevertheless, there are a couple of apparent trends which may be worth further investigation. For several species the number of points mapped in 2008 is considerably higher than that mapped in 2001: Blackburnian warbler, *Dendroica fusca*; (a new breeding species), black-throated green warbler (increase of three territories), golden-crowned kinglet (increase of three territories), and pine warbler (increase of 17 territories – a very significant increase). Three of these species are strongly associated with mature conifer stands while the remaining species (Blackburnian warbler) is closely tied to the presence of mature eastern hemlock. It is possible therefore that the observed increases in these species' abundance within the site are a reflection of a maturing of the conifer plantations.

All of the birds that have shown apparent increases over the past few years are species that nest high in the canopy or sub-canopy of their forest habitat; a similar increase is not observed for those species that nest low in the understory or on the ground. Perhaps most significantly, there were no hermit thrushes reported in 2008 (there were four territories mapped in 2001). Similar decreases are shown by several other low-nesting species associated with scrub and mixed forest habitat: white-throated sparrow (decrease of four territories), eastern towhee, *Pipilo erythrophthalmus*; (not recorded in 2008, a decrease of four territories), and chestnut-sided warbler, *Dendroica pennsylvanica*; (a decrease of five territories). Certainly, the comparison of numbers does seem to suggest that low-nesting species are declining (and disappearing) from the site, while canopy nesting species are increasing. This may simply be a result of the over all maturation of forest habitat throughout the site, but it should also be borne in mind that increased visitor pressure will likely impact those species that nest and forage on or near ground-level.

3.0 Recommendations

The recommendations for the Albion Hills Conservation Area are given in relation to the regional targets for natural heritage in the TRCA jurisdiction (see section 1.1, also TRCA 2007b, 2007d). 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 Albion Hills within the regional context, followed by specific recommendations for the site.

3.1 Summary

Located in the rural zone of the TRCA jurisdiction, Albion Hills is actually quite representative of the conditions for natural cover in this relatively intact northwestern section of the TRCA jurisdiction. The forest habitat patch quality is a mix of "fair" and "good" (L3 and L2) (Map 7). It is located within the relatively well-forested northern reaches of the Humber watershed. The site

is dominated by forest cover (289 ha), but this is interspersed with a fairly large wetland and aquatic component (59 ha), with meadow habitat concentrated in the eastern corner of the site.

3.1.1 Site Highlights

- High habitat diversity: 119 different vegetation types, including 45 wetland types
- Communities range from kettle peatland and swamp to mature forest to sand barren; forest and wetland in close proximity
- Four plant species with unique records (Albion Hills the only known extant occurrence in TRCA): slender cotton-grass, white-edged sedge, slender vervain, and burnweed; high incidence of other sensitive / rare species
- Twelve species of herpetofauna including spotted salamander and red-spotted newt
- Broad-winged hawk – Albion Hills is one of less than 20 sites in the jurisdiction where this L2 ranked species has been recorded as a probable breeding bird.
- Heronry (great blue herons) in kettle wetland – one of only a dozen nest sites for this species in the region

Albion Hills under current conditions supports 384 recorded species of native vascular plants, 160 of which are of regional concern. There are 107 species of breeding fauna, including 42 of regional concern. Given the over all “fair” to “good” habitat patch quality of the site the number of species of regional concern is much as might be expected.

3.2 Site Recommendations

Albion Hills is dominated by forest habitat, in fact there is very little natural open habitat on the site and consequently very few open habitat fauna specialists (only one bobolink territory in 2008). Any reforestation of existing meadow would therefore have little detrimental effect on the fauna biodiversity of the area, although the small open or semi-open habitats occupied by sand barren and open ground flora such as slender vervain and Robin’s plantain should be maintained. In most of Albion Hills, management should be geared toward expanding the forested natural system at Albion Hills wherever current land-use permits in order to increase the quantity and quality of natural cover.

However, there are a couple of larger agricultural fields that should be maintained as open habitat rather than reforested in the event that agriculture is discontinued. One is in the far southeast corner of the property adjacent to the railway. The other is in the vicinity of the farm itself, adjacent to Humber Station Road. These patches are large enough (>10 ha) that they could support breeding fauna of open habitats if they were maintained as meadow or as hay field (successful breeding of meadow birds would require that the mowing be delayed until about the second week of July).

Management of the site should strive towards meeting the refined target system presented for the Humber watershed. Regeneration and land acquisition are two options that would work at this site together with management of appropriate public use of the trail system.

The following table illustrates the contributions made by Albion Hills toward the quality distribution and quantity indicators, along with site-specific recommendations for potential improvements and for reaching the refined target for natural cover in the Humber watershed. Please note the independence of the various indicators in Table 3. They were selected as a means for describing important aspects of a single natural system encompassing a network of closely related and inter-dependent factors, and cannot be considered in isolation.

Table 3: Summary and Recommendations for the Albion Hills Conservation Area by Indicator

Indicator	Albion Hills Summary		Recommendations
Quality Distribution	Size, Shape, Forest Interior	29 area-sensitive forest-fauna species, nine of which require in excess of 20 ha of forest.	<ul style="list-style-type: none"> • Reforest open land within the site to increase habitat interior and improve size attributes. This would improve the opportunities for species such as broad-winged hawk, and would bolster the populations of forest songbirds.
	Matrix Influence	<p>Matrix surrounding much of the site is largely agricultural and natural. These mixed land-uses combine for a total matrix influence score of three to four out of five (fair).</p> <ul style="list-style-type: none"> • 57 of the 159 flora species of regional concern are sensitive to development • all 41 of the fauna species of regional concern are scored as sensitive to development <p>Located in north-west section of TRCA jurisdiction where there is relatively little urbanization.</p>	<ul style="list-style-type: none"> • Mitigate impacts of public use. <ul style="list-style-type: none"> - plan any trails to limit the amount of damage to species and vegetation communities. - cluster non-natural land uses to specific nodes on perimeter of area with buffer zones. • Convert nearby agricultural land and old field to forest and/or wetland. • Prevent further invasive species spread into high-quality natural areas, especially the mature forests. • Encourage stewardship from neighbouring landowners. • Retain and restore natural cover <p>TRCA region can retain range of flora, fauna, and community types if we protect the relatively diverse parts of jurisdiction such as this one.</p>

Quantity	The site contains nearly 500 ha of natural cover. This contributes 1.7% to the total natural cover within the Humber watershed. Of this, 317 ha is forest and 17.8 ha are wetland, 1.74 and 1.25% of the watershed totals for forest and wetland respectively.	<ul style="list-style-type: none"> • Maximize natural cover at Albion Hills. <ul style="list-style-type: none"> - Vegetation communities and flora and fauna species will then be protected. • Maintain/enhance continuous links between habitat patches. <ul style="list-style-type: none"> - recruit local stakeholders to restore riparian natural cover downstream of the site in order to connect the site with other sites in the lower Humber watershed. • Judicious positioning of restoration projects will have far reaching effects on all other Indicator categories.
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3.2.1 Quality Distribution Recommendation

The one landscape measure that is currently acting to diminish the over all habitat patch quality of the site is patch shape. If this one measure was to be increased, the area would improve in habitat patch total score, perhaps to the extent of introducing more “excellent” quality patches into the area. The potential results from such an increase in habitat patch score (and therefore quality) would be a subsequent improvement in the quality of the local natural system (reflected in the enhancement of the more sensitive communities and species).

Optimize Patch Size and Shape, Forest Interior

The larger the habitat block, the more resilient the fauna and flora communities are to developments within the landscape. Restoration of currently open areas adjacent to and within Albion Hills will enhance the overall size of the continuous forest blocks on the site, leading in turn to an increase in the forest interior available for interior obligate species. Caution should be exercised when restoring existing meadow habitat since such habitat may support significant meadow fauna and flora species. While TRCA surveys suggest that the restricted area of existing meadow (about 23 ha, widely fragmented) occurring on the site is unlikely to provide effective breeding habitat for species otherwise associated with such open habitat (bobolink, grasshopper sparrow, sedge wren, upland sandpiper), there are two areas of existing agricultural field that are large enough to provide potential open habitat on the west and far southeast sides of the property. This option should be pursued if agriculture ceases.

Increasing the size of habitat patches (and thus enhancing forest interior) is an effective way of mitigating the negative effects of human disturbance since the impacts of such disturbance are spread and dissipated over a wider area of natural cover. Since it is very likely that human disturbance levels will increase in the future, the only way to protect the area’s natural system

(e.g. the currently high numbers of sensitive breeding fauna) is to take early steps to mitigate the impacts. Increasing patch size and forest interior is the first step in achieving such mitigation.

Minimize Negative Matrix Influence

Urban land uses should be kept from intruding onto this site. Non-natural or higher impact land uses should be directed to the periphery of the site, and buffer zones should be identified around the forest and wetland habitats. Any further development within or in the vicinity of Albion Hills will exert additional negative matrix influence on the remaining area by the loss of natural cover in the matrix and urbanization of agricultural lands. Serious impacts would inevitably arise from such land use changes. For example, there are generally lower levels of human disturbance and opportunistic predation by domestic cats within an agricultural matrix than in a developed matrix. The matrix influence scores for the site were calculated using landscape analysis from 2002 ortho-rectified photographs.

The relatively large populations of fauna species of concern appear to be fairly evenly distributed throughout the entire site. Every effort should be made to mitigate any negative *matrix influence* that might occur throughout the site. For example, a long-term planning approach would direct trail development away from any areas that hold particularly sensitive fauna and flora. Since a large proportion of the sensitive fauna on the site are ground-nesting forest birds, particular attention should be paid to the affects of off-leash dog walking and other activities that impose a high degree of stress on such breeding fauna.

The principal issue at Albion Hills is the implementation and development of a more extensive trail system, ostensibly improving recreation potential for visitors to the Conservation Area. There are considerably more obvious impacts exerted by developments that actually remove large areas of natural cover and as such trail development has previously been considered comparatively benign. However, experience in urban Toronto in places where natural cover has been left relatively intact (e.g. the extensive ravine system) proves that despite the persistence of natural cover natural function is severely diminished by the exertion of urban influences from nearby developments. Trails, even in large areas of natural cover as at Albion Hills, serve as a means for many of the influences associated with urbanization to intrude deep into otherwise intact natural systems. The specifics of trail and other recreational developments within the site are addressed in detail in this section.

By increasing access to sensitive natural areas, trails can provide valuable educational and aesthetic exposure of the public to our natural heritage, but also increase impacts on these natural areas if not planned carefully. Mountain biking is a particular concern because of the impacts of the wheels on the landscape, the choice of terrain (it favours steep and thus delicate terrain), and the number of trails and users. For the purposes of harmony, it is necessary to keep hiking and mountain biking trails separate. This also means more trails.

When last reviewed by Ecology staff in 2004, handling of the mountain bike issue at Albion Hills had so far been excellent. However, a more recent assessment is not available. Trails were cut in advance and clearly designated, and users kept to them. Logs and other markers were used to keep trails from getting too wide. Users pay a registry fee that helps maintain the trails. Trails

were closed during wet weather and if erosion is uncontrolled. Each trail was also closed two weeks out of every four during the biking season to allow for recovery.

1. Two existing trails in 2004 cut too close to highly sensitive flora or vegetation communities. At that time, it was recommended that these trails should be replaced by other routes elsewhere that do not endanger sensitive features. One of the trails was near the sugar shack and cut across a forest floor covered with spring flora including broad-leaved spring beauty and sharp-lobed hepatica. From there it ascended into a pine plantation that has garlic mustard at one end. This presented a risk not only of damaging the spring ephemerals, but also of spreading garlic mustard seed via bicycle tire treads into the forest. The second problematic trail lay within a few metres of hairy rattlesnake plantain, a rare L1 orchid of mixed forests that has the highest possible score (20/20) according to the TRCA Natural Heritage ranking system. It is not known whether the trails have been moved.
2. Any new mountain bike trails should be restricted to conifer plantations, successional areas, and deciduous forests that do not have a rich complement of spring ephemerals. New trails should stay a minimum of 15 metres away from L1 and L2 flora (unless they are aquatic and out of reach of bicycles); and at least 75 metres from L2 and L3 fauna (particularly ground-nesters, see section 2.5.2) that could be disturbed and flushed from their nests.
3. The south-central part of the Conservation Area with its larger kettle wetlands and mature forests is currently more-or-less free of trails. This should remain as a refuge.
4. Monitoring of existing trails for erosion or over-widening should continue as at present. Any exotic species such as garlic mustard that show up at trail-side should be removed immediately upon sight. It may be possible to enlist mountain bikers themselves in this aspect of maintenance.
5. Management should maintain a policy of prohibiting “night-riding” at Albion Hills since such activity would likely have considerable impact on sensitive nocturnal fauna at the site (including migrating and foraging amphibians).

Other matrix influences at Albion Hills include camping; picnicking, hiking and cross-country skiing by day visitors, and environmental education based at the field centre (actually two field centres that partially share the same facilities) in the western section of the Conservation Area. There is also a pond formed by the damming of Centreville Creek, and part of this is used for swimming. These activities have had impacts, but they seem to be stable at present. They have been of great benefit to the public. However, certain improvements to mitigate matrix influence could be made over time as follows.

1. Impacts from the environmental education field centres have been remarkably light - especially considering the number of students that have passed through it over the last forty years. At the suggestion of staff biologists, field centre staff have moved the springtime location of a survival game played by students from the Etobicoke field centre from an area of sensitive forest floor flora to a less sensitive successional area nearby. They have also placed two new wetland viewing platforms carefully so as to

minimize impacts and maximize educational value. This good communication should certainly be maintained.

2. The swimming pond on Centreville Creek is an on-line pond and these are generally not helpful to water quality and habitat. It raises the temperature of an otherwise cold-water stream. The pond is turbid with little or no submerged or floating aquatic macrophytes, and has algal blooms. This indicates a relatively high loading of nutrients, and bacterial counts become elevated by mid-summer. The swimming area is cordoned off from the rest of the pond and the water there is treated. While removal of the pond and restoration of the natural stream bed is usually the best option to take in restoring stream water quality and temperature, this pond not only is used for swimming, but also supports small marshy areas with bullfrogs and a few flora species of concern. It is not clear in this case what the best course of action is overall, and so we recommend that the pond be retained for the moment, allowing marsh vegetation to slowly expand in the non-swimming area. At some point, it may be advisable to drain the pond, particularly if bullfrogs can or do live in nearby ponds or kettles that are off-line.
3. The camp grounds are located along the Humber River in the eastern portion of the conservation area. These are cut out of a matrix of lowland forest, successional area, and swamp. Most of the forest and wetland matrix is in the southern campground cluster near the chalet south of the main conservation area road. In the long term, lowland cedar forests and wetlands are probably not the most suitable sites for camp grounds, because of both drainage and ecological sensitivity issues. Large numbers of mosquitoes may also be problematic for campers here compared to an upland, semi-open, breezy site. There is some trampling and littering in the cedar forests around the campsites, although these are probably not increasing.

Eventually, it may be advisable to move the southern camping precinct to some new land if expansions are made to Albion Hills Conservation Area. Such a move would depend on budgets as well as the long-term intentions for the campsite. At this point, the lowland area would be restored to continuous natural cover, improving specific vegetation communities and habitats as well as having a beneficial effect at the landscape level. Such plans would need to take into account the targeted natural system.

The farm has successfully separated cattle pasture from natural habitat. In 2001, cattle had access to a stand of poplar which on investigation, turned out to be an organic deciduous swamp (SWD7-1), in a small kettle depression. Once the sensitivity of this vegetation type was discovered (it ranks as L3), they were quickly excluded from this polygon. There are a few remaining issues with the farm and with earlier conservation plantings that included invasive species. The recommendations below apply regardless of the farm's future.

4. Until 2008 when it was discontinued (see section 2.1.3), the dairy operation barn and its associated manure were immediately adjacent to the steep slope of the Centreville Creek ravine. Hence, nutrient influx and other lingering disturbance impacts can quickly enter the valley and the creek. Consideration should be given to rectifying this situation.
5. Albion Hills suffers from an incursion of invasive exotic shrubs and trees, most of which originated from plantings for wildlife food and cover. The main issues are autumn olive,

Asiatic bittersweet, and shrub honeysuckle which spread readily from old conservation plantings on the moraine and should be removed (Varga, 2001). The few Norway maple and European alder (*Alnus glutinosa*) planted around manicured areas will likely become a threat. European buckthorn has invaded the understory of some of the plantation areas, especially just to the north of the pond on Centreville Creek. *Funding should be sought for a summer crew to remove these plants, which are fairly easy to recognize with training.*

6. Two herbaceous invasive exotic species are spreading into parts of the Conservation Area, especially the southern half of it. They are dog-strangling vine which has one large population at the far south end of the site and a few smaller patches elsewhere; and garlic mustard, which is concentrated to the southwest. The dog-strangling vine is threatening a stand of Robin's plantain. The vine is in the early stages of invasion and it is of critical importance to start control efforts right away while they might still be effective (TRCA, 2008a). Garlic mustard (*Alliaria petiolata*) is also still localized. Control of these two species may necessitate the use of herbicides such as glyphosate. In any case, trails and other disturbance should be designed so as to avoid populations of these plants which would be encouraged by disturbance. Concentrations of invasive exotic plants can be identified from the dominant species listed in each vegetation polygon in the TRCA database.

In addition to the more specific matrix influence issues detailed above attention should be paid to surrounding land uses. Urban land uses should be kept from intruding onto this site as much as possible. Non-natural land uses in general should be kept to specific nodes on the perimeter of the area with wide buffer zones around them. Any change in surrounding land use will exert negative impacts on the natural cover in the area as the current agricultural cover adjacent to the site offers considerable advantages over an urban matrix. This is because there are lower levels of human disturbance and opportunistic predation, and more habitat value in farm fields than in urban areas. Furthermore, agriculture is a much more reversible land use than urban cover.

Encouraging increased natural cover in adjacent lands can further enhance the matrix. Landowner stewardship could inform neighbouring landowners on the value of natural cover. Community involvement in this local natural area could ensure that some human-influenced impacts on the communities and species would be diminished. Impacts from adjacent lands can be mitigated through measures such as the removal of invasive exotic species.

The impacts of deer browsing need to be considered as well. Deer impacts are increasing in the TRCA jurisdiction and are now noticeable at the nearby Bolton Tract, which had a flora survey in 2007.

3.2.2 Quantity Recommendations

Increase Natural Cover to Achieve Quality Distribution Targets

In order to achieve the target for natural cover quality distribution there needs to be an adequate amount of natural cover. Insufficient natural cover in many urban parts of the TRCA

jurisdiction such as the Don Valley has resulted in concentrated impacts on the remaining land base, as well as conflicts between various user groups. Albion Hills may not be urbanized, but it has high levels of visitor traffic from the nearby Toronto urban area and is subject to concentrated impacts. Increasing natural cover will mitigate those impacts.

The more natural cover we retain at Albion Hills and vicinity, the better it can support a healthy level of biodiversity. The site has a diversity of habitat types that includes very high numbers of vegetation communities and flora and fauna species that are of concern in the region. Vegetation communities and species of concern are associated primarily with the extensive mid-aged forest blocks – including plantations. These extensive forest blocks act in conjunction with the numerous wetlands that are scattered throughout this forested landscape to provide the full complement of life-cycle requirements for a large variety of herpetofauna.

Improve Connectivity To Nearby Habitat

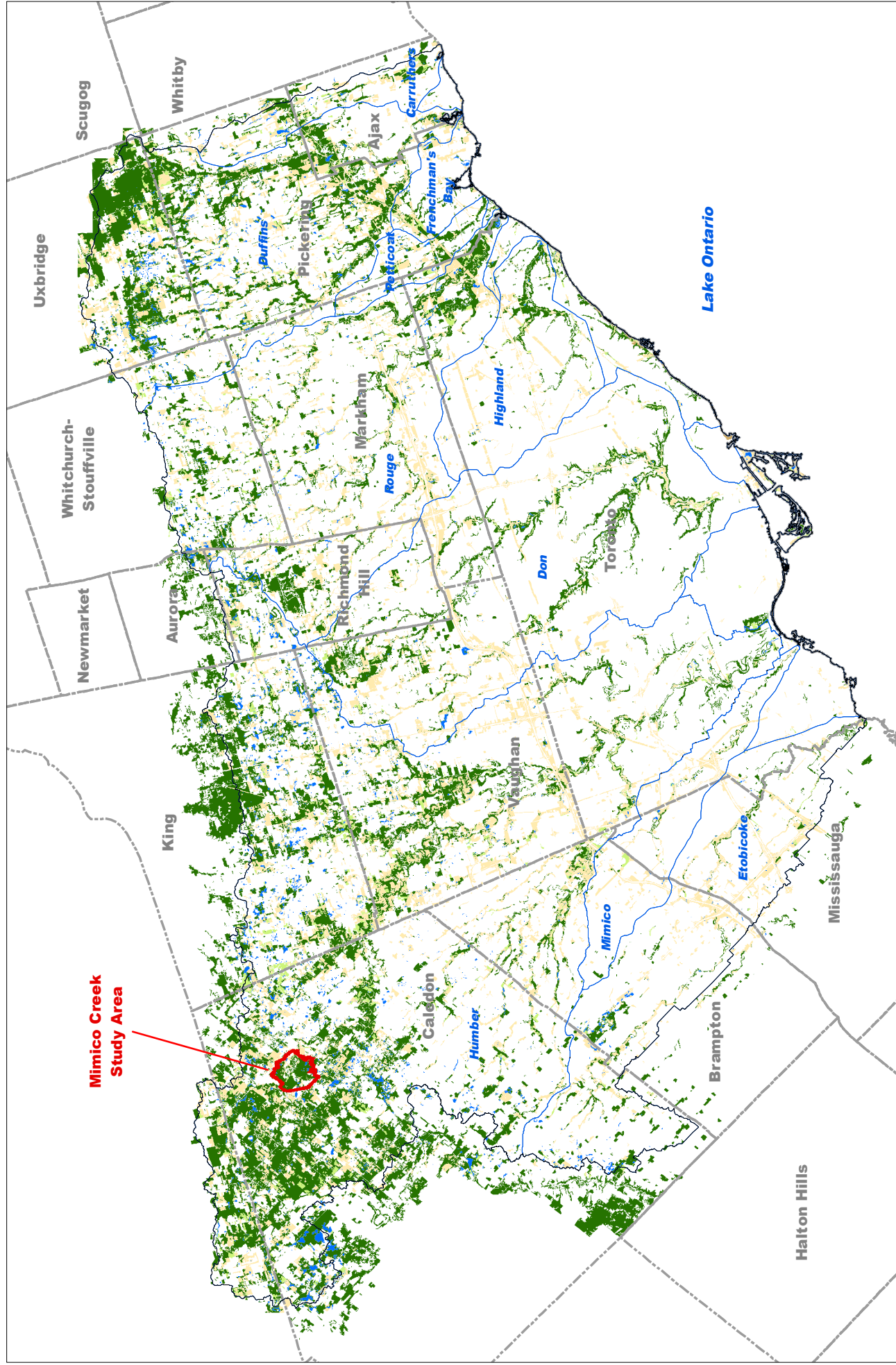
Restoration of agricultural and other open lands at this site would increase local natural cover, and it will contribute to the regional natural cover. Along with maximizing total natural cover in the area, special attention should be paid to landscape connectivity between Albion Hills and adjacent high-quality natural sites: the Palgrave property and mill pond; Gibson Lake, and Bolton Tract, as well as private lands to the west.

At the watershed level, it is important to maintain continuity of natural cover along the Humber River as it continues south through the urban landscape of Bolton connecting the site to the fauna communities further to the south, e.g. at Nashville Tract and Boyd Conservation Area. This aspect of habitat connectivity has immense implications at both the watershed and regional levels. Connectivity through natural cover along these potential corridors should be maintained and enhanced to improve the opportunities for dispersal of breeding and migrating fauna. The placement of restored habitat can be planned so as to maximize its benefits to habitat quality distribution, as well as connectivity and the protection of existing populations of species of concern.

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Mimico Creek Study Area



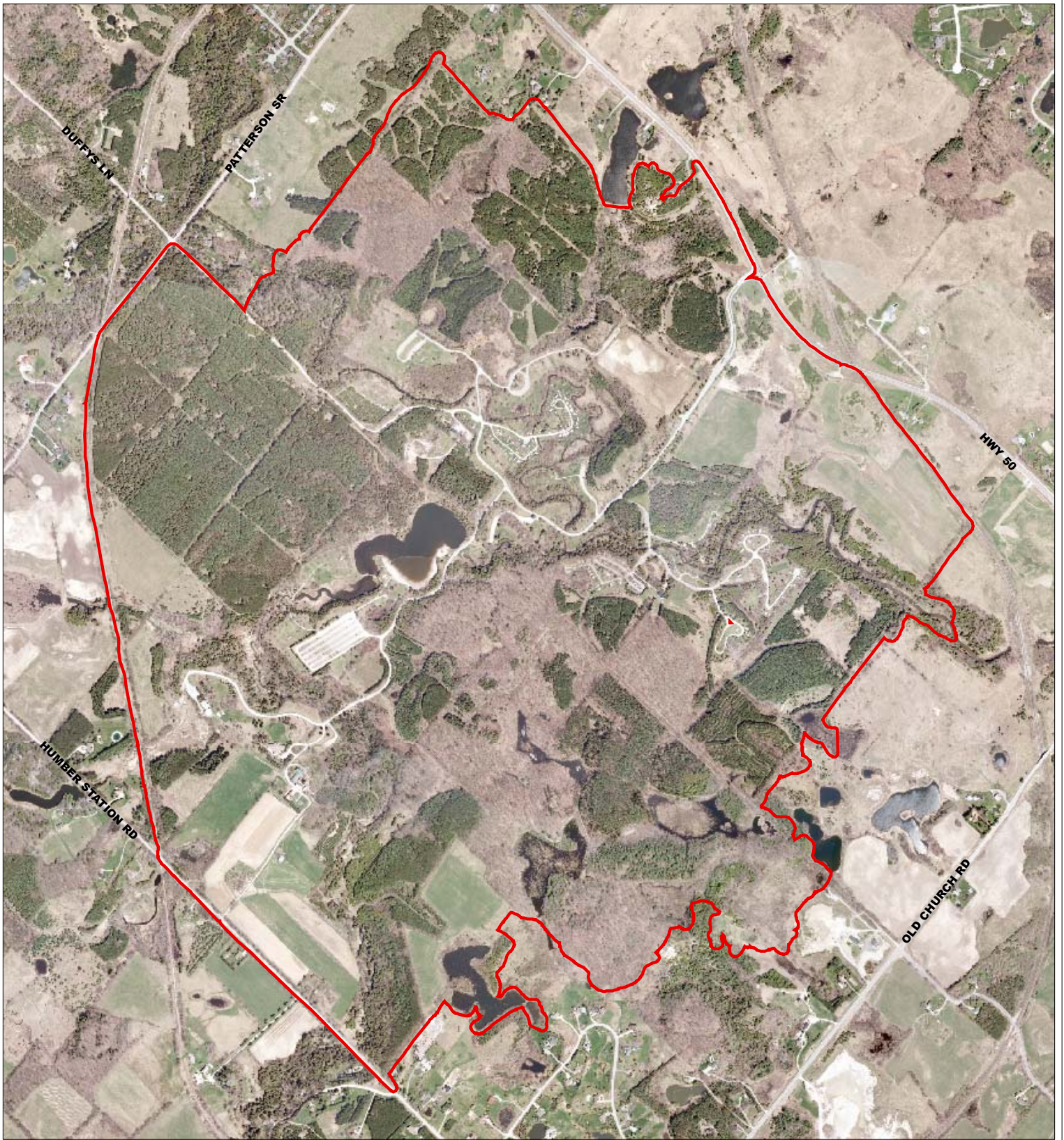
Date: February 2009



* Landscape analysis based on 2002 Orthophotography

Map 1: Albion Hills Study Area in the Context of Regional Natural Cover

Legend

	Natural Cover *		Albion Hills Study Area
	Forest		TRCA Jurisdiction
	Successional		Watershed
	Meadow		Municipal Boundary
	Wetland		
	Beach/Bluff		







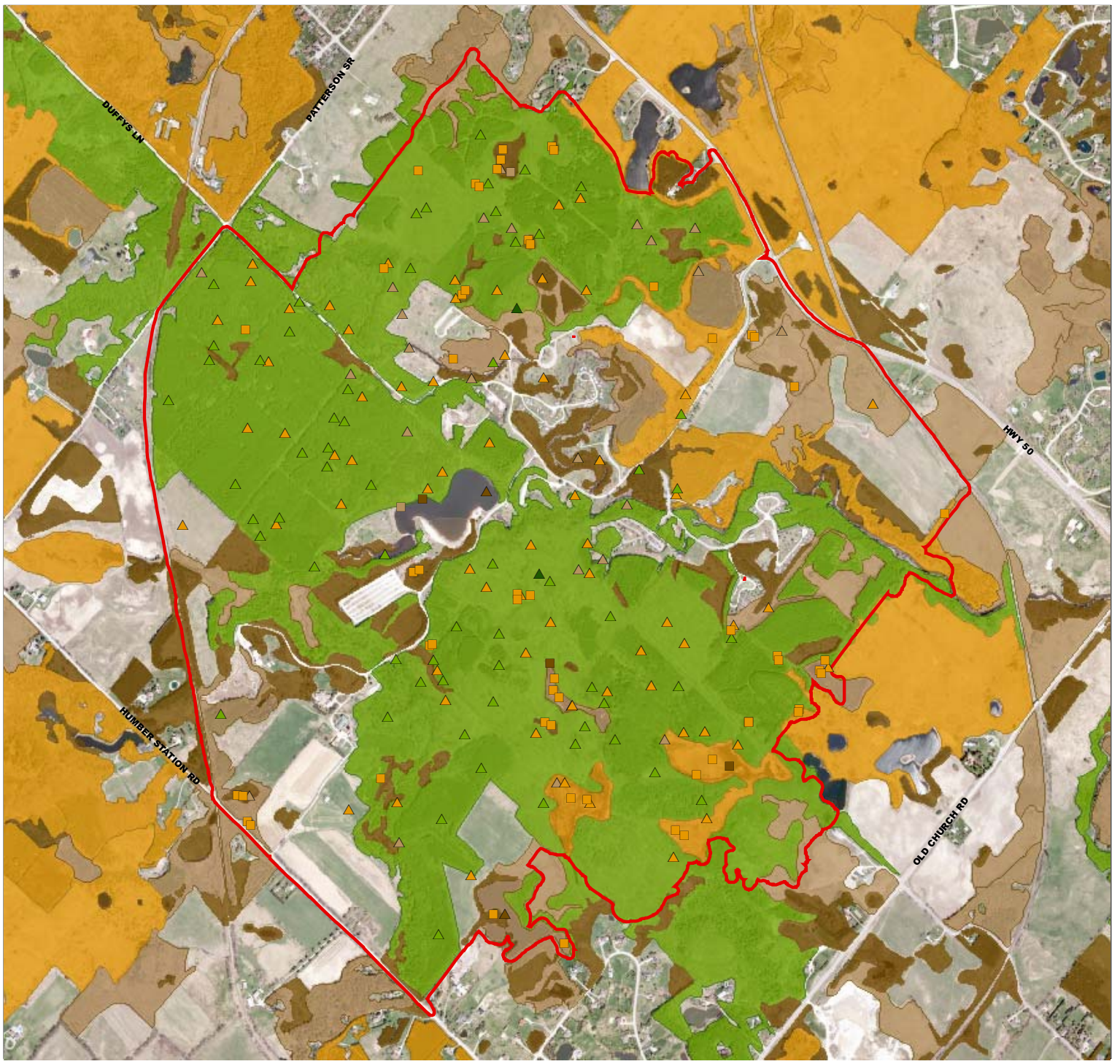
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Date: February 2009
Orthophoto: Spring 2007, First Base Solutions Inc.

Map 2:
Albion Hills Study Area

Legend

 **Study Area**



Fauna Area Sensitivity Scores

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

- △ Fauna Species
- (□ Frog Species)

Habitat Patch Size Scores *

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



0 100 200 400 600 800 Meters

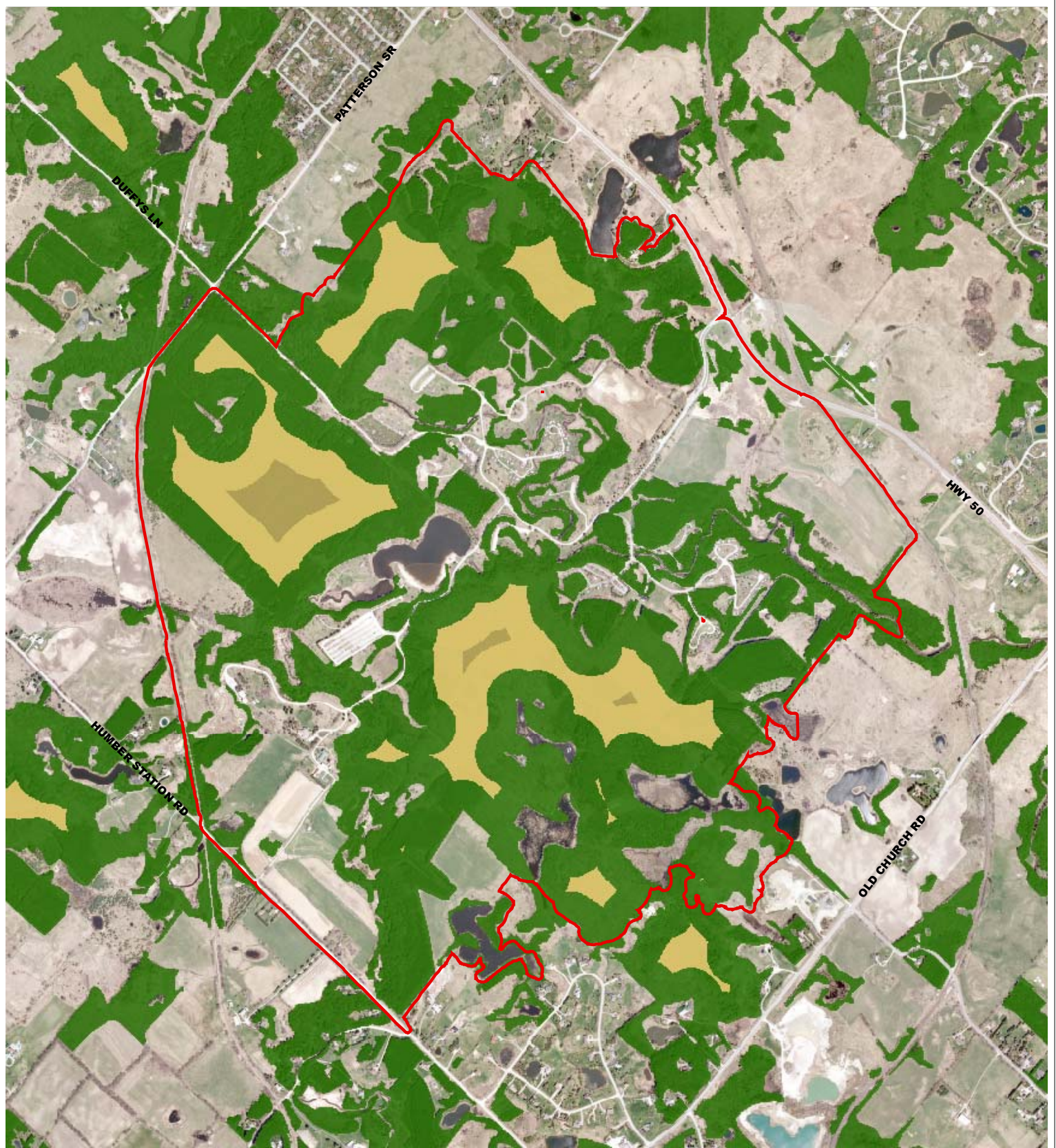
Date: February 2009
 Orthophoto: Spring 2007, First Base Solutions Inc.
 * Landscape analysis based on 2002 Orthophotography

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

Legend

Albion Hills Study Area

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



0 100 200 400 600 800
 Meters

Date: February 2009

Orthophoto: Spring 2007, First Base Solutions Inc.

* Landscape analysis based on 2002
 Orthophotography

Map 4: Interior Forest at Albion Hills

Legend

- Albion Hills Study Area
- Forest
- Forest Interior**
- 100m-200m
- 400m-500m
- 200m-300m
- 500m-600m
- 300m-400m
- 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

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0 100 200 400 600 800 Meters

Date: February 2009

Orthophoto: Spring 2007, First Base Solutions Inc.
* Landscape analysis based on 2002 Orthophotography

Map 5: 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

□ Albion Hills
Study Area



Fauna Sensitivity to Development Scores

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

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

△ Fauna Species (□ Frog Species)



0 100 200 400 600 800
Meters

Date: February 2009
Orthophoto: Spring 2007, First Base Solutions Inc.
* Landscape analysis based on 2002 Orthophotography

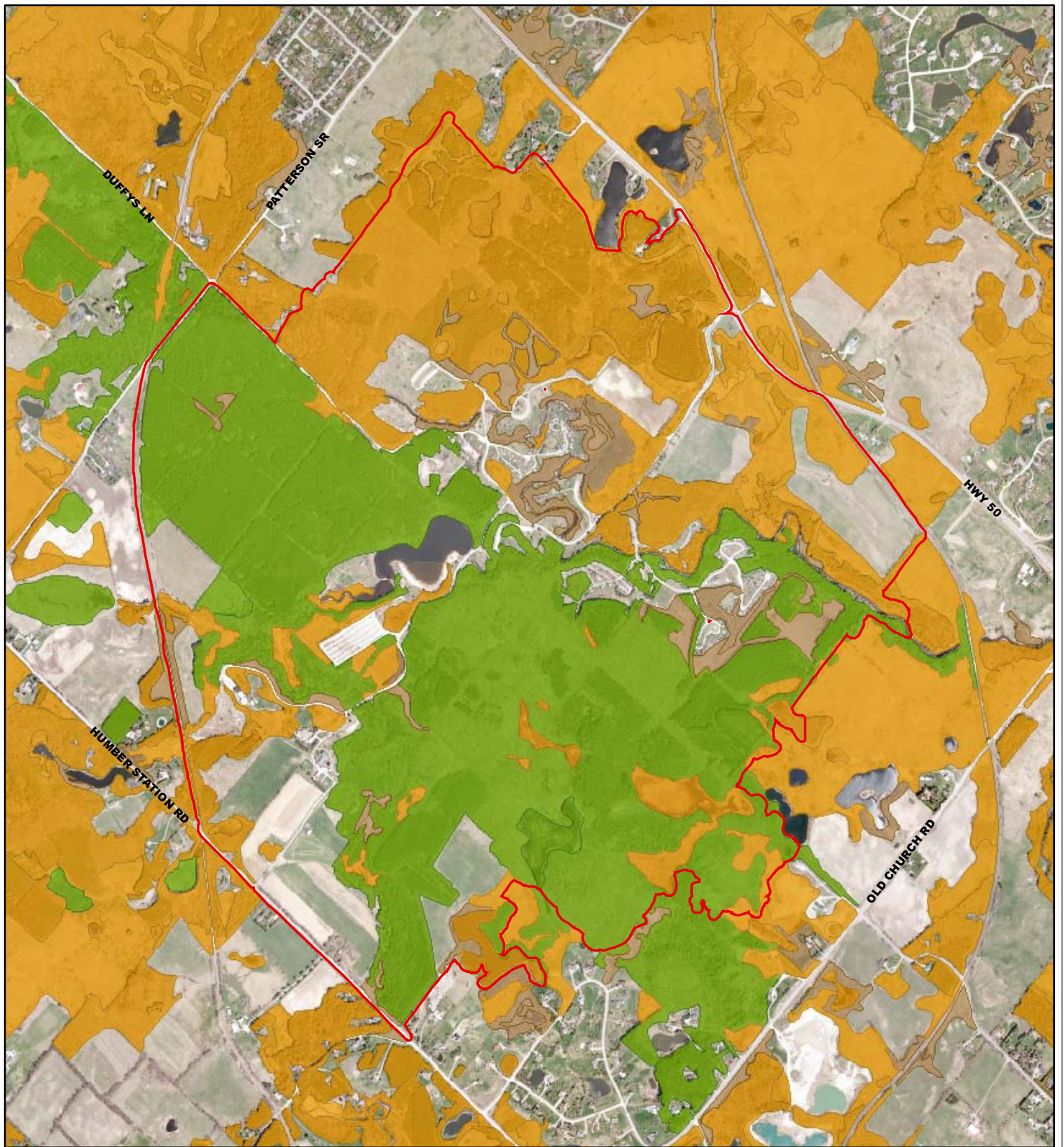
**Map 6:
Scores for Matrix Influence
and Fauna Sensitivity to
Development**

Legend

**Habitat Matrix
Influence Scores ***

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

□ Albion Hills Study Area



TORONTO AND REGION
Conservation
 for The Living City



0 100 200 400 600 800
 Meters

Date: February 2009

Orthophoto: Spring 2007, First Base Solutions Inc.

* Landscape analysis based on 2002
 Orthophotography

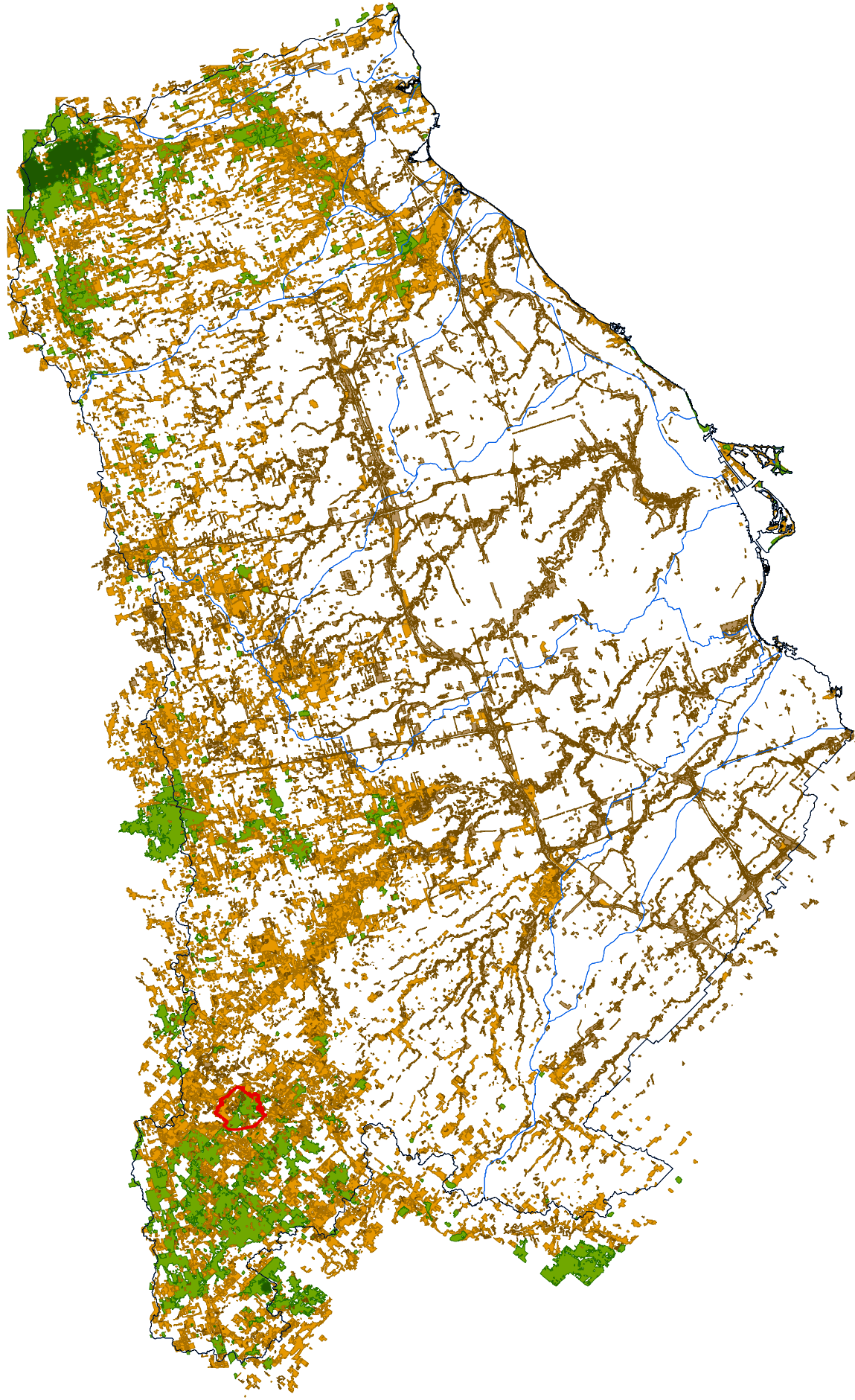
Map 7: Habitat Patch Quality


Legend

Habitat Patch Quality *

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

Albion Hills
 Study Area








 for The Living City






Date: February 2009
 * Landscape analysis based on
 2002 Orthophotography



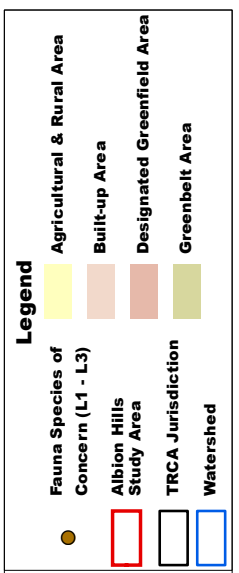
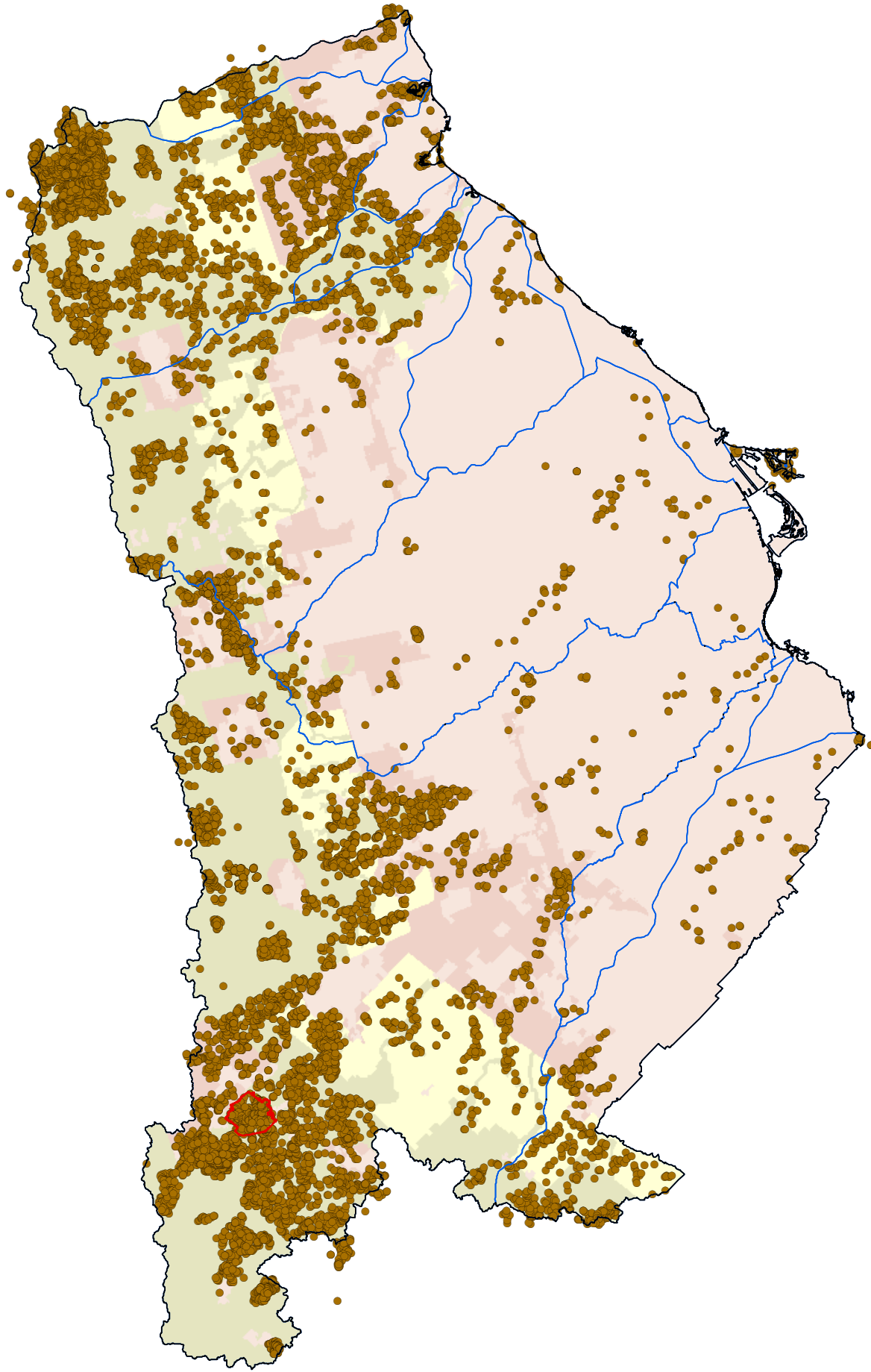
Map 8: Regional Natural System Habitat Patch Quality

Legend


Habitat Patch Quality*	Albion Hills Study Area
L1 - Excellent	
L2 - Good	
L3 - Fair	
L4 - Poor	
L5 - Very Poor	









TRCA Jurisdiction
 Watershed



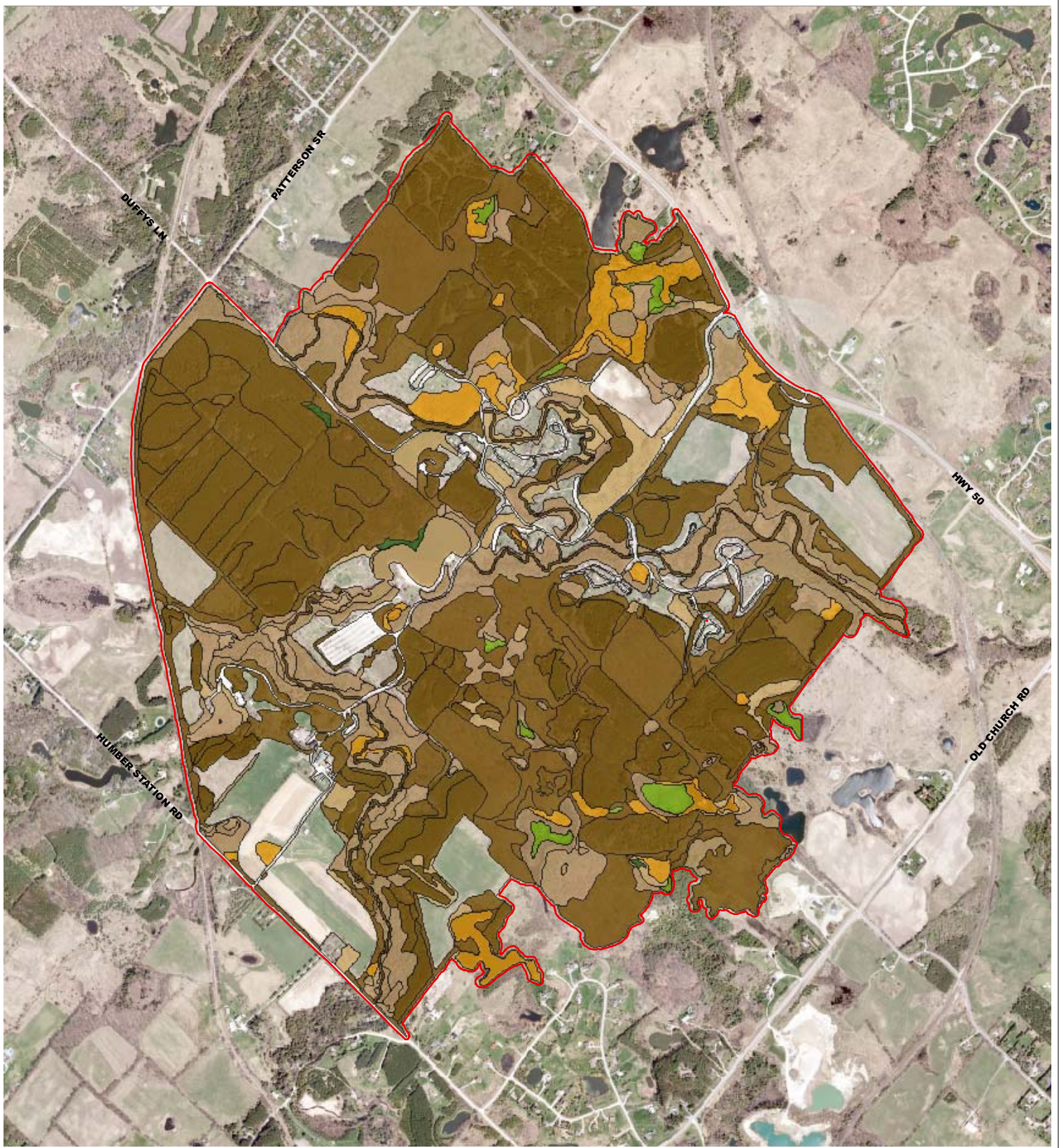
**Map 9:
Distribution of Fauna
Regional Species of Concern**







Date: February 2009









0 100 200 400 600 800
 Meters

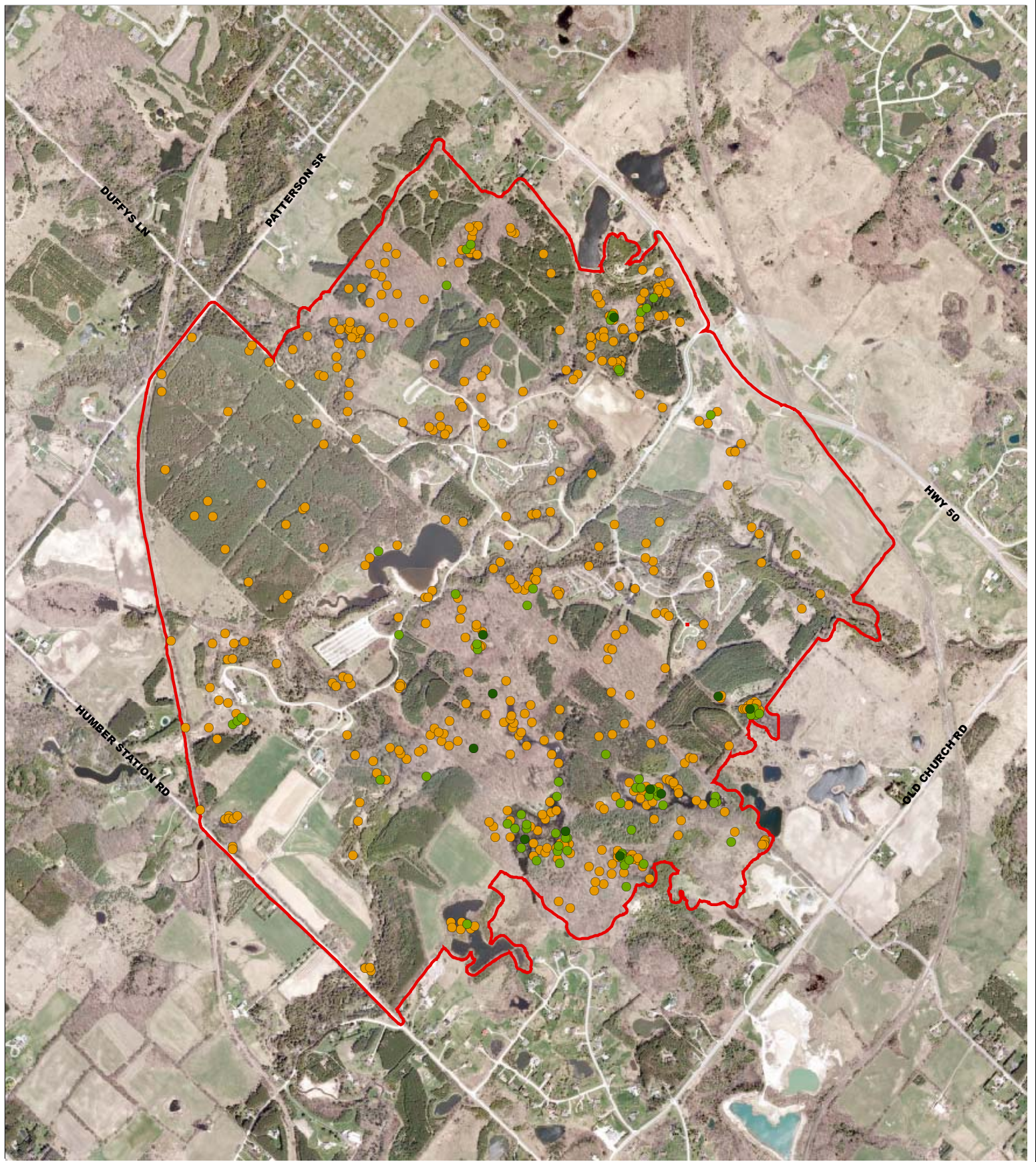
Date: February 2009
 Orthophoto: Spring 2007, First Base
 Solutions Inc.

Map 10: Vegetation Communities with their Associated Local Ranks

Legend
 Vegetation Community Ranks

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

 Albion Hills
 Study Area



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0 100 200 400 600 800
 Meters

Date: February 2009
 Orthophoto: Spring 2007, First Base
 Solutions Inc.

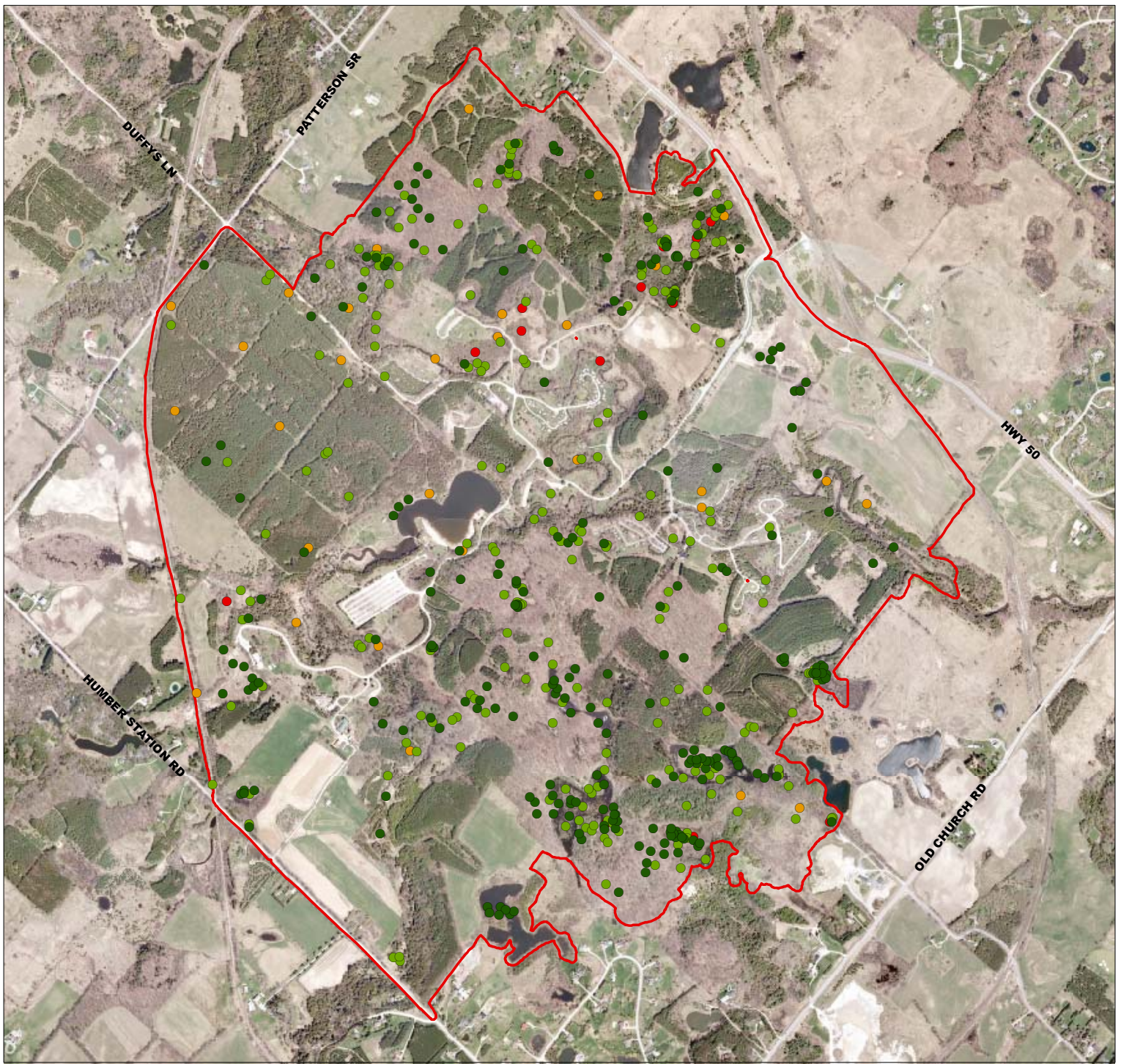
Map 11:
Location of Flora
Species of Concern

Legend

Flora Species of Concern (L1-L3)

- L1
- L2
- L3

Albion Hills Study Area



Flora Habitat Dependence Scores

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

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

○ Flora Species

TORONTO AND REGION
Conservation
for The Living City



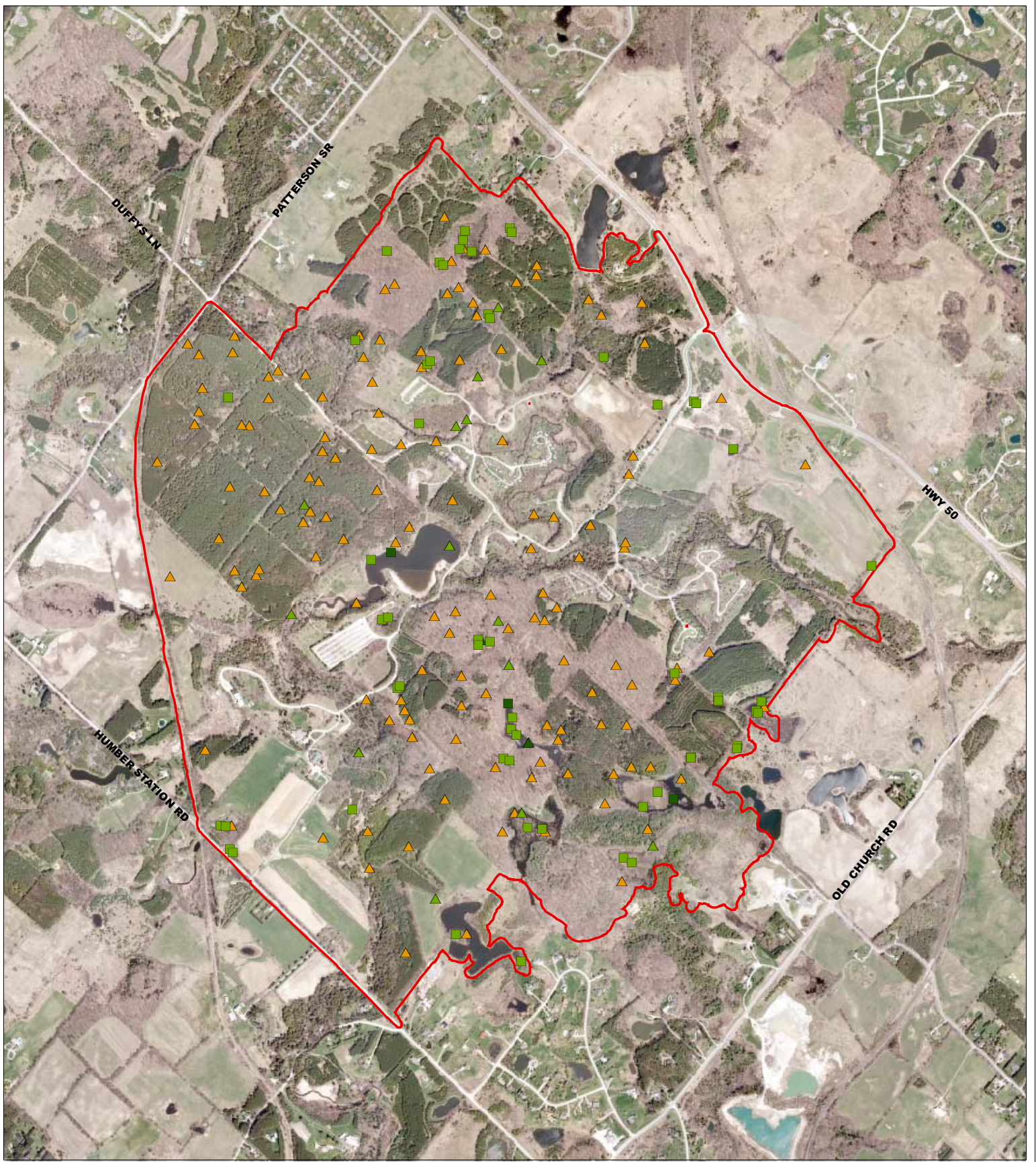
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Date: February 2009
Orthophoto: Spring 2007, First Base Solutions Inc.

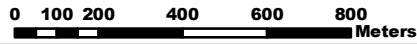
**Map 12:
Flora Habitat
Dependence Scores**

Legend

 Albion Hills Study Area



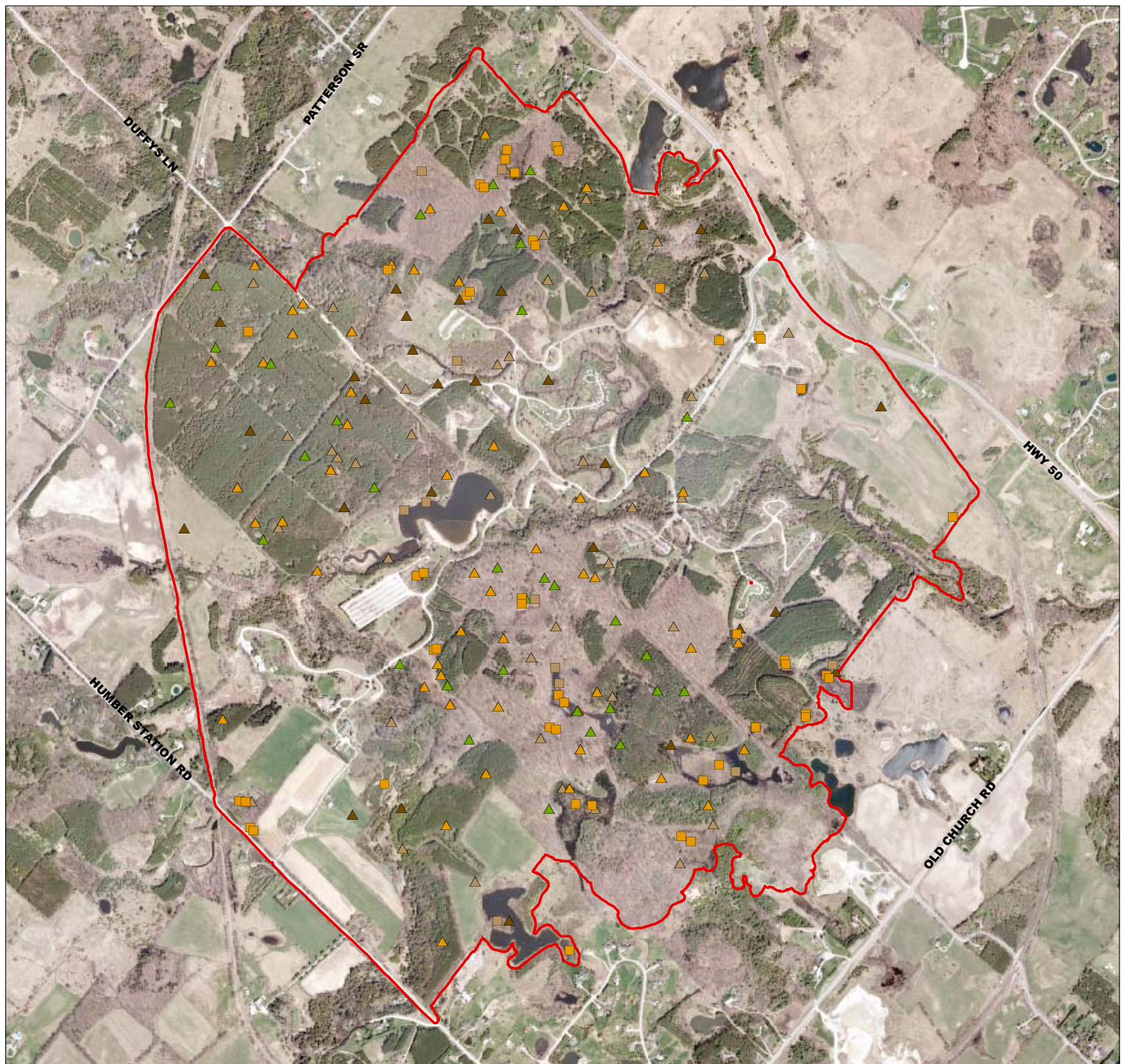





Date: February 2009
 Orthophoto: Spring 2007, First Base Solutions Inc.

Map 13: Location of Fauna Species of Concern

Fauna Species of Concern		Frog Species of Concern	
▲	L1	■	L1
▲	L2	■	L2
▲	L3	■	L3
		Albion Hills Study Area	



Fauna Habitat Dependence Scores

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

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



0 100 200 400 600 800 Meters

Date: February 2009

Orthophoto: Spring 2007, First Base Solutions Inc.

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

Legend

- Albion Hills Study Area
- △ Fauna Species
- (□ Frog Species)

Appendix 1: Vegetation Communities Found at Albion Hills

ELC Code	Vegetation Type (*indicates present as inclusion and/or complex only)	Local Occurr.	Geophy. Requir.	TOTAL SCORE	LOCAL RANK 2008	Area (#ha)
Forest (including plantation)						288.9
FOC2-2	Dry-Fresh White Cedar Coniferous Forest	2.5	2	4.5	L4	1.6
FOC4-1	Fresh-Moist White Cedar Coniferous Forest	2	2	4	L4	12.2
FOC4-2	Fresh-Moist White Cedar - Hemlock Coniferous Forest	2.5	2	4.5	L4	0.3
FOM3-2	Dry-Fresh Hemlock - Sugar Maple Mixed Forest	2.5	2	4.5	L4	1.1
FOM4-2	Dry-Fresh White Cedar - Poplar Mixed Forest	3	1	4	L4	2.1
FOM4-A	Dry-Fresh White Cedar - Hardwood Mixed Forest	2.5	1	3.5	L4	0.7
FOM6-1	Fresh-Moist Sugar Maple - Hemlock Mixed Forest	1.5	2	3.5	L4	7.8
FOM7-1	Fresh-Moist White Cedar - Sugar Maple Mixed Forest	2.5	2	4.5	L4	7.7
FOM7-2	Fresh-Moist White Cedar - Hardwood Mixed Forest	2.5	2	4.5	L4	17.6
FOM8-1	Fresh-Moist Poplar Mixed Forest	3.5	2	5.5	L3	0.4
FOM8-B	Fresh-Moist Ash Mixed Forest	3.5	2	5.5	L3	0.4
FOD3-1	Dry-Fresh Poplar Deciduous Forest	2	2	4	L4	6.2
FOD4-2	Dry-Fresh White Ash Deciduous Forest	2.5	0	2.5	L5	1.8
FOD4-F	Dry-Fresh Black Cherry Deciduous Forest	3.5	0	3.5	L4	0.3
FOD4-G	Dry-Fresh Basswood Deciduous Forest	3	0	3	L4	1.2
FOD4-I	Dry-Fresh Red Maple Deciduous Forest	3.5	2	5.5	L3	0.3
FOD5-2	Dry-Fresh Sugar Maple - Beech Deciduous Forest	1.5	0	1.5	L5	21.5
FOD5-4	Dry-Fresh Sugar Maple - Ironwood Deciduous Forest	2.5	0	2.5	L5	0.5
FOD5-6	Dry-Fresh Sugar Maple - Basswood Deciduous Forest	2.5	0	2.5	L5	4.6
FOD5-7	Dry-Fresh Sugar Maple - Black Cherry Deciduous Forest	2.5	0	2.5	L5	0.5
FOD5-8	Dry-Fresh Sugar Maple - White Ash Deciduous Forest	1.5	0	1.5	L5	18.4
FOD5-10	Dry-Fresh Sugar Maple - Paper Birch - Poplar Deciduous Forest	2.5	1	3.5	L4	0.9
FOD6-1	Fresh-Moist Sugar Maple - Ash Deciduous Forest	2	0	2	L5	1.3
FOD6-5	Fresh-Moist Sugar Maple - Hardwood Deciduous Forest	1.5	0	1.5	L5	0.8
FOD7-1	Fresh-Moist White Elm Lowland Deciduous Forest	2	1	3	L4	0.6
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest	1.5	1	2.5	L5	1.1
FOD7-a	Fresh-Moist Manitoba Maple Lowland Deciduous Forest	1.5	0	1.5	L5	2.2
FOD8-1	Fresh-Moist Poplar Deciduous Forest	1	0	1	L5	6.5
FOD9-5	Fresh-Moist Bitternut Hickory Deciduous Forest	3.5	2	5.5	L3	0.2
*CUP1-2	*Basswood Deciduous Plantation	4.5	0	4.5	L5	
CUP1-4	Hybrid Poplar Deciduous Plantation	3	0	3	L+	0.2
CUP1-8	Red Oak Deciduous Plantation	3.5	0	3.5	L5	0.1

Appendix 1: Vegetation Communities Found at Albion Hills

ELC Code	Vegetation Type (*indicates present as inclusion and/or complex only)	Local Occurr.	Geophy. Requir.	TOTAL SCORE	LOCAL RANK 2008	Area (#ha)
*CUP1-c	*Black Locust Deciduous Plantation	2.5	0	2.5	L+	
CUP2-A	Restoration Mixed Plantation	2.5	0	2.5	L5	0.4
CUP2-b	Black Locust - Conifer Mixed Plantation	3.5	0	3.5	L+	0.7
CUP2-c	Norway Maple - Conifer Mixed Plantation	3.5	0	3.5	L+	0.1
CUP3-1	Red Pine Coniferous Plantation	1.5	0	1.5	L5	38.8
CUP3-2	White Pine Coniferous Plantation	1.5	0	1.5	L5	43.3
CUP3-4	Jack Pine Coniferous Plantation	3	0	3	L+	14.1
CUP3-6	European Larch Coniferous Plantation	3	0	3	L+	1.2
CUP3-8	White Spruce - European Larch Coniferous Plantation	3.5	0	3.5	L5	1.5
CUP3-C	White Spruce Coniferous Plantation	2	0	2	L5	16.6
CUP3-D	Black Spruce Coniferous Plantation	4	0	4	L5	0.1
CUP3-e	Norway Spruce Coniferous Plantation	2.5	0	2.5	L+	1.5
CUP3-G	White Cedar Coniferous Plantation	2.5	0	2.5	L5	0.9
CUP3-H	Mixed Conifer Coniferous Plantation	1.5	0	1.5	L5	48.5
Successional						48.2
CUT1-1	Sumac Deciduous Thicket	2	0	2	L5	2.1
CUT1-3	Chokecherry Deciduous Thicket	4	0	4	L4	0.4
CUT1-A1	Native Deciduous Sapling Regeneration Thicket	2	0	2	L5	2.4
CUT1-A2	Native Mixed Sapling Regeneration Thicket	2.5	0	2.5	L5	1.8
CUT1-A3	Coniferous Sapling Regeneration Thicket	2.5	1	3.5	L4	1.0
CUT1-c	Exotic Deciduous Thicket	2	0	2	L+	2.0
CUH1-A	Treed Hedgerow	1.5	0	1.5	L4	4.7
CUH1-B	Native Shrub - Sapling Hedgerow	3	0	3	L5	0.3
CUS1-1	Hawthorn Successional Savannah	1.5	0	1.5	L5	1.3
CUS1-2A	White Cedar Successional Savannah	2.5	1	3.5	L4	1.2
CUS1-A1	Native Deciduous Successional Savannah	1.5	0	1.5	L5	14.0
CUS1-b	Exotic Successional Savannah	1.5	0	1.5	L+	5.9
CUW1-A1	White Cedar Successional Woodland	2.5	1	3.5	L4	2.3
CUW1-A2	White Pine Successional Woodland	2.5	1	3.5	L4	1.9
CUW1-A3	Native Deciduous Successional Woodland	1.5	0	1.5	L5	7.0

Appendix 1: Vegetation Communities Found at Albion Hills

ELC Code	Vegetation Type (*indicates present as inclusion and/or complex only)	Local Occurr.	Geophy. Requir.	TOTAL SCORE	LOCAL RANK 2008	Area (#ha)
Wetland						38.3
SWC1-1	White Cedar Mineral Coniferous Swamp	2.5	2	4.5	L4	0.6
SWC2-2	Hemlock Mineral Coniferous Swamp	3.5	2	5.5	L3	0.2
SWC3-1	White Cedar Organic Coniferous Swamp	2.5	3	5.5	L3	2.7
SWC3-2	White Cedar - Conifer Organic Coniferous Swamp	2.5	3	5.5	L3	3.1
SWM1-1	White Cedar - Hardwood Mineral Mixed Swamp	2	2	4	L4	3.4
SWM4-1	White Cedar - Hardwood Organic Mixed Swamp	2	3	5	L3	1.7
*SWD2-1	*Black Ash Mineral Deciduous Swamp	2.5	2	4.5	L4	
SWD4-2	White Elm Mineral Deciduous Swamp	2.5	2	4.5	L4	0.2
SWD4-3	Paper Birch - Poplar Mineral Deciduous Swamp	2	2	4	L4	1.4
SWD5-1	Black Ash Organic Deciduous Swamp	3.5	3	6.5	L2	0.2
SWD7-1	Paper Birch - Poplar Organic Deciduous Swamp	2.5	3	5.5	L3	0.6
SWT2-1	Alder Mineral Thicket Swamp	3	1	4	L4	3.5
SWT2-2	Willow Mineral Thicket Swamp	2	2	4	L4	2.0
SWT2-5	Red-osier Mineral Thicket Swamp	2	2	4	L4	0.6
*SWT2-8	*Silky Dogwood Mineral Thicket Swamp	3.5	2	5.5	L3	
SWT2-10	Nannyberry Mineral Thicket Swamp	4.5	1	5.5	L3	0.4
SWT3-1	Alder Organic Thicket Swamp	3	3	6	L3	1.5
SWT3-2	Willow Organic Thicket Swamp	2.5	3	5.5	L3	1.5
*SWT3-5	*Red-osier Organic Thicket Swamp	3	3	6	L3	
SWT3-7	Winterberry Organic Thicket Swamp	3.5	4	7.5	L2	0.8
*FEO1-2	*Slender Sedge Open Fen	4.5	5	9.5	L1	
FEO1-5	Beaked Sedge Open Fen	5	5	10	L1	0.1
MAM2-2	Reed Canary Grass Mineral Meadow Marsh	1	1	2	L5	0.7
*MAM2-3	*Red-top Mineral Meadow Marsh	3	0	3	L4	
MAM2-4	Fowl Manna Grass Mineral Meadow Marsh	4	1	5	L3	0.4
MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh	3	1	4	L4	1.2
MAM2-7	Horsetail Mineral Meadow Marsh	3	2	5	L3	0.3
MAM2-10	Forb Mineral Meadow Marsh	1.5	1	2.5	L5	1.4
MAM2-E	Bulrush Mineral Meadow Marsh	3.5	1	4.5	L4	0.4
MAM3-2	Reed Canary Grass Organic Meadow Marsh	3.5	2	5.5	L+	0.9
*MAM3-3	*Rice Cut-grass Organic Meadow Marsh	3.5	3	6.5	L2	
MAM3-8	Jewelweed Organic Meadow Marsh	4	3	7	L2	0.1

Appendix 1: Vegetation Communities Found at Albion Hills

ELC Code	Vegetation Type (*indicates present as inclusion and/or complex only)	Local Occurr.	Geophy. Requir.	TOTAL SCORE	LOCAL RANK 2008	Area (#ha)
MAM3-9	Forb Organic Meadow Marsh	3	3	6	L3	0.3
MAS2-1A	Broad-leaved Cattail Mineral Shallow Marsh	2	1	3	L4	1.3
MAS2-1b	Narrow-Leaved Cattail Mineral Shallow Marsh	2	0	2	L+	0.3
MAS2-9	Forb Mineral Shallow Marsh	3	1	4	L4	0.2
MAS2-C	Horsetail Mineral Shallow Marsh	4	1	5	L3	0.2
MAS2-d	Reed Canary Grass Mineral Shallow Marsh	3	1	4	L+	0.3
MAS2-G	Manna Grass Mineral Shallow Marsh	3.5	1	4.5	L4	0.4
MAS3-1A	Broad-leaved Cattail Organic Shallow Marsh	2.5	3	5.5	L3	2.8
MAS3-1b	Narrow-leaved Cattail Organic Shallow Marsh	3.5	1	4.5	L+	0.8
MAS3-2	Bulrush Organic Shallow Marsh	3.5	3	6.5	L2	0.5
MAS3-3	Narrow-leaved Sedge Organic Shallow Marsh	4.5	3	7.5	L2	0.2
MAS3-4	Broad-leaved Sedge Organic Shallow Marsh	3.5	3	6.5	L2	1.0
*MAS3-11	*Calla Lily Organic Shallow Marsh	4.5	4	8.5	L1	
Aquatic						21.0
SAS1-1	Pondweed Submerged Shallow Aquatic	2	2	4	L4	1.6
SAM1-2	Duckweed Mixed Shallow Aquatic	3	2	5	L3	4.7
SAM1-4	Pondweed Mixed Shallow Aquatic	3	2	5	L3	3.3
SAF1-3	Duckweed Floating-leaved Shallow Aquatic	2.5	1	3.5	L4	0.4
*OAO1	*Open Aquatic (riverine)	1.5	0	1.5	L5	6.2
OAO1-T	Turbid Open Aquatic (disturbed)	2	0	2	L+	4.7
Dynamic						0.9
*BLS1-A	*Sumac - Willow - Cherry Shrub Bluff	3.5	2	5.5	L3	
BLT1-A	White Cedar Treed Bluff	3.5	3	6.5	L2	0.3
*SBO1-B	*Dry-Fresh Flat-stemmed Bluegrass - Forb Sand Barren	3.5	3	6.5	L2	
SBT1	Treed Sand Barren Ecosite	3.5	5	8.5	L1	0.6
Meadow						22.7
CUM1-A	Native Forb Meadow	1.5	0	1.5	L5	19.7
CUM1-b	Exotic Cool-season Grass Graminoid Meadow	1	0	1	L+	2.0
CUM1-c	Exotic Forb Meadow	1.5	0	1.5	L+	1.0

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Botrychium matricariifolium</i>	daisy-leaved grape fern	5	5	5	5	20	L1
<i>Diplazium pycnocarpon</i>	glade fern	4	5	5	5	19	L1
<i>Eriophorum gracile</i>	slender cotton-grass	5	5	5	4	19	L1
<i>Galearis spectabilis</i>	showy orchis	5	5	5	5	20	L1
<i>Gaultheria hispidula</i>	creeping snowberry	4	5	5	5	19	L1
<i>Goodyera pubescens</i>	downy rattlesnake-plantain	4	5	5	5	19	L1
<i>Utricularia minor</i>	small bladderwort	4	5	5	5	19	L1
<i>Aronia melanocarpa</i>	black choke-berry	4	5	5	4	18	L2
<i>Botrychium dissectum</i>	cut-leaved grape fern	3	4	5	5	17	L2
<i>Botrychium virginianum</i>	rattlesnake fern	3	5	4	5	17	L2
<i>Calla palustris</i>	water arum	3	5	4	5	17	L2
<i>Carex echinata</i> ssp. <i>echinata</i>	little prickly sedge	5	4	5	3	17	L2
<i>Carex lasiocarpa</i>	slender woolly sedge	3	4	5	5	17	L2
<i>Carex magellanica</i> ssp. <i>irrigua</i>	bog sedge	4	4	5	5	18	L2
<i>Coptis trifolia</i> ssp. <i>groenlandica</i>	goldthread	2	5	5	5	17	L2
<i>Diphasiastrum digitatum</i>	crowfoot club-moss	3	4	5	5	17	L2
<i>Dulichium arundinaceum</i>	three-way sedge	3	4	5	5	17	L2
<i>Erechtites hieracifolia</i>	burnweed	5	5	3	4	17	L2
<i>Erigeron pulchellus</i>	Robin's plantain	4	5	4	5	18	L2
<i>Huperzia lucidula</i>	shining club-moss	3	5	5	5	18	L2
<i>Linnaea borealis</i> ssp. <i>longiflora</i>	twinflower	3	5	5	5	18	L2
<i>Lycopodium clavatum</i>	running club-moss	4	4	5	5	18	L2
<i>Lycopodium dendroidium</i>	round-branched ground-pine	2	5	5	5	17	L2
<i>Najas flexilis</i>	bushy naiad	3	4	5	5	17	L2
<i>Nemopanthus mucronatus</i>	mountain holly	4	3	5	5	17	L2
<i>Nymphaea odorata</i>	fragrant water lily (sensu lato)	3	5	5	4	17	L2
<i>Osmunda regalis</i> var. <i>spectabilis</i>	royal fern	2	5	5	5	17	L2
<i>Phlox divaricata</i>	wild blue phlox	4	4	4	5	17	L2
<i>Potamogeton amplifolius</i>	large-leaved pondweed	3	4	5	4	16	L3
<i>Potamogeton zosteriformis</i>	flat-stemmed pondweed	3	5	5	5	18	L2
<i>Potentilla palustris</i>	marsh cinquefoil	3	5	4	5	17	L2
<i>Triadenum fraseri</i>	marsh St. Johnswort	3	5	4	5	17	L2

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Utricularia vulgaris</i>	common bladderwort	3	4	5	5	17	L2
<i>Verbena simplex</i>	slender vervain	5	3	5	4	17	L2
<i>Abies balsamea</i>	balsam fir	2	3	4	5	14	L3
<i>Adiantum pedatum</i>	northern maidenhair fern	2	3	5	5	15	L3
<i>Agrostis scabra</i>	ticklegrass	3	3	4	4	14	L3
<i>Alnus incana</i> ssp. <i>rugosa</i>	speckled alder	2	4	4	5	15	L3
<i>Alopecurus aequalis</i>	short-awned foxtail	3	4	5	4	16	L3
<i>Anemone acutiloba</i>	sharp-lobed hepatica	2	4	4	5	15	L3
<i>Anemone cylindrica</i>	long-fruited thimbleweed	3	4	3	4	14	L3
<i>Angelica atropurpurea</i>	angelica	3	3	4	4	14	L3
<i>Aquilegia canadensis</i>	wild columbine	2	4	3	5	14	L3
<i>Aster urophyllus</i>	arrow-leaved aster	3	3	4	4	14	L3
<i>Calystegia spithamea</i> ssp. <i>spithamea</i>	low bindweed	4	4	4	4	16	L3
<i>Campanula aparinoides</i>	marsh bellflower	3	4	5	4	16	L3
<i>Cardamine concatenata</i>	cut-leaved toothwort	2	3	5	4	14	L3
<i>Carex alopecoidea</i>	foxtail sedge	2	3	5	4	14	L3
<i>Carex atherodes</i>	awned sedge	3	3	5	4	15	L3
<i>Carex brevior</i>	short-fruited sedge	3	3	4	4	14	L3
<i>Carex bromoides</i>	brome-like sedge	4	3	4	3	14	L3
<i>Carex brunnescens</i> ssp. <i>brunnescens</i>	brownish sedge	3	3	4	4	14	L3
<i>Carex canescens</i> ssp. <i>canescens</i>	silvery sedge	3	4	5	4	16	L3
<i>Carex cephaloidea</i>	thin-leaved sedge	3	3	5	3	14	L3
<i>Carex comosa</i>	bristly sedge	3	3	5	4	15	L3
<i>Carex crinita</i>	fringed sedge	2	4	4	4	14	L3
<i>Carex debilis</i> var. <i>rudgei</i>	white-edged sedge	5	2	4	4	15	L3
<i>Carex diandra</i>	lesser paniced sedge	3	4	5	4	16	L3
<i>Carex disperma</i>	two-seeded sedge	2	3	5	4	14	L3
<i>Carex eburnea</i>	bristle-leaved sedge	3	4	4	4	15	L3
<i>Carex hitchcockiana</i>	Hitchcock's sedge	3	3	5	3	14	L3
<i>Carex interior</i>	fen star sedge	2	4	4	4	14	L3
<i>Carex laevivaginata</i>	smooth-sheathed sedge	2	4	4	4	14	L3
<i>Carex leptalea</i> ssp. <i>leptalea</i>	bristle-stalked sedge	3	3	5	4	15	L3

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Carex leptonevia</i>	few-nerved wood sedge	4	3	4	3	14	L3
<i>Carex lupulina</i>	hop sedge	2	4	4	4	14	L3
<i>Carex plantaginea</i>	plantain-leaved sedge	2	4	5	4	15	L3
<i>Carex tuckermanii</i>	Tuckerman's sedge	2	4	4	4	14	L3
<i>Carex utriculata</i>	beaked sedge	2	3	4	5	14	L3
<i>Celastrus scandens</i>	American bittersweet	2	4	3	5	14	L3
<i>Ceratophyllum demersum</i>	coontail	2	3	5	4	14	L3
<i>Chamaedaphne calyculata</i>	leatherleaf	3	4	4	4	15	L3
<i>Chelone glabra</i>	turtlehead	2	3	4	5	14	L3
<i>Chrysosplenium americanum</i>	golden saxifrage	3	3	5	4	15	L3
<i>Cicuta bulbifera</i>	bulblet-bearing water-hemlock	2	3	5	4	14	L3
<i>Cinna latifolia</i>	nodding wood reed	3	3	5	3	14	L3
<i>Circaea alpina</i>	smaller enchanter's nightshade	2	4	5	4	15	L3
<i>Claytonia caroliniana</i>	broad-leaved spring beauty	2	4	5	5	16	L3
<i>Clintonia borealis</i>	bluebead lily	2	5	4	5	16	L3
<i>Cornus amomum</i> ssp. <i>obliqua</i>	silky dogwood	3	3	5	3	14	L3
<i>Cypripedium calceolus</i> var. <i>parviflorum</i>	smaller yellow lady's slipper	3	4	4	5	16	L3
<i>Cystopteris tenuis</i>	Mackay's fragile fern	2	4	5	5	16	L3
<i>Dicentra canadensis</i>	squirrel-corn	2	4	5	4	15	L3
<i>Dirca palustris</i>	leatherwood	3	4	5	4	16	L3
<i>Dryopteris clintoniana</i>	Clinton's wood fern	2	4	5	4	15	L3
<i>Dryopteris cristata</i>	crested wood fern	2	4	4	4	14	L3
<i>Eleocharis smallii</i>	Small's spike-rush	3	4	5	3	15	L3
<i>Epilobium angustifolium</i>	fire-weed	3	4	4	4	15	L3
<i>Equisetum fluviatile</i>	water horsetail	2	4	5	4	15	L3
<i>Equisetum pratense</i>	thicket horsetail	3	4	5	3	15	L3
<i>Equisetum scirpoides</i>	dwarf scouring rush	2	4	5	5	16	L3
<i>Equisetum sylvaticum</i>	woodland horsetail	2	3	5	4	14	L3
<i>Galium circaezans</i>	white wild licorice	4	4	4	3	15	L3
<i>Galium trifidum</i> var. <i>trifidum</i>	small bedstraw	4	4	4	3	15	L3
<i>Glyceria borealis</i>	northern manna grass	3	3	5	5	16	L3
<i>Glyceria septentrionalis</i>	eastern manna grass	2	3	5	4	14	L3

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Gymnocarpium dryopteris</i>	oak fern	2	3	5	5	15	L3
<i>Hydrocotyle americana</i>	marsh pennywort	2	4	4	4	14	L3
<i>Hydrophyllum canadense</i>	Canada waterleaf	2	3	5	4	14	L3
<i>Hypericum ascyron</i>	great St. Johnswort	3	4	5	2	14	L3
<i>Ilex verticillata</i>	winterberry	2	4	4	5	15	L3
<i>Iris versicolor</i>	blue flag	2	5	4	5	16	L3
<i>Juglans cinerea</i>	butternut	1	5	4	4	14	L3
<i>Juniperus communis</i>	common juniper	2	3	4	5	14	L3
<i>Larix laricina</i>	tamarack	2	4	4	4	14	L3
<i>Lemna trisulca</i>	star duckweed	2	4	5	3	14	L3
<i>Lilium michiganense</i>	Michigan lily	2	4	3	5	14	L3
<i>Liparis loeselii</i>	Loesel's twayblade	3	3	5	5	16	L3
<i>Lobelia siphilitica</i>	great blue lobelia	2	3	4	5	14	L3
<i>Lonicera canadensis</i>	fly honeysuckle	2	4	4	4	14	L3
<i>Lonicera hirsuta</i>	hairy honeysuckle	3	4	4	4	15	L3
<i>Lysimachia thyrsiflora</i>	tufted loosestrife	3	3	4	4	14	L3
<i>Medeola virginiana</i>	Indian cucumber-root	2	5	4	5	16	L3
<i>Menispermum canadense</i>	moonseed	2	4	4	4	14	L3
<i>Mimulus ringens</i>	square-stemmed monkey-flower	2	3	3	4	12	L3
<i>Mitchella repens</i>	partridgeberry	2	4	4	5	15	L3
<i>Mitella diphylla</i>	mitrewort	2	3	4	5	14	L3
<i>Mitella nuda</i>	naked mitrewort	2	4	5	5	16	L3
<i>Monarda didyma</i>	bee-balm	4	3	4	4	15	L3
<i>Monotropa hypopithys</i>	pinemap	2	4	5	5	16	L3
<i>Myosotis laxa</i>	smaller forget-me-not	2	4	3	4	13	L3
<i>Oryzopsis asperifolia</i>	white-fruited mountain-rice	2	4	4	5	15	L3
<i>Oryzopsis racemosa</i>	black-fruited mountain-rice	3	3	5	4	15	L3
<i>Osmorhiza longistylis</i>	smooth sweet cicely	4	4	4	4	16	L3
<i>Osmunda cinnamomea</i>	cinnamon fern	2	4	5	5	16	L3
<i>Penstemon digitalis</i>	foxglove beard-tongue	3	3	4	4	14	L3
<i>Phegopteris connectilis</i>	northern beech fern	3	3	5	5	16	L3
<i>Picea glauca</i>	white spruce	1	5	4	4	14	L3

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Poa alsodes</i>	grove meadow grass	3	3	5	3	14	L3
<i>Polystichum acrostichoides</i>	Christmas fern	1	3	5	5	14	L3
<i>Potamogeton foliosus</i>	leafy pondweed	2	3	5	4	14	L3
<i>Potamogeton natans</i>	floating pondweed	2	4	5	3	14	L3
<i>Pyrola elliptica</i>	shinleaf	2	4	4	4	14	L3
<i>Ranunculus hispidus</i> var. <i>caricetorum</i>	swamp buttercup	3	4	4	3	14	L3
<i>Ribes triste</i>	swamp red currant	2	4	4	5	15	L3
<i>Rumex</i> cf. <i>orbiculatus</i>	great water dock	4	3	4	4	15	L3
<i>Salix lucida</i>	shining willow	2	4	5	3	14	L3
<i>Scirpus cyperinus</i>	woolly bulrush	2	3	4	5	14	L3
<i>Scirpus pendulus</i>	drooping bulrush	3	4	5	4	16	L3
<i>Sisyrinchium montanum</i>	blue-eyed grass	2	3	4	5	14	L3
<i>Sparganium emersum</i> ssp. <i>emersum</i>	green-fruited bur-reed	2	3	5	4	14	L3
<i>Sparganium eurycarpum</i>	great bur-reed	2	4	5	4	15	L3
<i>Spirodela polyrhiza</i>	greater duckweed	2	4	5	3	14	L3
<i>Stellaria longifolia</i>	long-leaved chickweed	3	3	4	4	14	L3
<i>Streptopus roseus</i>	rose twisted-stalk	2	4	4	5	15	L3
<i>Taxus canadensis</i>	Canada yew	2	4	4	5	15	L3
<i>Trientalis borealis</i> ssp. <i>borealis</i>	star-flower	2	4	4	5	15	L3
<i>Triosteum aurantiacum</i>	wild coffee	4	5	4	3	16	L3
<i>Uvularia grandiflora</i>	large-flowered bellwort	1	4	5	5	15	L3
<i>Vallisneria americana</i>	tape-grass	3	4	5	4	16	L3
<i>Veronica catenata</i>	slender water speedwell	3	3	5	4	15	L3
<i>Veronica scutellata</i>	marsh speedwell	3	2	5	4	14	L3
<i>Viburnum acerifolium</i>	maple-leaved viburnum	2	3	4	5	14	L3
<i>Viola canadensis</i>	Canada violet	3	4	4	4	15	L3
<i>Viola macloskeyi</i> ssp. <i>pallens</i>	northern white violet	3	4	4	3	14	L3
<i>Viola rostrata</i>	long-spurred violet	2	4	4	4	14	L3
<i>Viola selkirkii</i>	Selkirk's violet	3	3	4	4	14	L3
<i>Wolffia borealis</i>	dotted water-meal	3	4	5	2	14	L3
<i>Zanthoxylum americanum</i>	prickly-ash	5	4	4	3	16	L3
<i>Acer rubrum</i>	red maple	2	4	1	5	12	L4

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Acer saccharinum</i>	silver maple	1	2	5	3	11	L4
<i>Acer spicatum</i>	mountain maple	2	3	4	4	13	L4
<i>Actaea pachypoda</i>	white baneberry	2	3	4	3	12	L4
<i>Allium tricoccum</i>	wild leek	1	3	4	4	12	L4
<i>Amelanchier arborea</i>	downy serviceberry	3	2	4	3	12	L4
<i>Antennaria</i> cf. <i>howellii</i> ssp. <i>howellii</i>	Howell's pussytoes	4	2	3	3	12	L4
<i>Apocynum androsaemifolium</i>	spreading dogbane	2	3	2	4	11	L4
<i>Asarum canadense</i>	wild ginger	2	3	4	3	12	L4
<i>Asclepias incarnata</i> ssp. <i>incarnata</i>	swamp milkweed	1	3	4	4	12	L4
<i>Aster macrophyllus</i>	big-leaved aster	2	3	2	4	11	L4
<i>Betula alleghaniensis</i>	yellow birch	1	4	3	5	13	L4
<i>Betula papyrifera</i>	paper birch	1	4	2	4	11	L4
<i>Boehmeria cylindrica</i>	false nettle	2	4	4	3	13	L4
<i>Calamagrostis canadensis</i>	Canada blue joint	1	3	4	4	12	L4
<i>Caltha palustris</i>	marsh marigold	2	4	3	4	13	L4
<i>Cardamine diphylla</i>	broad-leaved toothwort	2	3	4	4	13	L4
<i>Cardamine pensylvanica</i>	bitter cress	3	2	4	4	13	L4
<i>Carex albursina</i>	white bear sedge	2	3	5	4	14	L4
<i>Carex arctata</i>	nodding wood sedge	2	4	2	3	11	L4
<i>Carex aurea</i>	golden-fruited sedge	2	2	4	4	12	L4
<i>Carex communis</i>	fibrous-rooted sedge	2	4	3	3	12	L4
<i>Carex deweyana</i>	Dewey's sedge	2	4	3	3	12	L4
<i>Carex gracillima</i>	graceful sedge	2	3	4	2	11	L4
<i>Carex hystericina</i>	porcupine sedge	2	3	2	5	12	L4
<i>Carex intumescens</i>	bladder sedge	2	4	4	2	12	L4
<i>Carex lacustris</i>	lake-bank sedge	2	3	3	4	12	L4
<i>Carex laxiflora</i>	loose-flowered sedge	3	3	4	3	13	L4
<i>Carex peckii</i>	Peck's sedge	3	3	4	3	13	L4
<i>Carex pedunculata</i>	early-flowering sedge	2	3	3	3	11	L4
<i>Carex pensylvanica</i>	Pennsylvania sedge	2	4	3	4	13	L4
<i>Carex projecta</i>	necklace sedge	4	2	4	3	13	L4
<i>Carex pseudo-cyperus</i>	pseudocyperus sedge	2	3	3	4	12	L4

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Carex retrorsa</i>	retrorse sedge	2	3	3	4	12	L4
<i>Carex scabrata</i>	rough sedge	2	3	4	3	12	L4
<i>Carex sparganioides</i>	bur-reed sedge	2	2	5	2	11	L4
<i>Carex sprengelii</i>	long-beaked sedge	2	4	4	2	12	L4
<i>Carex stricta</i>	tussock sedge	2	3	3	4	12	L4
<i>Carex tribuloides</i>	blunt broom sedge	3	2	4	3	12	L4
<i>Carpinus caroliniana</i> ssp. <i>virginiana</i>	blue beech	1	3	4	3	11	L4
<i>Carya cordiformis</i>	bitternut hickory	2	4	4	2	12	L4
<i>Caulophyllum giganteum</i>	long-styled blue cohosh	2	3	4	4	13	L4
<i>Corylus cornuta</i>	beaked hazel	2	4	3	4	13	L4
<i>Cystopteris bulbifera</i>	bulblet fern	2	3	4	4	13	L4
<i>Danthonia spicata</i>	poverty oat grass	2	4	3	4	13	L4
<i>Diervilla lonicera</i>	bush honeysuckle	2	3	2	4	11	L4
<i>Dryopteris intermedia</i>	evergreen wood fern	2	4	4	3	13	L4
<i>Dryopteris marginalis</i>	marginal wood fern	2	3	3	4	12	L4
<i>Elymus hystrix</i>	bottle-brush grass	2	3	4	3	12	L4
<i>Elymus riparius</i>	riverbank wild rye	2	2	4	4	12	L4
<i>Epifagus virginiana</i>	beech-drops	2	3	5	2	12	L4
<i>Eupatorium perfoliatum</i>	boneset	1	3	4	3	11	L4
<i>Fagus grandifolia</i>	American beech	1	4	3	4	12	L4
<i>Festuca subverticillata</i>	nodding fescue	4	2	4	3	13	L4
<i>Fraxinus nigra</i>	black ash	2	4	4	3	13	L4
<i>Galium aparine</i>	cleavers	3	3	4	2	12	L4
<i>Galium asprellum</i>	rough bedstraw	3	2	4	2	11	L4
<i>Galium palustre</i>	marsh bedstraw	2	2	3	3	10	L4
<i>Glyceria grandis</i>	tall manna grass	2	3	4	2	11	L4
<i>Juncus effusus</i> ssp. <i>solutus</i>	soft rush	2	4	4	3	13	L4
<i>Lactuca canadensis</i>	wild lettuce	3	3	2	3	11	L4
<i>Leersia virginica</i>	white grass	3	2	5	3	13	L4
<i>Lycopus americanus</i>	cut-leaved water-horehound	2	4	3	3	12	L4
<i>Lycopus uniflorus</i>	northern water-horehound	2	3	3	3	11	L4
<i>Maianthemum canadense</i>	Canada mayflower	1	4	1	5	11	L4

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Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Monarda fistulosa</i>	wild bergamot	3	3	2	3	11	L4
<i>Osmorhiza claytonii</i>	woolly sweet cicely	2	4	4	3	13	L4
<i>Panicum acuminatum</i> var. <i>acuminatum</i>	hairy panic grass	2	3	3	3	11	L4
<i>Physalis heterophylla</i>	clammy ground-cherry	3	2	3	3	11	L4
<i>Pinus strobus</i>	white pine	1	4	3	4	12	L4
<i>Polygonatum pubescens</i>	downy Solomon's seal	2	4	2	5	13	L4
<i>Polygonum amphibium</i>	water smartweed	2	4	4	4	14	L4
<i>Populus grandidentata</i>	large-toothed aspen	2	3	4	3	12	L4
<i>Potamogeton pectinatus</i>	sago pondweed	2	2	5	3	12	L4
<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>	heal-all (native)	4	2	3	2	11	L4
<i>Prunus pensylvanica</i>	pin cherry	2	4	3	3	12	L4
<i>Pteridium aquilinum</i> var. <i>latiusculum</i>	eastern bracken	2	4	2	4	12	L4
<i>Quercus macrocarpa</i>	bur oak	2	4	3	3	12	L4
<i>Quercus rubra</i>	red oak	1	4	2	4	11	L4
<i>Rorippa palustris</i> ssp. <i>hispida</i>	hispid marsh cress	3	2	4	2	11	L4
<i>Rubus pubescens</i>	dwarf raspberry	2	3	3	5	13	L4
<i>Rudbeckia hirta</i>	black-eyed Susan	1	4	4	3	12	L4
<i>Sagittaria latifolia</i>	common arrowhead	1	2	5	4	12	L4
<i>Salix amygdaloides</i>	peach-leaved willow	2	2	5	3	12	L4
<i>Salix bebbiana</i>	Bebb's willow	2	3	3	4	12	L4
<i>Salix discolor</i>	pussy willow	2	3	4	3	12	L4
<i>Salix petiolaris</i>	slender willow	2	3	5	3	13	L4
<i>Schizachne purpurascens</i> ssp. <i>purpurascens</i>	purple melic grass	2	3	3	5	13	L4
<i>Scirpus microcarpus</i>	barber-pole bulrush	2	2	4	3	11	L4
<i>Sium suave</i>	water-parsnip	3	2	4	4	13	L4
<i>Smilax hispida</i>	bristly greenbrier	3	3	3	3	12	L4
<i>Solidago rugosa</i> ssp. <i>rugosa</i>	rough-stemmed goldenrod	3	3	2	3	11	L4
<i>Spiraea alba</i>	wild spiraea	2	4	4	3	13	L4
<i>Stachys palustris</i>	marsh hedge-nettle	3	3	4	3	13	L4
<i>Thelypteris palustris</i> var. <i>pubescens</i>	marsh fern	2	4	2	4	12	L4
<i>Thuja occidentalis</i>	white cedar	1	4	1	5	11	L4
<i>Tiarella cordifolia</i>	foam-flower	1	3	3	4	11	L4

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Trillium erectum</i>	red trillium	1	4	3	5	13	L4
<i>Trillium grandiflorum</i>	white trillium	1	4	4	5	14	L4
<i>Tsuga canadensis</i>	eastern hemlock	1	4	3	5	13	L4
<i>Typha latifolia</i>	broad-leaved cattail	1	4	4	4	13	L4
<i>Waldsteinia fragarioides</i>	barren strawberry	2	4	4	3	13	L4
<i>Wolffia columbiana</i>	columbia water-meal	2	4	5	2	13	L4
<i>Acer saccharum</i> ssp. <i>saccharum</i>	sugar maple	1	3	0	2	6	L5
<i>Achillea millefolium</i> ssp. <i>lanulosum</i>	woolly yarrow	2	2	0	1	5	L5
<i>Actaea rubra</i>	red baneberry	2	3	1	3	9	L5
<i>Agrimonia gryposepala</i>	agrimony	2	2	0	2	6	L5
<i>Alisma plantago-aquatica</i>	water-plantain	2	2	4	2	10	L5
<i>Ambrosia artemisiifolia</i>	common ragweed	2	1	3	0	6	L5
<i>Amphicarpaea bracteata</i>	hog-peanut	2	2	2	2	8	L5
<i>Anemone canadensis</i>	Canada anemone	2	2	2	2	8	L5
<i>Anemone virginiana</i>	common thimbleweed	2	3	0	3	8	L5
<i>Apocynum cannabinum</i>	hemp dogbane	2	2	2	2	8	L5
<i>Aralia nudicaulis</i>	wild sarsaparilla	2	3	1	4	10	L5
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	1	3	2	3	9	L5
<i>Asclepias syriaca</i>	common milkweed	2	2	0	2	6	L5
<i>Aster cordifolius</i>	heart-leaved aster	2	1	0	2	5	L5
<i>Aster ericoides</i> ssp. <i>ericoides</i>	heath aster	2	1	2	1	6	L5
<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i>	panicked aster	1	2	3	1	7	L5
<i>Aster novae-angliae</i>	New England aster	1	2	2	1	6	L5
<i>Aster puniceus</i> var. <i>puniceus</i>	swamp aster	2	2	2	2	8	L5
<i>Athyrium filix-femina</i> var. <i>angustum</i>	northeastern lady fern	2	3	1	3	9	L5
<i>Bidens cernuus</i>	nodding bur-marigold	2	2	3	3	10	L5
<i>Carex bebbii</i>	Bebb's sedge	2	2	3	3	10	L5
<i>Carex blanda</i>	common wood sedge	2	2	1	2	7	L5
<i>Carex cristatella</i>	crested sedge	2	2	4	1	9	L5
<i>Carex granularis</i>	meadow sedge	2	2	1	3	8	L5
<i>Carex radiata</i>	straight-styled sedge	2	2	2	2	8	L5
<i>Carex rosea</i>	curly-styled sedge	2	2	3	2	9	L5

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Carex stipata</i>	awl-fruited sedge	2	3	2	3	10	L5
<i>Carex vulpinoidea</i>	fox sedge	2	2	4	1	9	L5
<i>Cicuta maculata</i>	spotted water-hemlock	2	2	2	2	8	L5
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	enchanter's nightshade	2	1	1	1	5	L5
<i>Clematis virginiana</i>	virgin's bower	2	2	2	3	9	L5
<i>Clinopodium vulgare</i>	wild basil	3	3	1	3	10	L5
<i>Conyza canadensis</i>	horse-weed	3	1	2	0	6	L5
<i>Cornus alternifolia</i>	alternate-leaved dogwood	2	2	1	2	7	L5
<i>Cornus stolonifera</i>	red osier dogwood	1	2	0	3	6	L5
<i>Crataegus punctata</i>	dotted hawthorn	2	2	3	3	10	L5
<i>Crataegus</i> sp.	hawthorn	?	?	?	?		L5
<i>Desmodium canadense</i>	showy tick-trefoil	2	2	3	3	10	L5
<i>Dryopteris carthusiana</i>	spinulose wood fern	2	3	2	2	9	L5
<i>Echinocystis lobata</i>	wild cucumber	2	2	3	1	8	L5
<i>Eleocharis erythropoda</i>	creeping spike-rush	2	2	4	1	9	L5
<i>Equisetum arvense</i>	field horsetail	1	2	1	1	5	L5
<i>Equisetum hyemale</i> ssp. <i>affine</i>	scouring rush	2	2	2	2	8	L5
<i>Erigeron annuus</i>	daisy fleabane	2	2	0	1	5	L5
<i>Erigeron philadelphicus</i> ssp. <i>philadelphicus</i>	Philadelphia fleabane	2	2	0	1	5	L5
<i>Erigeron strigosus</i>	rough fleabane	3	2	1	1	7	L5
<i>Erythronium americanum</i> ssp. <i>americanum</i>	yellow trout-lily	2	3	3	2	10	L5
<i>Eupatorium maculatum</i> ssp. <i>maculatum</i>	spotted Joe-Pye weed	2	2	3	3	10	L5
<i>Eupatorium rugosum</i>	white snakeroot	2	2	2	1	7	L5
<i>Euthamia graminifolia</i>	grass-leaved goldenrod	2	1	4	1	8	L5
<i>Fragaria virginiana</i>	wild strawberry	2	2	0	2	6	L5
<i>Fraxinus americana</i>	white ash	1	2	0	3	6	L5
<i>Galium triflorum</i>	sweet-scented bedstraw	2	2	2	2	8	L5
<i>Geum aleppicum</i>	yellow avens	2	3	3	2	10	L5
<i>Geum canadense</i>	white avens	2	2	1	2	7	L5
<i>Glyceria striata</i>	fowl manna grass	2	2	1	2	7	L5
<i>Hackelia virginiana</i>	Virginia stickseed	2	2	0	2	6	L5
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	2	2	1	2	7	L5

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Impatiens capensis</i>	orange touch-me-not	1	2	0	2	5	L5
<i>Juncus articulatus</i>	jointed rush	2	2	4	2	10	L5
<i>Juncus bufonius</i>	toad rush	4	1	4	1	10	L5
<i>Juncus dudleyi</i>	Dudley's rush	2	2	3	1	8	L5
<i>Juncus tenuis</i>	path rush	2	2	1	1	6	L5
<i>Juniperus virginiana</i>	red cedar	2	1	4	1	8	L5
<i>Laportea canadensis</i>	wood nettle	2	3	2	2	9	L5
<i>Leersia oryzoides</i>	rice cut grass	2	2	3	2	9	L5
<i>Lemna minor</i>	common duckweed	2	2	4	2	10	L5
<i>Lysimachia ciliata</i>	fringed loosestrife	2	2	2	2	8	L5
<i>Maianthemum racemosum</i> ssp. <i>racemosum</i>	false Solomon's seal	2	3	2	3	10	L5
<i>Maianthemum stellatum</i>	starry false Solomon's seal	2	2	1	3	8	L5
<i>Matteuccia struthiopteris</i> var. <i>pensylvanica</i>	ostrich fern	1	2	2	2	7	L5
<i>Mentha arvensis</i> ssp. <i>borealis</i>	wild mint	2	2	3	2	9	L5
<i>Muhlenbergia mexicana</i> var. <i>mexicana</i>	common muhly grass	3	2	0	1	6	L5
<i>Oenothera biennis</i>	common evening-primrose	2	1	1	1	5	L5
<i>Onoclea sensibilis</i>	sensitive fern	2	3	1	3	9	L5
<i>Ostrya virginiana</i>	ironwood	2	3	2	2	9	L5
<i>Parthenocissus inserta</i>	thicket creeper	1	2	0	1	4	L5
<i>Phryma leptostachya</i>	lopseed	2	2	3	2	9	L5
<i>Plantago rugelii</i>	red-stemmed plantain	2	2	0	1	5	L5
<i>Poa palustris</i>	fowl meadow-grass	2	2	3	2	9	L5
<i>Populus balsamifera</i> ssp. <i>balsamifera</i>	balsam poplar	1	2	3	2	8	L5
<i>Populus deltoides</i>	cottonwood	2	1	4	1	8	L5
<i>Populus tremuloides</i>	trembling aspen	1	3	1	3	8	L5
<i>Prenanthes altissima</i>	tall wood lettuce	2	3	2	2	9	L5
<i>Prunus serotina</i>	black cherry	2	2	0	2	6	L5
<i>Prunus virginiana</i> ssp. <i>virginiana</i>	choke cherry	1	2	0	1	4	L5
<i>Ranunculus abortivus</i>	kidney-leaved buttercup	2	3	1	2	8	L5
<i>Ranunculus recurvatus</i> var. <i>recurvatus</i>	hooked buttercup	2	3	2	3	10	L5
<i>Ranunculus sceleratus</i>	cursed crowfoot	2	2	3	2	9	L5
<i>Rhus rydbergii</i>	poison ivy (shrub form)	2	2	0	2	6	L5

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Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Rhus typhina</i>	staghorn sumach	2	1	2	2	7	L5
<i>Ribes americanum</i>	wild black currant	2	3	2	2	9	L5
<i>Ribes cynosbati</i>	prickly gooseberry	2	3	2	2	9	L5
<i>Rubus allegheniensis</i>	common blackberry	2	3	0	1	6	L5
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>	wild red raspberry	1	1	0	1	3	L5
<i>Rubus occidentalis</i>	wild black raspberry	2	1	0	1	4	L5
<i>Salix eriocephala</i>	narrow heart-leaved willow	2	1	3	1	7	L5
<i>Sambucus canadensis</i>	common elderberry	2	3	2	2	9	L5
<i>Sambucus racemosa</i> ssp. <i>pubens</i>	red-berried elder	2	3	2	2	9	L5
<i>Sanguinaria canadensis</i>	bloodroot	2	3	0	3	8	L5
<i>Scirpus atrovirens</i>	black-fruited bulrush	2	2	4	2	10	L5
<i>Scutellaria galericulata</i>	common skullcap	3	2	3	2	10	L5
<i>Scutellaria lateriflora</i>	mad-dog skullcap	2	2	3	3	10	L5
<i>Smilax herbacea</i>	carriion-flower	3	3	2	2	10	L5
<i>Solidago altissima</i>	tall goldenrod	1	2	0	0	3	L5
<i>Solidago caesia</i>	blue-stemmed goldenrod	2	2	4	2	10	L5
<i>Solidago canadensis</i> var. <i>canadensis</i>	Canada goldenrod	2	2	0	1	5	L5
<i>Solidago flexicaulis</i>	zig-zag goldenrod	2	1	3	2	8	L5
<i>Solidago gigantea</i>	late goldenrod	2	1	1	1	5	L5
<i>Solidago nemoralis</i> ssp. <i>nemoralis</i>	grey goldenrod	2	2	2	2	8	L5
<i>Thalictrum dioicum</i>	early meadow rue	2	3	3	2	10	L5
<i>Thalictrum pubescens</i>	tall meadow rue	2	3	2	2	9	L5
<i>Tilia americana</i>	basswood	1	4	2	3	10	L5
<i>Ulmus americana</i>	white elm	1	4	0	2	7	L5
<i>Urtica dioica</i> ssp. <i>gracilis</i>	American stinging nettle	2	3	2	2	9	L5
<i>Verbena hastata</i>	blue vervain	2	2	4	2	10	L5
<i>Verbena urticifolia</i>	white vervain	2	2	2	2	8	L5
<i>Viburnum lentago</i>	nannyberry	2	3	1	2	8	L5
<i>Viola conspersa</i>	dog violet	2	2	0	2	6	L5
<i>Viola pubescens</i>	stemmed yellow violet	2	3	1	2	8	L5
<i>Viola sororia</i>	common blue violet	2	2	0	2	6	L5
<i>Vitis riparia</i>	riverbank grape	1	1	0	0	2	L5

Appendix 2: Albion Hills Conservation Area Flora Species		Local Occur.	Popn. Trend	Hab. Dep.	Sens. Dev.	Total Score	Rank TRCA
Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Acer platanoides</i>	Norway maple	+	+	+	+		L+
<i>Achillea ptarmica</i>	sneezeweed yarrow	+	+	+	+		L+
<i>Agrostis gigantea</i>	redtop	+	+	+	+		L+
<i>Alliaria petiolata</i>	garlic mustard	+	+	+	+		L+
<i>Alnus glutinosa</i>	European alder	+	+	+	+		L+
<i>Arctium minus ssp. minus</i>	common burdock	+	+	+	+		L+
<i>Arenaria serpyllifolia</i>	thyme-leaved sandwort	+	+	+	+		L+
<i>Barbarea vulgaris</i>	winter cress rocket	+	+	+	+		L+
<i>Betula pendula</i>	European white birch	+	+	+	+		L+
<i>Bromus inermis ssp. inermis</i>	smooth brome grass	+	+	+	+		L+
<i>Campanula rapunculoides</i>	creeping bellflower	+	+	+	+		L+
<i>Capsella bursa-pastoris</i>	shepherd's purse	+	+	+	+		L+
<i>Caragana arborescens</i>	Siberian pea-shrub	+	+	+	+		L+
<i>Carduus acanthoides</i>	plumeless thistle	+	+	+	+		L+
<i>Carduus nutans ssp. nutans</i>	nodding thistle	+	+	+	+		L+
<i>Carex spicata</i>	spiked meadow sedge	+	+	+	+		L+
<i>Celastrus orbiculatus</i>	Asiatic bittersweet	+	+	+	+		L+
<i>Centaurea maculosa</i>	spotted knapweed	+	+	+	+		L+
<i>Cerastium fontanum</i>	mouse-ear chickweed	+	+	+	+		L+
<i>Cerastium tomentosum</i>	snow-on-the-mountain	+	+	+	+		L+
<i>Chrysanthemum leucanthemum</i>	ox-eye daisy	+	+	+	+		L+
<i>Cirsium arvense</i>	creeping thistle	+	+	+	+		L+
<i>Cirsium vulgare</i>	bull thistle	+	+	+	+		L+
<i>Convallaria majalis</i>	lily-of-the-valley	+	+	+	+		L+
<i>Convolvulus arvensis</i>	field bindweed	+	+	+	+		L+
<i>Coronilla varia</i>	crown vetch	+	+	+	+		L+
<i>Crataegus monogyna</i>	English hawthorn	+	+	+	+		L+
<i>Cynanchum rossicum</i>	dog-strangling vine	+	+	+	+		L+
<i>Cynoglossum officinale</i>	hound's tongue	+	+	+	+		L+
<i>Dactylis glomerata</i>	orchard grass	+	+	+	+		L+
<i>Daucus carota</i>	Queen Anne's lace	+	+	+	+		L+
<i>Dianthus armeria</i>	Deptford pink	+	+	+	+		L+

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Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Echium vulgare</i>	viper's bugloss	+	+	+	+		L+
<i>Elaeagnus umbellata</i>	autumn olive	+	+	+	+		L+
<i>Epipactis helleborine</i>	helleborine	+	+	+	+		L+
<i>Erysimum cheiranthoides</i>	wormseed mustard	+	+	+	+		L+
<i>Festuca pratensis</i>	meadow fescue	+	+	+	+		L+
<i>Festuca trachyphylla</i>	hard fescue	+	+	+	+		L+
<i>Galeopsis tetrahit</i>	hemp-nettle	+	+	+	+		L+
<i>Hemerocallis fulva</i>	orange day-lily	+	+	+	+		L+
<i>Hesperis matronalis</i>	dame's rocket	+	+	+	+		L+
<i>Hieracium aurantiacum</i>	orange hawkweed	+	+	+	+		L+
<i>Hieracium caespitosum</i> ssp. <i>caespitosum</i>	field hawkweed	+	+	+	+		L+
<i>Hieracium pilosella</i>	mouse-ear hawkweed	+	+	+	+		L+
<i>Hieracium piloselloides</i>	smooth yellow hawkweed	+	+	+	+		L+
<i>Hypericum perforatum</i>	common St. Johnswort	+	+	+	+		L+
<i>Inula helenium</i>	elecampane	+	+	+	+		L+
<i>Iris pseudacorus</i>	yellow flag	+	+	+	+		L+
<i>Lathyrus latifolius</i>	everlasting pea	+	+	+	+		L+
<i>Leonurus cardiaca</i> ssp. <i>cardiaca</i>	motherwort	+	+	+	+		L+
<i>Lepidium campestre</i>	field pepper-grass	+	+	+	+		L+
<i>Lonicera x bella</i>	shrub honeysuckle	+	+	+	+		L+
<i>Lotus corniculatus</i>	bird's foot trefoil	+	+	+	+		L+
<i>Malus pumila</i>	apple	+	+	+	+		L+
<i>Malva neglecta</i>	common mallow	+	+	+	+		L+
<i>Medicago lupulina</i>	black medick	+	+	+	+		L+
<i>Medicago sativa</i> ssp. <i>sativa</i>	alfalfa	+	+	+	+		L+
<i>Melilotus alba</i>	white sweet clover	+	+	+	+		L+
<i>Melilotus officinalis</i>	yellow sweet clover	+	+	+	+		L+
<i>Myosotis scorpioides</i>	true forget-me-not	+	+	+	+		L+
<i>Nepeta cataria</i>	catnip	+	+	+	+		L+
<i>Phleum pratense</i>	timothy grass	+	+	+	+		L+
<i>Picea abies</i>	Norway spruce	+	+	+	+		L+
<i>Pinus banksiana</i>	Jack pine	+	+	+	+		L+

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Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Pinus sylvestris</i>	Scots pine	+	+	+	+		L+
<i>Plantago lanceolata</i>	English plantain	+	+	+	+		L+
<i>Poa compressa</i>	Canada blue grass	+	+	+	+		L+
<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky blue grass	+	+	+	+		L+
<i>Polygonum convolvulus</i>	black bindweed	+	+	+	+		L+
<i>Polygonum persicaria</i>	lady's thumb	+	+	+	+		L+
<i>Populus nigra</i>	black poplar	+	+	+	+		L+
<i>Potamogeton crispus</i>	curly pondweed	+	+	+	+		L+
<i>Potentilla argentea</i>	silvery cinquefoil	+	+	+	+		L+
<i>Potentilla recta</i>	sulphur cinquefoil	+	+	+	+		L+
<i>Prunella vulgaris</i> ssp. <i>vulgaris</i>	heal-all (European)	+	+	+	+		L+
<i>Ranunculus acris</i>	tall buttercup	+	+	+	+		L+
<i>Rhamnus cathartica</i>	common buckthorn	+	+	+	+		L+
<i>Robinia pseudoacacia</i>	black locust	+	+	+	+		L+
<i>Rosa multiflora</i>	multiflora rose	+	+	+	+		L+
<i>Rumex crispus</i>	curly dock	+	+	+	+		L+
<i>Salix alba</i>	white willow	+	+	+	+		L+
<i>Saponaria officinalis</i>	bouncing Bet	+	+	+	+		L+
<i>Silene vulgaris</i>	bladder campion	+	+	+	+		L+
<i>Solanum dulcamara</i>	bittersweet nightshade	+	+	+	+		L+
<i>Sonchus arvensis</i> ssp. <i>arvensis</i>	glandular perennial sow-thistle	+	+	+	+		L+
<i>Syringa vulgaris</i>	common lilac	+	+	+	+		L+
<i>Taraxacum officinale</i>	dandelion	+	+	+	+		L+
<i>Thlaspi arvense</i>	penny-cress	+	+	+	+		L+
<i>Torilis japonica</i>	hedge-parsley	+	+	+	+		L+
<i>Tragopogon dubius</i>	lemon-yellow goat's beard	+	+	+	+		L+
<i>Trifolium aureum</i>	hop-clover	+	+	+	+		L+
<i>Trifolium pratense</i>	red clover	+	+	+	+		L+
<i>Trifolium repens</i>	white clover	+	+	+	+		L+
<i>Tussilago farfara</i>	coltsfoot	+	+	+	+		L+
<i>Typha angustifolia</i>	narrow-leaved cattail	+	+	+	+		L+
<i>Typha x glauca</i>	hybrid cattail	+	+	+	+		L+

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Scientific Name	Common Name	1-5	1-5	0-5	0-5	2-20	(07/2008)
<i>Ulmus pumila</i>	Siberian elm	+	+	+	+		L+
<i>Verbascum thapsus</i>	common mullein	+	+	+	+		L+
<i>Veronica officinalis</i>	common speedwell	+	+	+	+		L+
<i>Veronica serpyllifolia</i> ssp. <i>serpyllifolia</i>	thyme-leaved speedwell	+	+	+	+		L+
<i>Viburnum lantana</i>	wayfaring tree	+	+	+	+		L+
<i>Viburnum opulus</i>	European highbush cranberry	+	+	+	+		L+
<i>Vicia cracca</i>	cow vetch	+	+	+	+		L+
<i>Acer negundo</i>	Manitoba maple	+?	+?	+?	+?		L+?
<i>Chamaesyce glyptosperma</i>	ridge-seeded spurge	+?	+?	+?	+?		L+?
<i>Echinochloa</i> sp.	barnyard grass	+?	+?	+?	+?		L+?
<i>Geranium robertianum</i>	herb Robert	+?	+?	+?	+?		L+?
<i>Oxalis stricta</i>	common yellow wood-sorrel	+?	+?	+?	+?		L+?
<i>Phalaris arundinacea</i>	reed canary grass	+?	+?	+?	+?		L+?
<i>Phragmites australis</i>	common reed	+?	+?	+?	+?		L+?
<i>Polygonum hydropiper</i>	water-pepper	+?	+?	+?	+?		L+?
<i>Potentilla norvegica</i>	rough cinquefoil	+?	+?	+?	+?		L+?
<i>Oenothera pilosella</i> ssp. <i>pilosella</i>	pilose sundrops	5	3	4	5	17	pL2
<i>Picea mariana</i>	black spruce	4	4	5	5	18	pL2
<i>Pinus resinosa</i>	red pine (reproducing from plantings)	2	5	5	5	17	pL2
<i>Fraxinus pennsylvanica</i> var. <i>pennsylvanica</i>	red ash	2	2	2	3	9	pL5
<i>Fraxinus pennsylvanica</i> var. <i>subintegerrima</i>	green ash	2	2	2	3	9	pL5
<i>Juglans nigra</i>	black walnut	2	1	2	1	6	pL5
<i>Forsythia viridissima</i>	forsythia	+	+	+	+		pL+
<i>Gleditsia triacanthos</i>	honey locust	+	+	+	+		pL+
<i>Larix decidua</i>	European larch (reproducing from plantings)	+	+	+	+		pL+
<i>Philadelphus coronarius</i>	mock-orange	+	+	+	+		pL+
<i>Populus x canadensis</i>	Carolina poplar	+	+	+	+		pL+
<i>Salix x sepulcralis</i>	weeping willow	+	+	+	+		pL+

Appendix 3: List of Fauna Species recorded at Albion Hills, 2008 and past decade.

Common Name	Code	Scientific Name	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	<i>Mniotilta varia</i>	1	3	2	4	2	2	5	1	20	L2
blue-winged warbler	BWWA	<i>Vermivora pinus</i>	3	3	2	3	1	2	5	1	20	L2
broad-winged hawk	BWHA	<i>Buteo platypterus</i>	3	2	3	5	1	4	3	1	22	L2
ruffed grouse	RUGR	<i>Bonasa umbellus</i>	1	3	3	3	2	2	5	1	20	L2
American woodcock	AMWO	<i>Scolopax minor</i>	0	2	3	3	2	2	4	0	16	L3
Blackburnian warbler	BLBW	<i>Dendroica fusca</i>	3	1	2	3	1	4	4	0	18	L3
black-throated green warbler	BTNW	<i>Dendroica virens</i>	1	4	2	3	1	3	4	0	18	L3
blue-headed vireo	BHVI	<i>Vireo solitarius</i>	3	2	2	3	1	2	3	0	16	L3
bobolink	BOBO	<i>Dolichonyx oryzivorus</i>	0	3	3	3	1	1	5	1	17	L3
brown creeper	BRCR	<i>Certhia americana</i>	1	2	2	3	2	2	4	0	16	L3
brown thrasher	BRTH	<i>Toxostoma rufum</i>	0	3	3	2	2	1	4	0	15	L3
chestnut-sided warbler	CSWA	<i>Dendroica pensylvanica</i>	2	2	2	3	1	1	4	0	15	L3
eastern towhee	EATO	<i>Pipilo erythrophthalmus</i>	2	3	2	2	2	1	4	0	16	L3
golden-crowned kinglet	GCKI	<i>Regulus satrapa</i>	3	2	2	3	1	3	3	0	17	L3
great blue heron	GBHE	<i>Ardea herodias</i>	2	2	1	3	1	2	4	0	15	L3
hermit thrush	HETH	<i>Catharus guttatus</i>	4	1	2	3	1	1	5	1	18	L3
hooded merganser	HOME	<i>Lophodytes cucullatus</i>	3	2	2	4	2	2	2	0	17	L3
mourning warbler	MOWA	<i>Oporornis philadelphia</i>	0	3	2	2	2	2	4	0	15	L3
Nashville warbler	NAWA	<i>Vermivora ruficapilla</i>	2	1	2	2	1	2	5	1	16	L3
ovenbird	OVEN	<i>Seiurus aurocapillus</i>	0	2	3	4	2	4	4	0	19	L3
pileated woodpecker	PIWO	<i>Dryocopus pileatus</i>	0	2	2	4	1	3	3	0	15	L3
pine warbler	PIWA	<i>Dendroica pinus</i>	1	2	2	4	1	3	3	0	16	L3
scarlet tanager	SCTA	<i>Piranga olivacea</i>	1	2	2	4	1	3	4	0	17	L3
sora	SORA	<i>Porzana carolina</i>	2	2	2	2	3	2	4	0	17	L3
Virginia Rail	VIRA	<i>Rallus limicola</i>	0	2	2	2	3	2	4	0	15	L3
white-throated sparrow	WTSP	<i>Zonotrichia albicollis</i>	2	3	2	2	2	1	4	0	16	L3
wild turkey	WITU	<i>Meleagris gallopavo</i>	2	1	0	4	3	4	3	0	17	L3
winter wren	WIWR	<i>Troglodytes troglodytes</i>	1	2	2	3	2	3	5	1	19	L3
wood duck	WODU	<i>Aix sponsa</i>	1	2	1	3	2	2	4	0	15	L3
wood thrush	WOTH	<i>Hylocichla mustelina</i>	0	3	2	3	2	2	4	0	16	L3
yellow-bellied sapsucker	YBSA	<i>Sphyrapicus varius</i>	4	2	2	2	1	3	3	0	17	L3
yellow-rumped warbler	YRWA	<i>Dendroica coronata</i>	3	1	2	3	1	2	4	0	16	L3

Appendix 3: List of Fauna Species recorded at Albion Hills, 2008 and past decade.

Common Name	Code	Scientific Name	LO	PTn	PTt	AS	PIS	HD	StD	+	TS	L-Rank
alder flycatcher	ALFL	<i>Empidonax alnorum</i>	1	2	2	1	1	2	4	0	13	L4
barn swallow	BARS	<i>Hirundo rustica</i>	0	2	3	1	1	2	1	0	10	L4
belted kingfisher	BEKI	<i>Ceryle alcyon</i>	0	3	2	2	1	2	2	0	12	L4
common yellowthroat	COYE	<i>Geothlypis trichas</i>	0	2	2	1	2	1	4	0	12	L4
Cooper's hawk	COHA	<i>Accipiter cooperii</i>	0	2	1	4	1	3	2	0	13	L4
eastern kingbird	EAKI	<i>Tyrannus tyrannus</i>	0	4	2	2	1	1	3	0	13	L4
eastern meadowlark	EAME	<i>Sturnella magna</i>	0	3	2	3	1	1	3	0	13	L4
eastern wood-pewee	EAWP	<i>Contopus virens</i>	0	4	2	2	1	1	3	0	13	L4
field sparrow	FISP	<i>Spizella pusilla</i>	0	3	2	2	1	1	4	0	13	L4
great-crested flycatcher	GCFL	<i>Myiarchus crinitus</i>	0	2	2	3	1	2	2	0	12	L4
green heron	GRHE	<i>Butorides virescens</i>	0	3	2	2	1	2	4	0	14	L4
grey catbird	GRCA	<i>Dumetella carolinensis</i>	0	2	2	1	1	1	3	0	10	L4
hairy woodpecker	HAWO	<i>Picoides villosus</i>	0	2	2	3	1	2	2	0	12	L4
indigo bunting	INBU	<i>Passerina cyanea</i>	0	2	2	1	1	2	4	0	12	L4
northern flicker	NOFL	<i>Colaptes auratus</i>	0	3	2	1	1	2	3	0	12	L4
northern rough-winged swallow	NRWS	<i>Stelgidoptery x serripennis</i>	0	1	2	1	1	3	2	0	10	L4
purple finch	PUFI	<i>Carpodacus purpureus</i>	3	4	2	1	1	0	1	0	12	L4
red-breasted nuthatch	RBNU	<i>Sitta canadensis</i>	0	1	2	3	1	1	2	0	10	L4
red-eyed vireo	REVI	<i>Vireo olivaceus</i>	0	2	2	2	1	1	3	0	11	L4
rose-breasted grosbeak	RBGR	<i>Pheucticus ludovicianus</i>	0	2	2	3	1	2	3	0	13	L4
ruby-throated hummingbird	RTHU	<i>Archilochus colubris</i>	1	2	2	1	1	2	2	0	11	L4
savannah sparrow	SAVS	<i>Passerculus sandwichensis</i>	0	3	2	1	1	1	4	0	12	L4
spotted sandpiper	SPSA	<i>Actitis macularia</i>	0	2	3	1	2	1	4	0	13	L4
swamp sparrow	SWSP	<i>Melospiza georgiana</i>	0	1	2	1	2	1	5	1	13	L4
tree swallow	TRES	<i>Tachycineta bicolor</i>	0	2	2	1	1	2	2	0	10	L4
white-breasted nuthatch	WBNU	<i>Sitta carolinensis</i>	0	2	2	3	1	2	2	0	12	L4
willow flycatcher	WIFL	<i>Empidonax traillii</i>	0	4	2	1	1	1	3	0	12	L4
American Crow	AMCR	<i>Corvus brachyrhynchos</i>	0	1	2	1	1	0	0	0	5	L5
American goldfinch	AMGO	<i>Carduelis tristis</i>	0	2	2	1	1	0	1	0	7	L5
American robin	AMRO	<i>Turdus migratorius</i>	0	1	2	1	1	0	1	0	6	L5
Baltimore oriole	BAOR	<i>Icterus galbula</i>	0	2	2	1	1	0	1	0	7	L5
black-capped chickadee	BCCH	<i>Parus atricapillus</i>	0	1	2	1	1	0	1	0	6	L5
blue jay	BLJA	<i>Cyanocitta cristata</i>	0	4	2	1	1	0	1	0	9	L5
brown-headed cowbird	BHCO	<i>Molothrus ater</i>	0	2	2	1	1	0	1	0	7	L5

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Common Name	Code	Scientific Name	LO	PTn	PTt	AS	PIS	HD	StD	+	TS	L-Rank
Canada goose	CANG	<i>Branta canadensis</i>	0	1	1	1	2	1	0	0	6	L5
cedar waxwing	CEDW	<i>Bombycilla cedrorum</i>	0	1	2	1	1	0	1	0	6	L5
chipping sparrow	CHSP	<i>Spizella passerina</i>	0	2	2	1	1	0	2	0	8	L5
common grackle	COGR	<i>Quiscalus quiscula</i>	0	3	2	1	1	0	1	0	8	L5
downy woodpecker	DOWO	<i>Picoides pubescens</i>	0	3	2	1	1	1	1	0	9	L5
eastern phoebe	EAPH	<i>Sayornis phoebe</i>	0	2	2	1	1	2	1	0	9	L5
house wren	HOWR	<i>Troglodytes aedon</i>	0	2	2	1	2	1	1	0	9	L5
killdeer	KILL	<i>Charadrius vociferus</i>	0	2	2	1	2	0	2	0	9	L5
mallard	MALL	<i>Anas platyrhynchos</i>	0	2	2	1	2	0	1	0	8	L5
mourning dove	MODO	<i>Zenaida macroura</i>	0	2	2	1	1	0	0	0	6	L5
northern cardinal	NOCA	<i>Cardinalis cardinalis</i>	0	2	2	1	1	1	2	0	9	L5
red-tailed hawk	RTHA	<i>Buteo jamaicensis</i>	0	2	2	2	1	1	1	0	9	L5
red-winged blackbird	RWBL	<i>Agelaius phoeniceus</i>	0	2	2	1	1	0	2	0	8	L5
song sparrow	SOSP	<i>Melospiza melodia</i>	0	2	2	1	2	0	2	0	9	L5
warbling vireo	WAVI	<i>Vireo gilvus</i>	0	1	2	1	1	1	2	0	8	L5
yellow warbler	YWAR	<i>Dendroica petechia</i>	0	1	2	1	1	1	3	0	9	L5
European starling	EUST	<i>Sturnus vulgaris</i>										L+
rock dove	ROPI	<i>Columba livia</i>										L+
Herpetofauna												
bullfrog	BUFR	<i>Rana catesbeiana</i>	3	3	2	2	4	2	5	1	22	L2
grey treefrog	TGTF	<i>Hyla versicolor</i>	1	3	3	3	4	2	5	1	22	L2
northern spring peeper	SPPE	<i>Pseudacris crucifer crucifer</i>	0	2	3	3	4	3	5	1	21	L2
striped chorus frog	MICF	<i>Pseudacris triseriata</i>	2	3	3	2	4	3	5	1	23	L2
wood frog	WOFR	<i>Rana sylvatica</i>	0	2	3	3	4	3	5	1	21	L2
northern leopard frog	LEFR	<i>Rana pipiens</i>	0	3	2	1	4	2	5	1	18	L3
American toad	AMTO	<i>Bufo americanus</i>	0	3	2	1	4	0	4	0	14	L4
green frog	GRFR	<i>Rana clamitans</i>	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	<i>Erethizon dorsatum</i>	2	2	2	4	4	3	3	0	20	L2
beaver	BEAV	<i>Castor canadensis</i>	1	2	1	2	3	1	3	0	13	L4

Appendix 3: List of Fauna Species recorded at Albion Hills, 2008 and past decade.

Common Name	Code	Scientific Name	LO	PTn	PTt	AS	PIS	HD	StD	+	TS	L-Rank
eastern chipmunk	EACH	<i>Tamias striatus</i>	0	2	2	2	3	1	3	0	13	L4
eastern cottontail	EACO	<i>Sylvilagus floridanus</i>	0	2	2	1	3	1	2	0	11	L4
mink	MINK	<i>Mustela vison</i>	1	2	2	3	3	0	3	0	14	L4
red squirrel	RESQ	<i>Tamiasciurus hudsonicus</i>	0	2	2	1	3	1	2	0	11	L4
white-tailed deer	WTDE	<i>Odocoileus virginianus</i>	0	2	1	3	2	2	1	0	11	L4
woodchuck	WOOD	<i>Marmota monax</i>	1	2	2	1	3	0	1	0	10	L4
coyote	COYO	<i>Canis latrans</i>	0	2	2	1	3	0	1	0	9	L5
grey squirrel	GRSQ	<i>Sciurus carolinensis</i>	0	2	2	1	3	0	0	0	8	L5
raccoon	RACC	<i>Procyon lotor</i>	0	2	2	1	3	1	0	0	9	L5
striped skunk	STSK	<i>Mephitis mephitis</i>	1	2	2	1	3	0	0	0	9	L5
Herpetofauna												
yellow-spotted salamander	YSSA	<i>Ambystoma maculatum</i>	4	3	3	3	5	4	5	2	29	L1
common snapping turtle	SNTU	<i>Chelydra serpentina</i>	2	3	3	1	5	2	5	2	23	L2
red-spotted newt	EANE	<i>Notophthalmus viridescens</i>	3	2	2	3	4	3	5	1	23	L2
midland painted turtle	MPTU	<i>Chrysemys picta marginata</i>	1	2	2	1	5	1	4	1	17	L3
LEGEND												
LO = local occurrence		PIS = Patch Isolation Sensitivity										
PTn = population trend, continent-wide		STD = sensitivity to development										
PTt = population trend, TRCA		+ = additional points										
HD = habitat dependence		TS = total score										
AS = area sensitivity		L-rank = TRCA Rank, October, 2008										
*American Woodcock was reported in 2008 but the records fell outside of the threshold dates required for proof of breeding. It is suspected that the species does indeed breed on the site.												