



Natural environment
assessment:

South March Highlands
Conservation Forest

May 2008

**Natural environment assessment (existing conditions):
South March Highlands Conservation Forest, Kanata,
Ottawa, Ontario**

May 2008

Daniel F. Brunton,
Brunton Consulting Services,
Ottawa, Ontario

Clarence (“Clarrie”) Frankton (1906 - 2000)



Clarrie Frankton first discovered the extraordinary biodiversity of the South March Highlands in the 1960s and in association with his wife Enid Frankton, continued to explore and document its natural features for over 30 years. Their expertly collected and identified scientific plant specimens provided the factual basis for the initial designation of the Trillium Woods as an area of particular natural environment significance. Indeed, virtually all of the upland portions of the present South March Highlands Conservation Forest were first identified as having exceptional ecological values by the Franktons. Simply put, there would be no Conservation Forest without the long-term, science-based, factual foundation provided by his contribution.

Content

1.0 INTRODUCTION

1.1 BACKGROUND AND STUDY OBJECTIVES	4
1.2 HISTORY OF CONSERVATION DESIGNATIONS	5
1.3 METHODOLOGY	7

2.0 SITE CONTEXT	9
------------------------	---

3.0 NATURAL ENVIRONMENT FEATURES AND FUNCTIONS

3.1 HABITATS

3.1.1 Habitat 1: Submerged Shallow Aquatic	14
3.1.2 Habitat 2: Meadow Marsh	17
3.1.3 Habitat 3: Organic Thicket Swamp	19
3.1.4 Habitat 4: Mixed Swamp Forest	20
3.1.5 Habitat 5: Deciduous Swamp Forest	21
3.1.6 Habitat 6: Rock Barrens	23
3.1.7 Habitat 7: Cultural Meadow and Thicket	24
3.1.8 Habitat 8: Deciduous Forest	25
3.1.9 Habitat 9: Mixed Forest	28
3.1.10 Habitat 10: Coniferous Forest	30

3.2 NATIVE BIODIVERSITY

3.2.1 Flora	31
3.2.2 Fauna	32

4.0 NATURAL ENVIRONMENT SIGNIFICANCE

4.1 SIGNIFICANT FLORA

4.2.1 Provincially Significant species	32
4.2.1 Regionally Significant species	35

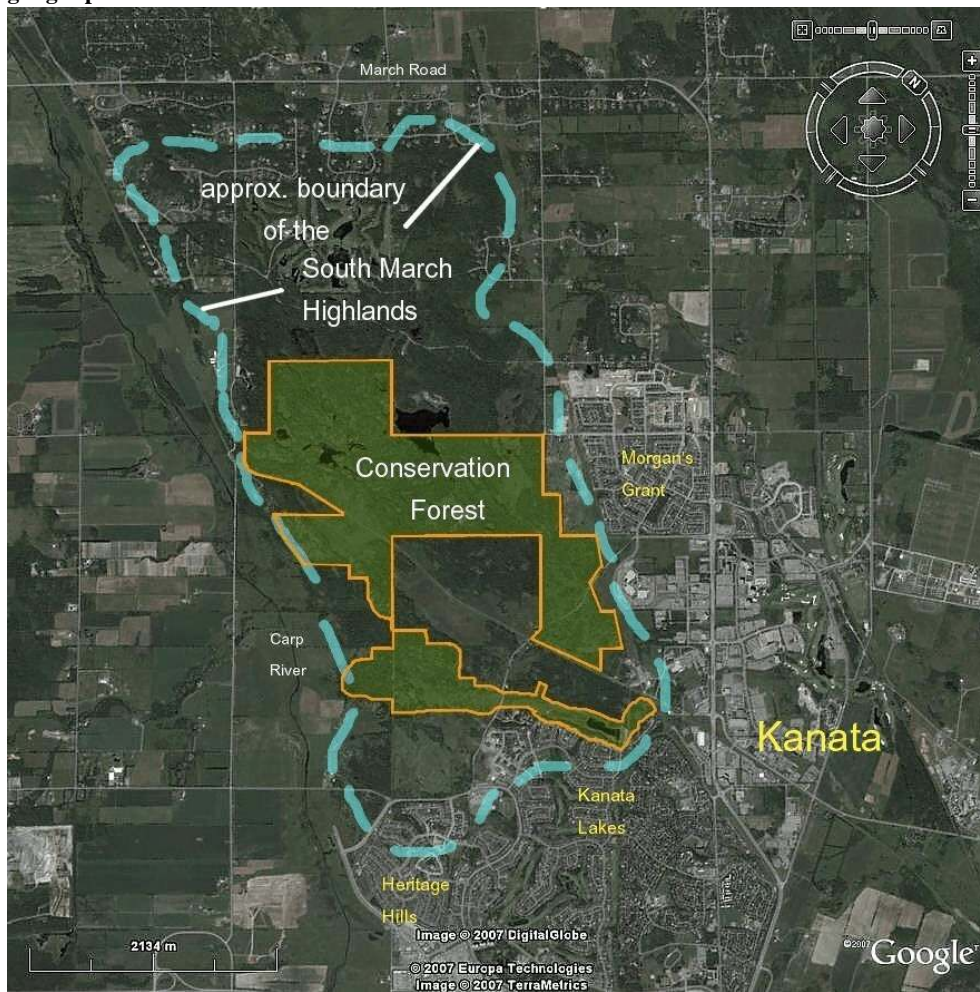
4.2	SIGNIFICANT FAUNA	38
4.3	SIGNIFICANT ECOLOGICAL FUNCTIONS	
4.3.1	Wildlife Corridor	40
4.3.2	Native Biodiversity Representation	41
4.3.3	Interior Habitat	41
4.3.4	Habitat Condition	42
 5.0 IMPACTS AND ECOLOGICAL CHALLENGES		
5.1	URBAN DEVELOPMENT	43
5.2	TRANSPORTATION CORRIDORS	43
5.3	RECREATIONAL PATHWAYS	45
5.4	BIOLOGICAL AGENTS	
5.4.1	Invasive flora	49
5.4.1	Invasive fauna	50
5.5	CLIMATE CHANGE	52
 6.0 CONCLUSIONS AND MITIGATION		
6.1	SIGNIFICANCE AND SENSITIVITY CONCLUSIONS	53
6.2	MITIGATION OPPORTUNITIES	54
6.3	ECOLOGICAL INTEGRITY	57
 7.0 REFERENCES CITED		
		58
 APPENDIX 1: NATIVE VASCULAR FLORA		
		63

1.0 INTRODUCTION

1.1 BACKGROUND AND STUDY OBJECTIVES

The South March Highlands Conservation Forest (hereafter, The Conservation Forest) represents a ca. 400 ha portion of the South March Highlands. This is the southern end of the Carp Hills, a bedrock based upland extending northward from Kanata towards the Ottawa River in West Carleton, City of Ottawa (former Region of Ottawa-Carleton), Ontario (Figure 1). The rocky nature of the landscape resisted extensive agricultural development and until recently it remained a wild ‘island’ of natural landscape in a landscape otherwise transformed long ago by agricultural development.

Figure 1: South March Highlands Conservation Forest within South March Highlands geographic area



Rural estate residential development and a large golf course development between Old Carp Road and March Road has substantially fragmented the northern portion of the South March Highlands. Aside from the impact of a seldom used railway line crossing the southern section of the Highlands and some agricultural development along that route, fragmentation and the development of transformed landscapes remained rare and scattered south of Old Carp Road. The relatively recent explosion of commercial and residential growth in and around Kanata, however, has meant greater development pressure and use throughout the Highlands.

1.2 HISTORY OF CONSERVATION DESIGNATIONS

The majority of the ca. 1,100 ha South March Highlands was identified as a Natural Environment Area in the 1974 Regional Official Plan, requiring the most protective management then available to the municipality for both “Environmentally Unique” and “Environmentally Significant” areas. Only limited development was permitted (RMOC 1977). This designation came into conflict when residential development expanded westward from Kanata Lakes in the 1970s. A development agreement between the land owner of the 550 ha Marchwood - Lakeside area closest to urban Kanata and the City of Kanata subsequently permitted residential development in 330 ha of the former Conservation Area. The ‘40% Agreement’ (Kanata 1981) retained 20% of the area (116 ha) as undevelopable natural protection area within a 218 ha Recreation and Open Space area. Although this Recreation and Open Space designation permitted a wide variety of recreation and utility developments such as sewer lines and a golf course, it was designated as Natural Environment Area in subsequent City of Kanata official Plans (Kanata 1991).

Public concern in the early 1990s regarding development in the South March Highlands in general and the Kanata Lakes area in particular identified the need for a comprehensive, objective assessment of natural environment features and values. Accordingly, studies were conducted in the Kanata Lakes (Marchwood - Lakeside) area by the City of Kanata and Genstar Development Company (Brunton 1992a) and of the remainder of the former South March Highlands conservation area by the City of Kanata (Brunton 1992b) in 1991 and 1992. These investigations were intended to provide an ecologically factual basis for the adjustment of designated Natural Environment Area boundaries and to recommend the establishment of any appropriate additional Natural Environment Areas. Although various recommendations were forthcoming, no alterations or expansions resulted.

South March Highlands Conservation Forest Existing Conditions

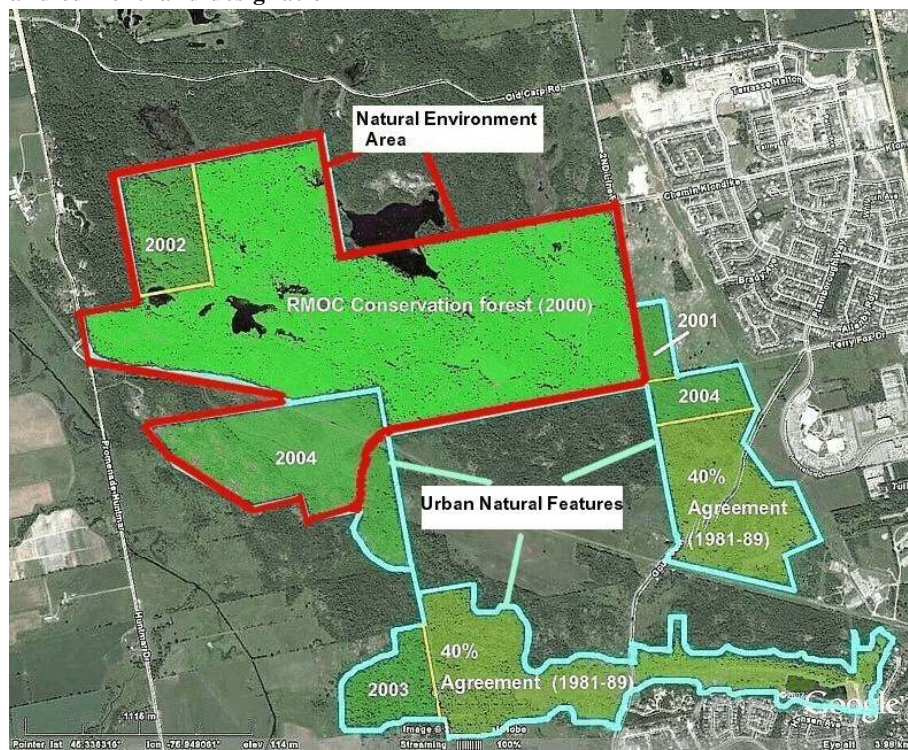
Although unconnected to the 1991 - 1992 natural environment inventories, significant additions to the original 116 ha area of protected landscape occurred following amalgamation of the municipality into the Region of Ottawa- Carleton (Figure 2). The most significant addition by far was a 240 ha block of forest, ponds and bedrock outcrops south of Old Carp Road purchased in 2000 (Spears 2000). All the wetland habitats included in this conservation acquisition are components of the South March Highlands Provincially Significant Wetland Complex (OMNR in lit, 2007).

The protected area has been enlarged by several smaller subsequent additions (Figure 2). An area of upland forest towards Huntmar Road was purchased by the Region (2002) and a wetland parcel west of the First Line Road allowance was obtained in compensation for erroneous tree cutting activity elsewhere in the Highlands in 2003. Two small upland forest parcels adjacent to the proposed Terry Fox Road ROW by Morgan's Grant were obtained through development approval negotiations with a development company in 2001 and through a land swap with another developer in 2003. A wetland and bedrock outcrop area near the railway west of the First Line Road allowance was secured in 2004 through development approval negotiation with yet another developer.

The Conservation Forest presently represents just under 400 ha, straddling the line between urban and rural Ottawa. Approximately 250 ha are within rural designation and 145 ha are zoned urban (Figure 2). That represents approximately 35% of the area initially identified as conservation area in the 1974 Regional Official Plan.

With adjacent urban lands to the south and east undergoing such an accelerated rate of residential development,

Figure 2: Growth of South March Highlands Conservation forest (1981-2007) and current land designation



the Terry Fox Road arterial proposed to bisect the Conservation Forest within the foreseeable future and substantially increased levels of year-round recreation activity (especially hiking and mountain biking) occurring throughout the Highlands, the urgent need for a management and conservation plan is apparent. Accordingly, the present study is being undertaken to provide a consolidated, up-to-date inventory of natural environment resources as the first phase in the development of such an ecologically sound management plan for the Conservation Forest.

The objectives of this study can be summarized as follows:

- to consolidate and up-date pertinent natural environment data from the 1991-1992 inventories and from subsequent smaller scale studies;
- to verify existing native biodiversity and special features representation through on-site investigations conducted throughout the peak growing/ breeding season;
- to review ecological function values in a manner consistent with the City's Natural Environment System Strategy (NESS) and Urban Natural Areas (UNA) studies;
- to identify the range of existing and anticipated uses and activities which present conservation management challenges in both the rural and urban portions of the Conservation Forest.

This is a large and ecologically complex area, the management of which is complicated by an irregular shape, artificial boundaries and a variety of adjacent landowners. Appropriate conservation management is further challenged by increasing landscape fragmentation across the South March Highlands, isolation from neighbouring natural habitats, and a growing level of public use. Accommodating and reconciling these will be critical in the development of a Conservation Forest management plan. Developing and documenting an objective, scientifically-defendable assessment and inventory of both existing conditions and ecological sensitivities is therefore a vital first step to the success of the overall planning process.

1.3 METHODOLOGY

There is a considerable depth of documentation of the natural environment values of the South March Highlands. Most of this results from proposed residential development within particular portions of the area. No comprehensive assessment of the entire Conservation Forest has been conducted for over 15 years. Accordingly, reviewing existing documentation was required to begin the process of

documenting a comprehensive inventory of natural environment features and functions. Particularly pertinent were Brunton (1992a, Brunton (1992b), Brunton (1997), Muncaster (2003), Dillon Consulting (2003), Brunton (2004), and Muncaster and Brunton (2006).

A multi-season field inventory was undertaken to identify and/ or confirm the location of special features, habitats and ecological function values within the Conservation Forest. Field investigations were conducted on 3 July, 6 July, 20 July, 25 July, 30 July, 10 August, 20 September and 27 September 2007. They involved foot travel into all natural areas and habitats. Written notes were taken to document vegetation and the natural features present and digital photography of various landscapes features and elements was obtained. Voucher specimens were also secured to support and verify determinations of suspected or confirmed significant plant species.

During field investigations particular attention was paid to the potential presence of Endangered or Threatened Species of flora and vertebrate fauna scheduled under the federal Species At Risk Act (SARA) or designated as Endangered or Threatened in the provincial Species At Risk Act (Ontario 2007). Search candidates included all those taxa known to occur in the Ottawa Valley in habitats like those found in the South March Highlands. Features and functions known to be significant at a Regional (City of Ottawa) level were also identified for particular attention.

The field investigations not only included the identification of native plant species encountered but involved attention to physical evidence (scats, tracks) for mammals and shelter or feeding sites (e.g. beneath logs, rocks, etc.) for amphibian and reptile species. As is typical of such undertakings faunal data, with the exception of those for breeding birds, were gathered incidentally and opportunistically during vegetation and floristic investigations. This reflects the fact that the return on interpretable information is far less from gathering faunal data than it is for comparable expenditures of project time and resources for floristic/ vegetation data.

The end result is this stand-alone document consolidating, up-dating and describing the existing natural environment conditions of the South March Highlands Conservation Forest. In addition to providing an inventory of native biodiversity, this report identifies and qualifies the significance of existing features and functions on a provincial or regional scale. A discussion of current impacts on features and functions is also provided, as is consideration of anticipated stresses from proposed developments. A preliminary identification of particularly disturbance-sensitive natural values within

the Conservation Forest is provided. A draft report was prepared in December 2007. Subsequent to reviews by City personnel David Miller, Jason Pollard and Kevin Jones it was revised to form this final report.

Discussions were conducted periodically through the inventory and documentation process with City of Ottawa project managers David Miller, Kevin Jones and/ or Craig Huff and a selection of stakeholders (e.g. a discussion meeting on 5 November 2007). This provided others with updates on the progress of the existing conditions assessment and accommodated their input on activities, observations and impacts that could assist in the evaluation of existing conditions.

A draft report was prepared in December 2007. Following review by and discussion with City project management personnel, the draft was revised to produce this final document.

2.0 SITE CONTEXT

The Conservation Forest (Figure 3) consists largely of a rugged landscape of Precambrian-age gneissic bedrock thinly buried in overburden, with only the northern and eastern edge (ca. 10%) being underlain by younger, sedimentary Nepean sandstone. The bedrock contains a rich and chemically complex mixture of diorite, gabbro, quartz and marble that is unique in the predominately sedimentary-based Ottawa landscape (Wilson 1956, Freeman 1979).

Although the area is drained along the western edge by several small tributaries of the Carp River, the majority of the Conservation Forest is contained within the watersheds of Shirleys Brook (northeast) and Watts Creek (southeast), both of which flow directly into the Ottawa River. Numerous shallow, perched wetlands occur in bedrock depressions across the western and northern portions of the area, their size and flow characteristics changing periodically as a result of beaver damming activity.

The variation of surface material on this bedrock dominated landscape is limited. The area is typically bare to thinly-buried bedrock outcrop, with relatively small areas underlain by marine clay west of the Goulbourn Forced Road north of the railway, and deeper loamy soils under mature hardwood forest in the north (Heron Pond area) and east (Trillium Woods area). Only one small area of

South March Highlands Conservation Forest Existing Conditions

Figure 3: Cultural setting of South March Highlands Conservation Forest



glacial till is present, along the west side of the Goulbourn Forced Road at the northeastern edge of the Conservation Forest. Shallow organic deposits underly wetland habitat in the bedrock trough occupied by Watts Creek (Kizell Drain and Kanata Pond) and west of Goulbourn Forced Road along the railway track (Pratt 1982).

The shallowness of the soil and abundance of bedrock outcropping that restricted agricultural development has also encouraged the retention of a largely forested landscape. Roadways are uncommon in the Conservation Forest. The irregular course of Goulbourn Forced Road in the south and that of the Old Carp Road to the north are indicative of the historic difficulty of landscape alteration here.

Habitats across the South March Highlands have been substantially shaped by fire, with great impact felt particularly in those areas of dry, rocky landscape. The huge fires that swept across western

Ottawa in 1870 (Walker and Walker 1969) were likely the most significant of these in regards to creating the condition and complexity of present habitats. Burned stumps from that event are still visible in the Conservation Forest. Wetland forest and mature woodlands would have been the least impacted by such catastrophic changes. The Trillium Woods, in fact, have been cited as presenting a fire resistant barrier that prevented the destruction of the fledgling community of South March (Kanata) in 1870 (Burns et al. 1972). There is no evidence of any major fires having occurred within the Highlands for many decades.

Nineteenth century agricultural development in the surrounding lowlands had significant effects on the natural environment of the South March Highlands in general and the Conservation Forest in particular, even if the agricultural footprint within the Highlands was relatively minor.

The ruins of McMurtry's Tannery along Second Line Road immediately north of the Forest (Figure 4) attests to the harvesting of Eastern Hemlock (*Tsuga canadensis*) bark in the 1860s for its tannins (used in the processing of leather). This would have dramatically reduced the abundance of this ecologically important, slow-growing component of mature upland forests, from which the Conservation Forest seems not yet to have recovered.

Figure 4: ruins of McMurtry's Tannery, Second Line Road



An infrequently used railway corridor crosses the central portion of the Highlands and represents, with the Goulborn Forced Road, the most significant existing physical intrusion into the Conservation Forest. The construction of a major arterial roadway (Terry Fox Road) is also proposed for development in this area, however, with virtually all of its passage over the South March Highlands (over 90%) being within the Conservation Forest (Dillon 2003). This too will constitute a major physical and ecological intrusion.

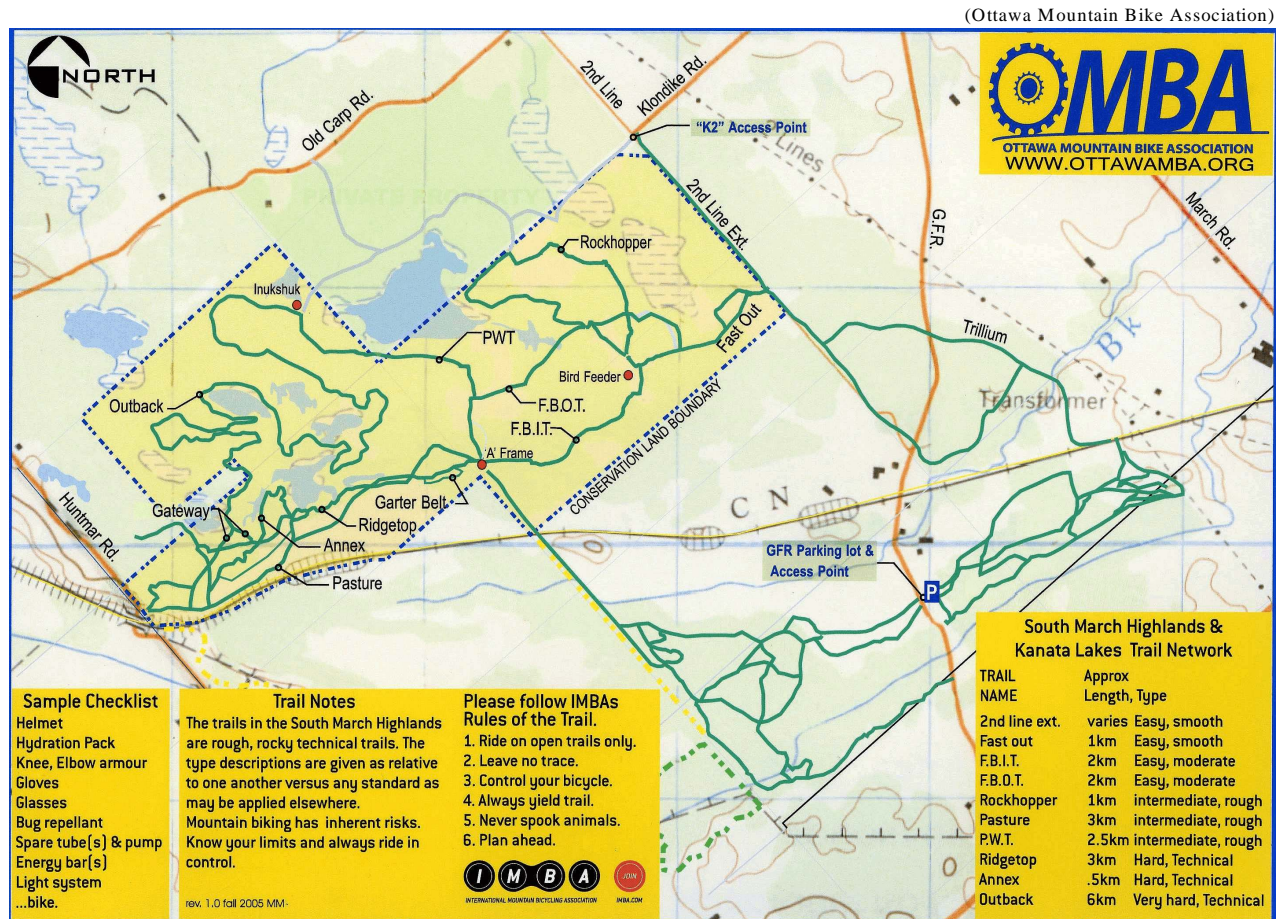
The Conservation Forest has long been the focus of attention of recreational visitors to the South March Highlands (Brunton 1988). The nature of that use has changed dramatically in recent

South March Highlands Conservation Forest Existing Conditions

years, from relatively small numbers of hikers, naturalists and cross-country skiers in the 1970s and 1980s to large numbers of urban hikers, joggers, skiers and mountain bikers. The limited system of informal pathways was supplemented in 1991 by the construction of a major surfaced pathway through the Trillium Woods between Kanata Pond and Morgan’s Grant (Brunton1992a) and by later development of formal pathways on either side of Kanata Pond/ Kizell Drain.

The growth over the last decade of both major and minor unofficial pathways to accommodate mountain bikers, has been particularly dramatic. Mountain bike trails now occur throughout all major urban and rural areas of the Conservation Forest and surrounding South March Highlands (Figure 5).

Figure 5: South March Highlands mountain bike trail network map



3.0 NATURAL ENVIRONMENT FEATURES AND FUNCTIONS

The following described the natural features and functions observed to exist within the South March Highlands Conservation Forest.

3.1 HABITATS

Habitat definitions are based largely on the mapping in Brunton 1992a and Brunton 1992 as translated to conform to the Southern Ontario Vegetation Classification system (Lee et al. 1998) and updated by on-site observations and notations during the present study.

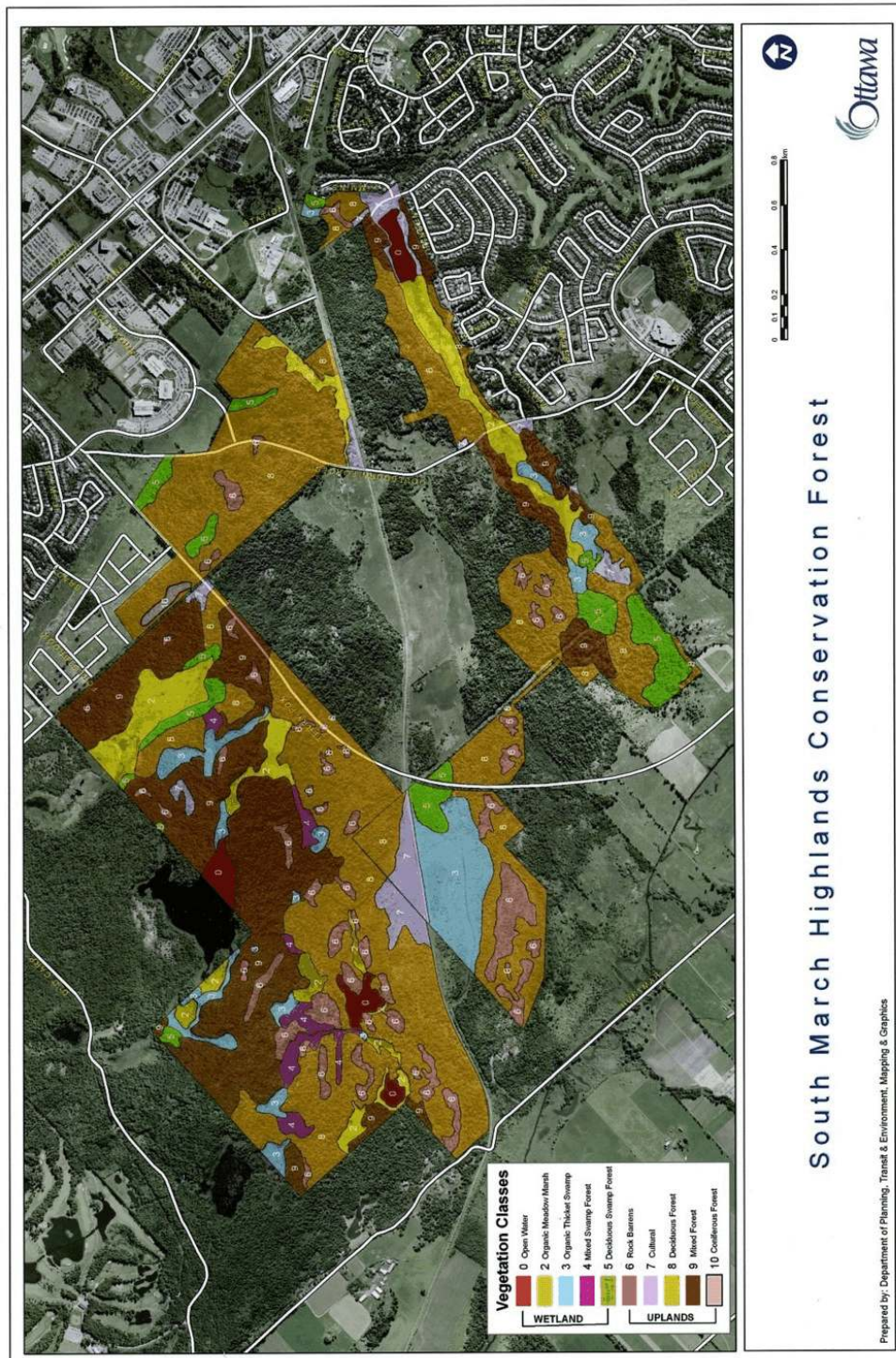
Over 30 vegetation types (ecotypes), as described by Lee et al (1998) were identified in the Conservation Forest during 2007 and are listed within the discussions of each habitat (below). All of these habitat were also reported in the 1991-1992 inventories. This area appears to contain examples of all the known habitats of the greater South March Highlands (Brunton 1997, Muncaster and Brunton 2005). Other vegetation variations are expected to be present as well.

The various vegetation types have been mapped onto an aerial base of the study area (see Habitat map). For cartographic clarity and interpretive value, however, they have be compiled within ten broader habitat categories as described below, with the appropriate ecotypes described within each habitat.

3.1.1 Habitat 1: Submerged Shallow Aquatic (SAS) (1.18 ha)

This is common in the portion of the study area north of the railway. It is found typically in large, shallow ponds in granitic bedrock depressions at the headwaters of Shirleys Brook and in small, transitory beaver ponds throughout the upland areas. Most water bodies originate from damming activity by beaver along creeks. Two, Heron Pond (straddling the boundary) and West Pond (just beyond), are permanent but with size and water levels significantly affected periodically by beaver dams at their outlets.

Figure 6: South March Highlands Conservation Forest habitats



The vegetation in open water areas is characterized by a combination of true aquatic species (pondweeds, duckweed) and marsh plants (loosestrife, cattail, canary-grass, etc.) that are typically sparsely distributed (Figure 7). One ecotype, *Submerged Shallow Aquatic* (SAS 1), is known in this habitat in the Conservation Forest. Characteristic plant species of this habitat include:

Canary-grass (<i>Phalaris arundinacea</i>)	Bulblet Water-hemlock (<i>Cicuta bulbifera</i>)
Cat-tail (<i>Typha latifolia</i>)	Northern Manna grass (<i>Glyceria borealis</i>)
Small Duckweed (<i>Lemna minor</i>)	Watermeal (<i>Wolffia columbiana</i>)
Small Pondweed (<i>Potamogeton pusillus</i>)	Coon-tail (<i>Ceratophyllum demersum</i>)
Water-plantain (<i>Alisma triviale</i>)	Yellow Water-lily (<i>Nuphar variegatum</i>)

The area of open water aquatics appears to have been reduced since the early 1990s (see also 3.1.2 *Habitat 2: Meadow Marsh*, below) apparently as a consequence of a smaller Beaver population and the subsequent overall reduction in the extent of deeper open water.

Significance and Sensitivity: this habitat is rare in the City of Ottawa (Geomatics International 1995), with most portions north of the railway line being components of the South March Highlands Provincially Significant Wetland Complex (OMNR in lit, 2007). It supports four Regionally Significant plant species (see 4.2.2 *Regionally significant vascular plant species*, below). One of these, large Duckweed (*Spirodella polyrhiza*), is suspected to have been extirpated by residential development activities.

Figure 7: open water vegetation (with juv. Northern Water Snake) at Klondike Road marsh



The shallow, isolated areas of this aquatic habitat are particularly sensitive to over-nutrication (surface run-off, fouling from Canada Geese, etc.) although being largely unsuitable for boating, etc., the wetlands appear to face few direct physical threats .

3.1.2 Habitat 2: Meadow Marsh (MAM) (36.13 ha)

Marsh areas are uncommonly scattered across the Conservation Forest in low bedrock depressions of old beaver ponds, drying drainage channels and along flowing waterways. They are most widely distributed along Shirleys Brook at the Klondike Road wetland (Figure 8) and Watts Creek (Kizell Drain). Marsh habitat is a common element of overgrown beaver ponds. Substrates contain a high organic component and often constitute a substantial layer of silty ooze over shallow till or bedrock.

A wide variety of wetland dominants characterize marsh sites in the study area characterized by graminoid and other monocot plant species varying from virtually pure stands of Canary-grass (*Phalaris arundinacea*) to mixed Canary-grass - Cat-tail (*Typha latifolia*) - Purple Loosestrife (*Lythrum salicaria*) vegetation.

Figure 8: Cat-tail marsh at Klondike Road ROW



Four ecotypes are represented, including *Reed Canary Grass marsh* (MAM3-2) found most commonly along major creeks, *Broad-leaved Sedge marsh* (MAM3-6) occurring along the shores of larger ponds and in large bedrock depressions north of the railway. *Jewelweed marsh* (MAM3-8) occurs in small bedrock depressions throughout the area and *Forb Marsh* (MAM3-9) is found along the shores of major ponds and in large bedrock depression areas.

Typical associated flora includes:

Canary-grass (*Phalaris arundinacea*)

Cat-tail (*Typha latifolia*)

St. John's wort (*Triadenum virginicum*)

Bristly Sedge (*Carex comosa*)

Fringed Sedge (*Carex crinita*)

Marsh Skullcap (*Scutellaria galericulata*)

Stinging Nettle (*Urtica dioica*)

Marsh Bedstraw (*Galium palustris*)

Great Bulrush (*Schoenoplectus tabernaemontani*)
Joe Pye Weed (*Eupatorium perfoliatum*)

Common Spikerush (*Eleocharis palustris*)
Marsh Fern (*Thelypteris palustris*)
Blue vervain (*Verbena hastata*)
Shining Willow (*Salix lucida*)

Significance and Sensitivity: Marsh vegetation is widespread in the City of Ottawa but the Precambrian bedrock-based marsh habitats here are considered to be Regionally Rare (Geomatics International 1995). The area of such habitat has been expanding within and adjacent to the Conservation Forest since the 1990s. Figures 9 and 10 show this habitat evolution/ transformation in larger ponds in the northern portion of the area. The one site where this infilling has not progressed (top

Figure 9: open wetland habitat in northeastern portion of the Conservation Forest in 1991

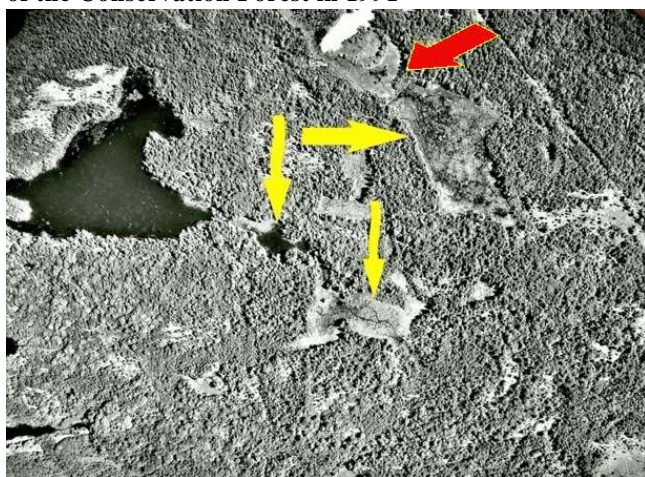
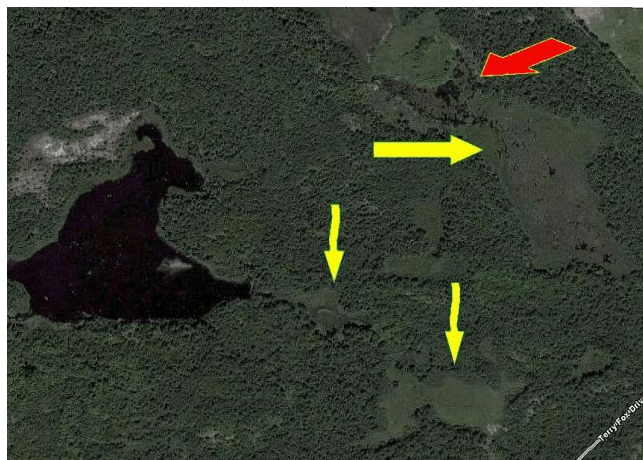


Figure 10: open wetland habitat innortheastern portion of the Conservation Forest in 2007



right [red] arrow) is the site of an actively maintained beaver dam.

Meadow marsh habitat is known to support three Regionally Significant plant species (see 4.2.2 *Regionally significant vascular plant species*, below), all of which persist. Most of this habitat portions north of the railway line being components of the South March Highlands Provincially Significant Wetland Complex (OMNR in lit, 2007).

Direct physical impacts on this habitat are not known in the study area beyond the degraded marsh habitat at and downstream of the Goulbourn Forced Road crossing of Watts Creek. Over-

nutrification and habitat stagnation (absence of natural disturbances by fire beaver flooding, etc.) likely constitute the prime sensitivities of this habitat.

3.1.3 Habitat 3: Organic Thicket Swamp (SWT) (31.7 ha)

This vegetation is common bordering marsh and swamp forest vegetation within the upland portion of the Conservation Forest and along the Carp River near the railway line (Figure 11). It is dominated by Speckled Alder (*Alnus incana*) and other native shrubs such as Red-osier Dogwood (*Cornus stolonifera*) and Slender Willow (*Salix petiolaris*).

Figure 11: willow swamp thicket south of rail line near Huntmar Road



Undergrowth established in the saturated to flooded organic substrate of this habitat varies from sparse to dense with a significant number of marsh species developing within the shrub cover at some sites.

Characteristic species include:

Speckled Alder (*Alnus incana* ssp. *rugosa*)
Red-osier Dogwood (*Cornus stolonifera*)
Bulbulet Water-hemlock (*Cicuta bulbifera*)
Northern Manna grass (*Glyceria borealis*)
Swamp Milkweed (*Asclepias incarnata*)
Joe Pye Weed (*Eupatorium perforatum*)

Shining Willow (*Salix lucida*)
Needle Spikerush (*Eleocharis acicularis*)
Wool-grass (*Scirpus cyperinus*)
Cypress Sedge (*Carex pseudo-cyperus*)
Meadowsweet (*Spiraea alba*)

Three ecotypes were noted here including *Alder thicket swamp* (SWT-1) found commonly along pond and creek shores and *Willow thicket swamp* (SWT-2) in similar sites, most notable being the large willow swamp thicket immediately south of the railway line near Huntmar Road. *Winterberry thicket swamp* (SWT-7) occurs as small stands in woodland swales and partially shaded pond edges

throughout.

Significance and Sensitivity: This is not considered to be significant habitat in the City or in this area (Geomatics International 1995, Brunton 1997). It supports three Regionally Significant plant species (see 4.2.2 *Regionally significant vascular plant species*, below), all of which are believed to persist. The extensive area of this habitat along the railway line is a component of the South March Highlands Provincially Significant Wetland Complex (OMNR in lit, 2007). Large areas of this habitat are relatively durable and disturbance tolerant, though the saturated, organic-rich soil is vulnerable to erosion from trail traffic (bicycle and pedestrian) in small thicket swamps occurring within woodlands.

3.1.4 Habitat 4: Mixed Swamp Forest (SWM) (7.59 ha)

Swamp vegetation dominated by a mixture of hardwood and coniferous forest cover is uncommonly distributed across both the South March Highlands and the Conservation Forest. It typically occurs in shallow, organic, acidic deposits in bedrock depressions associated with woodland ponds (i.e. southeast of Heron Pond) and on lower seepage slopes (along Watts Creek by the First Line Road ROW).

Red Maple (*Acer rubrum*), White Birch (*Betula papyrifera*), White Elm (*Ulmus americana*), Green Ash (*Fraxinus pennsylvanica*) and other early-successional tree species are secondary components of associations dominated by White Cedar (*Thuja occidentalis*) and/or Black Ash (*Fraxinus nigra*). The undergrowth is typically a tangled, shrub-dominated vegetation with floristic components from upland and wetland sites.

The ground vegetation includes the following characteristic plant species:

Canada Mint (<i>Mentha canadensis</i>)	Marsh Bluegrass (<i>Poa palustris</i>)
Sensitive Fern (<i>Onoclea sensibilis</i>)	Virginia Creeper (<i>Parthenocissus vitacea</i>)
Purple-stemmed Aster (<i>Symphiotrichum puniceus</i>)	False-nettle (<i>Bohmeria cylindrica</i>)
Meadowsweet (<i>Spiraea alba</i>)	Jewelweed (<i>Impatiens capensis</i>)
Northern Bugleweed (<i>Lycopus uniflorus</i>)	Spinulose Wood-fern (<i>Dryopteris carthusiana</i>)
	Large-leaved Beggars-ticks (<i>Bidens frondosa</i>)

Two ecotypes were observed here, *White Cedar Organic mixed swamp forest* (SWM4) and *Red Maple - Conifer mixed swamp forest* (SWM5), occurring in approximately equal measure. Small stands of both are also a frequent component of low sites within upland forest habitat.

Significance and Sensitivity: Although not frequently occurring in large stands here, this is a common habitat in the City of Ottawa and not considered to be intrinsically significant (Geomatics International 1995). Mixed Swamp habitat supports one Regionally Significant plant species (see 4.2.2 *Regionally significant vascular plant species*, below). This habitat is vulnerable to erosion from trail traffic (bicycle and pedestrian) where it occurs in small riparian zones (e.g. along Watts Creek) and in swales within woodlands. There appears to be potential for direct wildlife impact (especially on amphibian and reptile populations and breeding birds) from trail traffic.

3.1.5 Habitat 5: Deciduous Swamp Forest (SWD) (21.55 ha)

Hardwood swamp forests of Red Maple, Silver Maple (*Acer saccharinum*), Green Ash and White Elm in combination with a predominant cover of Black Ash are maintained in permanently wet areas in thin acidic, organic deposits across the higher elevation portions of the Conservation Forest (Figure 12). This habitat typically occurs in small areas in bedrock depressions (Kanata Pond area), on lower seepage slopes (Watts Creek headwaters) and at the forested edges of thicket swamps (along Watts Creek and Shirleys Brook). Beaver cutting and flooding has significantly affected such sites. Some small areas of trees have been killed by flooding (e.g. along Shirleys Brook), creating a variably open canopy.

Mature maple dominated swamp vegetation is uncommon, occurring in substantial stands only west of the First Line Road ROW and southeast of Heron Pond.

Figure 12: maple - ash swamp north of Watts Creek west of Goulbourn Forced Road



Small pockets, usually dominated by a few large maples each, occur elsewhere in small bedrock depressions and on lower seepage slopes.

The undergrowth is a combination of marsh, swamp thicket and early successional forest taxa. Although non-native elements are few, Purple Loosestrife and Canary-grass are locally dominant ground flora in some areas along Shirleys Brook.

Typical floristic elements include:

Fringed Sedge (<i>Carex crinita</i>)	Enchanter's Nightshade (<i>Circaea lutetiana</i>)
Lady Fern (<i>Athyrium filix-femina</i>)	Bladder Sedge (<i>Carex intumescens</i>)
Beaked Sedge (<i>Carex urticulata</i>)	False-nettle (<i>Boehmeria cylindrica</i>)
Sensitive Fern (<i>Onoclea sensibilis</i>)	Stemless Blue Violet (<i>Viola sororia</i>)
Manna-grass (<i>Glyceria striata</i>)	Crested Sedge (<i>Carex cristatella</i>)
Brome Sedge (<i>Carex bromoides</i>)	Foxtail Sedge (<i>Carex lupulina</i>)
Jewelweed (<i>Impatiens capensis</i>)	Tuckerman's Sedge (<i>Carex tuckermanii</i>)
Mexican Muhly Grass (<i>Muhlenbergia mexicana</i>)	Wood-nettle (<i>Laportea canadensis</i>)
Marsh fern (<i>Thelypteris palustris</i>)	Stinging Nettle (<i>Urtica dioica</i>)

Three ecotypes are known from this habitat, including *Ash mineral swamp forest* (SWD2) found commonly along streams, *Maple mineral swamp forest* (SWD3) occurring locally, with the largest, most mature occurrence being west of the First Line Road ROW, and *Ash organic swamp forest* (SWD5) occurring in small stands across the Conservation Forest.

Significance and Sensitivity: Deciduous Swamp Forest habitat supports one Regionally Significant plant species (see 4.2.2 *Regionally significant vascular plant species*, below). It is vulnerable to soil degradation and vegetation damage along low trail sections due to sensitive (saturated) substrates. Soil erosion and compaction, vegetation damage and canopy impact is presently evident along trails.

There appears to be potential for direct wildlife impact (especially on amphibian and reptile populations and breeding birds) from continued or additional trail traffic and noise. Habitat sensitivity is presumably most acute during late spring/ early summer wildlife breeding season.

3.1.6 Habitat 6: Rock Barrens (RB) (31.76 ha)

Exposed granitic bedrock ridges and outcrops are common throughout the Precambrian-based portions of the Conservation Forest, especially in the west above the Hazeldean Escarpment and north of the railway near Huntmar Road. These areas are still regenerating from the impact of the fires of 1870, as well as from logging and former agricultural practices (grazing). These sites have hot, very dry microclimates with substrates consisting of a mixture of bare rock, thin moss and lichen mats and very shallow soil (Figure 13). Such sites are usually associated with a variety of early successional forest vegetation. A herbaceous cover of native and introduced grasses and herbs of open, dry sites characterize the habitat, with isolated clumps of drought-tolerant shrubbery and/or tree saplings.

Figure 13: granitic bedrock outcrop along top of Hazeldean Escarpment



Regeneration of such sites is slow due to the virtual absence of soil in much of the habitat and the extreme susceptibility of the vegetation to drought. Many trees and shrubs are killed by periodic droughts (e.g. the hot, dry summer of 1991 - Brunton 1992a, 1992b).

Typical flora found within this habitat includes:

- | | |
|---|--|
| Blue grass (<i>Poa pratensis</i>) | Wild Strawberry (<i>Fragaria virginiana</i>) |
| Poverty-grass (<i>Danthonia spicata</i>) | Pale Corydalis (<i>Corydalis sempervirens</i>) |
| Yellow Hawkweed (<i>Hieracium piloselloides</i>). | Yellow Stonecrop (<i>Sedum acre</i>) |
| Bracken Fern (<i>Pteridium aquilinum</i>) | Common Juniper (<i>Juniperus communis</i>) |
| Mullein (<i>Verbascum thapsus</i>) | Gray Goldenrod (<i>Solidago nemoralis</i>) |
| Spotted St. John's-wort (<i>Hypericum perforatum</i>) | Timothy (<i>Phleum pratense</i>) |

Purslane (*Portulaca oleracea*)
Sheep-sorrel (*Rumex acetosella*)

Philadelphia Panic Grass (*Panicum philadelphicum*)

Three ecotypes have been noted in this habitat, including *Acidic open rock barren* (RBO-3) found commonly along the Hazeldean Escarpment lip and scattered elsewhere north of the railway line in small outcrop exposures, *Acidic shrub rock barren* (RBS-3) found throughout on less naturally-disturbed outcrops, and *Acidic treed rock barren* (RBT-3) which occupies transitional areas between open bedrock barren habitat and adjoining woodland.

Significance and Sensitivity: Rock Barrens constitute a rare habitat in the City of Ottawa (Geomatics International 1995) and recognized as being Provincially Rare as well (Bakowski 1996). Seven Regionally Significant plant species are represented here (see 4.2.2 *Regionally significant vascular plant species*, below), two of which (*Carex backii* and *Chenopodium capitatum*) have been extirpated by residential development. Similar landscape alteration is responsible for the destruction of the population of Provincially Rare *Woodsia oregana* ssp. *cathcartiana* immediately south of the Conservation Forest (Brunton 1997).

The bedrock substrate is impervious to trail impacts but the fragile surface vegetation (including significant species) is extremely sensitive to damage from mountain bike and even foot traffic. This slow-growing vegetation is quickly eliminated along pedestrian and mountain bicycle trails, particularly in wet depressions, on such outcrops. It appears to be especially vulnerable in spring and early summer and on steep slopes.

3.1.7 Habitat 7: Cultural Meadow and Thicket (CU) (16.23 ha)

Old pasture and long-abandoned croplands on thin to moderately deep soil sites are typical of this habitat. It is regenerating towards a variety of woodland vegetation types. It is widespread in association with former human activity along the railway and in small pockets at the edge of roadway (Second Line and First Line Road ROWs). Non-native vegetation predominates, with only scattered native shrub tree growth (Figure 14).

Typical species include:

Timothy (<i>Phleum pratense</i>)	Evening-primrose (<i>Oenothera parviflora</i>)
Brome Grass (<i>Bromus inermis</i>)	Hawthorn <i>Crataegus chrysoarpa</i>)
Common Raspberry (<i>Rubus strigosus</i>)	Toadflax (<i>Linaria vulgaris</i>)
Blue-eyed grass (<i>Sisyrinchium montanum</i>)	Pale Sedge (<i>Carex pallescens</i>)
Blue Vetch (<i>Vicia cracca</i>)	Tall Cinquefoil (<i>Potentilla recta</i>)
Ox-eye daisy (<i>Chrysanthemum leucanthemum</i>)	Yellow Sorrel (<i>Oxalis stricta</i>)
Canada Thistle (<i>Cirsium arvense</i>)	White Bedstraw (<i>Galium mollugo</i>)

Three ecotypes are present including **Figure 14:regenerating pasture north of railway** *Mineral Cultural Meadow* (CUM1) and *Mineral Cultural Thicket* (CUT1) which are equally common along the railway corridor and *Bedrock Cultural Thicket* (CUT2) found more sparingly in small, formerly grazed bedrock areas along the Hazeldean Escarpment near Watts Creek and towards the Second Line Road ROW.



Significance and Sensitivity: Three

Regionally Significant plant species are represented (see 4.2.2 *Regionally significant vascular plant species*, below), one of which may have been extirpated (*Ophioglossum pusillum*). With no intrinsic natural environment significance, the vegetation demonstrates no impact issues beyond potential indirect physical effects on native wildlife that may utilize this or adjacent habitats. The habitat has the negative potential to encourage invasive plant development in adjacent natural landscapes.

3.1.8 Habitat 8: Deciduous Forest (FOD) (201.85 ha)

This is the most common vegetation type in the Conservation Forest with variations reflecting

the long history of disturbance of much of the area as a result of fires, logging, agriculture and residential development. It occupies a wide variety of dry to mesic upland sites in rocky outcrops to loam-filled depressions. Red Maple, White Ash, Green Ash, Basswood, Ironwood (*Ostrya virginiana*), Sugar Maple, Bitternut Hickory (*Carya cordiformis*), White Elm, Bur Oak (*Quercus macrocarpa*), Trembling Aspen and White Birch combine in various associations to form the dominants in drier, rockier sites (Figure 15). Shrub and ground vegetation is diverse in such areas, typically composed of fewer shade tolerant species than in mature forest. There is a greater diversity of light-tolerant species in these younger, more open hardwoods.

Mature and submature forests dominated by Sugar Maple (Figure 16) associated with American Beech and or Yellow Birch in deeper loam soil and with Ironwood and Black Cherry (*Prunus serotina*) on rocky ground, are common. Mature trees are particularly conspicuous in the Trillium Woods, along the First Line Road ROW and north of the CNR tracks west of Heron Pond. Other species such as

Figure 15: younger, drier maple forest near First Line Road ROW



Figure 16: mature Sugar Maple - Black Maple forest in Trillium Woods



White Ash (*Fraxinus americana*), Black Maple (*Acer nigrum*), Red Oak (*Quercus rubra*), Eastern Hemlock and Basswood (*Tilia americana*) form locally important canopy associates, depending on particular site conditions. Ground vegetation diversity varies from sparse (consisting mostly of Sugar Maple seedlings) to a relatively dense mixture of herbaceous and shrubby plant growth.

Typical ground species include:

Wild Leek (*Allium tricoccum*)

Mountain-rice (*Oryzopsis racemosa*)

Mountain-rice (*Oryzopsis asperifolia*)

Canada Mayflower (*Maianthemum canadense*)

South March Highlands Conservation Forest Existing Conditions

Sweet-cicely (<i>Osmorhiza claytonia</i>)	Stellata Sedge (<i>Carex radiata</i>)
Common Sedge (<i>Carex communis</i>)	Sharp-lobed Hepatica (<i>Hepatica acutiloba</i>)
Peck`s Sedge (<i>Carex peckii</i>)	Sugar Maple (<i>Acer saccharum</i>) (seedlings)
Smooth Sedge (<i>Carex blanda</i>)	Evergreen Woodfern (<i>Dryopteris intermedia</i>)
White Trillium (<i>Trillium grandiflorum</i>)	Maidenhair Fern (<i>Adiantum pedatum</i>)
Trout Lily (<i>Erythronium americanum</i>)	Compressed Sedge (<i>Carex arctata</i>)
Squirrel-corn (<i>Dicentra canadensis</i>)	Prince`s-pine (<i>Dendrodolycopodium dendroideum</i>)
Leatherwood (<i>Dirca palustris</i>)	Herb-robert (<i>Geranium robertianum</i>)
Blue Cohosh (<i>Caulophyllum giganteum</i>)	
False Melic-grass (<i>Schizachne purpurascens</i>)	

At least seven ecotypes are noted in this forest habitat. In drier sites these include *Dry-fresh Oak - Red Maple Deciduous forest* (FOD-2-1) found on ridges and steeper slopes across the Conservation Forest and especially north of the railway where *Dry-fresh Oak - Hardwood Deciduous forest* (FOD-2-4) is also regularly found on even drier sites. *Dry-fresh Sugar Maple Deciduous forest* (FOD5-1) occurs in younger, more disturbed sites on lower slopes along the First Line and Second Line Road ROWs, with *Dry-fresh Sugar Maple-Ironwood Deciduous forest* (FOD5-2) and *Dry-fresh Sugar Maple-Red Maple Deciduous forest* (FOD5-9) occurring throughout on sites with thin, loamy soil.

Deeper, richer soils support mature and submature *Fresh-moist Sugar Maple Deciduous forest* (FOD6-2) and *Fresh-moist Sugar Maple-hardwood Deciduous forest* (FOD6-5) in various sites, particularly around the Trillium Woods, along First Line Road ROW and south of Heron Pond. This habitat represents the least disturbed forest vegetation in the South March Highlands (Brunton 1992a, Brunton 1992b).

Deciduous forest habitat is rich in special features, with 18 Regionally Significant plant species represented (see 4.2.2 *Regionally significant vascular plant species*, below). Three of these (*Claytonia virginica*, *Galearis spectabilis* and *Goodyera pubescens*), however, may have been extirpated. So too, apparently, has the South March Highlands population of Endangered *Panax quinquefolium* that occurs in this habitat close to the Conservation Forest.

Significance and Sensitivity: This is a rare habitat in Ottawa (Geomatics International 1995) and is probably better represented in the South March Highlands than anywhere else in the City (Brunton 1997). Subjective observations suggest, however, that an overall degrading of ecological integrity has occurred in this habitat since the early 1990s. It is moderately tolerant of trail impacts but remains vulnerable to ecological function limitations from overly dense trail networks than can result in physical and indirect impact on lower, more fragile sites and on fauna (passerine birds, amphibians and reptiles). Noise and physical impact from trails and adjacent roads and residential development during peak breeding, encouragement of invasive weed development along trails and disturbed edges, and degradation of soil (physical impact and perhaps also by exotic earthworm populations) are indicated. Organically rich soils on slopes are fragile and easily eroded and roots of canopy trees are readily damaged by mountain bike activity, particularly in spring-early summer.

3.1.9 Habitat 9: Mixed Forest (FOM) (100.86 ha)

This vegetation is transitional between deciduous forest (above) and the coniferous forest (below). It occupies a variety of dry to mesic situations, from rocky ridges and south-facing slopes where White Pine (*Pinus strobus*), Trembling Aspen, White Spruce (*Picea glauca*), White Ash, Basswood, White Cedar (*Thuja occidentalis*), Ironwood, Red Oak and Red Maple associate, as well as level bedrock-dominated flatlands of Red Maple, White Spruce, White Pine, Trembling Aspen and White Cedar Figure 17). It is locally common between Second Line Road and Heron Pond and west of the First Line allowance, and frequent elsewhere in sites too small to form significant habitat units within the otherwise more mesic, deciduous dominated landscape of the Conservation Forest.

Mixed forest may have been more common and certainly would have contained more Eastern Hemlock throughout the northern half of the Conservation Forest prior to 19th century

Figure17: small area of mixed forest (Red Spruce (*Picea rubens*) - Trembling Aspen) adjacent to Watts Creek



harvesting of this tree for leather-making purposes (see 2. *Site Context*, above).

Typical ground species in this transition forest vegetation include:

Peduncled Sedge (<i>Carex pedunculata</i>)	Gooseberry (<i>Ribes cynosbati</i>)
Indian-pipe (<i>Monotropa uniflora</i>)	Barren-ground Strawberry (<i>Waldsteinia fragarioides</i>)
Bedstraw (<i>Galium triflorum</i>)	Grass Sedge (<i>Carex gracillima</i>)
Starflower (<i>Trientalis borealis</i>)	Fringed Blue Aster (<i>Symphotrichum ciliolatum</i>)
Large-leaved Aster (<i>Eurybia macrophylla</i>)	Staghorn Clubmoss (<i>Lycopodium digitatum</i>)
Canada Mayflower (<i>Maianthemum canadense</i>)	Poison-ivy (<i>Toxicodendron rydbergii</i>)
Pale Blue Violet (<i>Viola labradorica</i>)	Marginal Shield Fern (<i>Dryopteris marginalis</i>)
Evergreen Woodfern (<i>Dryopteris intermedia</i>)	Bracken (<i>Pteridium aquilinum</i>)
Mountain-rice (<i>Oryzopsis asperifolia</i>)	
Common Juniper (<i>Juniperus communis</i>)	

At least six ecotypes can be identified in this habitat. In drier sites they include *Dry Oak - Pine mixed forest* (FOM1) and *Dry-fresh White Pine - Oak mixed forest* (FOM2-1) on ridges and upper slopes across the northern portion of the Conservation Forest, and *Dry-fresh White Pine-Sugar Maple mixed forest* (FOM2-2) on somewhat more mesic lower slopes west of the First Line Road ROW and north of Watts Creek. In wetter sites, such as the slopes and associated bedrock depressions along Watts Creek, *Fresh - moist White Cedar - hardwood Mixed Forest* (FOM7) with Trembling Aspen, Red Maple, White Spruce and even some of the rare Red Spruce is present. *Fresh-moist Sugar Maple - Hemlock Mixed Forest* (FOM6-1) occupies small, mature sites north of the railway where it was formerly substantially more common.

Significance and Sensitivity: although not considered intrinsically rare locally or in Ottawa (Geomatics International 1995, Brunton 1997) this habitat supports at least three Regionally Significant plant species and the Provincially Rare Daisy-leaved grape-fern (*Botrychium lanceolatum*) in lands adjacent to the Forest (see 4.2.2 *Regionally significant vascular plant species*, below). its sensitivity appears to be similar to that of Deciduous Forest habitat (above), though it is less biologically diverse, has less fragile substrate and is drier on average and thus is likely more tolerant of moderate trail use impacts.

3.1.10 Habitat 10: Coniferous Forest (FOC) (1.18 ha)

Dry, warmer-than-normal, rocky sites along or above the Hazeldean Escarpment support virtually pure White Pine and/or White Cedar groves, occasionally in proportions large enough to constitute the dominant vegetation. This habitat most frequently occurs in small sites dominated by other early successional forest cover. Some pine growth, such as in the ‘Cathedral Grove’ area west of the First Line Road ROW, is substantially taller than its associated deciduous growth (Figure 18).

While coniferous forest is common in the Conservation Forest, especially in the western areas along the Hazeldean Escarpment and elsewhere north of the railway, it seldom forms stands large enough to form distinctive units. One area of pine forest along Second Line Road near Morgan’s Grant subdivision is the exception.

White Pine domination is shared with a variety of deciduous canopy species including Trembling Aspen, White Ash, Basswood, Ironwood and Red Oak. Undergrowth is sparse to moderately dense and typically includes species such as the following:

- Bracken Fern (*Pteridium aquilinum*)
- Pink Ladyslipper (*Cypripedium acaule*)
- Wintergreen (*Gaultheria procumbens*)
- Wild Sarsaparilla (*Aralia nudicaulis*)
- Poverty-grass (*Danthonia spicata*)
- Large-leaved Aster (*Eurybia macrophylla*)
- Canada Mayflower (*Maianthemum canadense*)
- Northern Bush-honeysuckle (*Diervilla lonicera*)
- Grass Sedge (*Carex gracillima*)

Figure 18: small forest of mature White Pine west of First Line Road ROW



- Serviceberry (*Amelanchier arborea* var. *laevis*)
- Common Juniper (*Juniperus communis*)
- Canada Blueberry (*Vaccinium myrtilloides*)

One ecotype of Coniferous Forest has been documented in the Conservation Forest. That is *Dry-fresh Pine Forest* (FOC-1), restricted to a rocky, dry area along the Second Line Road ROW.

Small White Pine stands, such as ‘Cathedral Grove’ by the First Line Road, occur elsewhere.

Significance and Sensitivity: This is a rare habitat in Ottawa (Geomatics International 1995); it is not known to support any significant vascular plant species in the Conservation Forest. It is limited to minor groves within Mixed or Deciduous Forest and appears to share the sensitivity of those forest habitats as well.

3.2 NATIVE BIODIVERSITY

The following reviews the existing diversity of floral and faunal species within the Conservation Forest.

3.2.1 Flora

The South March Highlands Conservation Forest maintains the highest level of native floristic diversity of *any* natural area in the City of Ottawa. An annotated list of the total native flora of the South March Highlands (Appendix 1) identifies a total of 423 native vascular plant species from the Forest, including 38 that were unreported prior to the present study. This represents 94% of the floristic diversity of the larger South March Highlands area. This floristic diversity is exceeded in Ottawa only by the much larger (1900 ha) Stony Swamp Conservation Area in Nepean (Brunton 1983).

The ecological integrity of the flora and vegetation in the Conservation Forest is also exceptionally high, as measured by the ‘naturalness’ of the native flora. The native flora of the study area demonstrates an average Coefficient of Conservation (CC) rating of 5.08 - higher than any City of Ottawa Urban Natural Area (Muncaster and Brunton 2006). The Coefficient of Conservation provides a rating of the ‘naturalness’ of native plant species (i.e. the degree to which each species requires relatively pristine conditions) on a zero to 10 scale, where 0 indicates species having no requirement for natural habitat and 10 indicating taxa which require pristine habitat. Ottawa and eastern Ontario urban natural areas typically average under 4.0. The next closest natural area rating to that of the Conservation Forest is the Britannia Conservation Area at 4.81 (Brunton and Muncaster 2005b).

3.2.2 Fauna

Breeding bird representation was reviewed in 2007 during a roadside survey by Bruce M. Di Labio (in lit). There does not appear to have been any substantial change in the nature or quality of breeding bird populations in the Conservation Forest since the early 1990s, however (B. Di Labio, pers. comm.). One of the uncommon species noted here throughout that period, however (Golden-winged Warbler), has been determined to be of conservation concern (*see 4.2 Significant fauna*, below).

Subjective observation suggests a substantial decline in populations of common amphibian species comparable to that apparent across the Ottawa Valley since the 1990s, with Common Toad, Wood Frog, all salamander species and Western Chorus Frog being particularly less conspicuous in and about the South March Highlands in 2007.

Only common mammals species were observed incidentally during 2007 field studies in the Conservation Forest, either directly or by signs (tracks, droppings, etc.). These include Little Brown Bat, Eastern Chipmunk, Striped Skunk, Raccoon, Red Fox, Coyote, White-tailed Deer, Red Squirrel, Woodchuck, Gray Squirrel, Muskrat and Beaver.

4.0 NATURAL ENVIRONMENT SIGNIFICANCE

4.1 SIGNIFICANT FLORA

The list of significant native vascular flora known from within and adjacent to the Conservation Forest is extensive.

as well as Butternut (*Juglans cinerea*) is

4.1.1 Provincially Significant species

Six native species known to occur within or adjacent to the Conservation Forest are designated as being Provincially Rare (Oldham 1999; NHIC, in lit). Two of these are also designated as federally and provincially Endangered under national and Ontario Species At Risk legislation (SARA - Canada

South March Highlands Conservation Forest Existing Conditions

2003 and SARO - Ontario 2007, respectively). These six designated species are listed in the following table.

Species	Habitat(s)	Significance
<i>Botrychium lanceolatum</i> (Daisy-leaved Grapefern) ** ‡	FOD	Provincially Rare
<i>Woodsia oregana</i> ssp. <i>cathcartiana</i> (Oregon Woodsia) ** ‡	RB	Provincially Rare
<i>Picea rubens</i> (Red Spruce)	FOM	Provincially Rare
<i>Juglans cinerea</i> (Butternut)	CU, FOD, RB	SARA/ SARO - Endangered (Regionally common)
<i>Ceratophyllum echinatum</i> (Spiny Coon-tail) ** ‡	SAS	Provincially Rare
<i>Panax quinquefolius</i> (Ginseng) ** ‡?	FOD	SARA/ SARO - Endangered
** adjacent to but not within the Conservation Forest		‡ believed to be extirpated

Excluding the common Butternut, only one of the Provincially Rare vascular plants species known to occur (or to have occurred) in the larger South March Highlands has been found within the Conservation Forest. The other Provincially Rare species are either known or suspected to have been extirpated from all of the South March Highlands. At least three of these species appear to have been lost as a direct result of human activity (the *Woodsia* and *Ceratophyllum* by the expansion of residential development south of Watts Creek and the *Panax* by illegal harvesting).

Red Spruce (*Picea rubens*), a native tree species first discovered in the Conservation Forest in 2007 and now considered rare in Ontario (.M. J. Oldham, NHIC, pers. comm.), was only recently recognized to occur in Ottawa (Brunton 2007). Two small groves were observed in 2007 north of Watts Creek in mixed forest (Figure 17, above) and other occurrences are suspected north of the railway near the First Line Road and by the Second Line Road west of Klondike Road (pers. obs.).

Listed as Endangered, the Butternut (*Juglans cinerea*) tree has been decimated in the eastern United States and further south in Ontario by a fungal infection (*Sicococcus clavigigenti-juglandacerearum*) that first appears as cankers (Figure 19) then leads to severe damage and ultimately

South March Highlands Conservation Forest Existing Conditions

to the death of the individual. It is feared this infestation will endanger the species in Canada at some time in the future. Accordingly, it is designated by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) as Endangered in Canada and has been placed on the SARA Schedule 1 (Endangered) list.

Butternut is presently common in Ottawa and across eastern Ontario and southwestern Quebec, however, with its occurrence in and about the Conservation Forest (Figure 20) being consistent with the distribution pattern seen in the majority of deciduous woodlots in Ottawa-Gatineau (Muncaster and Brunton 2005, pers. obs.).

All mature Butternut trees observed in the Conservation Forest and throughout the South March Highlands in 2007 exhibited evidence of the blight, although symptoms were not yet evident on most saplings. Despite over a decade of research in Canada and the United States, there is no known effective treatment or mitigation of the blight (Ostry et al., 1994). Accordingly, practical conservation management implications for individuals trees here or in any particular eastern Ontario/

Figure 19: Fungal canker (black patch by arrow) on mature Butternut (*Juglans cinerea*) [pen for scale is 14 cm long]



Figure 20: Butternut occurrences (stars) in and adjacent to South March Highlands Conservation Forest (2007)



western Quebec woodland area, are indefinable.

4.1.2 Regionally significant vascular plant species

Many of the species listed in the table (below) are discussed in the original South March Highlands inventories (Brunton 1992a, 1992b). While those descriptions of Regional status need not be repeated here, discussions for those taxa not previously reported from the Conservation Forest are provided following the summary table (below).

Regionally Significant vascular plant species	Habitat(s)
** adjacent to but not within the Conservation Forest ‡ believed to be extirpated	
<i>Diphasiastrum complanatum</i> (Northern Ground-cedar)	RB, FOD
<i>Diphasiastrum tristachyum</i> (Ground-cedar)	RB, FOD
<i>Diphasiastrum x habereri</i> (hybrid Ground-cedar)	RB, FOD
<i>Selaginella rupestris</i> (Rock Spikemoss)	RB
<i>Ophioglossum pusillum</i> (Adder's-tongue Fern) ‡?	CU
<i>Diplazium pycnocarpon</i> (Glade Fern)	FOD
<i>Dryopteris goldiana</i> (Goldie's Woodfern)	FOD
<i>Dryopteris x mickelii</i> (hybrid Woodfern)	FOD
<i>Woodsia ilvensis</i> (Rusty Woodsia)	RB
<i>Sparganium fluctuans</i> (Floating Bur-reed)	SAS
<i>Potamogeton illinoensis</i> (Illinois Pondweed)	SAS
<i>Glyceria canadensis</i> (Canada Manna Grass) **	MAM
<i>Milium effusum</i> (Wild Millet)	FOD
<i>Poa saltuensis</i> (Forest Meadow grass)	FOD
<i>Torreyochloa pallida</i> var. <i>fernaldii</i> (Fernald's Manna Grass)	SWT
<i>Carex backii</i> (Back's Sedge) ‡	RB
<i>Carex debilis</i> var. <i>rudgei</i> (Weak Sedge) **	SWM
<i>Carex echinata</i> (Prickly Sedge) **	SWM

South March Highlands Conservation Forest Existing Conditions

<i>Carex grisea</i> (Gray Sedge)		FOD,SWD
<i>Spirodela polyrhiza</i> (Large Duckweed)	‡?	SAS
<i>Juncus canadensis</i> (Canada Rush) **		MAM
<i>Luzula acuminata</i> (Wood Rush)		FOD
<i>Uvularia sessilifolia</i> (Small Bellwort)		FOM
<i>Galearis spectabilis</i> (Showy Orchis)	‡?	FOD
<i>Goodyera pubescens</i> (Downy Rattlesnake-plantain)	‡?	FOD
<i>Salix candida</i> (Hoary Willow)		SWT
<i>Persicaria hydropiperoides</i> (False Water-pepper)		SWT
<i>Persicaria punctata</i> (Water Knotweed)		MAM
<i>Chenopodium capitatum</i> (Strawberry-blight) **	‡	RB
<i>Claytonia virginica</i> (Virginia Spring-beauty)	‡	FOD
<i>Brasenia schreberi</i> (Water-shield)		SAS
<i>Ranunculus pensylvanicus</i> (Hairy Buttercup)		SWT
<i>Chamaesyce glyptosperma</i> (Ridge-seeded Spurge)		CU
<i>Toxicodendron radicans</i> (Climbing Poison-ivy)		FOD
<i>Viola rostrata</i> (Long-spurred Violet)	‡?	FOD
<i>Osmorhiza longistylis</i> (Anise-root)		FOD
<i>Sanicula canadensis</i> (Canada Snakeroot)		FOD
<i>Verbena stricta</i> (Hoary Vervain)		FOM
<i>Galium boreale</i> (Northern Bedstraw)		CU
<i>Viburnum dentatum</i> var. <i>lucidum</i> (Southern Arrow-wood) **	‡	FOD
<i>Bidens discoidea</i> (Disk Beggar-ticks) **		SWT
<i>Hieracium umbellatum</i> (Canada Hawkweed)		FOM

- ***Diphasiastrum x habereri* (hybrid Ground-cedar)**

A large patch of this sterile hybrid of the Regionally Significant *Diphasiastrum tristachyum* and the common *D. digitatum* was found in 2007 in Rock Barren habitat with its parent species near Huntmar Road [Dfb 16,996].

- ***Carex backii* (Back's Sedge)**
A small population of this uncommon, boreal, calcicolous sedge was found on a marble bedrock outcrop near the south shore of Watts Creek in 2001 (Brunton 2001); the site was destroyed (pers. obs.) by residential development in 2006 or 2007.

- ***Carex debilis var. rudgei* (Weak Sedge)**
A small population of this widespread acidophylic sedge was found on thinly buried sandstone bedrock below mixed swamp forest habitat at Heron Pond just outside the Conservation Forest in 2007.

- ***Carex grisea* (Gray Sedge)**
This southern sedge was observed to be locally common in deciduous swamp forest along the north side of Watts Creek by Kanata Pond.

- ***Uvularia sessilifolia* (Small Bellwort)**
A southern herb of deciduous forest, it was found in small numbers June 2007 along the north side of Watts Creek by Kanata Pond.

- ***Ranunculus pensylvanicus* (Hairy Buttercup)**
Observed in small numbers along the First Line Road ROW near Watts Creek in 1991 before it was recognized to represent a Regionally Significant species, this northern species was not seen in 2007.

- ***Osmorhiza longistylis* (Anise-root)**
This southern species was found to be locally common on rocky slopes in deciduous upland forest by Huntmar Road (Brunton 2005); plants were transplanted eastward in 2007 in a salvage operation as part of roadway reconstruction mitigation (pers. obs.).

- ***Sanicula canadensis* (Canada Snakeroot)**
This southern species was discovered on a rocky slope in deciduous upland forest by Huntmar Road in 2005, representing the only known City of Ottawa population (Brunton 2005, Brunton 2007).

- ***Viburnum dentatum* var. *lucidum* (Southern Arrow-wood)**
Some individuals of this southern shrub were noted in Morgan's Grant at a site recently destroyed by residential development (A. Dugal, per. comm., April 2005).

- ***Bidens discoidea* (Disk Beggar-ticks)**
A widespread southern herb, it was recorded in 2007 growing epiphytically on rotting logs in deciduous swamp habitat southeast of Heron Pond.

- ***Hieracium umbellatum* (Canada Hawkweed)**
This northern herbaceous species was found uncommonly under White Pine on dry rocky slopes by Huntmar Road in 2005 (Brunton 2005).

The 41 Regionally Significant plant species now known from the Conservation Forest represent 85% of the 48 Regionally Significant flora (including the Provincially Rare taxa) known in the larger South March Highlands. Thirteen (27%) of these, however, are either known or suspected to have been extirpated.

4.2 SIGNIFICANT FAUNA

Four SARA listed animals are known from the Conservation Forest and the South March Highlands; their distribution and local status are described below.

The Golden-winged Warbler (*Vermivora chrysoptera*) occurs in scrubby thicket habitat, typically on wetland edges. It has been observed in very small numbers (one or two birds) and is presumed to have bred in most of the last 5-10 years in and about the large thicket swamp along the railway track immediately east of Huntmar Road (pers obs; B. Di Labio, pers. comm.). Never common in the Ottawa area, the population of this southern passerine species has declined dramatically throughout its range in recent years, likely the result of habitat maturation, nest parasitism by Brown-headed Cowbirds and hybridization (Vallender 2007) and was designated Threatened in 2005. It is important to this Species At Risk that development in upland adjacent does not degrade the thicket swamp habitat upon which population is dependent.

Blanding's Turtle (*Emdoidea blandingii*) was recently placed on the SARA Schedule 1 (Threatened) list. It occurs in a wide-ranging species most frequently found as individuals or in small numbers in woodland pools. The species was observed on the boundary of the Conservation Forest near Heron Pond in 2007 and has also been seen in the past in ponds along the First Line Road (Figure 21) and at Watts Creek (Brunton 2004).

Figure 21: Duckweed-covered woodland pool frequented by Blanding's Turtle and Snapping Turtle, First Line Road ROW



The third SARA Schedule 1 (Endangered) listed animal observed in the Conservation Forest in 2007 is the common insect, Monarch Butterfly. Scattered individuals were regularly noted here, as they were commonly in both natural and artificial sites across the Ottawa Valley in 2006 and 2007 (pers. obs.). The species is SARA-listed because of circumstances on its Mexican winter range. Its passing occurrence here is of no ecological significance, nor does it present any land management implications.

The fourth species of conservation concern is Milk Snake (*Lampropeltis triangulum*), an uncommon reptile reported to have been relatively common in the Shirleys Bay area - South March (hamlet) area east of the study area in the mid 1980s (Oldham and Sutherland 1986). Massive urbanization of that area (Morgan's Grant, etc.) has substantially reduced the extent of potential habitat in this latter area. The provincial population of Milk Snake has declined in recent years to the degree that it is now listed as a SARA-scheduled 'Special Concern' species. Such taxa do not receive the protection afforded designated Endangered or Threatened SARA or Ontario SAR, but are tracked to determine if population declines will continue to such a point where more restrictive designation is warranted.

Although habitat for Milk Snake (rocky, dry clearings in young hardwood and mixed forest) is present in the Conservation Forest and throughout the South March Highlands, no animals were observed during the present study.

4.3 SIGNIFICANT ECOLOGICAL FUNCTIONS

Known and potential representation of special features in the Conservation Forest and the area's contribution to local and regional natural environment and landscape protection values beyond its borders are largely dependent on the existence of suitably performing ecological functions. The significant watershed protection contributions of the South March Highlands to surface and ground-water systems beyond the boundaries of the Conservation Forest have been documented in recent studies of the Carp River and Shirleys Brook watersheds.

The Carp River Subwatershed Study (Robinson et al., 2002) established that while much of the Highlands is beyond the limit of the watershed, a number of small drainage channels flow down the Hazeldean Escarpment along the western edge of the Conservation Forest and contribute surface flow to the headwaters of the Carp River. The western edge of the South March Highlands, including the portions of the Conservation Forest, was identified as one of the Centres of Ecological Significance that contributed to the ecological functions of the overall watershed.

Similarly, the Shirleys Brook study identified that the northern and eastern portions of the Conservation Forest contributed surface flow, hydrological recharge and ecological function capacity to the larger watershed area flowing eastward to the Ottawa River (Aquafor Beech and Brunton Consulting ,2006).

Other significant ecological function contributions of the Conservation Forest are discussed below.

4.3.1 Wildlife Corridor

The Carp Ridge represents a major corridor for the exchange of ecological resources within western Ottawa. Be that the movement of individual animals, the transport of seeds, or the long-term expansion or contraction of habitats, this more or less continuous band of forested landscape connects natural habitats from the Ottawa River at Morris Island to the urban core of southern Kanata.

Over and above large number of woodland wildlife including migratory passerine birds, common amphibian and reptiles and a vast array of native vascular plants, the large size of this area of continuous habitat even facilitates the movement of large animals such as Black Bear (Brunton 1997). As the most diverse and furthest ‘inland’ area of this larger natural landscape, the Conservation Forest provides a critical role element of this corridor function.

4.3.2 Native Biodiversity Representation

The remarkable diversity and abundance of representative native flora, fauna and natural habitats of the area have been described above. The Conservation Forest represents one of the most important reservoirs of ecological potential in the City of Ottawa, providing resources for the renewal of depleted natural areas elsewhere as well as encouraging diversification within established habitats. This contribution works on a local level through its support of individual natural areas and on a larger level within the Carp Ridge and across City of Ottawa natural landscapes.

4.3.3 Interior Forest Habitat

The Conservation Forest continues to provide one of the most significant areas of Interior Forest in the vicinity of urban-zoned Ottawa, extending beyond it into the rural area through its contribution as the most ecological complex component of the Carp Ridge. Interior Forest area -continuous natural habitat 100 m or more removed from disturbance (Muncaster and Brunton 2005) - has been contained and substantially reduced by residential development in the southern and eastern South March Highlands (Figure 22). It is further challenged by the irregular shape of the Conservation Forest, resulting in a long narrow unit in the south along Watts Creek and a narrow ‘bottleneck’ in the rural lands to

Figure 22: continuous forest habitat westward from Trillium Woods



the north of the Trillium Woods (Figure 2).

Proposed residential development (Muncaster 2003) will virtually eliminate remaining Interior Forest values in the urban portion of the Conservation Forest.

4.3.4 Habitat Condition

Ecologically key areas within the Conservation Forest such as the interior of the Trillium Woods, the barrens and ponds atop the Hazeldean Escarpment north of the railway, and the hardwood forests at the headwaters of Watts Creek and around Heron Pond, are in relatively pristine condition. They contribute substantially to the high Co-efficient of Conservation rating of the Conservation Forest (see 3.2.1 *Native Biodiversity: Flora*, above).

Few invasive plants are present, human impacts are rare, and natural systems are operating in a more or less unimpeded manner. These constitute an exceptional reservoir of biological capacity and an increasingly vital source of replenishment and renewal for less intact and more isolated natural landscapes elsewhere in western Ottawa.

5.0 IMPACTS AND ECOLOGICAL CHALLENGES

Existing natural conditions are affected directly and indirectly by a variety of existing and scheduled human activities. Such impacts have increased substantially since the original South March Highlands inventories were conducted in the early 1990s. Management of these increased environmental stresses in such a way as to ensure that the representative and significant natural features and function of the Conservation Forest become and/ or remain self-sustainable, will be the major challenge of the South March Highlands Conservation Forest Management plan.

A wide variety of impacts on natural diversity and ecological integrity were evident and documented in 2007. These are summarized below.

5.1 URBAN DEVELOPMENT

Residential and commercial development has removed extensive areas of natural habitat adjacent to the Conservation Forest (especially to the east). Such development is scheduled to continue to present further impacts on remaining natural lands here (Delcan 2001, CH2MHILL 2001, Muncaster 2003). Over and above the removal of natural habitat and destruction of particular features, problems for native biodiversity associated with such development include habitat fragmentation, exposure of breeding wildlife to increased levels of noise and artificial light, detrimental competition from non-native invasive plants and animals, increased predation on native flora and fauna along woodland edges and degradation of wildlife corridor functions.

Areas particularly affected by such impacts include the lands south of Watts Creek and those to the east of the Trillium Woods - Second Line Road (Morgan's Grant) area. The ecological stress on the Conservation Forest resulting from such development will become substantially greater with the future construction of residential subdivisions in The Shirleys Brook headwaters area and the area west of the First Line Road.

5.2 TRANSPORTATION CORRIDORS

Increasing traffic and roadway development has resulted in many of the same effects on the Conservation Forest as development since the 1990s (noise, impact of non-native invasive plants and animals, increased predation along woodland edges and degradation of wildlife corridor functions), but on a substantially smaller scale to date. The up-grading (paving) and increased traffic levels of Goulburn Forced Road are the most dramatic consequences of existing increased transportation activity.

A small area of upland forest habitat was eliminated in 2007 by the upgrading of the section of Huntmar Road north of the railway. This impact was substantially mitigated, however, by realignment of the roadway to avoid most of the significant habitat and by the salvage of affected populations of significant flora remaining in the affected area (pers. obs.).

Proposed roadway development will have a substantial impact on the ecological features and function of the Conservation Forest. Most significant will be the proposed Terry Fox Road connection which will see a four-lane, east-west arterial route crossing the central portion of the Highlands (Dillon Consulting 2003). This roadway development will result in destruction of significant habitat, increased wildlife mortality along the roadway, reduced wildlife corridor function within the South March Highlands, fragmentation of the retained portion of presently continuous natural forest west of the First Line Road ROW, and reduction in the area of Interior Forest habitat in the Conservation Forest.

On a smaller scale, the upgrading of Goulbourn Forced Road is scheduled to employ an earth-fill and a culvert crossing at Watts Creek which will somewhat increase ecological stress (loss of natural habitat, no improvement of limited wildlife corridor function) on that already degraded wetland corridor.

The Kizell Drain sewer line construction between Goulbourn Forced Road and Kanata Pond presented substantial short-term impacts on this wetland (Brunton 2001) but the limited natural values of the site and the mitigative measures imposed appear to have largely neutralized long-term impacts on the limited values of already severely disturbed wetland habitat (Brunton 1992a).

The negative influences of the present railway corridor are minimized by its low level of use and its passage through an area long transformed by active and former agricultural activity (Figure 23). Negative impacts (primarily interference in wildlife corridor function) may increase if larger scale utilities (e.g. light rail rapid transit) is developed here. Development of this corridor may be benign or even positive, however, if lower impact development such as bicycle and pedestrian pathways are implemented.

Figure 23: railway corridor eastward from First Line Road ROW



5.3 RECREATIONAL PATHWAYS

The pressures of unstructured recreational use continue to increase throughout the South March Highlands and other near-urban wild lands. Contemporary subdivision construction in and around Ottawa tends to maximize the density of serviced land development, with the small (5% or less) Open Space portion also being transformed from a natural state into manicured recreational and/ utility spaces. Citizens desiring unstructured recreation opportunities not dependent on built facilities are increasingly confined to using such areas as the Conservation Forest. The physical impact of such recreational pressure is significant in many portions of the Conservation Forest and the South March Highlands. Impact is reflected here largely through the presence, condition and implications of formal and informal trail use.

At first glance, a woodland pathway appears to be the very definition of a benign facility. While they provide substantial benefits for users of natural habitats, they ironically do so at some cost to the natural environment features being celebrated and explored by this seemingly passive activity. Successful pathways, then, are those that find a balance between providing access and appreciation for users and protecting the features and functions of the landscape.

Pathways, by their very nature, provide concentrated access into areas that might otherwise be rarely or never visited. This increased access and traffic can lead to a wide variety of negative impacts on natural landscapes. These include an increase in litter, the vandalism of trees and landscape features, increased incidence of non-native fire, harassment and predation of native wildlife species by domestic

Figure 24: destruction of natural habitat by mountain bike trail washout



Figure 25: severe slope erosion to bedrock along mountain bike trail



pets and by opportunistic natural predators, direct wildlife mortality from human traffic, and the increased opportunities for the spread of invasive weeds. Pathways can also result in loss of habitat (Figure 24), and locally severe soil erosion (Figure 25) as well as increased sedimentation into adjacent wetland habitats, and death to canopy trees through root damage (Figure 26).

Figure 26: severe root damage along mountain bike trail



The number and distribution of pathways within the Conservation Forest is extensive. On one extreme are formal urban structures such as the wide gravel-surfaced tracks crossing the Trillium Woods and along the shores of Kanata Pond (Kizell Drain). These trails (Figure 27) are heavily used by urban pedestrians and joggers, and to a lesser degree, by dog-walkers.

Figure 27: major gravel-surfaced pathway through Trillium Woods



The impact of such facilities can be substantial, resulting for example, in the loss of over 0.5 ha of significant vegetation and the loss of significant plant species in the Trillium Woods. The overall length of wide-track trails in the Conservation Forest is relatively minor to date. Their impact can be substantially mitigated by appropriate route selection (avoiding significant habitat and features and construction within woodland edges), the strategic placement of culverts to prevent artificial pooling and diligent operational maintenance to avoid washouts, invasive weed development, etc.

The vast majority of trails in the Conservation Forest remain informal pathways developed by the unregulated and unplanned passage of skiers, hikers and more recently, mountain bikers. This trail

network has increased exponentially throughout the Conservation Forest since the early 1990s (pers. obs.), largely as a result of increased organized and individual activity by mountain bikers.

The majority of the informal trail corridors are relatively unobtrusive, free of litter and debris and have only localized negative impact on natural habitats and features. This is particularly the case when those pathways traverse already disturbed landscapes such as unopened roadway ROWs (Figure 28).

Figure 28: hard-packed mountain bike trail along Second Line Road ROW



Long-term, cumulative effects on ecological functions appear to be a more significant consideration than direct impact. These include consideration of the ability of areas to maintain representative native biodiversity in the face of wildlife disturbance, to avoid micro drainage alterations, soil compaction and erosion impacts, etc.

Increased levels of habitat impact with particular trail sections that cross significant and sensitive vegetation were evident even over the course of 2007 field work. It seems clear that without appropriate, ecologically based management in place, substantial habitat damage will result in significant habitat throughout the Conservation Forest within a relatively short time span .

Heavy use sections of mountain bike trails show particularly severe erosion in wetland habitats and on rocky slopes (e.g. Figures 24 to 26, above), particularly in the Huntmar Road area north of the railway corridor and in the Watts Creek area east of Goulburn Forced Road. Much of the latter impact, however, is along trail sections in upland landscape scheduled for destruction by future residential development.

Similarly, construction of various jumps (Figure 29), bridges, chutes (Figure 30) and other structures for mountain biking purposes has contributed to physical landscape impacts (sedimentation

Figure 29: mountain bike jump along trail north of railway



Figure 30: chute constructed along trail near Huntmar Road for mountain bike racing



Figure 31: faulty culverting and expanded impact area along mountain bike trail



Figure 32: mountain bike impact by ineffective trail bridge



of streams, destruction of habitat, soil erosion, etc.) in a number of locations.

A variety of crossing structures have been constructed in wet sites along particular trail sections to assist mountain bike riders. Some of these have been ineffective and counter-productively have encouraged riders unwilling to cope with the faulty facility to impact a wider area (Figures 31 and 32).

Figure 33: sandstone 'roman road' across muddy section of mountain bike trail



Other trail enhancement attempts , however, have been more successful by employing biologically neutral, local material like sandstone slabs (Figure 33) that appear to facilitate easier mountain bike travel and enhance protection for landscape features and functions.

Although involving a relatively small number of participants, dog walking (leashed and unleashed) is a significant trail activity in this natural landscape because of the potential for the activity to directly negatively impact wildlife (noise, harassment and pursuit of wildlife, waste control).

5.4 BIOLOGICAL AGENTS

Non-native or otherwise unnatural biological activity is also having significant effects on the diversity, ecological integrity and, most importantly, the sustainability of the Conservation Forest. Habitat modification is the only form of ecological impact that is deemed to represent a greater threat to native biodiversity on a global scale than the spread of non-native invasive vegetation and wildlife (Clout 1995). The explosive growth of non-native organisms in natural habitats is only achieved through the displacement of native species or through utilization of natural resources that otherwise would be available for the maintenance and sustenance of native wildlife. Severe non-native infestation results in less diverse habitats with reduced levels of ecological integrity that no longer are able to provide their full ecological function contributions. This is less of a concern in fragmented habitats and along roadway ROWs, etc. where landscape transformation and edge effects have already substantially reduced potential ecological contributions. The negative impact of invasives within the already rare areas of relatively intact natural habitat like those in much of the Conservation Forest, however, represent significant threats to their long term sustainability.

Biological elements that significantly influence natural features and functions in the Conservation Forest are identified below.

5.4.1 Invasive flora

A number of invasive non-native plant species were recently identified in the urban portion of the Conservation Forest (Muncaster and Brunton 2005). These are as follows:

Tartarian Honeysuckle (*Lonicera tartarica*)
Black Buckthorn (*Rhamnus cathartica*)
Glossy Buckthorn (*Rhamnus frangula*)
Garlic Mustard (*Alliaria petiolata*)
Manitoba Maple (*Acer negundo*)
Dog-strangling Vine (*Cynanchum rossicum*)

Two of these, Dog-strangling Vine and Garlic Mustard are especially threatening to natural values because of their uncommon ability to invade even undisturbed natural woodland habitats. Garlic Mustard, a particularly aggressive invader of native hardwood forest habitats in eastern North America (Nuzzo 1994), was not observed in the 1992 Conservation Forest inventories but is now established along the edge of the Trillium Woods by Goulbourn Forced Road (Brunton and Muncaster 2005).

Equally threatening is the Dog-strangling Vine, first seen as a single patch in the southern Trillium Woods in 1991 (Brunton 1992a) but observed in several sites there as well as along the ROW of the proposed Terry Fox Road above the Hazeldean Escarpment in 2007. The ability of this to invade natural deciduous woodland habitats and replace native ground flora upon which a wide variety of native biodiversity is dependent ((Miller and Kricsfalusy 2008) is of considerable long-term conservation concern.

Continued urban growth and increased recreational usership will encourage the spread of such non-native weeds along the woodland edges of the Conservation Forest and, potentially more significantly, along disturbed trail borders more deeply into presently intact woodland habitats.

5.4.2 Invasive fauna

Many non-native fauna occur in the Ottawa area, the most conspicuous being a variety of birds. European Starling, Wild Turkey¹, Canada Goose¹, Rock Pigeon, House Finch and House

¹ Both species are native elsewhere in Ontario (far to the south and to the north, respectively - Cadman et al. 1987) but there is no evidence that breeding ever occurred naturally in the Ottawa Valley (Eifrig 1910-1911; Lloyd 1923-1924). Both were introduced into the Ottawa area in recent

Sparrow are all seen in the Conservation Forest, but only two of these, Wild Turkey and Canada Goose appear to presently be having a significant impact on native biodiversity.

The impact of the rapidly increasing population of Wild Turkey is more potential than actual. It consumes large quantities of forest floor resources otherwise utilized by native gallinaceous species, however, and the cumulative impact of this on the forest floor may be significant.

Large breeding populations of non-native Canada Geese populations have clearly degraded the already poor quality aquatic habitat of Kanata Pond, fouling the shore and water with their nutrient-rich droppings (Figure 34) and damaging protective vegetation. Breeding pairs also degrade wetland habitats in all of the large ponds in the South March Highlands by harassing native wildlife species and dominating prime breeding and feeding habitat (pers. obs.).

Figure 34: abundant Canada Goose droppings and close-cropped grass at Kanata Pond margin



As noted previously (see 4.1.1 *Significant Floras, Provincially Significant species*, above), a rapidly spreading and uncontrolled fungal infection is devastating native Butternut (*Juglans cinerea*) populations. While that unfortunately will likely lead to the elimination of this tree in the South March Highlands, the absence of this species of predominantly disturbed woodland edges will likely have no significant effect on other native taxa, aside from the loss of Butternut fruits as a minor source of food for some mammals.

A possible significant negative change appears to be underway within the soil of the richest deciduous forests in the Conservation Forest as a result of the invasion of non-native earthworms. Recent research into the long term effect of exotic earthworm consumption of forest floor organic material indicates widespread soil degradation, dramatic reductions in ground level vegetation, microclimatic change though associated forest floor drying, and a resultant reduction in floristic and faunal diversity (Hendrix and Bohlen 2002, Gundale 2002, Wironen and Moore 2006, Pittaway 2007).

years by fish and game organizations hoping to establish huntable populations (Egan 2005, Rogers 2005).

Personal observations in The Conservation Forest (the Trillium Woods in particular), suggest that such a decline in the population density of some common plant species dependent on rich loamy substrate in mature deciduous forest habitats is occurring. Species suspected to be declining since the late 1990s include White Trillium (*Trillium grandiflorum*), Toothwort (*Cardamine diphylla*), Spring-beauty (*Claytonia* spp.), Maidenhair Fern (*Adiantum pedatum*), Wild Leek (*Allium tricoccum*), Christmas Fern (*Polystichum acrosticoides*) and Hepatica (*Anemone acutiloba*). Such suspected declines were independently observed by others familiar with those species and these sites (M. Weber, pers. comm.).

Comparably dramatic has been the apparent decline in population of woodland salamanders which are similarly directly and indirectly dependent on soil organics for both food and shelter. Few were observed in searches of almost 200 Urban Natural Areas in Ottawa (Muncaster and Brunton 2005) and none were noted in searches of suitable habitats during the present study of the Conservation Forest. Salamanders, particularly Spotted Newt, Red-backed Salamander and Blue-spotted Salamander, were readily found in wetter areas within deciduous forest habitat within the Conservation forest in the 1980s and 1990s (pers. obs.).

Although these interpretation are a speculative, they indicate a potentially important area for ecological investigations in the Conservation Forest.

5.5 CLIMATE CHANGE

The growing irregularity of weather events and increasing annual temperature across temperate to arctic regions of the earth is unquestionably a matter of great concern here and throughout the industrialized world. The Conservation Forest is directly impacted through subtle and direct consequences of this global threat, including the advancement of competition from drought tolerant invasive weed populations, increased vulnerability to abnormally frequent and/ or intense fire, potential (?) reduction in ground water and surface water storage capacity, etc.

Although impacts on the Conservation Forest are incremental and subtle, one very significant impact of a succession of atypically mild winters resulting from this climate warming is an abnormally high population of White-tailed Deer here and in many areas of eastern Ontario. Enhanced rates of

winter deer survival has benefitted from a variety of factor including less demanding weather conditions. These unnatural high numbers have lead to unprecedented levels of vegetation browsing, reducing the quality and abundance of canopy saplings, degrading forest floor vegetation and reducing the overall ecological integrity of woodland habitats (Broadfoot and Voigt 2000) .

6.0 CONCLUSIONS AND MITIGATION

6.1 SIGNIFICANCE AND SENSITIVITY CONCLUSIONS

Remarkably, much of the native biodiversity identified in the 1991 - 1992 South March Highlands inventories is retained within the 35% of the former South March Highlands conservation area presently designated as Conservation Forest. Approximately 94% of the native vascular plants of the larger area, for example, are (or were) found here. The fragility of this representation is underscored, however, by the wide variety and serious nature of present and increasing environmental stresses described in section 5. *Impacts and ecological challenges* (above).

It also bears repeating that the 41 Regionally Significant plant species now known from the Conservation Forest represent only 85% of the 48 such taxa known from the larger former conservation area and include *none* of the known Provincially Significant species of the South March Highlands. More ominously, perhaps, is the fact that 13 (27%) of Regionally Significant taxa, are either known or suspected to have been extirpated. Similarly, one known SARA-scheduled (Threatened) animal species, Blandings Turtle, has only been observed at the very western and northern edges of the Conservation Forest while another SARA-scheduled (Threatened) species, Golden-winged Warbler occurs at a site adjacent to a proposed arterial roadway corridor.

This evidently lower level of sustainability for the most vulnerable components of the native biodiversity of the Conservation Forest is particularly disquieting when future ecological isolation and the fragmentation of remaining natural landscapes is factored in. The proposed residential and transportation development within the South March Highlands (Terry Fox Road arterial, Second Line Road extension, etc.) undoubtedly markedly increase ecological stress on both the representative and exceptional natural features and functions of the Conservation Forest .

A measure of the sensitivity to disturbance of the habitats in the Conservation Forest has been developed in this study through consideration of the disturbance tolerance of particular habitats and observation of present and projected levels of impact upon them over the course of 2007 field investigations. This assessment reflects both seasonal issues (e.g. consideration of wildlife breeding cycles, resource vulnerabilities, etc.) and habitat character (e.g. rock barren impact tolerance, wetland habitat recovery, etc.).

The assessment of habitat sensitivity is intended to assist in management planning in the Conservation Forest on a habitat by habitat basis. These assessments are described in 3.1 *Natural Environment Features and Functions: Habitats*, above.

6.2 MITIGATION OPPORTUNITIES

The Conservation Forest is clearly in a fragile state and facing serious challenges to its long-term ecological integrity. It requires effective and timely conservation management plans and impact mitigation actions if many of its important ecological features and functions are to be sustained. Management of Conservation Forest recreational activity will need to focus largely on the design and operation of trails within it and mitigation of the ecological stresses exerted by external development.

Size and shape

The irregular shape of the Conservation Forest presents various conservation management challenges due to reductions in interior forest area, constraints to wildlife passage, etc. This will severely limit the long-term sustainability of natural habitats in the southern (urban) portion of the Conservation Forest. Additions of natural/ near- natural buffer areas are necessary along Watts Creek east of the Goulbourn Forced Road and in the 'narrows' between the Trillium Woods and Morgan's Grant if these areas are to be self-sustainable.

Even at 400 ha, the Conservation Forest is presently too small to fully represent South March Highlands natural features and functions. A substantial proportion of that deficiency, however, is represented in the area immediately east and north of Heron Pond. Were the contributions of that area

included within those of the present Conservation Forest, total protected floristic representation would rise to 98%. Significant species representation would also increase considerably, rising to 85% of the South March Highlands total. Substantially better representation of Blanding's Turtle breeding habitat would also be achieved. Conservation management of this adjacent landscape is clearly a desirable objective of impact mitigation for the Conservation Forest.

It is recommended that management planning consider mechanisms for incorporating and protecting the ecological contributions of adjacent lands, particularly those to the north, to minimize negative impacts of the unnatural shape of the Conservation Forest.

Trail development

The plethora of informal, unplanned mountain bike trails - particularly in the urban-zoned portion of the Conservation Forest - is having substantial negative impacts on upland habitats and associated wildlife. The trail system must be rationalized to a sustainable number of routes that are designed and positioned to reflect a) the over-riding priority of ecological protection in the Conservation Forest, and b) the carrying capacity of that landscape.

It is recommended that consideration of trail development during management planning include the following:

- elimination of chutes, jumps and the like along trails throughout natural habitat areas;
- trail routing and location should be directed to the periphery of continuous natural habitats (i.e. into already disturbed edge effect zone);
- restriction of heavier impact, greater use trails (e.g. wide-track surface pathways) to disturbed habitats and woodland edges in urban-zoned portions of the Conservation Forest;
- employment of biological neutral bridging of wet spots along trails (e.g. placement of rock slabs) to avoid easily erodable soils, damage to tree roots, damage to wildlife habitat, etc.

Research and restoration potential

The habitat diversity and remarkable ecological integrity of the Conservation Forest presents a unique, long-neglected opportunity for ecological research in the National Capital Region. It provides exceptional potential for academic ecological research in relatively intact and readily accessible natural landscape. The absence of a long-term baseline habitat investigation and biodiversity monitoring program represents a substantial missed research and educational opportunity by Ottawa area post-secondary institutions.

There is also considerable opportunity for applied research to be conducted that would relate directly to long term conservation management needs of this and other important natural environment areas in eastern Ontario and western Quebec. These include:

- ecologically appropriate control of invasive plants, with immediate emphasis on Garlic-mustard and Dog-strangling Vine;
- establishment of research program for assessment and control of exotic earthworm impact on hardwood forest soil and vegetation quality;
- establishment of climate change monitoring station(s);
- establishment of research program for the development of techniques for upland forest natural habitat restoration.

Mechanical removal of the existing small populations of Dog-strangling Vine and garlic Mustard (following focused surveys and location of all populations) would constitute important protective conservation measures. These populations are manageable at present but developments elsewhere indicate that such populations will become unmanageably large in a relatively short period of time if control efforts are not undertaken promptly.

The proposed realignment of Goulbourn Forced Road northward to the proposed Terry Fox Road arterial west of the Trillium Woods (Dillon Consultants, in lit, 2007) responds to long-standing arguments that the present roadway through the Trillium Woods be closed and restored to a natural condition (Brunton 1992a). Relocation of the wide gravel Trillium Woods pathway to this rehabilitated ROW might also be a viable, possibly preferred, alternative to re-routing particularly intrusive existing sections.

6.3 ECOLOGICAL INTEGRITY

The overall ecological integrity of the Conservation Forest appears to be more or less comparable to the level recorded in the early 1990s, although early indications of landscape-scale degradation appears to be evident. Aquatic systems seem to be somewhat degraded since that time, for example, with substantially fewer ephemeral woodland pools still flooded by mid-summer, less open water evident in beaver ponds and lower, slower water flow in the upper reaches of Shirleys Brook (pers. obs.). Poor water quality in Kanata Pond and other wetlands is at least partially a consequence of the abundance of breeding populations of non-native Canada Geese.

Upland systems appear to have largely maintained their 1900s level of native biodiversity but there is little doubt that the exceptionally high Coefficient of Conservation rating of the area (<5.0) will decline as proposed urban development removes adjacent natural habitat and increases the level of ecological stress. Accordingly, there is an urgent need to initiate an ecologically based management plan for the Conservation Forest while mitigation options remain as numerous as they will ever be.

To accommodate this important ecological consideration it is recommended that management planning include consideration of the following

- identification of a substantial undisturbed core natural habitat area within which recreational facilities will not be constructed;
- seasonal access and use limitations to reduce direct and indirect impact on soil, vegetation and, in particular, breeding wildlife;
- prohibition of off-leash pets and seasonal prohibition (during spring-early summer wildlife breeding season) of leashed pets on trails supporting sensitive habitats;
- relocation of major recreational pathway crossing the Trillium Woods to the edge of the woodland or along present ROW when Goulbourn Forced Road is re-routed, and installation of proper anti-pooling culverts to reduce habitat fragmentation, minimize wildlife impact and reduce habitat destruction.

7.0 REFERENCES CITED

Aquafor Beech & Brunton Consulting Services. 2006. *Greater Shirley's Brook – Constance Creek Environmental Management Study*. [Unpublished report for City of Ottawa], Aquafor Beech Ltd., Brampton.

Bakowsky, W. 1996. *Natural heritage resources on Ontario: vegetation communities of southern Ontario*. Natural Heritage Information Centre, Ontario ministry of natural Resources, Peterborough.

Broadfoot, J. D. and D. R. Voigt. 2000. *The status of deer herds in the western Greenbelt of the National Capital and recommendations for their management*. National Capital Commission, Ottawa.

Brownell, V. and M. H. Larson. 1995. *An evaluation framework for natural areas in the Regional Municipality of Ottawa-Carleton: volume 1*. Planning and Property Services Dept. Report 28-06, Regional Municipality of Ottawa-Carleton, Ottawa.

Brunton, D. F. 1982. *An Ecological Inventory of the Stony Swamp Conservation Area, National Capital Commission Greenbelt, Nepean, Ontario*. Conservation Studies 5, National Capital Commission, Ottawa.

Brunton, D. F. 1988. *Nature and Natural Areas in Canada's Capital*. The Ottawa Citizen, Ottawa.

Brunton, D. F. 1992a. *Natural Environment Inventory of the Kanata Lakes Study Area, Kanata, Ontario*. Daniel Brunton Consulting Services, Ottawa.

Brunton, D. F. 1992b. *South March Highlands Study Area: Natural Environment Assessment*. Daniel Brunton Consulting Services, Ottawa.

Brunton, D.F. 1997. *Summary Natural Area reports for Natural Areas west of the Rideau River (500 series)*. Planning and Development Approvals Department Report 28-08d, Regional Municipality of Ottawa-Carleton, Ottawa.

Brunton, D.F. 2001. *Natural environment assessment: Beaverpond Sanitary Sewer line corridor, Kanata, City of Ottawa, Ontario*, Daniel Brunton Consulting Services, Ottawa.

Brunton, D.F. 2004. *Delineation of Natural Environment Area in the South March Highlands Special Study Area, Kanata, City of Ottawa*. Planning and Development Approvals Branch, City of Ottawa.

Brunton, D.F. 2005. *Natural environment assessment: Huntmar Road upgrade corridor (Carp River to Old Carp Road), Kanata, City of Ottawa, Ontario*, Brunton Consulting Services, Ottawa.

Brunton, D. F. 2005b. *Vascular plants of the City of Ottawa, with identification of Significant species*, Appendix A of Muncaster Environmental Planning and Brunton Consulting Services. 2005. *Urban Natural Areas Environmental Evaluation Study, Final Report*. Planning and Growth Management Department, City of Ottawa, Ottawa.

Brunton, D. F. 2007. Additional City of Ottawa vascular plant taxa: 2005 - 2006. *Trail & Landscape* 40: 131-141.

Brunton, D. F. and B. Muncaster. 2005. *UNA 1: Trillium Woods*, in Muncaster Environmental Planning and Brunton Consulting. 2005. *Urban Natural Areas Environmental Evaluation Study*, Planning and Growth Management Department, City of Ottawa, Ottawa.

Brunton, D. F. and B. Muncaster. 2005b. *UNA 116: Britannia Conservation Area*, in Muncaster Environmental Planning and Brunton Consulting. 2005. *Urban Natural Areas Environmental Evaluation Study*, Planning and Growth Management Department, City of Ottawa, Ottawa.

Burns, B. et al. 1972. *March Past*. Department of the Secretary of State, Ottawa.

Cadman, M.D., P. F. Eagles and F.M. Helleiner (Compilers). 1987. *Atlas of the Breeding Birds of Ontario*. University of Waterloo Press, Waterloo.

Canada. 2007. *Statutes of Canada, 2002, Chapter 29, Species At Risk Act*. Canada Gazette Part III, 31 January 2003.

CH2MHILL. 2001. *Kanata Lakes Natural Environment Area Implementation Plan.* CH2MHILL Ottawa.

Clout, M. 1995. Introduced species: the greatest threat to global biodiversity? *Species* 24: 32 - 36.

Delcan Corporation. 2001. *South March Highlands Concept Design Summary, Area 10* [Morgan's Grant]. Delcan Corporation, Ottawa.

Dillon Consulting. 2003. *Terry Fox Drive Environmental Assessment Addendum and Functional Design Brief Update; Richardson Side Road to Realigned Goulbourn Forced Road* [Draft]. Dillon Consulting Ltd., Ottawa.

Egan, K. 2005. Honk if you hate Canada Geese. *The Ottawa Citizen* 30 May 2005.

Eifrig, C. W. G. 1910-1911. The birds of Ottawa. *The Ottawa Naturalist* 24: 152-163, 176-178, 187-206, 222-228.

Freeman, E. B. 1979. [Editor]. *Geological Highway Map, Southern Ontario.* Map 2441, Ontario Geological Survey, Toronto.

Gundale, M. J. 2002. Influence of exotic Earthworms on the soil organic horizon and the rare fern *Botrychium mormo*. *Conservation Biology* 16: 1555-1561.

Henrix, P. F. and P. J. Bohlen. 2002. Exotic earthworm invasions in North America: ecological and policy implications. *Bioscience* 52: 1-11.

Kanata. 1981. *Application to Register Notice of An Agreement, 26 May 1981.* [Ottawa Land Registry Office, NS140350].

Kanata. 1991. *Official Plan of the City of Kanata.* Consolidated 7 January 1991. City of Kanata, Kanata.

Lloyd, H. 1923-1924. The birds of Ottawa, 1923. *The Canadian Field-Naturalist* 37: 101-105, 125-127,

151-156, 38: 10-16.

Miller, G. C. and V. Kricsfalusy. 2008. *Dog-strangling Vine - Cynanchum rossicum (Kleopow) Borhidi - a review of distribution, ecology and control of this invasive exotic plant.* Toronto and Region Conservation, Toronto.

Muncaster, B. 2003. *Environmental Impact Statement: Kanata Lakes North, Kanata Ward, City of Ottawa.* Muncaster Environmental Planning, Ottawa.

Muncaster Environmental Planning and Brunton Consulting Services. 2005. *Urban Natural Areas Environmental Evaluation Study, Final Report.* Planning and Growth Management Department, City of Ottawa, Ottawa.

Muncaster Environmental Planning and Brunton Consulting Services. 2006. *Urban Natural Areas Environmental Evaluation Study: Addendum - 2005 Fieldwork Results, Final Report.* Planning and Growth Management Department, City of Ottawa, Ottawa.

Nuzzo, V. 1997. *Alliaria petiolata.* Proceedings of Exotic Pests of Eastern Forest Conference April 8-10, 1997, Nature Conservancy, Alexandria.

Oldham, M. J. 1999. *Natural heritage resources of Ontario: Rare vascular plants* (Third edition). Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough.

Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. *Floristic quality assessment system for southern Ontario.* Natural Heritage information Centre, Peterborough.

Oldham, M. J. and D. A. Sutherland. 1986. *1984 Ontario Herptofaunal Summary.* Essex Region Conservation Authority, Essex.

Ontario. 2007. *Bill 184, An Act to protect species at risk and to make related changes to other Acts.* Legislative Assembly of Ontario, Toronto.

Ostry, M. E., M. E. Mielke and D. D. Skilling. 1994. *Butternut - strategies for managing a*

threatened tree. General Technical Report, North Central Forest Experiment Station, U.S. Department of Agriculture, St. Paul, MN.

Pittaway, R. J. 2007. Earthworms threaten forest birds. *OFO News* 25(3): 3.

Pratt, J. A. Y. 1982. (Cartographer). *Map1506A, Surficial Geology - Ottawa, Ontario - Quebec*. Geological Survey of Canada, Ottawa.

RMOC. 1977. *Carp Hills - South March Highlands*, in, *Conservation Lands in Ottawa - Carleton*. (Three volumes). Planning Department, Region of Ottawa-Carleton, Ottawa.

Robinson Consultants & Aquafor Beech. 2004. *Carp River Subwatershed Study*. Planning and Development Approvals Branch, City of Ottawa.

Rodgers, D. 2005. Conservationists, hunters pin hopes on Outaouais turkeys. *The Ottawa Citizen* 23 November 2005.

Spears, T. 2000. Region Buys 'Algonquin in Ottawa': biggest step in conservation since protection of Mer Bleue bog. *The Ottawa Citizen*, 13 November 2000

Vallender, R. 2007. Golden-winged Warbler, in, M. D. Cadman, D. A. Sutherland, G. G. Beck, D. Lepage and A. R. Couturier, eds. 2007. *Atlas of the Breeding Birds of Ontario, 2001-2005*. Ontario Nature, Toronto.

Walker, H. and O. Walker. 1968. *Carleton Saga*. Runge Press Ltd., Ottawa.

Wilson, A. E. 1969. *A Guide to the Geology of the Ottawa District*. Ottawa Field-Naturalists' Club, Ottawa. [reprint of Canadian Field-Naturalist 70: 1-68, 1956].

Wironen, M. and T. R. Moore. 2006. Exotic earthworm invasion increases soil carbon and nitrogen in an old growth forest in southern Quebec. *Canadian Journal of Forestry Research* 36: 845-854.

Appendix 1: South March Highlands Conservation Forest native vascular flora

The following lists all of the native vascular plants known to occur or to have been verifiably reported from the Conservation Forest and South March Highlands. Scientific names of the native vascular plant species, subspecies and hybrids observed in the study area are listed below in alphabetical order within plant families arranged in natural (checklist) order. This is followed by a common English name and the southern Ontario Coefficient of Conservation (CC) value for this taxon. For taxa not provided with a southern Ontario CC value in Oldham et al. (1995), such as hybrids involving native species (and marked with an asterisk [*]), an estimated value has been assigned here. Species with a CC rating of 7 or better (CC number **bolded**) typically require sites with a relatively high level of ecological integrity. Voucher number for D. F. Brunton collections supporting recent additions to this list are noted in [brackets] in the ‘Notes’ column.

Taxa considered to be Regionally Rare (10 or fewer contemporary (post-1969) records) or Regionally Uncommon (11-20 contemporary (post-1969) records) in the City of Ottawa (Brunton 2005) are also noted by listing in **bold** type.

SPECIES/ TAXON	COMMON NAME	REGIONAL STATUS (Brunton 2005)	CC	NOTES [Dfb Colln Nos]
HUPERZIACEAE (Firmoss Family)				
<i>Huperzia lucidula</i> (Michx.) Trev. <i>(Lycopodium lucidulum</i> Michx.)	Shining Firmoss	Common (local)	7	
LYCOPODIACEAE (Clubmoss Family)				
<i>Dendrolycopodium dendroideum</i> (Michx.) A. Haines <i>(Lycopodium dendroideum</i> Michx.)	Common Ground-pine	Common	7	
<i>Dendrolycopodium hickeyi</i> (Wagner, Beitel & Moran) A. Haines <i>(Lycopodium hickeyi</i> Wagner, Beitel & Moran; <i>L. obscurum</i> L. var. <i>isophyllum</i> Hickey)	Hickey's Ground-pine	Uncommon	7	
<i>Dendrolycopodium obscurum</i> (L.) A. Haines	Ground-pine	Uncommon [17]	8	Trillium Woods

South March Highlands Conservation Forest Existing Conditions

<i>(Lycopodium obscurum L.)</i>				
<i>Diphasiastrum complanatum (L.)</i> Holub <i>(Lycopodium complanatum L.)</i>	Northern Ground-cedar	RS (7): Marshall Bay; Stony Swamp CA; The Burnt Lands; Greely East; Magladry Road South Vars East; Ont. Land Corp.	8	Huntmar Road
<i>Diphasiastrum digitatum (A. Br.)</i> Holub <i>(Lycopodium digitatum A. Br.; L. flabelliforme (Fern.) Blanch.)</i>	Ground-cedar	Common	5	
<i>Diphasiastrum ×habereri (House)</i> Holub <i>(D. digitatum (A. Br.) Holub x tristachyum (Pursh) Holub)</i>	hybrid Ground-cedar	RS (3): Stony Swamp CA; Marshall Bay; South March Highlands.	7*	2007 Addition (Huntmar Road) [Dfb 16,996]
<i>Diphasiastrum tristachyum (Pursh)</i> Holub <i>(Lycopodium tristachyum Pursh)</i>	Ground-cedar	RS (7*): Mer Bleue CA; Constance Bay (Sand Hills); Stony Swamp CA (2+ populations), South March Highlands; Vars West; Marlborough Forest (Paden Road alvar); Marathon West	8	Huntmar Road
<i>Lycopodium clavatum L.</i>	Staghorn Clubmoss	Common	6	
EQUISETACEAE (Horsetail Family)				
<i>Equisetum arvense L.</i>	Field Horsetail	Common	0	
<i>Equisetum fluviatile L.</i>	Water Horsetail	Common	7	
<i>Equisetum hyemale L.</i>	Scouring Rush	Common	2	
<i>Equisetum scirpoides Michx.</i>	Dwarf Scouring-rush	Common	7	2007 Addition (First Line Road)
<i>Equisetum sylvaticum L.</i>	Woodland Horsetail	Common	7	
SELAGINELLACEAE (Spikemoss Family)				
<i>Selaginella rupestris (L.) Spring</i>	Rock Spikemoss	RS (6*): Carp Hills *(Carp Barrens; Carp); Constance Bay (Sand Hills); The Burnt Lands; Morris Island (Mississippi Snye); South March Highlands*; Panmure Alvar.	8	Huntmar Rd
OPHIOGLOSSACEAE (Grapefern Family)				
<i>Botrychium dissectum Spreng.</i> <i>(incl. forma obliquum (Muhl.) Fern.)</i>	Cut-leaved Grapefern	Uncommon	6	<u>Not in Conservation Forest: (north of Heron Pond)</u>
<i>Botrychium lanceolatum (Gmel.) Angstr.</i>	Daisy-leaved Grapefern	PROVINCIAL CONSERVATION CONCERN	8	<u>Not in Conservation</u>

South March Highlands Conservation Forest Existing Conditions

		(S3); RS (6): Stony Swamp CA; South March Highlands; Baxter CA; Pinhey Forest; Britannia CA; Corkstown Campground .		Forest: (north of Heron Pond); Extirpated ? (not seen since 1974)
<i>Botrychium matricariifolium</i> A. Br.	Matricary Grapefern	Common	6	
<i>Botrychium simplex</i> E. Hitchc.	Least Moonwort	Uncommon	7	<u>Not in Conservation Forest:</u> (north of Heron Pond)
<i>Botrychium virginianum</i> (L.) Sw.	Rattlesnake Fern	Common	6	
<i>Ophioglossum pusillum</i> Raf. (<i>O. vulgatum</i> L. var. <i>pseudopodium</i> (Blake) Farw.)	Adder's-tongue Fern	RS (5*): Stony Swamp CA (several populations); Manions Corners; Leitrim (several populations); Shirleys Bay (Innis Point); South Gloucester.	5	Extirpated? Last observed in Trillium Woods (1971)
OSMUNDACEAE (Flowering-fern Family)				
<i>Osmunda cinnamomea</i> L.	Cinnamon Fern	Common	7	
<i>Osmunda claytoniana</i> L.	Interrupted Fern	Uncommon	7	
PTERIDACEAE (Maidenhair Fern Family)				
<i>Adiantum pedatum</i> L.	Maidenhair Fern	Uncommon	7	
DENNSTAEDTIACEAE (Bracken Fern Family)				
<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>latiusculum</i> (Desv.) Underw.	Bracken	Common	2	
THELYPTERIDACEAE (Marsh Fern Family)				
<i>Phegopteris connectilis</i> (Michx.) Watt	Northern Beech Fern	Common (local)	8	
<i>Thelypteris palustris</i> (Salisb.) Schott	Marsh Fern	Common	5	
ASPLENIACEAE (Spleenwort Fern Family)				
<i>Asplenium trichomanes</i> L. ssp. <i>trichomanes</i>	Diploid Maidenhair Spleenwort	RS (2): South March Highlands; Carp Hills.	8	
DRYOPTERIDACEAE (Woodfern Family)				
<i>Athyrium filix-femina</i> (L.) Roth var. <i>angustum</i> (Willd.) Lawson	Lady Fern	Common	4	
<i>Cystopteris bulbifera</i> (L.) Bernh.	Bulblet Bladder-fern	Common	5	
<i>Cystopteris fragilis</i> (L.) Bernh.	Fragile Fern	Common	7	
<i>Cystopteris tenuis</i> (Michx.) Desv. (<i>C. fragilis</i> (L.) Bernh. var. <i>mackayii</i> Lawson)	Mackay's Brittle Fern	Common	6	
<i>Deparia acrostichoides</i> (Sw.) Kato	Silvery Spleenwort	Uncommon	8	

South March Highlands Conservation Forest Existing Conditions

<i>(Athyrum thelypteroides</i> (Michx.) Desv.)				
<i>Diplazium pycnocarpon</i> (Spreng.) Broun <i>(Athyrum pycnocarpum</i> (Spreng.) Tidestr.)	Glade Fern	RS (8*) : South March Highlands; Antrim Black Maple ANSI; Antrim Woodlot; North Gower*; Manotick ANSI; Vars East; South Gloucester; Cardinal Creek.	10	Trillium Woods
<i>Dryopteris carthusiana</i> (Vill.) Fuchs <i>(D. spinulosa</i> (Muell.) Watt)	Spinulose Woodfern	Common	5	
<i>Dryopteris clintoniana</i> (Eat.) Dow.	Clinton's Woodfern	Uncommon	7	
<i>Dryopteris cristata</i> (L.) A. Gray	Crested Woodfern	Uncommon	7	
<i>Dryopteris goldiana</i> (Hook.) A. Gray	Goldie's Woodfern	RS (7) : Beechwood cemetery; Antrim Black Maple ANSI; Antrim; South March Highlands; Marlborough Forest; Little's Woods; South Gloucester.	10	Trillium Woods
<i>Dryopteris intermedia</i> (Muhl.) A. Gray	Evergreen Woodfern	Common	5	
<i>Dryopteris marginalis</i> (L.) A. Gray	Marginal Shieldfern	Common	5	
<i>Dryopteris ×mickelii</i> J. Peck <i>(D. clintoniana</i> (Eat.) Dow. x <i>goldiana</i> (Hook.) A. Gray)	hybrid Woodfern	RS (4) : Beechwood; Cody Creek Black Maple ANSI; South March Highlands (Trillium Woods); Riverside South Forest.	8*	Trillium Woods
<i>Dryopteris ×triploidea</i> Wherry <i>(D. carthusiana</i> (Vill.) Fuchs x <i>intermedia</i> (Muhl.) A. Gray)	Triploid Woodfern	Uncommon	5	
<i>Gymnocarpium dryopteris</i> (L.) Newm.	Oak Fern	Common	7	
<i>Matteuccia struthiopteris</i> (L.) Todaro	Ostrich Fern	Common	5	
<i>Onoclea sensibilis</i> L.	Sensitive Fern	Common	4	
<i>Polystichum acrostichoides</i> (Michx.) Schott	Christmas Fern	Uncommon	5	
<i>Woodsia oregana</i> D.C. Eat. ssp. <i>cathcartiana</i> (Robins.) Wind.	Cathcart's Woodsia	PROVINCIAL CONSERVATION CONCERN (S3); Extirpated : South March Highlands.	10	Not in Conservation Forest : formerly south of Kanata Pond
<i>Woodsia ilvensis</i> (L.) R. Br.	Rusty Woodsia	RS (2*) : Stony Swamp CA*; South March Highlands*.	8	Kanata Pond; Huntmar Road; north of Watts Creek
POLYPODIACEAE (Polypody Fern Family)				

South March Highlands Conservation Forest Existing Conditions

<i>Polypodium virginianum</i> L.	Common Polypody	Common	6	
TAXACEAE (Yew Family)				
<i>Taxus canadensis</i> Marsh.	Canada Yew	Common	7	
PINACEAE (Pine Family)				
<i>Abies balsamea</i> (L.) Mill.	Balsam Fir	Common	5	
<i>Larix laricina</i> (Du Roi) K. Koch	Larch	Common	7	
<i>Picea glauca</i> (Moench) Voss	White Spruce	Common	6	
<i>Picea rubens</i> Sarg.	Red Spruce	RS (7*) : Ontario Lands Corp (Anderson Road)*; Carlsbad Springs*; South March Highlands*; Manion Corners; Stony SwampCA; Pine Grove Forest.	7	2007 Addition (Watts Creek - west Block) [Ddfb 17,024, Dfb 17,026]
<i>Pinus strobus</i> L.	White Pine	Common	4	
<i>Tsuga canadensis</i> L.	Eastern Hemlock	Common	7	
CUPRESSACEAE (Cypress Family)				
<i>Juniperus communis</i> L.	Common Juniper	Common	4	
<i>Thuja occidentalis</i> L.	White Cedar	Common	4	
TYPHACEAE (Cat-tail Family)				
<i>Typha</i> × <i>glauca</i> Godron (<i>T. angustifolia</i> L. × <i>latifolia</i> L.)	hybrid Cat-tail	Uncommon	3*	2007 Addition (Kanata Pond; Watts Creek - West Block)
<i>Typha latifolia</i> L.	Common Cat-tail	Common	3	
SPARGANIACEAE (Bur-reed Family)				
<i>Sparganium emersum</i> Rehm. (<i>S. chlorocarpum</i> Rydb.)	Green Bur-reed	Common	5	
<i>Sparganium fluctuans</i> (Morong) Robins.	Floating Bur-reed	RS (5) : Upper Duck Island; Lower Duck Island; Greens Creek CA; South March Highlands; Crown Point.	9	Heron Pond
POTAMOGETONACEAE (Pondweed Family)				
<i>Potamogeton gramineus</i> L.	Grassleaf Pondweed	Common	6	2007 Addition (Shirleys Brook)
<i>Potamogeton illinoensis</i> Morong	Illinois Pondweed	RS (5) : Duck Islands; South March Highlands; Fitzroy Provincial Park; Morris Island (Lavergne Bay); Jock River at Bren-Maur.	6	Heron Pond

South March Highlands Conservation Forest Existing Conditions

<i>Potamogeton natans</i> L.	Floating Pondweed	Uncommon	5	2007 Addition: Klondike Rd marsh
<i>Potamogeton pusillus</i> L.	Small Pondweed	Uncommon	5	
<i>Potamogeton zosteriformis</i> Fern.	Zig-zag Pondweed	Common	5	
NAJADACEAE (Naiad Family)				
<i>Najas flexilis</i> (Willd.) R. & S.	Naiad	Common	5	
ALISMATACEAE (Water-plantain Family)				
<i>Alisma triviale</i> Pursh	Water-plantain	Common	3	
<i>Sagittaria latifolia</i> Willd.	Broad-leaved Arrowhead	Common	4	
HYDROCHARITACEAE (Frog's-bit Family)				
<i>Elodea canadensis</i> Michx.	Canada Waterweed	Common	4	
POACEAE (Grass Family)				
<i>Agrostis scabra</i> Willd.	Tickle Grass	Uncommon	6	
<i>Agrostis stolonifera</i> L. (<i>A. alba</i> L.; <i>A. palustris</i> Huds.)	Creeping Bent Grass	Common	0	
<i>Alopecurus aequalis</i> Sobol.	Water Foxtail Grass	Uncommon	7	Not in Conservation Forest: (east of Heron Pond)
<i>Brachyelytrum aristosum</i> (Michx.) Trel. (<i>Brachyelytrum erectum</i> (Schreb.) P. Beauv. var. <i>glabratum</i> (Vasey ex. Millsp.) Koyama & Kowano)	Bearded Shorthusk	Uncommon [17]	7	Trillium Woods
<i>Bromus ciliatus</i> L.	Fringed Brome Grass	Uncommon	6	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	Canada Bluejoint	Common	4	
<i>Danthonia spicata</i> (L.) Beauv. ex R. & S.	Poverty Grass	Common	7	
<i>Dichanthelium acuminatum</i> (Sw.) Gould & Clarke ssp. <i>fasciculatum</i> (Torr.) Freckmann & LeLong (<i>Panicum lanuginosum</i> Ell. var. <i>fasciculatum</i> Fern.; <i>P. acuminatum</i> auct., non Sw.)	Panic Grass	Common	6	
<i>Dichanthelium linearifolium</i> (Scribn.) Gould (<i>Panicum linearifolium</i> Scribn.)	Narrow-leaved Panic Grass	Common (local)	8	

South March Highlands Conservation Forest Existing Conditions

<i>Echinochloa muricata</i> (Michx.) Fern. (<i>E. microstachya</i> (Wieg.) Rydb.; <i>E. pungens</i> (Poir.) Rydb, p. pt.; <i>E. wiegandii</i> (Fass.) McNeill & Dore)	Barnyard Grass	Common	4	
<i>Elymus hystrix</i> L. (<i>Hystrix patula</i> Moench)	Bottlebrush Grass	Uncommon	5	
<i>Elymus virginicus</i> L.	Wild Rye Grass	Common	5	
<i>Festuca subverticillata</i> (Pers.) Alexeev (<i>F. obtusa</i> Biehler)	Nodding Fescue	Uncommon	6	
<i>Glyceria borealis</i> (Nash) Batch.	Northern Manna Grass	Uncommon	8	
<i>Glyceria canadensis</i> (Michx.) Trin.	Canada Manna Grass	RS (5*) : Mer Bleue CA*; Mud Creek; Albion Wetland; Notre Dame des Champs Community Centre Woods; South March Highlands*.	7	<u>Not in Conservation Forest</u> : (Heron Pond)
<i>Glyceria grandis</i> S. Wats.	Large Manna Grass	Common	5	
<i>Glyceria striata</i> (Lam.) A. Hitchc.	Fowl Manna Grass	Common	3	
<i>Leersia oryzoides</i> (L.) Sw.	Rice Cut-grass	Common	3	
<i>Leersia virginica</i> Willd.	Virginia Cut-grass	Uncommon	6	
<i>Milium effusum</i> L.	Wild Millet	RS (10*) : Morris Island (Lavergne Point); South March Highlands (Trillium Woods) Osgoode Swamp*; Navan; O'Toole Road; Emmett Road; French Hill Creek; Magladry Road South; Bearbrook; Vars East.	8	Trillium Woods; North of Kanata Pond
<i>Muhlenbergia mexicana</i> (L.) Trin.	Mexican Muhlenbergia	Common	1	
<i>Oryzopsis asperifolia</i> Michx.	Mountain Rice Grass	Common	6	
<i>Oryzopsis racemosa</i> (Sm.) Ricker ex Hitchc.	Mountain Rice Grass	Uncommon [18]	7	West Block; Trillium Woods; Huntmar Road
<i>Panicum capillare</i> L.	Witch Grass	Common	0	
<i>Panicum flexile</i> (Gatt.) Scribn.	Wiry Panic Grass	Uncommon (locally abundant)	8	
<i>Panicum philadelphicum</i> Bernh. ex Trin.	Philadelphia Panic Grass	Uncommon (locally abundant)	8	
<i>Poa palustris</i> L.	Swamp Meadow Grass	Common	5	
<i>Poa saltuensis</i> Fern. & Wieg.	Forest Meadow Grass	RS (5*) : South March Highlands*; Buchans Bay West; Carlsbad Springs SW; South Gloucester; DND	7	Terry Fox Road ROW; Trillium Woods

South March Highlands Conservation Forest Existing Conditions

		Woods.		
<i>Schizachne purpurascens</i> (Torr.) Swallen	False Melic Grass	Common	6	
<i>Sporobolus vaginiflorus</i> (Torr. ex A. Gray) Wood (<i>s.l.</i>)	Ensheathed Dropseed	Common [taxonomic problem; var. <i>vaginiflorus</i> rare on alvars ?].	1	
<i>Torreyochloa pallida</i> (Torr.) Church var. <i>fernaldii</i> (A. Hitchc.) Dore (<i>T. fernaldii</i> (A. Hitchc.) Church)	Fernald's Manna Grass	RS (4): Mer Bleue CA; South March Highlands; Stony Swamp CA; Fitzroy Prov Park.	8	
<i>Zizania palustris</i> L. var. <i>palustris</i>	Wild Rice	Uncommon	9	<u>Not in Conservation Forest:</u> (Heron Pond; Carp River)
CYPERACEAE (Sedge Family)				
<i>Carex albursina</i> Sheld.	White-bear Sedge	Uncommon [20]	7	First Line Road
<i>Carex arctata</i> Boott	Compressed Sedge	Common	5	
<i>Carex backii</i> Boott	Back's Sedge	RS (3): South March Highlands; Riverside Park; Fitzroy Provincial Park.	8	Extirpated (site on south shore of Kanata Pond destroyed) [Dfb 14,866]
<i>Carex bebbii</i> (Bailey) Fern.	Bebb's Sedge	Common	3	
<i>Carex blanda</i> Dew.	Smooth Sedge	Common	3	
<i>Carex bromoides</i> Willd.	Brome Sedge	Common	7	
<i>Carex brunnescens</i> (Pers.) Poir.	Brownish Sedge	Uncommon [12]	7	Trillium Woods
<i>Carex canescens</i> L.	Hoary Sedge	Uncommon [16]	7	2007 Addition (Kanata Pond) [Dfb 16,973]
<i>Carex cephaloidea</i> (Dew.) Dew.	Head Sedge	Uncommon	6	Trillium Woods; Kanata Pond; West Block
<i>Carex communis</i> Bailey	Common Sedge	Common	6	
<i>Carex comosa</i> Boott	Bristly Sedge	Uncommon	5	2007 Addition (Kanata Pond)
<i>Carex crinita</i> Lam.	Fringed Sedge	Common	6	
<i>Carex cristatella</i> Britt.	Crested Sedge	Common	3	
<i>Carex debilis</i> Michx. var. <i>rudgei</i> Bailey	Weak Sedge	RS (10*): Britannia CA; South March Highlands; Wall Road	7	2007 Addition; <u>Not in</u>

South March Highlands Conservation Forest Existing Conditions

		Woods, Cumberland; Albion Wetland; Pinhey Forest; Pine Grove Forest; Carlsbad Springs Forest; Greeley (3*); Vars West; Mer Bleue CA		<u>Conservation Forest:</u> (Heron Pond) [Dfb 17,054]
<i>Carex deweyana</i> Schw.	Dewey's Sedge	Common	6	
<i>Carex disperma</i> Dew.	Two-seeded Sedge	Uncommon	8	
<i>Carex echinata</i> Murr.	Prickly Sedge	RS (8*) : Mer Bleue CA* (common); Albion Wetland; Pine Grove Forest; Stony Swamp CA; Carp Hills (Carp Barrens); South March Highlands; Vars West; Ont. Land Corp. (several).	7	<u>Not in Conservation Forest:</u> (Heron Pond)
<i>Carex gracillima</i> Schw.	Filiform Sedge	Common	4	
<i>Carex granularis</i> Willd.	Granular Sedge	Common	3	
<i>Carex grayi</i> Carey	Gray's Sedge	Uncommon	8	Trillium Woods
<i>Carex grisea</i> Wahl. (<i>C. amphibola</i> Steudel var. <i>turgida</i> Fern.)	Gray Sedge	RS (7*) : Britannia CA*; Elmhurst Street Woods*; Shirleys Bay (Shirley's Brook); Stillwater Creek*; North Gower; Champlain Bridge; Hearts Desire.	8	2007 Addition (north of Kanata Pond) [Dfb 16,971]
<i>Carex hirtifolia</i> Mack.	Hairy Sedge	Uncommon [20]	5	Trillium Woods; First Line Rd; Terry Fox Road ROW
<i>Carex hitchcockiana</i> Dew.	Hitchcock's Sedge	Uncommon	6	2007 Addition (West Block) [Dfb 16,994]
<i>Carex hystericina</i> Willd.	Porcupine Sedge	Common	4	
<i>Carex intumescens</i> Rudge	Bladder Sedge	Common	6	
<i>Carex laxiflora</i> Lam.	Loose-flowered Sedge	Uncommon (Rare west of Rideau River)	5	2007 Addition (Trillium Woods) [Dfb 16,003]
<i>Carex lupulina</i> Willd.	Hop Sedge	Common	6	
<i>Carex pallescens</i> L.	Pale Sedge	Common	5	
<i>Carex peckii</i> Howe	Peck's Sedge	Common	6	
<i>Carex pedunculata</i> Willd.	Peduncled Sedge	Common	5	
<i>Carex pennsylvanica</i> Lam.	Pennsylvania Sedge	Common	5	
<i>Carex plantaginea</i> Lam.	Plantain-leaved Sedge	Uncommon	7	

South March Highlands Conservation Forest Existing Conditions

<i>Carex projecta</i> Mack.	Spreading Sedge	Uncommon	5	2007 Addition (Watts Creek - West Block)
<i>Carex radiata</i> (Wahl.) Small (<i>C. rosea</i> , auct., non Willd.)	Stellate Sedge	Common	4	
<i>Carex retrorsa</i> Schw.	Back-turned Sedge	Common	5	
<i>Carex rosea</i> Schkuhr ex Willd. (<i>C. convoluta</i> Mack.)	Rolled-up Sedge	Common	5	
<i>Carex scoparia</i> Willd.	Broom Sedge	Uncommon [12]	5	Huntmar Road; north of Kanata Pond
<i>Carex sparganioides</i> Willd.	Bur-reed Sedge	Uncommon [12]	5	Trillium Woods; West Block; First Line Road; Huntmar Road
<i>Carex sprengelii</i> Dew. ex Sprengel	Sprengel's Sedge	Common	6	
<i>Carex stipata</i> Willd.	Crowded Sedge	Common	3	2007 Addition (Kanata Pond; Trillium Woods)
<i>Carex tenera</i> Dew.	Slender Sedge	Common	4	
<i>Carex tuckermanii</i> Boott ex Dew.	Tuckerman's Sedge	Common	7	
<i>Carex vesicaria</i> L.	Inflated Sedge	Uncommon [16*]	7	2007 Addition (Huntmar Road)
<i>Carex vulpinoidea</i> Michx.	Fox Sedge	Common	5	
<i>Dulichium arundinaceum</i> (L.) Britt.	Three-way Sedge	Uncommon	7	2007 Addition (Huntmar Road ponds)
<i>Eleocharis acicularis</i> (L.) R.& S.	Needle Spikerush	Common	5	
<i>Eleocharis obtusa</i> (Willd.) Schultes	Blunt Spike-rush	Common	5	
<i>Eleocharis palustris</i> (L.) R.& S. (incl. <i>E. smallii</i> Britt.)	Marsh Spike-rush	Common	6	
<i>Schoenoplectus tabernaemontani</i> (Gmel.) Palla (<i>Scirpus validus</i> Vahl)	Strong Bulrush	Common	5	
<i>Scirpus atrovirens</i> Willd.	Blackish Bulrush	Common	3	
<i>Scirpus cyperinus</i> (L.) Kunth	Wool-grass	Common	4	

South March Highlands Conservation Forest Existing Conditions

<i>Scirpus hattorianus</i> Fern. (<i>S. atrovirens</i> Willd., p. pt.)	Mosquito Bulrush	Common	6	
<i>Scirpus pendulus</i> Muhl. (<i>S. lineatus</i> auct., non Michx.)	Drooping Bulrush	Uncommon (locally abundant).	3	
ARACEAE (Arum Family)				
<i>Arisaema triphyllum</i> (L.) Schott	Jack-in-the-pulpit	Common	5	
<i>Calla palustris</i> L.	Wild Calla	Common	8	
LEMNACEAE (Duckweed Family)				
<i>Lemna minor</i> L.	Small Duckweed	Common	2	
<i>Spirodela polyrhiza</i> (L.) Schleid.	Large Duckweed	RS (9*) : Britannia CA; Upper Jock River; Half Moon Bay Woods; Memorial Garden Woods; Fitzroy Harbour (Carp River); Riverstone Woods; Shirley's Bay* (Watts Creek; Innis Point); South March Highlands; Kars (Rideau River); Vincent Massey Park.	4	Watts Creek (extirpated?)
<i>Wolffia borealis</i> (Engelm.) Land. (<i>W. punctata</i> Griseb.)	Watermeal	Uncommon [15]	4	Shirleys Brook
<i>Wolffia columbiana</i> H. Karsten (<i>W. arrhiza</i> auct., non (L.) Horkel)	Watermeal	Uncommon [15]	4	Shirleys Brook
PONTEDERIAACEAE (Pickerelweed Family)				
<i>Zosterella dubia</i> (Jacq.) Small (<i>Heteranthera dubia</i> (Jacq.) MacM.)	Water Stargrass	Uncommon (locally abundant)	7	
JUNACEAE (Rush Family)				
<i>Juncus brevicaudatus</i> (Engelm.) Fern.	Rush	Common	6	
<i>Juncus canadensis</i> J. Gay	Canada Rush	RS (7) : Mer Bleue CA; Albion Wetland; Pine Grove Forest; Ont. Land Corp.; Notre-Dame-des-Champs Community Centre Woods; South March Highlands; Carp Hills.	6	Not in Conservation Forest: (Heron Pond)
<i>Juncus effusus</i> L. (incl. <i>J. pylaei</i> LaHarpe)	Common Rush	Common	4	
<i>Juncus filiformis</i> L.	Thread Rush	Uncommon	8	
<i>Juncus tenuis</i> Willd.	Path Rush	Common	0	
<i>Luzula acuminata</i> Raf.	Wood-rush	RS (6*) : South March Highlands*; Loggers Way Woods; Carp Hills; Fitzroy Provincial Park; French Hill Creek.	6	First Line Road; Trillium Woods; Huntmar Road

South March Highlands Conservation Forest Existing Conditions

LILIACEAE (Lily Family)				
<i>Allium tricoccum</i> Ait.	Wild Leek	Uncommon (local and declining)		
<i>Clintonia borealis</i> (Ait.) Raf.	Blue-bead Lily	Common	7	
<i>Erythronium americanum</i> Ker.	Trout-lily	Common	5	
<i>Lilium philadelphicum</i> L.	Wood Lily	Uncommon	8	Not in Conservation Forest: (Special Study Area, First Line Road)
<i>Maianthemum canadense</i> Desf. var. <i>canadense</i>	Canada Mayflower	Common	5	
<i>Maianthemum racemosum</i> (L.) Link (<i>Smilacina racemosa</i> (L.) Desf.)	False Solomon's-seal	Common	4	
<i>Polygonatum pubescens</i> (Willd.) Pursh	Solomon's-seal	Common	5	
<i>Trillium erectum</i> L.	Red Trillium	Common	6	
<i>Trillium grandiflorum</i> (Michx.) Salisb.	White Trillium	Common	5	
<i>Uvularia grandiflora</i> Sm.	Bellwort	Common (local)	6	
<i>Uvularia sessilifolia</i> L.	Small Bellwort	RS (7): Britannia CA; Baxter CA; Duck Islands; Marlborough Forest; Shirleys Bay (Innis Point); Riverstone Woods; Greens Creek CA.	7	2007 Addition (West Block) [20 June 07, Watts Creek]
AMARYLLIDACEAE (Amaryllis Family)				
<i>Iris versicolor</i> L.	Blue Flag	Common	5	
<i>Sisyrinchium montanum</i> Greene	Blue-eyed Grass	Common	4	
ORCHIDACEAE (Orchid Family)				
<i>Cypripedium acaule</i> Ait.	Pink Lady's-slipper	Common (local)	7	
<i>Cypripedium parviflorum</i> Salisb. (s.l.) (<i>C. calceolus</i> L.)	Yellow Lady's-slipper	Uncommon (locally abundant)	7	
<i>Galearis spectabilis</i> (L.) Raf.	Showy Orchis	RS (9*): Antrim Black Maple ANSI; Carp Hills; South March Highlands*; Kinburn Clay Plain Woods; Pleasant Park Woods ESA; Cardinal Creek; Pana Road; South Gloucester; vicinity of Metcalfe.	9	Trillium Woods
<i>Goodyera pubescens</i> (Willd.) R. Br.	Downy Rattlesnake-	RS (3): Carp Hills; Manotick	8	Trillium Woods

South March Highlands Conservation Forest Existing Conditions

	plantain	ANSI; South March Highlands.		
<i>Malaxis monophyllos</i> (L.) Sw.	White Adder's-mouth	Uncommon [12]	7	Watts Creek
<i>Platanthera aquilonis</i> Sheviak (<i>P. hyperborea</i> (L.) Lindl.)	Northern Green Orchid	Common	5	
<i>Platanthera lacera</i> (Michx.) G. Don	Ragged-fringed Orchid	Uncommon	6	Not in Conservation Forest: Extirpated? (east of Heron Pond - 1974)
<i>Platanthera psycodes</i> (L.) Lindl.	Purple-fringed Orchid	Uncommon	8	
<i>Spiranthes lacera</i> (Raf.) Raf.	Slender Ladies-tresses	Common	7	
SALICACEAE (Willow Family)				
<i>Populus balsamifera</i> L.	Balsam Poplar	Common	4	
<i>Populus deltoides</i> Marsh.	Eastern Cottonwood	Common	4	
<i>Populus grandidentata</i> Michx.	Large-toothed Aspen	Common	5	
<i>Populus tremuloides</i> Michx.	Trembling Aspen	Common	2	
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	Common	4	
<i>Salix candida</i> Flugge	Hoary Willow	RS (8*): Marlborough Forest*; Long Swamp; Mud Pond; Mer Bleue CA; Albion Wetland; Huntley Wetland; North Goulbourn Wetland, South March Highlands (Huntmar Road).	10	Not in Conservation Forest: (Huntmar Road north of Old Carp Rd)
<i>Salix discolor</i> L.	Pussy Willow	Common	3	
<i>Salix lucida</i> Muhl.	Shining Willow	Common	5	
<i>Salix petiolaris</i> Sm.	Meadow Willow	Common	3	
JUGLANDACEAE (Hickory Family)				
<i>Carya cordiformis</i> (Wang) K. Koch	Bitternut Hickory	Common (local)	6	
<i>Juglans cinerea</i> L.	Butternut	PROVINCIAL CONSERVATION CONCERN (S3?); Common [severe population decline anticipated due to rapid spread of disease]	6	throughout
BETULACEAE (Birch Family)				
<i>Alnus incana</i> (L.) Moench ssp. <i>rugosa</i> (Du Roi) Clausen (<i>A. rugosa</i> (Du Roi) Spreng.)	Speckled Alder	Common	6	

South March Highlands Conservation Forest Existing Conditions

<i>Betula alleghaniensis</i> Britt.	Yellow Birch	Common	6	
<i>Betula papyrifera</i> Marsh.	White Birch	Common	2	
<i>Carpinus caroliniana</i> Walt.	Blue-beech	Common (local)	6	
<i>Corylus cornuta</i> Marsh.	Beaked Hazel	Common	5	
<i>Ostrya virginiana</i> (Mill.) K. Koch	Ironwood	Common	4	
FAGACEAE (Oak Family)				
<i>Fagus grandifolia</i> Ehrh.	American Beech	Common	6	
<i>Quercus macrocarpa</i> Michx.	Bur Oak	Common	5	
<i>Quercus rubra</i> L.	Red Oak	Common	6	
ULMACEAE (Elm Family)				
<i>Ulmus americana</i> L.	White Elm	Common	3	
<i>Ulmus rubra</i> Muhl.	Red Elm	Uncommon	6	
<i>Ulmus thomasi</i> Sarg.	Rock Elm	Uncommon	6	
URTICACEAE (Nettle Family)				
<i>Boehmeria cylindrica</i> (L.) Sw.	False Nettle	Uncommon	6	
<i>Laportea canadensis</i> (L.) Wedd.	Canada Wood-nettle	Common	4	
<i>Pilea pumila</i> (L.) A. Gray	Clearweed	Uncommon	5	
<i>Urtica dioica</i> L. ssp. <i>gracilis</i> (Ait.) Selander	Slender Stinging Nettle	Common	2	
ARISTOLOCHIACEAE (Ginger Family)				
<i>Asarum canadense</i> L.	Wild Ginger	Common	6	
POLYGONACEAE (Knotweed Family)				
<i>Fallopia cilinodis</i> (Michx.) Holub (<i>Polygonum cilinode</i> Michx.)	Bindweed	Common	2	
<i>Fallopia scandens</i> (L.) Holub (<i>Polygonum scandens</i> L.)	False Buckwheat	Uncommon	3	
<i>Persicaria amphibia</i> (L.) S. F. Gray (<i>Polygonum amphibium</i> L.)	Water Smartweed	Common	5	
<i>Persicaria hydropiper</i> (L.) Spach (<i>Polygonum hydropiper</i> L.)	Water-pepper	Common	4	
<i>Persicaria hydropiperoides</i> (Michx.) J. K. Small (<i>Polygonum hydropiperoides</i> Michx.)	False Water-pepper	RS (9): Stony Swamp CA; Pinhey Forest; Ontario Land Corp.; South March Highlands; Champlain Bridge; Vars West; Queenswood Heights Wetland; Duck Islands; Marlborough Forest (Brassils Creek).	4	Shirleys Brook in Trillium Woods
<i>Persicaria lapathifolia</i> (L.) Gray	Dock Knotweed	Common	2	

South March Highlands Conservation Forest Existing Conditions

<i>(Polygonum lapathifolium L.; P. scabrum Moench)</i>				
<i>Persicaria punctata</i> (Ell.) J. K. Small <i>(Polygonum punctatum Ell.)</i>	Water Knotweed	RS (9*) : Stony Swamp CA; Constance Creek; Pine Grove Forest; Mer Bleue CA *; Vincent Massey Park; Billings Bridge; Experimental Farm, Ottawa; Magladry Road S.; South March Highlands	4	
<i>Rumex britannica</i> L. <i>(R orbiculatus L.)</i>	Great Water Dock	Uncommon	6	
CHENOPODIACEAE (Goosefoot Family)				
<i>Chenopodium capitatum</i> (L.) Aschers	Strawberry-blight	RS (5) : Albion Wetland; Chaudiere Rapids; South Gloucester; Cumberland; South March Highlands	4	Not in Conservation Forest: Extirpated (South of Watts Creek) [Dfb 14,911]
<i>Chenopodium simplex</i> (Torr.) Raf. <i>(C. gigantospermum Aellen; C. hybridum auct., non L.)</i>	Maple-leaved Goosefoot	Common	0	
PORTULACACEAE (Purslane Family)				
<i>Claytonia caroliniana</i> Michx.	Spring-beauty	Common	7	
<i>Claytonia virginica</i> L.	Virginia Spring-beauty	RS (7) : North Gower; Carsonby; Kinburn Clay Plain Woods; Third Line West Carleton Woodlot; Antrim Woodlot; Carp; South March Highlands (Trillium Woods) - extirpated?	5	Trillium Woods (Extirpated - not seen since 1979)
CARYOPHYLLACEAE (Pink Family)				
<i>Moehringia lateriflora</i> (L.) Fenzl <i>(Arenaria lateriflora L.)</i>	Grove Sandwort	Uncommon [11]	7	Trillium Woods; Huntmar Road
CERATOPHYLLACEAE (Hornwort Family)				
<i>Ceratophyllum demersum</i> L.	Coon-tail	Common	4	
<i>Ceratophyllum echinatum</i> A. Gray	Spiny Coon-tail	PROVINCIAL CONSERVATION CONCERN (S3); RS (3) : Highway 7 North (Rothbourne Swamp); Albion Wetland; South March Highlands.	8	Not in Conservation Forest: (Special Study Area) - Extirpated (site destroyed)

South March Highlands Conservation Forest Existing Conditions

NYMPHAEACEAE (Waterlily Family)				
<i>Nuphar variegata</i> Dur. ex Clint. (<i>N. lutea</i> (L.) Sm. ssp. <i>variegata</i> (Dur.) Beal)	Yellow Water-lily	Common	4	
<i>Nymphaea odorata</i> Ait. ssp. <i>odorata</i>	White Water-lily	Common	5	2007 Addition (Shirleys Brook)
CABOMBACEAE (Water-shield Family)				
<i>Brasenia schreberi</i> Gmel.	Water-shield	RS (9): South March Highlands; Carp Hills; Constance Bay Shores; Britannia CA; Petrie Islands; Queenswood Heights Wetland; Vars East; Ont. Land Corp.; Duck Islands.	7	Heron Pond
RANUNCULACEAE (Crowfoot Family)				
<i>Actaea pachypoda</i> Ell.	White Baneberry	Common	5	
<i>Actaea rubra</i> (Ait.) Willd.	Red Baneberry	Common	5	
<i>Anemone acutiloba</i> (DC) Lawson (<i>Hepatica acutiloba</i> DC)	Sharp-lobed Hepatica	Common	6	
<i>Anemone virginiana</i> L. (s.l.) (incl. <i>A. riparia</i> auct., non Fern.; <i>A. virginica</i> L. var. <i>cylindroidea</i> Boivin)	Tall Anemone	Common	4	
<i>Aquilegia canadensis</i> L.	Canada Columbine	Common	5	
<i>Caltha palustris</i> L.	Marsh-marigold	Common	8	
<i>Clematis virginiana</i> L.	Virgin's-bower	Common	5	
<i>Coptis trifolia</i> (L.) Salisb.	Goldthread	Common	7	
<i>Ranunculus abortivus</i> L.	Small-flowered Buttercup	Common	2	
<i>Ranunculus pensylvanicus</i> L.f.	Hairy Buttercup	RS (8): Mer Bleue*; Albion Wetland; Stittsville West; Petrie Islands; Strandherd Woodlot; Mountain Crescent Woods (Sawmill Creek); Petrie West; Barnsdale Road Woods.	3	Huntmar Road
<i>Ranunculus recurvatus</i> Poir.	Hooked Buttercup	Uncommon	4	
<i>Thalictrum dioicum</i> L.	Early Meadow-rue	Common	5	
<i>Thalictrum pubescens</i> Pursh (<i>T. polygamum</i> Muhl.)	Tall Meadow-rue	Common	5	
BERBERIDACEAE (Barberry Family)				
<i>Caulophyllum giganteum</i> (Farw.) Loc. & Black.	Blue-cohosh	Common	6	

South March Highlands Conservation Forest Existing Conditions

<i>(C. thalictroides var. giganteum Farw.)</i>				
MENISPERMACEAE (Moonseed Family)				
<i>Menispermum canadense</i> L.	Moonseed	Uncommon (primarily rivershores)	7	
PAPAVERACEAE (Poppy Family)				
<i>Sanguinaria canadensis</i> L.	Bloodroot	Common	5	
FUMARIACEAE (Fumitory Family)				
<i>Corydalis sempervirens</i> (L.) Pers.	Rock Harlequin	Common	7	
<i>Dicentra canadensis</i> (Goldie) Walp.	Squirrel-corn	Common	7	
<i>Dicentra cucullaria</i> (L.) Bernh.	Dutchman's-breeches	Common	6	
BRASSICACEAE (Mustard Family)				
<i>Arabis glabra</i> (L.) Bernh.	Smooth Rock-cress	Common	4	2007 Addition (Trillium Woods)
<i>Cardamine concatenata</i> (Michx.) Schwein. <i>(Dentaria laciniata Muhl.)</i>	Cut-leaved Toothwort	Uncommon [11*]	6	Trillium Woods
<i>Cardamine diphylla</i> (Michx.) Wood <i>(Dentaria diphylla Michx.)</i>	Toothwort	Uncommon	7	
<i>Cardamine pensylvanica</i> Muhl.	Pennsylvania Bitter-cress	Common	6	
<i>Rorippa palustris</i> (L.) Bess. <i>(incl.ssp. fernaldiana (Butt. & Abbe) Jonsell; ssp. hispida (Desv.) Jonsell)</i>	Yellow Cress	Common	3	
CRASSULACEAE (Stonecrop Family)				
<i>Penthorum sedoides</i> L.	Ditch Stonecrop	Uncommon	4	
SAXIFRAGACEAE (Saxifrage Family)				
<i>Chrysosplenium americanum</i> Schwein.	Golden Saxifrage	Uncommon [11*]	8	<u>Not in Conservation Forest</u> : 2007 Addition (Loch March Maple forest) [20 Sept 07]
<i>Mitella diphylla</i> L.	Mitrewort	Common	5	
<i>Mitella nuda</i> L.	Naked Mitrewort	Common	6	
<i>Saxifraga virginensis</i> Michx.	Early Saxifrage	Common	6	
<i>Tiarella cordifolia</i> L.	Foamflower	Common	6	

South March Highlands Conservation Forest Existing Conditions

GROSSULARIACEAE (Currant Family)				
<i>Ribes americanum</i> Mill.	Black Currant	Common	4	
<i>Ribes cynosbati</i> L.	Wild Gooseberry	Common	4	
<i>Ribes glandulosum</i> Grauer	Skunk Currant	Common	6	
<i>Ribes hirtellum</i> Michx.	Hairy Gooseberry	Uncommon	6	
ROSACEAE (Rose Family)				
<i>Agrimonia gryposepala</i> Wallr.	Hooked Agrimony	Common	2	
<i>Amelanchier arborea</i> (Michx. f.) Fern. ssp. <i>arborea</i>	Serviceberry	Uncommon [13]	5	Trillium Woods
<i>Amelanchier arborea</i> (Michx. f.) Fern. ssp. <i>laevis</i> (Wieg.) McKay (<i>A. laevis</i> Wieg.)	Shadbush	Common	5	
<i>Crataegus chrysocarpa</i> Ashe (incl. <i>C. aboriginum</i> Sarg)	Hawthorn	Common	4	
<i>Crataegus pringlei</i> Sarg.	Hawthorn	Uncommon	4	<u>Not in Conservation Forest: 2007 Addition (Heritage Hills)</u>
<i>Crataegus punctata</i> Jacq.	Hawthorn	Uncommon	4	2007 Addition (West Block)
<i>Crataegus submollis</i> Sarg.	Velvety Hawthorn	Common	4	
<i>Fragaria vesca</i> L.	Woodland Strawberry	Uncommon	4	
<i>Fragaria virginiana</i> Duchesne	Common Strawberry	Common	2	
<i>Geum aleppicum</i> Jacq.	Yellow Avens	Common	2	
<i>Geum canadense</i> Jacq.	White Avens	Common	3	
<i>Potentilla norvegica</i> L. (incl. <i>P. norvegica</i> L. ssp. <i>monspeliensis</i> (L.) Asch. & Grabn.)	Rough Cinquefoil	Common		
<i>Potentilla simplex</i> Michx.	Common Cinquefoil	Uncommon (locally abundant)	3	
<i>Prunus nigra</i> Ait.	Canada Plum	Common	4	<u>Not in Conservation Forest: (Richardson Lands) Extirpated (site destroyed)</u>
<i>Prunus pensylvanica</i> L.f.	Fire Cherry	Common	3	

South March Highlands Conservation Forest Existing Conditions

<i>Prunus serotina</i> Ehrh.	Black Cherry	Common	3	
<i>Prunus virginiana</i> L.	Choke Cherry	Common	2	
<i>Rubus allegheniensis</i> Porter	Blackberry	Common	2	
<i>Rubus odoratus</i> L.	Purple-flowered Raspberry	Common	3	
<i>Rubus pubescens</i> Raf.	Dwarf Raspberry	Common	4	
<i>Rubus strigosus</i> Michx. (<i>R. idaeus</i> L. var. <i>strigosus</i> (Michx.) Max.)	Common Raspberry	Common	0	
<i>Spiraea alba</i> Du Roi var. <i>alba</i>	Meadowsweet	Common	3	
<i>Spiraea tomentosa</i> L.	Steeplebush	Uncommon (locally abundant)	5	
<i>Waldsteinia fragarioides</i> (Michx.) Tratt.	Barren-ground Strawberry	Common	5	
FABACEAE (Bean Family)				
<i>Amphicarpaea bracteata</i> (L.) Fern.	Hog-peanut	Common	4	
<i>Desmodium canadense</i> (L.) DC.	Canada Tick-trefoil	Uncommon	5	
<i>Desmodium glutinosum</i> (Muhl.) Wood	Tick-trefoil	Uncommon [14]	6	2007 Addition; Not in <u>Conservation</u> <u>Forest:</u> (Loch March maple forest)
OXALIDACEAE (Wood-sorrel Family)				
<i>Oxalis acetosella</i> L.	Wood-sorrel	Common (local)	8	
POLYGALACEAE (Milkwort Family)				
<i>Polygala paucifolia</i> Willd.	Fringed Milkwort	Uncommon [13]	6	2007 Addition; Not in <u>Conservation</u> <u>Forest:</u> (east of Heron Pond)
EUPHORBIACEAE (Spurge Family)				
<i>Acalypha virginica</i> L. (<i>A. rhomboidea</i> Raf.)	Three-seeded Mercury	Common	0	
<i>Chamaesyce glyptosperma</i> (Engelm.) Small (<i>Euphorbia glyptosperma</i> Engelm.)	Ridge-seeded Spurge	RS (8): Mer Bleue CA; Antrim; South March Highlands; Stony Swamp CA; Shirleys Bay (Innis Point); Stittsville; South Gloucester; Ottawa West.	5	Goulbourn Forced Road
<i>Chamaesyce vermiculata</i> (Raf.) House	Hairy Spurge	Uncommon	0	

South March Highlands Conservation Forest Existing Conditions

<i>(Euphorbia vermiculata Raf.)</i>				
CALLITRICHACEAE (Water-startwort Family)				
<i>Callitriche verna L.</i>	Common Water-starwort	Uncommon	6	2007 Addition (Shirleys Brook)
ANACARDIACEAE (Cashew Family)				
<i>Rhus hirta (L.) Sudworth</i> <i>(R. typhina L.)</i>	Staghorn Sumac	Common	1	
<i>Toxicodendron radicans (L.) Kuntze</i> (<i>Rhus radicans L. ssp. negundo</i> (Greene) McNeill)	Climbing Poison-ivy	RS (8): Greens Creek CA; South March Highlands; Petrie Islands; Ottawa South; South Gloucester; Pleasant Park Woods; Armstrong Road; Carriere Park.	5	Trillium Woods
<i>Toxicodendron rydbergii (Rydb.)</i> Greene <i>(Rhus radicans L. var. rydbergii (Sm.) McNeill)</i>	Poison-ivy	Common	0	
AQUIFOLIACEAE (Holly Family)				
<i>Ilex verticillata (L.) A. Gray</i>	Winterberry Holly	Common	5	
CELASTRACEAE (Staff-tree Family)				
<i>Celastrus scandens L.</i>	Bittersweet	Common	3	
ACERACEAE (Maple Family)				
<i>Acer nigrum Michx. f.</i>	Black Maple	Uncommon	7	
<i>Acer pensylvanicum L.</i>	Striped Maple	Common (local)	7	
<i>Acer rubrum L.</i>	Red Maple	Common	4	
<i>Acer saccharinum L.</i>	Silver Maple	Common	5	
<i>Acer saccharum Marsh.</i>	Sugar Maple	Common	4	
BALSAMINACEAE (Touch-me-not Family)				
<i>Impatiens capensis Meerb.</i>	Spotted Touch-me-not	Common	4	
VITACEAE (Grape Family)				
<i>Parthenocissus quinquefolius (L.)</i> Planch <i>(P. vitacea, p. pt.)</i>	Woodbine	Uncommon [13]	6	2007 Addition (Terry Fox Road ROW) [Dfb 17,025]
<i>Parthenocissus vitacea (Knerr)</i> Hitc.	Virginia Creeper	Common	3	
<i>Vitis riparia Michx.</i>	River Grape	Common	0	
TILIACEAE (Linden Family)				

South March Highlands Conservation Forest Existing Conditions

<i>Tilia americana</i> L.	Basswood	Common	4	
HYPERICACEAE (St. John's-wort Family)				
<i>Hypericum ellipticum</i> Hook.	Pale St. John's-wort	Common	9	
<i>Hypericum majus</i> (A. Gray) Britt.	Large St. John's-wort	Common	5	
<i>Triadenum fraseri</i> (Spach) Gl. (<i>T. virginicum</i> (L.) Raf. ssp. <i>fraseri</i> (Spach) Gillett)	Marsh St. John's-wort	Common	7	
VIOLACEAE (Violet Family)				
<i>Viola blanda</i> Willd. (inc. <i>V. incognita</i> Brain.)	Sweet White Violet	Common	6	
<i>Viola canadensis</i> L.	Canada Violet	Common (local)	6	
<i>Viola cucullata</i> Ait.	Marsh Blue Violet	Common	5	
<i>Viola labradorica</i> Shrank (<i>V. conspersa</i> Reich.)	Dog Violet	Common	4	
<i>Viola macloskeyi</i> Lloyd ssp. <i>pallens</i> (Banks) Baker	Northern White Violet	Common	6	
<i>Viola pubescens</i> Ait. (incl. <i>V. eriocarpa</i> Schwein.)	Yellow Violet	Common	5	
<i>Viola rostrata</i> Pursh	Long-spurred Violet	RS (2*): Stony Swamp CA*; South March Highlands	6	Trillium Woods - Extipated ? (last seen 1971)
<i>Viola sororia</i> Willd. var. <i>sororia</i> (<i>V. septentrionalis</i> , auct.)	Wooly Blue Violet	Common	4	
THYMELAEACEAE (Mezereum Family)				
<i>Dirca palustris</i> L.	Leatherwood	Common (local)	7	
ONAGRACEAE (Evening-primrose Family)				
<i>Circaea alpina</i> L.	Lesser Enchanter's- nightshade	Uncommon	6	
<i>Circaea lutetiana</i> L. ssp. <i>canadensis</i> (L.) Asch. & Magnus	Enchanter's-nightshade	Common	3	
<i>Epilobium angustifolium</i> L.	Fireweed	Common	3	
<i>Epilobium ciliatum</i> Raf. (<i>E. adenocaulon</i> Haussk.; <i>E. glandulosum</i> , auct., non Lehm.)	Willow-herb	Common	3	
<i>Epilobium leptophyllum</i> Raf.	Narrow-leaved Willow- herb	Uncommon [16]	7	<u>Not in</u> <u>Conservation</u> <u>Forest:</u> (east of Heron Pond)

South March Highlands Conservation Forest Existing Conditions

<i>Ludwigia palustris</i> (L.) Ell.	Marsh-purslane	Common	5	
<i>Oenothera parviflora</i> L. (incl. <i>O. cruciata</i> Nutt. ex G. Don)	Evening-primrose	Common? [taxonomic problem]	1	
ARALIACEAE (Ginseng Family)				
<i>Aralia nudicaulis</i> L.	Wild Sarsaparilla	Common	4	
<i>Aralia racemosa</i> L.	Spikenard	Uncommon	7	2007 Addition (First Line Road)
<i>Panax quinquefolius</i> L.	Ginseng	PROVINCIAL CONSERVATION CONCERN (S3): RS (4*): South March Highlands; Marlborough Forest*; Harwood Plain; South Gloucester.	9	Not in Conservation Forest: (north of Old Carp Road) - Extirpated ? (not seen since 2000)
APIACEAE (Carrot Family)				
<i>Cicuta bulbifera</i> L.	Bulblet Water-hemlock	Common	4	
<i>Cryptotaenia canadensis</i> (L.) DC.	Honewort	Uncommon	5	
<i>Osmorhiza claytonii</i> (Michx.) Clarke	Sweet Cicely	Common (local)	5	
<i>Osmorhiza longistylis</i> (Torr.) DC.	Anise-root	RS (5): Stony Swamp CA; Carp Hills; South March Highlands (Huntmar Road); Mer Bleue CA; Pine Grove Forest.	6	2007 Addition (Huntmar Road) [Dfb 16,415B]
<i>Sanicula canadensis</i> L. ssp. <i>canadensis</i>	Canada Snakeroot	RS (1): South March Highlands	7	2007 Addition (Huntmar Road) Dfb 16,414]
<i>Sanicula marilandica</i> L.	Black Snakeroot	Common	5	
<i>Sium suave</i> Walt.	Water-parsnip	Common	4	
CORNACEAE (Dogwood Family)				
<i>Cornus alternifolia</i> L.f.	Alternate-leaved Dogwood	Common	6	
<i>Cornus canadensis</i> L. var. <i>canadensis</i>	Bunchberry	Common	7	
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	Common	6	2007 Addition (Huntmar Road)
<i>Cornus sericea</i> L. (<i>C. stolonifera</i> Michx.)	Red-osier Dogwood	Common	2	
PYROLACEAE (Wintergreen Family)				
<i>Pyrola elliptica</i> Nutt.	Shinleaf	Common	5	

South March Highlands Conservation Forest Existing Conditions

MONOTROPACEAE (Indian-pipe Family)				
<i>Monotropa uniflora</i> L.	Indian-pipe	Common	6	
ERICACEAE (Heath Family)				
<i>Gaultheria procumbens</i> L.	Wintergreen	Common	6	
<i>Gaylussacia baccata</i> (Wang.) K. Koch	Black Huckleberry	Uncommon	8	Not in Conservation Forest: (Heron Pond)
<i>Vaccinium angustifolium</i> Ait.	Low Blueberry	Common (local)	6	
<i>Vaccinium myrtilloides</i> Michx.	Velvetleaf Blueberry	Common	7	
PRIMULACEAE (Primrose Family)				
<i>Lysimachia ciliata</i> L.	Fringed Loosestrife	Common	4	2007 Addition (West Block; First Line Road)
<i>Lysimachia terrestris</i> (L.) BSP.	Swamp Candles	Common	6	
<i>Lysimachia thyrsoiflora</i> L.	Tufted Loosestrife	Uncommon	7	
<i>Trientalis borealis</i> Raf.	Starflower	Common	6	
OLEACEAE (Olive Family)				
<i>Fraxinus americana</i> L.	White Ash	Common	4	
<i>Fraxinus nigra</i> Marsh.	Black Ash	Common	7	
<i>Fraxinus pennsylvanica</i> Marsh.	Green Ash	Common	3	
GENTIANACEAE (Gentian Family)				
<i>Gentiana andrewsii</i> Griseb.	Bottle Gentian	Uncommon	6	
APOCYNACEAE (Dogbane Family)				
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	Common	3	
ASCLEPIADACEAE (Milkweed Family)				
<i>Asclepias incarnata</i> L.	Swamp Milkweed	Common	6	
<i>Asclepias syriaca</i> L.	Common Milkweed	Common	0	
CONVOLVULACEAE (Morning-glory Family)				
<i>Calystegia sepium</i> (L.) R.Br. ssp. <i>americanum</i> (Simms) Brumm. (<i>Convolvulus sepium</i> L.)	Hedge Bindweed	Common	2	
POLEMONIACEAE (Phlox Family)				
<i>Phlox divaricata</i> L.	Blue Phlox	Uncommon [12*]	7	Trillium Woods; north of Kanata Pond;

South March Highlands Conservation Forest Existing Conditions

				Terry Fox Road ROW
HYDROPHYLLACEAE (Waterleaf Family)				
<i>Hydrophyllum virginianum</i> L.	Waterleaf	Common	6	
BORAGINACEAE (Borage Family)				
<i>Hackelia deflexa</i> (Wahl.) Opiz (<i>H. americana</i> (A. Gray) Fern.)	American Stickseed	Uncommon [13]	5	Trillium Woods
VERBENACEAE (Vervain Family)				
<i>Verbena hastata</i> L.	Blue Vervain	Common	4	
<i>Verbena stricta</i> Vent.	Hoary Vervain	RS (7*) : South March Highlands; Carp Hills; Dwyer Hill; Cranberry Creek; Manions Corners*; Marlborough Forest*; Fitzroy Provincial Park.	7	Trillium Woods (Second Line Road)
<i>Verbena urticifolia</i> L.	White Vervain	Uncommon [14]	4	Trillium Woods; Second Line Road; Huntmar Road; First Line Road
LAMIACEAE (Mint Family)				
<i>Lycopus uniflorus</i> Michx.	Northern Bugleweed	Common	5	
<i>Mentha canadensis</i> L. (<i>M. arvensis</i> auct., non L.)	Wild Mint	Common	3	
<i>Scutellaria galericulata</i> L.	Marsh Skullcap	Common	6	
<i>Scutellaria lateriflora</i> L.	Mad-dog Skullcap	Common	5	
SOLANACEAE (Nightshade Family)				
<i>Physalis heterophylla</i> Nees	Clammy Ground-cherry	Common	3	
<i>Solanum ptycanthum</i> Dunal (<i>S. americanum</i> , auct.)	Black Nightshade	Common	3	
SCROPHULARIACEAE (Figwort Family)				
<i>Chelone glabra</i> L.	Turtlehead	Uncommon	7	
<i>Lindernia dubia</i> (L.) Penn.	False Pimpernel	Common	7	
<i>Mimulus ringens</i> L.	Monkey-flower	Common	6	
<i>Penstemon digitalis</i> Nutt.	Fox-glove Beard-tongue	Common	6	
<i>Penstemon hirsutus</i> (L.) Willd.	Hairy Beard-tongue	Uncommon	7	
<i>Veronica peregrina</i> L. ssp. <i>xalapensis</i> (Kunth) Penn.	Purslane Speedwell	Uncommon [16]	7	2007 Addition (Huntmar Road)
<i>Veronica scutellata</i> L.	Marsh Speedwell	Uncommon	7	

South March Highlands Conservation Forest Existing Conditions

OROBANCHACEAE (Broom-rape Family)				
<i>Epifagus virginiana</i> (L.) Bart.	Beech-drops	Common	6	
LENTIBULARIACEAE (Bladderwort Family)				
<i>Utricularia macrorhiza</i> Leconte (<i>U. vulgaris</i> , auct.)	Common Bladderwort	Common	4	
PHRYMACEAE (Lopseed Family)				
<i>Phryma leptostachya</i> L.	Lopseed	Uncommon	6	
PLANTAGINACEAE (Plantain Family)				
<i>Plantago rugelii</i> Dcne.	Pale Plantain	Common	1	
RUBIACEAE (Bedstraw Family)				
<i>Galium aparine</i> L.	Cleavers	Uncommon [13]	4	Trillium Woods; First Line Road; West Block
<i>Galium asprellum</i> Michx.	Rough Bedstraw	Uncommon [20]	6	2007 Addition (Terry Fox Road ROW) [30 July 07: First Line Road]
<i>Galium boreale</i> L.	Northern Bedstraw	RS (4): Stony Swamp CA; South March Highlands; McCarthy Woods; South Gloucester [some adventive?].	7	Trillium Woods
<i>Galium circaezans</i> Michx.	White Licorice	Uncommon [18]	7	Trillium Woods; north of Kanata Pond; First Line Road; West Block
<i>Galium palustre</i> L.	Marsh Bedstraw	Common	5	
<i>Galium tinctorium</i> L.	Dyer's Bedstraw	Uncommon [13]	5	Second Line Road
<i>Galium triflorum</i> Michx.	Fragrant Bedstraw	Common	4	
CAPRIFOLIACEAE (Honeysuckle Family)				
<i>Diervilla lonicera</i> Mill.	Northern Bush-honeysuckle	Common	5	2007 Addition (First Line Road) [west of First Line Rd 20 July

South March Highlands Conservation Forest Existing Conditions

				07]
<i>Linnaea borealis</i> L.	Twinflower	Uncommon	7	
<i>Lonicera canadensis</i> Bart. ex Marsh.	Canada Fly-honeysuckle	Common	6	
<i>Lonicera dioica</i> L.	Red Honeysuckle	Uncommon	5	
<i>Sambucus canadensis</i> L.	Canada Elderberry	Uncommon	5	2007 Addition (Watts Creek)
<i>Sambucus racemosa</i> L. ssp. <i>pubens</i> (Michx.) House (<i>S. pubens</i> Michx.)	Red Elderberry	Common	5	
<i>Symphoricarpos albus</i> (L.) Blake	Snowberry	Uncommon (locally abundant)	7	
<i>Triosteum aurantiacum</i> Bickn. (<i>T. perfoliatum</i> L. var. <i>aurantiacum</i> (Bickn.) Wieg.)	Horse-gentian	Uncommon	7	
<i>Viburnum acerifolium</i> L.	Maple-leaf Viburnum	Common	6	2007 Addition (West Block)
<i>Viburnum dentatum</i> L. var. <i>lucidum</i> Ait. (<i>V. recognitum</i> Marsh.)	Southern Arrow-wood	RS (5*): Stony Swamp CA; West Osgoode Swamp* (common); Osgoode Swamp (Springhill Bog); Bypass Woods; Conroy Woods [extirpated, South March Highlands].	7	Not in Conservation Forest: (Morgans Grant) - Extirpated (site destroyed)
<i>Viburnum lentago</i> L.	Southern Wild-raisin	Common	4	
<i>Viburnum rafinesquianum</i> Schultes	Northern Arrow-wood	Common	7	
CUCURBITACEAE (Gourd Family)				
<i>Echinocystis lobata</i> (Michx.) T.& G.	Wild Cucumber	Common	5	2007 Addition (First Line Road)
LOBELIACEAE (Lobelia Family)				
<i>Lobelia inflata</i> L.	Indian-tobacco	Common	3	
ASTERACEAE (Aster Family)				
<i>Achillea millefolium</i> L.	Yarrow	Common	0	
<i>Ageratina altissima</i> (L.) King & Robins. (<i>Eupatorium rugosum</i> Houtt.)	White Snakeroot	Common	5	
<i>Ambrosia artemisiifolia</i> L.	Ragweed	Common	0	
<i>Anaphalis margaritacea</i> (L.) Benth. & Hook.	Pearly-everlasting	Common	3	
<i>Antennaria howellii</i> E. Greene (s. l.)	Canada Pussy-toes	Uncommon	2	

South March Highlands Conservation Forest Existing Conditions

(incl. <i>A. h. ssp. canadensis</i> (E. Greene) Bayer, <i>ssp. petaloidea</i> (Fern.) Bayer, and <i>ssp. neodioica</i> (E. Greene) Bayer)				
<i>Bidens cernuus</i> L.	Nodding Beggar-ticks	Common	2	
<i>Bidens discoidea</i> (Torr. & Gray) Britt.	Disk Beggar-ticks	RS (8) : Stony Swamp CA; Albion Wetland; Magladry Road S; Ont. Land Corp.; Vincent Massey Park; Britannia CA; North Goulbourn Wetland Complex; Black Rapids.	6	2007 Addition; <u>Not in Conservation Forest:</u> (Heron Pond) [Dfb 17,055]
<i>Bidens frondosa</i> L.	Large-leaved Beggar-ticks	Common	3	
<i>Conyza canadensis</i> (L.) Cronq.	Horseweed	Common	0	
<i>Erechtites hieraciifolius</i> (L.) Raf.	Pilewort	Uncommon	2	
<i>Erigeron annuus</i> (L.) Pers.	Daisy Fleabane	Common	0	
<i>Erigeron philadelphicus</i> L.	Philadelphia Fleabane	Common	1	
<i>Erigeron strigosus</i> Muhl.	Spreading Fleabane	Common	0	
<i>Eurybia macrophylla</i> (L.) Cass. (<i>Aster macrophyllus</i> L.)	Large-leaved Aster	Common	5	
<i>Euthamia graminifolia</i> (L.) Nutt. (<i>Solidago graminifolia</i> (L.) Salisb.)	Narrow-leaved Goldenrod	Common	2	
<i>Eutrochium maculatum</i> (L.) E.E. Lamont (<i>Eupatorium maculatum</i> L.)	Joe-Pye-weed	Common	3	
<i>Hieracium umbellatum</i> L. (incl. <i>H. canadense</i> Michx. (s.l.); <i>H. kalmii</i> L. (s.l.); <i>H. laevigatum</i> L.)	Canada Hawkweed	RS (6*) : Shirleys Bay (Riddell Road, Innis Point); South March Highlands; Mer Bleue CA; Bypass Woods; Rockcliffe Park ESA	7	2007 Addition (Huntmar Road) [Dfb 16,413]
<i>Lactuca biennis</i> (Moench) Fern.	Blue-lettuce	Uncommon	6	
<i>Prenanthes altissima</i> L.	Tall White-lettuce	Common	5	
<i>Rudbeckia hirta</i> L.	Brown-eyed Susan	Common		
<i>Solidago altissima</i> L. ssp. <i>altissima</i> (<i>S. canadensis</i> L. var. <i>scabra</i> (Muhl.) Torr. & Gray)	Tall Goldenrod	Common	1	
<i>Solidago caesia</i> L.	Blue-stem Goldenrod	Uncommon	5	
<i>Solidago canadensis</i> L. ssp. <i>canadensis</i>	Canada Goldenrod	Common	1	
<i>Solidago flexicaulis</i> L.	Zigzag Goldenrod	Uncommon	6	
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	Uncommon	7	

South March Highlands Conservation Forest Existing Conditions

(<i>S. bicolor</i> L. var. <i>concolor</i> Torr. & Gray)				
<i>Solidago juncea</i> Ait.	Early Goldenrod	Common	3	
<i>Solidago nemoralis</i> Ait. ssp. <i>nemoralis</i>	Old-field Goldenrod	Common	2	
<i>Solidago rugosa</i> Mill. ssp. <i>rugosa</i>	Rough Goldenrod	Common	4	
<i>Symphyotrichum ciliolatum</i> (Lindl.) A. & D. Love (<i>Aster ciliolatus</i> Lindl.)	Fringed Blue Aster	Common (locally abundant)	6	
<i>Symphyotrichum cordifolium</i> (L.) Nesom (<i>Aster cordifolius</i> L.)	Heart-leaved Aster	Common	5	
<i>Symphyotrichum lanceolatum</i> (Willd.) Nesom ssp. <i>lanceolatum</i> (<i>Aster lanceolatus</i> Willd.; <i>A. simplex</i> Willd.)	Panicled Aster	Common	3	
<i>Symphyotrichum lateriflorum</i> (L.) A. & D. Love (<i>Aster lateriflorus</i> (L.) Britt.)	Calico Aster	Common	3	
<i>Symphyotrichum novae-angliae</i> (L.) Nesom (<i>Aster novae-angliae</i> L.; <i>Virgulus novae-angliae</i> (L.) Rev. & Keen)	New England Aster	Common	2	
<i>Symphyotrichum puniceum</i> (L.) A. & D. Love var. <i>puniceum</i> (<i>Aster puniceus</i> L.)	Purple-stemmed Aster	Common	6	
Total: 448 taxa	Average CC value: 5.08	CC Aggregate	2274	

Errata

The following species were reported from the study area in earlier literature and/ or documentation but are excluded from the above list for the reason(s) indicated in brackets following each listing>

Picea mariana

-population is *Picea rubens*;

Carex crawfordii

- population is *Carex scoparia*;

Carex platyphylla

- population is *Carex laxiflora*;

Stellaria longifolia

- unconfirmed sighting;

Nemopanthus mucronatus

- unconfirmed sighting;

Heliopsis helianthoides

- non-native population;

Solidago gigantea

- unconfirmed sighting