

5.0 Biological Description of Sifton Bog ESA

Botanists, zoologists, wildlife biologists and naturalists like to explore special areas that may support wildlife species not commonly found in the area. Examples of such species are orchids and carnivorous plants. Over time, the uniqueness of Sifton Bog has attracted its share of explorers, who documented in various formats aspects of the ecology of the bog ecosystem. Table 5 is a record of published studies on the flora of the Sifton Bog, including species accounts, post-graduate theses, life science inventories and evaluations for relative significance. By the 1950s the bog was officially protected in municipal policy (London Township) and recognized for its significant features (International Biological Programme site, Provincially Significant Wetland, Life Science Area of Natural and Scientific Interest, Significant Natural Area - now Environmentally Significant Area). When the first subdivision on the western side of the bog (Sifton Oakridge) was completed, the approval came with a conveyance of the most significant and unique section of the bog land to the UTRCA to be protected as a public open space.

In a proactive approach, the City, UTRCA, private sector landowners and community stakeholders undertook an Integrated Resource Management Study to provide context for future development around the bog and adjacent lands. D. McLeod (1992) completed the comprehensive life science inventory for the biological component of the study. This study was used as the baseline for several Environmental Impact Studies (EISs) that were completed in the mid-1990s (Table 5). The next quantitative study of the vegetation of the Sifton Bog was completed over the period 1998 - 2000 by a team of botanists subcontracted to BioLogic. This group coordinated the development of a monitoring program and set environmental targets to be implemented prior to development of the Crich/Drewlo lands along the eastern edge of the bog, by order of the Ontario Municipal Board. Thirteen permanent plots were established in the major vegetation communities on the bog mound and in the swamps. These same plots were located and monitored in 2008 by B. Bergsma and Bradwill Ecological Consulting in order to detect shifts of species or changes to community associations.

In an effort to interpret this wealth of information related to communities and species over time, B. Bergsma and W. DeYoung summarized 11 species accounts by author, species, and species presence by vegetation association. The integrated species list is presented in Appendix D.

Appendix E summarizes the major vegetation associations as described by the various authors. Rather than simply converting each author's community descriptions to the most recent Ecological Land Classification (ELC) for Southern Ontario (Lee *et al.* 1998), each community has been labeled according to the best descriptors, including Ontario Wetland Evaluation System community codes (OMNR 1993, as amended). This allows comparisons of species within communities over time. The final community classification has been converted to the most appropriate ELC equivalent.

Table 5. Botanical Studies of Sifton Bog

Author	Year	Title (full references are in the bibliography)
Dearness, Dr. John	1890	The Cyperaceae (Sedges) of Middlesex County. The Orchidaceae (Orchids) of Middlesex County.
Crawford, Margaret	1926	Studies on the Byron Bog with special reference to <i>Chamaedaphne calyculata</i> (Leatherleaf). M.A. thesis. UWO.
Judd, W.W.	1957	Studies of the Byron Bog in southwestern Ontario. I. Description of the bog.
Judd, W.W.	1966	Studies of the Byron Bog in southwestern Ontario. XXVI. Distribution of shrubs and vines.
Judd, W.W.	1967	Studies of the Byron Bog in southwestern Ontario. XXVIII. Distribution of club-mosses and ferns.
Judd, W.W.	1969	Studies of the Byron Bog in southwestern Ontario. XL. Distribution of <i>Sphagnum</i> mosses.
Orloci, Laszlo	1970	Analysis of Vegetation Samples Based on the Use of Information.
Cook, Frank	1971	The distribution of mosses in the Byron Bog, Southwestern Ontario.
Waldron, Gerry	1972	International Biological Programme (IBP) Checklist of vegetation and species.
Small <i>et al.</i>	1977	The Significant Sensitive Areas of Middlesex County. Ontario Ministry of Natural Resources. Life Science ANSI programme.
Proctor and Redfern	1979	Environmental Appraisal of proposed development property adjacent to Sifton Bog.
Graham, R.	1987	Unpublished thesis; field sampling scheme and vegetation data from 90 quadrats at the Sifton Bog.
Wu, Qiang	1989	Quantitative Analyses on the Vegetation of Byron Bog. M.Sc. thesis. UWO.
McLeod <i>et al.</i>	1989	Wetland Data Record and Evaluation – Sifton Botanical Bog.
McLeod, D.	1992	Integrated Resource Management Study: Life Science Inventory.
Gartner Lee Limited	1993	Environmental Impact Study, Crich/Drewlo Property, Sifton Bog, London, Appendix F: Vegetation Community Descriptions prepared by B. Bergsma.
Gartner Lee Limited	1995	Environmental Impact Study, Norquay Property, Sifton Bog, prepared by B. Bergsma.
Waldron, G. B. Larsen S. Aboud J. Gerrath H. Kleb	1999 - 2000	Pre-development monitoring of 13 geo-referenced 10 m x 10 m vegetation plots in the Sifton Bog (two seasons of data collection) including <i>Sphagnum</i> mosses. Submitted by BioLogic.
Bergsma, B.	2006	Life Science Inventory and Vegetation Community mapping update.
Luckman, B. <i>et al.</i>	2007	Dendrochronology of Black Spruce and Tamarack at the Sifton Bog.
Quinlan, C. B. Gallagher	2006 - 2007	Reconnaissance-level and targeted site visits to specific communities to map species presence/absence, changes, threats, age (Appendix B).
Bergsma, B. W. DeYoung A. Bake M. Wolosinecky N. McKernan M. Kornoibis L. Kemp	2008	Post-development monitoring of 13 geo-referenced 10 x 10 m vegetation plots in the Sifton Bog. In preparation by Bradwill Ecological Consulting.

5.1 Vegetation Community Mapping

Early vegetation community maps that accompanied the botanical inventories listed above were simple inventories of species observed (Judd 1957; Waldron 1972). The first quantitative vegetation analysis was undertaken in 1987 - 1989 by UWO graduate students and their advisors, R. Jancey and L. Orloci. Since this information has not been documented in any other reports on the Sifton Bog, a summary of key findings and mapping are provided in this master plan. As English names are used throughout this plan, an English to Latin table is provided in Table 6.

McLeod (1992) prepared a detailed vegetation community map for the site (Map 10a). A second quantitative vegetation analysis was undertaken in 1998 - 2000 by BioLogic (2001) as a requirement for pre-development monitoring. In 2006 - 2007 vegetation communities were revisited for this master plan and the boundary and community types were adjusted based on the Ontario Wetland Evaluation System and ELC standards. The 2007 vegetation communities are represented on Map 10b.

The wetland area of the bog is approximately 23 ha in size. This bog area is composed of four major zones that are arranged in concentric rings beginning with the central pond:

- Zone 1 - Redmond's Pond,
- Zone 2 - open sedge, shrub and treed bog communities,
- Zone 3 - coniferous, mixed, deciduous and buckthorn swamps, and
- Zone 4 - lagg zone.

Various terrestrial communities surround the bog and provide buffer and related wildlife habitat functions. These zones are consistent with the zones that Dr. Judd applied to the bog -- pond, floating bog, low woods and wooded slopes (Appendix M1).

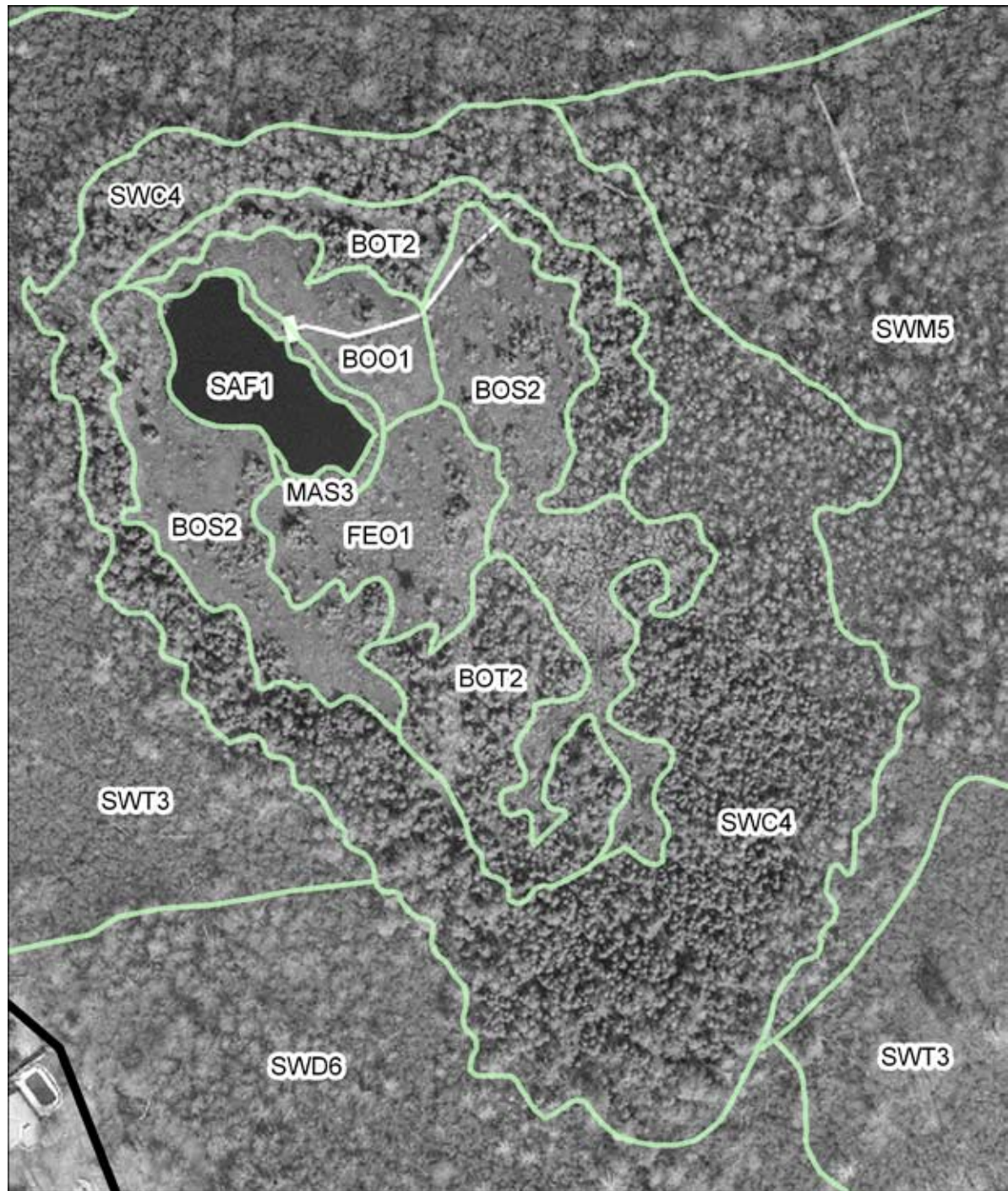
Sixteen distinctive vegetation communities have been recognized and described by various authors over the last 80-year period. These vegetation communities have been divided into major systems and zones as shown in Table 7 and described in the following section. Figure 11 shows the boundaries of the ELC community Ecosites within Zones 1 to 3.

Vegetation communities are ranked for their rarity by the Natural Heritage Information Centre (NHIC) of the Ontario Ministry of Natural Resources. Most bog types are ranked as common in Southern Ontario; however, the leatherleaf shrub kettle peatland of Sifton Bog is ranked S3 (rare to uncommon).

Table 6. Plant Names, English to Latin

Common Name	Latin Name	Common Name	Latin Name
alders	<i>Alnus spp.</i>	Norway Maple	<i>Acer platanoides*</i>
Alternate-leaved dogwood	<i>Cornus alternifolia</i>	Pale Laurel	<i>Kalmia polifolia</i>
apple species	<i>Malus sylvestris or pumila</i>	Pitcher Plant (Northern)	<i>Sarracenia purpurea</i>
ash species	<i>Fraxinus spp.</i>	plantain species	<i>Plantago spp.*</i>
Big Bluestem	<i>Andropogon gerardii</i>	Red Maple	<i>Acer rubrum</i>
Bitternut Hickory	<i>Carya cordiformis</i>	Red Oak	<i>Quercus rubra</i>
Black Ash	<i>Fraxinus nigra</i>	Red Osier Dogwood	<i>Cornus stolonifera</i>
Black Cherry	<i>Prunus serotina</i>	Robust Sedge	<i>Carex lacustris</i>
Black Huckleberry	<i>Gaylussacia baccata</i>	Rose Pogonia	<i>Pogonia ophioglossoides</i>
Black Spruce	<i>Picea mariana</i>	Rough Cotton-grass	<i>Eriophorum tennelum</i>
Black Walnut	<i>Juglans nigra</i>	Round-leaved Sundew	<i>Drosera rotundifolia</i>
Bog Laurel (Pale Laurel)	<i>Kalmia polifolia</i>	Royal Fern	<i>Osmunda regalis</i>
Buttonbush	<i>Cephalanthus occidentalis</i>	rush	<i>Scirpus spp.</i>
cattails	<i>Typha spp.</i>	sedges	<i>Carex spp.</i>
Clearweed	<i>Pilea pumila</i>	Sensitive Fern	<i>Onoclea sensibilis</i>
Common Bladderwort	<i>Utricularia vulgaris</i>	Silky or Glossy Dogwood	<i>Cornus ammomum</i>
Common Buckthorn	<i>Rhamnus cathartica*</i>	Silver Maple	<i>Acer saccharinum</i>
Common Smartweed	<i>Polygonum hydropiper</i>	Small Cranberry	<i>Vaccinium oxycoccos</i>
Cottongrass Bulrush	<i>Scirpus cyperinus</i>	Soft Rush	<i>Juncus effusus</i>
dogwoods	<i>Cornus spp.</i>	Southern Pond Lily	<i>Nuphar advena (Nymphaea advena)</i>
duckweed	<i>Lemna spp.</i>	Sphagnum mosses	<i>Sphagnum spp.</i>
Eastern Redcedar	<i>Juniperus virginiana</i>	Sugar Maple	<i>Acer saccharum</i>
Eastern White Pine	<i>Pinus strobus</i>	sundews	<i>Drosera spp.</i>
Fowl Manna-grass	<i>Glyceria striata</i>	Swamp Milkweed	<i>Asclepias incarnata</i>
Fowl Bluegrass	<i>Poa palustris</i>	Swamp Pink	<i>Arethusa bulbosa</i>
Freeman Maple (hybrid soft maple)	<i>Acer freemanii</i>	Swamp Rose	<i>Rosa palustris</i>
Glossy Buckthorn	<i>Rhamnus frangula*</i>	Swamp Thistle	<i>Cirsium muticum</i>
Grass Pink	<i>Calopogon tuberosus</i>	Tamarack	<i>Larix laricina</i>
Gray Dogwood	<i>Cornus racemosa</i>	Tartarian Honeysuckle*	<i>Lonicera tatarica</i>
Hackberry	<i>Celtis occidentalis</i>	Tawny Cottongrass	<i>Eriophorum virginicum</i>
hawthorns	<i>Crataegus spp.</i>	Three-way Sedge	<i>Dulichium arundinaceum</i>
Highbush Blueberry	<i>Vaccinium corymbosum</i>	viburnums	<i>Viburnum spp.</i>
Highbush Cranberry	<i>Viburnum trilobum</i>	Viper's Bugloss	<i>Echium vulgare*</i>
Hop-hornbeam	<i>Ostrya virginiana</i>	Water Parsnip	<i>Sium suave</i>
Horned Bladderwort	<i>Utricularia cornuta</i>	Water Shield	<i>Brasenia schreberi</i>
Labrador Tea	<i>Ledum groenlandicum</i>	White Ash	<i>Fraxinus americana</i>
Large Cranberry	<i>Vaccinium macrocarpon</i>	White Beakrush	<i>Rhynchospora alba</i>
Largetooth Aspen	<i>Populus grandidentata</i>	White Birch	<i>Betula papyrifera</i>
Leatherleaf	<i>Chamaedaphne calyculata</i>	White Cedar (Eastern)	<i>Thuja occidentalis</i>
Little Bluestem	<i>Schizachyrium scoparium</i>	White Elm	<i>Ulmus americana</i>
Manitoba Maple	<i>Acer negundo*</i>	White Mulberry	<i>Morus alba*</i>
Marsh Fern	<i>Thelypteris palustris</i>	White Oak	<i>Quercus alba</i>
Marsh St. Johnswort	<i>Hypericum virginicum</i>	willow	<i>Salix spp.</i>
Mountain Maple	<i>Acer spicatum</i>	Winterberry	<i>Ilex verticillata</i>
Nannyberry, Sweet Viburnum	<i>Viburnum lentago</i>	Yellow Birch	<i>Betula alleghaniensis</i>
Northern Pitcher Plant	<i>Sarracenia purpurea</i>	Yellow Pond Lily	<i>Nuphar variegatum</i>

* Non-native



Legend (Ecological Land Classification Ecosites)

SAF1	Floating-leaved Shallow Aquatic
MAS3	Organic Shallow Marsh
FEO1	Open Fen
BOO1	Open Bog
BOS2	Shrub Kettle Bog
BOT2	Treed Kettle Bog
SWC4	Tamarack-Black Spruce Organic Coniferous Swamp
SWM5	Maple Organic Mixed Swamp
SWD6	Maple Organic Deciduous Swamp
SWT3	Organic Thicket Swamp
SWD3	Maple Mineral Deciduous Swamp (<i>not shown here; see Map 10b</i>)

Figure 11. Vegetation communities for Zones 1 – 3 of Sifton Bog, 2007

Table 7. Vegetation Zones and Community Descriptions for Sifton Bog ESA, 2007

Vegetation Community	Dominant Species (based on OWES)	Location	Ecological Land Classification Ecosite	McLeod 1992*
WETLAND SYSTEM				
Zone 1: Redmond's Pond [Pond – Judd]				
Open water floating-leaved shallow aquatic	<i>Brasenia-Utricularia</i>	Redmond's Pond	SAF1: Floating-leaved Shallow Aquatic	1a
Southern Pond Lily organic shallow marsh	<i>Nymphaea-Typha</i>	Pond margins, pools, ditches, water tracks	MAS3: Organic Shallow Marsh	1b
Open floating <i>Sphagnum</i> -sedge zone	<i>Rhynchospora-Sphagnum-Drosera-Dulichium</i>	3 small bog ponds south of Redmond's Pond	FEO1: Open Fen	1c
Zone 2: Open Bog [Floating Bog – Judd]				
Open Beakrush-Cotton Grass graminoid-spruce bog	<i>Rhynchospora-Eriophorum-Drosera-Dulichium</i>	Mat north of Redmond's Pond	BOO1: Open Bog Graminoid	2a
Open <i>Sphagnum</i> -heath bog	<i>Chamaedaphne-Vaccinium-Eriophorum</i>	Mat east and west of Redmond's Pond, and south of boardwalk	BOS2: Shrub Kettle Bog	2b
Open spruce-Tamarack- <i>Sphagnum</i> and heath treed bog	<i>Larix-Picea-Sphagnum-Chamaedaphne-Vaccinium-Sarracenia-Eriophorum</i>	Mat east of pond, north of boardwalk	BOT2: Treed Kettle Bog	2c
Zone 3: Swamps [Low Woods – Judd]				
Closed spruce-Tamarack swamp forest	<i>Picea-Larix-Vaccinium-Sphagnum</i>	Outer edge of bog mat	SWC4: Tamarack-Black Spruce Organic Coniferous Swamp	3a
Closed organic mixed swamp	<i>Pinus-Larix-Acer rubrum-Betula</i>	Outer border of low damp woods	SWM5: Maple Organic Mixed Swamp	3b
Closed organic deciduous swamp	<i>Acer rubrum-Betula-Rhamnus frangula</i>	Low woods	SWD6: Maple Organic Deciduous Swamp	3c
Closed mineral maple swamp	<i>Acer freemanii</i>	Swamp in the southwest corner	SWD3: Maple Mineral Deciduous Swamp	1b
Tall shrub organic swamp thicket	<i>Rhamnus-Salix</i>	From bog margin to lagg zone	SWT3: Organic Thicket Swamp	3d
Zone 4 – Lagg Zone				
Organic graminoid meadow marsh	<i>Carex-Scirpus-Juncus-Glyceria</i>	Lagg zone by start of boardwalk	MAM3: Organic Meadow Marsh	2b
TERRESTRIAL SYSTEM [Wooded Slopes – Judd]				
Closed oak-cherry-maple forest	<i>Quercus-Prunus-Acer</i>	Upland slopes around bog	FOD1: Dry-Fresh Oak Deciduous Forest	5
Closed Sugar Maple forest	<i>Acer saccharum</i>	Forest in the SW corner	FOD5: Dry-Fresh Sugar Maple Deciduous Forest	5c
Open hawthorn-buckthorn-honeysuckle-poplar woods	<i>Crataegus-Rhamnus-Lonicera-Populus</i>	Eastern tableland	CUW1: Mineral Cultural Woodland	6a
Meadow and young woodland (maples, hawthorn, Viburnum, grasses)	<i>Acer saccharum-Crataegus-Viburnum-Poa</i>	Open fields at the south end of the ESA	CUM1: Mineral Cultural Meadow	6c
Open Little Bluestem-Big Bluestem prairie-savanna	<i>Schizachyrium scoparium-Andropogon gerardii</i>	Former gravel pit on slope east of bog and swamp	TPS1: Dry Tallgrass Savannah	7

* Map 10a shows McLeod's vegetation communities.

OWES = Ontario Wetland Evaluation System

5.1.1 Zone 1 - Redmond's Pond

Redmond's Pond supports a floating-leaved, shallow, open-water, aquatic ecotype. Pond depth is variable, generally less than 2 metres. Water levels fluctuate with the amount of precipitation over a season, but in general depth of water has been decreasing over time while the size of the pond has remained fairly constant. The bottom of the pond is not solid, but consists of unconsolidated peat that becomes firmer with depth. At the deepest part of the kettle lake the peat layer extends approximately 10 m down before the sand and gravel aquifer is encountered. Key plants of the pond are Southern Pond Lily, with Water Shield, Common Bladderwort and cattail.



Redmond's Pond with floating plants, 2000

Southern Pond Lily, which holds its leaves upright out of the water, is at the northern extent of its range limit and is considered "sensitive" in Ontario (NHIC website).

The extent to which Redmond's Pond is covered by these aquatic plants varies from year to year. Distribution and abundance of the aquatic plants show some relationship to pond water level, with more coverage by pond lilies during shallower (drier) years. In the last couple of years the abundance of aquatic plants has shown decline, which may be due to an overpopulation of Goldfish, which have been illegally introduced in the pond. Goldfish are members of the minnow family and reproduce quickly and uproot and consume aquatic vegetation.

A few small pools to the south and slightly west of Redmond's Pond have similar species composition, although they have more fen indicators.

5.1.2 Zone 2 - Open Bog

There is no defined edge to Redmond's Pond; rather, the edge is defined as a band of *Sphagnum*, sedges and sundews that floats on the water's surface. The mat is made up of the plants themselves plus the roots and rhizomes (underground stems) of these and other plants, both dead and alive. This mat would not support the weight of a person or animal. Primary plants in this zone are *Sphagnum*, Small Cranberry, White Beakrush and Round-leaved Sundew. Sedges are the primary pioneer plants in bog succession.

As the mat becomes more consolidated with increasing distance from the open water, it is able to support more species of bog plants, particularly those in the Ericaceae family. Leatherleaf is the dominant low shrub in this zone. Tawny Cotton Grass, Large Cranberry, Three-way Sedge and a few (<10 % cover) scattered short or stunted Tamarack grow in the low-shrub zone. The three mosses that dominate the mat are *Sphagnum fuscum*, *S. magellanicum*, and *S. fimbriatum*. When in flower in early summer, Bog Laurel and orchids such as Grass Pink and Rose Pogonia add colour to the mat.

The outer ring of the bog is similar to the low shrub zone; however, the presence of 10 - 25% cover of stunted Black Spruce and Tamarack qualifies this zone as a treed bog. One may also find Pitcher Plants, orchids, and some taller shrubs such as Highbush Blueberry and Black Huckleberry.

5.1.3 Zone 3 - Swamps

A series of swamps (treed wetlands) surround the bog communities. A very narrow coniferous band contains Black Spruce and Tamarack trees that are greater than 2 - 5 metres in height and have a canopy closure of more than 60% cover. This community is a defining limit of the bog mound and represents the final stage of bog succession. Sedges, *Sphagnum* mosses of different species, low and tall shrubs, as well as other shade-tolerant mosses and ferns, occur here. The peat underneath this vegetation type is only a few metres deep and more consolidated than peat closer to the centre of the bog, thus providing greater stability for trees.

The rest of the wetland is composed of mixed, deciduous and thicket swamps. These swamps are underlain by organic soil, not deep layers of peat as in the bog. The mixed deciduous and coniferous swamp is transitional between the coniferous swamp and deciduous swamp. Here, Black Spruce is replaced by Tamarack. White Birch, Eastern White Pine, Silver Maple and Freeman Maple (a hybrid between Silver and Red Maple) occupy the canopy layer. These swamps are wet most of the year, except in dry summers. There is a shallow man-made pond within the swamp at the end of Naomee Place. The original owner of the greenhouses on Riverside Drive owned this strip of land and hand-dug the pond (locally known as Turtle Pond) to provide water for the greenhouses. Water was pumped out of the swamp from at least 1950 to the mid 1990s.



An old well casing in the swamp near Naomee Place, is evidence of past digging to create a pond to supply water for the greenhouses on Riverside Drive.

The organic deciduous swamps are dominated by Freeman Maple with some White Birch and only the occasional Eastern White Pine. The understorey is almost entirely Glossy Buckthorn. In the past, other shrubs were present, including Swamp Rose, Winterberry, Mountain Maple and Red Osier Dogwood (McLeod 1992), but there is little evidence of them today. Several fern species have been recorded including Sensitive, Royal and Marsh Fern.

Large areas to the north, west and south of the bog communities, previously classified as mixed and deciduous swamps, are now occupied by a Glossy Buckthorn thicket swamp. Thickets are wetlands dominated by tall shrubs, not trees. The thicket is a virtual monoculture of buckthorn. The trees and shrubs cannot regenerate in the dark understorey of the buckthorn; nor can they withstand the heavy deer browse. It is expected this zone will become a buckthorn thicket in the future if no intervention is carried out. Some dead or dying trees still peek out of the overstorey, but these trees are not regenerating. The origin of the buckthorn appears to be from the northeast corner of the bog, where it was harvested up until 1945.

5.1.4 Zone 4 - Lagg Zone

The outer margins of the bog are occupied by various wet marshes and swamps that contain standing water throughout most of the season. A small emergent meadow marsh community occurs north of the deciduous swamp near the Oxford Street entrance. This community is dominated by emergent herbaceous plants with a scattering of Silver Maple. Species in this



Silver Maple Swamp west of Havenwood, Spring 2006

marsh-like area include Robust Sedge, Soft Rush, Common Smartweed, Cottongrass Bulrush, Swamp Milkweed, and Fowl Manna-grass. Other plants include Clearweed, Water Parsnip, and Swamp Thistle.

At the toe of the eastern slope in the lagg zone is a vegetation community that includes Manitoba Maple, willow, and Hackberry trees. Also present are Buttonbush, sedges, and Sensitive Fern.

At the southwest end of the ESA, the lagg zone is represented by a series of small deciduous swamps, located roughly between Havenwood Way and

Naomee Place. These shallow depressions (dug by hand some years back to produce water for greenhouses) usually have standing water for most of the spring and summer. The swamps are dominated by Silver/Red Maple, willows, Gray Dogwood, Red Osier Dogwood and Clearweed. A mat of floating duckweed often covers the standing water in summer.

The swampy area along the western edge of the ESA is underlain by mineral soil that has only a thin layer of organic soil on top. This area is very small, drier than the other swamps, and is dominated by a few large willow trees.

5.1.5 Deciduous Forests

There are both young and mature forests within the ESA. Despite age differences, all of the forest communities have low species diversity in the ground and shrub layers. This is hypothesized to be due to the heavy pressure of deer browse.

The forests in Naomee Park (southwest corner of the ESA) are mature and dominated by Sugar Maple, which occupy 60% of the overstory. A Sugar Maple and Black Cherry forest (FOD5) occurs on the flatter, moister ground. The tree species assemblage is interrupted by Silver Maple swamps (SWD3) that include other tree species tolerant of wetter conditions including Black Walnut, White Elm and Hackberry.

The large forested area in the southeast part of the ESA, west of Old Hyde Park Road, is a young forest (CUW1). Historically, this area was cleared for agriculture, but it has naturalized since about 1940 (Maps 7a, 7b). The resulting forest contains a wide variety of tree and shrub species representing both early and mid-successional forest development stages. Sugar, Silver, Norway and Manitoba Maple are all present. There are small, sunny openings dominated by hawthorns, viburnums such as Nannyberry and High-bush Cranberry. Non-native grasses form the groundcover. Low spots support Silver Maple and Gray Dogwood. A few large Bitternut Hickory and Eastern White Pine are present. Throughout, non-natives such as Common Buckthorn and Tartarian Honeysuckle are mixed with the native species.

On the north-facing slopes at the south end of the ESA is a mature forest dominated by White and Red Oak (FOD1). A wide range of other trees is present, including Sugar Maple, Black

Cherry, White Ash, Bitternut Hickory and Hop-hornbeam. The trees in this community are large and stately, but there is little regeneration, likely due to heavy browsing by deer. Common Buckthorn, a non-native shrub, is one of the few species present in the shrub layer.

5.1.6 Savanna and Shrub Thickets

A unique savanna habitat has taken over the former gravel pit on the eastern side of the bog (TPS1). Tallgrass prairie grasses including Big Bluestem and Little Bluestem have colonized the loose, sandy soils. A scattering of native and non-native trees has become established here. Mid-sized Bitternut Hickory, ash, Eastern Redcedar, Eastern White Pine, Largetooth Aspen and many dead White Elm trees are present. Clusters of non-native shrubs are also present including White Mulberry and Tartarian Honeysuckle. The groundlayer contains many non-natives including Vipers's Bugloss, plantain and non-native grasses. There is a lot of disturbance from bicycles and bonfires in this area (currently private property).

A woodland community, defined as a treed community having 35 - 60% cover, is present along the eastern slopes and tableland of the bog. The area immediately south of Oxford Street was under cultivation in 1945, but was left to naturalize in the early 1950s. Remnants of a former apple orchard are notable because of the presence of some apple trees and many species of hawthorn (CUW1). This community, which functions as a buffer for the bog, is being taken over by Common Buckthorn. The buckthorn grows to a height of 4 m and forms a closed canopy. As a result, there are few other plants. Alternate-leaved, Silky and Gray Dogwoods are found in small numbers in the more moist areas.

5.2 Vegetation Patterns

The total of 518 species have been identified from Sifton Bog ESA over the years, as follows:

- Tree - 57 species
- Shrub - 87
- Vine - 15
- Forb - 232
- Fern, fern ally - 18
- Graminoid - 97
- Aquatic plant - 12

Of these species, 133 or 26% are non-native or introduced, reflecting typical urban natural areas. Based upon the 11 species inventories that have been assembled (Appendix D), 38 species have been identified by six or more different authors (Appendix F1). Fourteen of these species occur on the list of 17 unique plant descriptors used in the quantitative analysis of the Sifton Bog vegetation by Wu (1989). Missing are *Sphagnum recurvum* (*Sphagnum* will be discussed in another section), Fowl Bluegrass and Rough Cotton-grass. The 14 common descriptor species are listed below.

- | | |
|-----------------------|-------------------------|
| 1. Red Maple | 8. Large Cranberry |
| 2. Tamarack | 9. Small Cranberry |
| 3. Black Spruce | 10. Round-leaved Sundew |
| 4. Leatherleaf | 11. Pitcher Plant |
| 5. Pale Laurel | 12. Sensitive Fern |
| 6. Glossy Buckthorn | 13. Tawny Cottongrass |
| 7. Highbush Blueberry | 14. Common Cattail |



Little Bluestem covers the loose sandy soil in the old gravel pit.

5.2.1 Quantitative Vegetation Grouping

Wu (1989) used an iterative ranking and clustering analysis method to identify vegetation patterns of the open bog and swamp zones. The analysis recognized four major vegetation groups, of which there were two bog (A and B) and two woodland (C and D) groups. The discriminating descriptors to separate the vegetation groups, the important descriptors in each vegetation group, and the distribution of the vegetation groups in the bog were described by Wu (1989).



Pitcher Plant and Round-leaved Sundew in Sphagnum

Glossy Buckthorn and Black Spruce, as well as pH and nitrate, were distinctive species and environmental factors distinguishing open bog from woodland. In the A bog grouping, Tamarack in the tree level, Small Cranberry in the shrub level, and Round-leaved Sundew and Pitcher Plant in the herb level were the primary vegetation descriptors, while nitrate was the environmental factor that distinguished bog vegetation. In the open bog, additional nitrogen is provided by insectivorous plants that digest proteins of trapped animals. The presence of Tamarack, Large Cranberry, Sensitive Fern, and Common Cattail, and the pH distinguish the bog pond and pond margin area (Group B) from the open shrub bog area.

In the woodland groupings, there is a southern woodland association (Group C) and a northern woodland association (Group D). Key descriptors for these two groups were: Black Spruce – Pale Laurel – Fowl Bluegrass in the southern woodland of the bog, and Red Maple – Glossy Buckthorn – Highbush Blueberry in the northern woodland.

5.2.2 Black Spruce and Tamarack Colonization of Bog Mat

Luckman (2007 in preparation) looked at the colonization patterns, growth, and relationship to disturbance of Tamarack and Black Spruce at the Sifton Bog by means of tree ring analysis, referred to as dendrochronology. In total, 113 Tamarack and 44 Black Spruce were sampled. Chronologies were developed from the samples. The oldest Tamarack was 129 years, while the oldest spruce was only 79 years. This reflects the time when spruce trees were harvested during the war and for Christmas trees. The oldest trees occur primarily to the east of Redmond's Pond, but are distributed throughout the bog mat. Luckman noted that over the last 25 years, colonization has occurred between existing trees to increase the density, rather than advancing into the open bog area. There were good relationships between historical events and the tree ring analysis; for instance, the burning of the bog in 1886 and cutting of Christmas trees in the 1940s limited the number of trees that colonized the bog. The oldest trees are located in the coniferous and mixed swamps of zone 3.

5.2.3 Basal Area Analysis

In 2007, three woodland communities were evaluated for basal area: Stand 1 (FOD5), Stand 2 (FOD5-7), and Stand 3 (FOD1). Stands 1 and 2 are young to mid-age woodlands; Stand 3 is a mid-age to mature woodland. Map 8 shows the plot locations.

The analysis showed that there is a dense stand of medium, large and extra large trees, a rarity in southern Ontario. However, about 30% of the trees were declining or dying, and there was a lack of saplings, likely due to heavy shade and deer browse pressure. This analysis is discussed in more detail in Section 7.8.

5.3 Rare, Conservative and Unusual Plants of the Sifton Bog

5.3.1 Rare Plants

The dominant species that make up the bog mat have remained present for many decades. Most of the bog plants are considered regionally rare, that is, rare in Middlesex County, and a few are provincially rare. McLeod (1992) noted five provincially rare plants: three bog and two terrestrial species (Table 8).

Table 8. Provincially Rare Species Listed in McLeod 1992 and their Status Today

Latin Name	Common Name	General Location	Last Verified	2007 Provincial Status*	Notes*
<i>Carex atlantica</i> ssp. <i>capillacea</i>	Atlantic Sedge	Treed Bog	1992 (McLeod)	S1, May be at Risk	Only known from a few bogs in eastern Ontario.
<i>Crataegus dodgei</i> var. <i>dodgei</i>	Dodge's Hawthorn	Upland Thicket	1992 (McLeod)	S4, Secure	Confined to extreme southern Ontario.
<i>Nuphar advenum</i> (Now <i>N. advena</i>)	Southern Pond Lily	Redmond's Pond	2007 (UTRCA)	S3, Sensitive	Confined to extreme southern Ontario.
<i>Panax quinquefolius</i>	American Ginseng	Upland woods	1894	S2, Endangered	Probably extirpated from ESA and area.
<i>Scirpus smithii</i> or <i>Schoenoplectus smithii</i>	Smith's Club-rush	Pond edge	1992 (McLeod)	S2?, May be at Risk	Southern species.

*Status and Notes taken from the Natural Heritage Information Centre (NHIC) website.

5.3.2 Highly Specialized (Conservative) Plants

The coefficient of conservatism (CC) is a value assigned to individual native plant species that represents their degree of tolerance to disturbance and fidelity to specific habitats. Plants with a coefficient of conservatism from 8 to 10 will occur in highly specialized habitats, with a narrow ecological niche. Species with a low CC (0 - 3) may occur in a wide variety of habitats, including disturbed sites. At Sifton Bog, 64% of the flora are specialized to an ecological niche (Table 9a). Another 18% of the flora are highly specialized, with a high CC (8 - 10). The habitat of the bog mound at Sifton Bog is highly specialized and supports plants with a narrower ecological niche, including 26 plant species with a CC of 10 (Table 9b).

Table 9a. Summary of Coefficients of Conservatism of Sifton Bog Plants

CC	Number of Species	Percent of Total species	Fidelity of Habitat	Percent
10	26	7.2	Highly Specialized	17.7
9	13	3.6		
8	25	6.9		
7	46	12.7	Specialized	64.0
6	60	16.6		
5	61	16.9		
4	64	17.7		
3	37	10.2	Common	18.3
2	20	5.5		
1	9	2.5		
	361	100.0		100.0

Table 9b. Species Found in Sifton Bog with a Coefficient of Conservatism 8 - 10

Latin Name	Common Name	True Bog*
CC=10		
<i>Andromeda polifolia</i> ssp. <i>glaucophylla</i>	Bog Rosemary	+
<i>Arethusa bulbosa</i>	Swamp-pink	
<i>Carex atlantica</i> ssp. <i>capillacea</i>	Eastern Sedge	+
<i>Carex chordorrhiza</i>	Creeping Sedge	
<i>Carex limosa</i>	Mud Sedge	
<i>Carex magellanica</i> ssp. <i>irrigua</i>	Bog Sedge	
<i>Carex oligosperma</i>	Few-seeded Sedge	+
<i>Carex pauciflora</i>	Few-flowered Sedge	+
<i>Carex tenuiflora</i>	Sparse-flowered Sedge	
<i>Eriophorum gracile</i>	Slender Cotton Grass	+
<i>Eriophorum virginicum</i>	Tawny Cotton Grass	+
<i>Kalmia polifolia</i>	Pale Laurel	
<i>Maianthemum trifolium</i>	Three-leaf Solomon's-seal	
<i>Pogonia ophioglossoides</i>	Rose Pogonia	
<i>Quercus prinoides</i>	Dwarf Chinquapin Oak	
<i>Rhynchospora alba</i>	White Beakrush	+
<i>Salix pyrifolia</i>	Balsam Willow	
<i>Sarracenia purpurea</i>	Northern Pitcher Plant	+
<i>Scirpus smithii</i>	Smith's Club-rush	
<i>Selaginella selaginoides</i>	Low Spike-moss	
<i>Silene virginica</i> var. <i>virginica</i>	Fire-pink	
<i>Triadenum virginicum</i>	Marsh St. John's-wort	
<i>Vaccinium macrocarpon</i>	Large Cranberry	+
<i>Vaccinium oxycoccos</i>	Small Cranberry	+
<i>Woodwardia virginica</i>	Virginia Chainfern	
<i>Zigadenus elegans</i> ssp. <i>glaucus</i>	White Camass	
CC=9		
<i>Calopogon tuberosus</i>	Tuberous Grass-pink	
<i>Carex trisperma</i> var. <i>trisperma</i>	Three-fruited Sedge	
<i>Carex trisperma</i> var. <i>billingsii</i>	Three-fruited Sedge	
<i>Carya glabra</i>	Pignut Hickory	
<i>Chamaedaphne calyculata</i>	Leatherleaf	+
<i>Drosera intermedia</i>	Spoon-leaved Sundew	+
<i>Ledum groenlandicum</i>	Labrador Tea	+
<i>Lycopodium inundatum</i>	Northern Club-moss	
<i>Menyanthes trifoliata</i>	Bog Buckbean	+
<i>Panax quinquefolius</i>	American Ginseng	
<i>Quercus muhlenbergii</i>	Chinquapin Oak	
<i>Taenidia integerrima</i>	Yellow Pimpernel	
<i>Utricularia cornuta</i>	Horned Bladderwort	

Table 9b (continued)

Latin Name	Common Name	True Bog*
CC=8		
<i>Asclepias exaltata</i>	Poke Milkweed	
<i>Asclepias tuberosa</i>	Butterfly Milkweed	
<i>Carex disperma</i>	Soft-leaved Sedge	
<i>Carex lasiocarpa</i>	Slender Sedge	
<i>Carex leptalea</i> ssp. <i>leptalea</i>	Slender Sedge	
<i>Celtis occidentalis</i>	Hackberry	
<i>Cercis canadensis</i>	Redbud	
<i>Cirsium muticum</i>	Swamp Thistle	
<i>Coeloglossum viride</i> var. <i>virescens</i>	Bracted Green Orchid	
<i>Eleocharis olivacea</i>	Bright-green Spike-rush	
<i>Eleocharis ovata</i>	Ovate Spike-rush	
<i>Galium brevipes</i>	Limestone Swamp Bedstraw	
<i>Galium lanceolatum</i>	Torrey's Wild Licorice	
<i>Galyussacia baccata</i>	Black Huckleberry	
<i>Goodyera pubescens</i>	Downy Rattlesnake-plantain	
<i>Juncus pelocarpus</i>	Brown-fruited Rush	
<i>Lonicera oblongifolia</i>	Swamp Fly Honeysuckle	
<i>Nemopanthus mucronatus</i>	Mountain Holly	
<i>Picea mariana</i>	Black Spruce	+
<i>Pinus resinosa</i>	Red Pine	
<i>Platanthera psycodes</i>	Small Purple-fringed Orchid	
<i>Quercus bicolor</i>	Swamp White Oak	
<i>Scirpus pedicellatus</i>	Stalked Bulrush	
<i>Sorghastrum nutans</i>	Yellow Indian-grass	
<i>Vaccinium corymbosum</i>	Highbush Blueberry	

Note: This list includes species documented in previous reports, especially McLeod 1992. Not all are confirmed to be present today.

* True Bog = True Bog Species, in other words, species that grow only in bog environments.

5.3.3 Unusual Plants - Insectivorous Plants

Of all the plants at the Sifton Bog, the most unusual are the insectivorous or carnivorous plants. By capturing prey insects as a source of nitrogen, these types of plants have adapted to living in an environment where nitrogen is not available. Three different species catch and trap insects in three different ways. The Horned Bladderwort captures its prey using underwater hollow leaves that bear an opening armed with trigger hairs. When an insect trips the hairs, the leaves expand and suck the insect inside. This type of trap is an active trap. There are two passive trap plants at the Sifton Bog. The Pitcher Plant is a pitfall trap. Insects crawl into the tubular-shaped leaves that are partially filled with water. The insects are unable to escape because of the stiff hairs along the inner wall of the leaf that point downward. Sundews are adhesive traps. They have a rosette of small leaves covered by thick glandular hairs that have a drop of highly viscous fluid at the ends. When an insect lands on the hairs it sticks as if to flypaper. The leaf encloses the insect, which is then digested by proteolytic enzymes (Larsen 1982).

5.3.4 Unusual Plants - Orchids

Other specialized plants of botanical interest are the native orchids. They are not generally numerous in occurrence and many are threatened by disturbance and are quite rare to find. At Sifton Bog, 11 species of orchids have been observed (Table 10).

5.3.5 Unusual Plants - Ericaceae (Heath Plants)

Many species of plants that are members of the family Ericaceae have morphological and physiological adaptations that allow them to colonize bog habitats. One of the most significant of these adaptations is the plants' requirement for fungal root associations known as mycorrhizae. It is also known that many members of the Ericaceae family possess compounds (acetylandromedol) in their tissues that are toxic to animals and, therefore, such plants are seldomly grazed for very long. Most of the Ericaceae are low shrubs. They have fragrant flowers, often in great clusters, and glossy evergreen and hairy leaves. Interestingly, these leaf adaptations resemble those of xerophytic desert plants in that such ericaceous plants possess leaf structures that reduce water loss through evaporation and transpiration. These adaptations include thick, leathery leaves; a thick, shiny, waxy cuticle over leaf surfaces; and a thick mat of tomentum (hair) over the undersurface of the leaves where stomata are located. Some species, such as Labrador Tea, have revolute borders that curl around and partly cover the hairy underside of the leaves, like a windbreak (Larsen 1982).

The most common shrub in this family is Leatherleaf, also known as Cassandra. Crawford (1926) completed a study of the distribution and growth of Leatherleaf in the Sifton Bog to determine what environmental factors may contribute to the variations in growth as observed. She described the plants' morphology:

The leaves are nearly evergreen, coriaceous, waxy green above and scurfy white below. The flowers are white bells borne in the axils of the upper small leaves, forming small, one-sided leafy racemes. They bloom from the middle to end of June. It has rhizomes that intermingle and form the bog mat.



Leatherleaf

Her conclusions indicated that the variation in height, luxuriance and yearly development of Leatherleaf is not only related to plant age, but also may be due to the varied concentrations of dissolved oxygen in the soil water.

Table 10 lists the unusual plants found in the past and notes about their current status. As many orchids have very short blooming periods and may not bloom every year, additional timed field work is needed to confirm their current presence or absence. Pitcher Plants were once fairly common on the bog mat and, in 2006, over 30 were seen in one summer day. However, in 2007 very few could be found and the cause is unclear (Dr. Nusha Keyghobadi, personal communication). There is anecdotal evidence that deer are eating Pitcher Plant flowers and leaves.

Table 10. Unique and Unusual Plants Found in Sifton Bog and Last Recorded Date of Observation

Plant	Found in 2006 - 2007	Date of Last Recorded Observation
Insectivorous Plants		
Pitcher Plant – <i>Sarracenia purpurea</i>	More than 30 were found in 2006, but only a few in 2007. None could be found in the fall of 2007. Many babies found again in spring 2008.	
Round-leaved Sundew – <i>Drosera rotundifolia</i>	Abundant (thousands) in 2007	
Spatula-leaved Sundew – <i>Drosera intermedia</i>		1990
Horned Bladderwort – <i>Utricularia cornuta</i>	One patch found on the mat in 2007	
Orchids		
Grass Pink – <i>Calopogon pulchellus</i>	Numerous (more than 50) in 2007	
Rose Pogonia – <i>Pogonia ophioglossoides</i>	Numerous (more than 50) in 2007	
Dragon's Mouth – <i>Arethusa bulbosa</i>		1990; previously more common
Ragged Fringed Orchis – <i>Habenaria lacera</i> or <i>Platanthera lacera</i>		1991
Tall Northern Orchid – <i>Platanthera hyperborea</i>		1907
Small Purple-fringed Orchid – <i>Platanthera psycodes</i>		1890 - 1900
Nodding Ladies' Tresses – <i>Spiranthes cernua</i>		1964
Ericaceous Plants		
Bog Rosemary – <i>Andromeda polifolia</i>		1990
Leatherleaf – <i>Chamaedaphne calyculata</i>	Dominant plant in 2007	
Wintergreen – <i>Gaultheria procumbens</i>		1990
Black Huckleberry – <i>Gaylussacia baccata</i>	Not abundant, but many shrubs found in 2007	
Pale Laurel – <i>Kalmia polifolia</i>	6 plants in 2007	
Labrador Tea – <i>Ledum groenlandicum</i>		1926; one plant
Highbush Blueberry – <i>Vaccinium corymbosum</i>	Not abundant, but many shrubs found in 2007	
Large Cranberry – <i>Vaccinium macrocarpon</i>	Abundant 2007	
Small Cranberry – <i>Vaccinium oxycoccus</i>	Abundant 2007	

5.3.6 Floral Regional Indicators

Most of the bog plants that are considered regionally rare, that is, rare in Middlesex County with less than five locations occurring, are also considered to be boreal indicator species, common in northerly bogs but not in southern Ontario bogs.

Of the provincially significant species (Table 8) only Atlantic Sedge is a boreal bog species. There are 19 species present in the bog that are true bog species (Appendix F2). Thirty-six species are commonly found in habitats on the Canadian Shield (Appendix F2). Two species, Water Shield and Marsh St. John's Wort, are considered to be Atlantic Coastal Plain Flora indicator species (Appendix F2). Four of the provincially significant species are considered southern or Carolinian species and are at-risk because they are at the northern extent of their ranges. Only one of the species in Table 8, Southern Pond Lily, was identified in 2006/07, but extensive field work was not undertaken to locate the other plants.

5.3.7 *Sphagnum*

Sphagnum is an “ecosystem engineer” that is not simply adapted to wet, nutrient-poor and acidic conditions, but rather generates conditions unfavourable for other plants to gain a competitive advantage (Hebda *et al.* 2000). The *Sphagnum* family differs from other moss families by having a high water-holding capacity. A spongy leaf structure results from many large, perforated, water-absorbing, hyaline cells that are interwoven among live epithelial cells. *Sphagnum* can hold up to 20 times its dry weight of water.



Sphagnum Moss

Sphagnum moss is an important component of bog ecology. It readily soaks up water and creates an acidic environment for itself and other bog plants. It does this by the exchange of hydrogen ions for other cations (Ca^{+2} , Mg^{2+} , K^{+} and Na^{+}). The acidity provided by *Sphagnum* gives direction to bog succession, with different species in control at each stage toward drier and more acidic conditions (Larsen 1982).

Judd undertook the first inventory of *Sphagnum* at the Sifton Bog in 1967. A second inventory of *Sphagnum* was

made in 1998 as part of the resource monitoring for the Sifton Bog by the developer’s consultant, BioLogic. The records from both studies are reproduced in Appendix G. Both authors found *Sphagnum magellanicum* present in the open bog and open shrub bog communities. The treed bog supported *S. capillaceum*, recorded by Judd and BioLogic. This same species was found also in the mixed swamp community, along with *S. fimbriatum*, *S. recurvum*, and *S. magellanicum*. The communities having the highest diversity of *Sphagnum* were the closed conifer swamp forest, with eight different species recorded; and the open fen, also with eight species.

5.4 Wildlife

5.4.1 Birds

The Sifton Bog is an isolated “island” habitat not large enough to support a high diversity of wildlife. Even still, for a small area, the fauna is quite diverse, enhanced by the unique variety of plant life. McLeod (1992) confirmed 70 breeding bird species for the site out of an historic record of 124 bird species. Any decline in species diversity over time parallels the decline of many species across southern Ontario, largely due to habitat loss. In 1999 and 2000, through fixed point count monitoring and random surveys, BioLogic observed 47 different species of birds. A list of birds observed and the frequency of observation are included in Appendix H1.

In the spring and fall, many species of warblers, sparrows and other migrants can be found. In some winters, the Black Spruce and Tamarack cones attract winter finches such as Pine Grosbeak, White-winged Crossbill, Pine Siskin, and Purple Finch. Great Horned Owls have been known to hunt for small mammals such as mice, voles and rabbits in and around the bog. A Great Horned Owl was seen in the fall of 2007 during the deer count. In the spring, Mallards and Canada Geese stage or nest on the pond and in areas of standing water. Black-capped Chickadees are seen often in the bog and surrounding swamps.

5.4.2 Butterflies

Many of the early animal records for the Sifton Bog are from Dr. W.W. Judd, who studied the insect life of the bog for many decades. In mid-summer, dragonflies and damselflies are common around the ponds. Many species of butterflies have been recorded including the rare Bog Copper, which, in its larval stage, feeds on the cranberry plant, and Brown Elfin, which, in its larval stage, feeds on the blueberry plant. These two butterflies were confirmed in 1992 by Dave McLeod. The Bog Copper was found in abundance in 2007 by local butterfly enthusiast Allen Dlugan (Ovanin 2007). He noted little luck finding it in previous years.



Bog Copper (Photo: Rosemary Scott)

5.4.3 Amphibians and Reptiles

The wet conditions at the bog attract a range of amphibians and turtles. In the past, seven species of amphibians have been recorded in Sifton Bog. These were Tetraploid Gray Treefrog, Spring Peeper, Green Frog, Wood Frog, Chorus Frog, Leopard Frog and American Toad. The Gray Treefrog, Spring Peeper and Green Frog were confirmed in 2007 through evening surveys. An inventory of wildlife was updated by Dave Martin in 1999 as part of the pre-development biological monitoring program (BioLogic 2001). They confirmed the breeding of Grey Treefrog, Spring Peeper, Green Frog, Wood Frog and American Toad.

Painted Turtles and sometimes Snapping Turtles are seen basking on logs in the pond. Spotted Turtles were recorded historically in the site, but have not been seen for many years and are probably extirpated from the area. A Blanding's Turtle was recorded in the past, but may have been released from another habitat.

5.4.4 Mammals

A large population of White-tailed Deer resides in the ESA. These herbivores eat a wide variety of plants but favour deciduous trees, cedars, shrubs and herbaceous plants. Deer were not commonly seen in the bog in the 1960s and 1970s (London Public Utilities Commission circa 1980). Over time, the population has increased as development has proceeded to change agricultural fields and meadows to residential development.

Other mammals common to urban environments include Red Fox, Cottontail Rabbit, Raccoon, Striped Skunk and Gray Squirrel. There are historical records of European Hare, Masked Shrew, Smoky Shrew and Southern Bog Lemming, none of which has been seen for decades. A dead Meadow Vole was seen hanging from a branch in the mixed swamp along the boardwalk in 2006, likely cached by a Northern Shrike or other raptor.

Incidental observations were made in 2006 - 2007 and are listed in Appendix H2.