An Overview and Assessment of Prairie and Oak Woodland Vegetation at Bronte Creek Provincial Park

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Abstract

Patches of prairie-like vegetation located along the east valley rim in Bronte Creek Provincial Park have long been known to area naturalists and field botanists. The Park is located in Halton Region at the western end of Lake Ontario. A general description of the prairie vegetation was provided by House and Carleton (1988) in an ANSI report prepared for the Nature Reserve Zone located within the Park. Recent field work has shown that, in addition to the prairie patches described by House and Carleton (1988), small patches of open valley rim and slope woodlands also support a suite of species with prairie and savanna affinities. The oak woodlands on the valley rim mainly comprise White Oak and, to a lesser extent, Black Oak, while Chinquapin Oak is more prevalent on the open valley slopes where slumping has occurred in the past. At least 22 plant species occurring within the Park are considered to be prairie/savanna 'indicators', four of which are considered to be either very rare or rare to uncommon in Ontario. The 'prairie' and related communities at Bronte Creek are among only a few remnants of such vegetation in Site District 7-4. With the notable exception of High Park on the 'Humber Plains' in Toronto. Bronte Creek's prairie vegetation is the richest in terms of prairie/savanna indicator species and rare taxa. It also is the most representative remaining example of prairie vegetation along river valley rims and bluffs in Site District 7-4. Currently, management and monitoring strategies are being formulated that will ultimately serve to restore and protect Bronte Creek Provincial Park's significant prairie and tallgrass oak woodland vegetation.

Introduction

Since 1992 the author has been conducting floristic and historical research on prairie, savanna and oak woodland communities occurring at the western end of Lake Ontario, particularly in the Regional Municipalities of Hamilton-Wentworth (Goodban et al. 1999) and Halton (*In prep.*). In response to several recent planning initiatives affecting Bronte Creek Provincial Park (e.g., Park Management Plan, Class Environmental Assessment for the Nelson Junction to Palermo Junction 155 kV Transmission Line Replacement Project), this discussion paper has been prepared to highlight the significance and sensitivity of the prairie and related vegetation communities associated with the Park. Bronte Creek Provincial Park is located at the western end of Lake Ontario, in the Regional Municipality of Halton (Figure 1).

Specifically, this discussion paper provides the following information:

- a general description of the prairie and related oak woodland vegetation, based on community descriptions by House and Carleton (1988) and augmented with field observations made by the author in May, June and August, 1998;

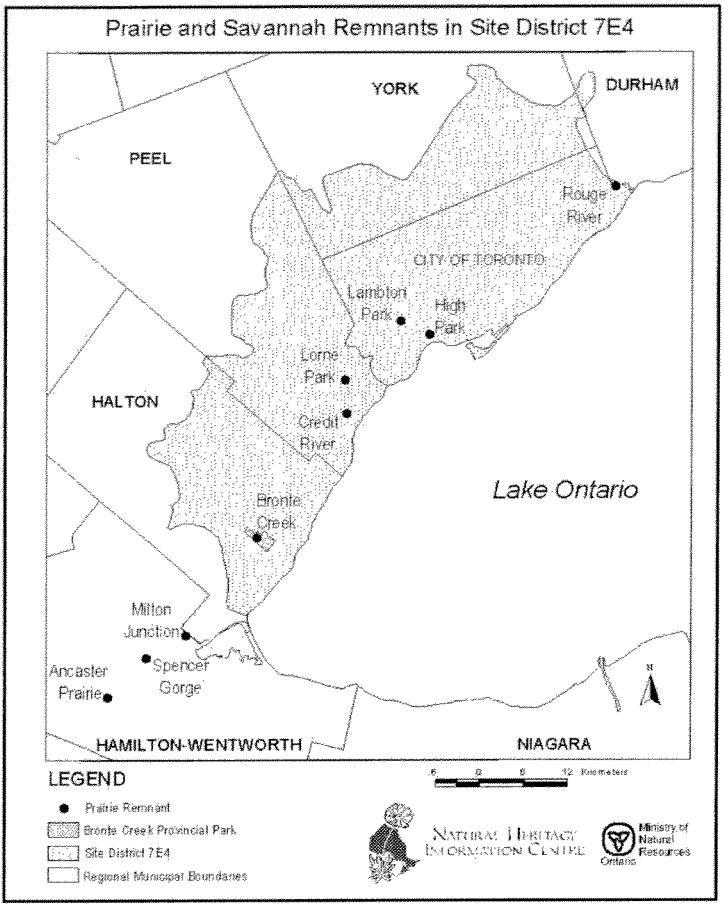

Figure 1: Location of Bronte Creek Provincial Park

- a list of plant species occurring within the prairie communities that are provincially and/or regionally rare;
- a brief review of the relative significance of the Bronte Creek prairie vegetation, in the context of Site Region 7-4; and,
- a review of pertinent park management issues, especially as they relate to current planning projects (e.g., Park Management Plan, Class EA).

General Description of Prairie and Related Vegetation at Bronte Creek Provincial Park and Vicinity

Prairie vegetation and related open (tallgrass) oak woodland is found on the east side of the Bronte Creek Valley at two locations on or in proximity to the two hydro right-of-ways that cross the Park as well as in areas where slumping has occurred along the valley slope. Smaller patches of prairie-like vegetation also occur north of the Park, within the Zimmerman Valley Life Science Area of Natural and Scientific Interest (ANSI) on dry valley rims (S. Varga, pers. comm; A. Goodban, field obs.).

The following generalized description of these prairie communities is taken *verbatim* from House and Carleton (1988: 17):

- Upland Prairie Communities are represented by two sites, the largest approaching one-quarter of an acre in size [0.1 ha]. Both sites occupy hydro corridors, are flat and experience a warmer than normal microclimate. The soils are well drained and are comprised of a dry sandy loam overlying Queenston Shale. Minor disturbance results from an existing walking trail and from periodic brush control along the hydro corridor.

- The two communities have been given special consideration because of the presence of significant amounts of Big Bluestem [*Andropogon gerardii*] and associated species with prairie affinities. Most plants are somewhat patchy in distribution. Species that tend to predominate include Canada Bluegrass (*Poa compressa*), Big Bluestem, a sedge (*Carex pensylvanica*), Hairy Bush-clover [*Lespedeza capitata*], New Jersey Tea (*Ceanothus americanus*), Asters (*Aster* spp.), Goldenrods (*Solidago* spp.), and Hawkweeds (*Hieracium* spp.).

- Permanent quadrats have been established in the larger of the two communities to provide a basis for monitoring vegetational change, such as resulted from the partial burn in 1978, which was beneficial in stimulating Big Bluestem.

- Species of floristic interest include Chinquapin Oak (*Quercus muehlenbergii*), Red Cedar (*Juniperus virginiana*), Big Bluestem, Little Bluestem (*Andropogon scoparius*), Whorled Milkwort (*Polygala verticillata*), Intermediate Pinweed (*Lechea intermedia*), Northern Downy Violet (*Viola fimbriatula*), Black Huckleberry [*Gaylussacia baccata*], Wandlike Bush-clover (*Lespedeza intermedia*), Hairy Bush-clover [*Lespedeza hirta*], and Virginia Yellow Flax (*Linum virginianum*).

The field work for the descriptions presented above was apparently undertaken no later than August, 1981. The site has changed somewhat since the field work was completed some18 years ago, with the result being that the mapping included in House and Carleton (1988) is somewhat dated. Many rare species were noted during the reconnaissance surveys by the author in 1998, in areas other than those mapped by House and Carleton (1988). The recent field visits confirmed the continued presence of many of these prairie/savanna plant species. In addition, two previously unrecorded species were noted, namely *Panicum villosissimum* (White-haired Panic Grass) and *Carex rugosperma* (Wrinkle-seeded Sedge), and the presence of *Desmodium cuspidatum* (Bracted Tick-trefoil) was confirmed.

What is not clear from House and Carleton (1988) is that there is at least a fringe of open tallgrass oak woodland at several locations along the valley rim. The steep valley slopes also support prairie-like vegetation in several areas on the Park's east side, especially where slumping has occurred in the past. In addition to the 'prairie' vegetation along the hydro lines, the following valley rim and slope communities occur within the Park:

- open *Quercus alba* (White Oak) and *Quercus velutina* (Black Oak) woodland on the valley rim, with patches of *Andropogon gerardii* (Big Bluestem), *Lespedeza hirta* (Hairy Bush-clover), *L. intermedia* (Wand-like Bush-clover),

Asclepias tuberosa (Butterfly-weed), *Helianthus divaricatus* (Woodland Sunflower), *Vaccinium pallidum* (Dryland Blueberry), *Gaylussacia baccata* (Black Huckleberry), *Ceanothus americanus* (New Jersey Tea), *Polygala senega* (Senega Snakeroot) and *Taenidia integerrima* (Yellow Pimpernel).

- open *Quercus muehlenbergii* (Chinquapin Oak) woodland on valley slopes where slumping has occurred in the past, with low shrubs such as *Cornus foemina ssp. racemosa* (Grey Dogwood) and *Ceanothus americanus* (New Jersey Tea), and patches of *Andropogon gerardii* (Big Bluestem), *Asclepias tuberosa* (Butterfly-weed), *Helianthus divaricatus* (Woodland Sunflower), *Polygala senega* (Senega Snakeroot), *Taenidia integerrima* (Yellow Pimpernel), *Penstemon hirsutus* (Hairy Beard-tongue) and *Calystegia spithamaea ssp. spithamaea* (Low Bindweed).

- open *Thuja occidentalis* (Eastern White Cedar) woodland on valley slopes where slumping has occurred in the past, with low shrubs such as *Cornus foemina* ssp. *racemosa* (Grey Dogwood), Snowberry (*Symphoricarpos albus*) and *Ceanothus americanus* (New Jersey Tea), and patches of *Andropogon gerardii* (Big Bluestem), *Asclepias tuberosa* (Butterfly-weed), *Helianthus divaricatus* (Woodland Sunflower), *Polygala senega* (Senega Snakeroot), *Taenidia integerrima* (Yellow Pimpernel), *Penstemon hirsutus* (Hairy Beard-tongue) and *Calystegia spithamaea* ssp. *spithamaea* (Low Bindweed).

Table 1 provides a list of plant species considered rare in Halton Region, OMNR 'old' Central Region and Ontario. A list of other prairie indicator species is included in Table 1. Of the species listed in Table 1, 22 were considered 'prairie/savanna indicators' by Bakowsky (1993). Four species are provincially rare (S2) or rare to uncommon (S3). Nine species are considered rare in OMNR's 'old' Central Region (Riley 1989) and nineteen species are considered rare in Halton Region (Geomatics International 1991).

A Comparative Evaluation of the Bronte Creek Prairie Remnants with Others in Site District 7-4

Prairie and Related Vegetation - Ontario

In Ontario, the Natural Heritage Information Centre ranks *all* tallgrass prairie, savanna and woodland communities as S1, or "...extremely rare in Ontario; usually 5 or fewer occurrences in the province, or very few remaining hectares..." (Bakowsky 1996). In the case of tallgrass communities, few remnants are more than 2.0 ha in size and much more than 99% of the original presettlement prairie and savanna vegetation has been destroyed (Bakowksy 1993; Goodban et al. 1999; Rodger 1998). This means that *all* tallgrass communities are of considerable conservation interest.

Prairie and Related Vegetation - Site District 7-4

The prairie communities at Bronte Creek Provincial Park are among only a few remnants of such vegetation in Site District 7-4 (Figure 1). The best example of prairie/savanna/oak woodland vegetation in this Site District is at High Park on the former "Humber Plains" (Bakowsky 1993; Varga 1989).

Table 1: Significant plant species for Bronte Creek Provincial Park—Prairies

Scientific Name	Common Name	Status	Source	Comments
Rare (S2) or Rare to Uncommon in Ontario (S3) [Oldham 1996]				
Desmodium cuspidatum	Bracted Tick-trefoil	S3 R HL	House and Carleton 1988 (A.Goodban - 1998 sight record, Field Botanists of Ontario field trip - 1999 sight record)	A single plant was observed at the northernmost hydro line 'prairie' in 1998 and 1999. Previously recorded by House and Carleton (1998) with no voucher specimen.
Liatris spicata	Dense Blazing-star	S3 R HL	W. McIlveen, field observation ca. 1993. A.Goodban, 1998 photograph.	Represents the first record for Halton Region. Sight record by W. McIlveen, with numerous other witnesses. Small population (less than 10 plants).
Linum virginianum	Smooth Yellow Flax	S2 R L	House and Carleton 1988 (TRTE);A. Goodban, 1998 field observation	More than 100 stems observed on June 20, 1998, scattered across the larger prairie community at the northernmost hydro line.
Panicum villosissimum (P. praecocius)	White-haired Panic Grass	S3 R HL	A. Goodban, 1998 (TRTE)	Apparently represents the first record for Halton Region. Scattered plants near the path that crosses the larger 'prairie' community at the northernmost hydro line.
Rare in OMNR 'old' Central Region (R) [Riley 1989]				
Carex rugosperma	Wrinkled-seeded Sedge	R HL	A. Goodban, 1998 (TRTE)	This species forms a carpet around the smaller, *Andropogon gerardii* dominated 'prairie' community at the central hydro line.
Lespedeza capitata	Round-headed Bush-clover	R HL	House and Carleton 1988; A. Goodban, 1998 field observation	Mapped from the larger 'prairie' community by House and Carleton (1988) and scattered plants observed in 1998 by A.Goodban.
Lespedeza hirta	Hairy Bush-clover	R HL	House and Carleton 1988;A. Goodban, 1998 field observation	Large patches containing hundreds of stems occur at the larger 'prairie' community at the northernmost hydro line. Smaller patches occur at the central hydro line and in open oak woodland on the valley rim.
Lespedeza intermedia	Wand-like Bush-clover	R HL	House and Carleton 1988; A. Goodban, 1998 photograph	Scattered plants grow with *Vaccinium angustifolium, V. pallidum, Gaylussacia baccata, Symphoricarpos albus, Viola fimbriatula, Andropogon gerardii* and *Carex pensylvanica* in open oak woodland on the valley rim. Patches also occur within the larger 'prairie' at the northernmost hydro line (A. Goodban, 1998 pers. obs.).
Quercus muehlenbergii	Chinquapin Oak	R HL	House and Carleton 1988; A. Goodban, 1998 field observation	Scattered trees occur along the valley rim and especially the open slopes where slumping has occurred (A. Goodban, pers. obs.).

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Bakowsky (1993) noted that on the Iroquois Plain (one of the two physiographic regions within Site District 7-4, the other being the South Slope):

> Both extensive and local areas of dry to dry-mesic prairie, oak and oak-pine savannah and woodlands were present along the sandy bluffs of glacial Lake Iroquois and along major river bluffs. Prairies were dominated by *Andropogon scoparius* and other grasses and herbs. Savannahs and woodlands were dominated mostly by *Quercus velutina* or *Q. velutina* and *Pinus strobus*.

In addition to Bronte Creek and High Park, prairie and related vegetation occurs within the Sixteen Mile Creek Valley (A. Goodban, 1996-98 pers. obs.; S. Varga, pers. comm.), the Credit River Valley (1984 field notes of D. Faber-Langendoen and Dr. Paul Maycock; A. Goodban, 1998 pers. obs.), Lambton Park (Bakowsky 1993), Lorne Park (Bakowsky 1993, A. Goodban, 1998 pers. obs.) and the Rouge River Valley (Varga et al. 1991).

Varga et al. (1991) describe two small openings in Red Oak-White Oak forests along the Rouge River Valley that are dominated by *Andropogon gerardii* (Big Bluestem). A number of prairie/savanna species listed above for Bronte Creek Provincial Park also occur at the Rouge River, including: *Mondarda fistulosa* (Wild Bergamot), *Helianthus divaricatus* (Woodland Sunflower), *Aster oolentangiensis* (Sky-blue Aster), *Polygala senega* (Senega Snakeroot), *Comandra umbellata* (Bastard Toadflax), *Taenidia integerrima* (Yellow Pimpernel), *Penstemon hirsutus* (Hairy Beard-tongue), *Carex rugosperma* (Wrinkle-seeded Sedge) and *Ceanothus americanus* (New Jersy Tea). Other native species of dry, open habitats that occur at both sites include *Carex pensylvanica* (Pennsylvania Sedge), *Danthonia spicata* (Poverty Oat Grass) and *Pteridium aquilinum* (Bracken). The provincially rare *Scirpus verecundus* (Shy Bulrush) is found in these openings at the Rouge River (Varga et al. 1991). Bronte Creek provincial park supports a richer assemblage of prairie indicator species in comparison to the Rouge River, including four provincially rare species.

The sites documented for Lambton Park and Lorne Park are very small and quite disturbed (Bakowsky 1993; A. Goodban, 1998 pers. obs.). Small sites occur under hydro lines along the Credit River Valley at the Queen Elizabeth Way (QEW) that support prairie grasses and some uncommon to rare species, including *Lespedeza capitata* (Round-headed Bush-clover) and *Lupinus perennis* (Wild Lupine)(1984 field notes of D. Faber-Langendoen and Dr. Paul Maycock). These sites are small and disturbed, being invaded by woody species (Faber-Langendoen, pers. comm.).

Along the Sixteen Mile Creek Valley there are small openings with *Andropogon gerardii* (Big Bluestem), and semi-open *Quercus alba* (White Oak) woodland/forest that support savanna/oak woodland species such as *Aureolaria flava* (Yellow False Foxglove), *Solidago arguta* (Sharp-leaved Goldenrod), *Polygala senega* (Senega Snakeroot), *Helianthus divaricatus* (Woodland Sunflower), *Carex rugosperma* (Wrinkle-seeded Sedge), *Ceanothus americanus* (New Jersey Tea), *Taenidia integerrima* (Yellow Pimpernel), *Vaccinium pallidum* (Dryland Blueberry), *Comandra umbellata* (Bastard Toadflax) and *Saxifraga virginiensis* (Early Saxifrage)[A. Goodban, pers. obs., May 15, 1998]. On slopes where slumping has occurred,

Table 1 (Continued): Significant plant species for Bronte Creek Provincial Park—Prairies

Scientific Name	Common Name	Status	Source	Comments
Rare in Halton Region (HL) [Geomatics International 1991]				
Amelanchier alnifolia var. humilis	Low Shadbush	HL	House and Carleton 1988; A. Goodban, 1998 field observation	Occurs in the larger 'prairie' community and along smaller openings on the valley rim (A. Goodban, pers. obs.).
Andropogon gerardii	Big Bluestem	HL	House and Carleton 1988; A. Goodban, 1998 field observation	Abundant at the two main 'prairie' communities along the hydro lines. Also, scattered plants occur in smaller openings on the valley rim and slopes (A. Goodban, pers. obs.).
Asclepias tuberosa	Butterfly-weed	HL	House and Carleton 1988; A. Goodban, 1998 field observation	Mainly occurs on the valley slope portion of the larger prairie community at the northernmost (A. Goodban, pers. obs.).
Aster oolentangiensis	Sky-blue Aster	HL	House and Carleton 1988; A. Goodban, 1998 field observation	Scattered plants occur in the larger prairie community at the northernmost hydro line (A. Goodban, pers. obs.).
Helenium autumnale	Sneezeweed	HL	House and Carleton 1988	Listed by House and Carleton (1988) as "present," but no voucher was collected and no community of occurrence was provided.
Lechea intermedia	Pinweed	HL	House and Carleton 1988	Listed by House and Carleton (1988) as "present," with a voucher collection at TRTE, but no community of occurrence was provided. Observed in 1998 (A. Goodban) and 1999 (Field Botanists of Ontario) at the larger 'prairie' site on the northernmost hydro line.
Polygala verticillata	Whorled Milkwort	HL	House and Carleton 1988	Listed for the 'prairie' communities by House and Carleton (1988), with a voucher collection at TRTE. Observed in 1998 (A. Goodban) and 1999 (Field Botanists of Ontario) at the larger 'prairie' site on the northernmost hydro line.
Schizachyrium scoparium (Andropogon scoparius)	Little Bluestem	HL	House and Carleton 1988; A. Goodban, 1998 field observation	Occurs less frequently in the larger prairie community (A. Goodban, pers. obs.).
Viola fimbriatula	Northern Downy Violet	HL	House and Carleton 1988; A. Goodban, 1998 field observation	Scattered plants occur under oaks along the valley rim (A. Goodban, pers. comm.).

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open-grown *Thuja occidentalis* (Eastern White Cedar) occur amidst openings dominated by *Andropogon gerardii* (Big Bluestem), with *Polygala senega* (Senega Snakeroot), *Helianthus divaricatus* (Woodland Sunflower), *Ceanothus americanus* (New Jersey Tea), *Taenidia integerrima* (Yellow Pimpernel), *Vaccinium pallidum* (Dryland Blueberry), *Comandra umbellata* (Bastard Toadflax) and *Saxifraga virginiensis* (Early Saxifrage) as associates.

Upstream of Bronte Creek Provincial Park, there is a small prairie remnant within the Zimmerman Valley Life Science ANSI that was recently discovered by Steve Varga (OMNR Aurora District - pers. comm.). The provincially rare *Linum virginianum* (Smooth Yellow Flax), which occurs within the Park, was also documented from the Zimmerman Valley.

Considering the preceding notes on other remnants within Site District 7-4, it is suggested here that, other than at High Park, the Bronte Creek Provincial Park prairie communities are the richest in terms of prairie indicator species and provincially rare species. Bronte Creek Provincial Park is the most representative remaining example of prairie vegetation along river valley rims and bluffs in Site District 7-4.

Prairie and Related Vegetation - Western End of Lake Ontario

West of Bronte Creek, beyond Site District 7-4, prairie and related vegetation (e.g., open oak woodland with savanna species, and small openings) occurs at Rock Chapel, Spencer Gorge, Milton Junction, Cootes Paradise and Ancaster Prairie. Around modern day Hamilton, Ancaster, Dundas and Flamborough, prairie and savanna was more extensive than along the north shore of Lake Ontario. At least 3,800 ha of prairie and savanna is estimated to have occurred there on sand plains, alluvial fans and post-glacial shoreline features (Goodban et al. 1999), largely outside of Site District 7-4. Bakowsky (1993) estimated that perhaps only 500 ha of prairie and savanna occurred on the Iroquois Plain (which forms part of Site District 7-4), based on scant historical information.

Summary: Significance of Prairie and Related Vegetation in Bronte Creek Provincial Park

The preceding discussion has established that:

- *all* tallgrass communities are considered *extremely rare* in Ontario, including prairie, savanna and oak woodland (ranked S1 - Bakowsky 1996); and,
- with the exception of High Park, the prairie and related communities at Bronte Creek Provincial Park are the most significant in Site District 7-4 in terms of size, number of prairie/savanna species, number of provincially rare and rare to uncommon species, and representativeness.

It should also be noted that Bronte Creek's prairie and related vegetation (oak woodland, rim openings), with its large patches of *Ceanothus americanus*, is reported to support a population of Mottled Duskywing (*Erynnis martialis*). This butterfly species occurs in oak savannas and barrens, where it has been extirpated at some sites and is in decline at others (Rodger 1998).

Table 1(Continued): Significant plant species for Bronte Creek Provincial Park—Prairies

Scientific Name	Common Name	Status	Source	Comments
Other Species with a High Fidelity for Prairie and Savanna Habitats (based on lists in Riley 1989; Bakowsky 1993; Rodger 1998)				
Anemone cylindrica	Thimbleweed	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Aster laevis	Smooth Aster	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Aster urophyllus	Arrow-leaved Aster	HL	House and Carleton 1988	
Ceonothus americanus	New Jersey Tea	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Comandra umbellata	Bastard Toadflax	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Elymus canadensis	Canada Wild-rye	n/a	House and Carleton 1988	
Helianthus divaricatus	Woodland Sunflower	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Monarda fistulosa	*Wild Bergamot*	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Penstemon hirsutus	Hairy Beard-tongue	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Polygala senega	Senega Snakeroot	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	
Vaccinium pallidum	Dryland Blueberry	n/a	House and Carleton 1988; A. Goodban, 1998 field observation	

Management Opportunities and Issues

The 'prairie' remnants along hydro lines are gradually filling in with young trees and shrubs, although the brush is periodically controlled by Ontario Hydro and Burlington Hydro. Similarly, the adjacent open oak woodlands are gradually filling in with shrubs such as *Hamamelis virginiana, Rhamnus cathartica* and *Cornus foemina* ssp. *racemosa*, and trees such as *Populus tremuloides, Prunus serotina, Acer saccharum* ssp. *saccharum* and *Fraxinus americana*.

In order for the prairie and oak woodland vegetation to persist and to conserve its biodiversity, some form on periodic management is required. This management should take the form of carefully planned and monitored prescribed burns and woody vegetation control efforts. Follow up herbicide treatments may be required to eliminate undesirable species.

Conclusions

It is clear that from a regional perspective, the prairie and related communities at Bronte Creek Provincial Park are quite significant. This vegetation supports many specialized prairie plant species, a number of which are considered provincially and/or regionally rare.

The prairie and related vegetation is primarily threatened by fire suppression. The Park Administration has indicated a willingness to begin implementing a management program to ensure that these significant natural features are conserved.

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