

ALVAR OF THE BRUCE PENINSULA

A Consolidated Summary
of Ecological Surveys
2008

Jarmo V. Jalava



Parks Canada Agency
Bruce Peninsula National Park
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I. INTRODUCTION

"Alvar" is a Swedish word, originally denoting the shallow-soiled grasslands on the limestone islands of Öland and Göteland in the Baltic Sea. The word is now applied to naturally open ecosystems found on shallow soils over relatively flat, glaciated limestone (or marble) bedrock, with less than 60% tree canopy cover (Reschke *et al.* 1999, Brownell and Riley 2000, Jones and Jalava 2005).

The alvars of the Bruce Peninsula and Manitoulin Island regions in Ontario are internationally-recognized for their rarity, their distinct ecological character, and because they are home to an exceptional variety of globally and provincially rare vegetation community types and species (Figures 1 and 2). Indeed, at least 22 vascular plant species, 4 species of lichens, 5 mosses, four species of reptiles, 7 mollusks, numerous insects and 4 reptile species found on the alvars of the Bruce Peninsula are globally or provincially rare. These include one plant species designated Endangered, 4 plants and 2 reptiles designated as Threatened, and 1 plant and 2 reptiles designated as Special Concern in Canada and Ontario by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Ontario Ministry of Natural Resources (OMNR). Additionally, alvar species such as Houghton's Goldenrod (*Solidago houghtonii*), Lakeside Daisy (*Hymenoxis herbacea*), Dwarf Lake Iris (*Iris lacustris*) and Hill's Thistle (*Cirsium hillii*) are endemic to the Great Lakes basin, and with the majority of the populations of the first three species occurring in Ontario.

Alvar habitats are increasingly threatened by a variety of human activities. Based on available background information (Brownell and Riley 2000, NHIC 2006, Brodribb and Oldham 2000, Canne-Hilliker 1988, 1998, Makkay 2003, Oldham and Kraus 2002, Jalava 2004, 2005, Jones and Jalava 2005), the principal human impacts affecting alvar habitats are: building and road construction; quarrying; off-road vehicle traffic; livestock grazing; activities associated with logging in adjacent forests; ornamental stone removal; bonsai and orchid collecting; and trampling by pedestrians (Jones and Jalava 2005). Invasion by exotic species often occurs as a result of these types of human disturbance. Additional indirect threats to recovery of alvars and their component species include lack of public awareness of the ecological significance of alvars, and knowledge gaps relating to the biological needs of alvar species at risk (Jones and Jalava 2005).

The long-term persistence of some open alvar communities may also be affected by processes such as natural succession. Fire-suppression in particular may result in the reduction of open alvar habitat, as it is evident that many of the Bruce Peninsula and Manitoulin region alvars have experienced fire in the past 150 years (Jones and Jalava 2005). Air photo analysis indicates increases in forest cover and reduction of open alvar in some of these areas (Schaefer 1996c, Schaefer and Larson 1997, Parker pers. comm. 2005). Changes in Lake Huron water levels, whether due to natural cycles or human causes, could also hypothetically reduce (or increase) the extent of near-shore alvars.



Figure 1. The threatened Lakeside Daisy is abundant in this open alvar near George Lake



Figure 2. Creeping Juniper (foreground) and the provincially rare Northern Dropseed (background) dominate this alvar community on the northern Bruce Peninsula

An Ecosystem-based Recovery Strategy

To ensure their continued survival, the Bruce Peninsula – Manitoulin Island Alvar Ecosystem Recovery Team (RT) was formed in 2004, with the overall objective of developing an ecosystem-based recovery strategy for imperiled alvar species and their globally significant alvar habitats. The RT includes membership from various non-government and government agencies, the academic research community and the private sector. The RT’s “ecosystem approach” to recovery recognizes the links between species, communities, and the biophysical processes that support them. Its objective is to maintain or enhance the natural ecological factors that sustain the alvar communities through managing the impacts of human activities that occur on the landscape within and around the alvars.

The RT recognized in its earliest stages the importance of compiling all existing information and filling inventory gaps relating to Bruce Peninsula and Manitoulin Island alvars in order to be able to strategize conservation activities in an effective manner. Standardized information and completion of inventory were therefore identified as the top initial priorities in the “Recovery Strategy for Alvar Ecosystems of the Bruce Peninsula and Manitoulin Island Regions in Ontario” (Jones and Jalava 2005). Meeting this objective will allow for updated information on the abundance, distribution and habitat quality of the five featured plant species of the RT and the numerous other species-at-risk that share their habitat. The five species are:

1. Gattinger’s Agalinis (*Agalinis gattingeri*)
2. Lakeside Daisy (*Hymenoxys herbacea*)
3. Houghton’s Goldenrod (*Solidago houghtonii*)
4. Hill’s Thistle (*Cirsium hillii*)
5. Dwarf Lake Iris (*Iris lacustris*)

Most of the alvars in the Bruce Peninsula region occur within the Greater Park Ecosystem (GPE) of the Bruce Peninsula – Fathom Five Marine National Park. In 2005, Parks Canada made it a priority to provide the funding and in-kind support necessary to fill many of the information gaps for alvar ecosystems on the Bruce Peninsula. This report endeavours to summarize the results of this effort in a user-friendly format. General locations of alvars on the Bruce Peninsula are presented in Figure 3.



Figure 3. Alvar locations on the Bruce Peninsula

Bruce Peninsula Alvar Studies

High quality alvar inventory work has been completed on the Bruce Peninsula to date, much of it in cooperation with the Ontario Ministry of Natural Resources (OMNR). The majority of this work was conducted between 1994 and 1997 as part of the International Alvar Conservation Initiative (IACI), a collaborative study of alvars across their range in the Great Lakes region of North America involving more than 50 researchers representing government and non-government agencies and academic institutions on both sides of the Canada – United States boundary (Reschke *et al.* 1999). The IACI was led and coordinated by The (U.S.) Nature Conservancy – Great Lakes Program in Chicago, Illinois. Ontario-based lead agencies of the IACI included the Ontario Natural Heritage Information Centre (NHIC) of the OMNR and the Federation of Ontario Naturalists (FON) (now known as Ontario Nature). A conference summarizing the work of the IACI was held in Tobermory on the Bruce Peninsula in 1997.

Other research has also been undertaken on Bruce Peninsula alvars over the past three decades. Some of it was done in association with the IACI, while other work was done independently by academic researchers, or as part of programs of the provincial and federal governments. Inventories of candidate nature reserves and Areas of Natural and Scientific Interest (ANSI) conducted by the Ontario Ministry of Natural Resources (OMNR) have described alvars on the Bruce Peninsula since the 1970s (e.g., Cuddy *et al.* 1976, Johnson 1982a-e, Riley *et al.* 1996, Jalava 2005b-c, Jalava 2006a-b). Morton and Venn (1987) conducted floristic studies on alvars of the Tobermory Islands (and other Bruce Peninsula sites) in the early 1980s. Kaiser (1992, 1993) summarized botanical work on the upper Bruce Peninsula and surveyed a number of alvar sites. Bouchard (1998) studied insect populations at two Bruce Peninsula alvar sites as part of the IACI. Academic research on alvars has included work by the Cliff Ecology Research Group (CLEG) at the University of Guelph, led by Dr. Doug Larson (e.g., Larson *et al.* 1999, Schaefer and Larson 1997). Non-government organizations such as Ontario Nature have also sponsored studies of Bruce Peninsula alvars, particular of alvar sites they have secured for protection (e.g., Varga *et al.* 1995, Sutherland 2004).

The detailed inventories of the IACI and other studies resulted in the ability to evaluate the conservation significance of alvars across their range in Ontario on an ecodistrict by ecodistrict basis. Such an “ecological theme study” of Ontario alvars was sponsored by the FON and authored by Brownell and Riley (2000). It summarized not only the information compiled by the IACI, but also earlier and concurrent research on Ontario alvars, such as that conducted by Dr. Paul Catling and Vivian Brownell (e.g., Catling *et al.* 1975, Catling and Catling 1993, Catling 1995, Catling and Brownell 1995, Catling and Brownell 1999a,b).

The Brownell and Riley (2000) report highlighted only the most significant (*i.e.*, provincially significant) alvars in each ecodistrict across southern Ontario, based on the information available at that time, and did not display maps of the alvar boundaries (only the greater natural areas within which the alvars are found were mapped). For local- and

regional-scale conservation planning, such as the “greater ecosystem” emphasis of Bruce Peninsula National Park and the land-securement activities of non-government conservation organizations, more detailed information and mapping on all alvars in the region was recognized by the RT as being essential. Fine-scale data and mapping is critical to informed park management, species-at-risk protection and prioritization of conservation lands for acquisition. Inventory aimed at addressing many of these gaps was sponsored by the Ontario Natural Heritage Information Centre (NHIC) of the Ontario Ministry of Natural Resources (MNR) and NatureServe Canada (Jalava 2004) in 2004, and continued by Parks Canada in 2005 and 2006 (Jalava 2005a, 2006c). This report summarizes in one document these recent and earlier alvar studies.

Purposes of this Report

The purposes of this summary report on Bruce Peninsula alvars are:

1. To provide a comprehensive summary of ecological inventory work conducted on Bruce Peninsula alvars to date;
2. To provide a summary of each alvar site on the Bruce Peninsula surveyed to date;
3. To complete digital mapping of all alvar communities on the Bruce Peninsula surveyed to date;
4. To provide species lists for each alvar surveyed on the Bruce Peninsula to date;
5. To evaluate the relative ecological significance of known Bruce Peninsula alvars;
6. To identify inventory gaps and other research needs;
7. To develop a conservation strategy for the future protection and management of alvars on the Bruce Peninsula.

Alvar Classification

Classification of alvar community types in North America has evolved significantly over the past two decades, and it seems that every new study results in modifications or updates. A comparison of the most widely-recognized classifications for Ontario alvars is provided in Table 1. These are:

1. The Southern Ontario Ecological Land Classification (ELC) (Lee *et al.* 1998, 2006), which is the standard classification used for defining and mapping vegetation community types south of the Canadian Shield in Ontario;
2. The alvar community classification developed by the International Alvar Conservation Initiative (IACI) (Reschke *et al.* 1999);
3. The alvar classification developed for Ontario by Brownell and Riley (2000), based largely on an evaluation of the work done by Catling and Brownell (1995) and Reschke *et al.* (1999);

4. Bakowsky (1997) and NHIC (2006), which are derived mainly from the Lee *et al.* (1998), but which include provincial conservation ranks (SRanks) for most alvar community types;
5. NatureServe (2006) provides an international community classification developed in consultation with state and provincial heritage programs, such as NHIC (2006) and Bakowsky (1997) in Ontario, as well as Reschke *et al.* (1999) and Brownell and Riley (2000).

The present study uses a classification that aligns with the standard Southern Ontario ELC (Lee *et al.* 1998), which is used by Parks Canada, Ontario Ministry of Natural Resources and most other agencies involved in conservation and land use planning in the province. However, because a considerable amount of study has been undertaken on alvars since the publication of Lee *et al.* (1998), a slightly modified and updated classification for alvars on the Bruce Peninsula is presented here (Table 1)

A challenge in alvar classification has involved determining what constitutes “alvar” versus “rock barren”. An important consideration in differentiating between such communities is the amplitude of relief. Alvars by definition occur on “level” bedrock-controlled terrain, but obviously no alvar site is perfectly flat. Some alvars occur on gently-sloping bedrock, others have deep crevices but are essentially flat, and most alvars have slight ridges and depressions interspersed with flatter sections. The point at which a relatively-flat “alvar” becomes a more rolling or rugged “limestone barren” or “calcareous rock barren” has not been clearly defined. For example, ELC definitions for alvar and rock barren, based on Lee *et al.* (2006), are as follows (*italics added*):

Alvar – “sedimentary rock, with high calcareous content; e.g. limestone, dolostone; fizzes with acid; high pH (> 7.5); *level, unfractured limestone (calcareous) bedrock*;...substrate depth < 15cm; ... *seasonal alternation between inundation and drought.*”

Calcareous Rock Barren – “sedimentary rock, with high calcareous content; e.g. limestone, dolostone; fizzes with acid; high pH (> 7.5); *near level to variable calcareous bedrock and rock; typically more fractured and variable than 'alvars'; absence of 'alvar' species*;...substrate depth < 15cm;...*subject to extremes in temperature and moisture.*”

As stressed in the ELC definitions, the presence or absence of alvar-associated species is another key indicator. However, alvar-associated species often occur in small numbers on limestone rock barrens (or on alvar-like inclusions within such barrens).

Given the rather vague distinctions in the definitions and the absence of universally-accepted criteria, it is perhaps clearer to define alvars on the basis of factors of elimination. In the present study, the following criteria were used to *exclude* habitat patches from the alvar definition:

- undulating bedrock with an amplitude >0.5 m (or up to 1 m in very large alvars), excluding vertical crevices
- sites with >3° overall slope
- periodically-inundated bedrock shorelines (*i.e.*, areas below the long term high water mark and areas exposed to wave action during storm events)
- sites where alvar-associated¹ vascular plant species comprise less than 10% of the total native vascular plant taxa
- habitat patches with fewer than 6 alvar-associated vascular plant taxa
- habitat patches <0.5 ha in size² (the ELC minimum patch size)
- bedrock woodlands with greater than 60% tree cover

Even with these relatively clear exclusionary criteria, subjective judgements had to be made during fieldwork. For example, precise measurements of topographic amplitude and degree of slope were not possible, and time constraints prohibited complete vascular plant species counts for all potential alvar habitats.

In addition, distinctions between treed alvars and “non-alvar” bedrock woodlands is often very difficult to make in the field (or through air photo interpretation), because small alvar-like openings frequently occur in habitat mosaics amidst more densely-treed woodlands. How one determines percent tree cover in such situations is a matter of scale. This is probably the main factor leading to disparities in estimates of extent of alvar at Bruce Peninsula sites.

Another frequent challenge involves distinguishing between open alvars and bedrock-based graminoid fens. Such communities frequently intergrade on the gently-sloping bedrock plain of the Bruce, where fen-associated species are frequently found on alvars. Extensive examples of fen-alvar intergrades occur at Dorcas Bay, Corisande Bay, Sucker Creek and many other sites on the west side of the Bruce Peninsula. The present study accords with Brownell and Riley (2000) in recognizing a fen-like moist-to-wet alvar community dominated by Tufted Bulrush (Figure 4); such a community type is not included in the current ELC (Lee *et al.* 1998, 2006).

¹ - based on alvar-associate vascular plants list in Brownell and Riley (2000)

² - in some cases smaller habitat patches have been included in this study

Table 1. Crosswalk between the various ecological classifications for alvar types occurring on the Bruce Peninsula

IACI Code	ELC Code	G / S Ranks	Southern Ontario ELC (Lee <i>et al.</i> 1998)	Reschke <i>et al.</i> 1999	Brownell and Riley 2000	Bakowsky 1997, NHIC 2006	NatureServe 2006	This Study
AP-4	ALO1-1	G2 S1	Dry Lichen – Moss Open Alvar Pavement Type	Alvar non-vascular pavement	3a – Nonvascular open alvar pavement (including 3d-3k*)		<i>Tortella tortuosa</i> - <i>Cladonia pocillum</i> - <i>Placynthium</i> spp. Sparse Vegetation Alvar Nonvascular Pavement	Dry Lichen – Moss Open Alvar Pavement
AP-3	ALO1-2	G1Q S1	Dry Annual Open Alvar Pavement Type	Annual alvar pavement-grassland	3b – Annual grasses (dropseeds)	Philadelphia Panic Grass - False Pennyroyal Alvar Pavement	<i>Sporobolus neglectus</i> - <i>Sporobolus vaginiflorus</i> - <i>Isanthus brachiatus</i> - <i>Panicum philadelphicum</i> - (<i>Poa compressa</i>) Herbaceous Vegetation	Dry Annual Open Alvar Pavement
					3b – Annual grasses (panic grasses)			
AG-2	ALO1-3	G2 S2S3	Dry-fresh Little Bluestem Open Alvar Meadow Type	Little Bluestem alvar grassland	4d - Little Bluestem Grassland Alvar	Northern Dropseed - Little Bluestem - Scirpus-like Sedge Alvar Grassland	<i>Sporobolus heterolepis</i> - <i>Schizachyrium scoparium</i> - (<i>Carex scirpoidea</i>) / (<i>Juniperus horizontalis</i>) Herbaceous Vegetation	Dry-fresh Little Bluestem Open Alvar Meadow
					4e - Little Bluestem – Northern Dropseed Grassland Alvar			
					4f – Northern Dropseed Grassland Alvar			
AG-5	ALO1-4	G2? S1	Dry-fresh Poverty Grass Open Alvar Meadow Type	Poverty Oat Grass dry alvar grassland	4a – Poverty Oat Grass open alvar grassland		<i>Danthonia spicata</i> - <i>Poa compressa</i> - (<i>Schizachyrium scoparium</i>) Herbaceous Vegetation	Dry-fresh Poverty Grass Open Alvar Meadow
					4b – Canada Blue Grass open alvar grassland			
AG-1	ALO1-5	G2	Fresh – Moist Tufted Hairgrass Open Alvar Meadow Type	Tufted Hairgrass Wet Alvar Grassland	4g – Tufted Hairgrass open alvar grassland	Tufted Hairgrass - Canada Bluegrass - Philadelphia Panic Grass Alvar Grassland	<i>Deschampsia caespitosa</i> - (<i>Sporobolus heterolepis</i> , <i>Schizachyrium scoparium</i>) - <i>Carex crawei</i> - <i>Packera paupercula</i> Herbaceous Vegetation	Fresh – Moist Tufted Hairgrass Open Alvar Meadow
AG	ALO1-6**				4 - (see 1b, Scirpus-like Sedge – Tussock Bulrush)	Open Alvar Ecosite		Moist -Wet Tufted Bulrush Alvar Grassland

IACI Code	ELC Code	G / S Ranks	Southern Ontario ELC (Lee et al. 1998)	Reschke et al. 1999	Brownell and Riley 2000	Bakowsky 1997, NHIC 2006	NatureServe 2006	This Study
AP	ALO1-7**				1a-d – Great Lakes limestone shoreline	Open Alvar Ecosite		Adventive Species Open Alvar Pavement (island bird colony)
ASH-8	ALS1-1	G3 S2S3	Common Juniper Shrub Alvar Type	Juniper alvar shrubland	6c - Common Juniper Tall shrubland alvar	Common Juniper - Creeping Juniper - Shrubby Cinquefoil Alvar Shrubland	<i>Picea glauca - Thuja occidentalis - Juniperus communis / Iris lacustris - Carex eburnea</i> Shrubland	Common Juniper Shrub Alvar
ASH-6	ALS1-2	G2? S2	Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar Type	Creeping Juniper – Shrubby Cinquefoil alvar pavement	5a – Creeping Juniper dwarf shrubland alvar 6a – Shrubby Cinquefoil tall shrubland alvar	Common Juniper – Creeping Juniper – Shrubby Cinquefoil Alvar Shrubland	<i>Juniperus horizontalis - Dasiphora fruticosa ssp. floribunda / Schizachyrium scoparium - Carex richardsonii</i> Dwarf-shrubland	Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar
ASH-7	ALS1-3	G2? S2	Scrub Conifer – Dwarf Lake Iris Shrub Alvar Type	Scrub conifer/ Dwarf Iris alvar shrubland	6d – Jack Pine – White Cedar tall shrubland alvar 17c – White Spruce – White Cedar / saplings / Dwarf Lake Iris	Jack Pine - White Cedar - Common Juniper Treed Alvar Shrubland	<i>Picea glauca - Thuja occidentalis - Juniperus communis / Iris lacustris - Carex eburnea</i> Shrubland	Scrub Conifer – Dwarf Lake Iris Shrub Alvar
ASSH-11	ALT1-4	G2? S2	Jack Pine – White Cedar – White Spruce Treed Alvar Type	White Cedar – Jack Pine / Shrubby Cinquefoil alvar savannah	14a – Jack Pine coniferous treed alvar 29c – Jack Pine – White Cedar – White Spruce / Common Juniper alvar woodland	White Cedar – Jack Pine – Shrubby Cinquefoil Treed Alvar Pavement	<i>Picea glauca - Thuja occidentalis - Juniperus communis / Iris lacustris - Carex eburnea</i> Shrubland	Jack Pine – White Cedar – White Spruce Treed Alvar
ASSH-11	ALT1-3	G2? S2	White Cedar – Jack Pine Treed Alvar Type	White Cedar – Jack Pine / Shrubby Cinquefoil alvar savannah	17d – White Cedar / saplings / Common Juniper	Jack Pine - White Cedar - Common Juniper Treed Alvar Shrubland	<i>Pinus banksiana - Thuja occidentalis - Picea glauca / Juniperus communis</i> Woodland	White Cedar – Jack Pine Treed Alvar

IACI Code	ELC Code	G / S Ranks	Southern Ontario ELC (Lee <i>et al.</i> 1998)	Reschke <i>et al.</i> 1999	Brownell and Riley 2000	Bakowsky 1997, NHIC 2006	NatureServe 2006	This Study
ASSH-11	ALT1-3	G2? S2	White Cedar – Jack Pine Treed Alvar Type	White Cedar – Jack Pine / Shrubby Cinquefoil alvar savannah	17e – White Cedar – Jack Pine / Shrubby Cinquefoil / Low Calamint coniferous alvar savannah	Jack Pine - White Cedar – Low Calamint Treed Alvar Grassland	<i>Pinus banksiana - Thuja occidentalis - Picea glauca / Juniperus communis</i> Woodland	
ASSH-13	ALT1-3	G2?S2	White Cedar – Jack Pine Treed Alvar Type	Mixed conifer / Common Juniper alvar woodland	27a – Jack Pine – White Cedar / <i>Carex eburnea</i> alvar woodland	Jack Pine - White Cedar - Common Juniper Treed Alvar Shrubland	<i>Pinus banksiana - Thuja occidentalis - Picea glauca / Juniperus communis</i> Woodland	
			28a – Jack Pine / Bearberry alvar woodland					
	ALT1-4		Jack Pine – White Cedar – White Spruce Treed Alvar Type		29a – Jack Pine / Common Juniper alvar woodland			

* - 3d. Scirpus-like Sedge – Little Bluestem open alvar pavement, 3e – Northern Dropseed open alvar pavement, 3f – Lance-leaved Coreopsis open alvar pavement, 3g – Balsam Ragwort – Wild Calamint open alvar pavement, 3h – Creeping Juniper open alvar pavement, 3i – Creeping Juniper – Shrubby Cinquefoil open alvar pavement, 3j – Common Juniper open alvar pavement, 3k – Jack Pine – White Cedar saplings – Common Juniper (successional) open alvar pavement

**-. “New” ELC code based on current study, not in Lee *et al.* (1998)

II. EVALUATION

Alvar Representation on the Bruce Peninsula

Ecoregions and ecodistricts form the standard spatial template within which the ecological attributes (“representation”) of natural areas in Ontario are evaluated and compared (Crins and Kor 2000). This report has applied this same template in grouping alvar sites and comparing their ecological attributes with one another. The Bruce Peninsula is found within Ecoregion 6E, which covers southern Ontario south of the Canadian Shield (Hills 1959, 1966, Jalava *et al.* 1997, Crins 2000) (ecoregions 5E, 4E, etc.), and north of the Carolinian Life Zone (Ecoregion 7E). Ecoregion 6E corresponds approximately to the northern part of the Mixedwood Plains Terrestrial Ecozone (ESWG 1995). Three of the ecodistricts within Ecoregion 6E occur within or partly on the Bruce Peninsula. Ecodistrict 6E-14 covers the northern half of the Bruce Peninsula, and corresponds quite closely with the Greater Park Ecosystem (GPE) of Bruce Peninsula National Park (BPNP). Ecodistrict 6E-4 covers the southeastern part of the Peninsula and areas farther south along the Niagara Escarpment into Grey County. Ecodistrict 6E-2 (Huron Fringe) includes the sand plains and associated physiographic features along the southwestern coast of the Bruce Peninsula.

The majority of alvars on the Bruce Peninsula occur in the northern part of the region, within Ecodistrict 6E-14. Over 40 alvar sites occur on the shallow-soiled dolostone bedrock plains and associated islands of this ecodistrict. Many of these alvars are relatively large, diverse and in excellent ecological condition. Some are host to sizeable populations of globally, provincially and/or locally rare alvar flora and fauna. Approximately 11 alvar sites have been documented in Ecodistrict 6E-4, most of them on escarpment terraces near the Georgian Bay shore below the main cliffs of the Niagara Escarpment. Three alvars are found on the Lake Huron side of the Peninsula within Ecodistrict 6E-4. Approximately eight alvar sites in Ecodistrict 6E-2 are concentrated in the Chief’s Point – Fishing Islands area, most of them being small patches on the Fishing Islands, but with some extensive grassland alvars at Chief’s Point.

Table 2 provides a comparison of alvar community representation and site condition for each of the surveyed alvar sites in Ecodistrict 6E-14. Table 3 provides the same comparisons for alvars in ecodistricts 6E-4 and 6E-2. Section 3 of this report provides more detailed written descriptions of the community types and other ecological features of these alvar sites. In several cases, two or more alvar sites have been grouped into one “meta-site”, usually where the alvars occur in one continuous natural area or are situated very close to one another. Site summaries in section 3 use this same breakdown of sites and meta-sites, generally with more detailed information on the occurrences of the various community types than is provided in the tables.



Figure 4. Moist alvar grassland dominated by Tufted Bulrush at Corisande Bay

LEGEND for Tables 2 and 3 and Complete Site List

G/S = Global Rank (GRANK) and Sub-national (Provincial) Rank (SRANK), based on NHIC (2006)
 B&R = Equivalent Brownell and Riley (2000) community code (when applicable)

Protection Level Codes

A = Protected as National Park, Provincial Nature Reserve, Conservation Authority Nature Reserve, NGO Nature Reserve; B = First Nation; C = Private Land Provincial ANSI; D = Unprotected Private Land
 Lower case codes indicate minority portion of site; upper case indicate majority; both codes upper case indicate approximately equal proportions.

Site Condition Codes

Upper Case = based on Brownell and Riley (2000)

Lower case = based on observations by the author (2003-2005)

A / a = Undisturbed; B / b = Slightly disturbed; C / c = Moderately disturbed but recoverable;

D / d = Heavily disturbed

?? = community may occur at site, based on literature source

Figures indicated estimated extent of community in hectares

Bolded community quality and extent indicate largest representative example in Ecodistrict

* - May include vegetation types identified in Brownell and Riley (2000) as 3d. Scirpus-like Sedge – Little Bluestem open alvar pavement, 3e – Northern Dropseed open alvar pavement, 3f – Lance-leaved Coreopsis open alvar pavement, 3g – Balsam Ragwort – Wild Calamint open alvar pavement, 3h – Creeping Juniper open alvar pavement, 3i – Creeping Juniper – Shrubby Cinquefoil open alvar pavement, 3j – Common Juniper open alvar pavement, 3k – Jack Pine – White Cedar saplings – Common Juniper (successional) open alvar pavement

** - ALO1-7 occurs in mosaic with ALO1-1 at Bear's Rump Island and is included in total for that community type

Complete Site List

Ecodistrict 6E-14

- 1 Bear's Rump Island
- 2 Cabot Head
- 3 Cape Hurd – Baptist Harbour
 - 3a Baptist Harbour
 - 3b Baptist Harbour OHF
 - 3c Baptist Harbour NW
 - 3d Baptist Harbour SE
 - 3e Barney Lake
 - 3f Barney Lake South
 - 3g Hopkins Bay
- 4 Corisande Bay
- 5 Cove Island
- 6 Dorcas Bay / Pendall Lake
 - 6a Dorcas Bay
 - 6b Pendall Lake
- 7 Dorcas Bay Road / Sideroad Creek
 - 7a Sideroad Creek
 - 7b Dorcas Bay Road North
 - 7c Dorcas Bay Road South
- 8 Driftwood Cove
- 9 Dyer's Bay Road & Highway 6
 - 9a Dyer's Bay Road & Hwy 6 NE
 - 9b FON Bruce Alvar Nature Reserve
 - 9c W & S of FON Bruce Alvar
- 10 Eagle Point
- 11 George Lake / Emmett Lake Road
 - 11a North of Umbrella Lake
 - 11b South of Upper Andrew Lake
 - 11c South of George Lake
 - 11d George Lake
 - 11e Saugeen Hunting Grounds / Emmett Lake Road
- 12 Greenough Harbour – Bradley Harbour
 - 12a Gauley Bay
 - 12b Greenough Harbour
 - 12c South of Bradley Harbour
 - 12d Bruce County Forest – Miller Lake Tract Interior
- 13 Hopkins Point
- 14 Niibin – West of Highway 6
 - 14a Niibin

- 14b West of Highway 6
- 15 North of Shouldice Lake
- 16 Pine Tree Point – Scugog Lake
 - 16a Pine Tree Point
 - 16b Scugog Lake
 - 16c Scugog Lake East (North Portion)
 - 16d Scugog Lake Southeast
- 17 Smoky Head – Cape Chin Road South
 - 17a Smoky Head
 - 17b Cape Chin Road South
- 18 Spring Creek
- 19 Sunset Park – Long Point
- 20 Zinkan Island Cove
- 23 Garden Island
- 24 Lyal Island

Ecodistrict 6E-4

- 21 Barrier Island
- 22 Cape Croker
 - 22a Halfway Point
 - 22b Prairie Point
 - 22c The Little Prairie
- 25 Pike Bay
- 26 Shoal Cove
- 29 St. Jean's Point / Sucker Creek
 - 29a St. Jean's Point
 - 29b Sucker Creek

Ecodistrict 6E-2

- 27 Chief's Point
- 28 Fishing Islands
 - 28a Indian (Frog) Island
 - 28b Main Station Island
 - 28c Bowes Island
 - 28d Rowan (Rownes) Island
 - 28e Smokehouse Island
 - 28f Cranberry Island
 - 28g (West) Argyle Island
 - 28h Haystack Island

Table 2. Representation and Condition Matrix for Alvars in Ecodistrict 6E-14

Alvar Community Type	GRANK / SRANK	Brownell & Riley (2000) Code	1. Bear's Rump Island	2. Cabot Head	3. Cape Hurd – Baptist Harbour	4. Corisande Bay	5. Cove Island	6. Dorcas Bay – Pendall Lake	7. Dorcas Bay Rd. – Sideroad Cr.	8. Driftwood Cove	9. Dyer's Bay Rd. & Highway 6	10. Eagle Point	11. George Lake – Emmett Lake Rd.	12. Greenough / Bradley Harbour	13. Hopkins Point	14. Nibin – West of Highway 6	15. North of Shouldice Lake	16. Pine Tree Pt. – Seung Lake	17. Smoky Head – Cape Chin Rd. S.	18. Spring Creek	19. Sunset Park and Long Point	20. Zinkan Island Cove	23. Garden Island	24. Lyal Island	
PROTECTION		A	A	Ac	A/C/d	C	A	A	A/D	C	A	D	Ab	a/C/d	D	B	A/D	A/c	a/D	D	A	C	D	A	
ALO1-1 Dry Lichen – Moss Open Alvar Pavement	G2 S1	3a, 3d- 3k*			A,a 1,6,3		a 0.2	a,A 1.7, 2.7			A,a 0.9, 3.8		A,a 7.8, 0.3					a,A 0.5		b 0.7	b 0.5				
ALO1-2 Dry Annual Open Alvar Pavement	G1Q S1	3b			a 0.4															b 0.25					
		3c						ab, A 0.4, 0.4																	
ALO1-3 Dry – Fresh Little Bluestem (/Northern Dropseed) Open Alvar Meadow	G2 S2 S3	4d						A 0.8				bc 1.3													
		4e	A 8	A,B,C 10,7, 3	a 3.2	a 1		ab 0.8											A,a 1.8						a 0.1
		4f			A 3.1												a 0.6								
ALO1-4 Dry – Fresh Poverty Grass Open Alvar Meadow	G2? S1	4a			a 1.4						a,bc 1.7,2								c 1.7						
		4b																c 1.1		d 6.8					
ALO1-5 Fresh – Moist Tufted Hairgrass Open Alvar Meadow	G2	4g									A 3.5					ab 4.5									ab 0.2
ALO1-6* Moist – Wet Tufted Bulrush Alvar Grassland		4 (1b)	A 4.5		a 0.8	a 2.5		a,A 1,3			a 0.2							a 0.3							

Alvar Community Type	GRANK / SRANK	Brownell & Riley (2000) Code	1.Bears' Rump Island	2. Cabot Head	3. Cape Hurd – Baptist Harbour	4. Corsande Bay	5. Cove Island	6. Dorcas Bay – Pendall Lake	7. Dorcas Bay Rd. – Sideroad Cr.	8. Driftwood Cove	9. Dyer's Bay Rd. & Highway 6	10. Eagle Point	11. George Lake – Emmett Lake Rd.	12. Greenough / Bradley Harbour	13. Hopkins Point	14. Niibin – West of Highway 6	15. North of Shoultice Lake	16. Pine Tree Pt. – Scugog Lake	17. Smoky Head – Cape Chin Rd. S.	18. Spring Creek	19. Sunset Park and Long Point	20. Zinkan Island Cove	23. Garden Island	24. Loyal Island	
ALO1-7* Compressed Spike-rush – Crawe's Sedge Open Alvar		4h	A**																						
ALS1-2 Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar	G2? S2	5a, 6a, 16a			A.a 2,6.1	ab 0.2	a 0.1	ab 0.2	cd 0.9				a 2	ab 18.3				A.a 11.5				ab >4	ab 4.3	a 2.1	
ALS1-3 Scrub Conifer – Dwarf Lake Iris Shrub Alvar	G2? S2	6d 17c			A.a 1.5, 2.4													a 2.6							
ALS1-1 Common Juniper Shrub Alvar	G3 S2 S3	6c			a 0.5			ab,A 3.8		AB 2.8+ ?	a 3.4		ab 1					a 4.1	d 4.3						
ALT1-4 Jack Pine – White Cedar – White Spruce Treed Alvar	G2? S2	14a 25a-b, 29c		A 1	A 3.4			a 2.6																a 0.6	
ALT1-3 White Cedar – Jack Pine Treed Alvar	G2? S2	15, 17a, 17d			a 1.3			A 2.3			A 0.6							a 0.4		C 6.5				b 2	
		17e							cd,B 1,46		a 6			A,a >1, 2.5											
		27a, 28a, 29a	~2?																						

**Table 3. Representation and Condition Matrix for Alvars
in Ecodistricts 6E-4 and 6E-2**

	GRANK / SRANK	Brownell & Riley (2000) Code	Ecodistrict 6E-4					Ecodistrict 6E-2	
			21. Barrier Island	22. Cape Croker	25. Pike Bay	26. Shoal Cove	29. St. Jean's Point – Sucker Creek	27. Chief's Point	28. Fishing Islands
PROTECTION			A	B	D	C	b/D	ab/C	a/C
ALO1-1 Dry Lichen – Moss Open Alvar Pavement	G2 S1	3a, 3d- 3k*		B 4.2		ab 0.9			ab 1.3
ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow	G2 S2S3	4d, 4e		B ~250	A 0.5	ab 0.3		a 101	
		4f		B ?					
ALO1-4 Dry-fresh Poverty Grass Open Alvar Meadow	G2? S1	4b				c 4.7			
ALO1-5 Fresh – Moist Tufted Hairgrass Open Alvar Meadow	G2	4g	ab 14.5	D ?		ab 0.2			a 0.8
ALO1-7* Adventive Species Open Alvar Pavement									d 1.5
ALS1-1 Common Juniper Shrub Alvar	G2? S2	5a, 6a, 16a		B 72					
ALS1-2 Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar	G3 S2S3	6c		B ?			a 12.5		ab 3.2
ALT1-3 Jack Pine – White Cedar – White Spruce Treed Alvar	G2? S2	6d , 17c			A 2.9				
[No ELC Code] Ash / Downy Arrowwood – Fragrant Sumac Alvar Savannah		9b		B 3?					

Biological Diversity and Ecological Functions of Bruce Peninsula Alvars

Alvars provide an essential ecological function for a variety of species that are largely restricted to alvars or alvar-like habitats in Ontario. Alvars are natural, meadow-like openings in the habitat mosaic of the Bruce Peninsula, providing habitat for a great variety of terrestrial species that might otherwise not be present if the region was completely forested. For example, according to Bouchard (1998), the ground beetle, *Agonum nutans*, appears to be “almost entirely restricted to grassland alvars in southern Ontario.” Crowe's Sedge, Richardson's Sedge, Lance-leaved Coreopsis, Flat-stemmed Spike-rush, Prairie Smoke, Upland White Goldenrod, Northern (Prairie) Dropseed, False Pennyroyal and Alaska Rein Orchid are almost entirely (86-100% of occurrences) confined to alvars in the province, and another 30 or so taxa show a moderate to high affinity (50-85% of occurrences) to alvar habitats (Brownell and Riley 2000, Catling and Brownell 1999, Catling 1995).

Bruce Peninsula and Manitoulin Island alvars are particularly significant for their Great Lakes endemic flora, which includes Dwarf Lake Iris, Lakeside Daisy and Houghton's Goldenrod. Other insect and plant species of Bruce Peninsula alvars have prairie or western affinities, relicts of periglacial grasslands that were widespread in the region approximately 9,000 years ago (Brownell and Riley 2000). Western taxa include Leafhoppers such as *Graminella mohri* and *Memnonia sp. n.* (Bouchard 1998) and plants such as Alaskan Rein-orchid, Crowe's Sedge, Hill's Thistle and Northern Dropseed (Brownell and Riley 2000). Northern and boreal species are also common on the alvars, and include Bird's-eye Primrose, Richardson's Sedge, Scirpus-like Sedge, Chestnut Sedge and Cespitose Bulrush (Brownell and Riley 2000).

For a harsh, barren environment that typically experiences annual flooding, drought and temperature extremes, the alvars of the Bruce Peninsula display remarkable overall ecological diversity. The alvar classification used in this report indicates the presence of at least 14 vegetation community types. Using the Brownell and Riley (2000) classification, there are almost 30 distinct alvar vegetation associations on the Bruce Peninsula. These habitats are host to an amazing total of 376 vascular plant species, 319 of them native and 57 introduced in Ontario, representing 25% of the total plant taxa and 30% of the native plant taxa of the Bruce Peninsula region.

At least 62 algae species, 58 moss taxa and 52 lichen taxa have been recorded on the alvars of the Bruce Peninsula, based almost entirely on the surveys of a limited number of sites by Claudia Schaefer in the mid-1990's as part of the IACI. Bouchard (1998) found 63 taxa of ground beetles (Carabidae), 105 taxa of leafhoppers and relatives (Auchenorrhyncha), 22 taxa of butterflies and skippers, 45 taxa of sawflies (Hymenoptera: Symphata), and 23 taxa of Orthopteroid insects at just two Bruce Peninsula alvar sites, also as part of the IACI research.

Mammals, birds, reptiles and amphibians of alvars have not received focused surveys on the Bruce Peninsula, and it is evident that there are few, if any, that are restricted or to

alvar habitats. However, many vertebrate species use alvars for part of their life cycle and may feed on alvar insects, seeds and plants. Snakes, bats and rodents may hibernate and seek shelter in the deep crevices of some alvar sites. The globally rare and nationally and provincially threatened Massasauga rattlesnake is frequently associated with alvar habitat on the Bruce. The dolostone pavement, which stores and radiates the heat from solar exposure, may be important to snakes for thermoregulation, particularly in spring and fall when nights are cool.

The alvar sites of the Bruce Peninsula vary considerably in terms of vascular plant diversity (tables 6 and 7). Some sites are extremely diverse, while others have low plant species totals. As would be expected, plant species totals for sites is generally proportional to the number of alvar community types present as well as to the degree of survey effort a site has received.

Based on surveys to date, by far the most ecologically diverse alvar “meta-site” on the Bruce Peninsula is Cape Hurd – Baptist Harbour. Six of the eight closely clustered alvars in this area are host to a remarkable 160 native vascular plant taxa in 10 alvar community types. Twenty-six of these plant species are moderately to strongly alvar-associated, 13 species are globally and/or provincially rare and nine are locally significant. Other highly diverse “meta-sites” in Ecodistrict 6E-14 are Pine Tree Point – Scugog Lake (128 native plant taxa, 20 of them alvar-associates, in seven alvar community types), Dyer’s Bay Road – Highway 6 (117 native plant taxa, 21 of them alvar-associates, in five community types), Cabot Head – George Lake (105 native plant taxa, 22 of them alvar-associates, in 4 community types) and Dorcas Bay – Pendall Lake (100 native plant taxa, 18 of them alvar-associates, in seven community types).

In Ecodistrict 6E-4, the Cape Croker area supports the greatest diversity of alvar communities and species, with at least 91 native vascular plant taxa, 19 of them alvar-associates, in 6 alvar communities (based on incomplete survey efforts). The Sucker Creek – St. Jean’s Point area on the opposite side of the Peninsula has only one alvar community type, but it supports a diversity of 75 vascular plant taxa, 16 of them being alvar associated. The small Shoal Cove site has relatively high community and species diversity for its size, but has not been surveyed according to IACI standards. The two alvar community types at the Pike Bay alvar support a high total of non-vascular plants, with 30 moss and 22 lichen species – almost half the species reported for alvars on the Bruce Peninsula.

In Ecodistrict 6E-2, the alvars of the Fishing Islands meta-site display remarkably high vascular plant diversity, with 137 native taxa, 19 of them alvar-associated, in four vegetation community types. This is due at least in part to the fact that most of the alvars at this site intergrade with coastal meadow marshes and there is some spill-over of coastal species into the alvar habitats. The Chief’s Point alvar sustains 75 native plant taxa, 15 of them alvar-associates.

Rare Species and Special Features of Bruce Peninsula Alvars

The alvars of the Bruce Peninsula are host to a great diversity of globally and provincially rare flora and fauna, including many that have been officially listed and regulated as Species-At-Risk by federal and provincial agencies. The officially designated species are listed below in Table (4).

Not included in Table 4 is the threatened Queensnake, which has occurred very near alvar habitats at Cape Hurd – Baptist Harbour and Scugog Lake, but which is primarily an aquatic species that would generally not use alvar habitats in its life cycle. The Endangered Kirtland’s Warbler has occurred in spring at the alvar at Cabot Head – Wingfield Basin (Riley *et al.* 1996), but it is believed that this bird was a migrant or a wandering unmated male, as there have been no subsequent reports; this species has also been excluded from the list.

Table 4. Endangered, Threatened and Special Concern taxa of Bruce Peninsula alvars

Scientific Name	Common Name	COSEWIC	OMNR	Global / Provincial Rank
<i>Agalinis gattingeri</i> *	Gattinger’s Agalinis	Endangered	Endangered	G4S2
<i>Hymenoxis herbacea</i> *	Lakeside Daisy	Threatened	Threatened	G2S2
<i>Cirsium hillii</i> *	Hill’s Thistle	Threatened	Threatened	G3S3
<i>Iris lacustris</i> *	Dwarf Lake Iris	Threatened	Threatened	G3S3
<i>Sistrurus catenatus</i>	Massasauga	Threatened	Threatened	G3G4S3
<i>Solidago houghtonii</i> *	Houghton’s Goldenrod	Special Concern		G3S2
<i>Arnoglossum plantagineum</i>	Tuberous Indian-plantain	Special Concern	Special Concern	G4G5S3
<i>Thamnophis sauritus</i>	Eastern Ribbonsnake	Special Concern	Special Concern	G5S3
<i>Lampropeltis triangulum</i>	Eastern Milksnake	Special Concern	Special Concern	G5S3

* - featured species of the Bruce Peninsula Manitoulin Island Alvar Ecosystem Recovery Strategy

Locations of occurrences of the five featured species of the RT are mapped on Figure 5. A complete list of globally and provincially rare taxa documented on alvars of the Bruce Peninsula, broken down by ecodistricts and sites within those ecodistricts is provided in tables 6 and 7. These tables also provide an opportunity to compare population sizes of rare species (when known), the presence of ancient trees, as well as overall vascular plant and community diversity, at each of the alvar sites. [Space limitations precluded including common names in tables 6 and 7. However, common names (when available) for all taxa are provided in the detailed summaries for each site and meta-site provided in Section 3 of this report.]

Figure 5. Occurrences of the Five Featured Species of the Bruce Peninsula – Manitoulin Island Alvar Ecosystem Recovery Strategy



Sites with the highest documented concentrations of globally and provincially rare taxa are the Cape Hurd – Baptist Harbour (12 taxa) metasite and the Dyer’s Bay Road – Highway 6 metasite (12 taxa). Other sites with high globally and provincially rare species totals are Cabot Head (10 taxa), George Lake – Emmett Lake Road metasite (8 taxa), Bear’s Rump Island (8 taxa), Cape Croker (7 taxa) and Pike Bay (7 taxa). These statistics are somewhat misleading, however, since sites with high totals generally have been surveyed for non-vascular plants and/or invertebrate fauna, whereas sites with lower totals often have not, and these taxonomic groups include a number of very rare alvar-associated species.

Featured Species Occurring on Non-alvar Habitats on the Bruce Peninsula

The five featured species of the Bruce Peninsula – Manitoulin Island Alvar Ecosystem Recovery Strategy are largely restricted to alvars in Ontario. However, they may also occur or even be abundant in non-alvar habitats. Their occurrence in non-alvar habitats is summarized as follows.

Gattinger’s Agalinis

On the Bruce Peninsula, Gattinger’s Agalinis is known only from alvar or alvar-like habitat at Barrier Island and Cape Croker (Canne-Hilliker 1988, 1998, NHIC 2006). Elsewhere in its range, Gattinger’s Agalinis may occur in other open habitat types, such as the prairie grasslands at Walpole Island in southwestern Ontario (Canne-Hilliker 1988, 1998).

Dwarf Lake Iris

Dwarf Lake Iris can be abundant, even dominant, in the understory of shallow-soiled coniferous woodlands with a somewhat open canopy. It is especially common in such habitats in the northwestern part of the Bruce Peninsula. Specific non-alvar habitats for Dwarf Lake Iris range from drier White Cedar, White Cedar – Jack Pine and White Cedar – White Spruce coniferous and mixed woodlands, to moist White Cedar coniferous forests and even the fringes of Black Spruce bogs. Jack Pine calcareous treed rock barrens, Common Juniper shrub rock barrens and Eastern Bracken sand barrens may also support this species. Untrampled sections of lightly-used trails and roads through the above habitats often support large colonies of this taxon.

Hill’s Thistle

Dry sandy openings of either natural or anthropogenic origin support populations of Hill’s Thistle (Allen 2004). The species is particularly closely associated with fringes of alvars near the western shore of the Bruce Peninsula. Non-alvar habitats in which the author has found the species include open Bracken Fern - Poverty Oat Grass - Bearberry sand barren, open White Spruce woodland, Jack Pine - White Cedar - White Birch treed barrens, Jack Pine bedrock woodlands, White Cedar - White Spruce - White Birch - Trembling Aspen woodlands, and dry sandy openings along trails through mixed bedrock woodland.



Figure 6. The globally rare Great Lakes endemic Dwarf Lake Iris in bloom in a treed alvar at Corisande Bay



Figure 7. The globally rare, provincially threatened Hill's Thistle at Lyal Island

Houghton's Goldenrod

According to NHIC (2006), hundreds of Houghton's Goldenrod plants occur on marshy limestone pavement along the shore of Wingfield Basin, not far from the population at the Cabot Head – Wingfield Basin alvar (Makkay 2003).

Lakeside Daisy

In addition to alvar pavement habitats at five sites on the northern Bruce Peninsula, Lakeside Daisy occurs on dolostone bedrock shelving along a 7 km stretch of Georgian Bay shoreline within Bruce Peninsula National Park (BPNP), above the high water mark. Surveys by BPNP staff, Jenna McGuire and John Haselmayer, reconfirmed a number of previously known populations (NHIC 2006, Campbell *et al.* 2002) and discovered additional populations during 2006 surveys for the species (McGuire 2006). The results for non-alvar populations of the 2006 survey are presented in Table 5 and all the sites surveyed are presented in Figure 3. It should be noted that two Lakeside Daisy occurrences (George Lake alvar and South of George Lake alvar) are not displayed in Figure 3, as they were not surveyed as part of the McGuire (2006) study.

Table 5. 2006 Non-alvar Lakeside Daisy populations on the Bruce Peninsula (McGuire 2006)

NAD83 Easting	NAD83 Northing	Site / Population Name	Population Count	% flowering	Patch size
0458775	5010323	West of Grotto	336	20	N/A
0458400	5010407	2 nd West of Grotto	~5600	N/A	0.0295 ha.
0458375	5010452	3 rd West of Grotto	1216	N/A	N/A
0458185	5010511	4 th West of Grotto	~5000+	N/A	N/A
0457956	5010523	1 st West of Overhanging Point	~2000+	N/A	N/A
0457900	5010515	2 nd West of Overhanging Point	~4000	N/A	N/A
0457811	5010497	3 rd West of Overhanging Point	~4000	N/A	N/A
0457753	5010490	4 th West of Overhanging Point	~1200	N/A	N/A
0457670	5010479	5 th West of Overhanging Point	31	9	N/A
0459788	5009868	West of Cave Point	~6986	1339	0.1 ha.
0462851	5008811	East of Halfway Log Dump trail entrance	659	59	N/A
0462489	5008987	1 st West of Halfway Log dump trail entrance	580	10	.00058 ha.

LEGEND
for Tables 6 and 7 and for Plant Species Lists of Site Summaries

Taxon: B = bryophyte; L = lichen; V = vascular plant; I = insect; M = mollusk; R = reptile

Data are listed separately for the following sites occurring within meta-sites, particularly where protection levels differs:

7a	Sideroad Creek
7 b-c	Dorcas Bay Road North – Dorcas Bay Road South
9a	Dyer’s Bay Road & Highway 6 Northeast
9b-c	FON Bruce Alvar – West and South of FON Bruce Alvar
11c	George Lake South
11d	George Lake
11e	Saugeen Hunting Grounds – Emmett Lake Road

GRANK, SRANK = Refer to NHIC (2006) for explanation of conservation ranks.

E, END = Designated “Endangered” by COSEWIC and/or OMNR

T, THR = Designated “Threatened” by COSEWIC and/or OMNR

S, SC = Designated “Special Concern” by COSEWIC and/or OMNR

COS = status designation of the Committee on the Status of Endangered Wildlife In Canada (COSEWIC)

OMNR = status designation of the Ontario Ministry of Natural Resources

Locally R/VU Plants = Plant taxa considered “rare” or “very uncommon” based on BGPC (2003)

Alvar Plants = number of vascular plant showing a moderate to extreme affinity to alvar habitats in Ontario based on Catling (1995), Catling and Brownell (1999a) and Brownell and Riley (2000)

See plant lists of site summaries:

E = Extreme affinity, H = High affinity, M = Moderate affinity;

t = taxonomic questions make affinity uncertain

Overall quality rank = Alvar community quality ranking is based on definitions and methods presented in Brownell and Riley (2000) and Reschke *et al.* (1999).

Numbers indicate observed or estimated population size (based on most recent source).

K = thousand

X = taxon found at site, population size not known

H – Found by Schaefer in 1996 or Morton pers. comm. (2004) in 1980, but not re-found during the present study.

* - Recorded in other community type(s) adjacent to alvar.

Table 6. Diversity, Rare Species and Other Special Features of Alvar Sites in Ecodistrict 6E-14

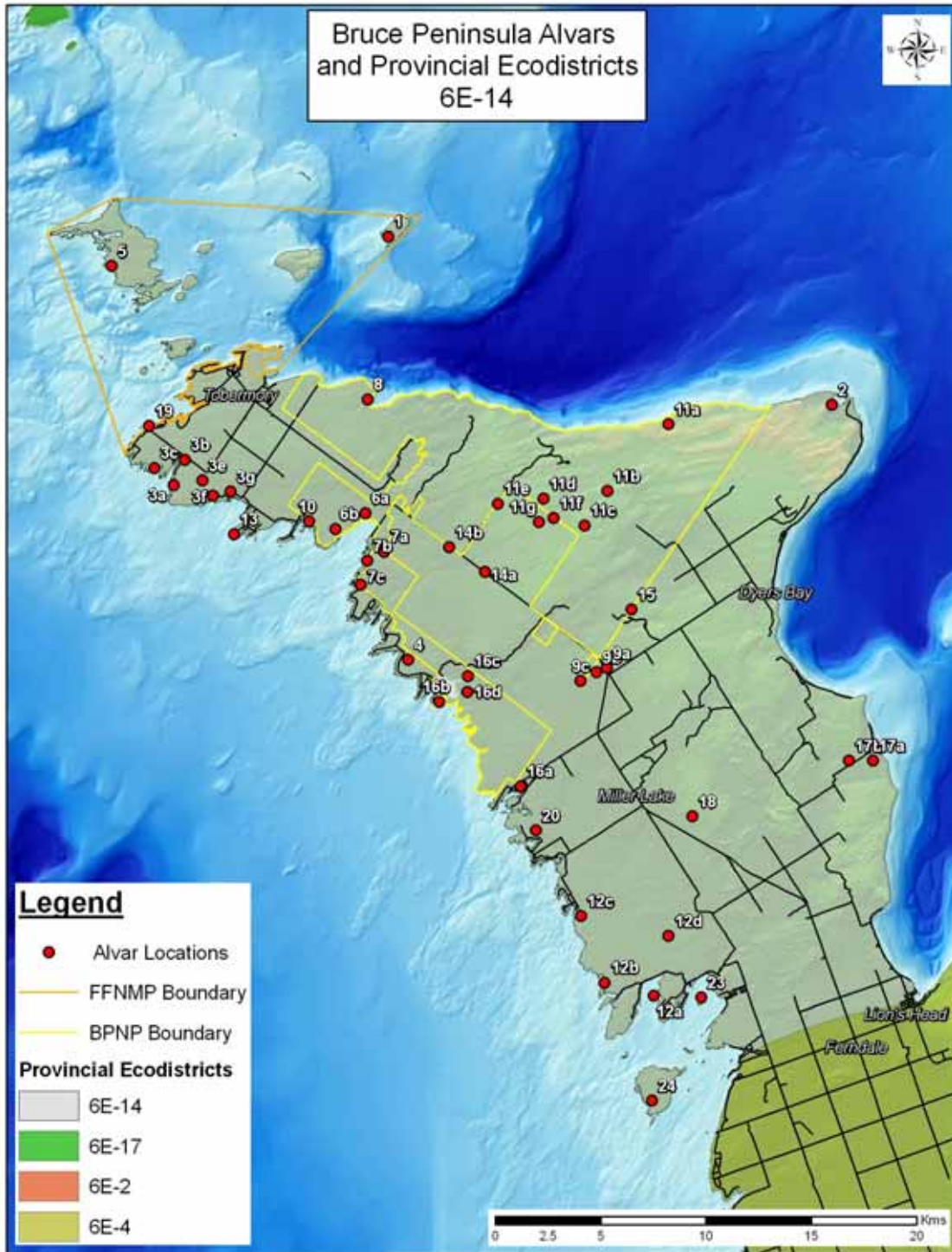
			1. Bear's Rump Is.	2. Cabot Head	3. Cape Hurd – Baptist Harbour	4. Corisande Bay	5. Cove Island	6. Dorcas Bay – Pendall Lake	7a. Sideroad Creek	7 b-c. Dorcas Bay Road	8. Driftwood Cove	9a. Dyer's Bay Rd. & Hwy 6 NE	9b-c. FON Bruce Alvar NR & W&S	10. Eagle Point	11c. George Lake South	11d. George Lake	11e. Saugen Hunting Grounds	12. Greenough / Bradley Harbour	13. Hopkins Point	14. Niubin – West of Highway 6	15. North of Shouldice Lake	16. Pine Tree Pt. – Scougog Lake	17. Smoky Head – Cape Chin	18. Spring Creek	19. Sunset Park and Long Point	20. Zinkan Island Cove	23. Garden Island	24. Lyal Island	
	Taxon	GRANK / SRANK	COS EWIC / OMNR																										
PROTECTION			A	A/c	A/c	C	A	A	A	D	C	A	A	D	A	A	B	C/d	D	B	A/D	A/c	a/D	D	A	C	D	A	
<i>Alvar Types</i>			4	2	10	4	2	7	1	2	1	1	5	1	3	1	4?	2	1	3	1	7	2	3	1	2	1	3	
<i>Native Vascular Plants</i>			~59	77	160	53	105	100	68	53	46	67	117	42	42	73	?	96	35	67	30	128	76	60	49	71	?	?	
<i>Locally Sign. Plants</i>			2	4	9	2	7	5?	1	1	1	4	9	0	3	9	1	2	0	2	1	5	4	3	0	0	68	55	
<i>Alvar Plants</i>			18	17	26	11	22	18	14	14	6	10	21	8	12	19	?	18	8	12	5	20	9	8	9	14	1	1	
<i>Ancient Trees</i>			Y	?	Y	Y?	?	Y	?	?	?	?	?	?	?	?	?	?	N	N	?	Y	?	?	?	?	15	15	
<i>G1-G3G4</i>			3	3	5	3	?	4	1	1	1	2	7	0	2	2	1	4	0	0	0	3	0	1	0	0	1	3	
<i>S1-S2S3</i>			3	3	7	0	?	2	0	0	0	1	7	0	1	7	1	1	0	2	0	1	1	1	0	0	0	0	
<i>S3-S3S4</i>			5	4	5	3	?	4	1	1	1	2	7	0	1	6	0	3	0	0	0	3	0	0	0	0	1	5	
<i>END</i>			0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>THR</i>			2	2	3	1	?	2	1	1	1	1	4	0	2	1	1	2	0	0	0	3	0	0	0	0	1	3	
<i>SC</i>			0	3	0	1	?	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	
<i>Brachytecium calcarium</i>	B	G3G4 S2										X			X														
<i>Cephaloziella rubella (s.l.)</i>	B	G5T3 S3S4						X																					
<i>Pseudocalliergon turgescens</i>	B	G3G5 S2	X		X			X					X		X		X		X		X								
<i>Tortella inclinata</i>	B	G4G5 S2			X								cf.		X														
<i>Cacoplaca ammiospilla</i>	L	G4G5 S1													X														
<i>Collema undulatum var. granulosum</i>	L	G?T? S1			X																								

Table 7. Diversity, Rare Species and Other Special Features of Alvars in Ecodistricts 6E-4 and 6E-2

	TAXON	GRANK	SRANK	COSEWIC	OMNR	Ecodistrict 6E-4					Ecodistrict 6E-2	
						21. Barrier Island	22. Cape Croker	25. Pike Bay	26. Shoal Cove	29. St. Jean's Pt. - Sucker Cr..	27. Chief's Point	28. Fishing Islands
PROTECTION						A	B	D	C	AB/c	B	ab/C
<i>Alvar Types</i>						2	~6	2	4	1	1	4
<i>Ancient Trees</i>						N	?	?	?	?	?	?
<i>Native Vascular Plants</i>						52	>91	59	>67	73	75	137
<i>Locally R/VU plants</i>						6	8	3	2	3	0	5
<i>Alvar Plants</i>						11	>19	12	8	16	14	19
<i>G1-G3G4</i>						0	2	4	0	2	2	0
<i>S1-S2S3</i>						2	1	4	0	0	0	0
<i>S3-S3S4</i>						1	6	3	0	6	2	1
<i>END</i>						1	1	0	0	0	0	0
<i>THR</i>						0	2	3	0	2	2	0
<i>SC</i>						0	1	0	0	1	0	0
<i>Brachyhegium calcareum</i>	B	G3G4	S2					X				
<i>Pseudocalliergon turgescens</i>	B	G3G5	S2					X				
<i>Tortella inclinata</i>	B	G4G5	S2					X				
<i>Psora decipiens</i>	L	G?	S1S2					X				
<i>Agalinis gattingeri</i>	V	G4	S2	E	E	H	X					
<i>Arnoglossum plantagineum</i>	V	G4G5	S3	SC	SC		1K			>2K		
<i>Astragalus neglectus</i>	V	G4	S3				<50					
<i>Cirsium hillii</i>	V	G3	S3	T	T		X	>30		53	>96	H*
<i>Galium brevipes</i>	V	G4?	S2?			X						
<i>Iris lacustris</i>	V	G3	S3	T	T			2K		>25K	>1K	H*
<i>Linum medium var. medium</i>	V	G5T?	S3							100s		*
<i>Linum sulcatum</i>	V	G5	S3				X					
<i>Packera obovata</i>	V	G5	S3									H*
<i>Scleria verticillata</i>	V	G5	S3							1K-2K		100s
<i>Spiranthes magnicamporum</i>	V	G4	S3							>50		
<i>Sporobolus heterolepis</i>	V	G5	S3			1Ks	100Ks					
<i>Sistrurus catenatus</i>	R	G3G4	S3	T	T		X	X				

III. SITE SUMMARIES

ECODISTRICT 6E-14



Site 1. BEAR'S RUMP ISLAND

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/5&6

NAD83 UTM 17 455000 5018220

Ownership: Federal

Protection: Fathom Five National Marine Park (100%); Bear's Rump Island ANSI (100%)

Survey Dates (Surveyors): July 1 and July 10, 1992 (S. Varga, P.G.S. Kor, B. Larson); July 4, 1996 (C. Schaefer)

Total Extent of Alvar: 12.7 ha

Overall Alvar Quality Rank: A

Directions: Bear's Rump Island, off the northern tip of the Bruce Peninsula east of Flowerpot Island, is reached by boat from Tobermory. Permission to access should be sought from appropriate staff at Bruce Peninsula National Park. Boat access to shore is extremely difficult and is not possible under certain wind conditions.

Site	Inventory Level	Map Source	Alvar Types	Alvar Extent (ha)	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Taxa
Bear's Rump Island	DRS vpib	IACI (Schaefer 1996)	3	~13.5	20	58 (58)	7

Codes: D = Detailed inventory; R = Reconnaissance inventory; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = mollusks; b = breeding birds

General Site Description

Bear's Rump Island is part of the Tobermory Islands archipelago off the northern end of the Bruce Peninsula. It is a promontory of the Niagara Escarpment projecting out of the waters of Georgian Bay. Massive talus slopes and cliffs, capped by dolostone of the Guelph and Amabel formations, rise up to 42 m above the lake at the east end of the island. To the west, the escarpment cuesta gradually descends to a shore terrace of resistant dolostones of the Manitoulin Formation (Varga 1995). This terrace forms cliffs up to 4m high on the south and north shores, but its caprock gradually slopes into the lake on the island's west side. Most of the terrace at the island's west end consists of relatively flat, exposed bedrock pavement. Above the wave-wash zone, these bedrock flats support high-quality alvar pavement and grassland communities, with no introduced species and outstanding wildflower displays (Schaefer 1996). Also present along the western shore are a series of low cobble beach ridges and sand beaches (Varga 1995).

Habitats adjacent to the alvars include Great Lakes coastal bedrock communities along the shore, and, on the sloping island plateau, post-fire successional mixed forest co-dominated by White Cedar, Balsam Fir and Trembling Aspen, with scattered trees of White Birch and Showy Mountain-ash, and a dense, 2 to 3 m high, shrub layer of Ground Yew. Along the shore, the frost-heaved bedrock pavement and pebble substrate sustains an open community of Silverweed, Greenish Sedge and Tufted Hairgrass, with scattered

Hairy Panic Grass, Balsam Ragwort and American Water-horehound. The cobble beaches along the south and north shores are largely non-vegetated, with Creeping Juniper and Herb Robert on the upper portions of the beach.

Alvar Representation

Four alvar community types have been reported for Bear's Rump Island, two of them by Schaefer (1996) and Reschke *et al.* (1999), namely, 8.5 ha of Little Bluestem grassland and 4.5 ha of Creeping Juniper-Shrubby Cinquefoil alvar pavement. Brownell and Riley (2000) write that "although Shrubby Cinquefoil and Creeping Juniper are present, the pavement is best classified as herbaceous pavement dominated by Scirpus-like Sedge – Tufted Bulrush. A shrubland community also exists." Two additional community types based on re-interpretation of Schaefer (1996) data are noted in the representation table of Brownell and Riley (2000), but only one of them, Compressed Spike-rush – Crawe's Sedge Open Alvar, is mentioned in the Brownell and Riley (2000) site summary.

Using the ELC-based classification of the present study, and some further interpretation past documentation, the following alvar types are reported for the site:

ALO1-3 Dry-fresh Little Bluestem (Northern Dropseed) Open Alvar (A-quality, 6ha)
ALO1-6 Moist -Wet Tufted Bulrush Alvar Grassland (A-quality, 4.5ha)
ALO1-7 Compressed Spike-rush – Crawe's Sedge Open Alvar (A-quality, 2.5ha)
[*ALT1-3 White Cedar – Jack Pine Treed Alvar (A-quality, 2ha)* – listed, but not described in Brownell and (Riley 2000)]

According to Varga (1995), the alvars along the west side of Bear's Rump Island are flooded by up to 20 cm of water in the spring (Schueler 1992), but by late summer they can become excessively dry. Scattered low shrubs of Creeping Juniper and occasional Shrubby Cinquefoil occur, along with a rich herb and graminoid layer of Northern Dropseed, with Tufted Hair Grass, Scirpus-like Sedge, Balsam Ragwort, Little Bluestem and Calamint as secondary species. Near the west shore, the alvar grades into a moister type, with scattered low shrubs of Creeping Juniper, Shrubby Cinquefoil and Sand Cherry, and a herb and graminoid layer dominated by Scirpus-like Sedge, with scattered Tufted Hair Grass, Balsam Ragwort, Wild Savory and Ohio Goldenrod. Areas of spring ponding are dominated by Shrubby Cinquefoil and Elliptic Spike-rush. [Varga 1995]

In addition to the alvars noted above, the Manitoulin shoreline terrace on the south side of the island sustains alvar-like open bedrock pavement communities, with scattered stunted groves of White Cedar, shrub patches of Creeping Juniper, Shrubby Cinquefoil, Ninebark and Sand Cherry, and a herb layer dominated by Scirpus-like Sedge, with scattered Rand's Goldenrod, Harebell and Balsam Ragwort. As the terrace shelf descends to within 1m of the lake, it supports a moister open community of Tufted Hair Grass, with scattered Narrow-leaf Goldenrod, Harebell, Balsam Ragwort and Bird's-eye Primrose. [Varga 1995]

Condition

The quality of this natural area is exceptional, with no evidence of recent human disturbance, no buildings and no trails (Varga and Larson 1992, Varga 1995, Schaefer 1996). The only evidence of human activity noted by Schaefer (1996) was an apparent campfire site in the southeastern alvar grassland. Most of the adjacent forests are intermediate-aged, having originated from a forest fire or a series of fires in the late 1800s or early 1900s. Some White Cedar trees and stands escaped the fires, particularly on the talus slopes and along the escarpment rim and cliff ecotone. White Cedar trees cored on one talus slope by Hunter and Associates (1982) were found to be 204 and 359 years old (Varga 1995), and Schaefer (1996) notes the presence of ancient trees within the alvar communities. It is reported that many decades ago timber was piled on the pavement that had been cut from the forests of the island (Schaefer 1996). No evidence of this past activity was observed by Schaefer (1996).

Remarkably, no exotic flora appear to have been recorded on the Bear's Rump Island alvars. All the site's alvar communities are ranked as being in excellent condition by the Reschke *et al.* (1999), Brownell and Riley (2000) and NHIC (2006).

Diversity

The alvar communities at Bear's Rump Island support 64 vascular plant taxa (Catling and Brownell 1991-1998), with 56 of these taxa found during Schaefer (1996) studies (only these were available for listing for this report). Overall, Bear's Rump Island supports 23 vegetation community types and 196 vascular plant taxa (Varga 1995). Two taxa of alga, 5 lichen taxa and 5 bryophyte taxa were recorded by Schaefer (1996). Faunal data for the island and its alvar habitats are not recent, and are probably incomplete. No invertebrate data were available, but there has been some collecting on the island by Dr. Steve Marshall of the University of Guelph (Schaefer 1996). Fifty-five breeding bird species have been recorded at the island (Francis 1985). Six amphibian and reptile species (Schueler 1992) have been noted (Varga 1995).

Ecological Functions

Varga (1995) notes that although it is relatively small (96 ha), Bear's Rump Island has about 35 ha of forest interior, providing habitat for 19 forest-interior bird species. Bear's Rump Island also has 6.2 km of Great Lakes shoreline. It protects an entire small island watershed. The island undoubtedly serves as a refuge for migrating landbirds crossing Lake Huron to and from Manitoulin Island. The alvars are completely surrounded by these natural habitats.

Special Features

Six provincially rare vascular plant taxa have been documented at the Bear's Rump

Island alvars and associated habitats. These include the threatened Hill's Thistle and Dwarf Lake Iris. Northern Dropseed is abundant in portions of the alvar. According to Schaefer (1996), the site also has ancient White Cedar trees. These occur in a small area at the northern end of the pavement community. According to Schaefer (1996), spiders have been collected from the alvar communities and are in the collections of Dr. Steve Marshall (University of Guelph), who has apparently identified some very interesting species. The occurrences of provincially rare taxa found to date at Bear's Rump Island alvars are summarized below. Two locally rare vascular plant taxa also occur at the site.

Non-vascular plants

A Moss	<i>Limprichtia cossonii</i>	G?S2
A Moss	<i>Pseudocalliergon turgescens</i>	G3G5S2

Schaefer (1996) found two provincially very rare mosses at the Bear's Rump Island alvar during surveys of the International Alvar Conservation Initiative (IACI).

Vascular plants

Hill's Thistle	<i>Cirsium hillii</i>	COSEWIC-THR, OMNR-THR	G3S3
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According to NHIC (2006), Hill's Thistle was first found at Bear's Rump Island in 1980 and last seen there some time before 1987. It is apparently "scarce and rarely flowers" at the site (Morton and Venn 1987, *in* Allen 2003), and has been assigned an EO rank of H ("historic"). It was not found during the 1992 survey of the island by Varga (1995) nor by the present author in 2007. No abundance information available and the habitat is indicated as alvar on limestone pavement (NHIC 2006).

Dwarf Lake Iris	<i>Iris lacustris</i>	COSEWIC-THR, OMNR-THR	G3S3
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According to NHIC (2006), the Great Lakes basin endemic Dwarf Lake Iris was first found on Bear's Rump Island in 1984, with no subsequent documentation. A "very small patch" is reported in Brownell (1984), with 3 colonies with 100, 51 and 1,511 individuals (presumably shoots) each, each only several square metres in size (NHIC 2006). All three patches were adjacent to a 2 m wide cedar grove in the middle of the alvar. As there have been no subsequent records, the occurrence is ranked a "historic" by NHIC (2006). The author in 2007 found similar populations of stunted Blue Flag Iris in the vicinity of the early 1980s record, and it is suspected the original report stems from a misidentification (not by Brownell, who was reporting a third-person observation).

Ram's-head Lady's-slipper	<i>Cypripedium arietinum</i>	G3S3
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According to NHIC (2006), the globally and provincially rare Ram's-head Lady's-slipper was found at Bear's Rump Island in 1983 (Brownell 1984), and has not been reported since. Fewer than 10 plants were observed and the occurrence is ranked "C" (NHIC 2006), although given the date of the most recent observation, it should probably be considered "historic". No habitat information is available, but this orchid often occurs along the fringes of alvars, or in adjacent open coniferous woodlands or alvar savannahs.

Rand's Goldenrod	<i>Solidago simplex</i> ssp. <i>randii</i>	G5T5?S3
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According to NHIC (2006), the provincially rare Rand's Goldenrod was first found at

Bear's Rump Island in 1975 and last reported in 1989. Although habitat information is not available, it was likely found either on alvar or limestone bedrock shoreline habitat. The occurrence is ranked "extant" by NHIC (2006).

Northern Dropseed *Sporobolus heterolepis* G5S3
According to NHIC (2006) the provincially rare Northern Dropseed was first found at the Bear's Rump Island alvars prior to 1984 and last reported in by Schaefer (1996). A large localized population of over "several thousand" plants occurs (Brownell 1984, Schaefer 1996 field work) on moist, seasonally flooded limestone pavement. The element occurrence is ranked "A", indicating that it is considered highly viable.

Rare Species of adjacent habitats:

Canby Blue Grass *Poa secunda* G5S1
According to NHIC (2006), a small population of the provincially extremely rare Canby Blue Grass was first documented at Bear's Rump Island in 1974 and last found there in 1989. It was found in rocky woods along the northeast shore of the island at the base of a cliff, and has not found in the site's alvar habitats.

Conclusions and Recommendations

Evaluation and Significance

Riley *et al.* (1996) confirm, and Brownell and Riley (2000) support the confirmation, that Bear's Rump Island is a provincially significant ANSI, noting that "the wet shoreline alvars are the best examples of this community type" in the Niagara Escarpment Biosphere Reserve. Riley *et al.* (1996) note that "the island is particularly noteworthy as an escarpment promontory island, with a large shore terrace sustaining a concentration of rare shoreline and alvar flora."

Threats:

The quality of this natural area is high, with no evidence of recent disturbance and no trails. No on-site or off-site threats have been identified, although there is the possibility of boating visitors causing a fire or leaving litter (Schaefer 1996).

Management:

This is a superb site which should continue to have limited access under management by the Fathom Five National Marine Park. The present study supports the recommendations by past researchers that visitor traffic to the island be maintained at appropriate levels to minimize damage to its sensitive and undisturbed flora and vegetation.

Future Research and Inventory Needs:

1. Invertebrate surveys and other alvar fauna.
2. Coring to determine age of apparent ancient trees.
3. Monitoring of rare species populations, habitat quality and potential threats.

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Vascular Plants of the Bear's Rump Island Alvars

X= Found by Schaefer (1996), O=Found by earlier studies but not by Schaefer (1996)

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	AL01-6	AL01-3
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X	X
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X	
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X	
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218		X	X
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M		X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R	Saskatoon-berry	G5	S4?			X	277	M	X	
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X	
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X
<i>Prunus pensylvanica</i> L.f.	Pin Cherry	G5	S5			X	277		X	
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X	X
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277		X	X
<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i>	Wild Red Raspberry	G5	S5			X	277			X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338		X	X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X	X
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X	X
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X	
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X	X
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X	X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411			X
<i>Houstonia longifolia</i> Gaertner	Long-leaved Houstonia	G4G5	S4?			X	416		X	X
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	T	T	X	423	H		O
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X	
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423			X
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423		X	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X	
<i>Juncus</i> sp.	Rush	G5	S5			X	455			X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X	X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X	X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	AL01-6	AL01-3
<i>Carex scirpoidea Michx. ssp. convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	X
<i>Carex viridula Michaux ssp. viridula</i>	Greenish Sedge	G5?T?	S5			X	457		X	X
<i>Eleocharis compressa Sullivant</i>	Flat-stemmed Spike-rush	G4	S4			R	457	E	X	X
<i>Scirpus cespitosus L. ssp. cespitosus</i>	Deer-grass	G5T	S5			X	457		X	X
<i>Agrostis scabra Willd.</i>	Rough Hair Grass	G5	S5			X	458			X
<i>Calamagrostis canadensis (Michaux) P. Beauv</i>	Canada Blue-joint	G5	S5			X	458			X
<i>Danthonia spicata (L.) P. Beauv. ex Roemer</i>	Poverty Oat Grass	G5	S5			X	458		X	X
<i>Deschampsia caespitosa (L.) P. Beauv. ssp</i>	Tufted Hair Grass	G5	S5			X	458	H	X	X
<i>Elymus trachycaulis (Link) Gould in Shinn.</i>	Slender Wheat Grass	G5	S5			X	458		X	X
<i>Panicum acuminatum Ell. var. fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	X
<i>Poa secunda</i>	Secund Poa, Canby's Poa	G5	S1			R	458			O
<i>Schizachyrium scoparium (Michaux) Nees</i>	Little Bluestem	G5	S4			X	458		X	X
<i>Sporobolus heterolepis (A. Gray) A. Gray</i>	Prairie Dropseed	G5	S3			X	458	E		X
<i>Lilium philadelphicum L.</i>	Wood Lily	G5	S5			X	475			X
<i>Maianthemum stellatum (L.) Link</i>	Starry False Solomon's-seal	G5	S5			X	475		X	X
<i>Zigadenus elegans Pursh ssp. glaucus</i>	White Camass	G5T4?	S4			X	475		X	
<i>Iris lacustris Nutt.</i>	Dwarf Lake Iris	G3	S3	T	T	X	476	M		O
<i>Sisyrinchium montanum E. Greene</i>	Little Blue-eyed Grass	G5	S5			X	476		X	X
<i>Sisyrinchium mucronatum Michaux</i>	Blue-eyed Grass	G5	S4S5			X	476		X	X
<i>Cypripedium arietinum R. Br.</i>	Ram's-head Lady's-slipper	G3	S3			X	489			O
<i>Cypripedium calceolus L. var. pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489			X

Non-Vascular Plants and Algae of the Bear's Rump Island Alvar

A= algae, B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	ALO1-6	ALO1-3
A	<i>Gloeocapsa alpina</i>			X	X
A	<i>Nostoc commune</i>			X	X
B	<i>Bryum sp.</i>			X	
B	<i>Limprichtia cossonii</i>	G?	S2		O
B	<i>Polytrichum juniperinum</i>	G5	S5	X	
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2		O
B	<i>Schistidium rivulare</i>	G4G5	S5	X	
L	<i>Cladina mitis / C. arbuscula</i>				X
L	<i>Dermatocarpon fluviatile / D. weberi</i>			X	
L	<i>Peltigera canina</i>	G5	S5?	X	
L	<i>Placynthium nigrum</i>	G?	S5?	X	
L	<i>Xanthoparmelia somloensis</i>	G5	S5?		X

2. CABOT HEAD

Bruce County, Northern Bruce Peninsula (formerly Lindsay Township)

NTS Map: 41H/3

NAD83 UTM 17T 476200 5010000

Ownership: Provincial/Private

Protection: Cabot Head Provincial Nature Reserve; Cabot Head Area of Natural and Scientific Interest (100%)

Survey Dates (Surveyors): Various site visits, includes non-alvar habitats within ANSI, August - September 1993 and October 1994 (S. Varga, J. Jalava); September 6, 1995 (C. Schaefer); August 19, 1998 (V. Brownell and P. Catling); many other site visits by biologists and naturalists, including the author, but published field data generally unavailable.

Total Extent of Alvar: 21 ha

Overall Alvar Quality Rank: A

Directions: Follow Dyer's Bay Road almost to the end. Alvars occur along the road ~0.5km before the Wingfield Basin parking lot, and further west along the vehicle track in an area closed to the public.

Site Name	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC Tracked Taxa
2. Cabot Head	DRSvpb	IACI	2	17	80 (77)	10

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection;

v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Alvar communities are found in several locations in the >9,000 ha natural area in the northeastern part of the Bruce Peninsula between Cabot Head and Emmett Lake Road. The alvars near Wingfield Basin on a terrace of Manitoulin Formation dolostone are entirely contained within the Cabot Head ANSI (which is divided into two sections, the Lindsay Township or "Southern" portion, and the St. Edmunds or "Northern" portion), the largest ANSI in the Niagara Escarpment Biosphere Reserve. The alvars occur as small patches within a vast mosaic of habitats, with the matrix vegetation community being fire-successional mixed and conifer forests and open woodlands dominated by White Cedar, with White Birch, Trembling Aspen, Balsam Fir, Large-toothed Aspen and White Spruce as co-dominants or secondary species (Varga 1995). Also frequent on the bedrock plain are extensive dry Common Juniper barrens interspersed with groves of White Cedar, White Spruce and White Birch, semi-open Jack Pine stands and Eastern Bracken clearings (Varga 1995, Varga *et al.* 1992-1994). Pockets of deeper soil support Sugar Maple stands sometimes mixed with White Birch, as well as stands of Hemlock and Red Oak in a few locations. Also within the natural area along Georgian Bay are expanses of Niagara Escarpment rim, cliff and talus communities, and below these slopes are cobble beaches, bedrock shelf shores and shale shore bluffs. A great diversity of wetlands and small lakes are found in low-lying basins throughout the natural area. Several inland lakes and their shorelines provide high representation of open water, emergent marshes, meadow marshes and graminoid fens.

Alvar Representation

According to Varga (1995), the Wingfield shore terrace has large areas of bedrock pavement sustaining White Cedar, White Birch and Trembling Aspen stands, dry semi-open Jack Pine forests, and open alvars dominated by Little Bluestem, Prairie Dropseed and Switch Grass. There are also moist alvars of Tufted Hair Grass, False Pennyroyal and Wiry Witch Grass, and wetter alvars dominated by Alpine Rush, Knotted Rush, Elliptic Spike-rush and Flat-stemmed Spike-rush.

According to Schaefer (1996, *fide* NHIC 2006), the Cabot Head – Wingfield basin alvar site is largely composed of alvar grasslands, which are often in a mosaic, with alvar patches separated by short distances by other natural communities. “The western areas are alive with colour in the spring, and [Spiked Lobelia] is abundant in places well into July. There is generally very little tree/tall shrub cover, making the grasslands very open, with a range of 1-10% cover of small shrubs (mostly [Shrubby Cinquefoil] although [Creeping Juniper] is the dominant shrub cover in one area). Some of the grassland areas have clear borders with adjacent wetlands, while others grade slowly into marshy vegetation.”

According to Brownell and Riley (2000), “on the west and southwest side of Wingfield Basin below the escarpment is a complex of small open grasslands surrounded by Jack Pine – White Cedar alvar woodland and savannah.”

ALOI-3 Dry-fresh Little Bluestem (/Northern Dropseed) Open Alvar Meadow

Brownell and Riley (2000) state: “The mesic to wet mesic alvar grassland is dominated by [Northern Dropseed] (15-20%), [Scirpus-like Sedge] (15-20%) and [Little Bluestem] (15-60%). Drier sections have a stronger component of the latter species. One grassland west of Wingfield Basin has an unusually high cover of [Spiked Lobelia]. Herbaceous cover ranges from 60-90%. [Creeping Juniper] is usually about 1% cover. A few saplings and seedlings of Jack Pine and White Cedar are present. Exposed bedrock is scarce.”

ALTI-4 Jack Pine – White Cedar – White Spruce Treed Alvar

Brownell and Riley (2000) describe the treed alvar sections of the Wingfield basin area as follows: “Jack Pine tree cover in the shrubland savannah is about 20%. Saplings and dwarf trees (2-5m tall) of Jack Pine, White Cedar, White Spruce and White Birch compose 20% cover. Herbs are moderately abundant with about 30% cover, and dominants include [Little Bluestem, Balsam Ragwort and Bristle-leaf Sedge]. About 20% cover of [Common Juniper] exists. [Creeping Juniper] ranges from 15-20% cover. This community grades into Jack Pine alvar woodland that has not been sampled.”

Condition

Schaefer (1996) writes that in the Wingfield basin alvars, “areas at the west side have experienced the least disturbance and also (or because of this) contain excellent

populations of [Lakeside Daisy] and [Northern Dropseed]....The only development in the area consists of several cottage buildings on the west side of Wingfield Basin and several buildings associated with the Cabot Head Lighthouse on the east side of the Basin. The road travels approximately 7.5 km along the base of Niagara Escarpment cliffs without any buildings and dead ends at the lighthouse parking lot. A hydro line crosses over the grassland south of Wingfield Basin....A very small old dump site occurs in the most southern area of the site. There are introduced species on-site, particularly in areas close to the road (gravel), but the exotic component is overall minor. The gravel roads cuts through one part of the site, and 2 track roads with associated ruts occur in the southernmost area and part of the western side of the site.” Brownell and Riley (2000) give most of the alvar in this area the highest quality rating (A), with areas immediately adjacent to the road ranked as “good” (B) quality.

Diversity

The three alvar types in the Wingfield basin area sustain at least 80 vascular plant species (Schaefer 1996), of which 18 display a strong affinity for alvar habitats in Ontario. The concentration and variety of snake species around Wingfield Basin is notable. They include the Threatened Massasauga rattlesnake, Special Concern species Northern Ribbonsnake and Eastern Milksnake, along with the more common Northern Watersnake, Smooth Greensnake, Northern Ringneck Snake, Northern Redbelly Snake, Dekay’s Brownsnake and Eastern Gartersnake (Varga 1995).

Ecological Functions

The Cabot Head natural area is part of a large, naturally vegetated woodland corridor extending for 57 km along the Niagara Escarpment from Whippoorwill Bay near Lion’s Head to the northern tip of the Bruce Peninsula at Tobermory (Riley *et al.* 1996). This woodland corridor extends to the Bruce Peninsula's western coast and covers 50,000 ha and is the largest block of woodland along the Niagara Escarpment south of Manitoulin Island, and one of the largest in the Southern Deciduous - Evergreen Forest Region (Larson *et al.* 1999). The natural area plays an important hydrological role. The Lindsay Township portion encompasses several watersheds, with 339 ha of inland lakes and beaver ponds, 27.6 km of inland lakeshore and 13.3 km of Great Lakes shoreline. It is also a headwater source for the Crane River, a high quality cold water stream (Varga 1995). The St. Edmunds Township portion includes 598 ha of open water, 72.4 km of inland lakeshores and 11.4 km of Great Lakes shoreline. It also encompasses several large watersheds, and its inland lakes are a major headwater source for three high-quality coldwater streams (Larson *et al.* 1999).

Special Features

An outstanding array of globally and provincially rare flora and fauna are found in the Cabot Head alvars and nearby habitats. A total of 4 vascular plant taxa considered

locally rare or very uncommon (BGPC 2003) also occur at the site. The occurrences of the globally and provincially rare taxa are described in more detail below.

Houghton's Goldenrod *Solidago houghtonii* COSEWC-SC G3S2
A population estimated at approximately 13,000 Houghton's Goldenrod plants is present at the Cabot Head alvar nearest to the road leading to the lighthouse (NHIC 2006, Makkay 2003). A small population is also found along the boulder shoreline of Wingfield Basin (Varga 1995). These are the only known Bruce Peninsula occurrences for one of the featured species of the Bruce Peninsula – Manitoulin Island Recovery Strategy.

Lakeside Daisy *Hymenoxis herbacea* COSEWIC-THR, OMNR-THR G2S2
Lakeside Daisy, also known as Stemless Rubberweed or Manitoulin Gold, is a globally rare, nationally and provincially threatened species endemic to the Great Lakes basin. It is believed that at least 95% of its global distribution is on the alvars of the Bruce Peninsula and Manitoulin Island. Outside of Canada, Lakeside Daisy is known from only two natural populations: a very small occurrence in Mackinac County, Michigan, and at Marblehead Quarry, Ohio. Approximately 50,000 plants were found at the Cabot Head alvar in 2000 (Campbell *et al.* 2002), while >10,000 were estimated during a 2006 survey (McGuire 2006).

Northern Dropseed *Sporobolus heterolepis* G5S3
Northern Dropseed, also known as Prairie Dropseed, is a provincially rare grass that is more common in western North America. It has been found at a number of higher quality alvar habitats in Ontario (Brownell and Riley 2000) and is not considered rare on the Bruce Peninsula (BGPC 2003). It is a dominant in the herb layer at the Cabot Head alvar. Schaefer (1996) estimated several thousand cespitose clumps to occur over an area of approximately 20 ha in 1996.

Kirtland's Warbler *Dendroica kirtlandii* COSEWIC-END, MNR-END G1SHB,SZN
Kirtland's Warbler, one of the world's rarest bird species, has been reported from Cabot Head in spring (NHIC 2006). This was likely a migrant or a wandering unmated male. Although there are historic breeding records for the Petawawa area in Ontario (NHIC 2006), the species' current breeding range is restricted to northeastern Michigan, at approximately the same latitude as the Bruce Peninsula. It has very specific habitat requirements. It nests in nearly homogeneous fire-successional stands of dense, scrubby Jack Pine, 1.3-6 m high (6-22 years old) (also given as 2-4 m tall and 8-20 years old) interspersed with many small openings, with minimal ground cover and few hardwoods (InfoNatura 2004). The habitat tends to be suitable only for periods of about 10-15 years. When trees reach 3.5 m or more in height, with no live needles present below about 1.0 m, habitat becomes increasingly unfavorable and populations decline (Brewer *et al.* 1991). It seldom nests in habitat tracts of less than 30 ha (Mayfield 1993), which may be a major limiting factor at the Cabot Head site.

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3 S3
Threatened (Eastern) Massasauga rattlesnakes are quite frequently encountered in the Cabot Head area, including observations by the author over the years. NHIC (2006)

contains numerous recent records for the Cabot Head ANSI and its vicinity. This globally and provincially significant taxon is a characteristic species of the Bruce Peninsula and eastern Georgian Bay ecosystems in Ontario, which are among its last major strongholds. It is likely that the large natural areas of the upper Bruce sustain viable populations. Massasaugas require a habitat mosaic that includes wetlands such as fens, as well as drier upland forests and barrens to complete their life cycle. The presence of and access to suitable hibernacula and gestation sites are critical limiting factors in their survival. Massasaugas, like many other snake species, are also highly vulnerable to roadkill, particularly at night and during the spring and fall, when they venture to bask on solar-heated hard-surface roads to assist with thermoregulation.

Eastern Ribbonsnake *Thamnophis sauritus* COSEWIC-SC G5S3
 The provincially rare Species of Concern, Eastern Ribbonsnake, is widespread in southern Ontario, preferring habitat mosaics that include mixed or deciduous forests and wetland habitats. NHIC (2006) indicates past records for the Cabot Head area and the author has observed the species in the immediate vicinity of the alvars.

Milksnake *Lampropeltis triangulum* COSEWIC-SC G5S3
 Milksnake, another Special Concern species, is also widespread in southern Ontario, preferring open habitats such as alvars, rock barrens, hayfields and pasture, as well as open woodlands. NHIC (2006) indicates past records for the Cabot Head area and the author has observed the species in the immediate vicinity of the alvars.

Striped Camel Cricket *Ceuthophilus meridionalis* GNR S2S3
 The provincially rare Striped Camel Cricket was collected at the Cabot Head alvar by Bouchard (1998), who states, “This species seems to be restricted to the Great Lakes region and is found from Michigan and Ontario south to Pennsylvania...This camel cricket is at or close to the northern North American limit of its range in Ontario alvars. It occurs in greatest numbers in pavement and shrubland alvars where specimens stay in cracks during the day (where moisture is higher) and come out to feed at night.”

A Ground Beetle *Agonum crenistriatum* G? S?
 This species of ground beetle has not been assigned a conservation rank by NHIC or NatureServe. However, according to Bouchard (1998), it is “significant”, as only 17 specimens have ever been collected in Canada. A specimen was collected at the Cabot Head alvar grassland by Bouchard (1998).

A Leafhopper *Auridius sp. n.* G? S?
 This species of leafhopper has not been assigned a conservation rank by NHIC or NatureServe. However, according to Bouchard (1998), it is “significant”, with few collections and a restricted distribution. A specimen was collected at the Cabot Head alvar grassland by Bouchard (1998).

A Leafhopper *Graminella mohri* G? S?
 This species of leafhopper has not been assigned a conservation rank by NHIC or NatureServe. However, according to Bouchard (1998), it is known in Ontario only from the “alvars of the Bruce Peninsula and the prairies of Blenheim and Windsor.” Thirteen

specimens were collected at the Cabot Head alvar grassland by Bouchard (1998). This leafhopper is known to feed on Switch Grass (Bouchard 1998).

A Leafhopper	<i>Limotettix urnura</i>	G? S?
A Leafhopper	<i>Memnonia sp. n.</i>	G? S?
A Leafhopper	<i>Paraphlepsius lobatus</i>	G? S?
A Leafhopper	<i>Pendarus punctiscriptus</i>	G? S?
A Leafhopper	<i>Texananus marmor</i>	G? S?
A Leafhopper	<i>Delphacodes nigriscutellata</i>	G? S?

All the above leafhopper species are considered “significant” by Bouchard (1998), and are almost entirely restricted to alvar habitats in Ontario. All were collected by Bouchard (1998) at the alvar grassland at Cabot Head.

The following additional provincially rare species are known from the Cabot Head area and may occur in alvars but have not been documented within these habitats at the site.

*Roundleaf Ragwort	<i>Packera obovata</i>	G5 S3
*Cooper's Milk-vetch	<i>Astragalus neglectus</i>	G4 S3
*Limestone Oak Fern	<i>Gymnocarpium robertianum</i>	G5 S2
*Rand's Goldenrod	<i>Solidago simplex ssp. randii</i>	G5 S3
*Oregon Woodsia (tetraploid)	<i>Woodsia oregana ssp. cathcartiana</i>	G5 S3

Conclusions and Recommendations

Evaluation and Significance

According to Brownell and Riley (2000), the Cabot Head – Wingfield basin area “contains high-quality examples of Little Bluestem grassland and Jack Pine alvar savannah woodland on the Bruce Peninsula, although they are not as large as that found at George Lake or Dyer’s Bay [Road]. The community associations have some similarities to those found at Cape Croker although the conditions are drier at Cabot Head.”

Threats

No immediate threats have been noted by researchers at the alvar patches in the Cabot Head area. The proximity of the road and frequent summer visitation of the Cabot Head lighthouse and environs creates the potential for damage to alvar vegetation and substrates by foot and vehicle traffic.

Management

Varga (1995) recommends that “efforts should be made to encourage the Parks Canada strategy of acquiring private holdings at the site as they become available. Visitor use of the site should remain at low levels to ensure the protection of its high-quality, sensitive shorelines, alvars and escarpment rims and cliffs.” Schaefer (1996) recommends that the Bruce Trail not be re-established in the Wingfield Basin area, and that vehicle use be discouraged on the two-track driveway that passes through the alvar there. Schaefer (1996) also suggests that signs be posted south of Wingfield Basin asking people not to

pull over to the side of the road at the Wingfield Basin alvar, but to park in the lighthouse parking lot.

Future Research and Inventory Needs

1. Mosses, lichens and algae have not been surveyed in detail at the Cabot Head alvars.
2. Monitoring of rare species populations, habitat quality and potential threats should be undertaken on a regular basis.

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Vascular Plants of the Cabot Head Alvars

NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	AL01-3	AL11-3
<i>Equisetum arvense</i> L.	Field Horsetail	G5	S5			X	5		X	X
<i>Equisetum variegatum</i> Schleicher ex Weber	Variiegated Scouring-rush	G5	S5			X	5		X	
<i>Asplenium trichomanes</i> L.	Maidenhair Spleenwort	G5	S5			X	19		X	
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	
<i>Pinus banksiana</i> Lambert	Jack Pine	G5	S5			X	33		X	X
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34		X	X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X	
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200			X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X	X
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	G5	S5			X	234		X	
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R.	Saskatoon-berry	G5	S4?			X	277	M	X	
<i>Amelanchier</i> cf. <i>arborea</i>	Juneberry	G5	S5			X	277			X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X	X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X	
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277		X	
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277		X	
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286		X	X
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	G5	S5			X	307			X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X	
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X	X
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		X	
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378		X	
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392			X
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X	
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X	X
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E	X	
<i>Plantago rugelii</i> Decne.	Rugel's Plantain	G5	S5			X	396		X	
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X	
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X	
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411		X	
<i>Diervilla lonicera</i> Miller	Bush-honeysuckle	G5	S5			X	418			X
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	
<i>Symphoricarpos albus</i>	Snowberry	G5	S5			X	418			X
<i>Viburnum rafinesquianum</i> Schultes	Downy Arrow-wood	G5	S5			X	418		X	X
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			X	423		X	
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423		X	
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			I	423		X	X
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423		X	

NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	ALO1-3	ALT1-3
<i>Hymenoxis herbacea</i>	Lakeside Daisy	G2	S2	T	T	R	423	H	X	
<i>Prenanthes racemosa Michaux</i>	Smooth White-lettuce	G5T?	SU			X	423		X	
<i>Senecio pauperculus Michaux</i>	Balsam Ragwort	G5	S5			X	423	M	X	
<i>Solidago hispida Muhl.</i>	Hairy Goldenrod	G5	S5			X	423		X	X
<i>Solidago houghtonii</i>	Houghton's Goldenrod	G3	S2	S		R	423		X	
<i>Solidago ptarmicoides (Nees) B. Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E	X	
<i>Solidago uliginosa Nutt.</i>	Bog Goldenrod	G4G5	S5			X	423		X	
<i>Taraxacum officinale G. Weber</i>	Common Dandelion	G5	SE5			I	423			X
<i>Juncus balticus Willd.</i>	Baltic Rush	G5	S5			X	455		X	
<i>Juncus dudleyi Wieg.</i>	Dudley's Rush	G5	S5			X	455		X	
<i>Carex aurea Nutt.</i>	Golden-fruit Sedge	G5	S5			X	457		X	
<i>Carex capillaris L.</i>	Hair-like Sedge	G5	S5			X	457		X	
<i>Carex crawei Dewey</i>	Crawe's Sedge	G5	S4			X	457	E	X	
<i>Carex eburnea Boott ex Hooker</i>	Bristle-leaf Sedge	G5	S5			X	457		X	
<i>Carex flava L.</i>	Yellow Sedge	G5	S5			X	457		X	
<i>Carex granularis Muhlenb. ex Willd.</i>	Meadow Sedge	G5	S5			X	457		X	
<i>Carex pellita Muhl.</i>	Woolly Sedge	G5	S5			X	457		X	
<i>Carex richardsonii R. Br.</i>	Richardson's Sedge	G4	S4?			X	457	E	X	
<i>Carex scirpoidea Michx. ssp. convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	
<i>Carex viridula Michaux ssp. viridula</i>	Greenish Sedge	G5?T?	S5			X	457		X	
<i>Eleocharis compressa Sullivant</i>	Flat-stemmed Spike-rush	G4	S4			R	457	E	X	
<i>Agrostis gigantea</i>	Redtop	G5	S5			X	458		X	
<i>Danthonia spicata (L.) P. Beauv. ex Roemer</i>	Poverty Oat Grass	G5	S5			X	458		X	
<i>Deschampsia caespitosa (L.) P. Beauv.</i>	Tufted Hair Grass	G5	S5			X	458	H	X	
<i>Elymus trachycaulus (Link) Gould in Shinn.</i>	Slender Wheat Grass	G5	S5			X	458		X	
<i>Muhlenbergia glomerata (Willd.) Trin.</i>	Marsh Wild-timothy	G5	S5			X	458	M	X	
<i>Oryzopsis asperifolia Michaux</i>	Rough-leaved Mountain-rice	G5	S5			X	458		X	X
<i>Panicum acuminatum Ell. var. fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	
<i>Poa compressa L.</i>	Canada Blue Grass	G?	S5			X	458		X	
<i>Poa pratensis L. ssp. pratensis</i>	Kentucky Blue Grass	G5T	S5			X	458		X	
<i>Schizachyrium scoparium (Michaux) Nees</i>	Little Bluestem	G5	S4			X	458		X	X
<i>Sporobolus heterolepis (A. Gray) A. Gray</i>	Prairie Dropseed	G5	S3			X	458	E	X	
<i>Lilium philadelphicum L.</i>	Wood Lily	G5	S5			X	475		X	
<i>Maianthemum stellatum (L.) Link</i>	Starry False Solomon's-seal	G5	S5			X	475		X	
<i>Zigadenus elegans Pursh ssp. glaucus</i>	White Camass	G5T4?	S4			X	475		X	
<i>Sisyrinchium mucronatum Michaux</i>	Blue-eyed Grass	G5	S4S5			X	476		X	
<i>Cypripedium calceolus L. var. pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X	

Non-Vascular Plants of the Cabot Head – George Lake Alvars

B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	AL/O1-3	AL/T1-3
B	<i>Dicranum polysetum</i>	G5	S5	X	
B	<i>Fissidens sp.</i>			X	
B	<i>Schistidium rivulare</i>	G4G4	S5	X	X
B	<i>Scorpidium turgescens</i>	T	T	X	
L	<i>Cladina rangiferina</i>	G5	S5	X	X
L	<i>Cladonia pyxidata</i>	G5	S5	X	
L	<i>Placynthium nigrum</i>	G?	S5?		X

Meta-Site 3. CAPE HURD – BAPTIST HARBOUR

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/4

NAD83 UTM 17T 445000 5006200

Ownership: Private, Ontario Heritage Foundation, Federation of Ontario Naturalists, Escarpment Biosphere Conservancy

Protection: Ontario Heritage Foundation (~5%), Federation of Ontario Naturalists (~10%), Escarpment Biosphere Conservancy (~15%); Cape Hurd – Baptist Harbour ANSI (90%)

Survey Dates (Surveyors): 1971 (G. Waldron, IBP inventory); 1975 (D. Cuddy / K. Lindsay / I. Macdonald); 1980 (J. Johnson); 17 August 1995 and 21 June 1996 (C. Schaefer, IACI); 10 June 1998 (V. Brownell); 23 and 25 August 2003, 16 and 28 June, 2, 16 and 28 August, 2004, and 20 August 2005 (J. Jalava)

Total Extent of Alvar: 37 ha

Overall Alvar Quality Rank: A (with some sections B and CD)

Directions: Alvar sites 3a-3e and 3h are reached by taking Cape Hurd Road southwest from Highway 6 in Tobermory. Sites 3a-3e are all southwest of the road after it makes the sharp turn to the northwest, with site 3a best reached from the dead end of South Baptist Harbour Road. Sites 3f and 3g are best reached by taking Warner Bay Road southwest off Highway 6 to the T-intersection almost at Lake Huron, and turning northwest, where site 3g occurs next to the road on the right hand side and site 3f involves following a dirt track to the north farther down the road. The accompanying map of this site summary may be used for orientation. As all of the sites are owned privately or by conservation organizations, permission to access must be sought beforehand.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Taxa
3a. Baptist Harbour	DRSvpn	Jalava 2005	2	17	77	9
3b. Baptist Harbour OHF	RSvp	Jalava 2005	2	11	37	1
3c. Baptist Harbour NW	RSvp	Jalava 2005	3	15	81	0
3d. Baptist Harbour SE	RSvp	Jalava 2005	3	10	44	0
3e. Barney Lake	DRSvpn	Jalava 2005	2	15	84	7
3f. Barney Lake South	Svp	Jalava 2005	1	1	16	1
3g. Hopkins Bay	RSvp	Jalava 2005	1	5	37	0
Meta-site totals			8	26	172 (160)	12

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

The Cape Hurd – Baptist Harbour is a ~800 ha natural area situated on the Lake Huron shore at the northwestern tip of the Bruce Peninsula, 5 km southwest of Tobermory. Most of the site is within a provincially significant life science Area of Natural and Scientific Interest (ANSI) of the same name. Natural features include extensive coniferous and mixed forests, treed and shrub carbonate rock barrens, bedrock shorelines, a diversity of globally rare alvars, rich fens and other wetland communities on the shallow-soiled dolostone bedrock plain of the northern Bruce Peninsula (Jalava 2005). The site is part of a mostly naturally-vegetated landscape, bisected only by secondary and tertiary roads, covering much of the western half of the Bruce Peninsula.

The Cape Hurd – Baptist Harbour ANSI is noted for its outstanding representation of undisturbed open carbonate bedrock shorelines, several high-quality alvar community types, rich fens, and extensive White Cedar – White Spruce coniferous forests on the dolostone bedrock plain at the north end of Ecodistrict 6E-14 on the Bruce Peninsula (Jalava 2005b). The site also provides minor representation of a relatively rich Sugar Maple deciduous forest, rare at this latitude on the Bruce, as well as shrub and treed carbonate rock barrens, mixed forests, thicket swamps, meadow marshes and open water communities.

Cape Hurd – Baptist Harbour ANSI supports high ecological diversity. Thirty-five vegetation community types (ecotypes), 441 vascular plant taxa (400 of them native to Ontario, and 22 of them orchids), 20 species of algae, 23 species of lichens, 27 species of mosses, 12 mammal species, 79 breeding bird species, 8 reptile species, 10 amphibian species and 6 dragonfly taxa have been recorded at the site (Jalava 2005b). The Cape Hurd – Baptist Harbour ANSI sustains at least seven globally and provincially rare alvar vegetation community types. The ANSI also provides habitat for seven provincially rare plant species and three provincially rare fauna, including the threatened Dwarf Lake Iris, Hill's Thistle, Massasauga rattlesnake and Queen Snake. Three additional plant taxa (one subspecies and two hybrids) recorded at the site may also be considered provincially significant. Twenty-seven of the site's vascular plant taxa are considered locally rare, and 10 are considered very uncommon on the Bruce Peninsula. The ANSI also provides habitat for at least 10 locally rare to uncommon fauna.

An area to the northeast of Cape Hurd Road that appeared to possibly have alvar was visited by Jones (2006), and it was determined as a result that alvar habitat was not present.

Alvar Representation

The Cape Hurd – Baptist Harbour area provides the best representation of open bedrock shoreline and open alvar habitats characteristic of Lake Huron coastal areas on the dolostone plain of ecodistrict 6E-14. The site also has excellent representation of alvar shrublands.

Sites within Cape Hurd - Baptist Harbour ANSI

- 3a - Baptist Harbour
- 3b - Baptist Harbour OHF
- 3c - Baptist Harbour Northwest
- 3d - Baptist Harbour Southeast
- 3e - Barney Lake
- 3f - Barney Lake South

Almost the entire Lake Huron shoreline of the Cape Hurd – Baptist Harbour ANSI consists of exposed dolostone bedrock, ranging from relatively flat expanses of pavement and shelving, to grooved and furrowed areas, as well as rugged, low (<2m high) outcrops.

There are also minor areas of cobble shoreline and beaches consisting of shingle-like dolostone rock fragments and gravel. The composition of the vegetation on the open shorelines is entirely dictated by the microtopography and substrate type. Many of the most exposed nearshore areas have little or no vegetative cover except for rock surface algae and lichens. Very sparsely scattered White Cedar trees, saplings and seedlings occur in some areas. Shrubby Cinquefoil shrubs may be quite common in areas where soil has accumulated in cracks in the bedrock. Kalm's St. John's-wort, Hoary Willow, Ninebark and Creeping Juniper are occasionally present in numbers, with the latter two species occurring primarily in the backshore fringe near the woodland edge. Sparse growth of a diversity of herbaceous taxa occurs, with the most common being Silverweed, Rough Hair Grass, Short-headed Rush, Tufted Hairgrass, Wild Savory, Acuminate Panic Grass, Bird's-eye Primrose, Canada Goldenrod, Herb Robert, Greenish Sedge, Scirpus-like Sedge, Spotted Jewelweed, Boneset, Meadow Spike-moss, Ohio Goldenrod and Hair-like Beak-rush.

Above the high water mark along these bedrock shorelines are extensive areas of high-quality alvar pavement, grassland and shrubland (sites 3a and 3c). Other, generally smaller but also high-quality, alvar patches occur farther inland to the southeast and east of Baptist Harbour (sites 3b and 3d), and to the west and south of Barney Lake (sites 3e and 3f).

Site outside Cape Hurd – Baptist Harbour ANSI
3g – Hopkins Bay
Bruce County, St. Edmunds Township
NTS Map: 41H/4
NAD83 UTM: 17T 447840 5005743
Ownership: Private / Public Road Allowance
Protection: Not protected
Survey Dates (Surveyors): August 20, 2005 (J. Jalava)
Air Photos: 7695
Total Extent of Alvar: 3 ha
Alvar Quality Rank: CD

The Hopkins Bay alvar occurs along both sides of a public right-of-way in the northwestern part of the Bruce Peninsula, just inland from the Lake Huron shore north of Warner Bay Road. The community mosaic at this site is affected by undulating terrain and variable soil depths. The proximity of a road immediately adjacent to the alvar patch, as well as periodic clearing of the right-of-way have affected and will continue to affect the overall quality of this relatively small site. [Jalava 2005a]



Figure 1. Open alvar pavement (foreground) and open bedrock shore (background) northwest of Baptist Harbour.

ALO1-1 Dry Lichen - Moss Open Alvar Pavement

Expanses of dry open alvar pavement dominated by lichens, mosses and algae occur above the average high water mark along the shoreline northwest of (Figure 1), and in one small area southeast of, Baptist Harbour. These areas are probably only flooded by Lake Huron waters during the most severe storm events, with many intervening years of no inundation. There are a few groves of White Cedar trees nested within the alvars, and White Cedar saplings and seedlings are very sparsely scattered on the pavement, rooting in deeper crevices. Low shrub cover ranges from 1% to 20%, with the most common species being Shrubby Cinquefoil. Kalm's St. John's-wort is also frequent, while Creeping Juniper is occasionally common along the woodland fringe. Herbaceous cover ranges from very sparse to near 25%, with the most common dominants being Scirpus-like Sedge, Little Bluestem, Wild Savory, Fringed Houstonia, Tufted Hairgrass, Harebell, Richardson's Sedge, Rock Sandwort and Acuminate Panic Grass. Upland White Goldenrod, Rough Hair Grass, Canada Blue Grass, Poverty Oat Grass, False Pennyroyal, Swamp Goldenrod, Lyre-leaved Rock-cress, Elliptic Spike-rush, Tufted Bulrush and Bastard Toad-flax are also occasionally dominant, but less widespread. Non-vascular flora of the open pavement alvars were not identified to species during Jalava (2005b) surveys, but cushion mosses, golden-coloured mosses (probably the provincially rare *Pseudocalliergon turgescens*) and various foliose and crustose lichen taxa were found to be very common on the bedrock (composition of non-vascular plant species dominants on the open alvar pavement (ALO1-1) community probably very closely resembles that

described below for the dry-fresh Little Bluestem Alvar Meadow, in which Schaefer (1995a-b) undertook identifications). The rock-surface algae, *Gloeocapsa alpina*, gives nearly all areas of open bedrock a grey-black colour. Almost no evidence of recent human disturbance was noted on these alvars, although a few items of jetsam have been stranded the near-shore alvar pavements during severe storm events. Some charred woods indicate past fire at the two northernmost sampled patches. A new driveway skirts the edge of one of these alvars.

According to Schaefer (1995a), “The site is a mosaic of seemingly dry pavement areas dominated by lichens (*Placynthium nigrum* and *Protoblastenia rupestris* most frequently), mosses (*Schistidium rivulare* at 37% frequency and *Tortella* spp. at 35%) and Nostoc (mostly *N. commune*, 22% frequency), thinly soiled herbaceous dominated areas ([Scirpus-like Sedge, Bluets, Little Bluestem, Calamint, Acuminate Panic Grass and Poverty Oat Grass] most frequently) and permanent standing water ([Twig-rush and Northern Dropseed] dominated). Trees occur in groves of 3 or 4 often (< 3 m high) and in areas where these groves are more frequent, the term alvar pavement/grassland savanna could be applied.”

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow

A diverse 6 ha patch of alvar grasslands dominated by Little Bluestem is also found not far from the Lake Huron shoreline southeast of Baptist Harbour. According to Schaefer (1995a), this alvar occurs on gently sloping pitted dolostone with occasional ephemeral pools of standing water in shallow depressions. Scattered White Cedar are present, most of them stunted or dead and bleached white by the sun. Vegetation consists of a mosaic of dry pavement dominated by lichens (*Placynthium nigrum*, *Protoblastenia rupestris* and *Cladonia* spp.), mosses (*Schistidium rivulare* and *Tortella* spp.) and algae mats (mainly *Nostoc commune*) (Figures 2 and 3), in combination with grasslands of Little Bluestem, Fringed Houstonia, Scirpus-like Sedge, Bristle-leaf Sedge, Wild Savory, Acuminate Panic Grass and Poverty Oat Grass. Moist depressions sustain lush growth of Twig-rush and the provincially rare Northern Dropseed. Groves of stunted (<3m tall) White Cedar trees occur within the grassland. Low shrubs of Creeping Juniper and Shrubby Cinquefoil also occur, particularly in association with the treed groves. This alvar complex is virtually undisturbed, with the exception of localized but serious damage caused by illegal collection of stunted trees for the bonsai trade.



Figure 2. Microbial mat and lichens on alvar pavement west of Baptist Harbour



Figure 3. Nostoc algal mat on alvar pavement west of Baptist Harbour

ALO1-4 Dry - Fresh Poverty Grass Open Alvar

A 2 ha patch of alvar grassland dominated by Poverty Oat Grass is found 300 m west of Barney Lake (Figure 4), less than 100 m from Cape Hurd Road. Very sparse, stunted White Spruce and White Cedar trees, saplings and seedlings are present, Creeping

Juniper is common and widespread, and occasional Common Juniper and Shrubby Cinquefoil low shrubs are scattered throughout. Dominant herbaceous species in drier portions are, in order of abundance, Poverty Oat Grass, Bristle-leaf Sedge, Fringed Houstonia, Balsam Ragwort, Acuminate Panic Grass and Bastard Toad-flax. A moister depression in the centre of the alvar is dominated by Tufted Hairgrass, Crawe's Sedge and Compressed Spike-rush.



Figure 4. Poverty Grass alvar grassland west of Barney Lake.

Exposed rock is covered in the algae, *Gloeocapsa alpina*. Other frequent non-vascular plant species include the moss, *Schiztidium rivulare*, the algae, *Nostoc* (sp.), the lichen, *Placynthium nigrum*, and microbial mats also occur. An ATV trail has caused significant but localized damage along the eastern edge of this alvar, which is otherwise undisturbed.

ALO1-6 Tufted Bulrush Wet Alvar Grassland

Species-rich, interesting communities that could be classified as wet open alvars or bedrock fens occur in two patches near the Lake Huron shore between Baptist Harbour and Baptist Island, and one small patch just west of the mouth of Baptist Harbour. Saturated to moist marly soils occur at the northeastern-most example, with seepage evident. Blackish thin organic to sandy soil deposits occur in cracks and depressions at the other two sites. The southeastern-most patch is drier at the north end and wetter at the south. Sparse trees, saplings and seedlings of White Cedar, and to a lesser extent Tamarack, are found in the marly example. Shrubby Cinquefoil is the sparse but

dominant low shrub in all three patches, while Sweet Gale, Kalm's St. John's-wort and Hoary Willow occur more locally. Dominant herbaceous taxa at all three patches are Twig-rush in drier sections and Little Bluestem in wetter areas, with Acuminate Panic Grass, Mermaid-weed and Ohio Goldenrod being frequent secondary dominants. Acuminate Panic Grass is also dominant in the western example, with Tufted Hairgrass a secondary species. Other herbs common at one or two examples include Poverty Oat Grass, Wild Savory and Upland White Aster on drier pavement, and Compressed Spike-rush, Hair-like Beak-rush, Bird's-eye Primrose, Northern Reed Grass and the locally rare Linear-leaved Sundew in wetter areas. The rock-surface algae, *Gloeocapsa alpina* covers drier areas of bedrock, and patches of foliose algae occur in shallow depressions. All three examples are undisturbed.

ALSI-1 Common Juniper Shrub Alvar

One sampled alvar shrubland, 500 m southwest of Barney Lake, is dominated by Common Juniper. This small patch has curtains of White Cedar and White Spruce trees and an extensive herb layer of Roundleaf Ragwort, Rough Hair Grass, Hairy Rock-cress and Yarrow. Another alvar shrubland, which could be classified as a treed alvar, is dominated by a combination of stunted (sapling and low-shrub sized) White Cedar and White Spruce, Common Juniper and Creeping Juniper low shrubs, and abundant Dwarf Lake Iris in the herb layer. Other common herbs in this shrubland patch are Bristle-leaf Sedge, Bracken Fern and Fringed Polygala.

The Hopkins Bay alvar is also dominated by Common Juniper shrubs (Jalava 2005a). Portions are quite flat, but other areas slope up to 5° to 8°, with a southwest aspect (undulating bedrock closer to Lake Huron on southwest side of road, though openly vegetated, are too rugged to be considered alvar). Exposed patches of light brown sandy soil (up to 10% of visible ground area) are present. Darker organic deposits also occur in cracks and pitted depressions. Soil depths range from 0 to 5 cm, averaging 1 to 3 cm. Vegetation on the alvar at Hopkins Bay consists of scattered copses of White Spruce, often with White Birch saplings, interspersed with a quite extensive low shrub layer alternating between Creeping Juniper and Common Juniper as dominants, and with Bearberry as a secondary species. The sparse herb layer is dominated by Richardson's Sedge and Bristle-leaf Sedge, with Hairy Goldenrod, Upland White Goldenrod, Heal-all, Wild Columbine, Poverty Oat Grass and Bracken Fern as associates. Crustose and thalloid lichens, as well as the rock surface algae, *Gloeocapsa*, are common on patches of exposed bedrock, which comprises approximately 10-30% of the surface area of the alvar.

ALSI-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar

ALSI-3 Scrub Conifer - Dwarf Lake Iris Shrub Alvar

Alvar dwarf shrublands dominated by Creeping Juniper and Shrubby Cinquefoil are found in several dry inland locations with very little soil and much exposed bedrock in the southeastern half of the ANSI, and also near the Lake Huron shore west of Baptist Harbour (Figure 5). Other frequent low shrubs include Common Juniper, Kalm's St. John's-wort, Bearberry and, in moist depressions, Alder-leaved Buckthorn. Sparsely scattered White Cedar and White Spruce trees, saplings and seedlings are usually present. The most common herbaceous taxa in these shrublands are Rough Hair Grass, Tufted

Hairgrass, Richardson's Sedge, Scirpus-like Sedge, Little Bluestem, Acuminate Panic Grass, Wild Savory, Fringed Houstonia, Rock Sandwort, Bristle-leaf Sedge, Balsam Ragwort, Poverty Oat Grass, Upland White Goldenrod, White Camass and, in moister depressions, Yellow Sedge, Compressed Spike-rush and Cespitose Bulrush. The algae *Gloeocapsa alpina* typically covers virtually all exposed dolostone, while cushion and turf mosses, crustose and foliose lichens are very common. Black to grey microbial mats (Figure 2) occur in shallow open depressions in some examples.



Figure 5. Creeping Juniper - Shrubby Cinquefoil dominated alvar shrubland.

ALT1-4 Jack Pine - White Cedar - White Spruce Treed Alvar

Several patches of treed alvar dominated by stunted White Cedar, White Spruce and often Tamarack trees, saplings and seedlings are found between Barney Lake and Baptist Harbour. Creeping Juniper, Bearberry and, occasionally, Common Juniper usually form an extensive but somewhat patchy low shrub layer. Dominant herbaceous taxa in these treed alvars are Richardson's Sedge, White Camass, Bastard Toad-flax, Bristle-leaf Sedge and Fringed Houstonia. Non-vascular taxa of other alvar pavement, grassland and shrubland communities predominate in patches of open bedrock of the treed alvars.

Condition

The majority of the key representative features (bedrock shorelines, alvars, open and shrub fens, and coniferous forests) of the ANSI are undisturbed or very lightly disturbed. Some portions of the ANSI have been impacted by cottage development, roads, driveways, ATV and snowmobile trails, selective logging and past fire. Introduced species occurrences tend to be very local at the site, limited to areas near roads, trails and cottages, and vast areas of habitat are comprised entirely of native flora, indicating good overall ecological integrity. The ANSI's greatest future threat is relatively high-density cottage development.

Most of the alvar shrublands show evidence of past fire, but are otherwise largely undisturbed. A few examples are locally disturbed by ATV trails, with some weedy species present near the trails. Some deer browse was noted at one patch of treed alvar, but these communities otherwise showed no evidence of recent human disturbance.

At the Hopkins Bay site, some charred woody debris is present, indicating past fire. If surrounding habitats are any indication, the deeper soiled parts of the alvar probably will eventually succeed back to woodland. Some deer browse was noted on herbaceous plants. An introduced mustard (*Brassica* sp.) is common in some sections, especially near the road that skirts its southwestern edge. Other weedy species, such as White Sweet Clover, occur in scattered locations, no doubt because of the presence of the public right-of-way and the proximity of the road.

Diversity

Combined, the various alvars in the Cape Hurd – Baptist Harbour area have a remarkable total of 172 vascular plant taxa, 26 of these taxa showing a high fidelity to alvar habitats. Schaefer (1995a-b) found impressive totals of 20 species of algae, 23 species of lichens and 27 species of mosses at the Baptist Harbour and Barney Lake alvars. Overall, the Cape Hurd – Baptist Harbour ANSI supports high ecological diversity. Thirty-five vegetation community types (ecotypes), 441 vascular plant taxa (400 of them native), 12 mammal species, 79 breeding bird species, 8 reptile species, 10 amphibian species and 6 dragonfly taxa have been recorded at the site.

Ecological Functions

The naturally-vegetated habitats of the Cape Hurd – Baptist Harbour ANSI contribute to landscape connectivity in the upper Bruce Peninsula region. The site provides corridor functions for the movement of a variety of organisms, and its position at the northwest tip of the Bruce Peninsula suggests that it is an important staging area for migrating landbirds. Woody vegetation in the site's wetlands and shorelines helps maintain the water quality and natural hydrological regimes of the local watershed. The integrity of Lake Huron coastal and alvar ecosystem functions are currently maintained in the extensive undeveloped portions of the ANSI.

Special Features

The Cape Hurd – Baptist Harbour ANSI sustains alvar habitat for several globally and provincially rare flora and fauna, including the threatened Dwarf Lake Iris, Hill’s Thistle and Massasauga rattlesnake. A total of nine vascular plant taxa considered locally rare or very uncommon (BGPC 2003) also occur on the alvars of the site. Other special features include old-growth stunted White Cedar trees on the coastal alvars.

Occurrences of provincially rare taxa occurring within or along the fringes of alvar habitats at Cape Hurd – Baptist Harbour are described in more detail below.

A Moss	<i>Pseudocalliergon turgescens</i>	G3G5S2
A Moss	<i>Tortella inclinata</i>	G4G5S2
A Lichen	<i>Cacoplaca ammiospilla</i>	G4G5S1
A Lichen	<i>Limprichtia cossonii</i>	G?T?S1
A Lichen	<i>Psora decipiens</i>	G?S2

Two moss and two lichen species considered provincially very rare (NHIC 2006) occur at both the Baptist Harbour and Barney Lake alvars, based on the fieldwork of Schaefer (1995a-b). An additional provincially very rare lichen, *Psora decipiens*, is found at the Baptist Harbour alvar.

Dwarf Lake Iris	<i>Iris lacustris</i>	COSEWIC-THR MNR-THR	G3S3
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The globally rare, nationally threatened and provincially rare Dwarf Lake Iris, was documented by the author at over 20 different locations at Cape Hurd – Baptist Harbour, all of them southeast of Baptist Harbour. Habitats ranged from drier White Cedar coniferous and mixed woodlands, to moist White Cedar coniferous forests, to alvar fringes and alvar ‘curtain’ woodlands, to untrampled sections of lightly-used trails and roads. Populations at the ANSI are estimated to be in the range of 50,000 to 100,000 plants (Jalava 2005b), but as this species usually reproduces vegetatively (Makkay 2004), it is likely that the genetic diversity is relatively low. The bulk of its global population is found near Lake Huron on the Bruce Peninsula and Manitoulin Island. It is also known from approximately 60 sites near Lake Huron and Lake Michigan in Michigan and 15 sites in Wisconsin (Makkay 2004).

Hill’s Thistle	<i>Cirsium hillii</i>	COSEWIC-THR, MNR-THR	G3S3
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At Cape Hurd – Baptist Harbour, the globally rare, and nationally and provincially threatened, Hill’s Thistle was found by the author at three locations in the southeastern part of the ANSI. Each of these populations was small, consisting of 11, 6 and 2 plants, and all occurred near or beneath copses of White Cedar - White Spruce, mainly along the fringes of alvar patches; associated species included Common Juniper, Creeping Juniper, Bearberry, Bristle-stalked Sedge, White Camass and Balsam Ragwort. A larger population consisting of 60 plants was recorded by Schaefer (1995b), and re-inspected by Jalava *et al.* (1997), in alvar savannah and open White Cedar woodland surrounding the Barney Lake alvar grassland.

Ram's-head Lady's-slipper *Cypripedium arietinum* G3S3

The globally and provincially rare Ram's-head Lady's-slipper occurs in low numbers along the fringes of coastal alvar habitats at Cape Hurd – Baptist Harbour. An individual plant was observed by the author during a brief site visit to Baptist Harbour in 1997, and the species was found along the edge of the alvar northeast of Baptist Harbour by Schaefer (1995a). This orchid is uncommon on the Bruce Peninsula, with numbers in individual populations fluctuating substantially from year to year.

Northern Dropseed *Sporobolus heterolepis* G5S2

Northern Dropseed is a provincially rare grass that is more common in western North America. It is characteristic of certain higher quality alvar habitats in Ontario. It is locally common at the near-shore alvar grassland southeast of Baptist Harbour. Associated species include various lichens and mosses, as well as Little Bluestem, Fringed Houstonia, Scirpus-like Sedge, Bristle-leaf Sedge, Wild Savory, Acuminate Panic Grass and Poverty Oat Grass. Schaefer (1995b) estimated 1,000 plants in this population, which was observed as extant by the author during the present study, as well as by Sutherland (2004).

Large White-flowered Ground-cherry *Leucophysalis grandiflora* G3G4S3?

The provincially rare Large White-flowered Ground-cherry was collected by Krotkov in “a clearing near Barney Lake”, perhaps in one of the alvar patches, in 1936 (Kaiser 1992). The specimen is housed at the University of Toronto / Royal Ontario Museum herbarium (TRT accession number 347000). As no subsequent observations have been made, this species should be considered rare or extirpated at the ANSI. It is also considered rare on the Bruce Peninsula (BGPC 2003).

Provancher's Philadelphia Fleabane *Erigeron philadelphicus* ssp. *provancheri* G5T2?SU is currently not ranked by NHIC (2006) because of uncertainty regarding its taxonomic validity. It is undoubtedly rare in Ontario, with its population limited to the Lake Huron bedrock shorelines of the Bruce Peninsula and Tobermory Islands. Schaefer (1995a) reports it from the Baptist Harbour alvar and it was found by Jalava (2005) on exposed bedrock shoreline habitats adjacent to some of the Baptist Harbour alvar patches.

Also of interest are provincially rare hybrid taxa found at the site by previous researchers. One was a probable specimen of the hybrid sedge, *Carex* cf. *X subviridula* (= *C. viridula* X *C. flava*) (S2) found by Schaefer (1995b) during her surveys of the Barney Lake alvar (Schaefer 1995b). The other is a hybrid goldenrod, **Krotkov's Goldenrod** (*Solidago* X *krotkovii* = *S. ptarmicoides* X *S. ohioensis*) (S1) also found by C. Schaefer during her surveys of the alvars on the southeast side of Baptist Harbour (Schaefer 1995a).

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3S3
(Eastern) Massasauga rattlesnakes are periodically encountered at Cape Hurd - Baptist Harbour and undoubtedly occur on the alvars there. NHIC (2006) contains several recent records for the area, and the snake is reported by local landowners (Schaefer 1995a-b). This is a characteristic species of the upper Bruce Peninsula and eastern Georgian Bay coast in Ontario, among the last major strongholds of this globally rare and provincially threatened taxon. It is likely that the large natural areas of the upper Bruce sustain viable

populations. Massasaugas require a habitat mosaic that includes wetlands such as fens, as well as drier upland forests and barrens to complete their life cycle.

Provincially rare species reported from habitats adjacent to the alvars:

Queen Snake *Regina septemvittata* COSEWIC-THR, MNR-THR G5S2
A detailed report of a Queen Snake seen on June 15, 2003 near the Lake Huron shoreline just northeast of Baptist Harbour was received in 2003 (Gibson 2003). The snake was observed by three people, one of them familiar with the species where it is more common in Ohio. The shallow Lake Huron waters adjacent to where the snake was found usually have an abundance of crayfish shells, and recently-moulted crayfish are the preferred food item for this very rare species in Ontario. The area was searched several subsequent times by the author and other individuals with unsuccessful results. There are at least two historic records of Queen Snake for the northwestern Bruce Peninsula, one of them a collected specimen in 1927 from the Scugog Lake area at Johnston's Harbour, and the other from Spring Creek in Lindsay Township prior to 1977. Queen Snakes are highly secretive, semi-aquatic, and difficult to survey. Nevertheless, the paucity of records for the Bruce suggests that the local population is small. The Bruce Peninsula occurrences are disjunct by hundreds of kilometres from other small populations in southwestern Ontario, and are also the northernmost records of this species in the world.

Conclusions and Recommendations

Evaluation and Significance

The Cape Hurd – Baptist Harbour area contains one of the most significant concentrations of high-quality alvar habitats on the Bruce Peninsula. The diverse of alvar communities sustain substantial populations of several globally and provincially rare species and ancient White Cedar trees.

Threats

Jalava (2005) identifies the major threat to the natural heritage values and ecological processes of the Cape Hurd – Baptist Harbour area as being cottage and residential development, and the associated road and driveway construction, clearing of native vegetation and introduction of non-native plant species and domestic pets. Some alvar habitat along Baptist Harbour has already been lost to cottage development, and additional subdivided lots are currently being sold in the area. Snowmobiles are likely used in some alvar areas and Schaefer (1995a-b) observed young trees with their leaders broken off.

At the Baptist Harbour alvar stunted, ancient cedar and tamarack trees have been targeted by bonsai collectors (Schaefer 1995a, Brownell and Riley 2000). No fewer than six excavation sites were observed by Schaefer (1995a). However, in 2003 the culprits engaging in this activity were reported by vigilant neighbours, and were apprehended by enforcement officials, duly charged, and brought to justice.

Management

It is recommended that the private stewards and managers of non-government conservation agencies with land holdings in the Cape Hurd – Baptist Harbour area continue to maintain the generally high ecological integrity of the alvars, and associated shorelines, wetlands and forest communities through appropriate land use planning, passive management and reduction of detrimental impacts (such as off-road vehicle use).

Land use planning and building permits should ensure that the ecological functions and natural heritage values of the ANSI are not negatively impacted by development. Further fragmentation of the alvars through subdivision of lots, clearing of driveways and construction of buildings will reduce ecological connectivity and increase the potential for invasion by introduced species. Infilling during the construction of roads, buildings and septic beds has potential hydrological impacts and may also result in the introduction of invasive introduced plants. For development activities not directly addressed through zoning, education and outreach with landowners is often the best approach.

Use of trails by all-terrain and off-road vehicles in ecologically sensitive alvar habitats should be discouraged. Landowners are encouraged to continue their vigilance in watching out for and reporting inappropriate activities within the ANSI, including trespassing, illegal camping, littering, and bonsai and orchid collecting. The ongoing activities of non-government and government agencies to secure the most significant and ecologically sensitive tracts for conservation purposes (through easements or acquisition) are encouraged. Exemplary private land stewards should be recognized through presentation of stewardship awards and other creative means.

Future Research and Inventory Needs

1. Invertebrate surveys and other alvar fauna.
2. Monitoring of rare species populations, habitat quality and potential threats.

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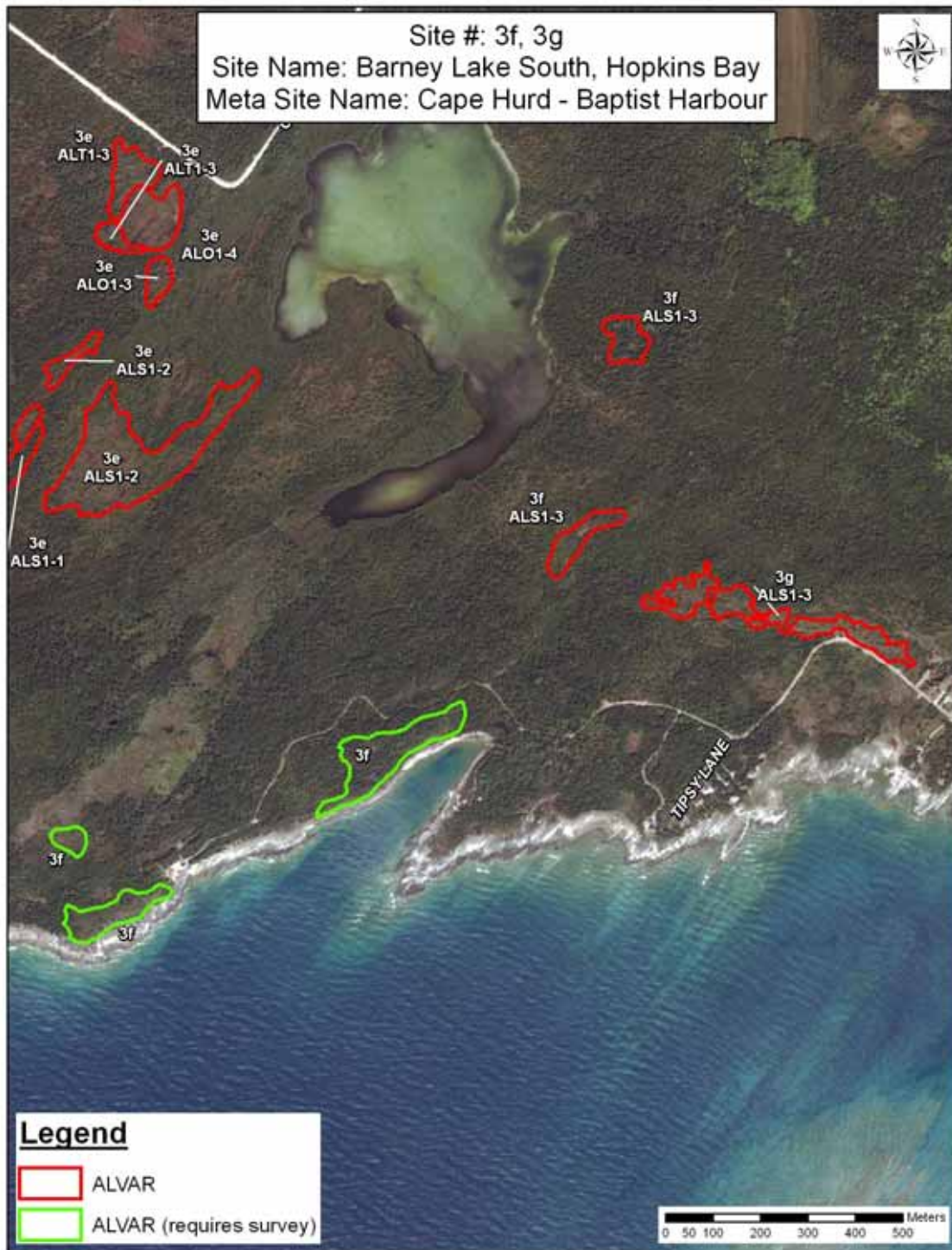
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Vascular Plants of the Cape Hurd – Baptist Harbour Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	3a ALOI-3	3b ALSI-2	3b ALTI-4	3c ALOI-1	3c ALOI-3	3c ALSI-2	3d ALSI-2	3e	3f ALSI-3	3g ALSI-1
<i>Selaginella eclipses</i> Buck	Buck's Meadow Spike-moss	G4	S4			X	3		X									
<i>Selaginella selaginoides</i> (L.) P. Beauv. ex	Northern Spike-moss	G5	S4			X	3		X									
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	G5	S5			X	5		X									
<i>Equisetum variegatum</i> Schleicher ex Weber	Variegated Scouring-rush	G5	S5			X	5		X									
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5T	S5			X	16				X						X	X
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33									X	X	
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33					X	X		X			
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33				X	X	X		X	X	X	X
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34		X		X				X	X		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X	X	X	X	X	X	X		X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X		X	X	X	X	X	X	X	X
<i>Anemone multifida</i> Poiret ex Lam. var. <i>multifida</i>	Cut-leaved Anemone	G5	S5			VU	130	M							X			
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X		X	X	X	X		X	X	X
<i>Ranunculus acris</i> L.	Common Buttercup	G5	SE5			XI	130									X		
<i>Ranunculus recurvatus</i>	Hooked Buttercup	G5	S5			X	130									X		
<i>Thalictrum pubescens</i> Pursh	Tall Meadow-rue	G5	S5			X	130					X						
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160		X									
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165					X	X			X		X
<i>Arenaria serpyllifolia</i> L.	Thyme-leaved Sandwort	G?	SE5			XI	178				X	X						
<i>Cerastium arvense</i> L. ssp. <i>strictum</i>	Field Chickweed	G5T?	S4			X	178									X		
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X		X	X	X					
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X			X	X	X	X	X		
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200								X	X		X
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218		X			X				X		
<i>Populus balsamifera</i> L.	Balsam Poplar	G5	S5			X	234								X			
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234										X	X
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234		X			X	X			X		
<i>Salix discolor</i> Muhlenb.	Pussy Willow	G5	S5			X	234									X		
<i>Salix exigua</i>	Sandbar Willow	G5	S5			X	234		X									

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	3a ALOI-3	3b ALSI-2	3b ALTI-4	3c ALOI-1	3c ALOI-3	3c ALSI-2	3d ALSI-2	3e	3f ALSI-3	3g ALSI-1
<i>Salix humilis</i> Marshall	Upland Willow	G5	S5			X	234									X		
<i>Salix serissima</i> (L. Bailey) Fern.	Autumn Willow	G4	S5			X	234											X
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M						X			X	
<i>Arabis lyrata</i> L. var. <i>lyrata</i>	Lyre-leaved Rock-cress		S4			X	237		X		X	X						
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247				X	X	X			X	X	X
<i>Chimaphila umbellata</i>	Pipsissewa	G5	S5			X	247				X							
<i>Vaccinium myrtilloides</i>	Velvet-leaf Blueberry	G5	S5			X	247		X									
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258		X			X	X					
<i>Ribes hirtellum</i> Michaux	Swamp Gooseberry	G5	S5			X	269					X						
<i>Parnassia glauca</i> Raf.	Grass-of-Parnassus	G5	S5			X	276		X									
<i>Amelanchier</i> sp.	Tall Juneberry					X	277										X	
<i>Fragaria vesca</i> L. ssp. <i>americana</i>	Woodland Strawberry	G5T?	S5			X	277				X				X	X		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277								X	X		X
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X			X				X		
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277		X				X					
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X	X	X	X	X	X	X		X
<i>Potentilla norvegica</i> L.	Rough Cinquefoil	G5	S5			XI	277						X					
<i>Prunus pensylvanica</i> L.f.	Pin Cherry	G5	S5			X	277										X	
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X			X	X		X			
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277						X		X	X		
<i>Rosa palustris</i>	Swamp Rose	G5	S5			X	277					X						
<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i>	Wild Red Raspberry	G5	S5			X	277					X						
<i>Melilotus alba</i> Medicus	White Sweet-clover	G?	SE5			XI	285											X
<i>Trifolium pratense</i> L.	Red Clover	G?	SE5			XI	285									X		
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286				X					X		X
<i>Proserpinaca palustris</i> L.	Mermaid-weed	G5	S4			X	289		X									
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301		X									
<i>Oenothera biennis</i> L.	Hairy Yellow Evening-primrose	G5	S5			X	301					X	X					
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307						X			X		X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X							X		X
<i>Geocaulon lividum</i> (Richardson) Fern.	Toadflax	G5	S5			X	313							X				X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338		X			X	X					
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	G5	S5			X	350										X	
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X		X	X	X			X		

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<i>Geranium bicknellii</i> Britton	Bicknell's Crane's-bill	G5	S4			VU	369								X			
<i>Cicuta bulbifera</i>	Bulbous Water-hemlock	G5	S5			X	374		X									
<i>Daucus carota</i> L.	Wild Carrot	G?	SE5			XI	374									X		X
<i>Gentianopsis virgata</i> (Raf.) Holub	Narrow-leaved Fringed Gentian	G5	S4			X	376		X									
<i>Asclepias incarnata</i> L. ssp. <i>incarnata</i>	Swamp Milkweed	G5T5	S5			X	379					X	X					
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X		X	X	X		X	X		
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X							X		
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392					X			X	X		X
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H			X							
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E				X		X				
<i>Plantago lanceolata</i> L.	English Plantain	G5	SE5			XI	396									X		
<i>Fraxinus pennsylvanica</i> Marshall	Red/Green Ash	G5	S5			X	398					X	X					
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S5			X	399		X				X					
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X	X		X	X			X		
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S5			X	399									X		X
<i>Pinguicula vulgaris</i> L.	Butterwort	G5	S5			X	408		X									
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411					X	X	X	X		X	X
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411		X			X						
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411									X		
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X		X	X	X	X	X	X		X
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X			X	X		X			
<i>Lonicera oblongifolia</i> (Goldie) Hooker	Swamp Fly-honeysuckle	G4	S5			X	418		X									
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			C	423								X	X		
<i>Artemisia campestris</i> L. ssp. <i>caudata</i>	Sagewort Wormwood	G5T4	S4S5	S	S	X	423		X		X	X	X					
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X		X	X		X	X		X
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423								X	X		X
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	T	T	X	423	H								X		
<i>Doelleringia umbellata</i>	Flat-topped Aster	G5	S5			X	423								X			
<i>Erigeron philadelphicus</i> L. ssp. <i>provancheri</i>	Provancher's Philadelphia Fleabane	G5T1 T2	SU			X	423		X									
<i>Eupatorium perfoliatum</i> L.	Boneset	G5	S5			X	423		X			X	X					
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423						X				X	
<i>Hieracium piloselloides</i> Villars	King Devil Hawkweed	G?	SE5			XI	423									X		

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	3a ALOI-3	3b ALSI-2	3b ALTI-4	3c ALOI-1	3c ALOI-3	3c ALSI-2	3d ALSI-2	3e	3f ALSI-3	3g ALSI-1
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X			X	X					
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X	X	X	X	X	X	X		X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423								X			
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423			X				X				X
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X			X	X			X		
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423		X			X	X					
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X			X	X	X	X	X		X
<i>Solidago simplex</i> Kunth ssp. <i>simplex</i> var. <i>simplex</i>	Goldenrod	G5T5	S4			R	423	Mt?								X		
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X			X	X	X				X
<i>Solidago x krotkovii</i> B. Boivin	(<i>S. ohioensis</i> X <i>S. ptarmicoides</i>)	HYB	S1			X	423		X									
<i>Symphotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicked Aster	G5	S5			X	423					X						X
<i>Triglochin maritimum</i> L.	Arrow-grass	G5	S5			X	430		X									
<i>Juncus alpinoarticulatus</i> Chaix	Alpine Rush	G5	S5			X	455									X		
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455									X		
<i>Juncus nodosus</i> L. var. <i>nodosus</i>	Knotted Rush	GT	S5			X	455					X				X		
<i>Carex aurea</i> Nutt.	Golden-fruit Sedge	G5	S5			X	457							X	X			
<i>Carex bebbii</i> (L. Bailey) Olney ex Fern.	Bebb's Sedge	G5	S5			X	457									X		
<i>Carex buxbaumii</i> Wahl.	Brown Bog Sedge	G5	S5			X	457									X		
<i>Carex capillaris</i> L.	Hair-like Sedge	G5	S5			X	457									X		
<i>Carex castanea</i>	Chestnut Sedge	G5	S5			X	457									X		
<i>Carex cf. pseudocyperus</i>	Cyperus-like Sedge	G5	S5			X	457									X		
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X					X	X			
<i>Carex cryptolepis</i> Mackenzie	Northeastern Sedge	G4	S5			X	457					X						
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X				X	X	X	X	X
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457			X				X				
<i>Carex garberi</i> Fern.	Elk Sedge	G4	S4			X	457									X		
<i>Carex gracillima</i> Schwein.	Graceful Sedge	G5	S5			X	457							X				
<i>Carex granularis</i> Muhlenb. ex Willd.	Meadow Sedge	G5	S5			X	457									X		
<i>Carex hystericina</i> Muhlenb. ex Willd.	Porcupine Sedge	G5	S5			X	457									X		
<i>Carex interior</i> L. Bailey	Inland Sedge	G5	S5			X	457									X		
<i>Carex lasiocarpa</i> Ehrh.	Hairy-fruited Sedge	G5	S5			X	457		X			X						
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X		X	X	X	X		X		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	3a ALOI-3	3b ALSI-2	3b ALTI-4	3c ALOI-1	3c ALOI-3	3c ALSI-2	3d ALSI-2	3e	3f ALSI-3	3g ALSI-1
<i>Carex scirpoidea</i> Michx. ssp. convoluta	Scirpus-like Sedge	G5	S5			X	457	H	X		X	X	X	X		X		
<i>Carex umbellata</i> Schkuhr ex Willd.	Umbellate Sedge	G5	S5			R	457									X		
<i>Carex viridula</i> Michaux ssp. viridula	Greenish Sedge	G5?T?	S5			X	457		X	X		X	X			X		
<i>Carex x subviridula</i> (Kuk.) Fern.	(C. flava X C. viridula)	HYB	S2			R	457									X		
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X		X	X	X					
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E	X	X						X		
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	G5	S5			X	457					X			X			
<i>Eleocharis smallii</i> Britton	Small's Spike-rush	G5?	S5			X	457					X						
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457		X			X						
<i>Scirpus cespitosus</i> L. ssp. cespitosus	Deer-grass	G5T	S5			X	457		X			X	X					
<i>Agrostis gigantea</i>	Redtop	G5	S5			X	458									X		
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458			X		X	X	X		X		
<i>Agrostis stolonifera</i> L.	Creeping Bent Grass	G5	S5			X	458		X									
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv.	Canada Blue-joint	G5	S5			X	458		X			X	X					
<i>Calamagrostis stricta</i> (Timm) Koeler	Northern Reed Grass	G5T5	S5			X	458		X									
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X			X	X		X	X	X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X			X	X	X		X		
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458					X	X			X		X
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M	X									
<i>Oryzopsis pungens</i>	Sharp-leaved Mountain-rice	G5	S5			VU	458				X							
<i>Panicum acuminatum</i> Ell. var. fasciculatum	Hairy Panic Grass	G5T5	S5			X	458		X			X	X	X	X	X		
<i>Panicum flexile</i> (Gattinger) Scribner	Wiry Witch Grass	G4G5	S4			X	458	H					X					
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5T5	S4			X	458					X						
<i>Panicum philadelphicum</i> Bernh. ex Trin.	Philadelphia Witch Grass	G5	S4			O	458	H				X						
<i>Phleum pratense</i> L.	Timothy	G?	SE5			XI	458									X		
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	X		X	X			X		
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X			X	X	X		X		
<i>Spartina pectinata</i> Link	Tall Cord Grass	G5	S4			X	458									X		
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	Prairie Dropseed	G5	S3			X	458	E	X									

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	3a ALOI-3	3b ALSI-2	3b ALTI-4	3c ALOI-1	3c ALOI-3	3c ALSI-2	3d ALSI-2	3e	3f ALSI-3	3g ALSI-1
<i>Sporobolus neglectus</i> Nash	Overlooked Dropseed	G5	S4			X	458					X		X				
<i>Sporobolus vaginiflorus</i>	Ensheathed Dropseed	G5	S4			X	458		X									
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475								X	X		X
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475					X	X	X				
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5T4	S4?			X	475		X			X	X		X			
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475		X		X	X	X		X	X		
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M	X									
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476		X			X	X	X	X	X		
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476									X		
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X	X		X		X		X		
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489				X	X	X		X	X	X	
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489									X		X
<i>Piperia unalascensis</i> (Sprengel) Rydb.	Alaska Rein Orchid	G5	S4			X	489	E?			X							
<i>Platanthera psycodes</i> (L.) Lindley	Small Purple Fringed-orchid	G5	S5			X	489		X									
<i>Spiranthes cernua</i> (L.) Rich.	Nodding Ladies'-tresses	G5	S5			X	489					X						
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	G5	S5			X	489						X		X	X		

Non-Vascular Plants and Algae of the Cape Hurd – Baptist Harbour Alvars

A= algae, B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	3a ALO1-3	3e ALO1-4
A	<i>Gloeocapsa alpina</i>			X	X
A	<i>Nostoc commune</i>			X	<i>Nostoc</i> sp.
A	<i>Trentepohlia annulata</i>	T	T	X	X
B	<i>Bryum pallescens</i>	G5	S4		X
B	<i>Bryum pseudotriquetrum</i>	G5	S5		X
B	<i>Campylium chrysophyllum</i>	G5	S5	X	X
B	<i>Campylium hispidulum</i>	G4G5	S5		X
B	<i>Campylium stellatum</i>	G5	S5	X	X
B	<i>Chilosecyphus minor</i>	T	T	X	
B	<i>Dicranum polysetum</i>	G5	S5		X
B	<i>Distichum capillaceum</i>	G5	S5		X
B	<i>Ditrichum flexicaule</i>	G5	S5	X	X
B	<i>Encalypta procera</i>	G4G5	S5	X	X
B	<i>Fissidens adianthoides</i>	G5	S5		X
B	<i>Fissidens</i> sp.			X	X
B	<i>Gymnostomum aeruginosum</i>	G5	S5	X	
B	<i>Hamatocaulis vernicosus</i>	G5	S5		X
B	<i>Limprichtia cossonii</i>	G?	S2	X	X
B	<i>Myurella julacea</i>	G5	S5	X	X
B	<i>Pohlia nutans</i>	G5	S5		X
B	<i>Preissia quadrata</i>	G5	S5	X	X
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2	X	X
B	<i>Radula complanata</i>	G4?	S4	X	
B	<i>Riccia sorocarpa / Mannia fragrans</i>			X	
B	<i>Schistidium apocarpum</i>	G5	S5	cf.	
B	<i>Schistidium rivulare</i>	G4G4	S5	X	X
B	<i>Thuidium delicatulum</i> var. <i>radicans</i>	G5	S5		X
B	<i>Thuidium recognitum</i>	G5	S5		X
B	<i>Tortella fragilis</i>	G4G5	S4	X	X
B	<i>Tortella inclinata</i>	G4G5	S2	X	X
B	<i>Tortella tortuosa</i>	G5	S5	X	X
L	<i>Acarospora glaucocarpa</i>	G5?	S4?	X	X
L	<i>Candelariella vitellina</i>	G5	S5		X
L	<i>Catapyrenium lachneum</i>	G5	S?	X	X
L	<i>Cladonia chlorophaea</i>	GU	S5	X	X
L	<i>Cladonia cristatella</i>	G5?	S5	X	
L	<i>Cladonia dahliana</i>	G?	S?		X
L	<i>Cladonia pocillum</i>	G4	S4?	X	
L	<i>Cladonia pyxidata</i>	G5	S5		X
L	<i>Cladonia symphycarpa</i>	G3G5	S?	X	X
L	<i>Collema undulatum</i> var. <i>granulosum</i>	G?T?	S1	X	X
L	<i>Dermatocarpon fluviatlie / weberi</i>			X	
L	<i>Imshaugia aleurites</i>	G5	S4?	X	
L	<i>Lecidea</i> sp.				X
L	<i>Peltigera canina</i>	G5	S5?	X	X
L	<i>Physcia adscendens</i>	G5	S5		X
L	<i>Placynthium nigrum</i>	G?	S5?	X	X
L	<i>Protoblastenia rupestris</i>	G?	S5?	X	X
L	<i>Psora decipiens</i>	G?	S1S2	X	
L	<i>Sarcogyne regularis</i>	G?	S5?		X
L	<i>Stereocaulon saxatile</i>	G5	S?		X
L	<i>Thelidium</i> cf. <i>absconditum</i>	T	T	X	X
L	<i>Toninia sedifolia</i>	G?	S?		X
L	<i>Xanthoparmelia somloensis</i>	G5	S5?		X

Site 4. CORISANDE BAY

Bruce County, St. Edmunds Township

NTS Map: 41H/4

NAD83 UTM 17T 456231 4997862

Ownership: Private

Protection: Corisande Bay Provincial Life Science ANSI (100%)

Survey Date (Surveyors): June 1, 2005 (J. Jalava); biological survey was also undertaken in the early 1980s by Johnson (1982)

Total Extent of Alvar: ~14 ha

Alvar Quality Rank: AB

Directions: The Corisande Bay area is reached by taking Johnson's Harbour Road southwest from Highway 6 to Dorcas Bay Road. Follow Dorcas Bay Road west approximately 2 km around a long bend to where Lake Huron becomes visible at the outlet of a small stream. A small alvar patch is near the shoreline here and the larger patches are approximately 0.5 km to the east on the far side of the marl pond, mostly on private land, requiring permission to access.

Site	Inventory Level	Map Source	Alvar Types	Alvar Extent (ha)	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
Corisande Bay	Rvpb	Jalava 2006	4	~14	11	53 (53)	3

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

The Corisande Bay alvars occur within the Corisande Bay ANSI, which is described by Jalava (2006) as an exemplary natural area that includes a shallow marly pond bordered on the north and east by extensive, open coniferous and mixed forests, and on the south and west by a mosaic of fen and forest communities. The diversity of associated habitats include Jack Pine –White Cedar woodlands, shrub fens, rich graminoid fens, White Cedar forests and swamps and patches of alvar in excellent condition.

Alvar Representation

The Corisande Bay site has an interesting, diverse suite of alvar habitats, situated mainly 400 to 800 inland from the Lake Huron shoreline, with one small example adjacent to the Lake Huron shoreline (Jalava 2006). These alvars range from a Tufted Bulrush wet alvar with fen elements, to dry Little Bluestem alvar grassland, to a Jack Pine alvar savannah.

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow

A dry open alvar grassland community, with occasional wet patches that grade into fen, occurs on very shallow soils and open bedrock to the east of the wet alvar-fen mosaic described above. The community has extensive exposed dolostone bedrock and broken dolostone fragments (Figure 1). Drier sections have organic and sandy deposits in

cracks, with some seasonal pooling in depressions. There is some marl in the moist areas. Dry portions have a few White Cedar and Jack Pine trees, and occasional shrub- to sapling-sized White Cedar and White Spruce. The low shrub layer is variable, both in extent and in the dominant species, with Creeping Juniper, Common Juniper, Shrubby Cinquefoil and Bearberry being the most frequent. Some sections have enough shrub cover (>25%) to be classified as alvar shrubland. The herbaceous layer is dominated by Little Bluestem, White Camass, Richardson's Sedge, Bristle-leaf Sedge and Bluets. Areas of exposed bedrock support an extensive community of *Tortella* spp. and other mosses, white foliose lichens, and the rock surface algae, *Gloeocapsa alpina*. A relatively flat moister depression at the northeast end of this grassland is fen-like and is dominated by Tufted Bulrush, with Club-rush and Bird's-eye Primrose also common.



Figure 1. Little Bluestem alvar grassland on broken dolostone at Corisande Bay

ALO1-6

Tufted Bulrush Wet Alvar Grassland

Approximately 500 m inland from the Lake Huron shore, an alvar-fen mosaic occurs on gently undulating glacial striae (Figure 2). The alvar grassland is irregularly drained due to its furrowed topography. The crests of the glacial striae are dry, whereas the marly depressions between them are moist to wet. The substrate grades from dry stony bedrock with very shallow, patchy organic deposits in higher sections, to moist marly muck and deeper organic deposits in depressions, particularly near the shore of a marl pond along the northern edge of the alvar. The crests of the glacial striae are dry, whereas the marly depressions between them are moist to wet.

The community is sparsely treed with White Cedar and occasional Jack Pine and White Spruce. The trees are generally stunted, and many are sapling or tall shrub sized. The low shrub layer is dominated by Shrubby Cinquefoil and Sweet Gale, along with stunted White Cedar and Tamarack. The herb layer is dominated by Tufted Bulrush, which is abundant in the wetter sections, with Bastard Toadflax, Hair-like Beak-rush and Buxbaum's Sedge as associates.



Figure 2. Tufted Bulrush wet alvar grassland at Corisande Bay

ALS1-2 *Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar*
Two small patches of dwarf shrub alvar dominated by Creeping Juniper are found near the outlet of the creek that drains the marl pond at the western edge of the ANSI, one along the Lake Huron shore, and the other just east of Dorcas Bay Road. Another example, which may be a clearing of anthropogenic origin, occurs inland amidst coniferous and mixed forests just west of Johnson's Harbour road near the eastern fringe of the site. All three examples have a well-developed low shrub layer of Creeping Juniper, with the patch near Lake Huron having Shrubby St. John's-wort as a co-dominant. Sand Cherry, Kalm's St. John's-wort and White Cedar seedlings are also common in the example east of Dorcas Bay Road. Trees and saplings are virtually absent in these alvars, although a copse of White Cedar with a few Tamarack is present in the example near Lake Huron, and a few White Spruce are present in the inland patch. The pitted and broken dolostone of the community near Lake Huron has an herb layer dominated by Little Bluestem, Ohio Goldenrod, Wild Savory, Northern Bog Violet and Scirpus-like Sedge along with *Gloeocapsa* algae, crustose lichens and cushion mosses growing on the bare bedrock. The example near Dorcas Bay Road is variably dominated by Acuminate Panic Grass, Wild Savory, Crawe's Sedge, Canada Bluejoint, Ticklegrass

and Tufted Hairgrass. The interior patch has a highly variable herb layer of Scirpus-like Sedge, Bristle-leaf Sedge and Bluets.



Figure 3. White Cedar – Jack Pine treed alvar with Dwarf Lake Iris understory

ALT1-3 White Cedar - Jack Pine Treed Alvar

A coniferous treed alvar (or alvar savannah) (Figure 3) occurs to the northwest of the alvar grassland, and borders the marl pond. The Jack Pine – White Cedar treed alvar community has very shallow, dry to dry-fresh, sandy-organic soil deposits, with frequent dolostone fragments and occasional granitic erratics. It is dominated by Jack Pine and White Cedar trees and saplings. There is a fairly well-developed low shrub layer consisting of Creeping Juniper and stunted White Cedar and White Spruce. The herbaceous layer is extensive and is dominated by Richardson’s Sedge and Dwarf Lake Iris, with Bristle-leaf Sedge also common. Approximately 10-25% of the surface area is exposed bedrock, which is covered in the rock surface algae, *Gloeocapsa*, as well as mosses and crustose lichens. This community has a population of 10,000s of Dwarf Lake Iris, as well as at least 34 Ram’s-head Orchid plants.

Condition

Most areas show no signs of human disturbance, although rarely-used off-road vehicle trail cuts through one section of alvar. Some deer browse on White Cedar trees and saplings was noted. It is probable that some of the alvar patches support ancient White

Cedars. Overall, these alvar communities are in excellent condition and no introduced species have been recorded at them to date.

Diversity

The Corisande Bay site has moderate alvar diversity, with four alvar types and 56 vascular plant species occurring on the alvars. Overall, the ANSI supports a diversity of 32 vegetation community types, providing habitat for at least 314 vascular plant taxa, of which 294 are native to Ontario. Twenty-four mammal species have been recorded at the ANSI. Eighty-two bird species were recorded at the ANSI during the present study, of which 72 showed evidence of breeding. Seven reptile species and four amphibian species have been found within the ANSI boundaries

Ecological Functions

The alvars of the Corisande Bay area occur in an extensive mosaic of naturally-vegetated habitats that contribute to landscape connectivity in the upper Bruce Peninsula region. The site provides corridor functions for the movement of a variety of organisms, and its position along the western shore of the Bruce Peninsula suggests that it provides important habitat for migrating landbirds and shorebirds. Woody vegetation in the site's wetlands and shorelines helps maintain the water quality and natural hydrological regimes of the local watershed. The integrity of the site's woodland, wetland and alvar ecosystem functions are currently being maintained because habitat conversion has to date been restricted to localized areas along the ANSI's western and southern fringes.

Special Features

The Corisande Bay alvars support sizable populations of globally and provincially rare species (Dwarf Lake Iris, Tuberous Indian-plantain and Ram's Head Orchid). Hill's Thistle has been found in several locations in the ANSI (Jalava 2006), but not in the alvar communities themselves. Two vascular plant species considered rare on the Bruce Peninsula (BGPC 2003) also occur on the alvars. Massasauga rattlesnake, Low Nut-rush and several other provincially rare taxa have also been found within the ANSI in habitats near the alvars.

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR, MNR-THR G3S3
Tens of thousands shoots of the globally rare, nationally and provincially threatened Dwarf Lake Iris were found by Jalava (2006) to be dominant in the White Cedar – Jack Pine treed alvar. Approximately 700 shoots were found by Jalava (2006) in the Tufted Bulrush wet alvar grassland. Populations at the ANSI are estimated by the author to be in the range of at least 50,000 to 100,000 plants, but as this species usually reproduces vegetatively (Makkay 2004), it is likely that the genetic diversity is relatively low.

Tuberous Indian-plantain *Arnoglossum plantagineum* COSEWIC-SC MNR-THR
G4S3

Moist depressions within the Little Bluestem open alvar community support a population of hundreds of Tuberous Indian-Plantain (G5G5S3 COSEWIC - Special Concern, OMNR – Special Concern), but the plants were depauperate in 2005 due to drought-like conditions.

Ram's-head Lady's-slipper *Cypripedium arietinum* G3S3

Eight flowering and 26 vegetative plants of the globally and provincially rare Ram's-head Lady's-slipper were found by Jalava (2006) in the White Cedar – Jack Pine treed alvar community (Figure 4) just east of the Corisande Bay marl pond. The total number of plants of this species documented at the ANSI by Jalava (2006) was 128 plants.

Conclusions and Recommendations

Evaluation and Significance

Jalava (2006) confirmed the Corisande Bay area as a provincially significant life science ANSI. The high quality of its alvar communities is significant, despite their relatively small size. The Tufted Bulrush wet alvar grassland is an extremely rare community type, and abundance of Dwarf Lake Iris and Ram's-head Lady's-slipper in the treed alvar is notable. The Corisande Bay area generally has a relatively high concentration of globally and provincially significant vegetation types and species, particularly for an area of its size. At least six provincially rare vegetation community types occur in the ANSI, four of them alvars, along with seven provincially rare plant taxa and three provincially rare fauna. These include the threatened Dwarf Lake Iris, Hill's Thistle and Massasauga rattlesnake, as well as Tuberous Indian-plantain, which is a species of Special Concern. The site also provides habitat for several locally significant flora and fauna, and it overlaps with the Corisande Bay Provincially Significant wetland complex.

Threats

According to Jalava (2006), the vast majority of the key representative features (open and shrub fens, alvars and open coniferous forests) of the Corisande Bay ANSI are undisturbed or very lightly disturbed. Some localized areas, mainly along the ANSI fringes, have been impacted by cottage development, roads, driveways, trails, selective logging and past fire. Introduced species occurrences tend to be very local at the site, limited to areas near roads, trails and cottages, and vast areas of habitat are comprised entirely of native flora, suggesting excellent overall ecological integrity. The ANSI's greatest future threat is further residential development along Dorcas Bay Road. Increased use of the off-road vehicle trail through the Little Bluestem alvar grassland would cause significant localized damage to the community.

Management

Jalava (2006) recommends that the private stewards of the Corisande Bay ANSI, and the public land managers, continue to maintain the generally high ecological integrity of the ANSI's alvars, wetlands and forest communities through appropriate land use planning, passive management and reduction of detrimental impacts. Land use planning and

building permits should ensure that the ecological functions and natural heritage values of the ANSI are not negatively impacted by development. Further fragmentation of the forest communities through subdivision of lots, clearing of driveways and construction of buildings will reduce ecological connectivity, forest interior habitats and corridor functions, and increase edge-effects and potential invasion by introduced species. Infilling during the construction of roads, buildings and septic beds has potential hydrological impacts and may also result in the introduction of invasive introduced plants. For development activities not directly addressed through zoning, education and outreach with landowners is often the best approach. Use of trails by all-terrain and off-road vehicles in ecologically sensitive habitats within public land portions of the ANSI should not be permitted, and private landowners should be educated on the impacts of such activities. Alvars, rock barrens, bedrock shorelines, shallow-soiled woodlands, and all wetland communities are particularly susceptible to erosion, soil compaction, damage to vegetation and hydrological impacts by off-road vehicles. Forestry practices on private lands within the ANSI should be undertaken according to appropriate prescriptions or management plans. Landowners are encouraged to continue their vigilance in watching out for and reporting inappropriate activities within the ANSI, including trespassing, illegal camping and littering and collecting of orchids and other natural heritage features. The continued activities of non-government and government agencies to secure the most sensitive and significant tracts for conservation purposes (through easements or acquisition) are strongly encouraged. Exemplary private land stewards should be recognized through presentation of stewardship awards and other creative means.

Future Inventory Needs

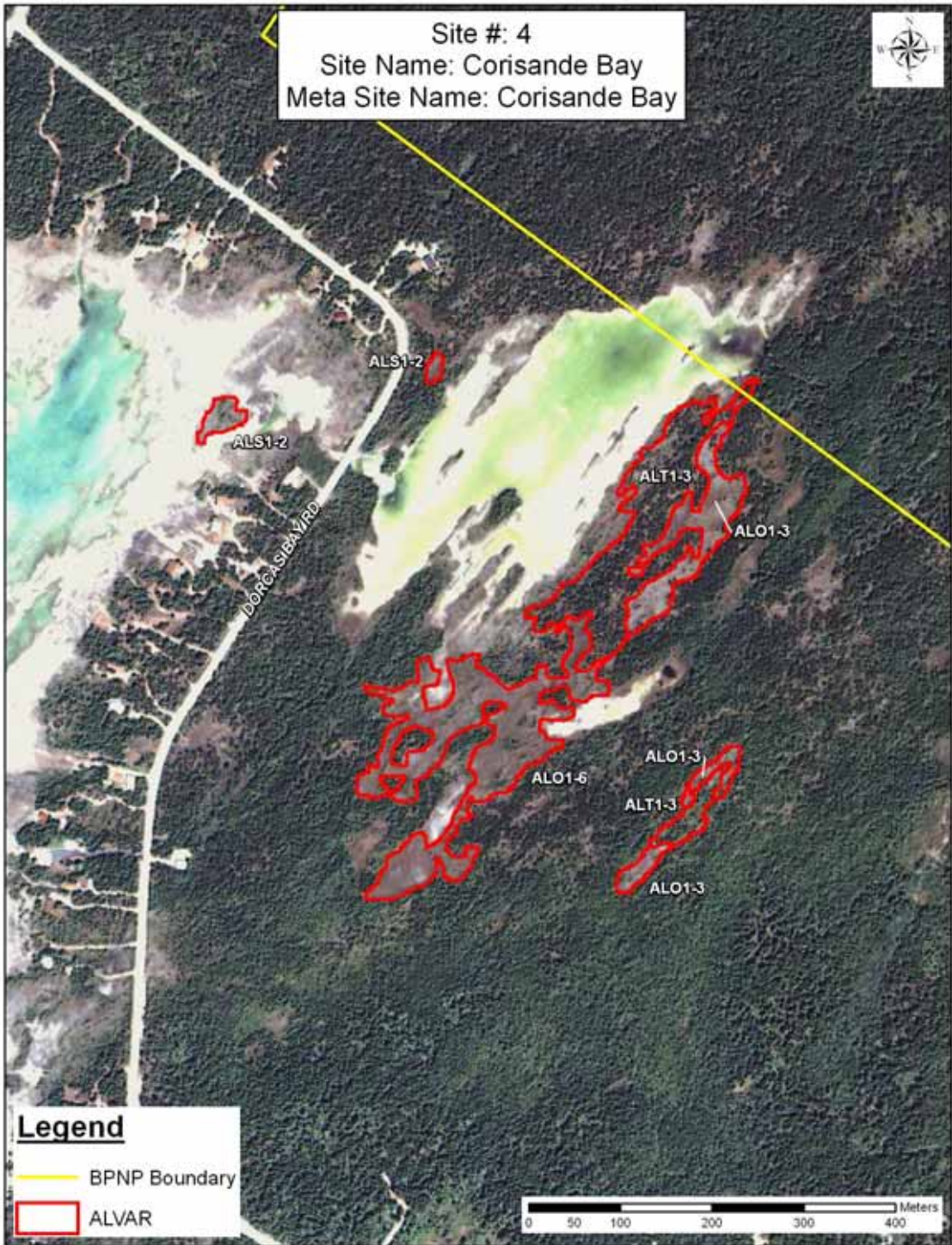
1. Invertebrates and other alvar fauna and non-vascular plants have not been surveyed at Corisande Bay.
2. Monitoring of alvar condition, rare species populations and threats should be undertaken on a regular basis.

References

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Vascular Plants of the Corisande Bay Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	AL01-7	AL01-3	AL11-3
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	X	X
<i>Pinus banksiana</i> Lambert	Jack Pine	G5	S5			X	33		X	X	X
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X		
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X	X
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34			X	
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130			X	
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160		X		
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178			X	
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M		X	
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218		X		
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247			X	X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258		X	X	
<i>Trientalis borealis</i> Raf. ssp. <i>borealis</i>	Starflower	G5T?	S5			X	258				X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X	
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X		
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277			X	
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	X	
<i>Geocaulon lividum</i> (Richardson) Fern.	Toadflax	G5	S5			X	313		X		
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338		X		
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	G5	S5			X	350		X	X	
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X		
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E	X		
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M		X	
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X	X	
<i>Pinguicula vulgaris</i> L.	Butterwort	G5	S5			X	408		X		
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411			X	X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X	X	
<i>Houstonia longifolia</i> Gaertner	Long-leaved Houstonia	G4G5	S4?			X	416			X	
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X		
<i>Lonicera oblongifolia</i> (Goldie) Hooker	Swamp Fly-honeysuckle	G4	S5			X	418			X	
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X	X	
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X		
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X		
<i>Arnoglossum plantagineum</i>	Tuberous Indian-plantain	G5G5	S3	S		X	423			X	
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455		X		
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X	X	X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	X	X
<i>Scirpus cespitosus</i> L. ssp. <i>cespitosus</i>	Deer-grass	G5T	S5			X	457		X	X	
<i>Carex buxbaumii</i> Wahl.	Brown Bog Sedge	G5	S5			X	457		X		
<i>Carex capillaris</i> L.	Hair-like Sedge	G5	S5			X	457		X		
<i>Carex livida</i> (Wahlenb.) Willd.	Livid Sedge	G5	S5			X	457		X		
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457		X		

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	AL01-7	AL01-3	AL11-3
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457			X	X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458			X	
<i>Oryzopsis pungens</i>	Sharp-leaved Mountain-rice	G5	S5			VU	458				X
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475		X	X	
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475		X		
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X	X	
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M	X		X
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476		X		
<i>Cypripedium arietinum</i> R. Br.	Ram's-head Lady's-slipper	G3	S3			X	489		X		X
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X		

Site 5. COVE ISLAND

Bruce County, St. Edmunds Township

NTS Map: 41H/5

NAD83UTM: 17T 441800 5016600

Ownership: Federal

Protection: Fathom Five National Marine Park (100%); Cove Island Provincial Life Science ANSI (100%)

Survey Date (Surveyors): August 22, 2006 (R.A. Jones); all information in Varga (1995) is based on the field work of J.K. Morton and J.M. Venn (Morton and Venn 1987), J. Francis (1985), J. Francis, J. Johnson and I. Macdonald (1983), Bird and Hale (1981), Hunter and Associates (1982), F. Schueler (1992), B. Hutchinson and H. Parsons, Bufo Incorporated (1986), Geomatics International Inc. (1993) and air photo interpretation.

Total Extent of Alvar: 0.3 ha

Alvar Quality Rank: A

Directions: Cove Island, off the northwestern end of the Bruce Peninsula, is reached by boat from Tobermory. Permission to access must be sought from appropriate Parks Canada staff.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
Cove Island	RSvpb	IKONOS and air photo interpretation	2	>15?	>33? (>33?)	~4?

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Cove Island is a 958 ha uninhabited island off the northern tip of the Bruce Peninsula. Much of the island is covered in shallow-soiled coniferous and mixed forests over dolostone bedrock. A variety of wetlands occur, primarily in the sheltered bays of the island, but also on the bedrock plain. Extensive bedrock shorelines occur, with small alvars documented in backshore areas above the high water mark along the western coast.

Alvar Representation

According to Varga (1995), open bedrock and alvars are concentrated on the Cove Island's southwest shore and at the head of Boat Harbour. Drier alvar patches are dominated by Little Bluestem, with scattered Creeping Juniper. Other common species include Upland White Aster, Balsam Ragwort, Rock Sandwort, Wild Savory, Seneca Snakeroot and Indian Paintbrush. A one-day survey of the island's western shore and of the north shore of Bass Lake by Jones (2006) confirmed the Varga (1995) report, and provided more detailed mapping and species data for the alvar communities. The overall area covered by the two alvar types in this area is, however, very small, totaling considerably less than 1 ha.



Figure 1. Extensive bedrock shoreline on the west coast of Cove Island

ALO1-1 Dry Lichen - Moss Open Alvar Pavement Type

Open alvar dominated by algae, lichens and mosses covers a small (0.25) ha area of level to slightly-undulating and somewhat uneven broken rock pavement near the Lake Huron shoreline north of Channel Point on Cove Island. Jones (2006) notes a “pebbly surface texture, cut by longitudinal cracks” as well as broken dolostone fragments. Scattered saplings and stunted trees of White Cedar occur. Sparse Shrubby Cinquefoil and White Cedar seedlings comprise the sparse (2-3%) low shrub cover. Herbs cover about 15% of the bedrock surface area, with Little Bluestem dominant, Gray Goldenrod as a secondary species, and Harebell as an associate. Non-vascular dominants include mosses and a black crustose lichen, while the rock surface algae, *Gloeocapsa alpina*, undoubtedly covers the exposed bedrock (though not noted by R.A. Jones during the 2006 survey). Although only areas above the Lake Huron high water mark have been considered alvar, Jones notes that the community is probably affected by wave and weather related stresses during high water.

ALS1-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar Type

At the (unnamed) point north of Channel Point, a very small Creeping Juniper dominated dwarf shrub alvar was documented by Jones (2006). A few White Cedar saplings are present, while Creeping Juniper covers approximately 45% of the surface area. Bearberry occurs as a low shrub associate. Mosses are very common, covering 45% of the surface area, while lichen squamules are also frequent. The description of rock surface colour suggests that the rock surface algae, *Gloeocapsa alpina*, is present. Jones (2006) notes that much of the remainder of the western shoreline of Cove Island is

probably too exposed and the rock too ridged or sloping to permit conditions necessary for the development of alvar vegetation.

Condition

Cove Island's bedrock shores and small adjacent open alvars are of high quality with no evidence of human disturbance. There is occasional day use of cobble beaches such as those at Tecumseh Cove for diving, and a number of fire pits are evident in the cove. A few minor trails are present, but none in alvar areas. Structures are limited to the lighthouse and building complex at the northeast end of the island, and an abandoned lodge at LaRonde's Harbour. Logging occurred between 1905 to 1910 (Varga 1995). Jones (2006) noted the presence of Canada Goose droppings along the western shore of the island; Canada Geese are known to browse shoreline vegetation and may have negative impacts.

Diversity

Overall, Cove Island supports up to 68 vegetation community types sustaining 394 vascular plant taxa (Varga 1995). Although very small in extent, the two alvar communities at the site are habitat for a high diversity of 113 vascular plant species, 105 of them native (some of the plant species may occur along the ecotone between alvar and bedrock shoreline, and may be dependent on periodic inundation or wave-wash by Lake Huron). A very high total of 22 of these species show a strong affinity to alvar habitats in Ontario.

Ecological Functions

Cove Island entirely contains several small watersheds, 78 ha of open water inland lakes, with 13.7 km of inland lake shores, and 34 km of Great Lakes shoreline. It undoubtedly serves as a refuge for migrating landbirds crossing Lake Huron to and from Manitoulin Island.

Special Features

Of the provincially rare species documented at Cove Island, Provancher's Philadelphia Fleabane, Dwarf Lake Iris and Rand's Goldenrod may occur in the alvar habitats. None of these taxa were documented by Jones (2006) in the alvar patches visited. Also probable on the alvars are four locally rare or very uncommon vascular plant species (BGPC 2003), including Whitlow-cress and Prairie Smoke, the latter being an alvar-restricted species in Ontario that has not been recorded at other Bruce Peninsula alvar sites.

Conclusions and Recommendations

Evaluation and Significance:

Riley *et al.* (1996) confirmed Cove Island and its adjacent islands as a provincial ANSI. Cove Island is the largest of the Tobermory Islands, with high quality Georgian Bay shores, fens and open alvars. It is recommended that visitor use remain at appropriate levels to protect the island's sensitive fen and shoreline communities. Parks Canada should continue its commendable stewardship by maintaining the low visitor levels, prohibition of camping and few trails at the site. [Varga 1995]

Threats:

The quality of this natural area is high, with no evidence noted of significant disturbance and no trails. No on-site or off-site threats have been identified, although there is the possibility of boating visitors causing a fire or leaving litter. Browsing of shoreline vegetation by Canada Geese is a potential impact to be considered in site management.

Management:

Cove Island is an outstanding natural area that should continue to have limited access under management by the Fathom Five National Marine Park. The present study supports the recommendations by past researchers that visitor traffic to the island be maintained at appropriate levels to minimize damage to its sensitive and undisturbed flora and vegetation.

Future Research and Inventory Needs:

1. Invertebrate surveys and other alvar fauna.
2. Monitoring of rare species populations, their habitat quality and potential threats.

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Preliminary List of Vascular Plants of Cove Island Alvars

Legend for "5 Cove Is" column: X = recorded by Jones (2006); U = possibly occurs on alvar
(based on species noted in Cove Island site summary in Varga 1995, without specific habitat information)

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	5 Cove Is
<i>Selaginella eclipses</i> Buck	Buck's Meadow Spike-moss	G4	S4			X	3		U
<i>Selaginella selaginoides</i> (L.) P. Beauv. ex	Northern Spike-moss	G5	S4			X	3		U
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X
<i>Juniperus communis</i> L. var. <i>depressa</i> Pursh	Common Juniper	G5T5	S5			X	34		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X
<i>Thalictrum pubescens</i> Pursh	Tall Meadow-rue	G5	S5			X	130		X
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160		X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X
<i>Polygonum lapathifolium</i> L.	Pale Smartweed	G5	S5			X	179		X
<i>Polygonum pensylvanicum</i> L.	Pinkweed	G5	S5			X	179		X
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE 5			XI	200		X
<i>Populus balsamifera</i> L.	Balsam Poplar	G5T?	S5			X	234		X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	G5	S5			X	234		X
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234		X
<i>Salix lucida</i> Muhlenb.	Shining Willow	G5	S5			X	234		X
<i>Arabis divaricarpa</i> Nels.	Divaricate Rock-cress	G5	S5			X	237		U
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M	X
<i>Draba cana</i>	Whitlow-grass, Hoary Draba	G5	S4			R	237		U
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258		U
<i>Parnassia glauca</i> Raf.	Grass-of-Parnassus	G5	S5			X	276		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X
<i>Geum triflorum</i> Pursh var. <i>triflorum</i>	Prairie Smoke	G4G5 T?	S4			R	277	E	U
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277		X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X
<i>Prunus pensylvanica</i> L.f.	Pin Cherry	G5	S5			X	277		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	5 Cove Is
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S 5			X	277	Mt?	X
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277		X
<i>Proserpinaca palustris</i> L.	Mermaid-weed	G5	S4			X	289		X
<i>Epilobium parviflorum</i> Schreber	Small-flowered Willow-herb	G?	SE 4			XI	301		X
<i>Oenothera biennis</i> L.	Hairy Yellow Evening-primrose	G5	S5			X	301		X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338		X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X
<i>Geranium bicknellii</i> Britton	Bicknell's Crane's-bill	G5	S4			VU	369		U
<i>Geranium robertianum</i> L.	Herb Robert	G5	SE 5			XI	369		X
<i>Impatiens capensis</i> Meerb.	Spotted Jewelweed	G5	S5			X	372		X
<i>Cicuta bulbifera</i>	Bulbous Water-hemlock	G5	S5			X	374		X
<i>Gentianopsis virgata</i> (Raf.) Holub	Narrow-leaved Fringed Gentian	G5	S4			X	376		X
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379		X
<i>Solanum dulcamara</i> L.	Climbing Nightshade	G?	SE 5			XI	382		X
<i>Calystegia sepium</i> (L.) R. Br.	Hedge Bindweed	G5	S5			X	383		X
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S 5			X	392	M	X
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X
<i>Mentha arvensis</i> L. ssp. <i>borealis</i>	Field Mint	G5	S5			X	392		X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H	X
<i>Fraxinus pennsylvanica</i> Marshall	Red/Green Ash	G5	S5			X	398		X
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S 5			X	399		X
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S 5			X	399		X
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE 5			XI	399		X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411		X
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	G5	S5			X	423		X
<i>Aster pilosus</i> Willd. var.	Pringle's Aster	G4G5	S4			X	423	M	X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	5 Cove Is
<i>pringlei</i>									
<i>Bidens tripartitus</i> L.	Beggarticks	G5	S5			X	423		X
<i>Cirsium vulgare</i> (Savi) Tenore	Bull Thistle	G5	SE5			XI	423		X
<i>Erigeron philadelphicus</i> L. ssp. <i>philadelphicus</i>	Philadelphia Fleabane	G5T?	S5			X	423		X
<i>Erigeron philadelphicus</i> L. ssp. <i>provancheri</i>	Provancher's Philadelphia Fleabane	G5T1 T2	SU			X	423		U
<i>Eupatorium perfoliatum</i> L.	Boneset	G5	S5			X	423		X
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	Grass-leaved Goldenrod	G5	S5			X	423		X
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	V
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423		X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X
<i>Solidago simplex</i> Kunth ssp. <i>randii</i>	Rand's Goldenrod	G5T5?	S3			R	423	M	U
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X
<i>Sonchus oleraceus</i> L.	Annual Sow-thistle	G?	S5			XI	423		X
<i>Symphyotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicked Aster	G5	S5			X	423		X
<i>Tussilago farfara</i> L.	Coltsfoot	G5	SE5			XI	423		X
<i>Triglochin palustre</i>	Marsh Arrow-grass	G5	S4			X	430		X
<i>Juncus brachycephalus</i> (Engelm.) Buchenau	Short-headed Rush	G5	S4S5			X	455		X
<i>Juncus nodosus</i> L. var. <i>nodosus</i>	Knotted Rush	GT	S5			X	455		X
<i>Carex aquatilis</i> Wahlenb.	Water Sedge	G5	S5			X	457		X
<i>Carex hystericina</i> Muhlenb. ex Willd.	Porcupine Sedge	G5	S5			X	457		X
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457		X
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E	X
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457		X
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X
<i>Bromus kalmii</i> A. Gray	Kalm's Brome	G5	S4			R	458	M	X
<i>Calamagrostis canadensis</i>	Canada Blue-joint	G5	S5			X	458		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	5 Cove Is
<i>(Michaux) P. Beauv</i>									
<i>Deschampsia caespitosa (L.) P. Beauv.</i>	Tufted Hair Grass	G5	S5			X	458	H	X
<i>Elymus trachycaulus (Link) Gould in Shinn.</i>	Slender Wheat Grass	G5	S5			X	458		X
<i>Glyceria striata</i>	Fowl Manna Grass	G5	S5			X	458		X
<i>Muhlenbergia glomerata (Willd.) Trin.</i>	Marsh Wild-timothy	G5	S5			X	458	M	X
<i>Panicum acuminatum Ell. var. fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Phalaris arundinacea</i>	Reed Canary Grass	G5	S5			X	458		X
<i>Schizachyrium scoparium (Michaux) Nees</i>	Little Bluestem	G5	S4			X	458		X
<i>Lilium philadelphicum L.</i>	Wood Lily	G5	S5			X	475		X
<i>Tofieldia glutinosa (Michaux) Pers. ssp.</i>	False Asphodel	G5T4	S4?			X	475		X
<i>Zigadenus elegans Pursh ssp. glaucus</i>	White Camass	G5T4 ?	S4			X	475		X
<i>Iris lacustris Nutt.</i>	Dwarf Lake Iris	G3	S3	T	T	X	476	M	U
<i>Iris versicolor L.</i>	Wild Blue-flag	G5	S5			X	476		X
<i>Sisyrinchium mucronatum Michaux</i>	Blue-eyed Grass	G5	S4S 5			X	476		X
<i>Piperia unalascensis (Sprengel) Rydb.</i>	Alaska Rein Orchid	G5	S4			X	489	E?	U
<i>Platanthera psychodes (L.) Lindley</i>	Small Purple Fringed-orchid	G5	S5			X	489		X
<i>Spiranthes cernua (L.) Rich.</i>	Nodding Ladies'-tresses	G5	S5			X	489		X

Meta-site 6. DORCAS BAY – PENDALL LAKE

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)
 NTS Map: 41H/4
 NAD83 UTM 17T 453250 5003800 to 454600 5004900 (site 6a), 452750 5003800 (site 6b)
 Ownership: Federal
 Protection: Bruce Peninsula National Park (100%); Dorcas Bay ANSI (100%)
 Survey Dates (Surveyors): August 10, 2004 (J. Jalava); August 10, 1995 (C. Schaefer)
 Total Extent of Alvar: 15.5 ha
 Overall Alvar Quality Rank: A

Directions: The Dorcas Bay alvars are best accessed from the trail leading north from the Singing Sands parking lot off Dorcas Bay Road a few km southwest of Highway 6. One alvar patch is found at the end of the trail that follows the north shore of Dorcas Bay; an interpretive sign highlighting alvar features is present at the end of this trail. Other alvar patches are located to the north in areas closed to public access (use air photos to locate). The Pendall Lake alvar is reached by taking Warner Bay Road southwest from Highway 6 (just south of Tobermory) to the T-intersection. Turn left and follow the road to its dead end near Pendall Point. Use air photos to find the alvar just north of the dead end.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Total Vascular Plant Taxa (native)	NHIC-Tracked Species
6a. Dorcas Bay	Dvp	Jalava 2004	6	17	92	3
6b. Pendall Lake	Dvpm	Schaefer 1996 (IACI)	2	13	50	3
Meta-site totals			8	18	106 (100)	5

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Several patches of alvar are found north of Dorcas Bay. Two examples are close to the Lake Huron shore and occur in a mosaic with fen communities. Other alvar patches further inland are found on bedrock exposures in an extensive landscape dominated by White Cedar bedrock woodlands. Other nearby natural communities include a small forested dune system, extensive fens and vast sand beaches at the base of Dorcas Bay.

Alvar Representation

The area north of Dorcas Bay within Bruce Peninsula National Park (formerly owned by the Federation of Ontario Naturalists) sustains several high quality alvar communities, including alvar pavement, alvar shrubland, treed alvar and an alvar grassland – fen complex (Jalava 2004). The Dorcas Bay – Pendall Lake area alvars have populations of Dwarf Lake Iris, Tuberos Indian-plantain, Low Nut-rush, Northern Dropseed and Purple-stemmed Cliffbrake. Also of interest are locally rare prairie-associated species such as Big Bluestem. Adjacent sandy woodlands and trail fringes sustain a significant

population of Hill's Thistle, as well as populations of Dwarf Lake Iris. At Pendall Lake, the species-rich and unusually wet alvar grassland also has fen characteristics, but the lack of a soil layer of any significance and the large amount of exposed bedrock distinguish it as an alvar (Schaefer 1996, Brownell and Riley 2000).

ALO1-1 Dry Lichen – Moss Open Alvar Pavement

Patches of alvar pavement dominated by rock-surface algae (20%), cushion and turf mosses (10-20%), microbial mats (5-15%), crustose lichens (2-10%) and foliose lichens (2-5%) is found near the Dorcas Bay shore above the high water mark, next to the alvar-fen complex, and at locations inland north of Dorcas Bay (Figure 1). Scattered White Cedar and Jack Pine trees and saplings are present, as is a sparse low shrub layer of Creeping Juniper. Herb cover varies from 10-20%, with Little Bluestem, Crawe's Sedge and Hair-like Beak-rush dominating patchily, and with Tufted Hairgrass and Calamint as secondary species.



Figure 1. Extensive alvar pavement at Dorcas Bay.

ALO1-2 Dry Annual Open Alvar Pavement

A 1 ha patch of alvar pavement dominated by various graminoid species occurs inland north of Dorcas Bay. Dominants are very patchy, depending on microtopography. The community shows evidence of past fire in the form of charred wood, and a few weeds are present, mostly along the now-closed FON nature trail. The community is generally very dry, with seasonal pooling in depressions, which have shallow black organic soil deposits (Jalava 2004). Sparsely scattered White Cedar and Jack Pine trees, saplings and tall shrubs are present (1-3% cover overall). Low shrubs occur patchily (3-15% cover), with

mats of Creeping Juniper and clumps of Common Juniper predominating. The most common species in the patchy and variable herb layer are Tufted Hair-grass and Witch Grass, with Crowe's Sedge and Poverty Oat Grass as secondary species. Non-vascular taxa are abundant, with cushion and turf mosses (covering 25-40% of the bedrock), rock surface algae and microbial crust (10-15% cover), foliose lichens (5-10% cover) and crustose lichens (2-5% cover).

ALO1-3 Dry-fresh Little Bluestem (/Northern Dropseed) Open Alvar

An unusual and interesting 2 ha open alvar community is found near the Dorcas Bay shore at the end of the trail leading to the interpretive "alvar" sign west from Singing Sands. The dolostone bedrock is characterized by long, linear, shallow furrows. Dryland alvar and prairie species occur on the crests of these glacial striae, while fen and wet alvar species are established in the grooves (Figure 2). Substrate moisture conditions are highly variable and dependent on microtopography. As are the soils, with shallow patches of black organic soil found on the dry ridges and marly muck occurring in the fen-like depressions (Jalava 2004). As a result, this community might best be described as mosaic between alvar types ALO1-3 and ALO1-6 (described below). White Cedar and Jack Pine trees and saplings occur patchily, with overall cover being approximately 2-8%. Some of the White Cedar's appear to be ancient. The most common species in the sparse low shrub layer are Kalm's St. John's-wort, Shrubby Cinquefoil and Creeping Juniper. Herbaceous dominants are highly variable, depending on microhabitat moisture levels, with Tufted Hairgrass, Northern Dropseed and, in fen-like sections, Tufted Bulrush dominating. Other common herbaceous species include Crowe's Sedge, Scirpus-like Sedge, Calamint, Upland White Goldenrod, Balsam Ragwort, Harebell and Canada Blue Grass. Non-vascular plants are common on exposed rock, with microbial crust, *Gloeocapsa* and *Nostoc* algae, cushion and turf mosses, and foliose lichens all present. The provincially rare Tuberous Indian-plantain is very common in this community, and this is one of the few alvars on the Bruce Peninsula in which the prairie grass, Big Bluestem, is present.

ALO1-6 Moist - Wet Tufted Bulrush Alvar Grassland

Brownell and Riley (2000) state that "on the east side of Pendall Lake, a very rich and possibly unique, wet mesic alvar grassland is found. [Tufted Bulrush] (30-45% cover) and [Little Bluestem] (5%) dominate. Unusual associates include [Low Nutrush, Hair-like Beak-rush, Tuberous Indian-plantain, Narrow-leaved Fringed-gentian, Grass of Parnassus and False Asphodel]. The herbaceous layer varies from 40-60% cover. Saplings of White Cedar are scattered throughout. [Shrubby Cinquefoil] ranges from 1-5% cover and [Creeping Juniper varies from 2-20% cover. Small groves of Jack Pine, White Cedar and Tamarack exist. Some ancient cedars occur. Exposed rock varies from 20-40%, with some sections approaching pavement in character." The same community is described by Schaefer (1996) as particularly interesting for its mix of fen - prairie - shoreline - associated species, as well as common "alvar species". The herbaceous dominants are Northern Dropseed and Tufted Bulrush (49 and 44% cover, respectively), Crowe's Sedge, Scirpus-like Sedge (9%), and Little Bluestem (44%). Creeping Juniper is prevalent at 52% rooted frequency.



Figure 2. Undulating glacial striae with dry alvar grassland ridges and fen-like depressions at Dorcas Bay.

ALS1-1 Common Juniper Shrub Alvar

ALS1-2 Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar

Patches of alvar shrubland dominated by Common Juniper and/or Creeping Juniper cover almost 10 ha in the interior alvar areas north of Dorcas Bay (Figure 3). The shrublands occur in mosaics with smaller patches of gently-undulating, southwest-sloping non-vascular alvar pavement. In some areas the rock surface is quite smooth, while in others crevices are quite common. These alvars show evidence of past fire (charred wood). Seasonal and post-rain pooling occurs in shallow depressions. The sparse tree, sapling and tall shrub (actually dwarf tree) dominants (averaging 5-15% combined cover) vary between White Cedar, Jack Pine and, less frequently, White Spruce or Tamarack. Low Common Juniper shrubs and sprawling Creeping Juniper shrubs cover generally 30% but up to 60% of the alvar surface in some areas. Dominant herbs are Rock Sandwort, Calamint, Hairy Rock-cress in one example, Bristle-leaf Sedge, Tufted Hairgrass, Yellow Sedge, Crawe's Sedge, Bluets, Calamint and Poverty Oat Grass in one small patch, and Bristle-leaf Sedge and Calamint in a third area. Rock surface algae, *Gloeocapsa alpina*, as well as cushion and turf mosses, crustose and fruticose lichens and microbial mats are common in these alvar shrublands.



Figure 3. Alvar shrubland at Dorcas Bay.

ALT1-3 White Cedar – Jack Pine Treed Alvar

According to Brownell and Riley (2000), “bordering the grassland east of Pendall Lake is a moderate-sized zone of Jack Pine – White Cedar – Tamarack savannah....Small trees compose about 30% cover. Saplings and dwarf trees of the same species...make up 20% cover. Shrubs include [Shrubby Cinquefoil] (2%) and [Creeping Juniper] (3-5%). [Little Bluestem] and [Scirpus-like Sedge] are the dominant herbs.”

Condition

The Dorcas Bay alvars have experienced slightly more human disturbance in recent decades than some of the other alvar sites, largely because of a (now closed) walking trail through the former FON alvar reserve and a driveway leading that cuts through the alvar grassland – fen complex. According to Cuddy *et al.* (1976), off-road vehicles occasionally formerly accessed interior habitats in the Dorcas Bay area, which may account for the above-normal frequency of exotic species. Dr. D. Larson of the University of Guelph has been studying trail impacts on the alvars at this site (Parker pers. comm. 2005).

The Pendall Lake alvar is described as displaying almost no evidence of recent human disturbance, with the exception of some excavation of stunted conifers for the bonsai trade (Schaefer 1996, Brownell and Riley 2000).

Diversity

Combined, the Dorcas Bay – Pendall Lake alvars support high vascular plant diversity of 106 taxa, based on Schaefer (1996) and Jalava (2004), of which 100 are native and 18 are largely restricted to alvar habitats in Ontario. Schaefer (1996) found 50 vascular plant taxa and 30 algae, moss and lichen taxa at the Pendall Lake site. A total of 93 vascular plant taxa were documented by Jalava (2004) at the other alvar sites in the Dorcas Bay area.

Ecological Functions

The Dorcas Bay – Pendall Lake alvars are part of an extensive tract of naturally-vegetated landscape on the northern Bruce Peninsula in which most ecological processes are more or less intact. This natural area includes the Bruce Peninsula National Park and several life science ANSIs.

Special Features

The Dorcas Bay – Pendall Lake alvars are host to several globally and provincially rare taxa, as well as at least five vascular plant species considered rare on the Bruce Peninsula (BGPC 2003). The centuries-old White Cedar trees at the Pendall Lake suggest that this community has remained relatively stable for several hundred years (Schaefer 1996). They are scattered on the grassland and abundant in the grassland savanna. More detailed discussion regarding the occurrences of provincially rare taxa is provided below.

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR, MNR-THR G3S3
Approximately 700 shoots of the globally rare, nationally threatened and provincially rare Dwarf Lake Iris were found by Jalava (2004) along the drier fringes of the alvar – fen complex near Dorcas Bay. The species is patchily abundant in adjacent sandy coniferous woodlands (NHIC 2006).

Tuberous Indian-plantain *Arnoglossum plantagineum* COSEWIC-SC MNR-THR G4S3
In 2004, moist depressions within the alvar – fen mosaic community near the Dorcas Bay shoreline supported a population of 250-300 flowering and more than 700 vegetative plants of Tuberous Indian-plantain (Figure 4) (Jalava 2004). Similar habitat at the Pendall Lake site supported an estimated 100 and 200 plants in 1996, while 200 to 300 blooming plants and perhaps three times as many additional leaves were observed in July 2004 (NHIC 2006, Schaefer 1996, Brownell and Riley 2000).

Ram’s-head Lady’s-slipper *Cypripedium arietinum* G3S3
Ram’s-head Lady’s-slipper was first reported for the Dorcas Bay area in 1964 and most recently in 2004. A total of over 400 plants are known to occur in the area (NHIC 2006). The species often occurs in open conifer bedrock woodlands, alvar savannahs and along the woody fringes of alvars.



Figure 4. Tuberous Indian-plantain (Special Concern, G4G5S3) at Dorcas Bay.

Northern Dropseed *Sporobolus heterolepis* G5 S3
 Approximately 1000 clumps of the provincially rare grass, Northern Dropseed, occur at Pendall Lake alvar (Schaefer 1996, Brownell and Riley 2000), and hundreds of clumps are found at the alvar – fen complex near Dorcas Bay (Jalava 2004).

Five-tooth Vertigo *Vertigo ventricosa* G3G4 S2S3
 This land snail is widespread but with few records across Ontario. It is reported for the Pendall Lake alvar in Reschke *et al.* (1999).

A Land Snail *Catinella exile* G1G2 S1
 This apparently extremely rare snail is known from very few stations, mostly on Great La Cloche Island in Manitoulin District (Grimm 1999). There is an unverified report for the Dorcas Bay area alvars (NHIC 2006).

The following provincially rare species have been recorded near the Dorcas Bay – Pendall Lake alvars. Species marked with an asterisk may occur on alvars; the remainder are normally found in surrounding forests and wetlands.

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3 S3
 (Eastern) Massasauga rattlesnakes are periodically encountered at Dorcas Bay and undoubtedly periodically occur on the alvars there. NHIC (2006) contains several recent records for the area, and the snake is reported by ANSI landowners (Schaefer 1995). This is a characteristic species of the upper Bruce Peninsula and eastern Georgian Bay coast in Ontario, which are among the last major strongholds of this globally uncommon and provincially threatened taxon. It is likely that the large natural areas of the upper Bruce sustain viable populations. Massasaugas require a habitat mosaic that includes wetlands such as fens, as well as drier upland forests and barrens to complete their life cycle.

Brush-tipped Emerald *Somatochlora walshii* G5 S3
 This dragonfly species was found in 2002 in habitat is described as “rich fen”, but is georeferenced to a point very near one of the alvar pavement patches at Dorcas Bay (NHIC 2006).

*Hill’s Thistle *Cirsium hillii* COSEWIC-THR MNR-THR G3 S3
 The globally rare, and nationally and provincially threatened Hill’s Thistle is frequent along the sandy trail leading to the Dorcas Bay alvar sites.

*Rand’s Goldenrod	<i>Solidago simplex</i> ssp. <i>randii</i>	G5T5?S3
*Low Nutrush	<i>Scleria verticillata</i>	G5 S3
*Roundleaf Ragwort	<i>Packera obovata</i>	G5 S3
*Milksnake	<i>Lampropeltis triangulum</i>	COSEWIC-SC, MNR-SC G5 S3
*Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	COSEWIC-SC, MNR-SC G5 S3
Great Lakes Wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>psammophilus</i>	G5T3 S3
Porcupine Grass	<i>Stipa spartea</i>	G5 S3
Eastern Red Damsel	<i>Amphiagrion saucium</i>	G5 S3
Ontario Goldenrod	<i>Solidago simplex</i> var. <i>ontarioensis</i>	G5T3? S3?
American Beachgrass	<i>Ammophila breviligulata</i>	G5 S3

Conclusions and Recommendations

Evaluation and Significance

The Dorcas Bay – Pendall Lake area is a highly diverse natural area, with several alvar community types and a high concentration of rare flora and fauna. The wet alvars and alvar – fen intergrade habitats are among the best examples on the Bruce Peninsula, providing habitat for an unusual combination of wetland, alvar and prairie species. Also of note at the site are ancient White Cedar trees.

Threats

The Dorcas Bay – Pendall Lake alvars are protected by Bruce Peninsula National Park. Potential threats to be considered in management of park activities include trampling by people walking through the alvars, vehicles driving along the track through the alvar-fen complex, and illegal bonsai collecting.

Management

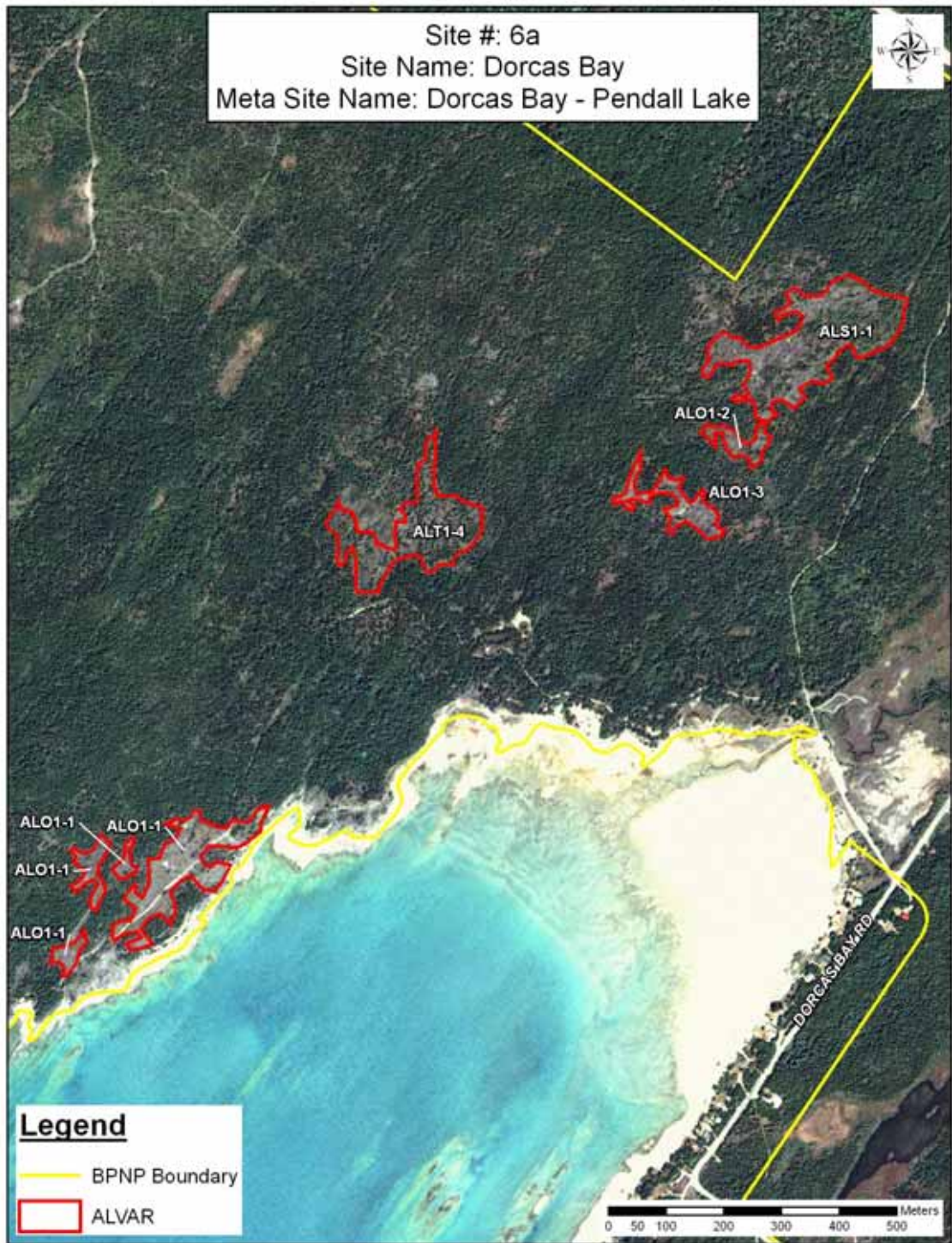
Continued passive management of alvar habitat is recommended. Where possible, pedestrian and vehicle traffic should be routed away from sensitive alvar habitats.

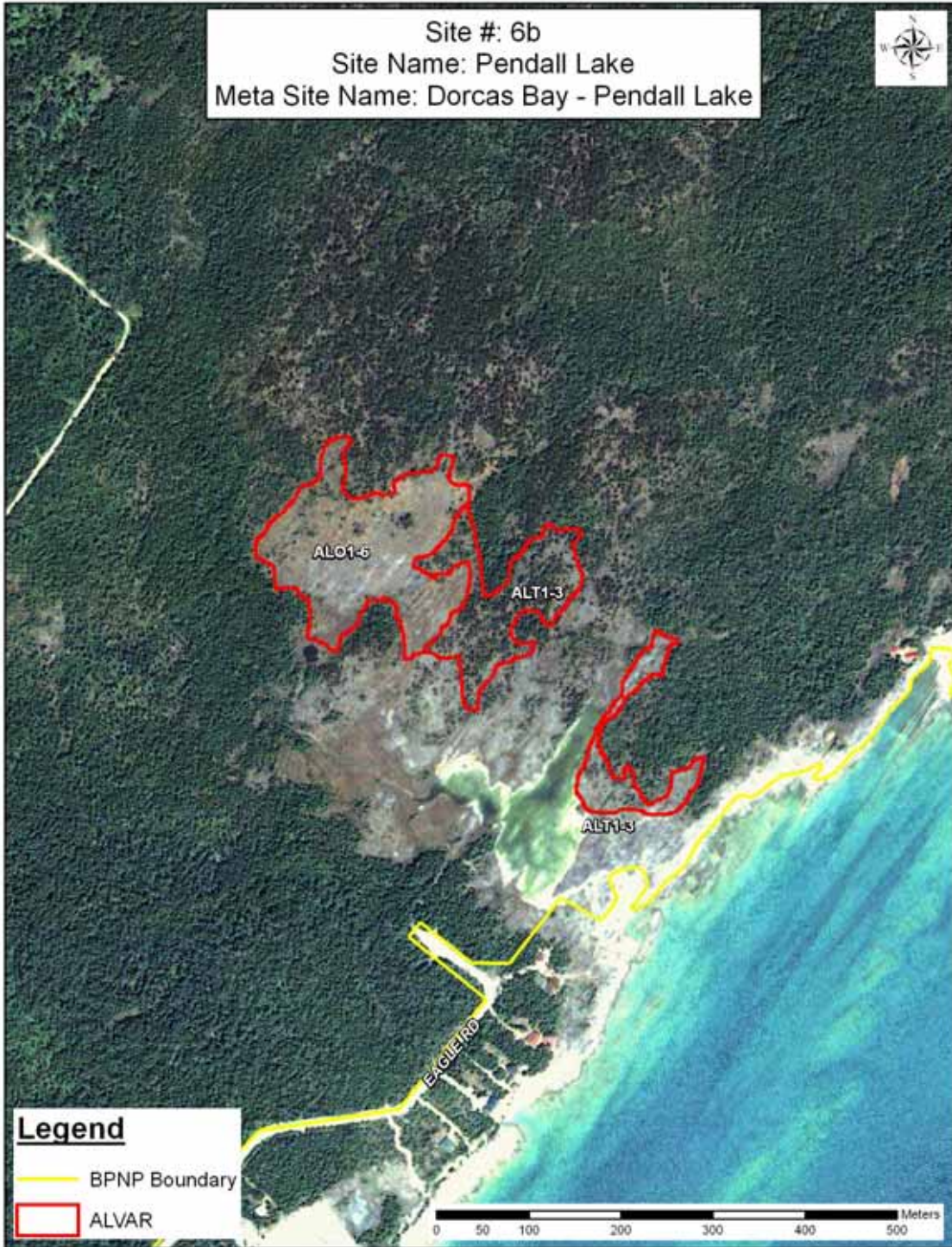
Future Inventory Needs

1. Non-vascular plants, invertebrates and other alvar fauna have not been surveyed at alvar patches other than Pendall Lake.
2. Monitoring of habitat quality, invasive species and populations of species-at-risk.

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Vascular Plants of the Dorcas Bay – Pendall Lake Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	6a AL01-2	6a AL01-3	6a ALS1-1	6b AL01-3/6
<i>Selaginella selaginoides</i> (L.) P. Beauv.	Northern Spike-moss	G5	S4			X	3					X
<i>Equisetum variegatum</i> Schleicher ex Weber &	Variegated Scouring-rush	G5	S5			X	5					X
<i>Pellaea atropurpurea</i> (L.) Link	Purple-stemmed Cliff-brake	G5	S3			R	13	M			X	
<i>Asplenium trichomanes</i> L.	Maidenhair Spleenwort	G5	S5			X	19				X	
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33					X
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X	X	X	X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X		X	X
<i>Pinus banksiana</i> Lambert	Jack Pine	G5	S5			X	33		X	X	X	
<i>Juniperus communis</i> L. var. <i>depressa</i> Pursh	Common Juniper	G5T5	S5			X	34		X		X	
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X	X	
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X	X	X	
<i>Ranunculus acris</i> L.	Common Buttercup	G5	SE5			XI	130		X		X	
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160				X	X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165				X	
<i>Cerastium fontanum</i> Baumg.	Mouse-eared Chickweed	G?	SE5			XI	178				X	
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X	X	X	
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M		X	X	X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X		X	
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218		X	X		
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234				X	
<i>Salix amygdaloides</i> Andersson	Peach-leaved Willow	G5	S5			X	234				X	
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234			X		
<i>Salix discolor</i> Muhlenb.	Pussy Willow	G5	S5			X	234				X	
<i>Salix exigua</i>	Sandbar Willow	G5	S5			X	234					X
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M			X	
<i>Arabis lyrata</i> L. var. <i>lyrata</i>	Lyre-leaved Rock-cress		S4			X	237		X		X	
<i>Erucastrum gallicum</i> (Willd.) O.E. Schulz	Dog Mustard	G5	SE5			XI	237					X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X	X	X
<i>Lysimachia quadriflora</i> Sims	Prairie Loosestrife	G5?	S4			X	258			X		X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258					X
<i>Parnassia glauca</i> Raf.	Grass-of-Parnassus	G5	S5			X	276			X		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277				X	
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X	X	X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X	X	X	X
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277				X	
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286				X	
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301					X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307			X	X	
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313					X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338			X		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	6a AL01-2	6a AL01-3	6a ALSI-1	6b AL01- 3/6
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	G5	S5			X	350					X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X	X	X	X
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378				X	
<i>Calamintha arkansana</i> (Nutt.) Shimm.	Wild Savory	G5	S4S5			X	392	M	X	X	X	X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X	X	X	X
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S5			X	399		X			
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X		X	
<i>Utricularia cornuta</i> Michaux	Horned Bladderwort	G5	S5			X	408			X		
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X	X	X	X
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411			X		X
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411					X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X	X	X	X
<i>Diervilla lonicera</i> Miller	Bush-honeysuckle	G5	S5			X	418				X	
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	X	X	X
<i>Lonicera oblongifolia</i> (Goldie) Hooker	Swamp Fly- honeysuckle	G4	S5			X	418				X	
<i>Arnoglossum plantagineum</i>	Tuberous Indian- plantain	G5G5	S3			X	423			X		X
<i>Artemisia campestris</i> L. ssp. <i>caudata</i>	Sagewort Wormwood	G5T4	S4S5	SC	SC	X	423				X	
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X	X	X
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423				X	
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423			X		X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X	X	X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X		X	
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423			X	X	
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423			X		
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X	X	
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X	X	X	
<i>Triglochin maritimum</i> L.	Arrow-grass	G5	S5			X	430			X		
<i>Juncus brachycephalus</i> (Engelm.) Buchenau	Short-headed Rush	G5	S4S5			X	455		X	X	X	
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455		X	X	X	
<i>Juncus nodosus</i> L. var. <i>nodosus</i>	Knotted Rush	GT	S5			X	455		X			
<i>Carex bebbii</i> (L. Bailey) Olney ex Fern.	Bebb's Sedge	G5	S5			X	457			X	X	
<i>Carex capillaris</i> L.	Hair-like Sedge	G5	S5			X	457					X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X	X	X	X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X		X	X
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457			X	X	
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X		X	X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	X		X
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457					X
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457			X		X
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike- rush	G4	S4			R	457	E				X
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	G5	S5			X	457			X	X	
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457			X		

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	6a AL01-2	6a AL01-3	6a ALSI-1	6b AL01- 3/6
<i>Scirpus cespitosus</i> L. ssp. <i>cespitosus</i>	Deer-grass	G5T	S5			X	457		X	X		X
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X		X	
<i>Andropogon gerardii</i> Vitman	Big Bluestem	G5	S4			X	458			X		
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X	X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X	X	X	X
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X	X	X	X
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M			X	X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	X	X	X
<i>Panicum capillare</i> L.	Witch Grass	G5	S5			X	458			X	X	
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458			X	X	
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X	X		X
<i>Spartina pectinata</i> Link	Tall Cord Grass	G5	S4			X	458			X		
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	Prairie Dropseed	G5	S3			X	458	E	X	X		
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475				X	
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475				X	X
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5T4	S4?			X	475			X		
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475		X	X	X	
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M	X	X		
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476			X		
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476					X
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X			X
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489		X		X	
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	G5	S5			X	489		X	X	X	

Non-Vascular Plants and Algae of the Dorcas Bay – Pendall Lake Alvars

A= algae, B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	6b ALO1-3/6
A	<i>Gloeocapsa alpina</i>			X
A	<i>Nostoc sp.</i>			X
B	<i>Bryum lisaе var. cuspidatum</i>	G5T5	S5	X
B	<i>Bryum pallescens</i>	G5	S4	X
B	<i>Campylium chrysophyllum</i>	G5	S5	X
B	<i>Campylium sp.</i>			X
B	<i>Campylium stellatum</i>	G5	S5	X
B	<i>Cephaloziella rubella s.l.</i>	G5T35	S3S4	X
B	<i>Dicranum fuscescens</i>	G5	S5	X
B	<i>Dicranum montanum</i>	G5	S5	X
B	<i>Dicranum scoparium</i>	G5	S5	X
B	<i>Ditrichum flexicaule</i>	G5	S5	X
B	<i>Encalypta procera</i>	G4G5	S5	X
B	<i>Fissidens adianthoides</i>	G5	S5	X
B	<i>Fissidens osmundioides</i>	G5	S5	X
B	<i>Hamatocaulis vernicosus</i>	G5	S5	X
B	<i>Limprichtia cossonii</i>	G?	S2	X
B	<i>Myurella julacea</i>	G5	S5	X
B	<i>Polytrichum juniperinum</i>	G5	S5	X
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2	X
B	<i>Schistidium rivulare</i>	G4G4	S5	X
L	<i>Catapyrenium lachneum</i>	G5	S?	X
L	<i>Cladonia chlorophaea</i>	GU	S5	X
L	<i>Cladonia macilenta</i>	G5	S5?	X
L	<i>Cladonia pyxidata</i>	G5	S5	cf.
L	<i>Cladonia symphycarpa</i>	G3G5	S?	X
L	<i>Dermatocarpon fluviatile / weberi</i>			X
L	<i>Lecidea sp.</i>			X
L	<i>Peltigera canina</i>	G5	S5?	X
L	<i>Placynthium nigrum</i>	G?	S5?	X
L	<i>Protoblastenia rupestris</i>	G?	S5?	X

Meta-site 7. DORCAS BAY ROAD / SIDEROAD CREEK

Bruce County, St. Edmunds Township

NTS Map: 41H/4

NAD83 UTM: 17T 454800 5002517 (site 7a), 454191 5002700 (site 7b), 453889 5001500 (site 7c)

Ownership: Federal (Bruce Peninsula National Park) (sites 7a and 7c); Private (sites 7b)

Protection: Bruce Peninsula National Park (sites 7a and 7c)

Survey Dates (Surveyors): June 20, 1996 (C. Schaefer); August 21, 2005 (J. Jalava)

Total Extent of Alvar: 48 ha

Overall Alvar Quality Rank: A to BC

Directions: Approximately 10.5 km south of Tobermory and 0.75 km north of Cyprus Lake Road is Singing Sands/Dorcas Bay Road, which leads southwest off of Highway 6. After a few km the road makes a sharp turn left and soon thereafter a sharp turn right. About 6.5 km after this last turn is an unmarked path on the left side of the road (south side), where one enters the Sideroad Creek site (Schaefer 1996). The Dorcas Bay Road North site is immediately adjacent to the road a further 0.2 km, on the Lake Huron side, and the Dorcas Bay Road South site is another 1.5 km to the south on the inland side of the road, across from a T-intersection after a sharp turn to the left.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
7a. Sideroad Creek	Dvp	Schaefer (1996) IACI	1	7	71 (68)	2
7b. Dorcas Bay Road North	Rvp	IKONOS, air photo	1	11	44 (44)	1
7c. Dorcas Bay Road South	Rvp	IKONOS, air photo	1	10	28 (28)	0
Meta-site Totals			2	18	87 (84)	2

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

South of Dorcas Bay on the landward side of Dorcas Bay Road is a relatively undisturbed and unfragmented landscape of open coniferous woodlands, wetland complexes and alvar shrubland savannas. The largest and most open alvar community occurs south of Sideroad Creek, which was surveyed by Schaefer (1996). Jalava (2005) surveyed a small treed alvar community (Site 7b, Dorcas Bay Road North) in good condition to the south of Sideroad Creek between Dorcas Bay Road and Lake Huron, as well as a patch of dwarf shrub alvar (Site 7c, Dorcas Bay Road South), 1.5 km further south along the road on the northeast (landward) side of the road.

Alvar Representation

The Sideroad Creek site has about 26 ha and Dorcas Bay Road North has 0.5 ha of treed alvar savannah, while the Dorcas Bay Road South site has a 1 ha patch of Creeping Juniper – Shrubby Cinquefoil alvar shrubland.

ALSI-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar Type

Except for its fringes and an occasional copse of Jack Pine and White Cedar, the Dorcas Bay Road South site is untreed. The low shrub layer varies from sparse to 30% cover, with dominants being variable and patchy. Shrubby Cinquefoil and Kalm's St. John's-wort occur in moister portions, while Creeping Juniper almost completely covers the ground in higher, drier sections, where Bearberry is also common. The most common herbaceous species is Little Bluestem, with Tufted Hairgrass as the secondary dominant. Associates in the fairly extensive herb layer are Richardson's Sedge, Bluets, Lindheimer's Panic Grass, Poverty Oat Grass and Upland White Goldenrod. Non-vascular species are very common, with the rock-surface algae, *Gloeocapsa* and crustose lichens covering the abundant, loose dolostone fragments. Microbial and algal mats are present where water occasionally pools. A coarse, golden-brown moss (probably the globally and provincially rare, *Pseudocalliergon turgescens*) is also common on the alvar. The Dorcas Bay South alvar site occurs on a substrate of dolostone fragments (averaging 1 cm to 15 cm in diameter, to a maximum of approximately 30 cm) covering 40% to 80% of the surface area, with shallow but widespread sandy organic deposits between the stones. Fine organic soil that becomes muck after rains is found in the alvar's shallow depressions.

ALT1-3 White Cedar - Jack Pine Treed Alvar Type

According to Schaefer (1996), at the Sideroad Creek alvar the dominant tree species are variable, but most common are White Spruce, White Cedar or Jack Pine. White Birch is a frequent associate. The cover by trees >5 m tall is generally 15%, but there is additional tree cover by individuals 2 to 5 m tall (which may be saplings or mature trees) of 15-20%. The "low shrub" layer ranges from 20-55% cover, but this also includes some trees <2 m (3-7% White Cedar in some areas). Sprawling shrubs, such as Creeping Juniper and Bearberry, comprise from 13-37% of the short shrub cover. The herb layer accounts for 15-49% of the ground cover. The dolostone rock is extremely close to the surface in this area. (Schaefer 1996, King and Godschalk 1997, NHIC 2006)

At the Dorcas Bay Road North alvar site, tree cover is also quite variable, with open sections having only about 5% tree and sapling cover, and other areas having over 50% cover (Figure 1). All the trees are quite stunted because of the paucity of soil and the wind effects off the adjacent Lake Huron coast. The main dominant is White Cedar, with Tamarack and White Birch being secondary species. Low shrub cover is extensive, with mats of Creeping Juniper covering between 40% and 95% of the overall surface area of the alvar. Bearberry, Common Juniper and Sand Cherry are associates in the shrub layer. The herb layer varies from very sparse to quite extensive, with the most common species being Bristle-leaf Sedge, and with Little Bluestem also being quite common. Associated herbs include Bluets, Upland White Goldenrod, Wormwood, Smooth Aster, Richardson's Sedge and Hairy Goldenrod. The rock surface algae, *Gloeocapsa*, as well as crustose lichens and cushion mosses (*Tortella* genus) are common on exposed patches of bedrock, which occupy from 5% to 20% of the surface area. The Dorcas Bay North site has an abundance of broken dolostone fragments (2 cm to 75 cm in diameter, but mostly 10-20 cm) overlying the bedrock of the Guelph Formation; occasional granitic erratics are also present. The alvar generally slopes in a southwesterly direction at an angle of up to 2°,

but there are flat sections. Very shallow sandy and organic soil deposits occur in cracks and crevices between the dolostone fragments.



Figure 1. White Cedar - Jack Pine treed alvar at Dorcas Bay Road North

Condition

Schaefer (1996) notes no unnatural on-site disturbances other than an old track or trail through the Sideroad Creek site, which may have been a logging access road. Some cut stumps occur along the trail, and there is a small area of litter dumped many years prior. The landward side of the road has almost no structures (a few seasonal homes) and is almost completely undisturbed. The lakeward side of the road has numerous cottages and some year-round homes.

Jalava (2005) notes some charred stumps at the Dorcas Bay Road North site, and that the alvar is likely slowly growing in with trees, albeit patchily. Disturbances and adjacent impacts include a driveway at southwest end of the alvar, and the Dorcas Bay Road edge along the eastern edge. However, away from road on the alvar, no introduced species were noted. There is moderately dense cottage development along much of the Lake Huron shore nearby and this alvar patch may be under threat from future development.

Farther south at the Dorcas Bay Road South site, charred woody debris is present. However, the alvar seems fairly stable in terms of succession, or may be growing in very slowly with woody vegetation. Disturbances include the adjacent road edge, and the site is bisected by a lightly-used off-road vehicle track, that is at least occasionally used for bicycling, as tracks were noted by Jalava (2005). Some cut stumps were noted in adjacent woodlands, and deer browse has occurred on the White Cedar trees.

Diversity

The two alvar community types found at the three sites along Dorcas Bay Road sustain 87 vascular plant taxa, 18 of them being largely alvar-restricted species. Oddly, of the three sites, Sideroad Creek has by far the highest vascular plant species total (71), yet it has the lowest total of alvar-restricted taxa (7).

Ecological Functions

The Sideroad Creek and the Dorcas Bay Road South alvars are part of a large tract of naturally-vegetated landscape between Highway 6 and Dorcas Bay Road that has not been fragmented by roads, although some minor off-road trails are present. This area protects the headwaters of numerous streams and various wetlands, and has extensive “interior” habitats. The Dorcas Bay Road North alvar is adjacent to the Lake Huron shoreline and were the property protected from future development, some shoreline functions would also benefit from protection.

Special Features

Two globally and provincially rare taxa have been found at the alvars along Dorcas Bay Road.

Hill’s Thistle *Cirsium hillii* COSEWIC-THR MNR-THR G3S3
One flowering plant of the globally rare, and nationally and provincially threatened, Hill’s Thistle was found by Jalava (2005) in treed alvar near the south end of the Dorcas Bay Road North site, while Schaefer (1996) found one vegetative plant along the trail through the treed alvar at Sideroad Creek.

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3S3
NHIC (2006) reports Massasauga rattlesnake at the Sideroad Creek alvar.

Conclusions and Recommendations

Evaluation and Significance

The Dorcas Bay Road alvars provide good representation of treed alvar, particularly at the Sideroad Creek site, where habitat quality is ranked as A. The other two alvar

patches are considered less significant. However, despite their proximity to the road, they are both relatively undisturbed.

Threats

At Sideroad Creek, Schaefer (1996) notes no current known threats, either on-site or off-site, to the surveyed area. Waterfront cottage development threatens the Dorcas Bay North site, which is one of the last remaining undeveloped stretches of shoreline in the immediate vicinity.

Management

Continued passive management is recommended for all three sites. Fire suppression may result in the treed alvars converting to open bedrock forest communities, but because of the depauperate soil conditions this will be a slow process. Although it does not rank highly relative to a number of other private land sites for acquisition, the Dorcas Bay Road North site provides an opportunity to protect a section of the Lake Huron shoreline along with the alvar habitat.

Future Inventory Needs:

1. Invertebrate and other faunal surveys.
2. Monitoring of habitat quality and threats.

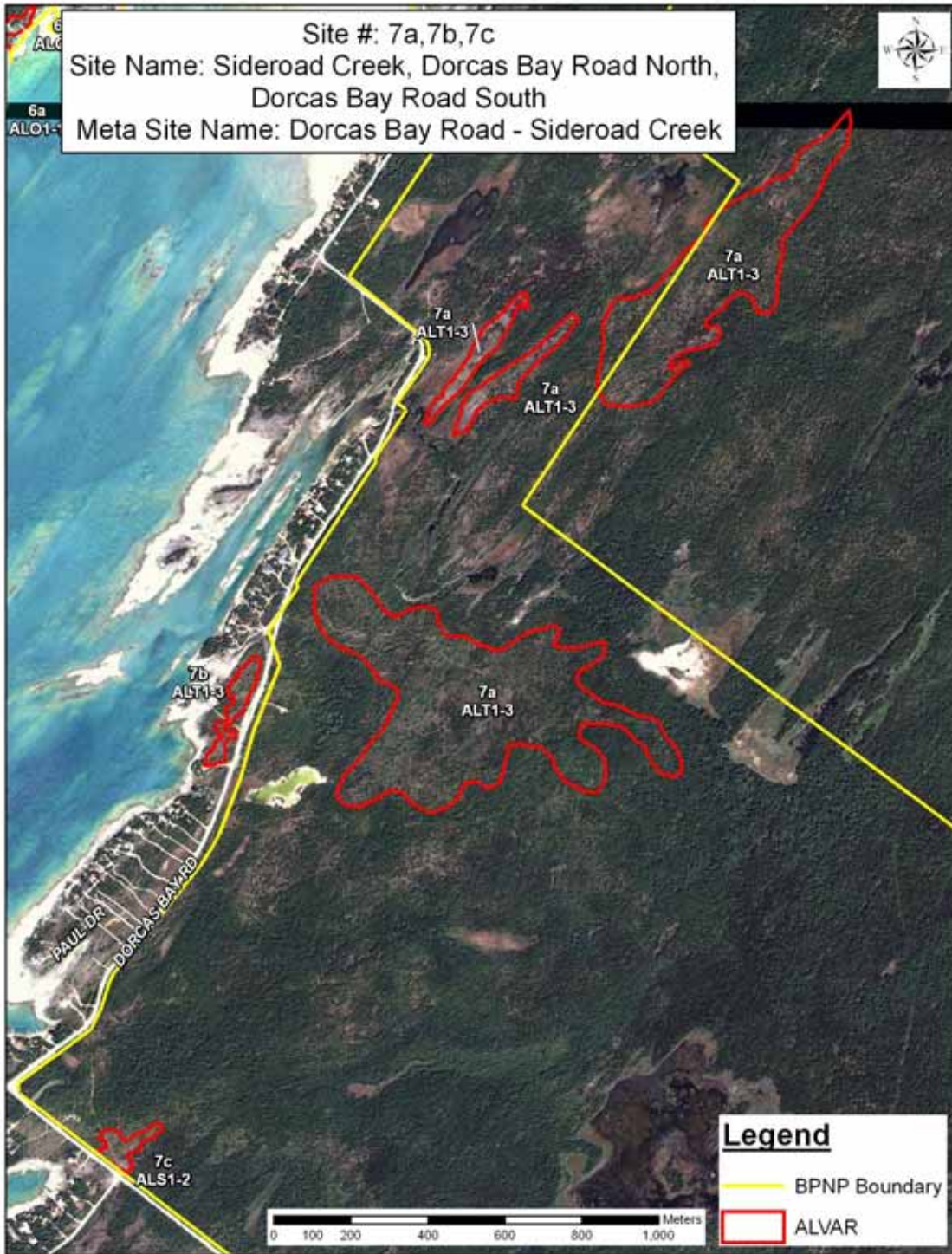
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Vascular Plants of the Dorcas Bay Road Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	7a AL/TI-3	7b AL/TI-3	7c ASH-6
<i>Pteridium aquilinum (L.) Kuhn</i>	Eastern Bracken	G5T	S5			X	16		X	X	
<i>Larix laricina (Du Roi) K. Koch</i>	Tamarack	G5	S5			X	33		X	X	
<i>Picea glauca (Moench) Voss</i>	White Spruce	G5	S5			X	33		X	X	
<i>Pinus banksiana Lambert</i>	Jack Pine	G5	S5			X	33		X		X
<i>Juniperus communis L. var. depressa</i>	Common Juniper	G5T5	S5			X	34		X	X	X
<i>Juniperus horizontalis Moench</i>	Creeping Juniper	G5	S5			X	34	M	X	X	X
<i>Thuja occidentalis L.</i>	White Cedar	G5	S5			X	34		X	X	X
<i>Anemone cylindrica A. Gray</i>	Long-fruited Thimbleweed	G5	S4			X	130		X		
<i>Aquilegia canadensis L.</i>	Wild Columbine	G5	S5			X	130		X		
<i>Betula papyrifera Marshall</i>	Paper Birch	G5	S5			X	165		X	X	X
<i>Cerastium arvense L. ssp. strictum</i>	Field Chickweed	G5T?	S4			X	178		X		
<i>Minuartia michauxii (Fenzl) Farw.</i>	Rock Sandwort	G5	S5			X	178		X		
<i>Hypericum kalmianum L.</i>	Kalm's St. John's-wort	G4	S4			X	200	M			X
<i>Hypericum perforatum L.</i>	Common St. John's-wort	G?	SE5			XI	200		X		
<i>Viola nephrophylla E. Greene</i>	Northern Bog Violet	G5	S4			X	218		X		
<i>Populus balsamifera L.</i>	Balsam Poplar	G5T?	S5			X	234		X	X	
<i>Arabis hirsuta (L.) Scop.</i>	Hairy Rock-cress	G5T5	S5			X	237	M	X		
<i>Arctostaphylos uva-ursi (L.) Sprengel</i>	Bear-berry	G5	S5			X	247		X	X	X
<i>Ribes cynosbati L.</i>	Prickly Gooseberry	G5	S5			X	269		X		
<i>Amelanchier alnifolia (Nutt.) Nutt. ex R. R.</i>	Saskatoon-berry	G5	S4?			X	277	M	X		
<i>Fragaria vesca L. ssp. americana (Porter)</i>	Woodland Strawberry	G5T?	S5			X	277			X	
<i>Fragaria virginiana Miller</i>	Wild Strawberry	G5	S5			X	277		X		
<i>Physocarpus opulifolius (L.) Maxim.</i>	Ninebark	G5	S5			X	277			X	X
<i>Potentilla fruticosa L. ssp. floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X	X
<i>Prunus pumila L.</i>	Sand Cherry	G5	S4S5			X	277	Mt?	X	X	X
<i>Prunus virginiana L. ssp. virginiana</i>	Choke Cherry	G5T?	S5			X	277		X	X	
<i>Rosa acicularis Lindley ssp. sayi</i>	Prickly Wild Rose	G5TU	S5			X	277		X		
<i>Medicago sativa L. ssp. sativa</i>	Alfalfa	G5	SE5			XI	285		X		
<i>Shepherdia canadensis (L.) Nutt.</i>	Soapberry	G5	S5			X	286		X	X	
<i>Cornus stolonifera Michaux</i>	Red-osier Dogwood	G5	S5			X	307		X		
<i>Comandra umbellata (L.) Nutt.</i>	Bastard-toadflax	G5	S5			X	313		X	X	
<i>Geocaulon lividum (Richardson) Fern.</i>	Toadflax	G5	S5			X	313			X	
<i>Rhamnus alnifolia L'Her.</i>	Alder-leaved Buckthorn	G5	S5			X	338		X		X
<i>Polygala paucifolia Willd.</i>	Fringed Polygala	G5	S5			X	350		X		
<i>Polygala senega L.</i>	Seneca Snakeroot	G4G5	S4			X	350	H	X		X
<i>Daucus carota L.</i>	Wild Carrot	G?	SE5			XI	374		X		
<i>Calamintha arkansana (Nutt.) Shinn.</i>	Wild Savory	G5	S4S5			X	392	M	X		
<i>Clinopodium vulgare L.</i>	Wild Basil	G?	S5			X	392		X		
<i>Prunella vulgaris L.</i>	Heal-all	G5	S5			X	392		X	X	X
<i>Castilleja coccinea (L.) Sprengel</i>	Indian Paintbrush	G5	S5			X	399	M	X	X	
<i>Melampyrum lineare Desr.</i>	Cow-wheat	G5	S4S5			X	399		X	X	
<i>Campanula rotundifolia L.</i>	Harebell	G5	S5			X	411		X	X	X
<i>Houstonia canadensis Willd.</i>	Fringed Houstonia	G4G5	S4?			X	416			X	X
<i>Houstonia longifolia Gaertner</i>	Long-leaved Houstonia	G4G5	S4?			X	416		X		
<i>Linnaea borealis L. ssp. longiflora</i>	Twinflower	G5T?	S5			X	418		X		

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MINR	BPEN	FAM#	Alvar fidelity	7a ALTI-3	7b ALTI-3	7c ASH-6
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	X	
<i>Symphoricarpos albus</i>	Snowberry	G5	S5			X	418		X		
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			C	423		X	X	
<i>Artemisia campestris</i> L. ssp. <i>caudata</i>	Sagewort Wormwood	G5T4	S4S5	S C	S C	X	423		X	X	
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423		X		
<i>Aster cordifolius</i> L.	Heart-leaved Aster	G5	S5			X	423		X		
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X	X
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	T	T	X	423	H	X	X	
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423			X	
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X		X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423			X	
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X	X	
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423				X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X	
<i>Solidago simplex</i> Kunth ssp. <i>simplex</i> var. <i>simplex</i>	Goldenrod	G5T5	S4			R	423	Mt?		X	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423			X	X
<i>Symphyotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicked Aster	G5	S5			X	423			X	
<i>Carex aurea</i> Nutt.	Golden-fruit Sedge	G5	S5			X	457		cf.		
<i>Carex castanea</i>	Chestnut Sedge	G5	S5			X	457		X		
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X	X	X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X	
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X		
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X	X	X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H		X	X
<i>Carex umbellata</i> Schkuhr ex Willd.	Umbellate Sedge	G5	S5			R	457		X		
<i>Andropogon gerardii</i> Vitman	Big Bluestem	G5	S4			X	458				X
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X	
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H		X	
<i>Oryzopsis asperifolia</i> Michaux	Rough-leaved Mountain-rice	G5	S5			X	458		X		
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X		
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5T5	S4			X	458				X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X		
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458			X	X
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475		X	X	
<i>Maianthemum canadense</i> Desf.	Wild Lily-of-the-valley	G5	S5			X	475		X		
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475		X		X
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475		X	X	X
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476		X		
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X		
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X	X	
<i>Piperia unalascensis</i> (Sprengel) Rydb.	Alaska Rein Orchid	G5	S4			X	489	E?	X		

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MINR	BPEN	FAM#	Alvar fidelity	7a ALTI-3	7b ALTI-3	7c ASH-6
	Orchid species	G5	S5			X	489		sp.		

Non-Vascular Plants and Algae of the Sideroad Creek Alvar

A= algae, B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	7a SC ALTI-3
A	<i>Gloeocapsa alpina</i>			X
A	<i>Trentepohlia annulata</i>	T	T	X
B	<i>Dicranum polysetum</i>	G5	S5	X
B	<i>Polytrichum juniperinum</i>	G5	S5	X
B	<i>Schistidium rivulare</i>	G4G4	S5	X
B	<i>Tortella fragilis</i>	G4G5	S4	sp.
L	<i>Cetraria arenaria</i>	G4	S4?	X
L	<i>Cladina rangiferina</i>	G5	S5	X
L	<i>Cladonia pyxidata</i>	G5	S5	X
L	<i>Cladonia symphycarpa</i>	G3G5	S?	X
L	<i>Peltigera canina</i>	G5	S5?	X

Site 8. DRIFTWOOD COVE ALVAR

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/4

NAD83 UTM 17T 454200 5010117

Ownership: Private

Protection: Little Cove to Cave Point ANSI (100%)

Survey Dates (Surveyors): July 7, 1996 (C. Schaefer)

Total Extent of Alvar: 2.8 (to 15?) ha

Overall Alvar Quality Rank: AB

Directions: The entrance to the property is a gated and locked driveway approximately 2.3 km northwest of Cameron Lake Road on Highway 6. It is on the east side of the road on the right side of two driveway entrances. It is a 7 km drive to the private residence where a trail can be taken, using air photos as a guide, to the alvar. Permission to access the site must be obtained in advance from the landowner.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
8. Driftwood Cove	DRvpn	Schaefer 1996 (IACI)	1	6	46 (40)	1

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

The Driftwood Cove alvar is located amidst open coniferous and woodlands on the dolostone bedrock plain near the cliff rim of the Niagara Escarpment. According to Schaefer (1996), this is a striking patch of alvar, as its wildflowers are particularly attractive against the black rock, the cryptogam layer is diverse, and the grykes are deep, dark and moist.

Alvar Representation

One alvar type, Common Juniper shrub alvar, was documented by Schaefer (1996) at Driftwood Cove.

ALSI-1 Common Juniper Shrub Alvar

Tree cover in the shrubland amounts to 5% cover, with White Birch and White Cedar dominant, and White Spruce as a secondary species. Tall shrub-sized White Cedar and White Birch also occur, forming about 5% cover. The low shrub layer is extensive, with Common Juniper a strong dominant, along with Creeping Juniper, Bearberry and Soapberry common, along with low White Cedar seedlings. The herb layer is also quite well developed, with Rock Sandwort dominant, and Canada Blue Grass and Balsam Ragwort as secondary species. Maidenhair Spleenwort and Wild Columbine are also quite common. The dolostone is covered in non-vascular plants and the rock surface algae, *Gloeocapsa alpina*. Common fruticose lichens include *Cladonia symphylicarpa*, *Cladina*

rangiferina and crustose lichens *Placynthium nigrum* and *Protoblastemia rupestris*. Cushion and weft mosses are also frequent, and there are a few areas with microbial mats.

Condition

The only disturbance note by Schaefer (1996) at the Driftwood Cove alvar was a trail (part of the Bruce Trail system). Trampling of the vegetation was evident, “particularly because the trail is poorly marked through the site, and so people criss-cross between the Juniper shrubs.” The only structure in the vicinity is an estate house overlooking Driftwood Cove, and a driveway, approximately 7 km long, which leads into the property from Highway 6 (Schaefer 1996).

Diversity

The Driftwood Cove alvar displays moderate ecological diversity. Of the 46 vascular plant taxa found there by Schaefer (1996), 40 are native. The same study found 3 algae taxa, 6 lichen taxa and 6 moss taxa on the alvar.

Ecological Functions

The Driftwood Cove alvar is part of an extensive tract of naturally-vegetated landscape on the northern Bruce Peninsula in which most ecological processes are largely intact. This natural area includes the Bruce Peninsula National Park and several life science ANSIs.

Special Features

Hill’s Thistle *Cirsium hillii* COSEWIC-THR, MNR-THR G3 S3
Schaefer (1996) reports the globally and provincially rare Hill’s Thistle for Driftwood Cove alvar. No details on population size are available for this record.

In addition to the threatened Hill’s Thistle, Bicknell’s Cranesbill is considered rare on the Bruce Peninsula (BGPC 2003) are found at the Driftwood Cove alvar.

Conclusions and Recommendations

Evaluation and Significance

One of the unique features of the Driftwood Cove alvar is its topographic position, in that there are few, if any, alvars so near to the rim of the Niagara Escarpment. Schaefer (1996) also comments on the aesthetic values of the site, its colourful floral displays and the interesting clint and gryke topography.

Threats

Schaefer (1996) considered the main threat to the quality of alvar habitat at this site to be trampling by hikers who use the Bruce Trail, which passes through the area.

Management

The current impacts of the trampling disturbance described above need to be assessed and appropriate measures need to be taken if the problem persists. Schaefer (1996) recommends consultation with the Bruce Trail Association, and suggests either erecting a boardwalk through the pavement community, or flagging the route clearly and have an interpretive sign to encourage people not to leave the trail. The private landowner should also be informed about the alvar and its ecological sensitivity.

Future Inventory Needs

1. Invertebrate and other alvar fauna surveys.
2. Assessment of current site condition.
3. Hill's Thistle population count and viability assessment.
4. Ongoing monitoring of habitat quality.

References

BGPC (Bruce – Grey Plant Committee). 2003. A checklist of Vascular Plants for Bruce and Grey Counties, Ontario. 3rd Edition, January 2003. Ontario Ministry of Natural Resources, Owen Sound Field Naturalists and Saugeen Field Naturalists. 51 pp.

Schaefer, C. 1996. Driftwood Cove Alvar. International Alvar Initiative Forms, on file, Natural Heritage Information Centre, Peterborough.

NHIC (Natural Heritage Information Centre). 2006. Element occurrence, natural areas and Ontario Herpetofaunal Summary databases. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario. Electronic databases.



Vascular Plants of the Driftwood Cove Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	ALSI-1
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5T	S5			X	16		X
<i>Asplenium trichomanes</i> L.	Maidenhair Spleenwort	G5	S5			X	19		X
<i>Cystopteris</i> sp.	Fragile Fern species					X	20		X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X
<i>Anemone virginiana</i> L. var. <i>virginiana</i>	Thimbleweed	G5	S5			X	130		X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X
<i>Arenaria serpyllifolia</i> L.	Thyme-leaved Sandwort	G?	SE5			XI	178		X
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M	X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X
<i>Potentilla recta</i> L.	Rough-fruited Cinquefoil	G?	SE5			XI	277		X
<i>Prunus virginiana</i> L.	Choke Cherry	G5T?	S5			X	277		X
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277		X
<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i>	Wild Red Raspberry	G5	S5			X	277		X
<i>Trifolium</i> sp.	Red Clover	G?	SE5			XI	285		X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286		X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		X
<i>Geranium bicknellii</i> Britton	Bicknell's Crane's-bill	G5	S4			VU	369		X
<i>Geranium robertianum</i> L.	Herb Robert	G5	SE5			XI	369		X
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379		X
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392		X
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S5			X	399		X
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X
<i>Diervilla lonicera</i> Miller	Bush-honeysuckle	G5	S5			X	418		X
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423		X
<i>Aster cordifolius</i> L.	Heart-leaved Aster	G5	S5			X	423		X
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	T	T	X	423	H	X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X
<i>Carex aurea</i> Nutt.	Golden-fruit Sedge	G5	S5			X	457		cf.
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's- slipper	G5T	S5			X	489		X
<i>Piperia unalascensis</i> (Sprengel) Rydb.	Alaska Rein Orchid	G5	S4			X	489	E?	X

Non-vascular Plants and Algae of the Driftwood Cove Alvar

A= algae, B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	8 DC ALS1-1
A	<i>Gloeocapsa alpina</i>			X
A	<i>Nostoc commune</i>			X
A	<i>Trentepohlia annulata</i>	T	T	X
B	<i>Dicranum polysetum</i>	G5	S5	X
B	<i>Ditrichum flexicaule</i>	G5	S5	X
B	<i>Encalypta procera</i>	G4G5	S5	X
B	<i>Ptilidium pucherrinium</i>	G5	S5	X
B	<i>Schistidium rivulare</i>	G4G4	S5	X
B	<i>Tortella fragilis</i>	G4G5	S4	sp.
L	<i>Cladina rangiferina</i>	G5	S5	X
L	<i>Cladonia pyxidata</i>	G5	S5	X
L	<i>Cladonia symphycharpa</i>	G3G5	S?	X
L	<i>Peltigera canina</i>	G5	S5?	X
L	<i>Placynthium nigrum</i>	G?	S5?	X
L	<i>Protoblastenia rupestris</i>	G?	S5?	X

Meta-site 9. DYER'S BAY ROAD AND HIGHWAY 6

Bruce County, Northern Bruce Peninsula (St. Edmunds Township and Lindsay Township)
 NTS Map: 41H/3
 NAD83 UTM 17T 465558 4997448 (site 9a), 465000 4997200 (site 9b), 464688 4997205 and 464214 4996700 (site 9c)
 Ownership: Federation of Ontario Naturalists (site 9b and part of site 9c); Nature Conservancy of Canada (site 9a); Ontario Ministry of Natural Resources (parts of site 9c)
 Protection: Provincial lands managed by Bruce Peninsula National Park (part of site 9c); NGO nature reserves (sites 9a and 9b); Johnston's Harbour – Pine Tree Point ANSI (sites 9b and 9c)
 Survey Dates (Surveyors): 1982 (J. Johnson); 1994 (S. Varga, J. Jalava, C. Schaefer); August 9, 1995, July 12, 1996 (C. Schaefer); August 5, 2004 and September 13, 2005 (J. Jalava)
 Total Extent of Alvar: 9 ha
 Overall Alvar Quality Rank: A to BC

Directions: All of these alvars can be accessed on foot by parking at the corner of Dyer's Bay Road and Highway 6. The FON Bruce Alvar Nature Reserve is reached by following the trail and boardwalk from the sign a couple of hundred metres north of the intersection on the west side of the Highway. Unless permission to conduct research has been obtained from FON, one should remain on the marked trail and boardwalk, as this alvar is extremely sensitive to trampling and, because it is quite well known, is highly vulnerable. Permission to access alvar patches to the west and southwest of the FON Alvar should also be obtained from the appropriate managing agencies (FON, Parks Canada or OMNR), and navigation through the surrounding forests to the sites should be done with the assistance of air photos and/or maps. Permission to access the alvar northeast of the intersection must be obtained from The Nature Conservancy of Canada, who recently secured the site; the bedrock pavement vegetation at this site is also highly vulnerable to trampling.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
9a. Dyer's Bay Road & Hwy 6 NE	Rvp	Jalava 2005	1	6	77 (67)	3
9b. FON Bruce Alvar Nature Reserve	Dvpngbim	Jalava 2005; Schaefer 1996 (IACI)	3	19	86 (79)	10
9c. W & S of FON Bruce Alvar	Rvp	Jalava 2005	4	16	79 (73)	6
Meta-site totals			5	23	144 (130)	12

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

The alvars in the Dyer's Bay Road and Highway 6 area are situated on the dolostone bedrock plain at the north end of ecodistrict 6E-14. The plain dips gradually to the southwest from the cuesta of the Niagara Escarpment, which follows the eastern and northeastern coasts of the Bruce. The dry, shallow-soiled terrain of the dolostone plain is typically covered in young- to intermediate-aged forests of a boreal nature. The most frequent tree dominants are White Spruce, White Cedar, Balsam Fir and, in burned-over areas often with sandy soil deposits, Jack Pine and Red Pine. Successional mixed and deciduous stands are not infrequent on the bedrock plain, and usually include admixtures

of Trembling Aspen, White Birch or Large-toothed Aspen as dominants or as secondary species in association with the conifers noted above. Various combinations of these boreal coniferous and deciduous tree species are the predominant woody vegetation in the treed swamps and rock barren habitats of the upper Bruce. The open coniferous and mixed woodlands are preferred habitat for the globally rare Great Lakes endemics, Dwarf Lake Iris and Hill's Thistle, the former species sometimes being a major understorey dominant in stands dominated by Jack Pine or White Cedar.

Calcareous rock barren and globally rare alvar habitats are common in this area. They are probably more extensive today than they were prior to logging and subsequent wildfires, but the general lack of soil and the presence of a distinct alvar flora indicate that these habitats have been an important component of the regional ecosystem for many millennia.

Several outstanding examples of alvar of various sizes occur within and near the Federation of Ontario Naturalists (FON) Bruce Alvar Nature Reserve site (surveyed by C. Schaefer in 1996), just northwest of the intersection of Highway 6 and Dyer's Bay Road (Sites 9b and 9c). The alvar complex contains an outstanding array of globally, nationally and provincially rare and threatened species and vegetation community types, and displays a high diversity of alvar species. The alvars are virtually undisturbed and occur in a woodland – wetland – alvar mosaic that supports additional rare and threatened species, including what is probably the most extensive population of Dwarf Lake Iris in the world, and significant populations of Hill's Thistle, Roundleaf Ragwort, Tuberosus Indian-Plantain and Ram's-head Orchid and Northern Dropseed. The alvars themselves support the largest population of Lakeside Daisy south of Manitoulin Island, as well as Purple-stemmed Cliffbrake, Limestone Oak Fern, Laurentian Fragile Fern and Massasauga rattlesnake.

Just northeast of the corner of Dyer's Bay Road and Highway 6 is a patch of alvar (Site 9a) similar in structure to the outstanding alvars on the opposite side of the highway that are part of the FON Bruce Alvar Nature Reserve. The alvar occurs in a mosaic with White Cedar – Jack Pine dolostone bedrock woodland, patches of open alvar pavement, grassland and White Cedar curtain woodlands. The site provides a good example of clint and gryke topography, with flat, relatively smooth flat pavement interspersed with deep linear crevices. This property was recently secured by the Nature Conservancy of Canada (Kraus pers. comm. 2005).

Alvar Representation

ALO1-1 Dry Lichen - Moss Open Alvar Pavement

Patches of dry open alvar pavement (Figure 1) dominated by lichens, mosses and algae occur at the FON Bruce Alvar Nature Reserve and adjacent provincial lands. Small patches of open pavement with similar structure and composition are found northeast of Dyer's Bay Road and Highway 6 (site 9a) as well, but the community has been classified as ALO1-4 (below) because of the predominance of grassland. At site 9b and 9c the pavement patches range in size from 1 to 2 ha, occurring in a mosaic with treed alvar

(ALT1-3). In fact, Schaefer (1995) classifies the example occurring at the FON Bruce Alvar Nature Reserve as “alvar pavement savannah” because of the prevalence of the curtain forests. These alvars are believed to have burned more than 100 years ago (Schaefer 1996a, Varga *et al.* 1995). Groves of Jack Pine and White Cedar trees and saplings dominate in the curtain forests, while sparsely-scattered Tamarack, White Cedar and White Spruce trees, saplings and tall-shrub-sized seedlings occur in the moister northwestern examples. Low shrub cover ranges from 1% to 20%, with the most common species being Common Juniper, with Shrubby Cinquefoil being a secondary species. Mats of Creeping Juniper and Bearberry also often occur along the woodland fringes of these open alvars.

Common herbaceous species are Tufted Hairgrass, Lance-leaved Coreopsis, Balsam Ragwort, Upland White Goldenrod, Richardson’s Sedge, Wild Savory, Poverty Oat Grass, Rough Hair Grass, Bristle-leaf Sedge and the globally rare Great Lakes endemic Lakeside Daisy. The dominant non-vascular taxa are the mosses, *Tortella (fragilis or tortuosa)*, *Ditrichum flexicaule* and *Schistidium rivulare*, as well as various foliose and crustose lichens. The rock-surface algae, *Gloeocapsa alpina*, gives nearly all areas of the exposed alvar pavement open bedrock a grey-black colour. Almost no evidence of recent human disturbance was noted on these alvars. The FON alvar boardwalk enters a small portion of one of the alvar pavement patches.



Figure 1. Open alvar pavement community dominated by lichens, mosses, rock-surface algae and Lance-leaved Coreopsis

ALO1-4 Dry - Fresh Poverty Grass Open Alvar

Patches of alvar grassland dominated by Poverty Oat Grass occur west of the FON Bruce Alvar Nature Reserve (Site 9c) and northeast of Dyer’s Bay Road and Highway 6 (Site

9a). At Site 9c, topography is generally flat, but seasonal pooling of water may occur in shallow depressions, and deeper crevices are present in one example. Very sparse Jack Pine, White Spruce and White Cedar trees and saplings occur. Shrubby Cinquefoil low shrubs are scattered throughout all three examples, while Common Juniper is frequent in two patches. Occasional Red-osier Dogwood and Slender Willow shrubs occur in moist crevices of one example. Common herbaceous species occurring with Poverty Oat Grass are Upland White Goldenrod, Northern Bog Violet, Balsam Ragwort, Rough Hair Grass, Tufted Hairgrass, panic grasses (*Panicum* spp.), Richardson's Sedge, White Camass and Buxbaum's Sedge. Exposed rock is covered in the algae, *Gloeocapsa alpina*. Other frequent non-vascular plant species include the various mosses and lichens, and the algae, *Nostoc* (sp.), which forms mats in moist depressions.

Vegetation on the Poverty Oat Grass alvar northeast of the corner of Dyer's Bay Road and Highway 6 (Site 9a) consists of flat open dolostone pavement dominated by non-vascular taxa, interspersed with patches of grassland, deep dark crevices, and curtain forests (Jalava 2005). The pavement is pitted with small solution holes, and the long (0.5m to 2m) deep crevices range from 10-50 cm wide. The topography has a slight overall undulation (amplitude <20cm), probably with a very slight southwesterly slope. Moisture levels are dry to dry-fresh, with a few areas of pooling in spring and after rains. The substrate, where present, is a light brown sandy/organic soil, with a maximum depth of less than 3cm, and generally averaging 0(-1) cm. Open pavement occupies 50-80% of the surface area and is dominated by the rock surface algae, *Gloeocapsa*, as well as crustose lichens and mosses of the *Tortella* and other genera. Microbial mats are common in shallow depressions.

Grasslands have developed where there are soil deposits, with the most common species being Richardson's Sedge, Bristle-leaf Sedge and Poverty Oat Grass (Figure 2). Frequent secondary species and associates include Upland White Goldenrod, Tufted Hairgrass and Wild Columbine. Harebell and Seneca Snakeroot are also occasionally common in the herb layer. An introduced knapweed (*Centaurea* sp.) has invaded a section of the alvar near Highway 6. Trees and saplings are limited to curtain forests which tend to be associated with the crevices, with the most common species being in descending order of frequency White Cedar, Jack Pine, White Birch, and tall shrub-sized Balsam Fir. Low shrubs also tend to be associated with the curtain forests, although in some areas shrubs have established themselves on the open alvar. The dominant low shrub species are Creeping Juniper, Common Juniper, Bearberry and Wild Honeysuckle.

ALO1-6 Tufted Bulrush Wet Alvar Grassland

A species-rich community that could be classified as wet open alvar or bedrock fen occurs west of the FON Bruce Alvar Nature Reserve. Shallow (3.5 to 12 cm deep), saturated to moist marly soils are present, with extensive seepage evident. Small patches of exposed bedrock are also present. Sparse trees, saplings and seedlings of White Cedar and, to a lesser extent, Jack Pine, White Spruce or Tamarack occur. Shrubby Cinquefoil is the sparse but dominant low shrub, occurring in association with stunted White Cedar, Tamarack and White Spruce, as well as Alder-leaved Buckthorn and occasionally Swamp Birch. Tufted Bulrush is the dominant herb. Co-dominant is the globally rare Dwarf Lake Iris, with the provincially rare Tuberous Indian-plantain also very common. Other

frequent herbs include Wild Blue Flag, Canada Bluejoint, Yellow Sedge, Wild Savory, Balsam Ragwort and Kalm's Lobelia. *Nostoc* algae is common.



Figure 2. Poverty Grass alvar grassland northeast of Dyer's Bay Road and Highway 6

ALSI-1 Common Juniper Shrub Alvar

A large area of Common Juniper dominated alvar shrubland is found on dry bedrock flats with extensive, deep crevices in a burned area southwest of the FON Bruce Alvar Nature Reserve. Scattered trees, saplings and shrub-sized stunted trees of White Cedar, White Spruce or Jack Pine are frequent. White Birch trees and saplings occasionally occur as associates. The most common herbaceous taxa are Little Bluestem, Bristle-leaf Sedge, Fringed Houstonia, Richardson's Sedge, Upland White Goldenrod and Rock Sandwort. The algae *Gloeocapsa alpina* typically covers virtually all exposed dolostone of the alvar shrubland, while cushion and turf mosses, crustose and foliose lichens are very common. Black to grey microbial mats occur in shallow open depressions in some examples.

ALT1-3 White Cedar - Jack Pine Treed Alvar

Alvar savannah or treed alvar dominated by stunted White Cedar, White Spruce and often Tamarack trees, saplings and seedlings were sampled by Schaefer (1995) at the FON Bruce Alvar. The site has alvar pavement interspersed with 'curtain forests' (treed areas growing in linear crevices) dominated by Jack Pine and White Cedar, resulting in overall tree cover of approximately 25%. Treed sections are most prevalent in the northeastern part of this alvar, as well as around the fringes of the more open pavement section in the southwest. The low shrub layer, which occurs primarily in the vicinity of the curtain forests, is dominated, in order of frequency, by Creeping Juniper, Shrubby Cinquefoil,

Common Juniper and Bearberry. Tufted Hairgrass, Poverty Oat Grass, Lance-leaved Coreopsis and Balsam Ragwort are the dominant herbs, with the globally rare Great Lakes endemic, Lakeside Daisy, also very common. The mosses *Tortella tortuosa*, *Ditrichum flexicaule* and *Schistidium rivulare* are very common on the pavement, which is covered by the rock surface algae *Gloeocapsa alpina*. With the exception of the FON boardwalk, there is little or no evidence of recent human disturbance at this site.

Condition

The alvars of the FON nature reserve and adjacent provincial lands are all considered to be in excellent condition, with minimal disturbance and few introduced species. The trail and boardwalk of the FON reserve caused some initial localized disturbance at the site, but ultimately serve to encourage visitors from trampling the alvar vegetation. Nevertheless, it is likely that occasional individuals disregard the clearly displayed signs imploring people to stay on the trail.

The alvar northeast of Dyer's Bay Road – Highway 6 has been considerably more impacted by past land uses. Gravel from road construction has severely disturbed the edge of the alvar along Highway 6, and exotic knapweeds (*Centaurea* sp.) and other non-native species have invaded this area. A remarkable amount of garbage has been dumped into the crevices of the alvar, at least in areas along and old driveway that bisects the community. Discarded ammunition shells were noted during the 2005 survey, an old campfire site is present, and there are a few cut stumps. However, overall the alvar is in reasonable condition and, with time, will undoubtedly recovery ecologically from past disturbances. The north end of the alvar is much less disturbed than the south end. Also, there are some areas of unvegetated exposed soil on this alvar, possibly natural in origin. Charred woody debris is present, indicating past fire. The alvar at this site will likely recover now that it has been secured by The Nature Conservancy of Canada.

Diversity

The alvars in the Dyer's Bay Road – Highway 6 area are among the most biologically diverse on the Bruce Peninsula. Combined, there are five alvar community types, which sustain at least 131 plant taxa, of which 118 are native to Ontario. A high total of 23 vascular plant taxa with strong alvar affinities occurs.

Ecological Functions

The alvars in the Dyer's Bay Road – Highway 6 area are part of the large Johnston's Harbour – Pine Tree Point natural area. Much of this area is protected by the province, Bruce Peninsula National Park, non-government conservation organizations and the provincial life science ANSI designation. It protects major portions of the Crane River and Brinkman's Creek watersheds, including headwaters of tributaries, as well as wetlands that provide recharge functions. Woody vegetation in the site's wetlands and

shorelines helps maintain the water quality and natural hydrological regimes of the local watershed. The site is a critical core area and linkage in landscape connectivity in the upper Bruce Peninsula region. The site is a corridor for the movement of a variety of organisms, and its position near the western coast of the Bruce Peninsula suggests that it is an important staging area for migrating landbirds. The integrity of Lake Huron shoreline, treed and shrub rock barren, forest, riparian, interior wetland and alvar ecosystem functions are currently maintained in the extensive undeveloped portions of the area.

Special Features

A high diversity of globally and provincially rare flora and fauna occur in the alvars and adjacent habitats of the Dyer's Bay Road – Highway 6 area. In addition to the provincially rare taxa discussed below, a high total of 11 vascular plant taxa considered rare or very uncommon on the Bruce Peninsula (BGPC 2003) have been documented at this meta-site.

A Moss *Pseudocalliergon turgescens* G3G5 S2
 This provincially rare moss, which occurs at a number of Bruce Peninsula alvars, was found by Schaefer (1995) at the FON Bruce Alvar Nature Reserve site.

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR G3 S3
 The globally rare, nationally threatened and provincially rare Dwarf Lake Iris occurs abundantly over a large area in the Johnston's Harbour – Pine Tree Point ANSI. It is a major understorey dominant in a 6 km² area in the northeastern interior, west of Highway 6 between Dyer's Bay Road and the Crane River, both in open woodlands and along the fringes of alvar patches. Habitats range from drier Jack Pine and White Cedar coniferous and mixed woodlands, to moist White Cedar coniferous forests, to alvar fringes and alvar 'curtain' woodlands, to untrampled sections of lightly-used trails. The area sustains a huge population, undoubtedly one of the largest in the world. Makkay (2004) estimated approximately 125,000 shoots in the Pine Tree Harbour and Dyer's Bay Road – Brinkman's Corners areas. Findings of the present study suggest that these estimates are low, as the author estimates that at least 100,000 shoots were visible solely from the transects walked during 2003 and 2004 field surveys, and that this represents only a fraction of the number of plants in the ANSI. Approximately 430 shoots of Dwarf Lake Iris were counted along the fringes of the alvar northeast of Dyer's Bay – Road and Highway 6, mainly in the southern portion of the alvar. The bulk of its global population is found near Lake Huron on the Bruce Peninsula and Manitoulin Island. It is known from about 60 sites in Michigan and 15 sites in Wisconsin (Makkay 2004).

Lakeside Daisy *Hymenoxys herbacea* COSEWIC-THR OMNR-THR G2S2
 Lakeside Daisy, also known as Stemless Rubberweed or Manitoulin Gold, is another globally rare, nationally and provincially threatened species endemic to the Great Lakes basin. In fact, it is believed that at least 95% of its global distribution is on the alvars of the Bruce Peninsula and Manitoulin Island. Outside of Canada, Lakeside Daisy is known from only two natural populations: a very small occurrence in Mackinac County,

Michigan, and at Marblehead Quarry, Ohio. Although restricted in range, Lakeside Daisy may be abundant or even dominant at locations where it does occur. The FON Bruce Alvar Nature Reserve area sustains the largest population of Lakeside Daisy in Ontario outside of Manitoulin Island (Jones and Jalava 2005). The population extends onto public lands in an alvar patch northwest of the private nature reserve. A survey at the site in 2000 by Campbell (2002) documented three subpopulations totaling an estimated 1,368,270 flowering ramets and 131,905,826 vegetative ramets (NHIC 2006). However these totals are likely considerably inflated, as Campbell *et al.* (2002) considerably overestimated the extent of habitat occupied by the species at the site (Campbell pers. comm. 2006). The consolidated total of surveys at the site by the author in 2004 and McGuire (2006) was approximately 23,000 Lakeside Daisy plants.

Ram's-head Lady's-slipper *Cypripedium arietinum* G3S3

A large population of the globally and provincially rare Ram's-head Lady's-slipper was noted by Johnson (1982) in the vicinity of the (now) FON Bruce Alvar Nature Reserve. The species was found there by Varga *et al.* (1995), but more recent records are not available (NHIC 2004). One Ram's-head Orchid (G3G4S3) was also found at the edge of the alvar northeast of Dyer's Bay Road and Highway 6 by Jalava (2005). This orchid is uncommon on the Bruce Peninsula, with numbers in individual populations fluctuating substantially from year to year.

Laurentian Bladder Fern *Cystopteris laurentiana* G2G4S2S3

A specimen of the provincially rare Laurentian Bladder Fern growing in a deep bedrock crevice in an alvar shrubland in the northeastern part of the ANSI was collected by the author in 2004. The crevice contained 28 fronds of this species. There are a number of records of this eastern North American taxon in Bruce and Grey counties, several of them from sites along the Niagara Escarpment (Riley *et al.* 1996).

Limestone Oak Fern *Gymnocarpium robertianum* G5S2

A dense patch (170-200 stems) of Limestone Oak Fern (G5S2) is found in a crevice in the northeastern part of the alvar northeast of Dyer's Bay Road and Highway 6. A smaller population consisting of five fronds of Limestone Oak Fern was found by the author in a small crevice near the edge of an alvar patch on public land just north of the FON Bruce Alvar Nature Reserve. Another small population of 60 fronds is also found within the FON reserve (NHIC 2006). Fewer than 25 occurrences of this species are known for Ontario, where it occurs from the Lake of the Woods area near the Manitoba border to locations in eastern Ontario. Approximately 12 stations of Limestone Oak Fern are known for the upper Bruce Peninsula.



Figure 10. Provincially rare Limestone Oak Fern at the alvar northeast of Dyer's Bay Road and Highway 6

Northern Dropseed *Sporobolus heterolepis* G5S3

Northern Dropseed, also known as Prairie Dropseed, is a provincially rare grass that is more common in western North America. It has been found at a number of higher quality alvar habitats in Ontario (Brownell and Riley 2000) and is not considered rare on the Bruce Peninsula (BGPC 2003). In the Johnston's Harbour – Pine Tree Point area, a few patches of this species are found at the FON Bruce Alvar Nature Reserve alvar, covering an area approximately 25 m² (Schaefer 1995), and it is a dominant in a small alvar-fen intergrade community in the northwestern part of the site Johnson (1982).

Purple-stemmed Cliff-brake *Pellaea atropurpurea* G5S3

The provincially rare fern, Purple-stemmed Cliff-brake, was found by the author in two patches at a White Cedar – Jack Pine treed alvar in the northeastern part of the ANSI. Each patch contained seven plants. This species is also known from the FON Bruce Alvar Nature Reserve alvar, where 61 fronds have been counted (NHIC 2006, Schaefer 1995, Varga *et al.* 1995), and from a bedrock outcrop along Highway 6 northwest of Dyer's Bay Road. It is considered rare on the Bruce Peninsula (BGPC 2003), and is

known in Ontario from crevices, ledges and cliffs in limestone bedrock on Manitoulin Island, the Bruce Peninsula, the Niagara Peninsula and several sites in eastern Ontario.

Tuberous Indian-plantain *Arnoglossum plantagineum* G4G5S3

A population of the provincially rare Tuberous Indian-plantain is found in an alvar-fen intergrade on public land just northwest of the FON Bruce Alvar Nature Reserve was estimated to contain 250-300 flowering plants and 1,000-1,500 vegetative plants by Jalava (2005). Tuberous Indian-Plantain is locally common in fens and wet alvars in the vicinity of Lake Huron in Bruce County, but its distribution elsewhere in the province is restricted to just a few locations in southwestern Ontario and one site in Simcoe County.

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3S3

Threatened (Eastern) Massasauga rattlesnakes are quite frequently encountered at the Johnston's Harbour – Pine Tree Point ANSI. NHIC (2006) contains numerous recent records for the ANSI and its vicinity, and the author has had several observations at the site, including two individuals recently emerged from hibernation in the alvar southwest of the FON reserve, and one from the FON reserve itself.

A Land Snail *Vertigo paradoxa* G2G3 S2S3

This globally and provincially rare species of land snail was found at the FON Bruce Alvar Nature Reserve during surveys of the International Alvar Conservation Initiative (IACI) (Reschke *et al.* 1999).

Striped Camel Cricket *Ceuthophis meridionalis* G? S2S3

The provincially rare Striped Camel Cricket was found at the FON Bruce Alvar Nature Reserve during insect surveys of the IACI (Bouchard 1998).

A Sawfly *Rhadinoceraea* sp. n. G? S?

According to Bouchard (1998), "two adult specimens collected [at the FON Bruce Alvar] in 1997 are thought to be a new species to science, which probably feeds on [White Camass], a restricted species found in all Ontario alvar regions except for the Smith Falls Plains."

A Ground Beetle *Selenophorus opalinus* G? S?

This species of ground beetle has not been assigned a conservation rank by NHIC or NatureServe. However, according to Bouchard (1998), it is "very rare in Canada." One specimen was collected at the FON Bruce Alvar Nature Reserve by Bouchard (1998).

Provincially significant species occurring in nearby habitats:

Hill's Thistle *Cirsium hillii* COSEWIC-THR G3S3

This globally and provincially rare species is widespread in the Johnson's Harbour – Pine Tree Point area in Jack Pine or White Cedar treed barrens, open Jack Pine woodlands, in partial shade in Common Juniper shrub barrens, and occasionally along trails through these habitats.

Cooper's Milk-vetch *Astragalus neglectus* G4S3
The globally uncommon and provincially rare Cooper's Milk-vetch is widespread in the Johnston's Harbour – Pine Tree Point area where it species appears to prefer dry sandy soils with partial shade in open woodlands, treed barrens, shrub barrens and the fringes of alvar habitats.

Roundleaf Ragwort *Packera obovata* G5S3
The provincially rare Roundleaf Ragwort was found at 30 different locations in the Johnston's Harbour – Pine Tree Point area, with more than 1,200 individual plants counted. Colonies at the site ranged from 5 to 10 plants to hundreds of plants. It is widespread but uncommon on the Bruce Peninsula, where it usually occurs in dry to dry-fresh open mixed woodlands and small clearings, often in sandy soil. The author's observations suggest that open White Birch – conifer woodlands with sandy soils are the preferred habitat on the Bruce Peninsula, and that the species may benefit from periodic wildfires.

Eastern Ribbonsnake *Thamnophis sauritus* G5S3 COSEWIC-SC
The provincially rare Species of Concern, Eastern Ribbonsnake, is widespread in southern Ontario, preferring habitat mosaics that include mixed or deciduous forests and wetland habitats. Schueler (1992) indicates two records for the Crane River area between 1983 and 1990. It is likely that a population of this species persists in the area, but the small number of records suggests that it is uncommon to rare at the site.

Milksnake *Lampropeltis triangulum* G5S3 COSEWIC-SC
Milksnake, another Special Concern species, is also widespread in southern Ontario, preferring open habitats such as alvars, rock barrens, hayfields and pasture, as well as open woodlands. Schueler (1992) indicates two records for the Crane River area between 1983 and 1990. As with Ribbonsnake, it is likely that a population of this species persists in the area, but the few observations suggest that it is uncommon to rare.

Conclusions and Recommendations

Evaluation and Significance

The alvars of the Dyer's Bay Road – Highway 6 area are among the most significant on the Bruce Peninsula. A high diversity of globally and provincially rare and threatened flora and fauna occur within the alvars and in their immediate vicinity. The alvars support the region's largest population of the globally rare and nationally threatened Lakeside Daisy. The alvars and nearby habitats sustain what is probably the world's largest population of the threatened Dwarf Lake Iris. The five different alvar community types are generally in excellent condition, and sustain a large number of species with a strong affinity to alvar habitats.

Threats

Because all of these alvars have been secured by agencies interested in their protection, the main threat to their ecological quality is trampling by visitors who leave designated

trails. There is also the potential for illegal ATV access, but appropriate signage is already in place to discourage this.

Management

It is recommended that a passive management approach be continued at these alvars. Vigilance in restricting visitors to designated trails is essential.

Some habitat restoration and litter removal should be considered for the alvar northeast of Dyer's Bay Road and Highway 6. If this Nature Conservancy owned property is to have public access, trail or boardwalk development should take into consideration impacts on the alvar habitat.

Future Inventory Needs

1. Non-vascular plants, invertebrates and other fauna have not been formally surveyed at alvar patches other than the main FON Bruce Alvar site.
2. Monitoring of habitat quality and rare species populations should be undertaken on a regular basis.

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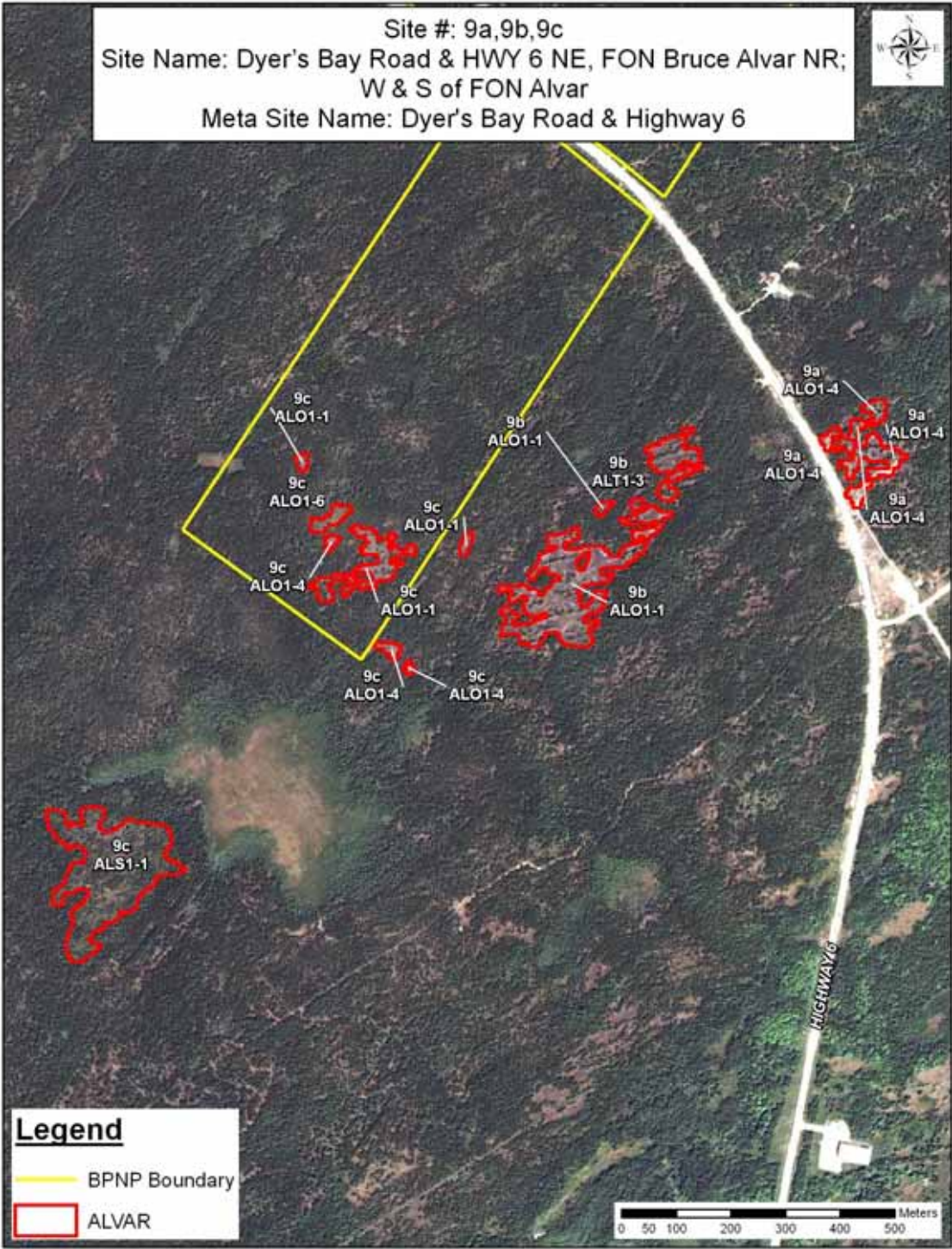
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Vascular Plants of the Dyer's Bay Road & Highway 6 Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	9a ALO1-4	9b	9c ALO1-1	9c ALO1-4	9c ALO1-6	9c ALTI-3
<i>Pellaea atropurpurea</i> (L.) Link	Purple-stemmed Cliff-brake	G5	S3			R	13	M		X		X		
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5	S5			X	16		X			X		
<i>Thelypteris palustris</i> Schott	Marsh Fern	G5T?	S5			X	17			X				
<i>Asplenium trichomanes</i> L.	Maidenhair Spleenwort	G5	S5			X	19		X	X	X	X		
<i>Asplenium trichomanes-ramosum</i> L.	Green Spleenwort	G4	S4			X	19		X	X	X	X		
<i>Cystopteris laurentiana</i> (Weath.) Blasdell	Laurentian Bladder Fern	G2G4	S2S3			R	20							X
<i>Gymnocarpium robertianum</i> (Hoffm.) Newman	Limestone Oak Fern	G5	S2			R	20		X		X			
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33		X	X				
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	X			X	
<i>Pinus banksiana</i> Lambert	Jack Pine	G5	S5			X	33		X	X	X	X	X	X
<i>Pinus resinosa</i> Aiton	Red Pine	G5	S5			X	33		X		X	X		
<i>Juniperus communis</i> L. var. <i>depressa</i> Pursh	Common Juniper	G5T5	S5			X	34		X	X	X	X		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X	X	X	X	
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X	X	X	X	X
<i>Anemone cylindrica</i> A. Gray	Long-fruited Thimbleweed	G5	S4			X	130		X					
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X	X	X	X		
<i>Thalictrum dioicum</i>	Early Meadow-rue	G5	S5			X	130			X				
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X	X	X	X		
<i>Betula pumila</i> L.	Swamp Birch	G5	S5			X	165						X	
<i>Arenaria serpyllifolia</i> L.	Thyme-leaved Sandwort	G?	SE5			XI	178			X		X		
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X	X	X	X		
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X					
<i>Viola adunca</i> Smith	Sand Violet	G5	S4S5			R	218					X		
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218				X		X	
<i>Populus balsamifera</i> L.	Balsam Poplar	G5T?	S5			X	234		X	X				
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	G5	S5			X	234		X					
<i>Salix humilis</i> Marshall	Upland Willow	G5	S5			X	234			X				
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M			X	X		
<i>Arabis lyrata</i> L. var. <i>lyrata</i>	Lyre-leaved Rock-cress		S4			X	237			X				
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X	X	X		X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258						X	
<i>Trientalis borealis</i> Raf. ssp. <i>borealis</i>	Starflower	G5T?	S5			X	258		X					
<i>Saxifraga virginensis</i> Michaux	Early Saxifrage	G5	S5			R	276	M		X				
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R	Saskatoon-berry	G5	S4?			X	277	M		X				
<i>Amelanchier sanguinea</i> (Pursh) DC.	Juneberry	G5	S5?			X	277				X			

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	9a ALO1-4	9b	9c ALO1-1	9c ALO1-4	9c ALO1-6	9c ALT1-3
<i>Fragaria vesca L. ssp. americana (Porter)</i>	Woodland Strawberry	G5T?	S5			X	277			X				
<i>Fragaria virginiana Miller</i>	Wild Strawberry	G5	S5			X	277		X		X	X		
<i>Potentilla fruticosa L. ssp. floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M			X	X	X	X
<i>Potentilla recta L.</i>	Rough-fruited Cinquefoil	G?	SE5			XI	277			X				
<i>Prunus pensylvanica L.f.</i>	Pin Cherry	G5	S5			X	277					X		
<i>Prunus pumila L.</i>	Sand Cherry	G5	S4S5			X	277	Mt?		X	X	X		
<i>Prunus virginiana L. ssp. virginiana</i>	Choke Cherry	G5T?	S5			X	277		X	X	X	X		
<i>Rosa acicularis Lindley</i>	Prickly Wild Rose	G5TU	S5			X	277		X	X	X	X		
<i>Rosa blanda Aiton</i>	Smooth Wild Rose	G5	S5			X	277		X					
<i>Rubus allegheniensis Porter</i>	Common Blackberry	G5	S5			X	277					X		
<i>Rubus idaeus L. ssp. melanolasius (Dieck)</i>	Wild Red Raspberry	G5	S5			X	277					X		
<i>Shepherdia canadensis (L.) Nutt.</i>	Soapberry	G5	S5			X	286			X				
<i>Epilobium ciliatum Raf. ssp. glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301			X				
<i>Oenothera perennis L.</i>	Sundrops	G5	S4S5			X	301			X				
<i>Cornus canadensis</i>	Bunchberry	G5	S5			X	307			X				
<i>Cornus foemina Miller ssp. racemosa</i>	Grey Dogwood	G5?	S5			R	307			X				
<i>Cornus rugosa Lam.</i>	Round-leaved Dogwood	G5	S5			X	307		X					
<i>Cornus stolonifera Michaux</i>	Red-osier Dogwood	G5	S5			X	307				X	X		
<i>Comandra umbellata (L.) Nutt.</i>	Bastard-toadflax	G5	S5			X	313		X	X				
<i>Rhamnus alnifolia L'Her.</i>	Alder-leaved Buckthorn	G5	S5			X	338				X			
<i>Polygala paucifolia Willd.</i>	Fringed Polygala	G5	S5			X	350		X	X				
<i>Polygala senega L.</i>	Seneca Snakeroot	G4G5	S4			X	350	H	X	X	X		X	X
<i>Daucus carota L.</i>	Wild Carrot	G?	SE5			XI	374		X					
<i>Halenia deflexa (Smith) Griseb. Ssp. deflexa</i>	Spurred Gentian	G5	S5			X	376			X				
<i>Apocynum androsaemifolium L.</i>	Spreading Dogbane	G5T?	S5			X	378			X				
<i>Asclepias incarnata L. ssp. incarnata</i>	Swamp Milkweed	G5T5	S5			X	379						X	
<i>Solanum dulcamara L.</i>	Climbing Nightshade	G?	SE5			XI	382		X					
<i>Acinos arvensis (Lam.) Dandy</i>	Basil Balm	G5	SE5			XI	392					X		
<i>Calamintha arkansana (Nutt.) Shinn.</i>	Wild Savory	G5	S4S5			X	392	M	X	X	X		X	X
<i>Clinopodium vulgare L.</i>	Wild Basil	G?	S5			X	392		X			X		
<i>Prunella vulgaris L.</i>	Heal-all	G5	S5			X	392		X	X	X			
<i>Castilleja coccinea (L.) Sprengel</i>	Indian Paintbrush	G5	S5			X	399	M		X	X		X	
<i>Melampyrum lineare Desr.</i>	Cow-wheat	G5	S4S5			X	399			X				
<i>Verbascum thapsus L.</i>	Common Mullein	G?	SE5			XI	399		X	X		X		
<i>Veronica arvensis L.</i>	Corn Speedwell	G?	SE5			XI	399			X				
<i>Campanula rotundifolia L.</i>	Harebell	G5	S5			X	411		X	X	X	X		
<i>Lobelia kalmii L.</i>	Kalm's Lobelia	G5	S5			X	411						X	
<i>Houstonia canadensis Willd.</i>	Fringed Houstonia	G4G5	S4?			X	416			X				
<i>Diervilla lonicera Miller</i>	Bush-honeysuckle	G5	S5			X	418		X	X	X			

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	9a ALO1-4	9b	9c ALO1-1	9c ALO1-4	9c ALO1-6	9c ALT1-3
<i>Linnaea borealis</i> L. ssp. <i>longiflora</i>	Twinflower	G5T?	S5			X	418			X				
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	X				
<i>Lonicera oblongifolia</i> (Goldie) Hooker	Swamp Fly-honeysuckle	G4	S5			X	418				X	X	X	
<i>Viburnum rafinesquianum</i> Schultes	Downy Arrow-wood	G5	S5			X	418			X				
<i>Arnoglossum plantagineum</i>	Tuberous Indian-plantain	G5G5	S3			X	423						X	
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423		X	X				
<i>Aster cordifolius</i> L.	Heart-leaved Aster	G5	S5			X	423					X		
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X				
<i>Aster urophyllus</i> Lindley	Arrow-leaved Aster	G4	S4			X	423		X					
<i>Centaurea</i> sp.	Knapweed species	G?	SE			XI	423		X					
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X					
<i>Coreopsis lanceolata</i> L.	Lance-leaved Coreopsis	G5	S4?			R	423	E	X	X	X			
<i>Doelleringia umbellata</i>	Flat-topped Aster	G5	S5			X	423		X					
<i>Erigeron philadelphicus</i> L. ssp. <i>philadelphicus</i>	Philadelphia Fleabane	G5T?	S5			X	423		X					
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423			X	X	X		
<i>Hieracium piloselloides</i> Villars	King Devil Hawkweed	G?	SE5			XI	423		X					
<i>Hymenoxis herbacea</i>	Lakeside Daisy	G2	S2	T	T	R	423	H		X	X			
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X	X	X	X	X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X	X	X	X		
<i>Solidago juncea</i>	Early Goldenrod	G5	S5			X	423			X				
<i>Solidago nemoralis</i> Aiton	Gray Goldenrod	G5T?	S5			X	423		X					
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X	X	X	X	X
<i>Solidago simplex</i> Kunth ssp. <i>simplex</i> var. <i>simplex</i>	Goldenrod	G5T5	S4			R	423	Mt?	X					
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X	X	X	X		
<i>Symphyotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicled Aster	G5	S5			X	423						X	
<i>Symphyotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423		X					
<i>Taraxacum erythrospermum</i> Andr. ex Besser	Red-seeded Dandelion	G?	SE5			XI	423		X					
<i>Taraxacum officinale</i> G. Weber	Common Dandelion	G5	SE5			XI	423		X			X		
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455			X				
<i>Carex capillaris</i> L.	Hair-like Sedge	G5	S5			X	457						X	
<i>Carex castanea</i>	Chestnut Sedge	G5	S5			X	457			X				
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E		X	X			
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X	X	X		
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X	X	X		X	X
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X	X	X	X		X
<i>Carex scirpoidea</i> Michx.	Scirpus-like Sedge	G5	S5			X	457	H		X		X		
<i>Carex umbellata</i> Schkuhr ex Willd.	Umbellate Sedge	G5	S5			R	457			X				

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	9a ALO1-4	9b	9c ALO1-1	9c ALO1-4	9c ALO1-6	9c ALT1-3
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457						X	
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	G5	S5			X	457						X	
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457						X	
<i>Scirpus cespitosus</i> L.	Tufted Bulrush	G5T	S5			X	457						X	
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X	X	X	X	X	X
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv	Canada Blue-joint	G5	S5			X	458		X	X	X			X
<i>Calamagrostis stricta</i> (Timm) Koeler	Northern Reed Grass	G5T5	S5			X	458		X					
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X	X	X	X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X					
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X	X				
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M	X	X				
<i>Oryzopsis asperifolia</i> Michaux	Rough-leaved Mountain-rice	G5	S5			X	458		X	X	X			
<i>Oryzopsis pungens</i> (Torrey ex Sprengel) A. H	Sharp-leaved Mountain-rice	G5	S5			VU	458		X			X		
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	X		X		
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5T5	S4			X	458		X		X			X
<i>Panicum philadelphicum</i> Bernh. ex Trin.	Philadelphia Witch Grass	G5	S4			O	458	H		X				
<i>Poa pratensis</i> L. ssp. <i>pratensis</i>	Kentucky Blue Grass	G5T	S5			X	458			X				
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X	X				
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	Prairie Dropseed	G5	S3			X	458	E		X				
<i>Sporobolus vaginiflorus</i>	Ensheathed Dropseed	G5	S4			X	458		X	X				
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475			X				
<i>Maianthemum canadense</i>	Wild Lily-of-the-valley	G5	S5			X	475		X	X				
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475			X	X		X	
<i>Tofieldia glutinosa</i> (Michaux) Pers.	False Asphodel	G5T4	S4?			X	475						X	
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475		X	X	X	X	X	X
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M		X	X		X	
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476		X					
<i>Cypripedium arietinum</i> R. Br.	Ram's-head Lady's-slipper	G3	S3			X	489		X	*				
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X	X	X	X		
<i>Epipactis helleborine</i>	Helleborine	G?	SE5			XI	489		X	X		X		
<i>Goodyera oblongifolia</i>	Menzie's Rattlesnake-plantain	G5	S4			X	489			X				
<i>Platanthera hyperborea</i>	Northern Green Orchid	G5	S5			X	489						X	
<i>Spiranthes romanzoffiana</i>	Hooded Ladies'-tresses	G5	S5			X	489			X	X			X

Non-Vascular Plants of the FON Bruce Alvar Nature Reserve

A= algae, B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	FON Alvar
A	<i>Gloeocapsa alpina</i>			X
A	<i>Nostoc musconum</i>			cf
A	<i>Trentepohlia annulata</i>	T	T	X
B	<i>Abietinella abietinum</i>	G4G5	S5	X
B	<i>Amblystegium riparium</i>	T	T	X
B	<i>Barbula</i> sp.			X
B	<i>Brachythecium calcareum</i>	G3G4	S2	X
B	<i>Brachythecium</i> sp.			X
B	<i>Bryum</i> sp.			X
B	<i>Campylium stellatum</i>	G5	S5	X
B	<i>Dicranum flagellare</i>	G5	S5	X
B	<i>Dicranum fuscescens</i>	G5	S5	X
B	<i>Dicranum montanum</i>	G5	S5	X
B	<i>Dicranum polysetum</i>	G5	S5	X
B	<i>Ditrichum flexicaule</i>	G5	S5	X
B	<i>Encalypta procera</i>	G4G5	S5	X
B	<i>Fissidens adianthoides</i>	G5	S5	X
B	<i>Fissidens</i> sp.			X
B	<i>Gymnostomum aeruginosum</i>	G5	S5	X
B	<i>Hypnum</i> sp.			X
B	<i>Pleurozium schreberi</i>	G5	S5	X
B	<i>Pohlia nutans</i>	G5	S5	X
B	<i>Polytrichum juniperinum</i>	G5	S5	X
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2	X
B	<i>Schistidium rivulare</i>	G4G4	S5	X
B	<i>Sphagnum</i> sp.			X
B	<i>Tetraphis pellucida</i>	G5	S5	X
B	<i>Thuidium recognitum</i>	G5	S5	X
B	<i>Tortella fragilis</i>	G4G5	S4	X
B	<i>Tortella inclinata</i>	G4G5	S2	cf.
L	<i>Acarospora glaucocarpa</i>	G5?	S4?	X
L	<i>Caloplaca ammiospila</i>	G4G5	S1	X
L	<i>Catapyrenium lachneum</i>	G5	S?	X
L	<i>Cetraria arenaria</i>	G4	S4?	X
L	<i>Cladina mitis/arbuscula</i>			X
L	<i>Cladina rangiferina</i>	G5	S5	X
L	<i>Cladina stellaris</i>	G5	S4?	X
L	<i>Cladonia chlorophaea</i>	GU	S5	X
L	<i>Cladonia coniocraea</i>	G5	S5	X
L	<i>Cladonia incrassata</i>	T	T	cf.
L	<i>Cladonia macilentata</i>	G5	S5?	X
L	<i>Cladonia multiformis</i>	G3G5	S4?	X
L	<i>Cladonia parasitica</i>	G3G5	S?	X
L	<i>Cladonia pyxidata</i>	G5	S5	X
L	<i>Cladonia symphylicarpa</i>	G3G5	S?	X
L	<i>Cladonia turgida</i>	G3G5	S5?	X
L	<i>Collema coccophorum</i>	G3G5	S?	X
L	<i>Dermatocarpon weberi</i>	T	T	X
L	<i>Lepraria finkii</i>	T	T	X
L	<i>Peltigera canina</i>	G5	S5?	X
L	<i>Placynthium nigrum</i>	G?	S5?	X
L	<i>Protoblastenia rupestris</i>	G?	S5?	X
L	<i>Psora decipiens</i>	G?	S1S2	X
L	<i>Stereocaulon glaucescens</i>	G3	S1	X
L	<i>Thelidium cf. absconditum</i>	T	T	X
L	<i>Toninia sedifolia</i>	G?	S?	X
L	<i>Xanthoria elegans</i>	G3G5	S5?	X

Site 10. EAGLE POINT

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/4

NAD83 UTM: 17T 451421 5004342

Ownership: Private

Protection: Not protected

Survey Dates (Surveyors): September 13, 2005 (J. Jalava)

Total Extent of Alvar: 1.3 ha

Overall Alvar Quality Rank: C

Directions: The Eagle Point alvar site is reached by taking Warner Bay Road southwest off Highway 6 just south of Tobermory to the T-intersection. Turn left at the T and follow the road beyond two sharp bends to the left followed by a very sharp bend to the right. The alvars are along the lakeshore approximately 0.6 km beyond this sharp bend on private land. Permission to access should be obtained from the landowners.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (native)	NHIC-Tracked Species
10. Eagle Point – Eagle Harbour	Rvp	IKONOS	1	8	44 (42)	1

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Dolostone bedrock areas just above the high water mark along the Lake Huron shore in the Eagle Point area on the northwestern Bruce Peninsula have variable undulating topography, resulting in a diverse, complex alvar mosaic habitats host to both dry land and wetland associated species (Figure 1). The predominant vegetation community type at the site is Little Bluestem alvar grassland, with smaller patches of pavement, shrubland and fen-like wet meadows nested within this community. Although the area has been subdivided into waterfront recreational lots, disturbance levels are currently surprisingly low and localized. Observations during the present study suggest that existing landowners appear to be making efforts not to impact heavily on the coastal environment, and future stewardship efforts might prove to be relatively successful in this area.

Alvar Representation

ALOI-3 Dry-fresh Little Bluestem Open Alvar Meadow Type

The Eagle Point alvar occurs just above high water mark along Lake Huron shore. It has somewhat undulating (maximum amplitude approximately 1m) pitted and fissured bedrock, with glacial striations, and some flat sections. The overall slope aspect is southwesterly. Dolostone fragments are common, but there is also much exposed bedrock (30% of the overall surface area). Seasonal pooling occurs in poorly drained depressions, and some areas are permanently wet to moist. The sandy-organic soils are generally very

shallow to non-existent, except in moist depressions, averaging 0 (to <1-2) cm deep in dry areas, and 2 to 5 cm deep in moist depressions.

Sparsely scattered White Cedar trees and saplings occur on the alvar, along with occasional White Spruce and Tamarack. Low shrubs are patchily common, with Shrubby Cinquefoil dominant. Knee-high stunted White Cedars are also quite common, while Creeping Juniper mats are frequent along the drier fringes of the alvar. For a coastal bedrock alvar, the herb layer is quite extensive, though patchy, with Little Bluestem being the most common species overall. Richardson's Sedge and Rock Sandwort are common in the driest parts of the alvar, Ensheathed Dropseed is common in moist patches, while in the wettest areas Twig-rush is dominant and Silverweed is a secondary species. Associates in the herb layer include Upland White Goldenrod, Balsam Ragwort and Bluets. The rock-surface algae, *Gloeocapsa alpina*, covers most of the exposed bedrock, while microbial mats occur in shallow, moist depressions.



Figure 1. The rugged pitted bedrock of the Eagle Point alvar

Condition

The alvar has a large amount of woody debris, some of it charred wood, indicating past fire. The ecological quality is very good, with only very localized disturbance by a small kayak launch and sitting area near shore, some wood cutting, a tent trailer, and a privy and fire pit. The area overall, however, is potentially threatened by cottage development.

Diversity

A brief survey of the Eagle Point alvar recorded 44 vascular plant species. The alvar has been classified as one community type, but within that community is a diversity of moisture levels depending on microtopographic position and drainage conditions.

Ecological Functions

The Eagle Point alvar is part of the Lake Huron coastal ecosystem. Bedrock shoreline communities are the main adjacent community type. Shorelines are areas of high biodiversity, with the majority of aquatic species occurring in the nearshore littoral zone. Most terrestrial fauna also use the shoreline ecotone during some part of their life cycle.

Special Features

Ram's-head Lady's-slipper *Cypripedium arietinum* G3S3
According to Schaefer (1996), the globally and provincially rare Ram's-head Lady's-slipper occurs at the Eagle Point alvar. This orchid is uncommon on the Bruce Peninsula, with numbers in individual populations fluctuating substantially from year to year.

Conclusions and Recommendations

Evaluation and Significance

The Eagle Point alvar provides high-quality but minor representation of Little Bluestem alvar along the Lake Huron coastal backshore.

Threats

Cottage development and trampling of vegetation are the primary threats to this alvar.

Management

The private landowners of the Eagle Point alvar should be provided information that will help them protect the globally significant values of the alvar on their lands.

Future Inventory Needs

1. Non-vascular plants, invertebrates and other fauna have not been formally surveyed at this site.
2. Regular monitoring of habitat quality and rare species populations.

References

Jalava, J.V. 2005. Biological Surveys of Bruce Peninsula Alvars 2005 Summary Report. Prepared for Bruce Peninsula National Park, Parks Canada. iii + 80 pp.

Schaefer, C. 1996. Report for the Alvar Initiative Project on Potential Bruce Peninsula Alvar Sites for Further Investigation. Manuscript. 7pp + air photos and maps.



Vascular Plants of the Eagle Point – Eagle Harbour Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	ALOI-3
<i>Larix laricina (Du Roi) K. Koch</i>	Tamarack	G5	S5			X	33		X
<i>Picea glauca (Moench) Voss</i>	White Spruce	G5	S5			X	33		X
<i>Juniperus horizontalis Moench</i>	Creeping Juniper	G5	S5			X	34	M	X
<i>Thuja occidentalis L.</i>	White Cedar	G5	S5			X	34		X
<i>Aquilegia canadensis L.</i>	Wild Columbine	G5	S5			X	130		X
<i>Betula papyrifera Marshall</i>	Paper Birch	G5	S5			X	165		X
<i>Minuartia michauxii (Fenzl) Farw.</i>	Rock Sandwort	G5	S5			X	178		X
<i>Hypericum kalmianum L.</i>	Kalm's St. John's-wort	G4	S4			X	200	M	X
<i>Salix candida Fluegge ex Willd.</i>	Hoary Willow	G5	S5			X	234		X
<i>Salix discolor Muhlenb.</i>	Pussy Willow	G5	S5			X	234		X
<i>Brassica rapa L.</i>	Field Mustard	G?	SE5			XI	237		X
<i>Rorippa sylvestris (L.) Besser</i>	Creeping Yellow Cress	G5	SE5			X	237		X
<i>Arctostaphylos uva-ursi (L.) Sprengel</i>	Bear-berry	G5	S5			X	247		X
<i>Fragaria virginiana Miller</i>	Wild Strawberry	G5	S5			X	277		X
<i>Physocarpus opulifolius (L.) Maxim.</i>	Ninebark	G5	S5			X	277		X
<i>Potentilla anserina L. ssp. anserina</i>	Silverweed	G5	S5			X	277		X
<i>Potentilla fruticosa L. ssp. floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X
<i>Prunus pumila L.</i>	Sand Cherry	G5	S4S5			X	277	Mt?	X
<i>Comandra umbellata (L.) Nutt.</i>	Bastard-toadflax	G5	S5			X	313		X
<i>Lycopus uniflorus Michaux</i>	Bugleweed	G5	S5			X	392		X
<i>Agalinis pauperula (A. Gray) Britton</i>	Small-flowered Agalinis	G5	S4S5			X	399		X
<i>Verbascum thapsus L.</i>	Common Mullein	G?	SE5			XI	399		X
<i>Campanula rotundifolia L.</i>	Harebell	G5	S5			X	411		X
<i>Lobelia cardinalis L.</i>	Cardinal Flower	G5	S5			X	411		X
<i>Houstonia canadensis Willd.</i>	Fringed Houstonia	G4G5	S4?			X	416		X
<i>Artemisia campestris L. ssp. caudata</i>	Sagewort Wormwood	G5T4	S4S5			X	423		X
<i>Aster laevis L.</i>	Smooth Aster	G5	S5			X	423		X
<i>Eupatorium perfoliatum L.</i>	Boneset	G5	S5			X	423		X
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423		X
<i>Euthamia graminifolia (L.) Nutt. ex Cass.</i>	Grass-leaved Goldenrod	G5	S5			X	423		X
<i>Senecio pauperculus Michaux</i>	Balsam Ragwort	G5	S5			X	423	M	X
<i>Solidago canadensis L.</i>	Canada Goldenrod	G5	S5			X	423		X
<i>Solidago nemoralis Aiton ssp. nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X
<i>Solidago ptarmicoides (Nees) B. Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E	X
<i>Solidago uliginosa Nutt.</i>	Bog Goldenrod	G4G5	S5			X	423		X
<i>Symphotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423		X
<i>Carex eburnea Boott ex Hooker</i>	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Carex richardsonii R. Br.</i>	Richardson's Sedge	G4	S4?			X	457	E	X
<i>Cladium mariscoides (Muhlenb.) Torrey</i>	Twig-rush	G5	S5			X	457		X
<i>Agrostis scabra Willd.</i>	Rough Hair Grass	G5	S5			X	458		X
<i>Deschampsia caespitosa (L.) P. Beauv.</i>	Tufted Hair Grass	G5	S5			X	458	H	X
<i>Panicum acuminatum Ell. var. fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Schizachyrium scoparium (Michaux) Nees</i>	Little Bluestem	G5	S4			X	458		X
<i>Sporobolus vaginiflorus (Torrey ex A. Gray)</i>	Ensheathed Dropseed	G5	S4			X	458		X
<i>Cypripedium arietinum R. Br.</i>	Ram's-head Lady's-slipper	G3	S3			X	489		X

Meta-site 11. GEORGE LAKE – EMMET LAKE ROAD

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/3

NAD83 UTM 17T 462501 5003717 (site 11d) (see table below for other alvar UTM)

Ownership: Federal (sites 11a-b, 2g); Provincial/Private (sites 2-b, 2e); First Nation (sites 2f, 2h)

Protection: Bruce Peninsula National Park (sites 11a-d); Cabot Head Area of Natural and Scientific Interest (100%); Saugeen Hunting Grounds (Nawash First Nation) (sites 2f, 2h)

Survey Dates (Surveyors): September 6, 1995, and July 8 and 23, 1996 (C. Schaefer); 1991, June and August 19, 1998 (V. Brownell and P. Catling); August 24, 2006, (R.A. Jones – site 2c, J.

Jalava – site 2f); additional site visits by biologists and naturalists, but published field data generally unavailable.

Total Extent of Alvar: 0.8 ha (Site 11a), 4.7 ha (Site 11c), 10 ha (site 11d); Brownell and Riley (2000) estimate the overall extent of alvar in this area to be almost 500 ha, but this is probably due to air photo interpretation and differing definitions of what constitutes treed alvar vs. treed rock barren habitat.

Overall Alvar Quality Rank: A

Directions: To reach the Cabot Head – Wingfield Basin alvars (site 2a), follow Dyer’s Bay Road almost to the end. Alvar habitat is present west of the road ~0.5km before the Wingfield Basin parking lot, and further west along the vehicle track in an area closed to the public. The George Lake alvar (site 2g) is reached from Highway 6 by turning east on Emmett Lake Road. About half way along there is an alvar openings occur along the road. Continue along the road. With the help of an air photo, the cut survey line between the Park and Cape Croker Hunting Grounds can be located on the right. Follow this cut line (~1 hour) to where an ATV road crosses the survey line. Follow ATV road to left for 1.2 km and to the alvar communities. Permission to access the site along the ATV road from Emmett Lake Road must be obtained be from the Chippewas of Nawash at Cape Croker. Other alvar patches within this meta-sites require bushwhacking and the use of air photos.

Site Name (NAD 83 UTM)	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC Tracked Taxa
11a. North of Umbrella Lake (468148 5008820)	Rvp	IKONOS	1	1	20 (19)	0
11b. S. of Upper Andrew Lake (465600 5005800);	?	IKONOS, Colour IR	?	?	?	?
11c. South of George Lake (464536 5004210)	Rvp	IKONOS	3	12	43 (42)	2
11d. George Lake (462501 5003717)	DRSvpm	IACI	2	19	73 (73)	7
11e. Saugeen Hunting Grounds / East Emmett Lake Road (includes “George Lake Island” and “West of George Lake”) (460400 5005200, 462200 5004200, 463000 5004500)	S	IKONOS, Colour IR	?	?	?	>1
Meta-site Totals			4	22	93 (91)	8

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection;

v = vegetation; p = vascular plants; n= non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Alvar communities are found in several locations in the >9,000 ha natural area in the northeastern part of the Bruce Peninsula between Cabot Head and Emmett Lake Road. The alvars occur on the dolostone bedrock plain above the Niagara Escarpment as well as below the escarpment near Wingfield Basin on a terrace of Manitoulin Formation dolostone. This natural area is almost entirely contained within the Cabot Head ANSI

(which is divided into two sections, the Lindsay Township or “Southern” portion, and the St. Edmunds or “Northern” portion), the largest ANSI in the Niagara Escarpment Biosphere Reserve. Alvars outside the ANSI boundaries but within the continuous natural area occur at the Saugeen Hunting Grounds (Nawash First Nation) near Emmett Lake Road.

The George Lake – Emmett Lake Road area alvars occur as small patches within a matrix vegetation community of fire-successional forests and open bedrock woodlands dominated by White Cedar, with White Birch, Trembling Aspen, Balsam Fir, Large-toothed Aspen and White Spruce as co-dominants or secondary species (Varga 1995). Also frequent are extensive dry Common Juniper rock barrens interspersed with groves of White Cedar, White Spruce and White Birch, semi-open Jack Pine stands, and Eastern Bracken clearings (Varga 1995, Varga and Jalava 1993-1994). Pockets of deeper soil support Sugar Maple stands sometimes mixed with White Birch, as well as stands of Hemlock and Red Oak in a few locations. Occasional Red Pine forests occur near sandy lakeshores, and semi-open Jack Pine stands are found on dry bedrock pavement concentrated around George Lake. Also within the natural area along Georgian Bay are expanses of Niagara Escarpment rim, cliff and talus communities, and below these slopes are cobble beaches, bedrock shelf shores and shale shore bluffs. A great diversity of wetlands and small lakes are found in low-lying basins throughout the natural area. Several inland lakes and their shorelines provide high representation of open water, emergent marshes, meadow marshes and graminoid fens.

Alvar Representation

11a – North of Umbrella Lake

An area of open bedrock north of Umbrella Lake was surveyed by Jones (2006). The site contains marginal alvar shrubland habitat, which verges on being a Common Juniper shrub barren community. Open bedrock covers about 30% of the site. Sparsely scattered White Cedar trees (5% cover) and saplings (15% cover), with occasional White Birch and White Spruce, are present. Almost half the area is covered in Common Juniper shrubs, with Creeping Juniper and Bearberry as associated low shrubs. The herb layer is sparse (10-15% cover), and is dominated by Eastern Bracken.

11b - South of Upper Andrew Lake

Air photos and satellite imagery indicate several areas of exposed bedrock, shrublands and bedrock savannahs in the area between Wingfield Basin and George Lake (see map included with this site summary). Varga (1995) writes, “dry Common Juniper barrens are scattered throughout these bedrock plains....The barrens also sustain groves of White Cedar, White Spruce and White Birch, a small semi-open Jack Pine stand, Eastern Bracken openings and several alvars of Little Bluestem, Upland White Aster and Balsam Ragwort.” A number of potential alvar patches in this area were visited in 2006 as part of this study (see descriptions for sites 2c and 2f, below), and additional patches of alvar were documented. Site visits are required at 2b, 2d and 2e to determine and map the

areas that consist of dolostone barren habitats on rolling bedrock terrain, areas that contain flat bedrock with alvar vegetation, and the areas that contain combinations of both. It is speculated that most are undulating rock barren, or marginal alvar similar to 2c described below.

11c - South of George Lake

AL01-1 Dry Lichen – Moss Open Alvar Pavement

Patches of open alvar pavement dominated by the algae, *Gloeocapsa alpina*, lichens and mosses are frequent in the area south of George Lake. Some are very small patches and occur as inclusions within the bedrock woodland community of the area. Several larger patches were sampled by J. Jalava in 2006, of which two supported new occurrences of the threatened Lakeside Daisy. In some areas the pavement is quite smooth (Figure 1), while in others it is heavily pitted (Figure 2). Soils, where present, are fine, pale sandy loam with some organic content.



Figure 1. Abundant “cushion” mosses on smooth alvar pavement south of George Lake

Very sparse White Cedar and, less frequently, White Spruce or Tamarack trees and saplings may be present, at least along the fringes of the pavement. Creeping Juniper is the dominant low shrub, forming patchy mats, usually also along the fringes of the pavement. Shrubby Cinquefoil is co-dominant in one example, as are Common Juniper and Bearberry in another. The herb layer varies from sparse (5-20% cover) in two examples to quite extensive (30-50% cover) in the examples with Lakeside Daisy. Frequent herb dominants include Upland White Goldenrod, Tufted Hairgrass, Richardson’s Sedge, Acuminate Panic Grass and Calamint. Two examples are dominated by the threatened Lakeside Daisy, with secondary species being Tufted Hairgrass, Richardson’s Sedge, Wild Chives and Balsam Ragwort. These pavement

communities support a great diversity of on-vascular taxa, and include various algae and microbial mats.



Figure 2. Lakeside Daisy is abundant on this pitted alvar pavement south of George Lake

ALS1-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar

Several patches, some of them quite extensive, of Creeping Juniper dwarf shrub alvar also occur south of George Lake. Very shallow (to nonexistent) tight-textured, fine sandy soils predominate. Topography is variable, and moist patches are common. The most patches sometimes support wetland species, including various willows, Twig-rush and forbs. Drier shrublands typically support scattered trees and saplings of Jack Pine and White Cedar are usually present, sometimes forming copses within the alvar shrubland. Stunted tall shrubs of these species, along with White Spruce are also quite common. Creeping Juniper forms dense mats, occurring patchily in some examples, and covering almost the entire alvar in others. Bearberry, White Spruce seedlings and Common Juniper are occasional secondary dominants, while Shrubby Cinquefoil is sometimes co-dominant in moister examples. Where shrub density is not excessive, the most frequent dominant herbs are Richardson's Sedge, Tufted Hairgrass, Upland White Goldenrod, Bristle-leaf Sedge, Calamint and, in moister examples, Yellow Sedge, Bog Goldenrod and Heal-all. The threatened Dwarf Lake Iris is found along the fringes of one example, but is more common in the adjacent bedrock woodland. The rock-surface algae, *Gloeocapsa alpina*, crustose lichens and cushion mosses are common on patches of open bedrock, and areas with pooling support microbial mats and *Nostoc* algae.

ALT1-3 White Cedar – Jack Pine Treed Alvar

Patches of treed alvar occur in a mosaic with bedrock woodlands and occasional alvar shrublands and pavements south of George Lake. Tree and sapling dominants in the treed alvars are White Cedar, usually with Jack Pine, but occasionally with Tamarack, and rarely, Red Pine. These same tree species, along with White Spruce, are frequent in the shrub layer, along with low shrubs of Common Juniper, Creeping Juniper or Bearberry. Bristle-leaf Sedge, Richardson's Sedge and Poverty Oat Grass are the most common herbs, sometimes in association with herb species noted for alvar dwarf shrublands above. The non-vascular layer on exposed bedrock may be dominated by Reindeer Lichen (*Cladonia rangiferina*), the rock surface algae, *Gloeocapsa alpina*, crustose lichens and cushion mosses.

11d - George Lake

ALO1-1 Dry Lichen – Moss Open Alvar Pavement

ALT1-3 Jack Pine – White Cedar – White Spruce Treed Alvar

ALT1-4 White Cedar – Jack Pine Treed Alvar

According to Varga (1995), the George Lake pavements support a mosaic of “Jack Pine groves among Common Juniper - Creeping Juniper barrens and open bedrock communities dominated by Lance-leaved Coreopsis, Balsam Ragwort, Canada Blue Grass and Upland White Aster.”

According to Schaefer (1995), the George Lake alvar site is made up of “a spectacular mosaic of open areas of flat, unbroken dolostone pavement, sparsely vegetated by herbs, and curtain and island forests (groves) of Jack Pine and White Cedar. The latter are generally 3-4 m high. Crevices from 30 cm to 1 m wide occur, both in the open and in treed areas.” The pavements areas are dominated by Lance-leaved Coreopsis, Wild Chives, Balsam Ragwort, Rock Sandwort, Early Saxifrage and Indian Paintbrush. Schaefer writes, “exposed dolostone bedrock is a key feature, blackened from the coating of blue-green algae...*Tortella tortuosa* and *T. fragilis*, as well as *Schistidium rivulare* are the most common mosses; *Peltigera canina*, *Cladonia symphycarpia* and the crustose *Placynthium nigrum* are the dominant lichen species. On a smaller scale these communities would be considered alvar pavements. The wildflower array, particularly in the spring, is stunning. The lichen flora is additionally rich because of the abundant granitic erratics.”

According to Brownell and Riley (2000), “inland from the southwest side of George Lake is a complex of small open pavements surrounded and interspersed by Jack Pine – White Cedar alvar woodland. The dolostone occurs primarily in large pieces, not solid pavement. Tree cover in the woodland is about 35-40%. An exposed bedrock-lichen-moss component composes about 45-50% cover of the pavements. Herbs are relatively abundant with about 40% cover, and dominants include [Lance-leaved Coreopsis and Richardson's Sedge]. About 2% of cover of [Common Juniper] exists. [Creeping Juniper] ranges from 5-10% cover. There is 3-5% cover of Jack Pine, White Cedar and White Birch trees in the pavement community....As indicated by the observation point

data and personal observations by the author, alvar grassland and forb-dominated pavement communities also exist [in this area] although they are relatively small.”

11e - Saugeen Hunting Grounds / East Emmett Lake Road

A number of significant alvar patches within the Chippewas of Nawash Saugeen Hunting Grounds, between Emmett Lake Road and George Lake have not been formally surveyed. The following community is described by Brownell and Riley (2000) as being found around the shores of George Lake.

ALO1-3 Dry-fresh Little Bluestem (/Northern Dropseed) Open Alvar Meadow

According to Brownell and Riley (2000), “surrounding George Lake is a very wide strip of exposed dolostone which is subject to fluctuating water levels. Along the high water mark adjacent to the forest edge is a unique 3-15m wide band of Switch Grass – Little Bluestem alvar grassland.” Associated herbs include Sneezeweed, Tufted Hairgrass, Upland White Goldenrod, Purple Meadow-rue, Smooth White-lettuce, Tall Cord Grass, Calamint, Twig-rush and Narrow-leaved Fringed-gentian. Shrubs include Swamp Birch, Alder-leaved Buckthorn, Sand Cherry and Kalm’s St. John’s-wort (Brownell and Riley 2000).

ALO1-1 Dry Lichen – Moss Open Alvar Pavement

ALT1-3 Jack Pine – White Cedar – White Spruce Treed Alvar

ALT1-4 White Cedar – Jack Pine Treed Alvar

Air photo interpretation and comments by Brownell and Riley (2000) suggest the presence of extensive areas of Jack Pine and White Cedar dominated alvar pavement savannah in this area. However, the estimates in Brownell and Riley (2000) of more than 800 ha of treed alvar in this area and adjacent Bruce Peninsula National Park lands require on-the-ground verification.

Condition

Varga (1995a-b) notes that for the overall Cabot Head ANSI area, recent human impacts are negligible. Varga (1995a) writes, “most of the site is covered in intermediate-aged post-fire successional forests that originated after fires in the northern Bruce Peninsula in the late 1800s and early 1900s. Older stands of Sugar Maple, Red Oak and Hemlock may have largely escaped these fires and may contain trees in excess of a hundred years old. The 10 km of stunted White Cedars on the rim and cliff ecotone may be old-growth stands, with trees in excess of several hundred years old. The calcareous lakes are of high quality with little or no development on their shores. The Bruce Trail, which crosses the site, has caused little damage to sensitive vegetation. Disturbances are restricted to selective logging in the 1970s of Sugar Maple forests north of Umbrella and Conley Lakes, and around Emmett Lake. Most of the site's forests show no evidence of logging during the lifetime of the stands.”

11a - North of Umbrella Lake

11b - South of Upper Andrew Lake

The preponderance of Eastern Bracken in the understorey and the low diversity of alvar-associated species suggest clearing due to past disturbance such as wildfire, and that this community will eventually revert to a bedrock woodland due to natural succession. Currently the habitat is virtually undisturbed, although the Bruce Trail passes nearby (with some broken glass and a stone cairn noted near the trail). A site inspection is required to determine the condition of alvars, if present, south of Upper Andrew Lake. Almost without a doubt little or no recent human disturbance has occurred in this area.

11c - South of George Lake

The alvars south of George Lake appear virtually devoid of human disturbance. A very seldom-used trail (with faint rutting) passes through one shrubland – pavement mosaic, but its effect in 2006 were negligible. Past fire is evident in most areas, and dieback of shrubs due to drought is frequent.

11d - George Lake

11e - Saugeen Hunting Grounds / East Emmett Lake Road

Lands surrounding the George Lake alvar are forested with forests that originated after fires in the late 1800's or early 1900's, vast and largely protected by Bruce Peninsula National Park. According to Schaefer (1994, 1995), "a few cottages/hunting cabins are supposedly being constructed on the shore of George Lake." Hunting by members of the Chippewas of Nawash band almost certainly occurs in areas surrounding George Lake (Schaefer 1995). Brownell and Riley write that the alvar woodland is "relatively undisturbed except for a couple of old access roads now used primarily by ATVs. A hunt camp is located on the southwest side of George Lake. Overall, the site condition was assessed by fieldworkers as excellent (A)."

Diversity

The four alvar vegetation types in the George Lake – Emmett Lake Road area are inhabited by at least 93 vascular plant taxa (91 native), of which 22 show a strong affinity to alvar habitats in Ontario. They are nested within a vast natural area, which, according to Riley *et al.* (1996), supports an outstanding diversity of 571 vascular plant species, 143 breeding bird species, 21 mammal species and 26 species of reptiles and amphibians. The Cabot Head area sustains significant populations of larger mammals such as Black Bear, Fisher and River Otter. Biodiversity data are not available for alvar patches in the Emmett Lake Road (Saugeen First Nation) (site 11e) and potential alvar south of Upper Andrew Lake (site 11b).

11a – North of Umbrella Lake

One marginal alvar community supporting 20 vascular plant species and one alvar species was documented north of Umbrella Lake.

11c – South of George Lake

Alvar habitats south of George Lake include three different community types, supporting 43 vascular plant taxa (42 native), of which 12 show a strong affinity to alvar habitats in Ontario.

11d - George Lake

The two alvar types at the George Lake site sustain at least 73 vascular plant taxa documented by Schaefer (1994, 1995) and 75 taxa documented by Catling and Brownell (1991-1998), of which 17 display a strong affinity to alvar habitats in Ontario. Twenty-four moss taxa and 30 lichen taxa were found by Schaefer (1996) at the George Lake alvar.

Ecological Functions

The Cabot Head – George Lake natural area is part of a large, naturally vegetated woodland corridor extending for 57 km along the Niagara Escarpment from Whippoorwill Bay near Lion’s Head to the northern tip of the Bruce Peninsula at Tobermory (Riley *et al.* 1996). This woodland corridor extends to the Bruce Peninsula's western coast and covers 50,000 ha and is the largest block of woodland along the Niagara Escarpment south of Manitoulin Island, and one of the largest in the Southern Deciduous - Evergreen Forest Region (Larson *et al.* 1999).

The natural area plays an important hydrological role. The St. Edmunds Township portion of the Cabot Head ANSI includes 598 ha of open water, 72.4 km of inland lakeshores and 11.4 km of Great Lakes shoreline. It also encompasses several large watersheds, and its inland lakes are a major headwater source for Sideroad Creek, Willow Creek and the Crane River, three high-quality coldwater streams (Larson *et al.* 1999).

Special Features

An outstanding array of globally and provincially rare flora and fauna are found in the Cabot Head – George Lake alvars and nearby habitats. A total of 11 vascular plant taxa considered locally rare or very uncommon (BGPC 2003) also occur at the site. The occurrences of the globally and provincially rare taxa are described in more detail below.

A Moss	<i>Brachythecium calcareum</i>	G3G4 S2
A Moss	<i>Pseudocalliergon turgescens</i>	G3G5 S2
A Moss	<i>Tortella inclinata</i>	G4G5 S2
A Lichen	<i>Caloplaca ammiospila</i>	G4G5 S1
A Lichen	<i>Psora decipiens</i>	G? S1S2

The three moss and four lichen taxa listed above were found by Schaefer (1996) at the George Lake alvar during IACI surveys. J. Jalava also found the provincially rare moss

Pseudocalliergon turgescens at an alvar patch south of George Lake (2f) in 2006. All of these taxa are considered provincially extremely rare (S1) to very rare (S2).

Lakeside Daisy *Hymenoxis herbacea* COSEWIC-THR, OMNR-THR G2S2
 Lakeside Daisy, also known as Stemless Rubberweed or Manitoulin Gold, is a globally rare, nationally and provincially threatened species endemic to the Great Lakes basin. It is believed that at least 95% of its global distribution is on the alvars of the Bruce Peninsula and Manitoulin Island. Outside of Canada, Lakeside Daisy is known from only two natural populations: a very small occurrence in Mackinac County, Michigan, and at Marblehead Quarry, Ohio. Approximately 3,200 were found during the most recent survey on dolostone pavement in the Emmett Lake Road, while 25,000 plants were reported for this area in 2000 (Campbell *et al.* 2002, NHIC 2006). “Thousands” are present at the George Lake alvar (Campbell *et al.* 2002, NHIC 2006). In 2006, the author discovered previously undocumented Lakeside Daisy populations of 9,700 and 5,200 plants in two patches of open alvar south of George Lake (site 11c) (Jalava 2006).

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR MNR-THR G3S3
 The globally rare, nationally threatened and provincially rare Dwarf Lake Iris, was discovered by the author in 2006 at one location in this alvar meta-site, south of George Lake (site 2f). Approximately 21,000 vegetative shoots were estimated in open White Cedar woodland along the fringe of an alvar mosaic. This is the first known record for the entire Cabot Head – George Lake area, and represents the northeastern-most population on the Bruce Peninsula. As this species usually reproduces vegetatively (Makkay 2004), it is likely that the genetic diversity is relatively low. The bulk of its global population is found near Lake Huron on the Bruce Peninsula and Manitoulin Island. It is also known from approximately 60 sites near Lake Huron and Lake Michigan in Michigan and 15 sites in Wisconsin (Makkay 2004).

Purple-stemmed Cliff-brake *Pellaea atropurpurea* G5S3
 The provincially rare fern, Purple-stemmed Cliff-brake is considered rare on the Bruce Peninsula (BGPC 2003), and is known in Ontario from crevices, ledges and cliffs in limestone bedrock on Manitoulin Island, the Bruce Peninsula, the Niagara Peninsula and several locations in eastern Ontario. There is a 1983 record of a “small population” in habitat described as “dolostone bedrock in very open conifer-dominated forest,” which would likely be classified as treed alvar, near Emmett Lake Road within the Saugeen Hunting Grounds (NHIC 2006).

The following provincially rare species are known from the George Lake area and may occur in alvar habitats, but have not been documented within the alvars themselves.

Massasauga	<i>Sistrurus catenatus</i>	COSEWIC-THR, MNR-THR	G4T3S3
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	COSEWIC-SC	G5S3
Milksnake	<i>Lampropeltis triangulum</i>	COSEWIC-SC	G5S3
*Roundleaf Ragwort	<i>Packera obovata</i>		G5 S3
*Cooper's Milk-vetch	<i>Astragalus neglectus</i>		G4 S3
*Limestone Oak Fern	<i>Gymnocarpium robertianum</i>		G5 S2

Conclusions and Recommendations

Evaluation and Significance

According to Brownell and Riley (2000), the George Lake area “contains the largest and best quality example of Jack Pine alvar woodland in the Bruce Peninsula physiographic region of Site District 6-14. The FON Bruce Alvar Nature Reserve (Dyer’s Bay Road alvar) is most similar to this site. The George Lake alvar contains unique occurrences of Lance-leaved *Coreopsis pavement* and Switch Grass – Little Bluestem grassland.”

Threats

No immediate threats have been noted by researchers at any of the alvar patches in the George Lake natural area. The proximity to roads of alvar habitat at the Saugeen Hunting Grounds creates the potential for damage to vegetation and substrate by pedestrians or off-road vehicles.

Management

The interior alvars at George Lake are relatively inaccessible, and continued passive management is recommended.

Future Research and Inventory Needs

1. Additional surveys of the interior open bedrock areas and unsurveyed sites around George Lake are required to determine their composition and relative significance.
2. The alvars within the Saugeen Hunting Grounds have never been formally surveyed using standard methods.
3. Invertebrate surveys have not been undertaken at the George Lake alvars.
4. Coring to determine age of apparent ancient trees may be appropriate in some locations.
5. Monitoring of rare species populations, habitat quality and potential threats should be undertaken on a regular basis.

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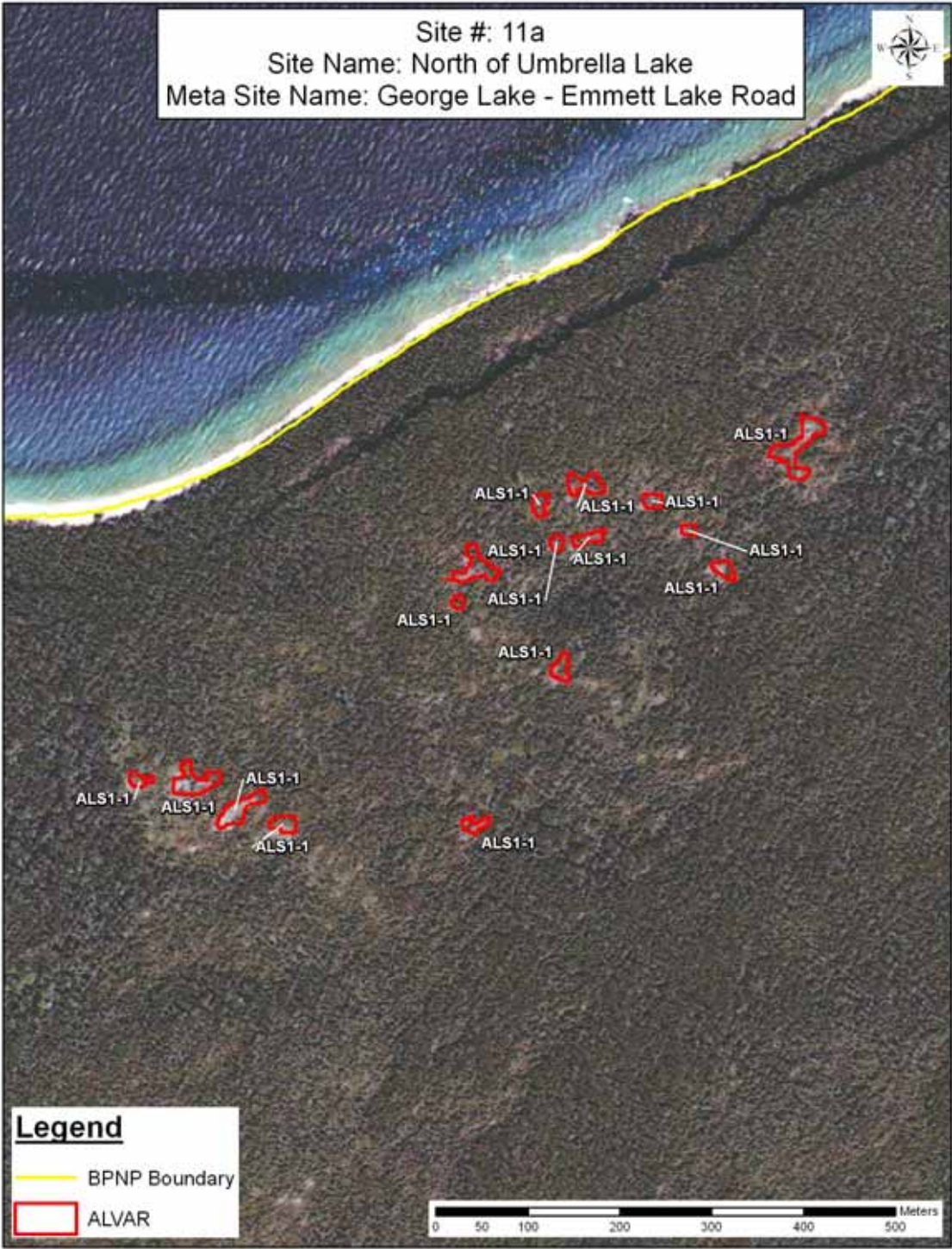
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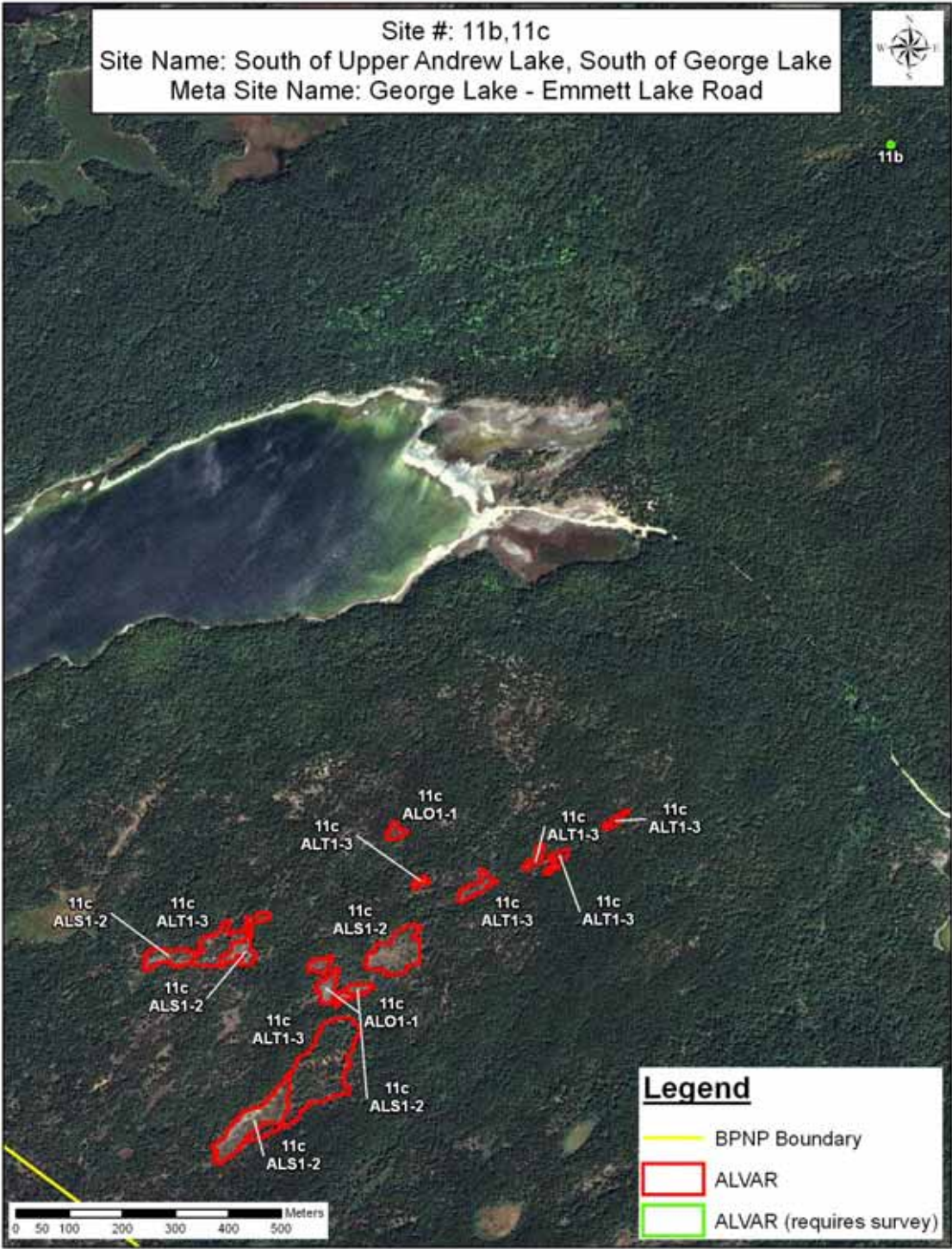
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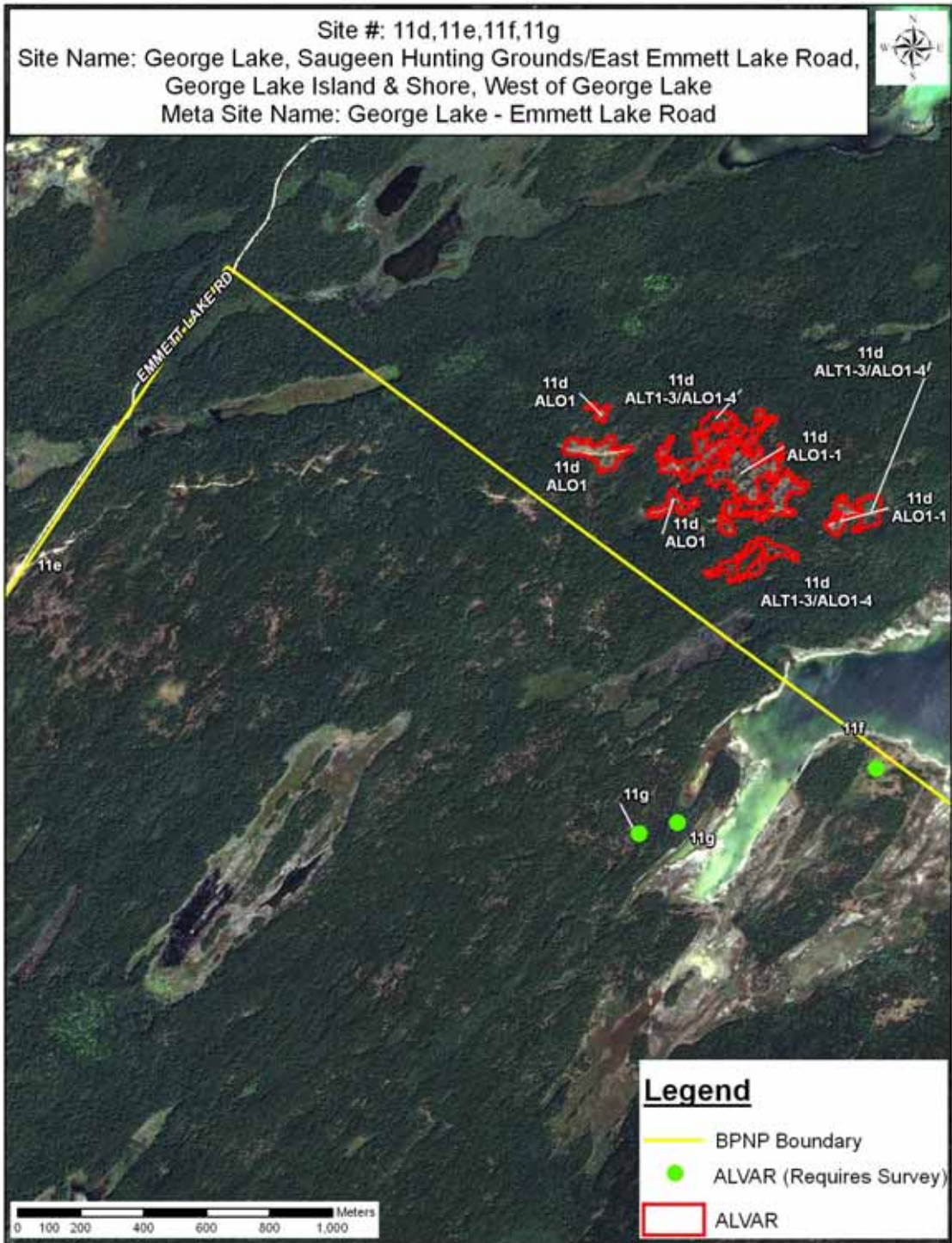
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Vascular Plants of the George Lake – Emmett Lake Road Alvars

NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	11a ALSI-1	11c ALOI-1	11c ALSI-2	11c ALTI-4	11d ALOI-1
<i>Pellaea atropurpurea</i> (L.) Link	Purple-stemmed Cliff-brake	G5	S3			R	13	M					X
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5T	S5			X	16		X				X
<i>Larix laricina</i> (Du roi) K.	Tamarack	G5	S5			X	33			X		X	
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	X	X	X	X
<i>Pinus banksiana</i> Lambert	Jack Pine	G5	S5			X	33				X	X	X
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34		X	X	X	X	X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M		X	X	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X	X	X	X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130			X			X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X				
<i>Arenaria serpyllifolia</i> L.	Thyme-leaved Sandwort	G?	SE5			XI	178						X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X	X			
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218						X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X				
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	G5	S5			X	234				X		X
<i>Salix discolor</i>	Pussy Willow	G5	S5			X	234				X		
<i>Salix petiolaris</i>	Slender Willow	G5	S5			X	234				X		
<i>Salix eriocephala</i> Michaux	Heart-leaved Willow	G5	S5			X	234						X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X	X	X	X
<i>Vaccinium myrtilloides</i>	Velvet-leaf Blueberry	G5	S5			X	247						X
<i>Saxifraga virginensis</i> Michaux	Early Saxifrage	G5	S5			R	276	M					X
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R	Saskatoon-berry	G5	S4?			X	277	M					X
<i>Amelanchier laevis</i>	Smooth Juneberry	G5	S5			X	277						X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277						X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M			X	X	
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?					X
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277						X
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277						X
<i>Rosa blanda</i> Aiton	Smooth Rose	G5	S5			X	277			X	X		
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301						X
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	G5	S5			X	307		X				

NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	11a ALSI-1	11c ALOI-1	11c ALSI-2	11c AL/TI-4	11d ALOI-1
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	X	X		X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338				X		
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	G5	S5			X	350						X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H					X
<i>Calamintha arkansana</i>	Calamint	G5	S4S5			X	392				X		
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392						X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392			X	X		X
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E					
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M		X			X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S5			X	399		X				X
<i>Pedicularis canadensis</i>	Wood-betony	G5	S5			X	399						X
<i>Verbascum thapsus</i> L.	Common Mullein	G5	SE5			X	399		X				
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411			X			X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416					X	X
<i>Symphoricarpos albus</i>	Snowberry	G5	S5			X	418						X
<i>Viburnum rafinesquianum</i> Schultes	Downy Arrow-wood	G5	S5			X	418						X
<i>Antennaria howellii</i>	Pussytoes	G4G5T?	SU			X	423						X
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423			X			X
<i>Coreopsis lanceolata</i> L.	Lance-leaved Coreopsis	G5	S4?			R	423	E		X			X
<i>Doelleringia umbellata</i>	Flat-topped Aster	G5	S5			X	423						X
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423						X
<i>Hymenoxis herbacea</i>	Lakeside Daisy	G2	S2	T	T	R	423	H		X			X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M		X	X	X	X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423						X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423					X	
<i>Solidago juncea</i>	Early Goldenrod	G5	S5			X	423						X
<i>Solidago nemoralis</i> Aiton	Gray Goldenrod	G5T?	S5			X	423		X		X		X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X	X	X	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423			X	X		
<i>Symphotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423				X		
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455						X
<i>Carex capillaris</i> L.	Hair-like Sedge	G5	S5			X	457						X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E					X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X		X	X	X

NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	11a ALSI-1	11c ALOI-1	11c ALSI-2	11c ALTI-4	11d ALOI-1
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457			X	X	X	X
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E		X	X	X	X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i> (K	Scirpus-like Sedge	G5	S5			X	457	H					X
<i>Carex umbellata</i> Schkuhr ex Willd.	Umbellate Sedge	G5	S5			R	457						X
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457						X
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E					X
<i>Eleocharis elliptica</i>	Elliptic Spike-rush	G5	S5			X	457				X		
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X	X			X
<i>Calamagrostis canadensis</i>	Canada Bluejoint	G5	S5			X	458			X		X	
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X	X	X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv. ssp	Tufted Hair Grass	G5	S5			X	458	H		X	X	X	
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458						X
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M					X
<i>Oryzopsis asperifolia</i> Michaux	Rough-leaved Mountain-rice	G5	S5			X	458						X
<i>Oryzopsis pungens</i> (Torrey ex Sprengel) A. H	Sharp-leaved Mountain-rice	G5	S5			VU	458						X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458			X			X
<i>Panicum capillare</i> L.	Witch Grass	G5	S5			X	458						X
<i>Panicum philadelphicum</i> Bernh. ex Trin.	Philadelphia Witch Grass	G5	S4			O	458	H					X
<i>Poa alpina</i> L.	Alpine Poa	G5	S4			R	458						X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X				X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458						X
<i>Allium schoenoprasum</i> L. var. <i>sibiricum</i> (L.)	Wild Chives	G5T5	S4			R	475	E		X			X
<i>Maianthemum canadense</i> Desf.	Wild Lily-of-the-valley	G5	S5			X	475						X
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475						X
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475				X	X	X
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M			X		
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476						X
<i>Spiranthes lacera</i> (Raf.) Raf. var. <i>lacera</i>	Slender Ladies'-tresses	G5T5	S4S5			X	489						X

Non-Vascular Plants and Algae of the George Lake Alvar

A= algae, B = bryophyte, L=lichen

TAXON	NAME	GRANK	SRANK	2d George Lake
A	<i>Nostoc sp.</i>			X
A	<i>Gloeocapsa alpina</i>			X
A	<i>Trentepohlia annulata</i>			X
B	<i>Brachythecium calcareum</i>	G3G4	S2	X
B	<i>Bryum sp.</i>			X
B	<i>Campylium chrysophyllum</i>	G5	S5	X
B	<i>Campylium sp.</i>			X
B	<i>Dicranum montanum</i>	G5	S5	X
B	<i>Dicranum polysetum</i>	G5	S5	X
B	<i>Dicranum scoparium</i>	G5	S5	X
B	<i>Ditrichum flexicaule</i>	G5	S5	X
B	<i>Fissidens sp.</i>			
B	<i>Leucobryum glaucum</i>	G5	S5	X
B	<i>Myurella julacea</i>	G5	S5	X
B	<i>Pleurozium schreberi</i>	G5	S5	X
B	<i>Polytrichum juniperinum</i>	G5	S5	X
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2	X
B	<i>Ptilidium pucherrinium</i>	G5	S5	X
B	<i>Radula complanata</i>	G4?	S4	X
B	<i>Schistidium rivulare</i>	G4G4	S5	X
B	<i>Thuidium delicatulum var. radicans</i>	G5	S5	X
B	<i>Thuidium recognitum</i>	G5	S5	X
B	<i>Tortella fragilis</i>	G4G5	S4	X
B	<i>Tortella inclinata</i>	G4G5	S2	X
B	<i>Tortella tortuosa</i>	G5	S5	X
B	<i>Tortula ruralis</i>	G5	S5	X
L	<i>Acarospora fuscata</i>	G5?	S5	X
L	<i>Acarospora glaucocarpa</i>	G5?	S4?	X
L	<i>Caloplaca ammiospila</i>	G4G5	S1	X
L	<i>Candelariella vitellina</i>	G5	S5	X
L	<i>Catapyrenium lachneum</i>	G5	S?	X
L	<i>Cladina mitis/arbuscula</i>			X
L	<i>Cladina rangiferina</i>	G5	S5	X
L	<i>Cladonia chlorophaea</i>	GU	S5	X
L	<i>Cladonia coniocraea</i>	G5	S5	X
L	<i>Cladonia cristatella</i>	G5?	S5	X
L	<i>Cladonia multiformis</i>	G3G5	S4?	X
L	<i>Cladonia pleurota</i>	T	T	X
L	<i>Cladonia pyxidata</i>	G5	S5	X
L	<i>Cladonia symphylicarpa</i>	G3G5	S?	X
L	<i>Collema coccophorum</i>	G3G5	S?	X
L	<i>Dermatocarpon fluviatile / weberi</i>			X
L	<i>Leptogium lichenoides</i>	G5	S5?	X
L	<i>Peltigera canina</i>	G5	S5?	X
L	<i>Placynthium nigrum</i>	G?	S5?	X
L	<i>Porpidia crustulata</i>	G?	S5?	X
L	<i>Protoblastenia rupestris</i>	G?	S5?	X
L	<i>Psora decipiens</i>	G?	S1S2	X
L	<i>Rhizocarpon lecanorinium</i>	G?	S?	X
L	<i>Rhizocarpon obscuratum</i>	G?	S4?	X
L	<i>Stereocaulon saxatile</i>	G5	S?	X

TAXON	NAME	GRANK	SRANK	2d George Lake
L	<i>Thelidium cf. absconditum</i>	T	T	X
L	<i>Thelidium sp.</i>			X
L	<i>Umbilicaria deusta</i>	G?	S4	X
L	<i>Xanthoparmelia somloensis</i>	G5	S5?	X
L	<i>Xanthoria elegans</i>	G3G5	S5?	X

Meta-site 12. GREENOUGH HARBOUR – BRADLEY HARBOUR

Bruce County, Northern Bruce Peninsula (formerly Lindsay Township)

NTS Map: 41H/3, 41A/14

NAD83 UTM 17T 467943 4982071 (site 12a), 466100 4982100 (site 12b), 4644004985700 (site 12c), 468500 4984700 (site 12d)

Ownership: Bruce County (in part), Ontario Ministry of Natural Resources (in part), Nature Conservancy of Canada (in part), Private (in part)

Protection: Bruce County Forest – Miller Lake Tract ANSI (sites 12b-d), Bruce County Forest, Crown Land, Nature Conservancy of Canada (part of 12b)

Survey Dates (Surveyors) [site visits to ANSI including non-alvar habitats reported in Johnson (2003)]: July 8, 11, 15-16, 25-26, August 5, 24-25, September 5-6, 30, 2001 (J. Johnson); May 30, June 29, July 6, 16, 2002 (J. Johnson); August 21 and 25, 2006 (R. Jones, sites 11b and 11c, respectively), September 6, 2006 (J. Jalava, site 12a)

Total Extent of Alvar: 25.3 ha

Overall Alvar Quality Rank: Condition = AB, size = A

Directions: The Gauley Bay (12a) and Greenough Harbour (12b) sites are reached by taking Tamarack Road west from Stokes Bay and using appropriate air photos and maps as guides to find the various alvar patches. The South of Bradley Harbour (12c) site is reached from the end of Bradley Drive off Lindsay Road 20. The Bruce County Forest – Miller Lake Tract Interior (12d) sites are reached by walking inland off Ira Lake Road, using air photos as guides. Landowner permission to access must be obtained in advance for all non-Crown land sites.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (native)	NHIC-Tracked Species
12a – Gauley Bay	Rvp	IKONOS	1	8	37 (35)	0
12b&12c – Greenough Harbour & South of Bradley Harbour	Rvpb	Johnson (2003)	2	18	90 (86)	4
12d – Bruce County Forest – Miller Lake Tract Interior	not surveyed	IKONOS	?	?	?	?
Meta-site totals			2	18	102 (96)	4

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

According to Johnson (2003), the Greenough Harbour – Bradley Harbour natural area (part of the Bruce County Forest – Miller Lake Tract Area of Natural and Scientific Interest) is a “very large bedrock-based area along Lake Huron (with more than 9 km of shoreline)... Approximately five eighths of the vascular plants native to the Bruce Peninsula and at least 13 provincially rare native plants have been found here.... There are many depressions running northeast/southwest, containing marsh, fen, and swamp wetlands, as well as Spring Creek, a watercourse at which at least 6 provincially rare or significant plants and snakes have been found (though two could conceivably have been upstream from the ANSI). The area tends to be more significant toward Lake Huron. There is good representation of dolostone Great Lakes shores, alvars, and (largely inland) calcareous fens.”

Alvars in the Greenough Harbour area and south of Bradley Harbour were surveyed in 2006 in order to more precisely map alvar communities noted in Johnson (2003), and to have alvar-specific species data. The Gauley Bay site, which is situated across the bay from the Greenough Harbour area, was also surveyed in 2006 and consists of coastal dwarf shrub alvar situated just above the Lake Huron high water mark.

Alvar Representation

An estimated 26 ha of alvar are estimated to occur near the Lake Huron shore between Greenough Harbour and Bradley Harbour (Johnson 2003), and another 2 to 4 ha occur at the Gauley Bay site. Based a combination of alvar surveys of the present study and descriptions in Johnson (2003), the following alvar types have been documented in the Gauley Bay - Greenough Harbour – Bradley Harbour area.

ALSI-2 Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar

Along the long stretch of undeveloped shoreline between Greenough Harbour (Figure 1) and Bradley Harbour, dwarf shrub alvars are frequent. Very sparsely scattered White Cedar trees or saplings occur on the shrublands, along with occasional White Spruce. Creeping Juniper is strongly dominant in the low shrub layer, with Shrubby Cinquefoil as a secondary species, occasionally with Alder-leaved Buckthorn or Kalm's St. John's-wort. The herb layer is sparse to moderate, the most common species being Little Bluestem, Poverty Oat Grass, Ohio Goldenrod and, in moist depressions, Twig-rush. Shallow blackish soils occur in cracks and depressions, suggesting organic content. Mosses, lichens and rock surface algae are common.



Figure 1. Creeping Juniper dwarf shrub alvar near Greenough Harbour

At Gauley Bay, the dwarf shrub alvar community has a few copses of White Cedar, Tamarack and White Spruce trees and saplings. The variable low shrub layer of Creeping Juniper has Shrubby Cinquefoil as a strong secondary dominant, while Kalm's St. John's-wort and Sand Cherry occur as associates. The herb layer is sparse to moderate (10-35% cover), and is strongly dominated by Little Bluestem, with Bluets, Ohio Goldenrod, Upland White Goldenrod and Calamint as associated species. The rock surface algae, *Gloeocapsa alpina*, covers the undulating bedrock and abundant dolostone fragments. Other common non-vascular taxa include black crustose lichens and cushion mosses. Exposure to Lake Huron weather systems helps keep this community open. White Cedar dieback, presumably due to drought, is widespread.

ALT1-4 Jack Pine – White Cedar – White Spruce Treed Alvar

Under the alvar "association or complex" "Alvar", Johnson (2003) writes: "Twelve separate alvars were found. The substrate is dolostone bedrock, some of it fractured, generally level or sloping down to Lake Huron, though sometimes some relief is present. The soil is very thin to nonexistent, with much exposed bedrock. The moisture regime is mostly dry, though various locations diverge from this, for example a few saturated fen pockets in a large alvar. In these open alvars, trees are common, though they tend to be stunted. Among them, White Cedar is the number one dominant. Tamarack and White Spruce are also common. These are the only common trees.

Surveys of alvars of the present study along the Lake Huron coast between Greenough Harbour and Bradley Harbour by R.A. Jones in 2006 concur with descriptions in Johnson (2003). White Cedar dominated alvars predominate, but the trees largely occur in scattered copses with open untreed areas between them (Figure 2). Tamarack is a co-dominant or secondary dominant in the tree layer, while White Spruce and, less frequently, White Birch, occur as associates. Sapling cover is about 10-15% overall, and distributed individually as well as in scattered groups, also with White Cedar dominant, and with Tamarack and White Spruce as associates. The low shrub layer is well developed, with Creeping Juniper forming extensive mats. Shrubby Cinquefoil and Kalm's St. John's-wort are associates. Common Juniper is a co-dominant or associate in the treed alvars south of Bradley Harbour. Herb cover is also quite extensive, especially in the Greenough harbour area, with Little Bluestem dominant, and with Bristle-leaf Sedge (near trees) and Acuminate Panic Grass as the major associates. Johnson (2003) also notes Richardson's Sedge as a dominant, which may have been difficult to identify due to the late August date of the 2006 survey. Towards the shore, Ohio Goldenrod and Narrow-leaved Fringed-gentian are also fairly common. The sparser herb layer south of Bradley Harbour consists of Bristle-leaf Sedge, Ticklegrass and Poverty Oat Grass. Non-vascular cover is extensive on the bedrock, with mosses and lichens predominating. Exposed bedrock is interspersed with areas of very shallow dark brown sandy soil.



Figure 2. Treed alvar south of Bradley Harbour

Condition

Most of the forests and woodlands of this area burned in the early 1900s. Johnson (2003) also notes that large areas have recently been flooded by beaver. Conceivably, some inland alvar patches may have become permanently inundated. Charred woody debris is present on the alvars, indicating past fire, and very lightly used trails occur in the vicinity of some of the alvar patches. Johnson (2003) does not mention any recent human disturbance of alvar sites in the Bruce County Forest - Miller Lake Tract ANSI. General disturbance factors noted in that report that may affect alvar communities include ATV trails, cottage development, tree-cutting (very local and limited at the site), grazing by escaped cattle (also very limited at the site).

Based on a 2005 roadside site inspection by the author, a few alvar patches occurring near or adjacent to the road that services the new Greenough Harbour area subdivision may be subject to future disturbance and invasion by exotic species. It is uncertain if actual residential or driveways may be permitted to be constructed on these alvar patches within the subdivided area. At the Gauley Bay site (11a), a vehicle track follows the eastern edge of the alvar, with some rutting into alvar, and there are a couple of cottages nearby; otherwise no evidence of human disturbance was noted in 2006.



Figure 3. The threatened Hill's Thistle going to seed at Greenough Harbour

Conclusions and Recommendations

Evaluation and Significance

According to Johnson (2003), "Alvars, dolostone Great Lakes shore (at least 9 km long), and coastal meadow marshes, all provincially rare communities, occur. The ten backshore alvars are obviously significant. There are also tiny "alvarlets" adjacent to the Lake Huron shore, and areas verging toward alvar but less significant than backshore alvars; the significant 'near-alvar' area at Bradley Harbour is very much an exception to this tendency to be less significant. Some life scientists would call this and some other near-alvars, true alvars."

Threats

Much of this area is private land and shoreline cottage development and associated roads and clearing of land are the greatest threat to its ecological integrity. According to Johnson (2003) *fide* NHIC (2006): "A major cottage development is planned at Greenough Point. In all probability there will in future be development pressure along the rest of the Lake Huron shore of this ANSI, north to Bradley Harbour. Almost the entire shoreline, and fairly far inland, is privately owned. There is also some potential for development pressure all along the south or southeast boundary of the ANSI to its east or southeast apex, and north or northwest from that apex for more than 1 km. Much of this edge is along (at the head of Gauley Bay) or reasonably near Lake Huron, and all of the land there within the ANSI is privately owned."

ATV use on alvar habitats is another potentially serious threat, given the extent of ATV trails in the general area.

Management

Passive management is recommended for alvars habitats occurring on public lands within the site. It is recommended that the private landowners be provided information necessary to help protect the globally-significant natural heritage values of the site's alvar habitats.

Future Inventory Needs

1. Non-vascular plants, invertebrates and other fauna have not been formally surveyed at this site.
2. Monitoring of habitat quality and rare species populations should be undertaken on a regular basis.

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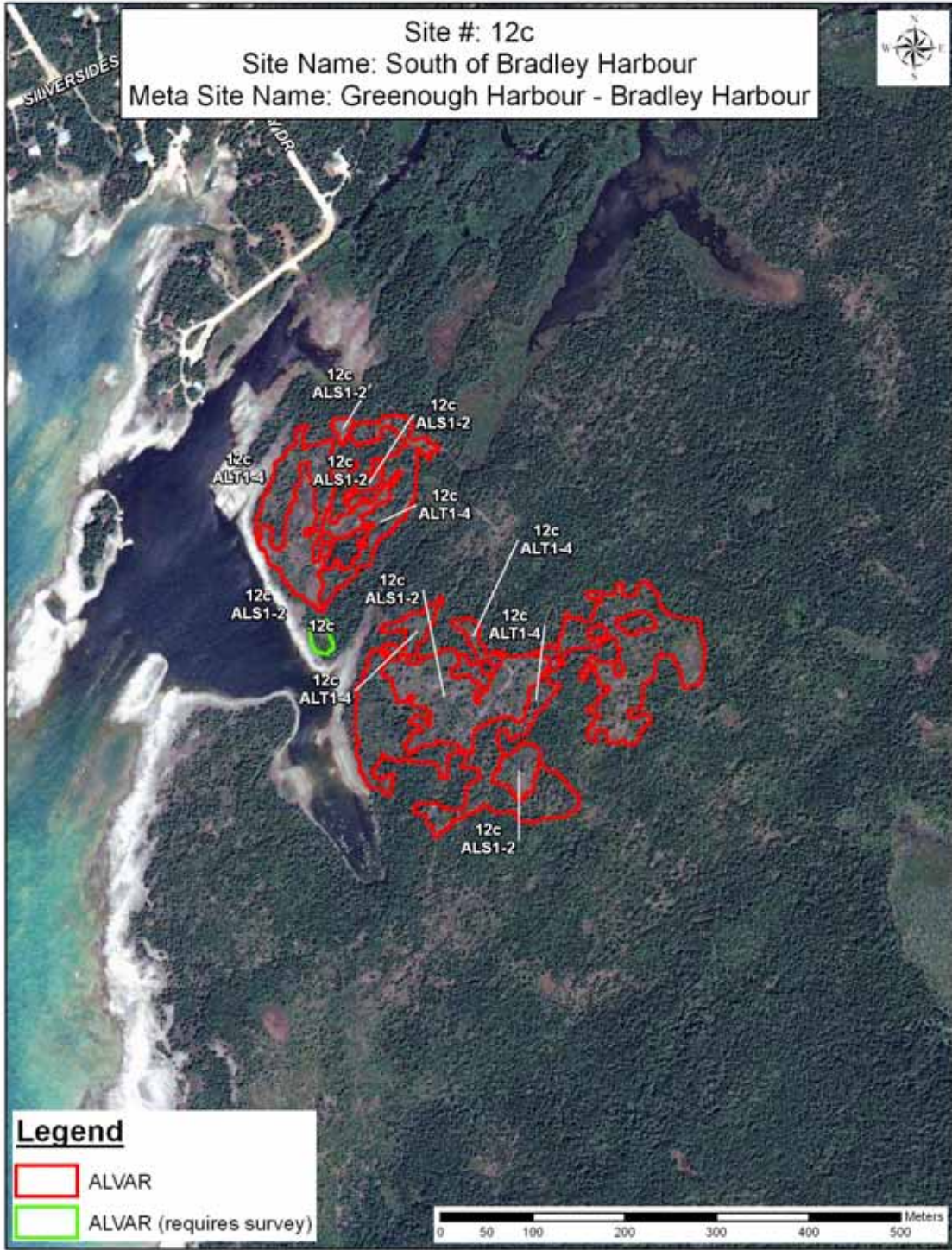
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**Vascular Plants of the
Greenough Harbour – Bradley Harbour Alvars**

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	11a ALS1-2	11b-d ALS1-2 / ALTI-4
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33			X
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X	X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130			X
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160			X
<i>Alnus incana</i> (L.) Moench ssp. <i>rugosa</i>	Speckled alder	G5T5	S5			X	165		X	
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X	X
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X	X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X	
<i>Populus balsamifera</i> L.	Balsam Poplar	G5T?	S5			X	234			X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234			X
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234			X
<i>Salix petiolaris</i> J.E. Smith	Slender Willow	G4	S5			X	234			X
<i>Diplotaxis muralis</i> (L.) DC.	Wall Rocket	G?	SE1			XI	237		X	
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247			X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258			X
<i>Parnassia glauca</i> Raf.	Grass-of-Parnassus	G5	S5			X	276			X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277			X
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277			X
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277			X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt	X	X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286			X
<i>Proserpinaca palustris</i> L.	Mermaid-weed	G5	S4			X	289			X
<i>Lythrum salicaria</i> L.	Purple Loosestrife	G5	SE5			XI	292			X
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			X	301			X
<i>Oenothera biennis</i> L.	Hairy Yellow Evening-primrose	G5	S5			X	301			X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307			X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338			X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X	X
<i>Geranium robertianum</i> L.	Herb Robert	G5	SE5			XI	369			X
<i>Impatiens capensis</i> Meerb.	Spotted Jewelweed	G5	S5			X	372			X
<i>Cicuta bulbifera</i>	Bulbous Water-hemlock	G5	S5			X	374			X
<i>Gentianopsis virgata</i> (Raf.) Holub	Narrow-leaved Fringed Gentian	G5	S4			X	376			X
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379			X
<i>Calystegia sepium</i> (L.) R. Br.	Hedge Bindweed	G5	S5			X	383			X
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X	X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392			X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	I1a ALS1-2	I1b-d ALS1-2 / ALTI-4
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H		X
<i>Fraxinus pennsylvanica</i> Marshall	Red/Green Ash	G5	S5			X	398		X	X
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S5			X	399			X
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M		X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S5			X	399			X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X	X
<i>Lobelia cardinalis</i> L.	Cardinal Flower	G5	S5			X	411			X
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411			X
<i>Houstonia longifolia</i> Gaertner	Long-leaved Houstonia	G4G5	S4?			X	416		X	X
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	
<i>Symphoricarpos albus</i>	Snowberry	G5	S5			X	418		X	
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	
<i>Aster pilosus</i> Willd. var. <i>pringlei</i>	Pringle's Aster	G4G5	S4			X	423	M		X
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	T	T	X	423	H		X
<i>Doelleringia umbellata</i>	Flat-topped Aster	G5	S5			X	423		X	
<i>Eupatorium perfoliatum</i> L.	Boneset	G5	S5			X	423			X
<i>Helenium autumnale</i> L.	Sneezeweed	G5	S5			X	423			X
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X	X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X	
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X	
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423		X	X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X	X
<i>Symphotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicked Aster	G5	S5			X	423			X
<i>Symphotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423		X	
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455			X
<i>Carex cryptolepis</i> Mackenzie	Northeastern Sedge	G4	S5			X	457			X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X
<i>Carex hystericina</i> Muhlenb. ex Willd.	Porcupine Sedge	G5	S5			X	457			X
<i>Carex lasiocarpa</i> Ehrh.	Hairy-fruited Sedge	G5	S5			X	457			X
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E		X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H		X
<i>Carex sterilis</i>	Sterile Sedge	G5	S5			X	457			X
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457			X
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X	X
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E		X
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457			X
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X	X
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv	Canada Blue-joint	G5	S5			X	458			X
<i>Calamagrostis stricta</i> (Timm) Koeler ssp.	Northern Reed Grass	G5T5	S5			X	458		X	
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	I1a ALSI-2	I1b-d ALSI-2 / ALTI-4
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H		X
<i>Glyceria striata</i>	Fowl Manna Grass	G5	S5			X	458			X
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M		X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	
<i>Panicum virgatum</i> L.	Switch Grass	G5	S4			X	458			X
<i>Phleum pratense</i> L.	Timothy	G?	SE5			XI	458			X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X	X
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475			X
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475			X
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5T4	S4?			X	475			X
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475			X
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M		X
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476			X
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476			X
<i>Cypripedium arietinum</i> R. Br.	Ram's-head Lady's-slipper	G3	S3			X	489			X
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489			X
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489			X
<i>Spiranthes cernua</i> (L.) Rich.	Nodding Ladies'-tresses	G5	S5			X	489			X

Site 13. HOPKINS POINT

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/4

NAD83 UTM: 17T 447901 5003757

Ownership: Private

Protection: Not protected

Survey Dates (Surveyors): September 13, 2005 (J. Jalava)

Total Extent of Alvar: 0.4 ha

Overall Alvar Quality Rank: C

Directions: The Hopkins Point West site is reached by taking Warner Bay Road (near the Tobermory town limits) southwest from Highway 6 past the sharp bend to the southeast to the first right, Baise Road. Follow Baise Road to its end. The alvar patch is next to the road on the south side.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
13. Hopkins Point	Rvp	IKONOS, Jalava (2005)	1	8	36 (35)	0

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

A small patch of alvar grassland is found just inland from the tip of Hopkins Point (Figure 1). The alvar community is in good condition, but is potentially threatened by future cottage development. [Jalava 2005]

Alvar Representation

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow Type

The Hopkins Point alvar occurs on very shallow sandy-organic soil deposits (averaging 0 to 2 cm deep), with considerable amounts of exposed rock, mostly bedrock, but also with a large quantity of dolostone fragments. The alvar is quite flat area with a slight depression in centre, where wetland species have established. There is a very gradual southwesterly slope overall.

This alvar has no tree cover, but is bordered by stunted White Cedar bedrock woodland with White Spruce and Tamarack as associates. The low shrub layer is also very sparse, with Shrubby Cinquefoil being dominant and with Kalm's St. John's-wort as a secondary species, and Sand Cherry is occasionally common. The herb layer is quite extensive and variable in dominance, depending on microtopography and associated water levels. Little Bluestem is dominant overall, while Ensheathed Dropseed and Twig-rush are dominant in moist-to-wet depressions. Associated herbs are Tufted Hairgrass, Rock Sandwort,

Harebell, Richardson's Sedge and Bluets. Between 10% and 30% of the overall surface area is exposed bedrock covered in the rock-surface algae, *Gloeocapsa*. Also very common on the bedrock are crustose lichens and mosses (*Tortella* genus, and others). Microbial and algal mats occur in shallow depressions where water pools in spring and after rains.



Figure 1. Little Bluestem alvar grassland at Hopkins Point

Condition

Some charred woody debris is present on this alvar, indicating past fire. Overall the ecological quality is good, with almost no weeds. Impacts include a cottage access road along the northern edge and a minor power line along road. There seems to be a good probability of driveway construction through alvar in future to the nearby lakeshore. Some cut stumps were noted on the fringes of the alvar.

Diversity

The Hopkins Point alvar grassland community sustains 36 vascular plant species, of which all but one are native to Ontario.

Ecological Functions

The Hopkins Point alvar is part of the Lake Huron coastal ecosystem. Bedrock shoreline communities are the main adjacent community type. Shorelines are areas of high biodiversity, with the majority of aquatic species occurring in the nearshore littoral zone. Most terrestrial fauna also use the shoreline ecotone during some part of their life cycle. The coastal habitats are also undoubtedly important refugia and feeding areas for migrating birds.

Special Features

No provincially or locally rare flora or fauna have been documented at the Hopkins Point alvar.

Conclusions and Recommendations

Evaluation and Significance

The Hopkins Point site contains a small alvar in good ecological condition. It is at most locally significant, as the Little Bluestem alvar grassland community type is relatively common and better represented at other sites in Ecodistrict 6E-14.

Threats

This alvar is potentially threatened by waterfront residential development and associated driveways and other habitat modification.

Management

It is recommended that the private landowners be provided information necessary to help them protect the natural heritage values of the site's alvar habitat.

Future Inventory Needs

1. Non-vascular plants, invertebrates and other fauna have not been formally surveyed at this site.
2. Monitoring of habitat quality ought to be undertaken on a regular basis.

References

Jalava, J.V. 2005. Biological Surveys of Bruce Peninsula Alvars 2005 Summary Report. Prepared for Bruce Peninsula National Park, Parks Canada. iii + 80 pp.



Vascular Plants of the Hopkins Point Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	I3 AL01-3
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234		X
<i>Rorippa sylvestris</i> (L.) Besser	Creeping Yellow Cress	G5	SE5			X	237		X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277		X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286		X
<i>Proserpinaca palustris</i> L.	Mermaid-weed	G5	S4			X	289		X
<i>Oenothera biennis</i> L.	Hairy Yellow Evening-primrose	G5	S5			X	301		X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X
<i>Halenia deflexa</i> (Smith) Griseb. Ssp. <i>deflexa</i>	Spurred Gentian	G5	S5			X	376		X
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392		X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X
<i>Artemisia campestris</i> L. ssp. <i>caudata</i>	Sagewort Wormwood	G5T4	S4S5			X	423		X
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X
<i>Sporobolus vaginiflorus</i> (Torrey ex A. Gray)	Ensheathed Dropseed	G5	S4			X	458		X

Meta-site 14. NIIBIN and WEST OF HIGHWAY 6

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/4

NAD83 UTM 17T 459800 5001920 (site 14a); 458065 5003140 (site 14b)

Ownership: Niibin (site 13a): private (50%), Chippewas of Nawash First Nation (50%); West of Highway 6 (13b) Chippewas of Nawash / Private (75%), Bruce Peninsula National Park (25%).

Protection: Protected through management practices of Chippewas of Nawash First Nation and Bruce Peninsula National Park.

Survey Dates (Surveyors): July 10 and 24, August 8, 1996 (C. Schaefer)

Total Extent of Alvar: 5.5 ha

Overall Alvar Quality Rank: AB

Directions: Along Highway 6 approximately 6 km north of Dyer's Bay Road is a large radio tower; another 1.65 km past the tower is the Niibin Alvar (site 13a), which straddles the highway. Continuing north along High, approximately 0.8 km past Emmett Lake Road on the southwest side of the highway is an alvar opening immediately adjacent to the road (site 13b).

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (native)	NHIC-Tracked Species
14a. Niibin	Dvp	IACI (Schaefer 1996)	1	7	29 (29)	1
14b. West of Highway 6	Rvp	IKONOS	2	10	56 (53)	1
Meta-site Totals			3	12	70 (67)	2

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

According to Schaefer (1996), Niibin is an “extremely interesting site and unlike any other observed on the Bruce Peninsula or in other alvar regions of Ontario. A wetland channel runs through the centre of the site in a northeast-southwest direction, and likely ends at a wetland community southwest of the site. Each spring the swollen water channel results in the entire site being submerged in up to a couple of feet of water. The flooded area usually reaches the woodland edge of the site. Slowly through the spring the water recedes and pavement is exposed. It is not until late June or even July that all the pavement is exposed. A narrow central channel continues to be dominated by [irises and wetland] sedges and grasses. Despite being open for a relatively short time, typical alvar plants are quick to establish at the site, and there is a surprising abundance of Little Bluestem, [Balsam Ragwort], etc.”

To the north, just past Emmett Lake Road on the both sides of Highway 6, is another small but interesting patch of alvar grassland and treed alvar (savannah). The grassland community is strongly dominated by the provincially rare Northern Dropseed. The community is saturated in spring and after heavy rains, normally becoming moist-fresh to fresh during the summer months. Soils are dark brown, fine-textured silty loam, probably with some organic content. Soil depths in the grassland community were measured at the

centroid as 13, 18, 22, 20 and 20 cm, which are greater depths than most alvar communities on the northern Bruce. The treed alvar portion to the south and on the opposite side of the highway has more typical very shallow soils, with much exposed bedrock. The alvar complex is surrounded by open Jack Pine – White Cedar woodland, which, though not surveyed, probably supports small alvar openings.



Creeping Juniper dwarf shrubs (foreground) grading into Northern Dropseed alvar grassland (background) at alvar West of Highway 6

Alvar Representation

Niibin Alvar (Site 13a)

ALO1-5 Fresh – Moist Tufted Hairgrass Open Alvar Meadow

Schaefer writes “There are grassland and shrubland (latter dominated by [Creeping Juniper] or [Swamp Birch and Alder-leaved Buckthorn]) associations but these are <0.5 ha in size or disconnected, and therefore the site is best classified as a pavement community.” However, all of the Schaefer (1996) observation points had herbaceous cover of 25-75%, exposed bedrock of 15-60%, and all but one had <25% shrub cover, so the community is classified here as an alvar grassland. A few scattered Red Ash trees, saplings and tall shrubs are present. The dominant herbs are, in order of frequency and abundance, Tufted Hairgrass, Little Bluestem, Acuminate Panic Grass and Balsam Ragwort. Woolly Sedge and Canada Bluejoint are common in the wettest patches of alvar. Non-vascular plants, algae and microbial mats are common on the exposed dolostone pavement.

West of Highway 6 (Site 13b)

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow Type (Northern Dropseed)

The alvar grassland at this site is strongly dominated by the provincially rare Northern Dropseed (80-90% cover), with Lindheimer's Panic Grass, Balsam Ragwort, Northern Comandra and Buxbaum's Sedge as associates, in order of abundance. Scattered copses of Jack Pine and White Cedar trees and saplings occur on adjacent higher ground. There are generally no shrubs in the grassland, but Creeping Juniper and, to a lesser extent, Sand Cherry, form a dense shrub layer in the transition to adjacent treed alvars and bedrock woodlands, particularly along the southern fringe of the grassland. Non-vascular species occur patchily, and include cushion mosses and brownish algae mats, as well as microbial mats and the rock surface algae, *Gloeocapsa alpina*, on small patches of exposed pavement.

ALT1-3 White Cedar - Jack Pine Treed Alvar Type

Next to the alvar grassland on the southwest side of the highway, as well as an area on the northeast side, is open alvar savannah dominated by White Cedar and Jack Pine trees, with Tamarack as an associate, and White Spruce occasional in the sapling layer. Low shrubs are common, with Creeping Juniper dominant and Common Juniper a secondary species. The variable but sparse herb layer is dominated by Upland White Goldenrod, with Bristle-leaf Sedge common under the trees, and Gray Goldenrod, Richardson's Sedge and Sand Violet as associates in openings. The bedrock is covered in the rock surface algae, *Gloeocapsa alpina*, and cushion mosses and crustose lichens are also present.

Condition

Niibin (site 14a)

Highway 6 bisects the site, and its routing through the area involved the construction of a large artificial embankment. According to Schaefer (1996), in 1996 there was no evidence of other anthropogenic activity. Schaefer (1996) writes, "On the east side of the highway are the Saugeen Hunting Grounds of the Chippewas of Nawash First Nation. They stretch for 4 km along the highway. The Dudgeon property stretches for 2.2 km along the highway on the west side, and has no development on it. Surrounding areas are also largely undisturbed forest habitats. Scattered residential buildings occur along the highway north of Emmett Lake Road." None of the vascular plant species listed by Schaefer (1996) for the site are introduced, suggesting good ecological integrity at the site, despite its proximity to the highway.

West of Highway 6 (site 14b)

With the exception of Highway 6 and the utility corridor that follows the highway, which follow the northeastern edge of the site, no human disturbance was noted within this alvar complex. The construction of the highway embankment probably affected the hydrological regime of the alvar, reducing water flow from the east (since the bedrock

slopes gradually to the west-southwest). An off-road vehicle trail runs southwest from the western edge of the alvar grassland, but no rutting was noted within the alvar itself.

Diversity

The one alvar community type at Niibin displays considerable structural diversity, with shrubby sections, grassland and pavement patches. It also contains wetland elements. However, species diversity is relatively low, at 29 vascular plant taxa. The alvar West of Highway 6 displays greater diversity, with two alvar community types and a total of 56 vascular plant species, 53 of them native, and 10 of them restricted mainly to alvars in Ontario. Combined, these two closely-situated alvars support three alvar community types, 67 native vascular plant taxa and 12 alvar plant species.

Ecological Functions

The hydrological regime at the Niibin alvar is of particular interest, with the extensive spring flooding as a result of its situation along a watercourse, the subsequent drawdown, and the rapid annual colonization by alvar species.

Special Features

A Moss *Pseudocalliergon turgescens* G3G5 S2
This provincially rare moss was found by Schaefer (1996) at the Niibin Alvar (site 13a).

Northern Dropseed *Sporobolus heterolepis* G5S3
Northern Dropseed, also known as Prairie Dropseed, is a provincially rare grass that is more common in western North America. It has been found at a number of higher quality alvar habitats in Ontario (Brownell and Riley 2000) and is not considered rare on the Bruce Peninsula (BGPC 2003). It is a strong dominant at the alvar grassland West of Highway 6 (site 14b). Tens of thousands of clumps are present. There are also smaller patches of the grass on the northeast side of the highway.

In addition, Schaefer (1996) states “*Iris lacustris*” dominates the narrow wet channel through the centre of the site. However, it is suspected that Schaefer meant the common “*Iris versicolor*” or Wild Blue Flag, since no rare species documentation is included in the IACI data forms. The provincially rare hybrid, *Carex flava* X *Carex viridula*, is also found at the Niibin Alvar (site 13a).

Conclusions and Recommendations

Evaluation and Significance

The Niibin alvar is significant as the only “riparian” alvar on the Bruce Peninsula, in that it is flooded by a watercourse in spring, with waters receding as summer progresses,

exposing the alvar pavement.

The West of Highway 6 site supports one of the few Bruce Peninsula alvars strongly dominated by the provincially rare Northern Dropseed. Although adjacent to Highway 6, the alvar is in good ecological condition.

Threats

Modification or expansion of Highway 6 through these area could affect the alvar. Alterations, such as damming, to the wetland system that runs through the Niibin site and floods it yearly in the spring could adversely affect the alvar communities.

Management

It is recommended that the Chippewas of Nawash First Nation and the private landowners of these sites be provided stewardship information necessary to help them protect the natural heritage values.

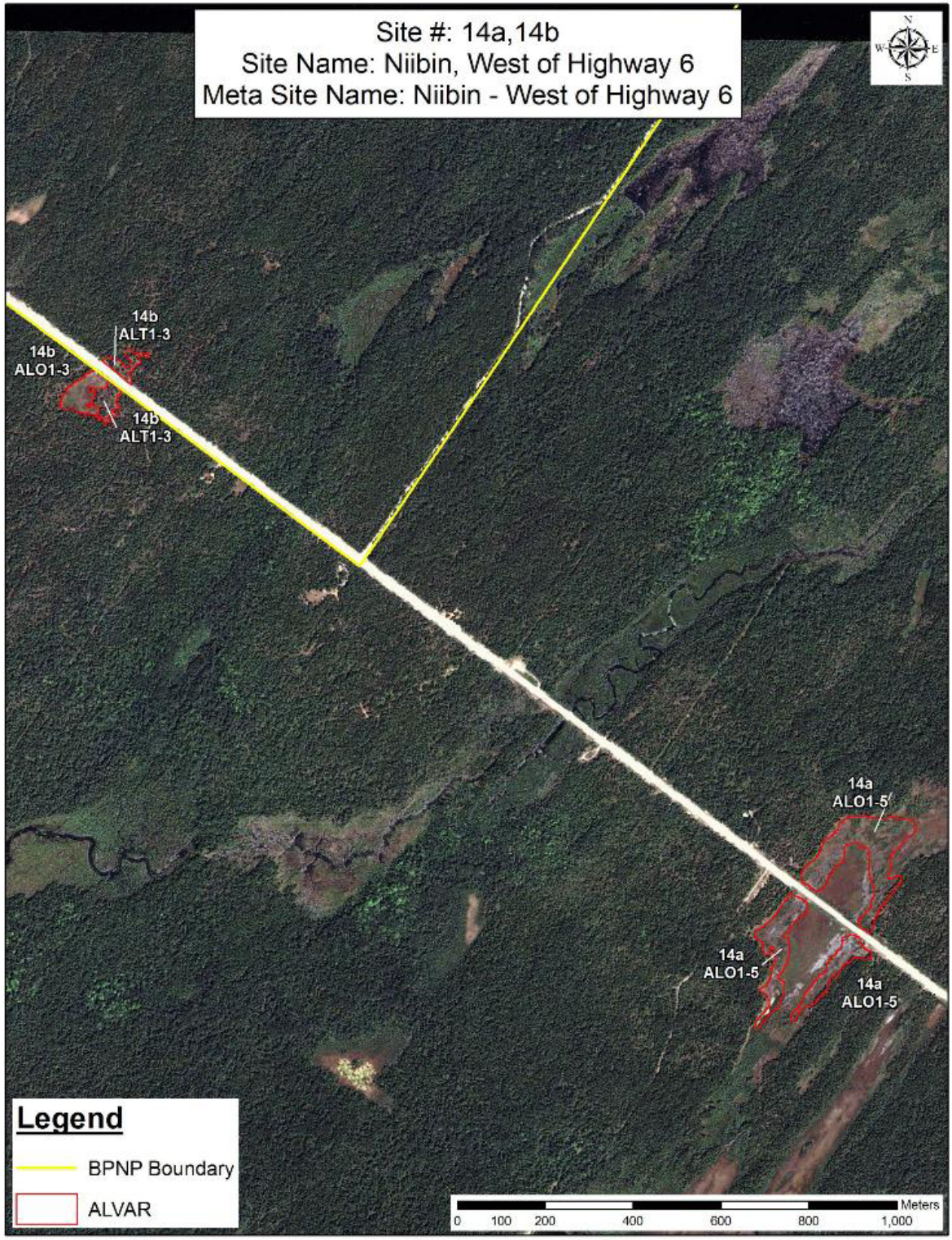
Future Inventory Needs

1. Invertebrates and other fauna have not been formally surveyed at these sites.
2. Monitoring of rare species populations and habitat quality should be undertaken on a regular basis.

References

Jalava, J.V. 2006. Field notes from a site visit, August 22, 2006. Unpublished notes, air photo mapping and digital data spreadsheets.

Schaefer, C. 1996. Niibin Alvar. International Alvar Initiative Forms, on file, Natural Heritage Information Centre, Peterborough.



Vascular Plants of the Niibin and West of Highway 6 Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	14a ALO1-5	14b ALO1-3	14b ALTI-3
<i>Larix laricina (Du Roi) K. Koch</i>	Tamarack	G5	S5			X	33			X	X
<i>Picea glauca (Moench) Voss</i>	White Spruce	G5	S5			X	33				X
<i>Pinus banksiana Lambert</i>	Jack Pine	G5	S5			X	33			X	X
<i>Juniperus communis L. var. depressa</i>	Common Juniper	G5T5	S5			X	34			X	X
<i>Juniperus horizontalis Moench</i>	Creeping Juniper	G5	S5			X	34	M	X	X	X
<i>Thuja occidentalis L.</i>	White Cedar	G5	S5			X	34			X	X
<i>Aquilegia canadensis L.</i>	Wild Columbine	G5	S5			X	130				X
<i>Ranunculus flammula L.</i>	Creeping Spearwort	G5	S5			R	130		X		
<i>Thalictrum pubescens Pursh</i>	Tall Meadow-rue	G5	S5			X	130		X		
<i>Betula papyrifera Marshall</i>	Paper Birch	G5	S5			X	165		X	X	X
<i>Hypericum kalmianum L.</i>	Kalm's St. John's-wort	G4	S4			X	200	M	X	X	
<i>Hypericum perforatum L.</i>	Common St. John's-wort	G?	SE5			XI	200			X	
<i>Viola adunca Smith</i>	Sand Violet	G5	S4S5			R	218				X
<i>Viola sp.</i>	Violet species	G5	S4			X	218		X		
<i>Populus tremuloides Michaux</i>	Trembling Aspen	G5	S5			X	234			X	
<i>Salix bebbiana Sarg.</i>	Bebb's Willow	G5	S5			X	234			X	
<i>Salix discolor Muhlenb.</i>	Pussy Willow	G5	S5			X	234			X	
<i>Arctostaphylos uva-ursi (L.) Sprengel</i>	Bear-berry	G5	S5			X	247				X
<i>Lysimachia quadriflora Sims</i>	Prairie Loosestrife	G5?	S4			X	258		X	X	
<i>Potentilla fruticosa L. ssp. floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X		
<i>Prunus pumila L.</i>	Sand Cherry	G5	S4S5			X	277	Mt	X	X	
<i>Prunus virginiana L.</i>	Choke Cherry	G5T?	S5			X	277				X
<i>Rosa blanda Aiton</i>	Smooth Wild Rose	G5	S5			X	277			X	
<i>Cornus stolonifera Michaux</i>	Red-osier Dogwood	G5	S5			X	307			X	
<i>Comandra umbellata (L.) Nutt.</i>	Bastard-toadflax	G5	S5			X	313		X	X	
<i>Rhamnus alnifolia L'Her.</i>	Alder-leaved Buckthorn	G5	S5			X	338		X	X	
<i>Daucus carota L.</i>	Wild Carrot	G?	SE5			XI	374				X
<i>Calamintha arkansana (Nutt.) Shinn.</i>	Wild Savory	G5	S4S5			X	392	M			X
<i>Lycopus americanus Muhlenb. ex Bartram</i>	American Water-horehound	G5	S5			X	392		X		
<i>Prunella vulgaris L.</i>	Heal-all	G5	S5			X	392		X	X	X
<i>Fraxinus pennsylvanica Marshall</i>	Red/Green Ash	G5	S5			X	398		X	X	
<i>Campanula rotundifolia L.</i>	Harebell	G5	S5			X	411				X
<i>Lobelia kalmii L.</i>	Kalm's Lobelia	G5	S5			X	411		X		
<i>Houstonia longifolia Gaertner</i>	Long-leaved Houstonia	G4G5	S4?			X	416				X
<i>Lonicera hirsuta</i>	Hairy Honeysuckle	G5	S5			X	418				X
<i>Lonicera oblongifolia (Goldie) Hooker</i>	Swamp Fly-honeysuckle	G4	S5			X	418			X	
<i>Aster ciliolatus Lindley</i>	Fringed Blue Aster	G5	S5			X	423				X
<i>Coreopsis lanceolata L.</i>	Lance-leaved Coreopsis	G5	S4?			R	423	E		X	
<i>Helenium autumnale L.</i>	Sneezeweed	G5	S5			X	423		X		
<i>Prenanthes racemosa Michaux</i>	Smooth White-lettuce	G5T?	SU			X	423		X	X	
<i>Senecio pauperculus Michaux</i>	Balsam Ragwort	G5	S5			X	423	M	X	X	X
<i>Solidago hispida Muhl.</i>	Hairy Goldenrod	G5	S5			X	423				X
<i>Solidago nemoralis Aiton ssp. nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423				X
<i>Solidago ptarmicoides (Nees) B. Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E			X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	14a ALO1-5	14b ALO1-3	14b ALTI-3
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X		X
<i>Symphotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicked Aster	G5	S5			X	423			X	
<i>Carex buxbaumii</i> Wahl.	Brown Bog Sedge	G5	S5			X	457			X	
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X		
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457			X	X
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X	X	
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E			X
<i>Carex viridula</i> Michaux	Greenish Sedge	G5?T?	S5			X	457		X		
<i>Carex x subviridula</i> (Kuk.) Fern.	(<i>C. flava</i> X <i>C. viridula</i>)	HYB	S2			R	457		X		
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458			X	
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv	Canada Blue-joint	G5	S5			X	458			X	
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458			X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X	X	
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458				X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	X	
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5T5	S4			X	458			X	
<i>Panicum virgatum</i> L.	Switch Grass	G5	S4			X	458		X		
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458			X	
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X		
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	Prairie Dropseed, Northern Dropseed	G5	S3			X	458	E		X	
<i>Sporobolus</i> sp.	Ensheathed Dropseed	G5	S4			X	458		X		
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475			X	X
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476			X	
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489				X
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489				X
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	G5	S5			X	489		X		

Preliminary List of Non-vascular Plants and Algae of the Niibin Alvar

TAXON	NAME	GRANK	SRANK	14a ALO1-5
A	<i>Gloeocapsa alpina</i>			X
A	<i>Nostoc commune</i>			X
A	<i>Trentepohlia amulata</i>			X
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2	X
L	<i>Placynthium nigrum</i>	G?	S5?	X

Site 15. NORTH OF SHOULDICE LAKE

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)
 NTS Map: 41H/4
 NAD83 UTM: 17T 466531 4999925
 Ownership: Private (in part), Federal (Bruce Peninsula National Park) (in part)
 Protection: Partly protected by Bruce Peninsula National Park
 Survey Dates (Surveyors): August 30, 2005 (J. Jalava)
 Total Extent of Alvar: 1.1 ha
 Overall Alvar Quality Rank: CD

Directions: From Highway 6 travel east along Dyer's Bay Road to the first road on the left, Shouldice Lake Road. Take Shouldice Lake Road north past Shouldice Lake to a rough track heading northeast on the right hand side of the road. Alvar patches are found along this track. The track appears to be a public right-of-way, as it was not posted in 2005.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
15. North of Shouldice Lake	Rvp	Jalava (2005), IKONOS	2	5	36 (30)	1

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Inland amidst open White Cedar-dominated coniferous bedrock woodlands north of Shouldice Lake is an area of patchy Poverty Oat Grass alvar grassland and pavement habitats interspersed with White Cedar curtain forests (Jalava 2005). Closer to Shouldice Lake Road another more disturbed alvar opening is also dominated by Poverty Oat Grass.

Alvar Representation

Jalava (2005) writes, "The main alvar area of this site consists of dolostone bedrock with scattered limestone fragments and occasional small erratics. Physiognomically, it is open pavement alvar interspersed with curtain forests (overall, it could be considered alvar woodland if treed areas were included). Some clint and gryke topography is present, with shaded crevices. Soil deposits are minimal and very shallow, with depths measured at the first centroid listed above being 0 cm, 0 cm, 0 cm, 0.5 cm, 0 cm, and 0.5 cm. The disjunct alvar patch near the road access point has deeper, sandy brown soil of the Breyden series."

ALO1-1 Dry Lichen – Moss Open Alvar Pavement

ALO1-4 Dry-fresh Poverty Grass Open Alvar Meadow Type

Although the alvar patches north of Shouldice lake have extensive bedrock pavement (Figure 1), there is sufficient herbaceous cover overall (average 15% to 35%) to classify some portions as grasslands. The alvar patches generally have no trees or saplings, but curtain forests are dominated by White Cedar, with White Birch, Red Pine and White Spruce as associates. Low shrubs occur patchily, mostly around the fringes of the alvar openings, with the most common species by far being Common Juniper, with Bearberry as an associate. Poverty Oat Grass, Upland White Goldenrod, Balsam Ragwort and Hairy Goldenrod are the dominant native species in the herb layer, with the locally rare Early Saxifrage locally abundant, and with the introduced Common St. John's-wort also common in most areas. Bristle-leaf Sedge is abundant along the woodland fringes of the alvar patches. The rock-surface algae, *Gloeocapsa*, covers nearly all exposed dolostone, with mosses (*Tortella* sp. and others) and crustose lichens also common on the pavement.

A disjunct alvar grassland occurs on deeper soil closer to the road access point to the site. It is more strongly dominated by Poverty Oat Grass, with Balsam Ragwort, Acuminate Panic Grass, Upland White Aster and Bristle-leaf Sedge as secondary native species, and with the introduced Common St. John's-wort and Black Medick also being common, indicating past disturbance of some kind.



Figure 1. Alvar pavement and grassland habitat north of Shouldice Lake

Condition

The interior alvar patches show evidence of past fire, with charred stumps present. The community mosaic is bisected by off-road vehicle trail that has been recently used for a logging operation in the area. Communities along the trail are quite weedy, but away from the trail the weed component drops off rapidly.

Diversity

The alvars north of Shouldice Lake sustain 30 native vascular plant taxa, of which five display a strong affinity to alvar habitats in Ontario. Structurally, the alvars are somewhat diverse, in that grassland and pavement occur patchily, and shrubby sections occur along the fringes and adjacent to curtain forests.

Ecological Functions

These alvars occur in a naturally-vegetated landscape that is part of the Bruce Peninsula National Park – Cabot Head natural area. This is one of the largest and least impacted natural areas in Ontario south of the Canadian Shield. Extensive tracts of “interior” habitat are present. The alvars occur as small-patch communities within the larger mixed/coniferous bedrock woodland matrix community.

Special Features

One provincially rare vascular plant species was documented by Jalava (2005) at the site. Also, the locally rare Early Saxifrage is patchily common on the alvar pavement patches.

Cooper's Milk-vetch *Astragalus neglectus* G4S3
Cooper's Milk-vetch (G3S3) grows in good numbers along the trail near the alvar patches at the North of Shouldice Lake site, with 166 plants counted during the 2005 site visit. This species appears to prefer dry sandy soils with partial shade in open woodlands, treed barrens, shrub barrens and the fringes of alvar habitats.

Conclusions and Recommendations

Evaluation and Significance

The alvars North of Shouldice Lake are best considered locally significant when compared to larger and less disturbed sites, although the alvar community types present at the site are both globally and provincially significant. The presence of sizeable populations of the globally and provincially rare Cooper's Milk-vetch and the locally rare Early Saxifrage is notable.

Threats

Damage to vegetation and soils by the heavy machinery used in ongoing logging operations in the vicinity of the alvar patches at this site is the greatest threat. Alvar patches may seem convenient locations for cutting and storing timber and equipment.

Expansion or upgrading of the vehicle access track that passes through or near the alvars would also potentially further disturb the habitats.

Management

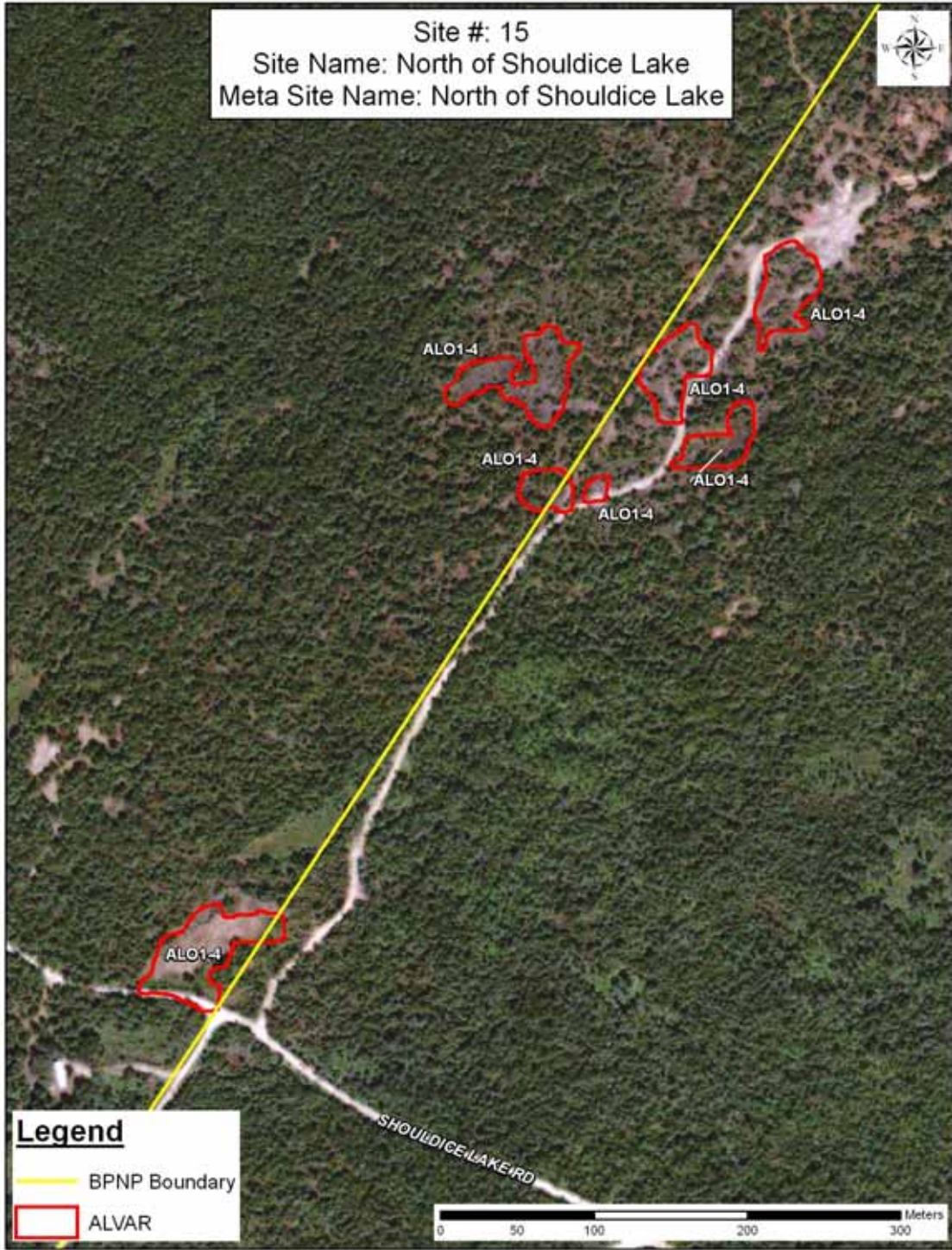
It is recommended that the private landowners be provided information necessary to help them protect the natural heritage values of the site's alvar habitats.

Future Inventory Needs

1. Non-vascular plants, invertebrates and other fauna have not been formally surveyed at this site.
2. Further survey work to determine if additional alvar patches occur in the vicinity of those found along the right-of-way.
3. Monitoring of habitat quality and rare species populations should be undertaken on a regular basis.

References

Jalava, J.V. 2005. Biological Surveys of Bruce Peninsula Alvars 2005 Summary Report. Prepared for Bruce Peninsula National Park, Parks Canada. iii + 80 pp.



Vascular Plants of the North of Shouldice Lake Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	15 ALOI-4
<i>Pteridium aquilinum (L.) Kuhn</i>	Eastern Bracken	G5T	S5			X	16		X
<i>Asplenium trichomanes L.</i>	Maidenhair Spleenwort	G5	S5			X	19		X
<i>Larix laricina (Du Roi) K. Koch</i>	Tamarack	G5	S5			X	33		X
<i>Picea glauca (Moench) Voss</i>	White Spruce	G5	S5			X	33		X
<i>Pinus resinosa Aiton</i>	Red Pine	G5	S5			X	33		X
<i>Juniperus communis L. var. depressa Pursh</i>	Common Juniper	G5T5	S5			X	34		X
<i>Thuja occidentalis L.</i>	White Cedar	G5	S5			X	34		X
<i>Anemone cylindrica A. Gray</i>	Long-fruited Thimbleweed	G5	S4			X	130		X
<i>Aquilegia canadensis L.</i>	Wild Columbine	G5	S5			X	130		X
<i>Minuartia michauxii (Fenzl) Farw.</i>	Rock Sandwort	G5	S5			X	178		X
<i>Hypericum perforatum L.</i>	Common St. John's-wort	G?	SE5			XI	200		X
<i>Salix discolor Muhlenb.</i>	Pussy Willow	G5	S5			X	234		X
<i>Arctostaphylos uva-ursi (L.) Sprengel</i>	Bear-berry	G5	S5			X	247		X
<i>Saxifraga virginiana Michaux</i>	Early Saxifrage	G5	S5			R	276	M	X
<i>Astragalus neglectus (Torrey & A. Gray) E.</i>	Cooper's Milk-vetch	G4	S3			X	285	H	X
<i>Medicago lupulina L.</i>	Black Medick	G?	SE5			XI	285		X
<i>Prunella vulgaris L.</i>	Heal-all	G5	S5			X	392		X
<i>Plantago lanceolata L.</i>	English Plantain	G5	SE5			XI	396		X
<i>Verbascum thapsus L.</i>	Common Mullein	G?	SE5			XI	399		X
<i>Campanula rotundifolia L.</i>	Harebell	G5	S5			X	411		X
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423		X
<i>Senecio pauperulus Michaux</i>	Balsam Ragwort	G5	S5			X	423	M	X
<i>Solidago hispida Muhl.</i>	Hairy Goldenrod	G5	S5			X	423		X
<i>Solidago ptarmicoides (Nees) B. Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E	X
<i>Solidago uliginosa Nutt.</i>	Bog Goldenrod	G4G5	S5			X	423		X
<i>Taraxacum officinale G. Weber</i>	Common Dandelion	G5	SE5			XI	423		X
<i>Juncus dudleyi Wieg.</i>	Dudley's Rush	G5	S5			X	455		X
<i>Carex eburnea Boott ex Hooker</i>	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Carex richardsonii R. Br.</i>	Richardson's Sedge	G4	S4?			X	457	E	X
<i>Agrostis scabra Willd.</i>	Rough Hair Grass	G5	S5			X	458		X
<i>Danthonia spicata (L.) P. Beauv. ex Roemer</i>	Poverty Oat Grass	G5	S5			X	458		X
<i>Panicum acuminatum Ell. var. fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Panicum lindheimeri Nash</i>	Lindheimer's Panic Grass	G5T5	S4			X	458		X
<i>Panicum virgatum L.</i>	Switch Grass	G5	S4			X	458		X
<i>Sporobolus vaginiflorus (Torrey ex A. Gray)</i>	Ensheathed Dropseed	G5	S4			X	458		X
<i>Epipactis helleborine (L.) Crantz</i>	Helleborine	G?	SE5			XI	489		X

Meta-Site 16. PINE TREE POINT - SCUGOG LAKE

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds and Lindsay townships)

NTS Map: 41H/3

NAD83 UTM 17T 461500 4992000 (site 16a), 17 457600 4996000 (site 16b), 4997000 459000 (site 16c), 459020 4996425 (site 16d)

Ownership: Federally-managed Crown land and Provincial Nature Reserve (80-90%); Private (10-20%)

Protection: Bruce Peninsula National Park / Crown Land (OMNR) (80-90%); Johnston Harbour – Pine Tree Point ANSI (100%); Scugog Lake Provincially Significant Wetland (adjacent to some alvar patches)

Survey Dates (Surveyors): 1982 (J. Johnson); September 7, 1995, July 9, July 24 and August 8 1996 (C. Schaefer); July 27, August 3, 2004 (J. Jalava)

Total Extent of Alvar: ~50 ha (based on Jalava 2005); 796.1 ha (based on Brownell and Riley 2000 *fide* NHIC – which includes areas classified by Jalava (2005) as “rock barren”)

Overall Alvar Quality Rank: A

Directions: To reach the alvars in the Pine Tree Point alvars (15a) from Highway 6, travel west on Lindsay Road 30 to Pine Tree Harbour Road, which is on the right just before the road dead ends at the harbour. Halfway (~100m) before the sharp turn left there is a track on the right, adjacent to a cottage. Just past the cottage there is a place to pull off the track to head in on foot into the main part of the site. To reach the Scugog Lake alvars (site 15b-d) from Highway 6, take Johnson’s Harbour Rd. west (just north of Crane River Rest Stop) and continue almost to the end. Look for wide path and MNR reserve sign on left. Follow the path to the alvar site 15b. Sites 15c and 15d are best reached by canoe or kayak, putting in at the culvert where Johnson’s Harbour Road meets the north end of Scugog Lake, and paddling to the alvar sites using air photos or a map as a guide. Accessing site 15d involves a short but rather challenging portage through dense brush at the southeast end of Scugog Lake, as well as paddling through very shallow water and a thicket swamp, to reach a small lake which must be crossed to get to the alvar.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (native)	NHIC-Tracked Species
16a - Pine Tree Point	Dvpnb	Schaefer (1996) IACI; Jalava 2005	2	13	74 (72)	2
16b - Scugog Lake	Dvpnb	Schaefer (1995) IACI; Jalava 2005	2	17	68 (67)	5
16c - Scugog Lake East (North Portion)	Dvpb	Jalava 2005	2	10	53 (51)	0
16d - Scugog Lake Southeast	Dvpb	Jalava 2005	1	10	37 (37)	0
Meta-site Totals			8	20	134 (128)	6

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

The alvars in the Pine Tree Point – Scugog Lake area are situated near Lake Huron on the dolostone bedrock plain at the north end of ecodistrict 6E-14. Calcareous rock barren and globally rare alvar habitats are common in this area. They are probably more extensive today than they were prior to logging and subsequent wildfires, but the general lack of soil and the presence of a distinct alvar flora indicate that these habitats have been an important component of the regional ecosystem for many millennia.

Alvar Representation

A range of alvar communities occur near the shoreline, and up to 1.5 km inland, along the stretch of Lake Huron coast between Pine Tree Point and the Scugog Lake area. Many of these alvars are virtually undisturbed and occur in a woodland – wetland – alvar mosaic that supports a variety of rare and threatened species.

At the Scugog Lake site, “The alvar pavement savanna is slightly raised relative to the [Buxbaum’s Sedge-dominated] wetland to the north. Some areas of unbroken dolostone pavement exist, but the majority of the area is broken dolostone rubble and slate pieces. All the rock is dark grey since it is covered by the blue-green alga *Gloeocapsa alpina*. [Creeping Juniper] is quite common, and [Shrubby Cinquefoil] shrubs (small) are frequent. Herbs account for under 50% cover, and [Scirpus-like Sedge, Little Bluestem and Bluets] are dominant. This layer is quite diverse and species rich; [Richardson’s Sedge] is frequent, as well as other sedge and grass species. “Exposed” rock is the prevalent feature and common mosses are [the mosses] *Schistidium rivulare*, *Tortella fragilis* and *Tortella tortuosa*; common lichens are the crustose *Placynthium nigrum*, *Cladonia symphycarpi* and *Cladonia pyxidata*. The grassland communities occur to the south; most of the areas are rock and herbs dominated by graminoid species: [Little Bluestem Scirpus-like Sedge, Tufted Hairgrass, Tufted Bulrush and Acuminate Panic Grass].” [Schaefer 1995]

Vast, remote areas of sparsely-treed dolostone plain occur in the area north and northeast of Pine Tree Point. However, much of this area appears to have burned, possibly after heavy logging (Schaefer 1996) in the early 1900’s, and the alvar-like habitats occurring there may not be sustained by natural processes (Schaefer and Larson 1997, Jones and Reschke 2005). Also, large expanses of the treed barrens occur on undulating bedrock with too much relief to support alvar communities. Of the Pine Tree Point area (Figure 1), Schaefer (1996) writes, “The site is a very large complex of alvar savannas with significant shrub layers, as well as some smaller areas with little tree cover or herbaceous layer, and dominated by [Creeping Juniper]. Perhaps these latter communities are best described as dwarf shrublands. The shrubland savannas surveyed were most frequently dominated by [White Birch and Common Juniper]. Some areas were somewhat undulating rather than flat, yet the vegetation was the same. The rock was still very close to the surface, and 37% of the observation area was exposed rock or *Cladonia* lichens (and cushion mosses to a minor degree) growing almost directly on the rock. The undulating topography if significant enough (no slope angle cut off in definition of alvar

flatness) may go against the working definition. However these areas occur on a complex of other, flat areas and share their characteristics for the most part. They also may prove interesting for research on lack of inundation (although this feature is absent at many alvars). Some of the site may be open (or more open) because of past logging. The history of this site (*e.g.*, fire, cutting) would greatly help in understanding it. The Red Pine – [Creeping Juniper association] is unique in this region.”



Figure 1. Rugged treeless barren habitat inland from Pine Tree Point

However, small patches with very shallow soils on flat bedrock are undoubtedly naturally-occurring alvar, and two such patches were surveyed as part of the present study.

ALO1-1 Dry Lichen – Moss Open Alvar Pavement

The small (<1 ha) northwestern patches are found just north of the Crane River near Scugog Lake on gently sloping, fairly smooth dolostone bedrock with some areas of seepage from small adjacent wetlands. Groves of Jack Pine and White Cedar trees and saplings dominate in the curtain forests, while sparsely-scattered Tamarack, White Cedar and White Spruce trees, saplings and tall-shrub-sized seedlings occur in the moister northwestern examples. Low shrub cover ranges from 1% to 20%, with the most common species being Common Juniper, with Shrubby Cinquefoil being a secondary dominant in the northwestern patches. Mats of Creeping Juniper and Bearberry often occur on the woodland fringes of these open alvars.

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow

Three small patches of open alvar grassland dominated by Little Bluestem are found in the vicinity of Scugog Lake at the northwest end of the ANSI. Scattered Jack Pine or White Cedar trees and saplings are present. Creeping Juniper is the dominant low shrub, with Common Juniper, Shrubby Cinquefoil and Bearberry also often common. Herbaceous vegetation consists of Little Bluestem, Seneca Snakeroot, Upland White Goldenrod, Bristle-leaf Sedge, Wild Savory and Poverty Oat Grass. Non-vascular taxa on the open bedrock patches is similar to that of the pavement community (ALO1-1) described above.

ALO1-6 Moist -Wet Tufted Bulrush Alvar Grassland

A species-rich communities that could be classified as wet open alvar or “bedrock fen” was sampled near the Crane River shore at the northeast end of Scugog Lake. Shallow (generally 3.5 to 12 cm deep), saturated to moist marly soils are present, with extensive seepage evident. Small patches of exposed bedrock are also present. Sparse trees, saplings and seedlings of White Cedar and, to a lesser extent, Jack Pine, White Spruce or Tamarack occur. Shrubby Cinquefoil is the sparse but dominant low shrub, occurring in association with stunted White Cedar, Tamarack and White Spruce, as well as Alder-leaved Buckthorn and occasionally Swamp Birch. Cespitose Bulrush is a dominant in the herb layer. Co-dominants and secondary species are Seneca Snakeroot, Bird’s-eye Primrose, Grass-of-Parnassus and Thin-leaved Cottongrass, along with associates White Camass, Finely-nerved Sedge and Sterile Sedge.



Figure 2. Patch of Creeping Juniper dominated alvar shrubland near Pine Tree Point

ALSI-1 Common Juniper Shrub Alvar

ALSI-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar

ALSI-3 Scrub Conifer - Dwarf Lake Iris Shrub Alvar

Three alvar shrubland types were sampled at the Johnston's Harbour – Pine Tree Point ANSI. Common Juniper dominated alvars occur on dry bedrock flats in the southeastern interior of the ANSI, north of Pine Tree Point. Alvar dwarf shrublands dominated by Creeping Juniper and Shrubby Cinquefoil are found in several widely-dispersed inland locations at the site (Figure 2, 3). Patches of alvar shrubland occur in a mosaic with treed rock barrens just inland from the stretch of Lake Huron shoreline north of Ladyslipper Bay. In fact, most of the treed rock barrens and shrub rock barrens of the site contain alvar elements, and it is likely that flatter terrain mapped as rock barrens includes treed, shrub and open alvar patches.



Figure 3. Creeping Juniper – Shrubby Cinquefoil dwarf shrub alvar east of Scugog Lake

The shrub alvar types at this site usually have scattered trees, saplings and shrub-sized stunted trees of White Cedar, White Spruce or Jack Pine, but a few examples are virtually treeless. White Birch trees and saplings occasionally occur as associates. Bearberry is a frequent secondary species, and Kalm's St. John's-wort or Sand Cherry are occasionally common in the Creeping Juniper – Shrubby Cinquefoil shrublands. The most common herbaceous taxa in the Common Juniper alvar shrublands are Little Bluestem, Bristle-leaf Sedge, Fringed Houstonia, Richardson's Sedge, Upland White Goldenrod and Rock Sandwort. Herb layers of the Creeping Juniper – Shrubby Cinquefoil alvars are

dominated by a similar suite of herbs and grasses, occasionally with the addition of Wild Savory, Yellow Sedge, Scirpus-like Sedge, Poverty Oat Grass, Harebell, Hair-like Sedge, Balsam Ragwort and panic grasses (*Panicum* spp.). Herbaceous dominants in the sampled scrub conifer alvar shrublands included Dwarf Lake Iris, Hair-like Sedge, Bristle-leaf Sedge, Little Bluestem, Richardson's Sedge and Large-leaved Aster. The algae, *Gloeocapsa alpina*, typically covers virtually all exposed dolostone of these alvar shrublands, while cushion and turf mosses, crustose and foliose lichens are very common. Black to grey microbial mats occur in shallow open depressions in some examples. With the exception of historic wildfire, occasional ATV trails and discarded ammunition shells, little or no recent human disturbance was noted at the sampled alvar shrublands of the ANSI.

ALT1-4 Jack Pine – White Cedar – White Spruce Treed Alvar

The Scugog Lake alvar savannah is dominated by sparsely-scattered White Cedar and Tamarack trees, saplings and shrub-sized stunted trees. Sparsely-distributed Creeping Juniper, Shrubby Cinquefoil and Bearberry shrubs are present. Fringed Houstonia, Upland White Goldenrod, Acuminate Panic Grass, Little Bluestem, Scirpus-like Sedge, Richardson's Sedge, Bristle-leaf Sedge and Narrow-leaved Blue-eyed Grass are the most common taxa in the diverse herbaceous layer. The suite of dominant non-vascular taxa is similar to that of the FON alvar, with the addition of the lichens *Placynthium nigrum* and *Cladonia symphicarpia*.

Condition

Most of the Pine Tree Point – Scugog Lake does not show evidence of recent human disturbance and the site is generally in excellent ecological condition. The majority of non-native taxa are restricted to localized areas that have been impacted by roads, trails, cottage development or past logging activities. Areas to the south of the site around Pine Tree Point and northeast around Johnston's Harbour are under increasing pressure from cottage development.

A network of off-road trails, ranging from seldom-used to regularly-traveled, has fragmented some of the alvar habitats. Foot, bicycle and vehicle traffic along trails, driveways and roads may cause erosion, damage the root mat and introduce exotic and invasive species. The very thin soils in alvar and rock barren habitats are particularly susceptible to erosion and compaction and are especially prone to exotic species invasion. The most widespread and serious human impact noted along trails in the area was the proliferation by all-terrain vehicles (ATVs). Although most of the site is difficult to access and seldom-visited, a number of trails provide access to the interior. In 2004, it was noted by Jalava (2005) that these trails are being used by ATVs. Rutting, erosion and soil-compaction by ATVs was noted in numerous locations both along trails as well as a considerable distance from trails. Nevertheless, overall disturbance to the alvars of the area is low, with the most serious ATV impacts being in the interior northeast of Pine Tree Point.

Schaefer (1995) noted that old or ancient, stunted White Cedar and Tamarack trees were

being dug up from the Scugog Lake alvar for the bonsai trade. Schaefer (1995) writes, “Branches had been sawed off and left on the ground and the substrate was disturbed. The largest threat to this significant site is the removal of possibly its most important feature: the ancient cedars. They may be removed enough in the future that we will never be able to learn all it is that they could tell us about alvars, their ecology, origin and mechanisms for maintenance.” Schaefer (1996) also noted cutting of Red Pine trees in an unusual Red Pine – Creeping Juniper alvar association on private land in the Pine Tree Point area.

Diversity

The Pine Tree Point – Scugog Lake area sustains a high diversity of eight alvar community types and 20 vascular plant taxa with an affinity for alvar habitats. Overall, the alvars support 134 vascular plant taxa, of which 128 are native to Ontario. A high total of 23 moss taxa and 23 lichen taxa have been recorded at the alvars of the site.

Ecological Functions

The alvars in the Pine Tree Point – Scugog Lake area are part of the large Johnston’s Harbour – Pine Tree Point natural area. Much of this area is protected by the OMNR and Bruce Peninsula National Park, and by its provincial life science ANSI designation. The Scugog Lake Provincially Significant Wetland also covers wetland areas adjacent to many of the site’s alvar patches.

The site contains the lower portions of the Crane River and Brinkman’s Creek watersheds, including headwaters of tributaries, as well as wetlands that provide recharge functions. Woody vegetation in the site’s wetlands and shorelines helps maintain the water quality and natural hydrological regimes of the local watershed.

The site is a critical core area and linkage in landscape connectivity in the upper Bruce Peninsula region. The site is a corridor for the movement of a variety of organisms, and its position along the western coast of the Bruce Peninsula suggests that it is an important staging area for migrating landbirds. The integrity of Lake Huron shoreline, treed and shrub rock barren, forest, riparian, interior wetland and alvar ecosystem functions are currently maintained in the extensive undeveloped portions of the area.

Special Features

In the Pine Tree Point – Scugog Lake area, the nationally and provincially Threatened and globally rare Dwarf Lake Iris and Hill’s Thistle tend to occur in open bedrock woodlands and along trails in the vicinity of alvars, with only a few small populations documented within the alvars themselves. Similarly, the provincially rare Low Nut-rush occurs on wet bedrock pavement in an alvar-fen intergrade community, but not on alvar proper. Massasauga rattlesnake has been recorded in the vicinity of alvars in the area,

and undoubtedly occurs within them. In addition to the provincially rare taxa, five vascular plant species considered rare or very uncommon on the Bruce Peninsula (BPGC 2003) have been documented at the Pine Tree Point and Scugog Lake alvars.



Figure 4. Hill's Thistle and Dwarf Lake Iris in open treed barrens in the Pine Tree Point Interior

Ancient Trees

At Scugog Lake, according to Schaefer (1995), the White Cedar trees in the alvar savannah community are old, many of them over 400 years in age. Dwarf Tamarack trees in the alvar are also apparently old-growth. The grassland communities also have scattered stunted old White Cedars.

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR OMNR-THR G3S3
 The globally rare, nationally and provincially threatened Dwarf Lake Iris (Figure 4), was found by the author at over 40 locations within the Johnston Harbour – Pine Tree Point ANSI, but only minor populations within the alvars of the Pine Tree Point – Scugog Lake site. Habitats ranged from drier Jack Pine and White Cedar coniferous and mixed woodlands, to moist White Cedar coniferous forests, to alvar fringes and alvar 'curtain' woodlands, to untrampled sections of lightly-used trails.

Hill's Thistle *Cirsium hillii* COSEWIC-THR OMNR-THR G3S3
 Hill's Thistle (Figure 4) is globally rare, nationally and provincially threatened. It is also known from Michigan, Wisconsin, Indiana, Illinois, Minnesota and Iowa (Allen 2004). This thistle is usually found in open, dry, sandy, fire-prone habitats, including prairies, pine and oak barrens and savannahs, sand dunes, open bedrock woodlands, and alvar habitats (Allen 2004). At Johnston's Harbour – Pine Tree Point ANSI, 47 individual

plants were found by the author at 14 different locations (Jalava 2005). Most populations are quite small, but the species is widespread at the site in Jack Pine or White Cedar treed barrens, open Jack Pine woodlands, in partial shade in Common Juniper shrub barrens, and occasionally along trails through these habitats. Schaefer (2005) found the species in the alvar savannah at Scugog Lake.

Several globally and provincially rare land snail taxa were found by Grimm at the Scugog Lake alvars during the International Alvar Conservation Initiative (Reschke *et al.* 1999, Grimm 1996):

A Land Snail	<i>Vertigo morsei</i>	G1G2 S2
A Land Snail	<i>Vertigo elatior</i>	G2G3 S2S3
A Land Snail	<i>Catinella aprica</i>	G3 S2
A Land Snail	<i>Euchemotrema leai</i>	G? S2S3

Conclusions and Recommendations

Evaluation and Significance

The alvars of the Pine Tree Point – Scugog Lake area are highly significant, particularly for their overall community and species diversity and the presence of ancient trees, but also for their landscape context, as this is one of the largest roadless natural areas on the western side of the Bruce Peninsula.

Threats

Trail impacts, particularly by ATV's, and bonsai collecting are the only significant on-site threats noted for the alvars of this large site. Increased cottage development on surrounding lands could result in increased visitation and associated impacts on the alvars. As the public becomes more aware that these are public lands (because of National Park signage and a growing population on the Bruce Peninsula), pressures may increase.

Management

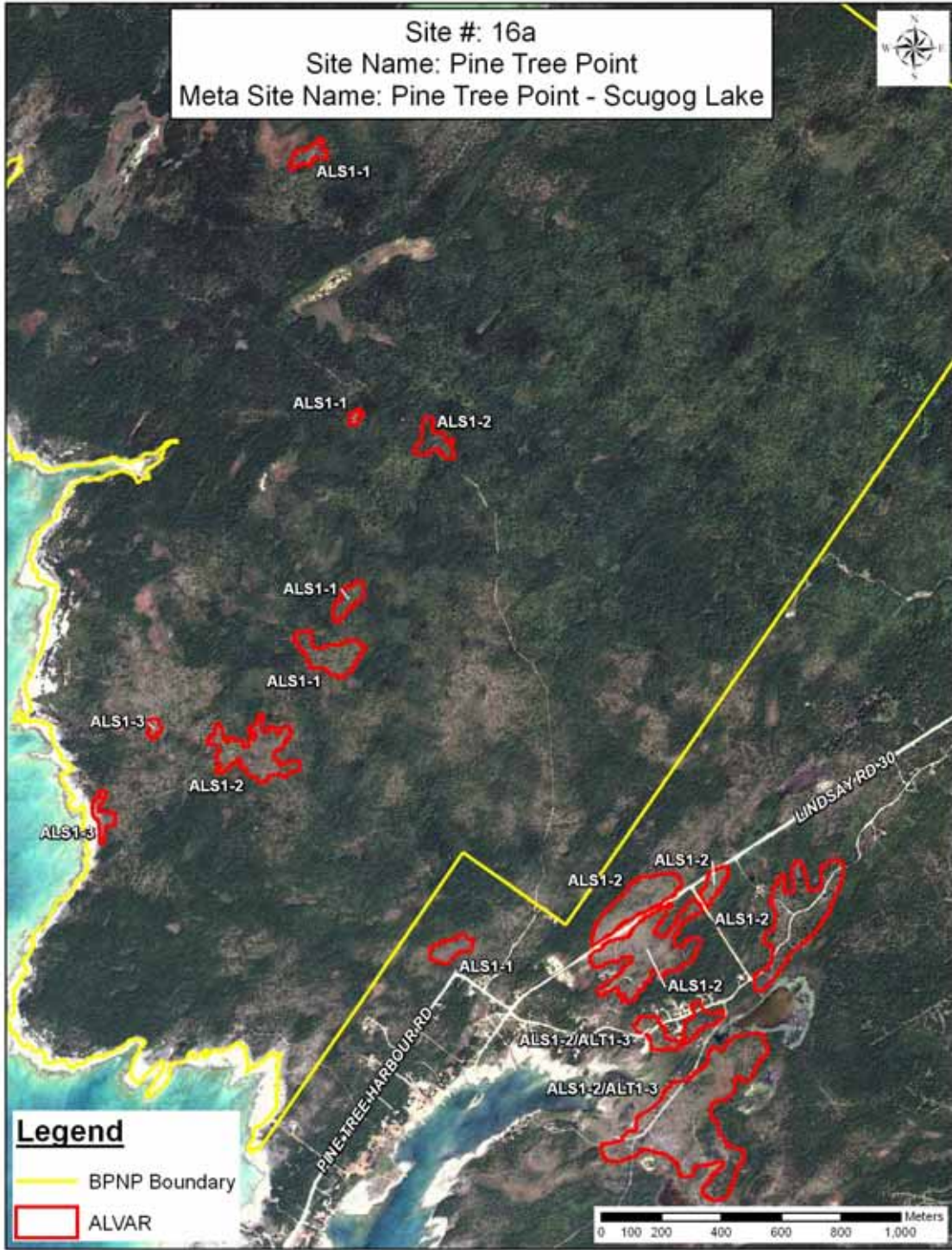
Bruce Peninsula National Park and the Ontario Ministry of Natural Resources should continue to work cooperatively to control ATV access along trails through alvar and other habitats on public lands within the Johnston Harbour – Pine Tree Point ANSI. This study agrees with the Schaefer (1995) recommendation that signs be posted at the Scugog Lake alvar addressing the illegality of bonsai collecting at the site and the significance of ancient trees. Patrolling of the site should be frequent and private land neighbours encouraged to report suspicious activities. Otherwise, passive management is recommended for the alvar and other habitats of this outstanding natural area.

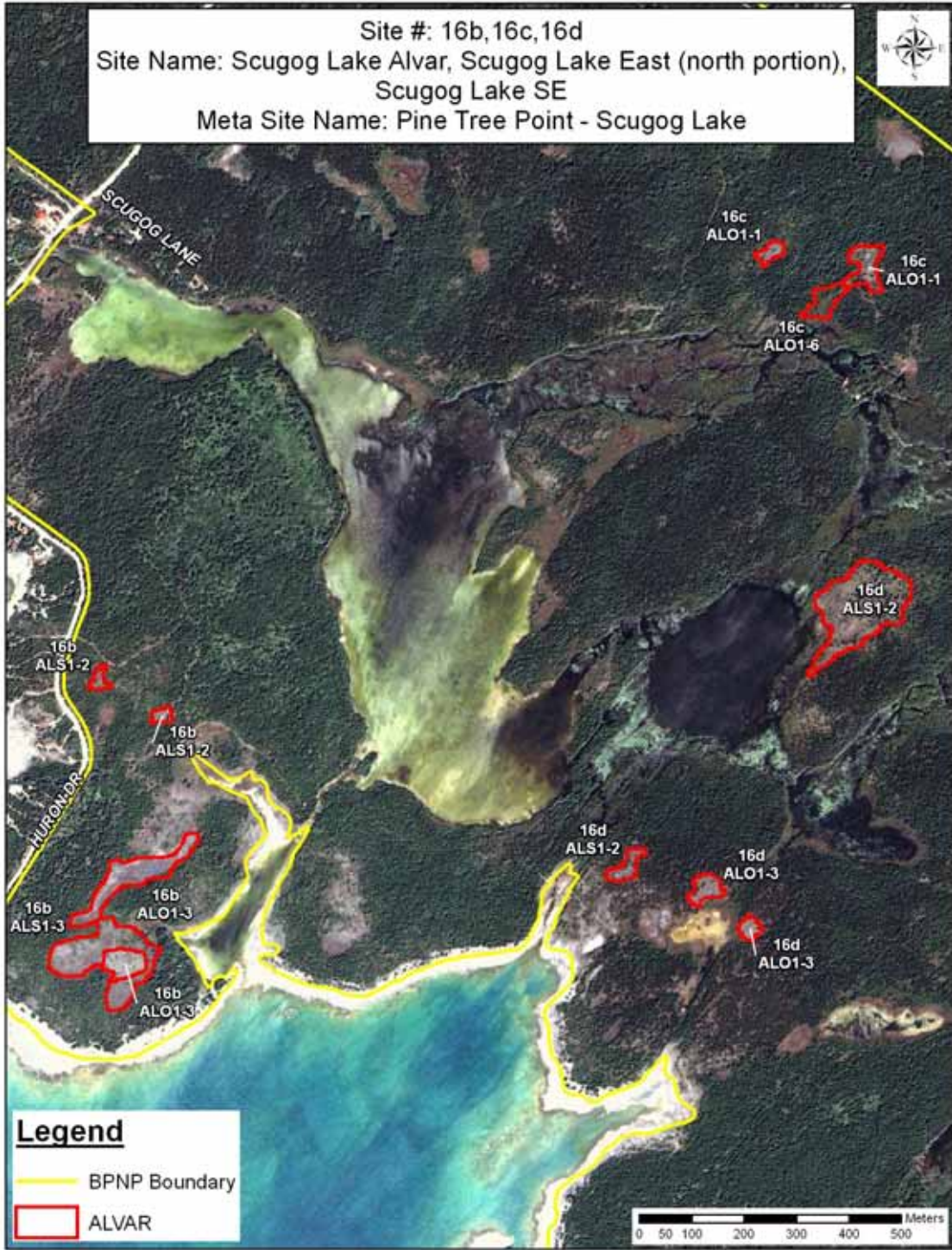
Future Inventory Needs

1. Non-vascular plants, invertebrates and other fauna have not been formally surveyed at sites 16c and 16d.
2. Monitoring of habitat quality and rare species populations, as well as ancient trees, should be undertaken on a regular basis.

References

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Vascular Plants of the Pine Tree Point – Scugog Lake Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	16a ALSI-1	16a ALSI-2	16b ALSI-1	16b ALSI-3	16c ALSI-1	16c ALSI-6	16d ALSI-2
<i>Selaginella eclipses</i> Buck	Buck's Meadow Spike-moss	G4	S4			X	3					X			
<i>Equisetum variegatum</i> Schleicher ex Weber	Variegated Scouring-rush	G5	S5			X	5							X	
<i>Osmunda regalis</i> L. var. <i>spectabilis</i> (Willd.	American Royal Fern	G5T	S5			X	7					X			
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5T	S5			X	16		X	X					
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33		X			X			
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X	X			X	X	X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	X		X	X		X
<i>Pinus banksiana</i> Lambert	Jack Pine	G5	S5			X	33		X				X		X
<i>Pinus resinosa</i> Aiton	Red Pine	G5	S5			X	33		X	X					
<i>Juniperus communis</i> L. var. <i>depressa</i> Pursh	Common Juniper	G5T5	S5			X	34		X	X			X		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X	X	X	X	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X	X	X	X	X	X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X	X			X		
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160							X	
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X	X		X			X
<i>Arenaria serpyllifolia</i> L.	Thyme-leaved Sandwort	G?	SE5			XI	178						X		
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X				X		
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M			X	X			X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200			X					
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218					X	X		
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X	X					
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	G5	S5			X	234		X						
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234				X	X			
<i>Diplotaxis muralis</i> (L.) DC.	Wall Rocket	G?	SE1			XI	237					X			
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X		X			X
<i>Gaultheria procumbens</i> L.	Partridgeberry	G5	S5			X	247		X						
<i>Pyrola chlorantha</i> Sw.	Greenish Pyrola	G5	S4S5			X	248		X						
<i>Lysimachia quadriflora</i> Sims	Prairie Loosestrife	G5?	S4			X	258					X			
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258							X	

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	16a ALSI-1	16a ALSI-2	16bALOI-1	16bALSI-3	16cALOI-1	16cALOI-6	16dALSI-2
<i>Ribes hirtellum</i> Michaux	Swamp Gooseberry	G5	S5			X	269				sp.	sp.			
<i>Parnassia glauca</i> Raf.	Grass-of-Parnassus	G5	S5			X	276							X	
<i>Saxifraga virginensis</i> Michaux	Early Saxifrage	G5	S5			R	276	M				X			
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R	Saskatoon-berry	G5	S4?			X	277	M	X	X					
<i>Fragaria vesca</i> L. ssp. <i>americana</i> (Porter)	Woodland Strawberry	G5T?	S5			X	277			X			X		
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X				X		
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277		X	X					
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X	X	X	X	X	X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt	X		X	X	X		
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277		X	X					
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277			X			X		
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286		X	X					
<i>Proserpinaca palustris</i> L.	Mermaid-weed	G5	S4			X	289				X	X			
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301						X		
<i>Cornus canadensis</i>	Bunchberry	G5	S5			X	307		X						
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	X	X	X	X		X
<i>Geocaulon lividum</i> (Richardson) Fern.	Toadflax	G5	S5			X	313				X				
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338						X	X	X
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	G5	S5			X	350					X			
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X			X	X	X	X
<i>Halenia deflexa</i> (Smith) Griseb. Ssp. <i>deflexa</i>	Spurred Gentian	G5	S5			X	376		X						
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378		X						
<i>Asclepias incarnata</i> L. ssp. <i>incarnata</i>	Swamp Milkweed	G5T5	S5			X	379				X	X			
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M				X	X		X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X	X		X			X
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S5			X	399					X			
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X	X		X	X		X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S5			X	399		X						
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399						X		
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X		X	X	X		X
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411					X			
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411		X	X		X			
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416				X	X	X		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	16a ALSI-1	16a ALSI-2	16b ALSI-1	16b ALSI-3	16c ALSI-1	16c ALSI-6	16d ALSI-2
<i>Houstonia longifolia</i> Gaertner	Long-leaved Houstonia	G4G5	S4?			X	416		X	X					
<i>Diervilla lonicera</i> Miller	Bush-honeysuckle	G5	S5			X	418		X	X					
<i>Linnaea borealis</i> L. ssp. <i>longiflora</i>	Twinflower	G5T?	S5			X	418		X	X					
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	X		X			
<i>Lonicera hirsuta</i>	Hairy Honeysuckle	G5	S5			X	418		X						
<i>Lonicera oblongifolia</i> (Goldie) Hooker	Swamp Fly-honeysuckle	G4	S5			X	418								X
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			C	423		X						
<i>Artemisia campestris</i> L. ssp. <i>caudata</i>	Sagewort Wormwood	G5T4	S4S5			X	423				X				X
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423		X						
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X		X	X		
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X						
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	T	T	X	423	H	X						
<i>Eupatorium perfoliatum</i> L.	Boneset	G5	S5			X	423					X			
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423		X						
<i>Helenium autumnale</i> L.	Sneezeweed	G5	S5			X	423				X	X			
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X	X		X			X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X	X	X	X	X	X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423					X			
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X	X		X			X
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423					X			
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423				X	X			
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X	X	X			X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423			X	X	X	X	X	
<i>Symphotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicle Aster	G5	S5			X	423						X		X
<i>Symphotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423					X			
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455						X		
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455		X	X					
<i>Carex aurea</i> Nutt.	Golden-fruit Sedge	G5	S5			X	457			X			X		
<i>Carex buxbaumii</i> Wahl.	Brown Bog Sedge	G5	S5			X	457					X			
<i>Carex capillaris</i> L.	Hair-like Sedge	G5	S5			X	457		X	X				X	
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X	X	X	X	X		
<i>Carex cryptolepis</i> Mackenzie	Northeastern Sedge	G4	S5			X	457						X	X	
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X	X	X	X		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	16a ALSI-1	16a ALSI-2	16b ALSI-1	16b ALSI-3	16c ALSI-1	16c ALSI-6	16d ALSI-2
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X				X		X
<i>Carex granularis</i> Muhlenb. ex Willd.	Meadow Sedge	G5	S5			X	457		X				X		
<i>Carex leptalea</i>	Bristle-stalked Sedge	G5	S5			X	457							X	
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X	X		X	X		X
<i>Carex scirpoidea</i> Michx. ssp. convoluta	Scirpus-like Sedge	G5	S5			X	457	H	X	X	X	X			X
<i>Carex sterilis</i>	Sterile Sedge	G5	S5			X	457							X	
<i>Carex umbellata</i> Schkuhr ex Willd.	Umbellate Sedge	G5	S5			R	457							X	
<i>Carex viridula</i> Michaux ssp. viridula	Greenish Sedge	G5?T?	S5			X	457		X		X	X			
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457				X	X			X
<i>Eleocharis acicularis</i>	Elliptic Spike-rush	G5	S5			X	457							X	
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E			X		X		
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	G5	S5			X	457		X						
<i>Scirpus cespitosus</i> L. ssp. cespitosus	Deer-grass	G5T	S5			X	457				X			X	
<i>Agrostis gigantea</i>	Redtop	G5	S5			X	458			X			X		
<i>Calamagrostis stricta</i> (Timm) Koeler ssp.	Northern Reed Grass	G5T5	S5			X	458				X	X			
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X		X			X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H			X	X			
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X						
<i>Oryzopsis pungens</i> (Torrey ex Sprengel) A. H	Sharp-leaved Mountain-rice	G5	S5			VU	458		X						
<i>Panicum acuminatum</i> Ell. var. fasciculatum	Hairy Panic Grass	G5T5	S5			X	458			X	X	X			X
<i>Panicum columbianum</i> var. siccanum	Panic Grass	G5T5	S4			N	458		X						
<i>Panicum flexile</i> (Gattinger) Scribner	Wiry Witch Grass	G4G5	S4			X	458	H			X	X			
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	X			X		
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X	X	X				X
<i>Sporobolus vaginiflorus</i> (Torrey ex A. Gray)	Ensheathed Dropseed	G5	S4			X	458					X			
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475		X	X					
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475			X			X		
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5T4	S4?			X	475		X		X	X		X	
<i>Zigadenus elegans</i> Pursh ssp. glaucus	White Camass	G5T4?	S4			X	475		X	X		X	X	X	X
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M		X	X				
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476				X	X			
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476		X						
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X	X	X	X	X		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	16a ALSI-1	16a ALSI-2	16bALOI-1	16bALSI-3	16cALOI-1	16cALOI-6	16dALSI-2
<i>Cypripedium calceolus L. var. pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X	X		X			X
<i>Epipactis helleborine (L.) Crantz</i>	Helleborine	G?	SE5			XI	489		X						
<i>Piperia unalascensis (Sprengel) Rydb.</i>	Alaska Rein Orchid	G5	S4			X	489	E?	X						
<i>Platanthera hyperborea</i>	Northern Green Orchid	G5	S5			X	489		X						
<i>Platanthera psycodes (L.) Lindley</i>	Small Purple Fringed-orchid	G5	S5			X	489								X
<i>Spiranthes romanzoffiana Cham.</i>	Hooded Ladies'-tresses	G5	S5			X	489					X			

Non-vascular Plants of the Pine Tree Point and Scugog Lake Alvars

TAXON	NAME	GRANK	SRANK	16a ALS1-1	16a ALS1-2	16b AL01-1	16b ALS1-3
A	<i>Gloeocapsa alpina</i>					X	X
A	<i>Nostoc commune</i>						cf.
A	<i>Trentepohlia annulata</i>	T	T			sp.	X
B	<i>Bryum pallescens</i>	G5	S4				X
B	<i>Bryum sp.</i>						X
B	<i>Campylium chrysophyllum</i>	G5	S5				X
B	<i>Campylium polygamum</i>	G5	S5				X
B	<i>Campylium stellatum</i>	G5	S5				X
B	<i>Chiloscyphus profundus</i>	T	T				X
B	<i>Dicranum fuscescens</i>	G5	S5	X			X
B	<i>Dicranum polysetum</i>	G5	S5	X			
B	<i>Dicranum scoparium</i>	G5	S5				X
B	<i>Ditrichum flexicaule</i>	G5	S5	X	X		X
B	<i>Fissidens adianthoides</i>	G5	S5				X
B	<i>Fissidens sp.</i>						X
B	<i>Myurella julacea</i>	G5	S5				X
B	<i>Plagiothecium laetum</i>	G5	S5				X
B	<i>Pleurozium schreberi</i>	G5	S5				X
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2	X			X
B	<i>Radula complanata</i>	G4?	S4				X
B	<i>Schistidium apocarpum</i>	G5	S5				X
B	<i>Schistidium rivulare</i>	G4G4	S5	X	X		X
B	<i>Tortella fragilis</i>	G4G5	S4			X	X
B	<i>Tortella inclinata</i>	G4G5	S2				sp.
B	<i>Tortella tortuosa</i>	G5	S5			X	X
B	<i>Tortula ruralis</i>	G5	S5				X
L	<i>Acarospora glaucocarpa</i>	G5?	S4?				cf.
L	<i>Candelariella vitellina</i>	G5	S5				X
L	<i>Cetraria arenaria</i>	G4	S4?			X	X
L	<i>Cladina rangiferina</i>	G5	S5	X	X	X	X
L	<i>Cladina stellaris</i>	G5	S4?	X		X	
L	<i>Cladonia cenotea</i>	G5	S4?				X
L	<i>Cladonia chlorophaea</i>	GU	S5				X
L	<i>Cladonia macilenta</i>	G5	S5?				X
L	<i>Cladonia parasitica</i>	G3G5	S?				X
L	<i>Cladonia pocillum</i>	G4	S4?				X
L	<i>Cladonia pyxidata</i>	G5	S5		X		X
L	<i>Cladonia scabriuscula</i>	G?	S?				X
L	<i>Cladonia symphycarpa</i>	G3G5	S?	X	X		X
L	<i>Collema furfuraceum</i>	G5	S?				X
L	<i>Peltigera canina</i>	G5	S5?	X	X		
L	<i>Placynthium nigrum</i>	G?	S5?	X	X	X	X
L	<i>Porpidia crustulata</i>	G?	S5?				X
L	<i>Protoblastenia rupestris</i>	G?	S5?		X		X
L	<i>Sarcogyne regularis</i>	G?	S5?				X
L	<i>Stereocaulon glaucescens</i>	G3	S1		sp.		
L	<i>Thelidium cf. absconditum</i>	T	T				X

Meta-site 17. SMOKY HEAD – CAPE CHIN

Smoky Head North

Bruce County, Lindsay Township

NTS Map: 41H/3

NAD83 UTM: 17T 478158 4993009 (site 17a) 477142 4992977 (site 17b)

Survey Date (Surveyors): August 23, 2005 (J. Jalava)

Ownership: Ontario Ministry of Natural Resources (site 17a); private (site 17b)

Protection: Smoky Head – White Bluff Provincial Nature Reserve Park (site 17a)

Total Extent of Alvar: 1.7 ha (17a); 11 ha (17b)

Alvar Quality Rank: C (17a); D (17b)

Directions: From Highway 6 take Lindsay Road 5 east to East Road and turn north. Follow East Road around the sharp bend to the right to Cape Chin Road South (technically a right-hand turn from East Road, but really you just go straight instead of veering north). The Cape Chin Road South site is on the left after two 90° jogs in the road. The Smoky Head North site is most directly accessed by continuing along the Cape Chin South Road to the sharp bend to the left and parking there. Walk due south or slightly south-southeast to reach the alvar, after a few hundred metres of bushwhacking.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
17a. Smoky Head	Dvpb	Varga et al. 1995; IKONOS	1	7	75 (58)	1
17b. Cape Chin	Rvp	IKONOS	2	3	50 (41)	0
Meta-site totals			3	9	92 (73)	1

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

A moderate-sized alvar-like community occurs on the escarpment bedrock plain just west of the Niagara Escarpment rim between Smoky Head and Cape Chin. With the exception of its northern fringe, the community is quite weedy compared to most Bruce Peninsula alvars and quite likely was pastured or experienced some other form of human disturbance in the past century. There is also evidence of past fire. However, it has relatively high plant diversity and many characteristic alvar species. The community is now protected as part of the Smoky Head Provincial Nature Reserve Park. The alvar grassland is fringed by dense Common Juniper – Creeping Juniper thickets. Now that it is fully protected, and since its status as a naturally-occurring alvar is uncertain, it will be interesting to monitor natural succession in this community.

A relatively-large disturbed alvar-like community occurs further inland along Cape Chin South Road. The area has almost certainly been grazed in the past. The site consists of extensive bedrock shrubland that has the structure of an alvar community but relatively low numbers of alvar-associated species. The shrubland community is interspersed with small patches of pavement and very disturbed alvar-like grassland. This site is mentioned

as a potential but degraded alvar site by Schaefer (1996). The south side of the road, which has similar habitat, was surveyed by Varga *et al.* (1994).

Alvar Representation

ALO1-4 Dry-fresh Poverty Grass Open Alvar Meadow Type

At the Smoky Head North site (Figure 1), scattered granitic erratics (10-50 cm diameter) and exposed dolostone bedrock make up about 1-2% of the surface area of the alvar community. Scattered woody debris and charred logs are present. Soil depths measured at random points within 1 m of the observation point coordinate were 5.5, 10, 8, 8 and 10 cm. The soils are dark brown loam of Breypen series, and are deep enough to support woodland, suggesting that without fire this site would not remain an alvar.



Figure 1. Poverty Grass alvar grassland at Smoky Head North

Very sparse White Ash trees and saplings occur on this alvar grassland. Common Juniper shrubs occur patchily, covering up to 25% of the surface area around the fringes, but otherwise being quite sparse. The remainder of the community is covered in grasses and herbs, with the most common species being Poverty Oat Grass. Secondary dominants, which are variable and patchy, include Wild Strawberry, Heal-all, Acuminate Panic Grass and Kentucky Blue Grass, along with the introduced species Red Clover, English Plantain and Devil's Paintbrush. Other occasionally common herbs are Yellow Sedge in moist patches, False Pennyroyal on very shallow soils along the fringes, and Gray Goldenrod in very dry patches. Mosses occur sparsely amongst the grasses and herbs and foliose lichens grow on the occasional granitic erratics.

Alvar-like grasslands at the very disturbed (grazed) Cape Chin Road South site are dominated by Canada Blue Grass, Balsam Ragwort and introduced species such as Timothy, English Plantain and Devil's Paintbrush, which in some areas is a strong dominant. False Pennyroyal (Figure 2) is abundant in some locations where the grassland borders patches of exposed pavement.



Figure 2. Alvar grassland with False Pennyroyal (lower left) at Cape Chin South alvar.

ALSI-1 Common Juniper Shrub Alvar

Extensive but somewhat disturbed Common Juniper shrub alvars occur along the fringes of the alvar grassland at the Cape Chin Road South site. The dolostone bedrock in this community is very close to the surface, with 5% to 15% of the surface area of the shrubland areas being exposed rock. There are many flat sections, but the bedrock is gently undulating overall, with a maximum amplitude of approximately 1m, and an average 0.5 m. Some clint and gryke topography is present, with occasional deep crevices. The community is generally dry to very dry, with some pooling in spring and after rains. Soils are a shallow dark brown loam and are often exposed (and often weedy), probably due to past grazing. Soil depths measured at one location were 4.1, 12.2, 10.2, 13, 10.9 cm. The very shallow soils may prevent succession into woodland.

The shrubland at Cape Chin South has a few scattered White Cedar, Trembling Aspen and Balsam Poplar trees and saplings, most of them occurring in deeper-soiled copses. Bebb's Willow is not uncommon in most patches in such copses. Most of the community is dominated by Common Juniper (35% to 70% cover overall). The herb layer is highly

variable, being extensive in openings having some soil. Dominant herbs are Canada Blue Grass, Poverty Oat Grass, Balsam Ragwort, Wild Strawberry, Heal-all, Bristle-leaf Sedge, Common Milkweed and the introduced Devil's Paintbrush. Non-vascular plants are common on the frequent but small patches of exposed bedrock, with the rock-surface algae, *Gloeocapsa*, as well as mosses and crustose lichens being common.

Condition

As noted above, the Smoky Head North alvar has a relatively high component of weedy introduced species, and may have been a pasture at one time.

Some sections of the Cape Chin Road South alvar community are weedy, but others are not. There are scattered big stumps suggesting past fire and/or cutting. The main disturbance appears to have been past grazing, based on the numbers and types of weedy species present. Because of the relatively large size of the site, Cape Chin Road along its southern edge does not have a major impact on the community.

Diversity

The Smoky Head North and Cape Chin South sites have low community diversity and low to moderate vascular plant species diversity.

Ecological Functions

These alvars occur in a naturally-vegetated landscape are part of a vast natural area that includes the Smoky Head – White Bluff and Cape Chin provincial nature reserve parks. The area is separated from the Bruce Peninsula National Park and Cabot Head Provincial Nature Reserve Park to the north only by secondary roads. This is one of the largest and least impacted natural landscapes in Ontario south of the Canadian Shield. Extensive tracts of “interior” habitat are present. The alvars occur as small-patch communities within the larger mixed/coniferous bedrock woodland matrix community.

Special Features

Cooper's Milk-vetch *Astragalus neglectus* G3 S3
Nine vegetative plants of the globally uncommon and provincially rare Cooper's Milk-vetch were found during the 2005 site visit to the Smoky Head North alvar. This species was documented at the site previously by Varga *et al.* (1994).

No provincially rare species were found at Cape Chin Road South. However, Fernald's Hay Sedge (*Carex foenea*), a native plant apparently never recorded on the Bruce Peninsula (BGPC 2003), was collected during the present study. The locally rare False Pennyroyal occurs at both the Smoky Head North and the Cape Chin Road South sites.

Conclusions and Recommendations

Evaluation and Significance

These are among the few alvar sites on the bedrock plain occurring relatively close to the Niagara Escarpment cliffs. Because of the levels of past disturbance, the alvar-like habitats at Smoky Head North and Cape Chin Road South are of relatively low conservation significance. Because it is entirely protected as part of a provincial nature reserve park, the Smoky Head North site offers the potential to study natural succession at a formerly disturbed and possibly pastured alvar site.

Threats

No current threats are evident at the fully protected Smoky Head North site. The Cape Chin Road South alvar is threatened by continued grazing by cattle. The south side of the road has been subdivided into numerous lots; subdivision and associated residential development is a possible future threat to the alvar-like habitats on the north side of the road.

Management

Continued passive management is recommended for the Smoky Head North site. The landowner of the Cape Chin Road South alvar may be provided information on the significance and stewardship of alvar habitats.

Future Inventory Needs

1. Non-vascular plants, invertebrates and other fauna have not been formally surveyed at these sites, although breeding bird surveys were conducted at the Smoky Head – White Bluff ANSI in the early 1990s (Varga *et al.* 1994).
2. Monitoring of habitat quality and rare species populations and natural succession should be undertaken on a regular basis at the Smoky Head North site.

References

- BGPC (Bruce – Grey Plant Committee). 2003. A checklist of Vascular Plants for Bruce and Grey Counties, Ontario. 3rd Edition, January 2003. Ontario Ministry of Natural Resources, Owen Sound Field Naturalists and Saugeen Field Naturalists. 51 pp.
- Jalava, J.V. 2005. Biological Surveys of Bruce Peninsula Alvars 2005 Summary Report. Prepared for Bruce Peninsula National Park, Parks Canada. iii + 80 pp.
- Schaefer, C. 1996. Report for the Alvar Initiative Project on Potential Bruce Peninsula Alvar Sites for Further Investigation. Manuscript. 7pp + air photos and maps.
- Varga, S., J.V. Jalava and B. Larson. 1994. Biological Inventory and Evaluation of the Smoky Head - White Bluff Provincial Nature Reserve and ANSI. OMNR, Southern Region, Aurora, Ontario: OFER 50522. vii + 108 pp. + 2 maps.



Vascular Plants of the Smoky Head – Cape Chin Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	17a ALO1-4	17b ALS1-1	17b ALO1-4
<i>Equisetum arvense L.</i>	Field Horsetail	G5	S5			X	5		X		
<i>Asplenium trichomanes L.</i>	Maidenhair Spleenwort	G5	S5			X	19			X	
<i>Picea glauca (Moench) Voss</i>	White Spruce	G5	S5			X	33		X	X	
<i>Juniperus communis L. var. depressa Pursh</i>	Common Juniper	G5T5	S5			X	34		X	X	X
<i>Juniperus horizontalis Moench</i>	Creeping Juniper	G5	S5			X	34	M	X		
<i>Thuja occidentalis L.</i>	White Cedar	G5	S5			X	34		X	X	
<i>Anemone cylindrica A. Gray</i>	Long-fruited Thimbleweed	G5	S4			X	130		X	X	
<i>Ranunculus acris L.</i>	Common Buttercup	G5	SE5			XI	130		X		
<i>Ranunculus hispidus Michaux var. caricetorum</i>	Swamp Buttercup	G5T5	S5			X	130		X		
<i>Ulmus americana L.</i>	American Elm	G5?	S5			X	151		X	X	
<i>Betula papyrifera Marshall</i>	Paper Birch	G5	S5			X	165		X	X	
<i>Dianthus armeria L.</i>	Deptford Pink		SE5			XI	178				X
<i>Rumex crispus L.</i>	Curly Dock	G?	SE5			XI	179		X		
<i>Hypericum perforatum L.</i>	Common St. John's-wort	G?	SE5			XI	200		X	X	
<i>Viola nephrophylla E. Greene</i>	Northern Bog Violet	G5	S4			X	218				X
<i>Populus balsamifera L.</i>	Balsam Poplar	G5T?	S5			X	234		X	X	
<i>Populus grandidentata Michaux</i>	Large-toothed Aspen	G5	S5			X	234		X	X	
<i>Populus tremuloides Michaux</i>	Trembling Aspen	G5	S5			X	234		X	X	
<i>Salix bebbiana Sarg.</i>	Bebb's Willow	G5	S5			X	234		X	X	
<i>Salix discolor Muhlenb.</i>	Pussy Willow	G5	S5			X	234		X	X	
<i>Salix lucida Muhlenb.</i>	Shining Willow	G5	S5			X	234		X		
<i>Arabis divaricarpa Nels.</i>	Divaricate Rock-cress	G5	S5			X	237			X	
<i>Sedum acre L.</i>	Mossy Stonecrop	G?	SE5			XI	274			X	
<i>Amelanchier sanguinea (Pursh) DC.</i>	Juneberry	G5	S5?			X	277		X		
<i>Amelanchier sp.</i>	Tall Juneberry					X	277		X		
<i>Fragaria virginiana Miller</i>	Wild Strawberry	G5	S5			X	277		X	X	
<i>Geum aleppicum Jacq.</i>	Yellow Avens	G5	S5			X	277				X
<i>Malus pumila Miller</i>	Apple	G5	SE5			XI	277		X		
<i>Potentilla argentea L.</i>	Silvery Cinquefoil	G?	SE5			XI	277		X		X
<i>Potentilla norvegica L.</i>	Rough Cinquefoil	G5	S5			XI	277		X		
<i>Potentilla recta L.</i>	Rough-fruited Cinquefoil	G?	SE5			XI	277		X	X	
<i>Prunus virginiana L. ssp. virginiana</i>	Choke Cherry	G5T?	S5			X	277			X	
<i>Rosa acicularis Lindley ssp. sayi</i>	Prickly Wild Rose	G5TU	S5			X	277		X		
<i>Rosa blanda Aiton</i>	Smooth Wild Rose	G5	S5			X	277			X	
<i>Rubus idaeus L. ssp. melanolasius (Dieck)</i>	Wild Red Raspberry	G5	S5			X	277				X
<i>Astragalus neglectus (Torrey & A. Gray) E.</i>	Cooper's Milk-vetch	G4	S3			X	285	H	X		
<i>Medicago lupulina L.</i>	Black Medick	G?	SE5			XI	285		X		X
<i>Trifolium pratense L.</i>	Red Clover	G?	SE5			XI	285		X	X	
<i>Vicia cracca L.</i>	Cow Vetch	G?	SE5			XI	285		X		X
<i>Shepherdia canadensis (L.) Nutt.</i>	Soapberry	G5	S5			X	286		X	X	

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	17a ALO1-4	17b ALS1-1	17b ALO1-4
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	G5	S5			X	307			X	
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X	X	
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		X		
<i>Daucus carota</i> L.	Wild Carrot	G?	SE5			XI	374		X	X	X
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378		X	X	
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379		X	X	
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392		X	X	
<i>Lycopus uniflorus</i> Michaux	Bugleweed	G5	S5			X	392		X		
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X	X	
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H			X
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E	X	X	
<i>Plantago lanceolata</i> L.	English Plantain	G5	SE5			XI	396		X	X	X
<i>Fraxinus americana</i> L.	White Ash	G5	S5			X	398		X	X	
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X	X	
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X		
<i>Viburnum rafinesquianum</i> Schultes	Downy Arrow-wood	G5	S5			X	418			X	
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			C	423		X	X	
<i>Anaphalis margaritacea</i> (L.) Benth. & Hook.	Pearly Everlasting	G5	S5			X	423			X	
<i>Antennaria neglecta</i> E. Greene	Pussytoes	G5	S5			X	423		X	X	
<i>Antennaria parlinii</i> Fern.	Plantain-leaved Everlasting	G4G5 T?	SU			X	423		X		
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423		X	X	
<i>Aster novae-angliae</i> L.	New England Aster	G5	S5			X	423		X		
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X	X	
<i>Erigeron strigosus</i> Muhlenb. ex Willd.	Spreading Fleabane	G5	S5			X	423		X		
<i>Hieracium aurantiacum</i> L.	Devil's Paintbrush	G?	SE5			XI	423		X	X	X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X	X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X	X	
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X	X	
<i>Solidago simplex</i> Kunth ssp. <i>simplex</i> var. <i>simplex</i>	Goldenrod	G5T5	S4			R	423	Mt?			X
<i>Symphotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423		X	X	
<i>Juncus tenuis</i> Willd. var. <i>tenuis</i>	Path Rush	G5T?	S5			X	455		X	X	
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X	
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X		
<i>Carex foenia</i>	Fernald's Hay Sedge	G5	S5			N	457				X
<i>Carex gracillima</i> Schwein.	Graceful Sedge	G5	S5			X	457		X		
<i>Carex granularis</i> Muhlenb. ex Willd.	Meadow Sedge	G5	S5			X	457			X	
<i>Carex merritt-fernaldii</i> Mackenzie	Merritt-Fernald's Sedge	G5	S5			X	457		X		

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	17a ALO1-4	17b ALS1-1	17b ALO1-4
<i>Carex projecta</i> Mackenzie	Spreading Sedge	G5	S5			X	457		X		
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E	X		X
<i>Rhynchospora alba</i> (L.) M. Vahl	White Beak-rush	G5	S5			X	457		X		
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X	
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X		
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458			X	
<i>Lolium pratensis</i> (Hudson) Darbysh.	Meadow Fescue	G5	SE5			XI	458		X		
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X		
<i>Phleum pratense</i> L.	Timothy	G?	SE5			XI	458		X	X	X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	X	X
<i>Poa palustris</i> L.	Fowl Meadow Grass	G5	S5			X	458		X		X
<i>Poa pratensis</i> L. ssp. <i>pratensis</i>	Kentucky Blue Grass	G5T	S5			X	458		X		
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X		
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X		
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489		X		

Site 18. SPRING CREEK

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/4

NAD83 UTM: 17T 469600 4990400

Ownership / Protection: Unknown (possibly Bruce County Forest)

Survey Dates (Surveyors): August 21, 2006 (J. Jalava).

Ecodistrict: 6E-14

Total Extent of Alvar: 3.2 ha

Overall Alvar Quality Rank: B (size); BC (condition)

Directions: A GPS unit and air photos or satellite image should be used to find this site, as there are no trails or roads nearby. North of Clarke's Corners on Highway 6, park vehicle near NAD83 UTM 469546 4989450. Bushwhack northeast to UTM 469600 4990400.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (native)	NHIC-Tracked Species
18. Spring Creek	Rvp	IKONOS	3	8	71 (60)	1

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Several small patches of alvar occur in the interior of the Bruce Peninsula north of Clarke's Corners, southeast of the Spring Creek headwaters, east of Highway 6. The alvars seem somewhat disturbed, with introduced species being relatively common. An unusually large amount of woody debris is also present (Figure 1), suggesting past fire. However, the site displays an interesting mosaic of dry alvar pavement and moister annual grass pavement microhabitats (Figure 2), as well as areas of treed alvar. The dolostone varies from smooth to heavily pitted, and slopes gently to the southwest. Dolostone fragments are common. Soils are generally very shallow to nonexistent and where present, they are sandy with some organic content. Pooling occurs in depressions.

The alvar pavement communities are bisected by fairly large long, linear crevices, one of them up to 4 m deep, with woody growth (trees, saplings and shrubs) often concentrated along the crevices because of the increased moisture and soil accumulation. The provincially rare Laurentian Fragile Fern occurs in the shade of one such crevice.

Alvar Representation

Alvar non-vascular pavement (ALO1-1) dominated by mosses and lichens, with inclusions of annual grass dominated pavement (Figure 2), is the main community type found at this site. Treed alvar occurs mainly to the south and west of the pavement patches.



Figure 1. Woody debris on alvar pavement southeast of Spring Creek.



Figure 2. Mosaic of non-vascular alvar pavement and annual grasses southeast of Spring Creek

ALO1-1 Dry Lichen - Moss Open Alvar Pavement Type

The dominant biotic cover in the alvar pavement community consists of the rock surface algae, *Gloeocapsa alpina*, with white crustose lichens and black cushion mosses (cf. *Tortella* sp.) also very common. Curtains and copses of White Cedar trees and saplings, as well as scattered White Birch and White Spruce are interspersed with the pavement. The sparse but quite diverse herbaceous layer is dominated by Calamint, with Upland White Goldenrod as a secondary species. Common associates include Balsam Ragwort, Rock Sandwort, Early Saxifrage, Poverty Oat Grass, Horseweed and, in moist patches, Ensheathed Dropseed, Lindheimer's Panic Grass and Yellow Sedge. Bristle-leaf Sedge is common along the treed fringes.

ALO1-2 Dry Annual Open Alvar Pavement

Patches of pavement dominated by annual grasses occur as small patches within the non-vascular pavement community. Ensheathed Dropseed is the dominant herb, with Yellow Sedge, Balsam Ragwort, Lindheimer's Panic Grass, Upland White Goldenrod and Poverty Oat Grass as secondary species. The rock surface algae, *Gloeocapsa alpina*, is common on exposed dolostone, while the algae, *Nostoc* sp. and microbial mats occur in areas of pooling. Cushion mosses (probably *Tortella* sp.) are frequent in drier portions of the community.

ALT1-4 Jack Pine - White Spruce - White Cedar Treed Alvar

To the south and west of the alvar pavement communities is an area of treed alvar dominated by White Cedar, with White Birch trees and saplings and White Spruce saplings as secondary species. The low shrub layer is variable and patchy, with Common Juniper and Bearberry dominating. Herbs are sparse, with Bristle-leaf Sedge dominant, while Common St. John's-wort and Horseweed are frequent, suggesting past disturbance. Rock surface algae covers the exposed bedrock, and cushion mosses are also common in the pavement openings. Deep crevices are frequent in the treed sections. An abundance of charred wood is evidence of past wildfire.

Condition

The alvars in the Spring Creek area show signs of past disturbance, but the reason for the relatively high number of introduced species and native species that do well in disturbed areas is unclear. A large amount of woody debris is present, some of it charred, indicating past fire. The site is isolated and will probably revert to relatively natural conditions with ongoing passive management.

Diversity

The one alvar community type supports a relatively high total of 49 vascular plant taxa, all of them native.

Ecological Functions

The naturally-vegetated habitats of the Spring Creek area contribute to landscape connectivity in the upper Bruce Peninsula region. The site's alvar communities occur as small-patch communities in the coniferous bedrock woodland – wetland matrix that predominates. The area is separated only by minor roads (or Highway 6) from several large ANSIs, as well as Bruce Peninsula National Park and the nearly continuous natural landscape of the Niagara Escarpment.

Special Features

Laurentian Bladder Fern *Cystopteris laurentiana* G2G4S2S3
A specimen of the provincially rare Laurentian Bladder Fern growing in a deep bedrock crevice in a treed area near alvar pavement was found by the author in 2006. The crevice contained 10 fronds of this species. There are a number of records of this eastern North American taxon in Bruce and Grey counties, several of them from sites along the Niagara Escarpment.

Conclusions and Recommendations

Evaluation and Significance

In relation to other sites with similar communities on the Bruce Peninsula, this site contains a locally significant alvar with an interesting pavement / grassland mosaic.

Threats

Potential logging and use of the alvar clearings for storing heavy equipment or logs is probably the only imminent threat. Quarry activity occurs nearby.

Management

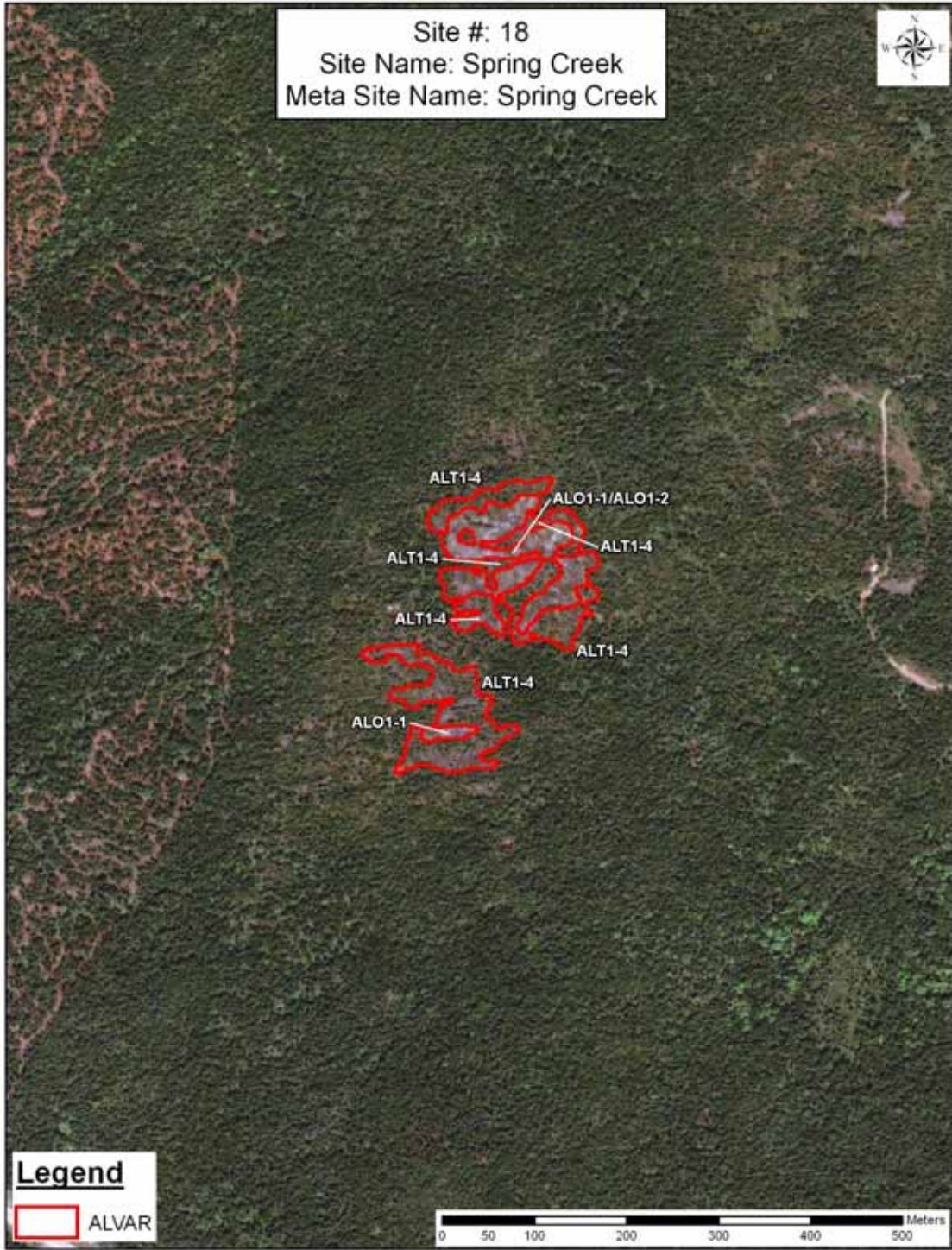
Passive management is recommended for this alvar community. Land managers should be notified of the ecological significance and sensitivity of alvar communities.

Future Inventory Needs

1. Invertebrates and other fauna have not been formally surveyed at this site.
2. Monitoring of habitat quality ought to be undertaken on a regular basis.

References

Jalava, J.V. 2006. Field notes from a site visit, August 21, 2006. Unpublished notes, air photo mapping and digital data spreadsheets.



Vascular Plants of the Spring Creek Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	18 AL01-1	18 AL01-2	18 AL11-4
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5	S5			X	16		X		X
<i>Asplenium trichomanes</i> L.	Maidenhair Spleenwort	G5	S5			X	19		X		X
<i>Asplenium trichomanes-ramosum</i> L.	Green Spleenwort	G4	S4			X	19		X		
<i>Cystopteris laurentiana</i> (Weath.) Blasdell	Laurentian Bladder Fern	G2G4	S2S3			R	20				X
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33				X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X		X
<i>Juniperus communis</i> L. var. <i>depressa</i> Pursh	Common Juniper	G5T5	S5			X	34			X	X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X		X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X	X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X		
<i>Clematis virginiana</i> L.	Virgin's Bower	G5	S5			X	130		X		
<i>Ranunculus acris</i> L.	Common Buttercup	G5	SE5			XI	130		X		
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X	X	X
<i>Arenaria serpyllifolia</i> L.	Thyme-leaved Sandwort	G?	SE5			XI	178		X		
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X		
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X	X	X
<i>Populus balsamifera</i> L.	Balsam Poplar	G5T?	S5			X	234		X		
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X	X	
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	G5	S5			X	234		X		
<i>Salix discolor</i> Muhlenb.	Pussy Willow	G5	S5			X	234		X		
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M	X		
<i>Arabis lyrata</i> L. var. <i>lyrata</i>	Lyre-leaved Rock-cress		S4			X	237		X		
<i>Erysimum cheiranthoides</i> L.	Wormseed Mustard	G5	SE5			XI	237		X		
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X		X
<i>Saxifraga virginiana</i> Michaux	Early Saxifrage	G5	S5			R	276	M	X		
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R	Saskatoon-berry	G5	S4?			X	277	M	X		X
<i>Amelanchier spicata</i> (Lam.) K. Koch	Juneberry	G5	S5			X	277		X		
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X		
<i>Potentilla norvegica</i> L.	Rough Cinquefoil	G5	S5			XI	277		X		
<i>Potentilla recta</i> L.	Rough-fruited Cinquefoil	G?	SE5			XI	277		X		
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277		X		X
<i>Waldsteinia fragarioides</i> (Michaux) Tratt.	Barren Strawberry	G5	S5			X	277		X		
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301		X		
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338				X
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378		X		
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379		X		
<i>Solanum dulcamara</i> L.	Climbing Nightshade	G?	SE5			XI	382		X		
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X		
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392		X		
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	18 ALOI-1	18 ALOI-2	18 ALTI-4
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			X	423		X		
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	G5	S5			X	423		X		
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423		X		
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X		
<i>Conyza canadensis</i> (L.) Cronq.	Horseweed	G5	S5			X	423		X		X
<i>Eurybia macrophylla</i>	Large-leaved Aster	G5	S5			X	423		X		
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	Grass-leaved Goldenrod	G5	S5			X	423		X		
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X	
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X		
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X		
<i>Solidago nemoralis</i> Aiton	Gray Goldenrod	G5T?	S5			X	423		X		
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X	X
<i>Symphotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423		X		
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455		X	X	
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457			X	X
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X	X	
<i>Carex granularis</i> Muhlenb. ex Willd.	Meadow Sedge	G5	S5			X	457		X		
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E	X		
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X		
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X	
<i>Elymus repens</i> (L.) Gould	Quack Grass	G5	SE5			XI	458		X		
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458				X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X		
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5T5	S4			X	458		X	X	
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X		
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X		
<i>Sporobolus neglectus</i> Nash	Overlooked Dropseed	G5	S4			X	458		X	X	
<i>Sporobolus vaginiflorus</i> (Torrey ex A. Gray)	Ensheathed Dropseed	G5	S4			X	458		X	X	
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476		X		
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X		X
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489		X		

Site 19. SUNSET PARK AND LONG POINT

Bruce County, Northern Bruce Peninsula (formerly St. Edmunds Township)

NTS Map: 41H/4

NAD83 UTM: 17T 444000 5008900

Ownership: Federal / Municipal

Protection: Municipal park, managed by Bruce Peninsula National Park (Schaefer 1996)

Survey Dates (Surveyors): August 22, 2006 (J. Jalava).

Ecodistrict: 6E-14

Total Extent of Alvar: 0.5 ha

Overall Alvar Quality Rank: AB (condition), CD (size)

Directions: Take Cape Hurd Road southwest from Highway 6 beyond the sharp turn to the northwest to where it ends at T-intersection with Myles Drive and Zorra Drive. Turn right onto Zorra Drive and then immediately left along a lane. The alvar patches are along the Lake Huron shore at the end of the lane.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (native)	NHIC-Tracked Species
19. Sunset Park and Long Point	Rvp	IKONOS	1	9	49 (49)	0

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Small patches of coastal alvar occur along the north shore of the Bruce Peninsula east of Cape Hurd, just above the high water mark. The alvars occur on highly pitted, undulating dolostone with lots of blocky limestone fragments and smaller stones, including granitic erratics. Overall, the community is dry, with occasional pooling in solution holes resulting from rainfall, snow-melt and, nearest the shore, spray from Lake Huron waves during storm events. There is very little soil; thin organic/sandy deposits occur in cracks and solution holes.

Alvar Representation

Alvar non-vascular pavement (ALO1-1) dominated by mosses and lichens is the community type found at this site.

ALO1-1 Dry Lichen - Moss Open Alvar Pavement Type

The dominant biotic cover consists of the rock surface algae, *Gloeocapsa alpina*, with black cushion mosses (cf. *Tortella* sp.) also very common. Copses of White Cedar – White Spruce – Tamarack trees, saplings and tall shrubs occur primarily on higher bedrock outcrops adjacent to the open alvar pavement. Low shrubs are common, with Shrubby Cinquefoil dominant, and Kalm's St. John's-wort, Ninebark, stunted White Cedar and Hoary Willow as secondary species. The sparse but quite diverse herb layer is dominated by Ohio Goldenrod, Swamp Goldenrod, Gray Goldenrod, Smooth Aster, Little Bluestem, Scirpus-like Sedge, Bird's-eye Primrose and Acuminate Panic Grass.



Rugged alvar pavement at Sunset Park – Long Point alvar

Condition

The alvar community is generally undisturbed, and no introduced plant species were recorded during the 2006 survey. The site is largely public land and there is some visitation by beachcombers, sunbathers, swimmers and inukshuk enthusiasts. Cottage development occurs along the Lake Huron shoreline nearby.

Diversity

The one alvar community type supports a relatively high total of 49 vascular plant taxa, all of them native.

Ecological Functions

The naturally-vegetated habitats of the Sunset Park – Long Point – Cape Hurd area contribute to landscape connectivity in the upper Bruce Peninsula region. The site's position at the northwest tip of the Bruce Peninsula suggests that it is part of an important staging area for migrating landbirds. Woody vegetation in the site's wetlands and shorelines helps maintain the water quality and natural hydrological regimes of the local

watershed. The integrity of Lake Huron coastal and alvar ecosystem functions are currently maintained in the undeveloped portions of this area.

Special Features

No provincially significant features have been documented at this site, but its alvar community is both globally and provincially rare.

Conclusions and Recommendations

Evaluation and Significance

In relation to other sites with similar communities on the Bruce Peninsula, this site contains a locally significant alvar.

Threats

Impacts associated with adjacent cottage development and the permitted public access to the site, such as trampling and introduction of exotic flora, are probably the main threats to this alvar.

Management

Passive management is recommended for this alvar community. Adjacent landowners and the public should be notified of the ecological significance and sensitivity of alvar communities.

Future Inventory Needs

3. Invertebrates and other fauna have not been formally surveyed at this site.
4. Monitoring of habitat quality ought to be undertaken on a regular basis.

References

Jalava, J.V. 2006. Field notes from a site visit, August 22, 2006. Unpublished notes, air photo mapping and digital data spreadsheets.

Schaefer, C. 1996. Report for the Alvar Initiative Project on Potential Bruce Peninsula Alvar Sites for Further Investigation. Manuscript. 7 pp.



Vascular Plants of the Sunset Park and Long Point Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	19 AL01-1
<i>Equisetum arvense</i> L.	Field Horsetail	G5	S5			X	5		X
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160		X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218		X
<i>Salix bebbiana</i> Sarg.	Bebb's Willow	G5	S5			X	234		X
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234		X
<i>Salix discolor</i> Muhlenb.	Pussy Willow	G5	S5			X	234		X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277		X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	M t?	X
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301		X
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X
<i>Lycopus uniflorus</i> Michaux	Bugleweed	G5	S5			X	392		X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X
<i>Fraxinus pennsylvanica</i> Marshall	Red/Green Ash	G5	S5			X	398		X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411		X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423		X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455		X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457		X
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X
<i>Calamagrostis stricta</i> (Timm) Koeler ssp.	Northern Reed Grass	G5T5	S5			X	458		X
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	19 ALOI-1
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M	X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X
<i>Tofieldia glutinosa</i> (Michaux) Pers.	False Asphodel	G5T4	S4?			X	475		X

Site 20. ZINKAN ISLAND COVE

Bruce County, Northern Bruce Peninsula (formerly Lindsay Township)

NTS Map: 41H/4

NAD83UTM: 17T 463021 4989852 (interior portion) and 461400 4989840 (coastal portion)

Ownership: Private

Protection: Zinkan Island Cove Provincial Life Science ANSI (100%)

Survey Dates (Surveyors): August 31, 2005 and August 22, 2006 (J. Jalava); the Zinkan Island Cove area was also subject to a biological inventory in the early 1980s (Johnson 1982b).

Total Extent of Alvar: 5.5 ha

Overall Alvar Quality Rank: B

Directions: From Highway 6 take Lindsay Road 20 west to the first road on the right, Youngblood Road. Travel north on Youngblood to the sharp turn to the left. Instead of turning along the main road, go straight along the unpaved public road allowance. Park where the road allowance becomes a snowmobile trail. The alvars are along and near this road allowance on private land, so permission to access must be obtained (except for areas visible from the public road allowance). Another area of alvar, also on private land, is situated along the Lake Huron shoreline, reached by continuing around the sharp bend noted above to the T-intersection, where you turn right. Follow this road around a few bends and near the end you will see alvar habitats along the lakeward side of the road.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
20. Zinkan Island Cove	Rvp	Jalava 2005; IKONOS	2	14	71 (67)	1 (4*)

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds; * - rare species documented near alvars

General Site Description

Frequent patches of alvar are evident on air photos in the area north of White Cedar Road, east of Lake Huron in the Zinkan Island Cove area. Most appear to be relatively small patches of alvar shrubland and treed alvar. A more extensive area of Creeping Juniper alvar dwarf shrubland, surveyed in 2006, occurs along the Lake Huron shoreline. Subdivision of lots has been occurring in this area, and development pressures are therefore quite high in Zinkan Island Cove area. An area of alvar grassland dominated by Tufted Hairgrass was surveyed in 2005 in the interior portion of the site. A wet alvar, noted by Johnson (1982b), could not be surveyed in 2006 because landowner permission to access was not obtained and the area was heavily posted.

Alvar Representation

ALO1-5 Fresh - Moist Tufted Hairgrass Open Alvar Meadow Type

An alvar grassland is found west of the public right of way that extends north from Youngblood Road. The Tufted Hairgrass alvar grassland also has extensive areas of exposed bedrock and dolostone fragments. Very shallow sandy and organic deposits

occur in cracks and depressions on the bedrock, with the depth rarely more than 1 cm. Conditions are generally dry, with occasional seasonal pooling in depressions.

The alvar grassland has sparsely scattered, shrub- to tree-sized White Cedar and White Spruce. Creeping Juniper and, to a lesser extent, Common Juniper, are common in the low shrub layer. The herb layer is dominated by Tufted Hairgrass, with Calamint, Rock Sandwort, Common St. John's-wort, Poverty Oat Grass, Yellow Sedge and Lindheimer's Panic Grass as secondary species. Balsam Ragwort and Bristle-leaf Sedge occur as associates. The rock surface algae, *Gloeocapsa*, mosses of the *Tortella* and other genera, crustose lichens, foliose lichens, algal mats and microbial mats were all documented on the extensive areas of exposed bedrock (Figure 1).



Figure 1. Cushion mosses, microbial mats, dolostone fragments and Richardson's Sedge on the Zinkan Island Cove alvar

ALS1-2 Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar Type
Based on air photo interpretation and a brief reconnaissance survey by Jalava (2005), the predominant alvar community in the interior portion of Zinkan Island Cove area is Creeping Juniper dwarf shrub alvar (Figure 2) intergrading with open White Cedar woodlands and, probably, areas of treed alvar. The Creeping Juniper – Shrubby Cinquefoil dwarf shrub alvars surveyed had extensive areas of exposed bedrock, often covered in small (5-15 cm diameter) dolostone fragments. Occasional granitic erratic boulders are present in some areas. The substrate in some areas consists of very shallow (0-2cm deep) sandy (grey) soil and organic deposits occurring in cracks, crevices and other small depressions. The largest patch, occurring on a dome-like formation west of the right-of-way has dark brown to grey-brown sandy soil with organic content; soil depths measured 7.5, 3.0, 0, 3.4, 3.7cm.

The alvar shrublands typically have no tree layer, but White Cedar, White Spruce and White Birch trees and saplings occur as ‘curtain’ forests along narrow, deeper-soiled, usually linear, depressions. Scattered stunted, shrub-sized White Spruce and a few White Cedar occur on the alvar itself. Creeping Juniper is by far the most common low shrub, while Common Juniper and White Spruce also occur in this layer, particularly adjacent to the curtain forests. The moderately-sparse herb layer at two observation points is dominated by Richardson’s Sedge, with Upland White Goldenrod, Calamint and, along the fringes, Bristle-leaf Sedge, as secondary species. Bluets are also quite common. The extensive (30-50% of the surface area) dolostone pavement at these observation points is covered in the rock-surface algae, *Gloeocapsa alpina*, cushion mosses and crustose lichens. At two other observation points, Scirpus-like Sedge is dominant, along with Tufted Hairgrass, Poverty Oat Grass, Bluets and, in one area, Little Bluestem. Lindheimer’s Panic Grass and Ensheathed Dropseed occur as associates. In addition to the non-vascular species noted for the other examples above, algal and microbial mats were noted at these observation points in shallow bedrock depressions.



Figure 2. Undisturbed Creeping Juniper - Shrubby Cinquefoil dwarf shrub alvar in the interior of Zinkan Island Cove

Dwarf shrub alvar strongly dominated by Creeping Juniper also occurs near the Lake Huron shore. Shrubby Cinquefoil, Sand Cherry and stunted White Cedar are secondary species in the low shrub layer. Little Bluestem is strongly dominant in the sparse herb layer, except in moist depressions (mainly in the southern part of the community), where Twig-rush is dominant. Associates and secondary herbs include Scirpus-like Sedge, Harebell, Upland White Aster, Gray Goldenrod, Swamp Goldenrod and Northern

Comandra. The rock surface algae, *Gloeocapsa alpina*, covers almost all the exposed dolostone (including the abundant fragments), while crustose pink and black lichens and dark cushion mosses are also common.

Condition

Charred woody debris was noted at some observation points on the dwarf shrub alvars, indicating past fire. Deer tracks were noted. An off-road vehicle / snowmobile trail bisects some patches along the public right-of-way. Otherwise, no recent human disturbance was noted on the alvar shrublands (Jalava 2005).

A few discarded ammunition shells were noted on the grassland, but otherwise this alvar patch also showed no signs of human disturbance.

Diversity

Surveyed sections of the Zinkan Island Cove alvars displayed moderate ecological diversity, with two alvar community types and a total of 71 vascular plant taxa, of which 67 are native to Ontario, and 14 are strongly associated with alvar habitats.

Ecological Functions

The Zinkan Island Cove alvars are found within a provincially significant life science ANSI of the same name. This is a critical core area and linkage in landscape connectivity in the upper Bruce Peninsula region. The site is a corridor for the movement of a variety of organisms, and its position along the western coast of the Bruce Peninsula suggests that it is an important staging area for migrating landbirds. The integrity of Lake Huron shoreline, treed and shrub rock barren, forest, riparian, interior wetland and alvar ecosystem functions are currently maintained in the extensive undeveloped portions of the area. The alvars occur as small-patch communities within the coniferous-mixed forest matrix community.

Special Features

Northern Dropseed *Sporobolus heterolepis* G5S3
Northern Dropseed, also known as Prairie Dropseed, is a provincially rare grass that is more common in western North America. It has been found at a number of higher quality alvar habitats in Ontario (Brownell and Riley 2000) and is not considered rare on the Bruce Peninsula (BGPC 2003). Twenty-five clumps of this species were found in a moist area in the southern portion of the dwarf shrub alvar near the Lake Huron shoreline.

In addition, Massasauga (COSEWIC – Threatened, OMNR – Threatened, G3G4S3) rattlesnakes are common in the general area, and Eastern Milksnake (COSEWIC –

Special Concern, OMNR – Special Concern, G5S3) also occurs. Hill’s Thistle (G3S3 COSEWIC – Threatened, OMNR – Threatened) and Ram’s-head Lady’s-slipper were documented in the Zinkan Island Cove ANSI by Johnson (1982b).

Conclusions and Recommendations

Evaluation and Significance

The Zinkan Island Cove alvars are in good to excellent ecological condition and enhance the representation of these globally significant community types in the Bruce Peninsula region. Shoreline subdivision and associated cottage development threatens the coastal dwarf alvar shrubland. Compared to other sites in the ecodistrict, these alvars should be considered of moderate priority for conservation action.

Threats

The major threat to these alvars is seasonal and permanent residential development, which is occurring at a relatively rapid rate in the area, both along the Lake Huron shoreline and along interior roads.

Management

Passive management of alvar habitats is recommended for this site. Private landowners should be provided information on the significance and stewardship of alvars.

Future Inventory Needs

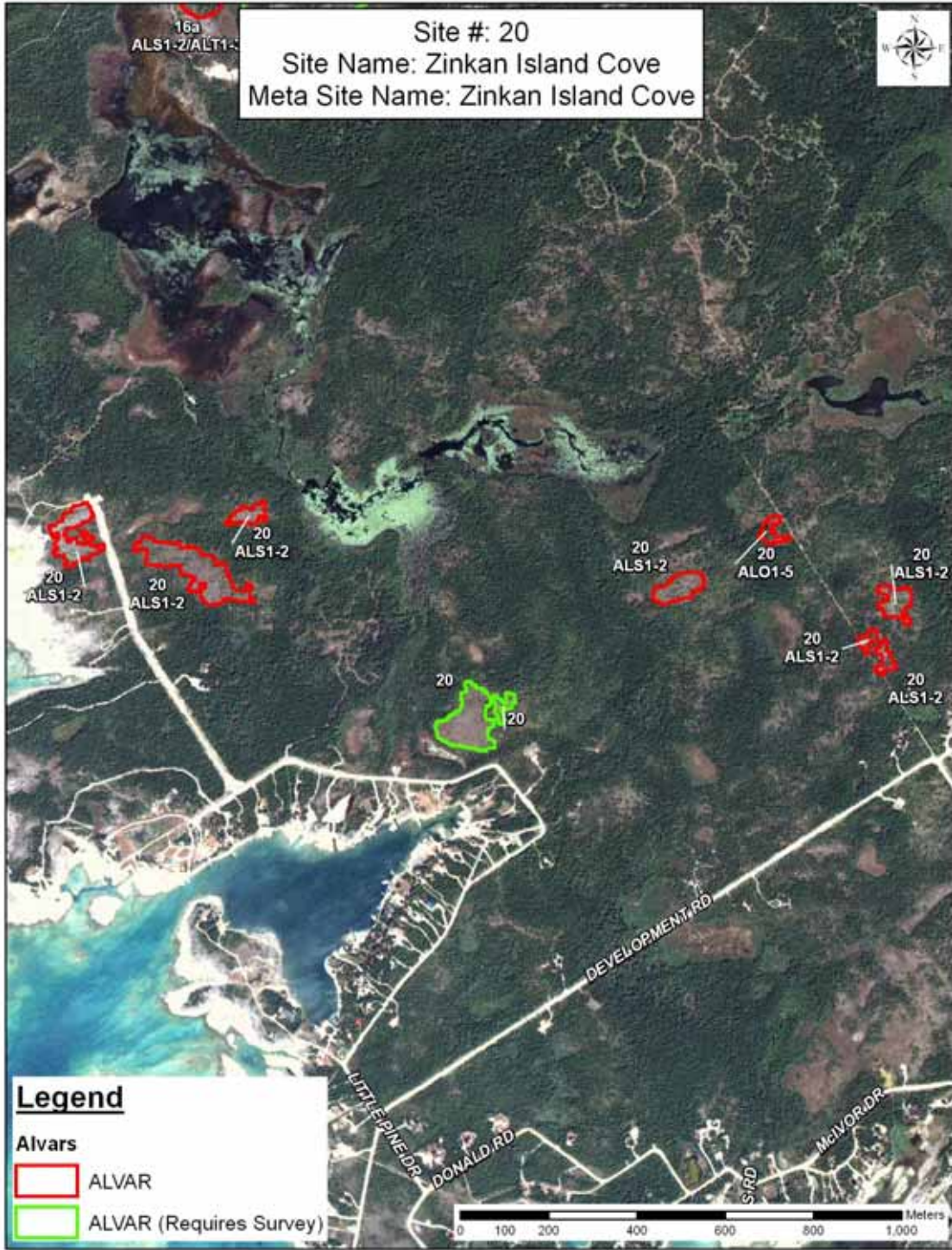
1. A number of open bedrock communities are evident on air photos and satellite imagery should be investigated and, where appropriate, have standard alvar surveys conducted.
2. Regular monitoring of alvar habitat quality is recommended.

References

Jalava, J.V. 2005a. Biological Surveys of Bruce Peninsula Alvars 2005 Summary Report. Prepared for Bruce Peninsula National Park, Parks Canada. iii + 80 pp.

Jalava, J.V. 2006. Field notes from a site visit, August 22, 2006. Unpublished notes, air photo mapping and digital data spreadsheets.

Johnson, J. 1982. Biologically Significant Areas, Site #11, Zinkan Island Cove. Ontario Ministry of Natural Resources, Owen Sound District.



Vascular Plants of the Zinkan Island Cove Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	20 ALSI-2	20 ALOI-4
<i>Larix laricina (Du Roi) K. Koch</i>	Tamarack	G5	S5			X	33		X	
<i>Picea glauca (Moench) Voss</i>	White Spruce	G5	S5			X	33		X	X
<i>Pinus banksiana Lambert</i>	Jack Pine	G5	S5			X	33		X	
<i>Juniperus communis L. var. depressa Pursh</i>	Common Juniper	G5T5	S5			X	34		X	X
<i>Juniperus horizontalis Moench</i>	Creeping Juniper	G5	S5			X	34	M	X	X
<i>Thuja occidentalis L.</i>	White Cedar	G5	S5			X	34		X	X
<i>Aquilegia canadensis L.</i>	Wild Columbine	G5	S5			X	130		X	X
<i>Betula papyrifera Marshall</i>	Paper Birch	G5	S5			X	165		X	X
<i>Minuartia michauxii (Fenzl) Farw.</i>	Rock Sandwort	G5	S5			X	178		X	X
<i>Rumex crispus L.</i>	Curly Dock	G?	SE5			XI	179			X
<i>Hypericum kalmianum L.</i>	Kalm's St. John's-wort	G4	S4			X	200	M	X	
<i>Hypericum perforatum L.</i>	Common St. John's-wort	G?	SE5			XI	200		X	X
<i>Viola nephrophylla E. Greene</i>	Northern Bog Violet	G5	S4			X	218			X
<i>Populus tremuloides Michaux</i>	Trembling Aspen	G5	S5			X	234		X	X
<i>Salix bebbiana Sarg.</i>	Bebb's Willow	G5	S5			X	234		X	
<i>Salix discolor Muhlenb.</i>	Pussy Willow	G5	S5			X	234		X	X
<i>Salix petiolaris J.E. Smith</i>	Slender Willow	G4	S5			X	234			X
<i>Arabis hirsuta (L.) Scop.</i>	Hairy Rock-cress	G5T5	S5			X	237	M		X
<i>Arctostaphylos uva-ursi (L.) Sprengel</i>	Bear-berry	G5	S5			X	247		X	X
<i>Lysimachia quadriflora Sims</i>	Prairie Loosestrife	G5?	S4			X	258		X	
<i>Trientalis borealis Raf. ssp. borealis</i>	Starflower	G5T?	S5			X	258			X
<i>Fragaria virginiana Miller</i>	Wild Strawberry	G5	S5			X	277		X	X
<i>Potentilla anserina L. ssp. anserina</i>	Silverweed	G5	S5			X	277		X	
<i>Potentilla fruticosa L. ssp. floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X
<i>Prunus pumila L.</i>	Sand Cherry	G5	S4S5			X	277	Mt?	X	
<i>Spiraea alba Duroi</i>	Meadowsweet	G5	S5			X	277			X
<i>Cornus stolonifera Michaux</i>	Red-osier Dogwood	G5	S5			X	307			X
<i>Comandra umbellata (L.) Nutt.</i>	Bastard-toadflax	G5	S5			X	313		X	X
<i>Rhamnus alnifolia L'Her.</i>	Alder-leaved Buckthorn	G5	S5			X	338		X	
<i>Calamintha arkansana (Nutt.) Shinn.</i>	Wild Savory	G5	S4S5			X	392	M	X	X
<i>Lycopus uniflorus Michaux</i>	Bugleweed	G5	S5			X	392			X
<i>Prunella vulgaris L.</i>	Heal-all	G5	S5			X	392		X	X
<i>Castilleja coccinea (L.) Sprengel</i>	Indian Paintbrush	G5	S5			X	399	M		X
<i>Verbascum thapsus L.</i>	Common Mullein	G?	SE5			XI	399			X
<i>Campanula rotundifolia L.</i>	Harebell	G5	S5			X	411		X	X
<i>Lobelia spicata Lam.</i>	Pale-spiked Lobelia	G5	S4			X	411		X	
<i>Houstonia canadensis Willd.</i>	Fringed Houstonia	G4G5	S4?			X	416		X	X
<i>Lonicera dioica L.</i>	Wild Honeysuckle	G5	S5			X	418		X	
<i>Aster laevis L.</i>	Smooth Aster	G5	S5			X	423		X	X
<i>Chrysanthemum leucanthemum L.</i>	Ox-eye Daisy	G?	SE5			XI	423			X
<i>Prenanthes racemosa Michaux</i>	Smooth White-lettuce	G5T?	SU			X	423		X	
<i>Senecio aureus L.</i>	Golden Ragwort	G5	S5			X	423		X	
<i>Senecio pauperculus Michaux</i>	Balsam Ragwort	G5	S5			X	423	M	X	X
<i>Solidago hispida Muhl.</i>	Hairy Goldenrod	G5	S5			X	423		X	
<i>Solidago nemoralis Aiton</i>	Gray Goldenrod	G5T?	S5			X	423		X	
<i>Solidago ptarmicoides (Nees) B. Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E	X	X
<i>Solidago uliginosa Nutt.</i>	Bog Goldenrod	G4G5	S5			X	423		X	X
<i>Juncus dudleyi Wieg.</i>	Dudley's Rush	G5	S5			X	455			X
<i>Carex eburnea Boott ex Hooker</i>	Bristle-leaf Sedge	G5	S5			X	457		X	X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	20 ALSI-2	20 ALOI-4
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X	X
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X	X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X	
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X	
<i>Calamagrostis stricta</i> (Timm) Koeler ssp.	Northern Reed Grass	G5T5	S5			X	458		X	
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X	X
<i>Elymus trachycaulus</i> (Link) Gould in Shim.	Slender Wheat Grass	G5	S5			X	458		X	X
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M	X	
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458			X
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5T5	S4			X	458		X	X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X	X
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	Prairie Dropseed, Northern Dropseed	G5	S3			X	458	E	X	
<i>Sporobolus neglectus</i> Nash	Overlooked Dropseed	G5	S4			X	458		X	
<i>Sporobolus vaginiflorus</i> (Torrey ex A. Gray)	Ensheathed Dropseed	G5	S4			X	458		X	X
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475			X
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's- seal	G5	S5			X	475		X	
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5T4	S4?			X	475		X	
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475		X	X
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476		X	
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X	

Site 23. GARDEN ISLAND

Bruce County, Northern Bruce Peninsula (formerly Eastnor Township)

NTS Map: 41A/14

NAD83 UTM 17T 469973 4981812

Ownership: Private

Protection: Not protected

Survey Dates (Surveyors): August 20, 2004 (J. Jalava); September 19, 2003 (J. Johnson, A. Winters, P. Krotsch)

Total Extent of Alvar: 4.3 ha

Overall Alvar Quality Rank: A

Directions: With permission from the landowner, Garden Island can be accessed by boat by making the short voyage west from the Stokes Bay marina.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
23. Garden Island	Rvp	Jalava 2004 colour IR air photo	1	15	78 (68)	1

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Garden Island in Stokes Bay along the central part of the western coast of the Bruce Peninsula sustains several patches of high-quality alvar dwarf shrubland interspersed with mixed forest and extensive Great Lakes coastal meadow marsh communities. The site supports a sizeable population of the threatened Hill's Thistle. [Jalava 2004]

Alvar Representation

ALSI-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar

The Garden Island alvar patches consist primarily of Common Juniper – Shrubby Cinquefoil dwarf shrubland (Figure 1). Very sparsely scattered small (stunted) trees and saplings of White Cedar occur in the dwarf shrubland, although trees and saplings are quite common in one small area. The low shrub layer is variable (20-95% cover), but usually extensive, with Creeping Juniper usually being the most common species, but with Bearberry and Sand Cherry also dominating in some sections. Common Juniper shrubs are widespread but sparse on the dwarf shrubland. The quite diverse herb layer generally ranges from 10-25% cover, although in some areas it is as low as 3%. Little Bluestem is the most common herb, with Rydberg's Poison-ivy, Bristle-leaf Sedge, Poverty Oat Grass, Upland White Goldenrod and Crawe's Sedge also being frequent. Occasional associates include Swamp Goldenrod, Balsam Ragwort, Harebell, Acuminate Panic Grass, Marsh Wild-timothy, Calamint, Wild Columbine, Rock Sandwort, Smooth Aster and Bluets. Non-vascular plants are often common, with cushion mosses dominating, and with foliose and crustose lichens, microbial crust and rock surface algae

common in some patches.

Within the dwarf alvar shrubland is a small (0.25 ha) patch of alvar grassland on grey-brown sandy loam near the east end of the island. It is dominated by Poverty Oat Grass, Lance-leaved Coreopsis and Little Bluestem, with Calamint as a secondary species and Canada Blue Grass as an associate. A few scattered Creeping Juniper shrubs are present, and the extensive non-vascular layer is dominated by cushion and turf mosses, with wet mosses, crustose lichens, foliose lichens and rock surface algae also present.



Figure 1. Extensive alvar dwarf shrubland at Garden Island

Condition

The Garden Island alvar patches are generally in excellent condition, but often with some evidence of past disturbance. Charred wood is frequent, indicating past widespread fire. Signs of deer and goose browsing are frequent and widespread on the vegetation. One area has a surprising number of introduced plant species, such as Ox-eye Daisy, Common St. John's-wort and hawkweeds.

Diversity

Although only one alvar community type is technically present at Garden Island, the community itself is highly variable, with dry sections, moist patches (harbouring species of wet alvars), densely shrubby sections and grassy areas. The stone content in the substrate is also variable, with the northwest end of the island being stonier and more shallow-soiled. For an area of its size, this alvar shrubland has high vascular plant diversity.

Ecological Functions

Garden Island contains a virtually intact small island ecosystem that is currently exposed to very little human disturbance. Situated along the western coast of the Bruce Peninsula, the island undoubtedly serves as a refuge for migrating landbirds. The site is situated not far from the Lyal Island Provincial Nature Reserve and Black Creek Provincial Park.

Special Features

Hill's Thistle *Cirsium hillii* COSEWIC-THR, OMNR-THR G3S3
Jalava (2004) found 83 rosettes, including 11 flowering, during an inventory of the Garden Island alvar in August 2004. The previous year, a search specifically for Hill's Thistle found 57 shoots, including one plant in seed, in many separate subpopulations on the island (NHIC 2006). Garden Island appears to have a relatively healthy population of this species, which rarely occurs in large numbers at any given location. The thistles appear to thrive in shallow sandy soils along the fringes of the alvar, where they are partly shaded by adjacent woodlands.

Conclusions and Recommendations

Evaluation and Significance

Garden Island sustains a high-quality alvar dwarf shrubland. It is also host to a sizeable population of the globally rare and threatened Hill's Thistle. The globally rare Great Lakes endemic, Stiff Yellow Flax occurs along the shoreline, but not on the alvars of the site. The island is uninhabited, has a single private landowner, and thus presents an exceptional conservation opportunity for conservation organizations.

Threats

The primary threat to this site is cottage development, although there is no evidence that this is planned for the immediate future (there is an old run-down log cabin along the south shore). Visitation by boaters appears to be infrequent.

Management

The current landowner is to be commended for his/her custodianship of the site, and should be provided with information on the significance and stewardship of alvar

habitats.

Future Inventory Needs

1. Garden Island would benefit from an overall life science inventory.
2. Faunal surveys should be undertaken.
3. Monitoring of rare species populations, their habitat quality and potential threats, including browse by deer and geese.

References

Jalava, J.V. 2004. Biological Surveys of Bruce Peninsula Alvars. Prepared for NatureServe Canada, Ontario Natural Heritage Information Centre and Parks Canada. iii + 21 pp.

NHIC (Natural Heritage Information Centre). 2006. Element occurrence, natural areas and Ontario Herpetofaunal Summary databases. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario. Electronic databases.



Vascular Plants of the Garden Island Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	23 ALS1-2
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5T	S5			X	16		X
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X
<i>Juniperus communis</i> L. var. <i>depressa</i> Pursh	Common Juniper	G5T5	S5			X	34		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X
<i>Anemone cylindrica</i> A. Gray	Long-fruited Thimbleweed	G5	S4			X	130		X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X
<i>Cerastium fontanum</i> Baumg.	Mouse-eared Chickweed	G?	SE5			XI	178		X
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M	X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R.	Saskatoon-berry	G5	S4?			X	277	M	X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X
<i>Potentilla norvegica</i> L.	Rough Cinquefoil	G5	S5			XI	277		X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277		X
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277		X
<i>Lathyrus palustris</i> L.	Marsh Pea	G5	S5			X	285		X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286		X
<i>Proserpinaca palustris</i> L.	Mermaid-weed	G5	S4			X	289		X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338		X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		X
<i>Pastinaca sativa</i> L.	Wild Parsnip	G5	SE5			XI	374		X
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378		X
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392		X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X
<i>Plantago rugelii</i> Decne.	Rugel's Plantain	G5	S5			X	396		X
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X
<i>Veronica officinalis</i> L.	Common Speedwell	G5	SE5			XI	399		X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411		X
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411		X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			C	423		X
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	THR		X	423	H	X
<i>Coreopsis lanceolata</i> L.	Lance-leaved Coreopsis	G5	S4?			R	423	E	X
<i>Erigeron strigosus</i> Muhlenb. ex Willd.	Spreading Fleabane	G5	S5			X	423		X
<i>Hieracium pilosella</i> L.	Mouse-ear Hawkweed	G?	SE5			XI	423		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	23 ALS1-2
<i>Lactuca canadensis</i> L.	Canada-lettuce	G5	S5			X	423		X
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X
<i>Solidago ptarmicoides</i> (Nees) B. <i>Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455		X
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455		X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E	X
<i>Cladium mariscoides</i> (Muhlenb.) <i>Torrey</i>	Twig-rush	G5	S5			X	457		X
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	G5	S5			X	457		X
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X
<i>Calamagrostis canadensis</i> (Michaux) <i>P. Beauv</i>	Canada Blue-joint	G5	S5			X	458		X
<i>Danthonia spicata</i> (L.) P. Beauv. ex <i>Roemer</i>	Poverty Oat Grass	G5	S5			X	458		X
<i>Elymus trachycaulus</i> (Link) Gould in <i>Shinn.</i>	Slender Wheat Grass	G5	S5			X	458		X
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M	X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5T5	S4			X	458		X
<i>Phleum pratense</i> L.	Timothy	G?	SE5			XI	458		X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X
<i>Schizachyrium scoparium</i> (Michaux) <i>Nees</i>	Little Bluestem	G5	S4			X	458		X
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475		X
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475		X
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489		X

Site 24. LYAL ISLAND

Bruce County, Northern Bruce Peninsula (formerly Eastnor Township)

NTS Map: 41A/14

NAD83 UTM 17T 467800 4977500

Ownership: Private nature reserve (Ontario Nature)

Protection: Lyal Island Nature Reserve (Dr. John Agnos and Asa Danard Sanctuary) (100%)

Survey Dates (Surveyors): August 23, 2006 (J. Jalava and R.A. Jones); September 18, 2003 (J. Johnson, A. Winters, I.D. Macdonald, species-at-risk survey); July 3, 1982, August 9-12, 1982 (I.D. Macdonald, life science survey).

Total Extent of Alvar: 2.8 ha

Overall Alvar Quality Rank: condition = A, size = BC

Directions: Check weather forecast, launch a boat or canoe from beach at Black Creek Provincial Park, travel around to far side of Lyal Island. Alvars are not far inland from the shore towards the southwest end of island.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (native)	NHIC-Tracked Species
24. Lyal Island	Rvp	1997 Colour IR air photos	3	15	55 (55)	5

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Lyal Island is a 305 ha island west of Stokes Bay along the western coast of the Bruce Peninsula. It has flat to very gently rolling dolostone topography, with cobble beach ridges around its periphery. According to Elliott (1969), the vegetation consists of mixed deciduous and coniferous upland forests, alvar meadows and small marshes. The island is completely undeveloped, with the exception of an automatic navigation light on the island's west shore. Alvar habitats, mainly Creeping Juniper dwarf shrub alvar, occur near the southwestern shore of the island adjacent to Twig-rush fens, as well in a couple of locations in the island's southern interior.

Alvar Representation

Surveys of the Lyal Island's alvars by the present study in 2006 documented three alvar community types and an associated alvar-fen intergrade community.

ALOI-3 Dry-fresh Little Bluestem Open Alvar Meadow Type

A 0.5 ha patch of alvar grassland dominated by Little Bluestem occurs near the southwestern shore of Lyal Island. Acuminate Panic Grass is a minor associate. The alvar into a small fen-like area dominated by Twig-rush, with Canada Bluejoint at the eastern edge. There is a sparse low shrub layer dominated by Shrubby Cinquefoil, with Sand Cherry, Alder-leaved Buckthorn, Sweet Gale and Kalm's St. John's-wort as minor

associates. Adjacent communities include a cobble beach ridge and bedrock shoreline to west; the community grades into Creeping Juniper dwarf shrub alvar to east. A few, scattered granitic boulders are present, while most of the surface substrate consists of flattish, broken greyish dolostone fragments with no exposed bedrock pavement.



Figure 1. Creeping Juniper dominated dwarf shrub alvar at Lyal Island

ALSI-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar Type
Several small but excellent-quality Creeping Juniper dominated dwarf shrub alvars occur in thin sandy soils in the southwest portion of Lyal Island (Figure 1), not far from the Lake Huron shore. The substrate consists primarily of small dolostone fragments covering the bedrock. Occasional trees and saplings of White Cedar and, less commonly, Tamarack and White Spruce occur, mainly along the alvar fringes. Minor associates in the low shrub layer are Shrubby Cinquefoil, Kalm's St. John's-wort, Bearberry and seedlings of White Cedar. Sweet Gale shrubs occur in the ecotone where this community grades into Twig-rush fen. Dominant in the sparse to moderately-extensive herb layer is Little Bluestem, with Scirpus-like Sedge as the most frequent secondary species. Associates include Poverty Oat Grass, Bristle-leaf Sedge, Richardson's Sedge, Upland White Goldenrod, Swamp Goldenrod, Calamint, Cespitose Bulrush, Lindheimer's Panic Grass and Acuminate Panic Grass. The rock surface algae, *Gloeocapsa alpina*, covers the abundant exposed dolostone fragments, while black crustose lichens, pink crustose lichens and cushion mosses are variably common. Charred woody debris and deer-browse on White Cedar was noted in most examples.

ALTI-4 Jack Pine - White Spruce - White Cedar Treed Alvar

Patches of treed alvar showing evidence of past fire occur on slightly higher bedrock terrain in association with the dwarf shrub alvars. Dolostone fragments with patches of very thin sandy soils form the dry substrate. Drought dieback was noted during the 2006 surveys on woody vegetation, and some browse by deer and Snowshoe Hare was evident. White Cedar is strongly dominant in the tree and sapling layers, which, respectively, form 1-15% cover and 10-15% cover. The sparse to moderate low shrub layer is dominated by Bearberry and Creeping Juniper. Herbs are patchy but fairly extensive, with the most common species being Little Bluestem, Poverty Oat Grass, Richardson's Sedge and Bristle-leaf Sedge. Non-vascular species composition the exposed dolostone fragments and bedrock is similar to that of the dwarf shrub alvars.

Condition

Elliott (1969) noted past logging and hunting and that the island at the time was "visited extensively by local picnic parties and fishermen." Otherwise, human impacts on the island are not extensive, being primarily associated with the timber cutting in the 1800s and the establishment and subsequent demolition of a manned lighthouse station on the island's west shore. A good indicator of habitat quality was the complete absence of introduced species noted during the 2006 alvar surveys. The acquisition of this site by the Federation of Ontario Naturalists (FON 2000a,b) in the 1990s should ensure continued low future human impacts.

Diversity

Lyal Island's three alvar vegetation types sustain a moderate diversity of 55 vascular plant species, of which a high proportion (27%, or 15 species) show a strong affinity to alvar habitats in Ontario.

Ecological Functions

Lyal Island consists of a virtually intact island ecosystem, one of the largest along the western coast of the Bruce Peninsula, that is currently exposed to very little human disturbance. Its coastal location means that the island undoubtedly serves as a refuge for migrating landbirds.

Special Features

Of "exceptional interest" at Lyal Island are fossils along the shore, including Nantiloid molluscs up to 1 foot long (Falls *et al.* 1990). Eastern Ribbonsnake (COSEWIC Special Concern, OMNR Special Concern, G5S3) and Roundleaf Ragwort (G5S3) are known from the site, but there is no evidence to suggest they are associated with the alvars. The following taxa are alvar-associated:

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3S3
Massasauga rattlesnakes have been regularly observed at Lyal Island in recent decades (NHIC 2006, FON 2006). R.A. Jones encountered two adults during the 2006 alvar surveys. These consistent observations suggest a healthy population persists at the island.

Hill's Thistle *Cirsium hillii* COSEWIC-THR, OMNR-THR G3S3
Approximately 183 shoots of Hill's Thistle in 5 subpopulations were found by J. Johnson, A. Winters and I. Macdonald at Lyal Island in 2003 (NHIC 2006). Two populations were mid-way along the outer southwestern or western shore of the island, slightly inland and three were to the west or northwest of a large pond in the central part of the island (NHIC 2006). Most shoots were strictly vegetative but 8 had an inflorescence or had flowered in 2003, including several with seeds (NHIC 2006). Three flowering (Figure 2) and 41 vegetative plants were found by J. Jalava during the 2006 alvar surveys (probably the first two populations noted by NHIC 2006), and R.A. Jones also documented the species along an alvar fringe in the island interior. A healthy population appears to persist at the site.



Figure 2. Threatened Hill's Thistle in flower at Lyal Island alvar in 2006

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR, OMNR-THR G3S3
According to NHIC (2006), the Great Lakes basin endemic Dwarf Lake Iris occurs in several locations on the island, forming dense carpets in some local areas. During the

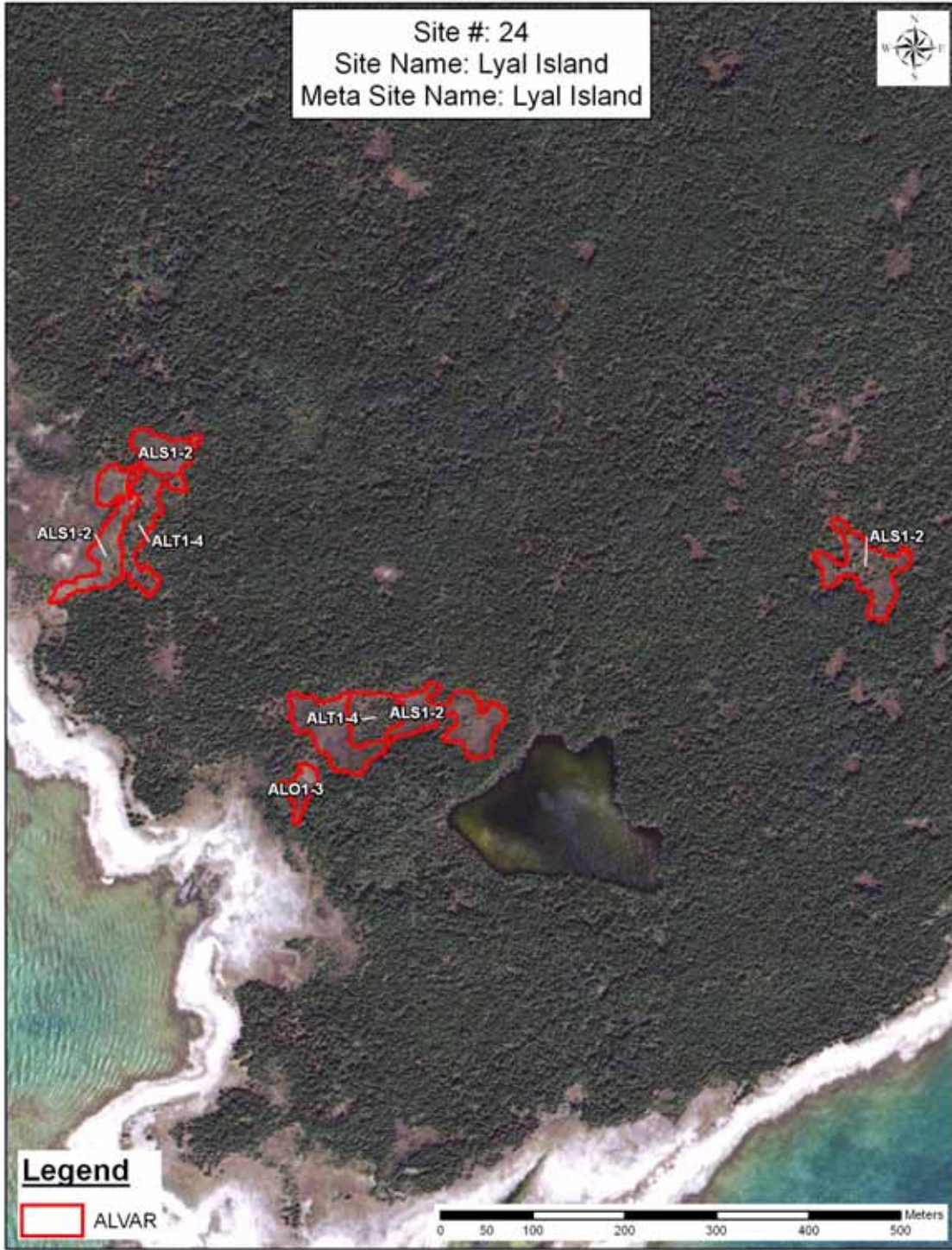
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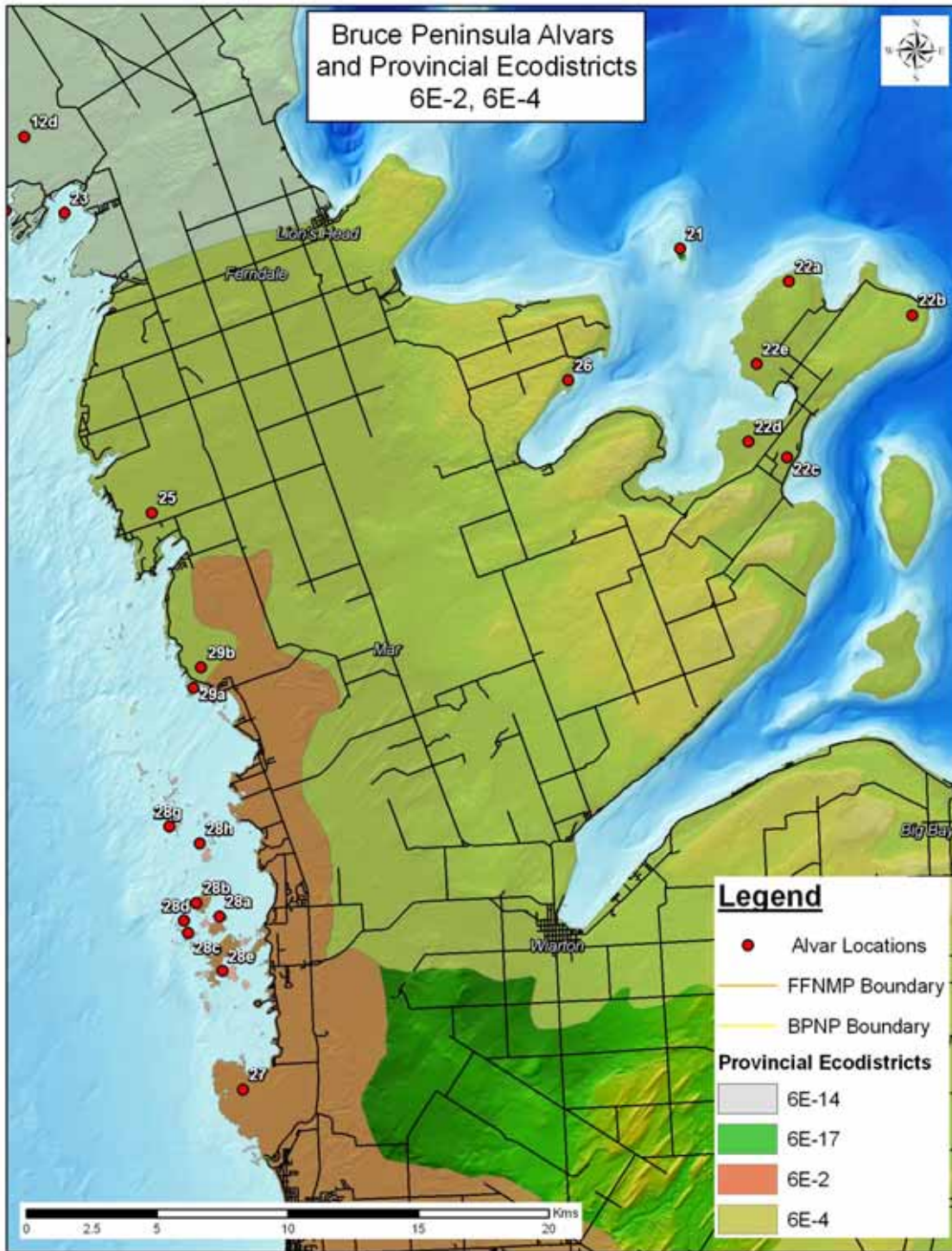


Vascular Plants of the Lyal Island Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	24 ALS1-2	24 AL/T1-4
<i>Larix laricina (Du Roi) K. Koch</i>	Tamarack	G5	S5			X	33		X	X
<i>Picea glauca (Moench) Voss</i>	White Spruce	G5	S5			X	33		X	X
<i>Juniperus horizontalis Moench</i>	Creeping Juniper	G5	S5			X	34	M	X	
<i>Thuja occidentalis L.</i>	White Cedar	G5	S5			X	34		X	
<i>Aquilegia canadensis L.</i>	Wild Columbine	G5	S5			X	130			X
<i>Myrica gale L.</i>	Sweet Gale	G5	S5			X	160		X	
<i>Hypericum kalmianum L.</i>	Kalm's St. John's-wort	G4	S4			X	200	M	X	
<i>Arctostaphylos uva-ursi (L.) Sprengel</i>	Bear-berry	G5	S5			X	247		X	X
<i>Primula mistassinica Michaux</i>	Bird's-eye Primrose	G5	S4			X	258		X	
<i>Parnassia glauca Raf.</i>	Grass-of-Parnassus	G5	S5			X	276		X	
<i>Physocarpus opulifolius (L.) Maxim.</i>	Ninebark	G5	S5			X	277		X	
<i>Potentilla fruticosa L. ssp. floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	
<i>Prunus pumila L.</i>	Sand Cherry	G5	S4S5			X	277	Mt?	X	
<i>Prunus virginiana L. ssp. virginiana</i>	Choke Cherry	G5 T?	S5			X	277		X	
<i>Shepherdia canadensis (L.) Nutt.</i>	Soapberry	G5	S5			X	286		X	
<i>Rhamnus alnifolia L'Her.</i>	Alder-leaved Buckthorn	G5	S5			X	338		X	
<i>Polygala senega L.</i>	Seneca Snakeroot	G4 G5	S4			X	350	H	X	
<i>Calamintha arkansana (Nutt.) Shinn.</i>	Wild Savory	G5	S4S5			X	392	M	X	X
<i>Agalinis paupercula (A. Gray) Britton</i>	Small-flowered Agalinis	G5	S4S5			X	399		X	
<i>Campanula rotundifolia L.</i>	Harebell	G5	S5			X	411		X	X
<i>Lobelia kalmii L.</i>	Kalm's Lobelia	G5	S5			X	411		X	
<i>Aster laevis L.</i>	Smooth Aster	G5	S5			X	423		X	
<i>Aster pilosus Willd. var. pringlei</i>	Pringle's Aster	G4 G5	S4			X	423	M	X	
<i>Cirsium hillii (Canby) Fern.</i>	Hill's Thistle	G3	S3	T	T	X	423	H	X	
<i>Packera obovata</i>	Roundleaf Ragwort	G5	S3			X	423			X
<i>Prenanthes racemosa Michaux</i>	Smooth White-lettuce	G5 T?	SU			X	423		X	
<i>Senecio pauperculus Michaux</i>	Balsam Ragwort	G5	S5			X	423	M	X	
<i>Solidago hispida Muhl.</i>	Hairy Goldenrod	G5	S5			X	423			X
<i>Solidago ohioensis Riddell</i>	Ohio Goldenrod	G4	S4			X	423		X	
<i>Solidago ptarmicoides (Nees) B. Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E	X	X
<i>Solidago uliginosa Nutt.</i>	Bog Goldenrod	G4 G5	S5			X	423		X	
<i>Symphotrichum lanceolatum ssp. lanceolatum</i>	Hairy-stemmed Panicked Aster	G5	S5			X	423		X	
<i>Carex eburnea Boott ex Hooker</i>	Bristle-leaf Sedge	G5	S5			X	457			X
<i>Carex flava L.</i>	Yellow Sedge	G5	S5			X	457		X	
<i>Carex richardsonii R. Br.</i>	Richardson's Sedge	G4	S4?			X	457	E	X	X
<i>Carex scirpoidea Michx. ssp. convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	
<i>Cladium mariscoides (Muhlenb.) Torrey</i>	Twig-rush	G5	S5			X	457		X	
<i>Eleocharis compressa Sullivant</i>	Flat-stemmed Spike-rush	G4	S4			R	457	E	X	
<i>Rhynchospora capillacea Torrey</i>	Hair-like Beak-rush	G5	S4?			X	457		X	
<i>Scirpus cespitosus L. ssp. cespitosus</i>	Deer-grass	G5 T	S5			X	457		X	

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	24 ALS1-2	24 AL/T1-4
<i>Scleria verticillata</i> Muhlenb. ex Willd.	Low Nut-rush	G5	S3			X	457		X	
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X	
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv	Canada Blue-joint	G5	S5			X	458		X	
<i>Calamagrostis stricta</i> (Timm) Koeler ssp.	Northern Reed Grass	G5 T5	S5			X	458		X	
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X	
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5 T5	S5			X	458		X	
<i>Panicum lindheimeri</i> Nash	Lindheimer's Panic Grass	G5 T5	S4			X	458		X	
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X	X
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5 T4	S4?			X	475		X	
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5 T4?	S4			X	475			X
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M	X	
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476		X	
<i>Spiranthes cernua</i> (L.) Rich.	Nodding Ladies'-tresses	G5	S5			X	489		X	

ECODISTRICTS 6E-4 and 6E-2



ECODISTRICT 6E-4

Site 21. BARRIER ISLAND

Bruce County, Northern Bruce Peninsula (formerly Eastnor Township)

NTS Map: 41 A/14

UTM: 17T 4936974980283

Ownership (possibly under dispute): Chippewas of Nawash First Nation / Federal (Public Works Canada)

Protection: Barrier Island Provincial Life Science ANSI (100%)

Survey Dates (Surveyors): September 2, 2005 (J. Jalava, F. Burrows); July 25, 1996 (C. Schaefer)

Total Extent of Alvar: 14.5 ha

Alvar Quality Rank: B

Directions: Barrier Island is accessed by boat from Lion's Head, Hope Bay or Cape Croker. It is approximately 3 km northeast of Cape Dundas and 3 km northwest of Cape Croker. A shallow harbour, protected when winds are westerly, is found at the southeast end of the island.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
21. Barrier Island	Rvp	Air photo; Schaefer 1996	1	11	65 (52)	2

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Barrier Island is a small, relatively flat limestone island in Georgian Bay, approximately three kilometres from Cape Dundas off the east coast of the Bruce Peninsula.

Approximately 15 of the island's 35 ha are alvar grassland dominated by Tufted Hairgrass in combination with a variety of other herbaceous plants. There is a relatively high component of introduced species in the island's alvar habitats, with nesting gulls undoubtedly being the vector.

Barrier Island was surveyed in 2005 primarily to attempt to relocate a population of Gattinger's Agalinis discovered there in 1980 by Dr. J. Morton (NHIC 2006), but not subsequently reported. The 2005 survey was not successful in re-finding the species, but it should be noted that the site visit was abbreviated somewhat due to weather conditions. Schaefer (1996) undertook a detailed survey of the Barrier Island alvar as part of the International Alvar Conservation Initiative, and also did not report Gattinger's Agalinis.

Alvar Representation

The Barrier Island alvar occurs on flat, very gently sloping limestone plain with shallow brown loam soils and occasional patches of exposed bedrock. Limestone fragments are

very common and occasional granitic erratics are also present. Moisture levels are variable, with higher areas being very dry and shallow depressions experiencing seasonal pooling. Adjacent habitats are shrub and sapling thickets along the eastern fringe of the island, and extensive Great Lakes coastal meadow marsh communities along the shorelines.

ALOI-5 Fresh - Moist Tufted Hairgrass Open Alvar Meadow

Dominant plants on the Barrier Island alvar grassland were found to be highly variable and patchy in 2005, differing somewhat from descriptions in Schaefer (1996). The differences may be due in part to the impacts of nesting gulls, and the associated spread of introduced species. Changes in Lake Huron water levels since Schaefer's visit may also have resulted in proliferation of shoreline adventives into the alvar.

No trees or large shrubs occur on the alvar grassland. In 2005, portions of the Barrier Island alvar were dominated primarily by Tufted Hairgrass and Foxtail Barley, with Common Ragweed, Sticky Willow-herb and Canada Bluegrass as associates. *Nostoc* algae, microbial mats and microbial crust were frequent in areas of exposed bedrock. Somewhat drier sections were dominated by Canada Bluegrass and Common Ragweed, with Foxtail Barley and Tufted Hairgrass as associates. The extreme eastern edge of the alvar has sizeable patches of False Pennyroyal (Figure 1), Northern Dropseed, an annual dropseed (*Sporobolus vaginiflorus* or *S. neglectus*) and Common Ragweed.

Condition

Introduced species are abundant in parts of the Barrier Island, and are almost certainly brought in by birds. Gulls nest on the alvar, with associated debris from their nests being common. Otherwise the alvar is undisturbed, and probably receives very infrequent human visitation.

Diversity

The Barrier Island alvar consists of a variable alvar grassland community that supports at least 65 vascular plant taxa, of which 52 are native, and of which 11 taxa show a moderate to strong affinity to alvar habitats in Ontario.

Ecological Functions

Barrier Island is an uninhabited island off the east coast of the Bruce Peninsula in Georgian Bay. Natural ecological processes are intact at the site. It is a colonial waterbird (gulls and terns) nesting site and undoubtedly serves as a refuge for migrating landbirds following the coast of the Bruce Peninsula during the spring and fall.



Figure 1. Locally rare False Pennyroyal is dominant in parts of the Barrier Island alvar

Special Features

In addition to the three provincially rare plant species discussed below, six vascular plant taxa considered rare or very uncommon on the Bruce Peninsula (BGPC 2003) have been documented at the Barrier Island alvar.

Gattinger's Agalinis *Agalinis gattingeri* COSEWIC-END, OMNR-END G4S2
 The endangered Gattinger's Agalinis was found at Barrier Island in 1980 by Dr. John Morton (NHIC 2006), but was not re-found by Schaefer (1996) or during the present study. It is nevertheless possible that a small population persists at the site.

Northern Dropseed *Sporobolus heterolepis* G5S3
 The provincially rare Northern Dropseed (G5S3) was found by Jalava (2005) at four different locations on the alvar, with the population ranging in the different patches from a few clumps to several thousand clumps.

Limestone Swamp Bedstraw *Galium brevipes* G4?S2?
 The provincially rare Limestone Swamp Bedstraw was found at Barrier Island by Schaefer (1996). No estimate of population size is available.

Conclusions and Recommendations

Evaluation and Significance

The Barrier Island alvar is unique in the context of other alvars in Ecodistrict 6E-4 and the Bruce Peninsula generally. Its community and species composition differ significantly from other island alvars in the region. More extensive Tufted Hairgrass alvar grasslands within the ecodistrict occur on the mainland nearby at the Nawash First Nation on Cape Croker.

Threats

There are no apparent significant human threats to the Barrier Island alvar, unless visitation by boaters dramatically increases. The main threat to the alvar is posed by invasive plant species, which are undoubtedly brought to the island by nesting gulls.

Management

Continued passive management is recommended for the Barrier Island ecosystem. It is unlikely that much can be done to control the introduced and invasive species that occur as a result of nesting waterbirds.

Future Inventory Needs

1. An additional survey for the endangered Gattinger's Agalinis is recommended.
2. A complete life science inventory of Barrier Island is warranted in order to inform future management.
3. Vertebrate and invertebrate fauna and non-vascular plants have not been surveyed at the site.
4. Monitoring of introduced and invasive species should be undertaken.
5. Monitoring rare species populations should be done regularly.

References

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Schaefer, C.A. 1996. Barrier Island Alvar. Site Survey summary; Community Form 1 – reconnaissance transect; addendum to form 1; Community Form 2 – community ranking; addendum to form 2; special plant survey form for *Sporobolus heterolepis*.

NHIC (Natural Heritage Information Centre). 2006. Element occurrence, natural areas and Ontario Herpetofaunal Summary databases. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario. Electronic databases.

Site #: 21
Site Name: Barrier Island
Meta Site Name: Barrier Island



Vascular Plants of the Barrier Island Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	21 AL01-4
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Rumex crispus</i> L.	Curly Dock	G?	SE5			XI	179		X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X
<i>Lepidium campestre</i> (L.) R. Br.	Field Pepper-grass	G?	SE5			XI	237		S
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		S
<i>Sedum acre</i> L.	Mossy Stonecrop	G?	SE5			XI	274		S
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		S
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277		S
<i>Potentilla recta</i> L.	Rough-fruited Cinquefoil	G?	SE5			XI	277		X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	S
<i>Rosa blanda</i> Aiton	Smooth Wild Rose	G5	S5			X	277		S
<i>Medicago lupulina</i> L.	Black Medick	G?	SE5			XI	285		S
<i>Medicago sativa</i> L. ssp. <i>sativa</i>	Alfalfa	G5	SE5			XI	285		X
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301		S
<i>Epilobium parviflorum</i> Schreber	Small-flowered Willow-herb	G?	SE4			XI	301		X
<i>Oenothera biennis</i> L.	Hairy Yellow Evening-primrose	G5	S5			X	301		X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		S
<i>Vitis riparia</i> Michaux	Riverbank Grape	G5	S5			X	340		X
<i>Rhus aromatica</i> Aiton	Fragrant Sumac	G5	S%			R	361	M	S
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		S
<i>Impatiens capensis</i> Meerb.	Spotted Jewelweed	G5	S5			X	372		S
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379		X
<i>Verbena hastata</i> L.	Blue Vervain	G5	S5			R	391		X
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392		S
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X
<i>Lycopus uniflorus</i> Michaux	Bugleweed	G5	S5			X	392		X
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H	S
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E	X
<i>Agalinis gattingeri</i>	Gattinger's Agalinis	G4	S2	E	E	X	399	H	H
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S5			X	399		X
<i>Veronica anagallis-aquatica</i> L.	Water Speedwell	G5	SE5			XI	399		S
<i>Veronica scutellata</i> L.	Marsh Speedwell	G5	S5			R	399		X
<i>Galium brevipes</i> Fern. & Wieg.	Limestone Swamp Bedstraw	G4?	S2?			R	416		S
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	G5	S5			X	423		X
<i>Cirsium arvense</i> (L.) Scop.	Canada Thistle	G?	SE5			XI	423		X
<i>Eupatorium perfoliatum</i> L.	Boneset	G5	S5			X	423		S
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	Grass-leaved Goldenrod	G5	S5			X	423		X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X
<i>Tanacetum vulgare</i> L.	Tansy	G?	SE5			XI	423		X
<i>Juncus alpinoarticulatus</i> Chaix	Alpine Rush	G5	S5			X	455		S
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455		X
<i>Juncus nodosus</i> L. var. <i>nodosus</i>	Knotted Rush	GT	S5			X	455		S
<i>Carex bebbii</i> (L. Bailey) Olney ex Fern.	Bebb's Sedge	G5	S5			X	457		X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	S

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	21 AI/OI-4
<i>Carex flava L.</i>	Yellow Sedge	G5	S5			X	457		S
<i>Carex hystericina Muhlenb. ex Willd.</i>	Porcupine Sedge	G5	S5			X	457		S
<i>Carex pellita Muhl.</i>	Woolly Sedge	G5	S5			X	457		S
<i>Carex viridula Michaux ssp. viridula</i>	Greenish Sedge	G5?T?	S5			X	457		S
<i>Eleocharis erythropoda Steudel</i>	Red-based Spike-rush	G5	S5			X	457		S
<i>Agrostis scabra Willd.</i>	Rough Hair Grass	G5	S5			X	458		X
<i>Agrostis stolonifera L.</i>	Creeping Bent Grass	G5	S5			X	458		S
<i>Calamagrostis stricta (Timm) Koeler ssp.</i>	Northern Reed Grass	G5T5	S5			X	458		S
<i>Deschampsia caespitosa (L.) P. Beauv.</i>	Tufted Hair Grass	G5	S5			X	458	H	X
<i>Hordeum jubatum L. ssp. jubatum</i>	Foxtail Barley	G5	SE5			XI	458		X
<i>Panicum capillare L.</i>	Witch Grass	G5	S5			X	458		X
<i>Panicum philadelphicum Bernh. ex Trin.</i>	Philadelphia Witch Grass	G5	S4			O	458	H	S
<i>Phleum pratense L.</i>	Timothy	G?	SE5			XI	458		S
<i>Poa compressa L.</i>	Canada Blue Grass	G?	S5			X	458		X
<i>Poa pratensis L. ssp. pratensis</i>	Kentucky Blue Grass	G5T	S5			X	458		X
<i>Sporobolus heterolepis (A. Gray) A. Gray</i>	Prairie Dropseed	G5	S3			X	458	E	X
<i>Sporobolus vaginiflorus (Torrey ex A. Gray)</i>	Ensheathed Dropseed	G5	S4			X	458		X
<i>Maianthemum stellatum (L.) Link</i>	Starry False Solomon's-seal	G5	S5			X	475		S
<i>Sisyrinchium mucronatum Michaux</i>	Blue-eyed Grass	G5	S4S5			X	476		S

Meta-site 22. CAPE CROKER

Chippewas of Nawash Unceded First Nation, Bruce County

NTS Map: 41 A/14, 41 A/15

NAD83 UTM 17T 498000 4979000 (site 22a), 502500 4977777 (site 22b), 497800 4972500 (site 22c), 496000 4973000 (site 22d), 496500 4976000 (site 22e)

Ownership: Chippewas of Nawash Unceded First Nation (100%)

Protection: Chippewas of Nawash Unceded First Nation (100%)

Survey Dates (Surveyors): June 14 and 15, 1993 (breeding birds and vegetation, S. Blaney); September 30, 1995 (S. Varga); August 9, 1996 (C. Schaefer); ca. 1999 (brief site visit J. Jalava, G. Allen, R. Gray and others); 1991 and August 21, 1998 (V. Brownell and P. Catling).

Total Extent of Alvar: ~490 ha

Overall Alvar Quality Rank: A to D

Directions: About 5 km north of the town of Wiarton on the Bruce Peninsula, turn east off of Highway 6 towards the town of Colpoy's Bay. Use topo map and air photos to locate the alvar sites.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
22a. Halfway Point	S?vp	IACI air photo (Schaefer 1996)	2	?	?	?
22b. Prairie Point	Dvp	IACI air photo (Schaefer 1996)	3	19	106 (91)	3
22c. The Little Prairie	R?vp	IACI air photo (Schaefer 1996)	2?	?	?	2
Meta-site Totals			~6	>19	>106 (>91)	~7

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

According to Varga (1995), "Cape Croker is a peninsula on the eastern side of the Bruce Peninsula, with a distinctive hourglass shape. It has a spectacular series of four escarpment promontories and terraces at the peninsula base, connected by a narrow neck of land to a broad outer terrace ringed by shale slopes. The peninsula is located between two major escarpment re-entrant valleys, the flooded valleys of Colpoy's Bay and Hope Bay. Along the base of the peninsula, the four escarpment promontories, Sydney Bay Bluff, Jones Bluff, King's Point Bluff and Malcolm Bluff, rise up to 120 m above Georgian Bay....Below the Manitoulin terraces at Jones Bluff and King's Point Bluff, softer shales form a gradual slope down to Georgian Bay....At Prairie Point, the shales form a large plain just above the lake level, with fractured limestones or dolostones common on the surface."

Alvar Representation

At least three separate areas of alvar or alvar-like habitats are found on the lower geological formations of the Niagara Escarpment at Cape Croker. The largest alvar patch

is at Prairie Point, along the narrow neck of the peninsula. Other alvars (or alvar-like habitats apparent on air photos) are found at Halfway Point (just east of Prairie Point) and Porcupine Point (known as Little Prairie, northeast of MacGregor Harbour), and possibly elsewhere. Only the Prairie Point alvar was surveyed during the IACI, but site visits documenting vegetation and flora have been made to the Porcupine Point and Halfway Point alvars by Catling (1995) and Catling and Brownell (1991-1998).

According to Schaefer (1996), “Several large potential alvar grasslands occur elsewhere on the Cape, which could not be surveyed due to time allowance.”

Site 22a. Halfway Point

ALO1-1 *Dry Lichen – Moss Open Alvar Pavement*
ALO1-3 *Dry-fresh Little Bluestem Open Alvar Meadow*
ALS1-1 *Common Juniper Shrub Alvar*

According to Brownell and Riley (2000), “West of the band office is a long opening containing mostly dry mesic Little Bluestem grassland but with some sections of pavement, Northern Dropseed wet mesic grassland and Common Juniper shrubland (P. Catling 1998 pers. comm.). [Small Skullcap], a rare species on Bruce alvars, is present here. Sections have a fair amount of [Canada Blue Grass] particularly in the western end, which is quite disturbed around some old farm buildings.”

Site 22b. Prairie Point

According to Schaefer (1996), the Prairie Point site “is a complex of expansive grasslands, separated from each other by narrow shrubland communities occurring on slightly raised ridges. One or more pavement communities occur at the site. The grasslands are impressive due to their size and the dominance of [Northern Dropseed] (generally well over 50% cover in the community, and in some grassland areas at 70% cover). [Flat-stemmed Spike-rush] is the only other significantly common species. The grasslands are very flat, and are likely periodically inundated over much of their area. The shrublands are drier and are dominated by [Fragrant Sumac], but have a diversity of shrub species present in significant amounts. [Northern Dropseed] is also found in this community type, as well as [Cooper’s Milk-vetch]. The pavement area surveyed is a significant expanse of limestone rock, and scattered [Shrubby Cinquefoil] shrubs and [Scirpus-like Sedge] and [Calamint] frequent in the sparse herbaceous cover.”

According to Brownell and Riley (2000), four community types have been described at Prairie Point: >81 ha of Tufted Hairgrass grassland, >51 ha of Little Bluestem grassland, >41 ha of Common Juniper shrubland, and >21 ha of Creeping Juniper-Shrubby Cinquefoil alvar pavement. Brownell (1998 pers. obs.) considers the majority of the grassland at Prairie Point to be Northern Dropseed - Compressed Spikerush wet mesic grassland. “Only a small portion of grassland is dominated by Little Bluestem or Tufted Hairgrass. The grassy pavement community described by Schaefer (1996) at observation point 5 does not contain Creeping Juniper and is best classified as Scirpus-like Sedge-Compressed Spikerush - Northern Dropseed pavement.”

ALO1-1 Dry Lichen – Moss Open Alvar Pavement

According to Brownell and Riley (2000), “A grassy pavement community with about 55% bare crumbly limestone, lichen and mosses is located close to the shore at Prairie Point. The herbaceous layer is about 45% with dominant herbs including [Scirpus-like Sedge, Flat-stemmed Spike-rush] and [Northern Dropseed]. About 13% [Shrubby Cinquefoil] is found.”

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow

According to Brownell and Riley (2000), “The moister grassland sections are dominated by Flat-stemmed Spike-rush and [Northern] Dropseed, while the drier portions are dominated by Canada Blue Grass and Little Bluestem. Wet mesic Northern Dropseed alvar grassland is the most prominent grassland type. [Northern Dropseed] (45-70% cover) and Flat-stemmed Spike-rush (10-25%) cover dominate. [Canada Blue Grass] ranges from 0-2%. The herbaceous layer is about 90%. [Shrubby Cinquefoil] ranges from 0-13% cover.”

ALS1-1 Common Juniper Shrub Alvar

Common Juniper - Fragrant Sumac - Hairy Beardtongue Alvar Shrubland Type (NHIC 2006)

According to Brownell and Riley (2000), “A central, mesic shrubland alvar...indicated by darker grey in the air photos of Prairie Point, is dominated by [Common Juniper], [Downy Arrowwood] (15% cover each) and [Fragrant Sumac] (20% cover). The herbaceous layer is 30% and includes [Northern Dropseed] and [Poverty Oat Grass].

Site 22c. Little Prairie (Harbour Point, Porcupine Point, Partridge Point, Pine Tree Point)

According to Schaefer (1996), “Several grassland pockets were observed on day when data could not be collected. These were west along the shore from Harbour Point and were very small but superb in quality - wetter ones were dominated by [Northern Dropseed] and [Tuberous Indian-plantain] and the drier ones by [Little Bluestem].”

According to Brownell and Riley (2000), “A large open area northwest of MacGregor Bay contains pockets of [Northern Dropseed, Little Bluestem and Tufted Hairgrass], but is mostly dominated by [Canada Blue Grass, Creeping Bent Grass, Canada Goldenrod and Calico Aster]. It was probably at one time good alvar, but is now in fair to poor condition and may best be described as old field. Successional shrubland dominated by [Downy Arrowwood, Fragrant Sumac] and ash saplings occurs along the western edge of the large opening. Little Bluestem and Tufted Hairgrass are dominant herbs.”

Condition

All communities surveyed at Prairie Point were ranked as in excellent or excellent to good condition by the IACI and Brownell and Riley (2000) except for some areas of degraded alvar in the north end of the site. Some residential buildings occur just north of the surveyed area and to the south. The small centre of the community is north of the surveyed area (Schaefer 1996).

According to Schaefer (1996), “Exotic flora generally restricted to roadside at east end of surveyed area, except for [Canada Blue Grass] which comprises approximately 5% cover (some areas completely native and others with higher than 5% cover of [Canada Blue Grass]). An old track is present. A small dump site, likely where fishing nets are sometimes emptied (some rotting fish and dead cormorants likely caught in nets) at end of a track from the road.”

In the late 1990’s the Band was considering moving its pow-wow grounds to the Prairie Point alvar, and heavy equipment was used to construct a driveway to the site. After meeting on-site with OMNR staff, this decision was reversed or deferred. Apparently, this move is again being considered or has already been undertaken (Riley pers. comm. 2005).

The small, moist alvar patches near the shoreline at Porcupine Point (near Little Prairie) were not disturbed, but the drier grassland expanses inland have been grazed in the past and are according to Brownell and Riley (2000), probably best described as “old field.”

The alvars at Halfway Point Sections have a fair amount of Canada Blue Grass, suggesting past disturbance, particularly in the western end, which is quite disturbed around some old farm buildings (Brownell and Riley 2000).

Diversity

Although inventory work has been limited at Cape Croker, it is evident that the alvars there support moderate community diversity and high species diversity. The Prairie Point alvar alone supports at least 106 vascular plant taxa, of which 91 are native to Ontario and 19 display an affinity to alvars in the province.

Ecological Functions

According to Varga (1995), “The Cape Croker First Nation area is a major portion of a long, naturally vegetated woodland corridor stretching for 49 km along the Niagara Escarpment from Barrow Bay to Warton. It includes such core natural areas as Hope Bay Forest, Cape Dundas and Barrow Bay South. This escarpment corridor is part of a regional woodland extending to the Lake Huron shore of the Bruce Peninsula, comprising about 35,000 ha. On the west shore, the mega-woodland links such important natural areas as Sucker Creek, Howdenvale Bay and Black Creek Swamp. Cape Croker's location in the midst of this regional woodland and its large size result in the provision of habitat for a diversity of 24 forest-interior bird species and 7 raptor species.” Situated along the coast of the Bruce Peninsula, the area is undoubtedly an important refuge for migrating land and water birds following the coast in the spring and fall.

Special Features

In addition to the provincially significant taxa described below, the open bedrock habitats at Cape Croker support such western prairie species such as Little Bluestem, Prairie Dropseed, Scirpus-like Sedge and Fragrant Sumac and such alvar species as False Pennyroyal, Small Skullcap and Flat-stemmed Spike-rush (Varga 1995). Eight of the site's vascular plant taxa are considered rare or very uncommon on the Bruce Peninsula (BGPC 2003).

Gattinger's Agalinis *Agalinis gattingeri* COSEWIC-END, OMNR-END G4S2
The endangered Gattinger's Agalinis has recently been confirmed as occurring at Cape Croker (Canne-Hilliker 1998). According to NHIC (2006), there are "lots of plants (probably > 1000) observed by Joe Johnson (pers. comm. to M.J. Oldham, 10 Oct. 2000)." The habitat is described as "dampish, natural calcareous prairie (+/- an alvar)" (Canne-Hilliker, 1998), "based on an observation by Joseph W. Johnson" (NHIC 2006). Exact UTM co-ordinates are not available for this record, but the population could probably be re-found by consulting with the original observer, J. Johnson.

Tuberous Indian-plantain *Arnoglossum plantagineum* COSEWIC-SC G4S3
According to Brownell and Riley (2000), the population of Tuberous Indian-plantain at Prairie Point and Porcupine Point numbers approximately 1000 plants, one of the largest populations on Bruce Peninsula alvars.

Cooper's Milk-vetch *Astragalus neglectus* G3S3
According to Brownell and Riley (2000) and Schaefer (1996), there is a population of fewer than 50 plants of Cooper's Milk-vetch at Prairie Point. Elsewhere at Cape Croker there is ample suitable habitat for this species, and it is in the author's opinion the population is probably substantially greater.

Grooved Yellow Flax *Linum sulcatum* G5S3
The provincially rare Grooved Yellow Flax is reported for the alvar grassland at Prairie Point by Schaefer (1996). No population count is provided.

Hill's Thistle *Cirsium hillii* COSEWIC-THR, OMNR-THR G3S3
There is a pre-1949 report of Hill's Thistle for Cape Croker (Varga 1995, NHIC 2006), but no details are available on this record. The site has ample suitable habitat for this species, which often occurs in shallow sandy soils within or near alvars.

Northern Dropseed *Sporobolus heterolepis* G5S3
According to Brownell and Riley (2000), the population of the provincially rare Northern Dropseed (G5S3) at Prairie Point and Porcupine Point numbers in the hundreds of thousands. The species is dominant over large areas of the Prairie Point alvar and parts of the Porcupine Point alvars.

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3S3
Several individual of Massasauga rattlesnakes were reported in the 1981-1984 period from the Cape Croker First Nation (NHIC 2006). No habitat information is available, but

there is strong likelihood that the species, if extant, at least occasionally occurs on the alvars of the site.

Conclusions and Recommendations

Evaluation and Significance

According to Riley *et al.* (1996), "The Cape Croker area has excellent representation of such Niagara Escarpment features as escarpment promontories, with extensive rims, cliffs, talus and bedrock plains, minor re-entrant valleys, bedrock-based terraces, and shale slopes and plains. Cape Croker has the most extensive escarpment shale slopes on the Bruce Peninsula. Little Prairie sustains one of the largest shore alvars on the Georgian Bay side of the Bruce Peninsula."

According to Brownell and Riley (2000), "The alvar communities at Cape Croker are extensive and contain the highest quality examples of Northern Dropseed alvar grassland, Fragrant Sumac – Common Juniper alvar shrubland and herbaceous pavement in the Bruce Peninsula physiographic region, site district 6-4."

Threats

Potential threats to the alvar habitats of the site include construction of buildings, driveways, roads, off-road vehicle use, grazing and trampling of vegetation. The current status of such threats is not fully known.

Management

The Nawash First Nation should be provided information to assist them with the stewardship of the significant alvar habitats on their lands.

Future Inventory Needs

If the Nawash First Nation is interested, further inventories and monitoring of alvar habitats and alvar species-at-risk populations should be undertaken at Cape Croker. Background information, ecological expertise and outside funding may be provided to the band to assist with such inventories and monitoring.

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Site #: 22a,22b,22c
Site Name: Halfway Point,
Prairie Point, The Little Prairie
Meta Site Name: Cape Croker



Vascular Plants of the (Cape Croker) Prairie Point Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	22d ALOI-3	22d ALSI-1	22d ALOI-1
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X		
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X		
<i>Pinus banksiana</i> Lambert	Jack Pine	G5	S5			X	33		X		
<i>Pinus strobus</i> L.	White Pine	G5	S5			X	33		X		
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34		X	X	
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X	
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X		
<i>Anemone cylindrica</i> A. Gray	Long-fruited Thimbleweed	G5	S4			X	130			X	
<i>Anemone virginiana</i> L. var. <i>virginiana</i>	Thimbleweed	G5	S5			X	130			X	
<i>Ranunculus acris</i> L.	Common Buttercup	G5	SE5			XI	130		X		
<i>Quercus rubra</i> L.	Northern Red Oak	G5	S5			X	163		X		
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165			X	
<i>Polygonum</i> sp.	Knotweed					X	179		X		
<i>Rumex crispus</i> L.	Curly Dock	G?	SE5			XI	179		X	X	
<i>Hypericum kalmianum</i> L.	Kalm's St. John's- wort	G4	S4			X	200	M	X		
<i>Hypericum perforatum</i> L.	Common St. John's- wort	G?	SE5			XI	200		X		X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X		
<i>Salix discolor</i> Muhlenb.	Pussy Willow	G5	S5			X	234		sp		
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X	
<i>Agrimonia</i> cf. <i>gryposepala</i>	Agrimony	G5	S5			X	277			X	
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex R. R	Saskatoon-berry	G5	S4?			X	277	M	X	X	
<i>Crataegus</i> sp.	Hawthorn					X	277		X	X	
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X	X	
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X	X
<i>Potentilla recta</i> L.	Rough-fruited Cinquefoil	G?	SE5			XI	277		X	X	
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X		
<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry	G5T?	S5			X	277		X	X	
<i>Rosa blanda</i> Aiton	Smooth Wild Rose	G5	S5			X	277		X		
<i>Astragalus canadensis</i> L.	Canada Milk-vetch	G5	S4			R	285			X	
<i>Lotus corniculatus</i> L.	Birdfoot Trefoil	G?	SE5			XI	285		X		
<i>Melilotus alba</i> Medicus	White Sweet-clover	G?	SE5			XI	285		X		
<i>Melilotus officinalis</i> (L.) Pallas	Yellow Sweet-clover	G?	SE5			XI	285			X	
<i>Trifolium pratense</i> L.	Red Clover	G?	SE5			XI	285		X	X	
<i>Vicia cracca</i> L.	Cow Vetch	G?	SE5			XI	285			X	
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286			X	
<i>Oenothera biennis</i> L.	Hairy Yellow Evening-primrose	G5	S5			X	301		X		
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X		
<i>Linum sulcatum</i> Riddell var. <i>sulcatum</i>	Grooved Yellow Flax	G5T5	S3			R	345		X		

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	22d ALO1-3	22d ALS1-1	22d ALO1-1
<i>Rhus aromatica</i> Aiton	Fragrant Sumac	G5	S%			R	361	M	X	X	
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		X	X	
<i>Daucus carota</i> L.	Wild Carrot	G?	SE5			XI	374		X		
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378		X		
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379			X	
<i>Solanum dulcamara</i> L.	Climbing Nightshade	G?	SE5			XI	382		X		
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X		X
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392			X	
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X		
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H	X		
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E	X		
<i>Fraxinus pennsylvanica</i> Marshall	Red/Green Ash	G5	S5			X	398		X		
<i>Agalinis gattingeri</i>	Gattinger's Agalinis	G4	S2	E	E	X	399	H	**		
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X		
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X		
<i>Veronica peregrina</i> L. s.l.	Purslane Speedwell	G5T?	S5			R	399		X		
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X		
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411		X		
<i>Houstonia longifolia</i> Gaertner	Long-leaved Houstonia	G4G5	S4?			X	416		X		
<i>Diervilla lonicera</i> Miller	Bush-honeysuckle	G5	S5			X	418			X	
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X		
<i>Symphoricarpos albus</i>	Snowberry	G5	S5			X	418			X	
<i>Viburnum rafinesquianum</i> Schultes	Downy Arrow-wood	G5	S5			X	418		X	X	
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			C	423		X		
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	G5	S5			X	423		X		
<i>Antennaria</i> sp.	Pussytoes species	G5	S5			X	423		X	X	
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X	
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X		
<i>Erigeron strigosus</i> Muhlenb. ex Willd.	Spreading Fleabane	G5	S5			X	423			X	
<i>Hieracium</i> sp.	Hawkweed species	G?	SE5			XI	423		X		
<i>Prenanthes racemosa</i> Michaux	Smooth White- lettuce	G5T?	SU			X	423		X		
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X		X
<i>Solidago juncea</i>	Early Goldenrod	G5	S5			X	423		X		
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X	X	
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X	X
<i>Juncus alpinoarticulatus</i> Chaix	Alpine Rush	G5	S5			X	455		X		X
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455		X		
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455		X		
<i>Carex aurea</i> Nutt.	Golden-fruit Sedge	G5	S5			X	457		X		
<i>Carex bebbii</i> (L. Bailey) Olney ex Fern.	Bebb's Sedge	G5	S5			X	457			X	
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X		X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X	

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	22d ALO1-3	22d ALS1-1	22d ALO1-1
<i>Carex granularis</i> Muhlenb. ex Willd.	Meadow Sedge	G5	S5			X	457		X		
<i>Carex lasiocarpa</i> Ehrh.	Hairy-fruited Sedge	G5	S5			X	457		X		
<i>Carex merritt-fernaldii</i> Mackenzie	Merritt-Fernald's Sedge	G5	S5			X	457		cf.		
<i>Carex pellita</i> Muhl.	Woolly Sedge	G5	S5			X	457		X		
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X		X
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457		X		
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E	X		X
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X		
<i>Bromus kalmii</i> A. Gray	Kalm's Brome	G5	S4			R	458	M	X		
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv	Canada Blue-joint	G5	S5			X	458		X		
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X	
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X		X
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X	X	
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X		
<i>Panicum virgatum</i> L.	Switch Grass	G5	S4			X	458		X		
<i>Phleum pratense</i> L.	Timothy	G?	SE5			XI	458		X	X	
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	X	
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X		
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	Prairie Dropseed	G5	S3			X	458	E	X	X	X
<i>Sporobolus vaginiflorus</i> or <i>S. neglectus</i>	Dropseed	G5	S4			X	458		X		
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475			X	
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475		X		
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476		X		
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X		X
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		X		
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	G5	S5			X	489		X		

Non-vascular Plants of the (Cape Croker) Prairie Point Alvar

TAXON	NAME	GRANK	SRANK	22d ALO1-3	22d ALS1-1	22d ALO1-1
A	<i>Gloeocapsa alpina</i>			X	X	X
A	<i>Nostoc commune</i>			X		
B	<i>Fissidens</i> sp.			X		
B	<i>Tortella</i> sp.	G4G5	S4	sp.	sp.	
L	<i>Catapyrenium lachneum</i>	G5	S?	X		
L	<i>Cladina</i> sp.	G5	S5	sp.	sp.	
L	<i>cf. Cladonia symphycarpa</i>	G3G5	S?	cf.		
L	<i>Placynthium nigrum</i>	G?	S5?	X	X	

Site 25. PIKE BAY

Bruce County, South Bruce Peninsula (formerly Albermarle Township)

NTS Map: 41A/14

NAD83 UTM 17T 473500 4970200

Ownership: Private

Protection: Lyal Island Provincial Nature Reserve (100%)

Survey Dates (Surveyors): August 11, 1995 (C. Schaefer); August 23, 1998 (V. Brownell)

Total Extent of Alvar: 3.4 ha (surveyed), 3.3 (unsurveyed)

Overall Alvar Quality Rank: A

Directions: From Highway 6 turn west along Pike Bay Road. 750 m past the general store, alvar habitat will appear on the north side of the road. There is a path from the back of this alvar opening to a larger alvar grassland, which is best located with the assistance of air photos. Landowner permission must be obtained to access this site.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
25. Pike Bay	Dvvp	Schaefer 1995 (IACI air photo)	2	12	62 (59)	10

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Approximately 1.5 east of the Lake Huron shore north of Pike Bay Road are high-quality alvar patches on the bedrock plain amidst White Cedar-dominated forests and woodlands.

Alvar Representation

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow

ALT1-4 Jack Pine – White Cedar – White Spruce Treed Alvar

According to Schaefer (1995), the main alvar area at Pike Bay consists of “a dolostone pavement flat (alvar pavement community) dominated by [False Pennyroyal] and [Little Bluestem] to a much lesser degree. [Creeping Juniper] is abundant over the unbroken pavement and [Shrubby Cinquefoil] is common in places. Slight depressions in the topography of the bedrock have standing water after heavy or moderate rains, and in spring. The majority of the alvar is described as alvar grassland savanna, with an incomplete herbaceous layer between trees (20% exposed bedrock on average). The dominant herbs change between areas: at times [False Pennyroyal] at 40%, some places with [Tufted Hairgrass] at 30%, and in some areas [Richardson’s Sedge] is a sole dominant at 35% cover. [Yellow Sedge] and [Crawe’s Sedge] are common. Trees are mostly [White Cedar], with [White Spruce] secondary. Shrub layer is approximately 25% overall, but mostly [Creeping Juniper] and [Bearberry].”

Condition

According to Schaefer (1995), “there is the odd occurrence of an introduced species, but their presence is minimal. The only other disturbance, which is also minimal, is the presence of a snowmobile route [possibly occasionally used by ATVs]. The owner was asked for permission for a route but denied it, and it was erected anyway.” Brownell and Riley (2000) also considered the habitat quality to be excellent, based on Brownell’s 1998 site visit.

Diversity

The Pike Bay site’s two alvar community types sustain 62 vascular plant taxa, of which 59 taxa are native and 12 are largely restricted to alvar habitats in Ontario. Schaefer (1995) documented high non-vascular plant diversity at this alvar, with 30 bryophyte and 22 lichen taxa recorded, including several considered provincially rare to very rare.

Ecological Functions

The Pike Bay alvars occur as small patch communities in a relatively unfragmented mixed and coniferous forest matrix covering much of the western part of the Bruce Peninsula. Ecosystem functions are largely intact in this area.

Special Features

For a site of its size, the Pike Bay Alvar has a remarkably high component of 10 provincially extremely rare to rare species, based on a single site visit by Schaefer (1995). These include three taxa designated as threatened in Canada and Ontario.

Massasauga *Sistrurus catenatus* COSEWIC-THR, MNR-THR G4T3S3
Schaefer (1995) and Brownell and Riley (2000) report Massasauga rattlesnake for the Pike Bay alvar site, but no additional details are provided. The surrounding areas provide ample habitat for this threatened species.

Hill's Thistle *Cirsium hillii* COSEWIC-THR, OMNR-THR G3S3
Schaefer (1995) found (at least) 31 Hill’s Thistle plants, six of them flower and three in seed, in a 10 m² area at the Pike Bay alvar. The habitat is described as “very shallow dolostone...in open woods which are part of an alvar grassland savannah. These dry, more wooded areas generally occur where the bedrock is slightly higher than surrounding areas.” A healthy population of Hill’s Thistle appears to persist at the site.

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR, OMNR-THR G3S3
Schaefer (1995) found two separate populations of approximately 1,000-2,000 and 100-200 shoots of Dwarf Lake Iris within and along the fringes of shadier, cooler, deeper-soiled treed groves of spruce and cedar within the alvar grassland community at the Pike

Bay alvar. The species was dominant in this microhabitat, but not found in more open areas of the alvar.

Schaefer (1995) documented an outstanding total of two provincially very rare lichen species and five provincially very rare to rare moss species at the Pike Bay alvar during surveys of the International Alvar Conservation Initiative (IACI). The following non-vascular flora occur:

<i>Caloplaca ammiospila</i>	A Lichen	G4G5 S1
<i>Psora decipiens</i>	A Lichen	G? S1S2
<i>Brachythecium calcareum</i>	A Moss	G3G4 S2
<i>Pseudocalliergon turgescens</i>	A Moss	G3G5 S2
<i>Tortella inclinata</i>	A Moss	G4G5 S2
<i>Mannia fragrans</i>	A Moss	G5 S3?
<i>Pseudocalliergon turgescens</i>	A Moss	G3G5 S2

Conclusions and Recommendations

Evaluation and Significance

Brownell and Riley (2000) did not consider the Pike Bay Alvar provincially significant because “Cape Croker also occurs in this site district.” However, Pike Bay is the only documented site in Ecodistrict 6E-4 sustaining the “scrub conifer – Dwarf Lake Iris Shrub Alvar” community type. The community is virtually undisturbed, and is sizeable at 10 ha. It occurs as a small patch community in a relatively intact bedrock forest matrix and sustains populations of at least four provincially rare taxa. Thus, the Pike Bay Alvar scores well on four of five standard evaluation criteria (representation, condition, ecological functions and special features) and should be considered provincially significant.

Threats

The presence of a snowmobile trail, which may also be used by off-road vehicles, is probably the greatest threat to the integrity of the alvar community. Logging of adjacent forests and trees within the alvar are another potential threat. The current status of the snowmobile trail and overall site condition is unknown.

Management

The current landowner is to be commended for his/her custodianship of the site, and should be provided with information on the significance and stewardship of alvar habitats. Provincial life science ANSI status should be considered for this site.

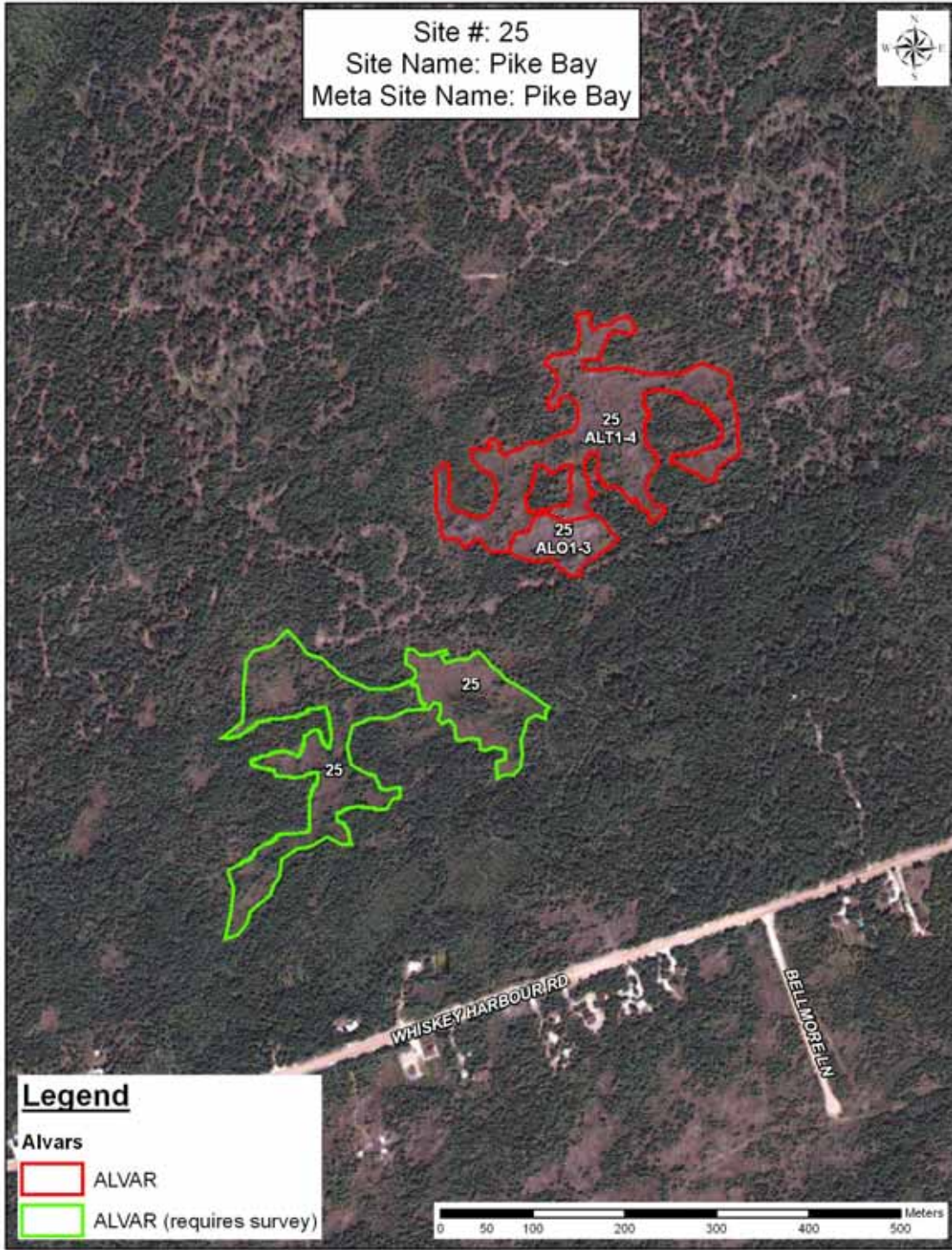
Future Inventory Needs

1. The Pike Bay alvar site would benefit from an overall life science inventory.
2. Faunal surveys should be undertaken.
3. Monitoring of rare species populations, their habitat quality and potential threats, including damage to vegetation along the trail through the site.

References

Brownell, V.R., and J.L. Riley. 2000. *The Alvars of Ontario: Significant Alvar Natural Areas in the Ontario Great Lakes Region*. Federation of Ontario Naturalists, Don Mills, Ontario. 269 pp.

Schaefer, C. 1995. Pike Bay Alvar. International Alvar Initiative Forms, on file, Natural Heritage Information Centre, Peterborough.



Vascular Plants of the Pike Bay Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	25 ALOI-3	25ALS1-3
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33			X
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X	
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X	X
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34		X	X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34			X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165			X
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X	
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X	
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200			X
<i>Salix</i> sp.	Willow species	G5	S5			X	234		X	
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X	X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277			X
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X	X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286			X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	X
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	G5	S5			X	350			X
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water- horehound	G5	S5			X	392		X	X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X	X
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E	X	X
<i>Fraxinus nigra</i>	Black Ash	G5	S5			X	398		X	
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X	X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S5			X	399			X
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X	
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X	X
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411			X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X	X
<i>Symphoricarpos albus</i>	Snowberry	G5	S5			X	418			X
<i>Aster ciliolatus</i> Lindley	Fringed Blue Aster	G5	S5			X	423			X
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X
<i>Hieracium</i> sp.	Hawkweed species	G?	SE5			XI	423			X
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423			X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X	X
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423			X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423			X
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455			X
<i>Juncus nodosus</i> L. var. <i>nodosus</i>	Knotted Rush	GT	S5			X	455			X
<i>Carex aurea</i> Nutt.	Golden-fruit Sedge	G5	S5			X	457		X	
<i>Carex castanea</i>	Chestnut Sedge	G5	S5			X	457			X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X	X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X	X
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X	X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	25 ALO1-3	25ALS1-3
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E		X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	X
<i>Carex umbellata</i> Schkuhr ex Willd.	Umbellate Sedge	G5	S5			R	457			X
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E	X	X
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H	X	X
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X	
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458		X	X
<i>Sporobolus vaginiflorus</i> (Torrey ex A. Gray)	Ensheathed Dropseed	G5	S4			X	458		X	X
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475		X	
<i>Maianthemum racemosum</i>	False Solomon's-seal	G5	S5			X	475			X
<i>Polygonatum pubescens</i>	Solomon's-seal	G5	S5			X	475			X
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476			X
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489			X
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	G5	S5			X	489		X	

Non-vascular Plants of the Pike Bay Alvar

A = Algae, B = Bryophytes (mosses), L = Lichens

TAXON	NAME	GRANK	SRANK	25 ALO1-3	25 ALS1-3
A	<i>Gloeocapsa alpina</i>			X	X
A	<i>Nostoc commune</i>				cf.
A	<i>Nostoc</i> sp.			X	
A	<i>Trentepohlia annulata</i>	T	T	X	X
B	<i>Brachythecium calcareum</i>	G3G4	S2		X
B	<i>Bryum pallescens</i>	G5	S4		X
B	<i>Bryum pseudotriquetrum</i>	G5	S5		X
B	<i>Bryum</i> sp.				X
B	<i>Campylium chrysophyllum</i>	G5	S5		X
B	<i>Campylium</i> sp.				X
B	<i>Dicranum polysetum</i>	G5	S5		X
B	<i>Dicranum scoparium</i>	G5	S5		X
B	<i>Dicranum viride</i>	G5	S5		X
B	<i>Ditrichum flexicaule</i>	G5	S5	X	X
B	<i>Encalypta procera</i>	G4G5	S5		X
B	<i>Evernia mesomorpha</i>	G5	S5?		X
B	<i>Fissidens adianthoides</i>	G5	S5		X
B	<i>Fissidens</i> sp.			X	
B	<i>Mannia fragrans</i>	G5	S3?		X
B	<i>Myurella julacea</i>	G5	S5		X
B	<i>Pleurozium schreberi</i>	G5	S5		X
B	<i>Preissia quadrata</i>	G5	S5	X	X
B	<i>Pseudocalliergon turgescens</i>	G3G5	S2	X	

TAXON	NAME	GRANK	SRANK	25 ALO1-3	25 ALS1-3
B	<i>Radula complanata</i>	G4?	S4		X
B	<i>Riccia sorocarpa / Mannia fragrans</i>			X	
B	<i>Schistidium apocarpum</i>	G5	S5	X	
B	<i>Schistidium rivulare</i>	G4G4	S5	X	X
B	<i>Thuidium delicatulum var. radicans</i>	G5	S5		X
B	<i>Thuidium recognitum</i>	G5	S5	X	X
B	<i>Tortella fragilis</i>	G4G5	S4	X	X
B	<i>Tortella humilis</i>	G5	S4		X
B	<i>Tortella inclinata</i>	G4G5	S2	X	cf.
B	<i>Tortella tortuosa</i>	G5	S5	X	X
B	<i>Tortula ruralis</i>	G5	S5		sp.
L	<i>Acarospora glaucocarpa</i>	G5?	S4?		cf.
L	<i>Caloplaca ammiospila</i>	G4G5	S1	X	
L	<i>Catapyrenium lachneum</i>	G5	S?	X	
L	<i>Cetraria arenaria</i>	G4	S4?	X	
L	<i>Cladina rangiferina</i>	G5	S5	X	
L	<i>Cladina stellaris</i>	G5	S4?		sp.
L	<i>Cladonia chlorophaea</i>	GU	S5	X	X
L	<i>Cladonia coniocraea</i>	G5	S5		sp.
L	<i>Cladonia pyxidata</i>	G5	S5	X	X
L	<i>Cladonia subradiata</i>	T	T		X
L	<i>Cladonia symphyocarpa</i>	G3G5	S?	X	X
L	<i>Collema coccophorum</i>	G3G5	S?	sp.	
L	<i>Hypogymnia physodes</i>	G5	S5		X
L	<i>Peltigera canina</i>	G5	S5?	X	X
L	<i>Placynthium nigrum</i>	G?	S5?	X	
L	<i>Protoblastenia rupestris</i>	G?	S5?	X	X
L	<i>Psora decipiens</i>	G?	S1S2	X	X
L	<i>Thelidium cf. absconditum</i>	T	T		X
L	<i>Thelidium sp.</i>			X	
L	<i>Toninia sedifolia</i>	G?	S?	X	
L	<i>Xanthoparmelia somloensis</i>	G5	S5?	X	
L	<i>Xanthoria elegans</i>	G3G5	S5?	X	

Site 26. SHOAL COVE

Bruce County, Northern Bruce Peninsula (formerly Eastnor Township)

NTS Map: 41A/14

NAD83 UTM 17T 489100 4975000

Ownership: Private

Protection: Hope Bay Forest Area of Natural and Scientific Interest (ANSI) (100%)

Survey Dates (Surveyors): summer 1992 (S. Varga, B. Larson, C. Schaefer, part of overall life science inventory of ANSI)

Total Extent of Alvar: 6 ha

Overall Alvar Quality Rank: current condition unknown, but probably B to C

Directions: Follow Jackson Cove Road east from County Road 9, bearing right at the T-intersection, down to Jackson Cove. Turn left at the bottom of the steep hill and follow road to the end. With landowner permission, the alvars can be accessed from here by walking southwest.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
26. Shoal Cove	Dvp	Jalava <i>et al.</i> 1994 (OBM)	2 (4)	8	84-95 (67-71)	0

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

Alvars at Shoal Cove occur on a shore terrace of Manitoulin Formation dolostone, amongst bedrock and cobble shoreline meadow marshes, treed swamps and thicket swamps at the base of the Niagara Escarpment on the Cape Dundas Peninsula (Jalava *et al.* 1994). The site is within the Hope Bay Forest Life Science ANSI. The associated shingle spit complex is a provincially significant geological formation (Kor 1992).

Alvar Representation

Four alvar types have been found at Shoal Cove (Jalava *et al.* 1994), although only two are greater than the 0.5 ha threshold used to define vegetation communities in Ontario. The two types marked with an asterisk (*) below each cover only approximately 0.2 ha.

<i>ALO1-1</i>	<i>Dry Lichen – Moss Open Alvar Pavement</i>
<i>ALO1-3</i>	<i>Dry-fresh Little Bluestem Open Alvar Meadow*</i>
<i>ALO1-4</i>	<i>Dry-fresh Poverty Grass Open Alvar Meadow</i>
<i>ALO1-5</i>	<i>Fresh – Moist Tufted Hairgrass Open Alvar Meadow*</i>

According to Jalava *et al.* (1994), “Several alvars occur in the Shoal Cove area, near the Georgian Bay shore. Sandy loam soils are...prevalent at these sites...but the soil depth is always less than 15 cm. Moisture is generally dry mesic. The ice-heaved bedrock is highly fractured, and large numbers of granite erratics are present....

“Switchgrass, Tufted Hairgrass, Little Bluestem, Balsam Ragwort and Canada Blue Grass are the dominant species. Common secondary herbs include Ensheathed Dropseed, Poverty Oat Grass, Heal-all, Yarrow, Rough Fleabane, Ox-eye Daisy, Common Buttercup, Balsam Ragwort and Wild Strawberry...Scattered Red Ash trees and saplings are often common. Other tree and sapling species often present are White Cedar, White Ash and White Elm, in order of frequency. Shrubs are sparse, with the most common species being Shrubby Cinquefoil, Common Juniper and Creeping Juniper.”

Condition

According to Jalava *et al.* (1994), some of the Shoal Cove alvar patches “have been disturbed and contain a high number of alien plant species, but will undoubtedly eventually return to natural alvar conditions if protected.” According to Schaefer (1996), “This alvar is significantly separated from other alvars on the Bruce, and may be interesting because of this. It was inventoried for the MNR as part of the Hope Bay ANSI. There is some disturbance in that there is an old road traversing through part of the alvar. There is almost no activity there at present (it would seem).”

Diversity

The vascular plant list in Jalava *et al.* (1994) does not differentiate between species occurring on alvars and those occurring on rock barrens at the Hope Bay Forest ANSI, so an exact figure was not available (community-specific data are on-file at the Natural Heritage Information Centre in Peterborough). In any case, the alvar communities are diverse, with four different types occurring in a small area. Between 67 and 71 native plant species occur on them, of which 8 show an affinity to alvar habitats in Ontario.

Ecological Functions

According to Jalava *et al.* (1994), “The Hope Bay Forest ANSI is part of a highly significant continuous natural area encompassing the Cape Dundas Peninsula and including the regionally significant ANSIs at Cape Dundas and Barrow Bay South. This area includes 15 km of escarpment slopes and shorelines and a block of escarpment plain forest, approximately 30 square km in size.” With minor breaks, this area is part of a 380 square km primarily natural area extending southwest to the Lake Huron shore. Small watersheds are protected within the Hope Bay Forest ANSI, and the area undoubtedly serves as a refuge for birds migrating along the coast of the Bruce Peninsula, and as a corridor for the movement and genetic dispersal of terrestrial flora and fauna.

Special Features

No provincially rare flora or fauna were documented by Jalava *et al.* (1994) at the Shoal Cove alvar. However, the site warrants a search for the endangered Gattinger’s Agalinis, which has been documented in similar habitat at nearby Barrier Island and Cape Croker. The site’s locally significant plant species include False Pennyroyal and Small Skullcap.

Conclusions and Recommendations

Evaluation and Significance

The Shoal Cove alvars are part of the provincially significant Hope Bay Forest ANSI (Jalava *et al.* 1994), and the shoreline terrace – shingle spit complex on which the alvars occur are provincially significant from an earth science perspective (Kor 1992). The site provides the best representation of Poverty Grass alvar in Ecodistrict 6E-4.

Threats

Shoreline cottage development and associated impacts are the primary threat to this alvar. Because of its natural heritage significance and ANSI designation and the high level of sensitivity of the habitats, it is unlikely that development would be approved on or near the alvars. However, trampling by foot-traffic, vehicle access, dumping of fill, planting of gardens or lawns, and domestic pets are difficult to control in situations such as this and could pose a serious threat to the alvar and associated habitats.

Management

It is recommended that the private landowner(s) of the Shoal Cove alvar be provided with information on the significance, environmental sensitivity and stewardship of alvars.

Future Inventory Needs

1. The Hope Bay alvar site would benefit from an inspection of the current habitat quality and future monitoring.
2. A search for the endangered Gattinger's Agalinis should be undertaken.
3. An updated survey of the alvar using IACI standards would be valuable.
4. Invertebrate fauna and non-vascular plants have not been surveyed at the site.

References

- Jalava, J.V., B. Larson, C.A. Schaefer and S. Varga. 1994. Biological Inventory and Evaluation of the Hope Bay Forest Provincial Nature Reserve and Area of Natural and Scientific Interest. Ontario Ministry of Natural Resources, Southern Region, Aurora. OFER 50523. vii + 110 pp. + maps.
- Kor, P.S.G. 1992. An Earth Science Inventory and Evaluation of the Hope Bay Forest Area of Natural and Scientific Interest; Ontario Ministry of Natural Resources, Southern Region, Aurora, Open File Geological Report 9204, 53 pp.
- Schaefer, C. 1996. Report for the Alvar Initiative Project on Potential Bruce Peninsula Alvar Sites for Further Investigation. Manuscript. 7 pp + air photos and maps.



Vascular Plants of the Shoal Cove Alvars

X (upper case) = very likely occurs on alvar; x (lower case) = possibly occurs on alvar, but may have been recorded only on rock barrens elsewhere in the Hope Bay Forest ANSI (Jalava *et al.* 1994)

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	26 ALO1
<i>Equisetum arvense</i> L.	Field Horsetail	G5	S5			X	5		X
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	G5T	S5			X	16		X
<i>Asplenium trichomanes</i> L.	Maidenhair Spleenwort	G5	S5			X	19		x
<i>Cystopteris bulbifera</i> (L.) Bernh.	Bulblet Fern	G5	S5			X	20		X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X
<i>Anemone cylindrica</i> A. Gray	Long-fruited Thimbleweed	G5	S4			X	130		X
<i>Ranunculus acris</i> L.	Common Buttercup	G5	SE5			XI	130		X
<i>Ulmus americana</i> L.	American Elm	G5?	S5			X	151		X
<i>Rumex crispus</i> L.	Curly Dock	G?	SE5			XI	179		x
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X
<i>Populus balsamifera</i> L.	Balsam Poplar	G5T?	S5			X	234		X
<i>Populus grandidentata</i> Michaux	Large-toothed Aspen	G5	S5			X	234		x
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234		X
<i>Salix petiolaris</i> J.E. Smith	Slender Willow	G4	S5			X	234		X
<i>Arabis glabra</i>	Tower-mustard	G5	S5			X	237		X
<i>Lepidium campestre</i> (L.) R. Br.	Field Pepper-grass	G?	SE5			XI	237		X
<i>Ribes cynosbati</i> L.	Prickly Gooseberry	G5	S5			X	269		x
<i>Sedum acre</i> L.	Mossy Stonecrop	G?	SE5			XI	274		X
<i>Fragaria vesca</i> L. ssp. <i>americana</i>	Woodland Strawberry	G5T?	S5			X	277		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X
<i>Malus pumila</i> Miller	Apple	G5	SE5			XI	277		X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X
<i>Potentilla recta</i> L.	Rough-fruited Cinquefoil	G?	SE5			XI	277		X
<i>Prunus pennsylvanica</i> L.f.	Pin Cherry	G5	S5			X	277		X
<i>Prunus serotina</i> Ehrh.	Wild Black Cherry	G5	S5			X	277		x
<i>Prunus virginiana</i> L.	Choke Cherry	G5T?	S5			X	277		X
<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i>	Wild Red Raspberry	G5	S5			X	277		X
<i>Lotus corniculatus</i> L.	Birdfoot Trefoil	G?	SE5			XI	285		x
<i>Medicago lupulina</i> L.	Black Medick	G?	SE5			XI	285		x
<i>Medicago sativa</i> L. ssp. <i>sativa</i>	Alfalfa	G5	SE5			XI	285		x
<i>Trifolium</i> sp.	Clover species	G?	SE5			XI	285		x
<i>Vicia cracca</i> L.	Cow Vetch	G?	SE5			XI	285		X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286		X
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	G5	S5			X	307		x
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		X
<i>Daucus carota</i> L.	Wild Carrot	G?	SE5			XI	374		x
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378		X
<i>Hackelia deflexa</i> (Wahlenb.) Opiz	Stickseed	G5	S5			X	390		X
<i>Acinos arvensis</i> (Lam.) Dandy	Basil Balm	G5	SE5			XI	392		X
<i>Clinopodium vulgare</i> L.	Wild Basil	G?	S5			X	392		X
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X
<i>Mentha X piperita</i> L.	Peppermint	G?	SE5			XI	392		X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	26 ALOI
<i>Nepeta cataria</i> L.	Catnip	G?	SE5			XI	392		X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H	X
<i>Trichostema brachiatum</i> L.	False Pennyroyal	G4G5	S4			R	392	E	X
<i>Fraxinus americana</i> L.	White Ash	G5	S5			X	398		x
<i>Fraxinus pennsylvanica</i> Marshall	Red/Green Ash	G5	S5			X	398		X
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X
<i>Veronica anagallis-aquatica</i> L.	Water Speedwell	G5	SE5			XI	399		X
<i>Veronica arvensis</i> L.	Corn Speedwell	G?	SE5			XI	399		X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X
<i>Diervilla lonicera</i> Miller	Bush-honeysuckle	G5	S5			X	418		X
<i>Symphoricarpos albus</i>	Snowberry	G5	S5			X	418		X
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			C	423		X
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	G5	S5			X	423		X
<i>Anaphalis margaritacea</i> (L.) Benth. & Hook.	Pearly Everlasting	G5	S5			X	423		X
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X
<i>Hieracium aurantiacum</i> L.	Devil's Paintbrush	G?	SE5			XI	423		X
<i>Hieracium caespitosum</i> Dum.	Yellow Hawkweed	G?	SE5			XI	423		X
<i>Hieracium piloselloides</i> Villars	King Devil Hawkweed	G?	SE5			XI	423		X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X
<i>Solidago juncea</i>	Early Goldenrod	G5	S5			X	423		X
<i>Symphyotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicled Aster	G5	S5			X	423		X
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455		X
<i>Carex buxbaumii</i> Wahl.	Brown Bog Sedge	G5	S5			X	457		X
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Carex granularis</i> Muhlenb. ex Willd.	Meadow Sedge	G5	S5			X	457		X
<i>Carex interior</i> L. Bailey	Inland Sedge	G5	S5			X	457		X
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	G5	S5			X	457		X
<i>Agrostis gigantea</i>	Redtop	G5	S5			X	458		X
<i>Danthonia spicata</i>	Poverty Oat Grass	G5	S5			X	458		X
<i>Elymus trachycaulus</i>	Slender Wheat Grass	G5	S5			X	458		X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Panicum virgatum</i> L.	Switch Grass	G5	S4			X	458		X
<i>Phleum pratense</i> L.	Timothy	G?	SE5			XI	458		x
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X
<i>Poa pratensis</i> L. ssp. <i>pratensis</i>	Kentucky Blue Grass	G5T	S5			X	458		X
<i>Schizachyrium scoparium</i>	Little Bluestem	G5	S4			X	458		X
<i>Sporobolus vaginiflorus</i>	Ensheathed Dropseed	G5	S4			X	458		X
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475		X
<i>Maianthemum canadense</i> Desf.	Wild Lily-of-the-valley	G5	S5			X	475		X
<i>Maianthemum racemosum</i>	False Solomon's-seal	G5	S5			X	475		X
<i>Polygonatum pubescens</i>	Solomon's-seal	G5	S5			X	475		X
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476		X
<i>Sisyrinchium mucronatum</i>	Blue-eyed Grass	G5	S4S5			X	476		X
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's- slipper	G5T	S5			X	489		X

Site 29. ST. JEAN'S POINT / SUCKER CREEK

Bruce County, South Bruce Peninsula (formerly Amabel Township)

NTS Map: 41A/14

NAD83 UTM: 17T 17 475000 4963700 (site 29a); 474886 4964331 (site 29b, north side),
475333 4964176 (site 29b, south side)

Ownership: St. Jean's Point (site 29a): Grey Sauble Conservation Authority; Sucker Creek (site 29b) unknown, probably private

Protection: Sucker Creek (site 29a) St. Jean's Point Nature Preserve (Grey Sauble Conservation Authority) (100%); Sucker Creek (site 29b): Sucker Creek Area of Natural and Scientific Interest, Sucker Creek Provincially Significant Wetland

Survey Dates (Surveyors): July 28, 1997 (J. Jalava, T. King, H. Godschalk)

Total Extent of Alvar: 11 ha (surveyed), 1.8 (unsurveyed)

Overall Alvar Quality Rank: A

Directions: To reach the St. Jean's Point alvar, take Howdenvale Bay Road from Highway 6 to Howdenvale to the Lake Huron shore, where the road (Sunset Drive) turns north. The alvar is on the west side of the road at St. Jean's Nature Preserve, about 1 km north of Howdenvale (Jalava 1997). The Sucker Creek alvar patches are accessed few hundred farther north along Sunset Drive, where an ATV trail branches to the northeast (NHIC 2006). Alvars occur along ATV trail and probably elsewhere within the site.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
29a. St. Jean's Point	Rvp	Jalava 1997	1	10	38 (38)	2
29b. Sucker Creek	Rvp	IKONOS	1	14	59 (57)	6
Meta-site Totals			1	16	75 (73)	6

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

The St. Jean's Point alvar is found adjacent to the Lake Huron shoreline just north of Howdenvale Bay at the base of St. Jean's Point. The alvar dwarf shrubland grades into a bedrock shoreline community, with some shoreline species present on the alvar. A White Cedar – White Birch woodland is also present on the point. Although small and adjacent to a road, the alvar in 1997 the alvar was in excellent ecological condition, with no introduced species noted (Jalava 1997, Godschalk and King 1997).

Outstanding examples of dwarf shrub alvar dominated by Creeping Juniper are found on both sides of the large Sucker Creek wetland. These may be the best examples of this community type anywhere, in terms of size and quality. These alvars are highly diverse, with frequent wet depressions that grade into fen communities. Large populations of Dwarf Lake Iris occur, and Hill's Thistle is also frequent, and Tuberous Indian-Plantain is common in the fen intergrade areas on the south side of the wetland. Prairie species such as Big Bluestem and Switchgrass are more common at this site than any other alvar

surveyed by the author, and this is one of the few locations known for the provincially rare Great Plains Ladies'-tresses in Bruce County.



Extensive high-quality alvars (foreground) occur on the north and south sides of the Sucker Creek wetland (background)

Alvar Representation

29a – St. Jean’s Point

ALSI-2 Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar

The St. Jean’s Point alvar is dominated by a low shrub layer (40% cover) of Creeping Juniper, with Shrubby Cinquefoil as a secondary dominant. A few scattered stunted White Cedars are present. The extensive (65% cover) herb layer is dominated by Balsam Ragwort and Scirpus-like Sedge, with associates including Calamint, Acuminate Panic Grass, Upland White Goldenrod, Heal-all and a number of other herbs. Soil depths average approximately 3 cm, with some areas of exposed rock and deeper-soiled sections.

29b – Sucker Creek

ALSI-2 Creeping Juniper – Shrubby Cinquefoil Dwarf Shrub Alvar

Extensive areas of high-quality dwarf shrub alvar dominated by Creeping Juniper are found on both the north and south sides of the Sucker Creek wetland. Dolostone fragments and granitic erratics are common on the bedrock, which contains very shallow

scattered pockets of dark sandy soil, with some organic content. The alvars are more extensive on the south side, where they intergrade with Twig-rush dominated fen communities. Small patches of Twig-rush fen are also present on the north side. Secondary low shrub dominants are Shrubby Cinquefoil and stunted White Cedar. The herbaceous layer is quite well developed (20-30% cover) and very diverse, with Little Bluestem dominant. Secondary dominants are Switchgrass and an annual dropseed (*Sporobolus vaginiflorus* or *S. neglectus*); other common herbs include Swamp Goldenrod, Compressed Spike-rush, Dwarf Lake Iris, Sticky Tofieldia, Acuminate Panic Grass, Bluets and Poverty Oat Grass). The prairie grass, Big Bluestem, rare on alvars on the Bruce Peninsula, is locally common as well. The rock surface algae, *Gloeocapsa alpina*, covers almost all exposed bedrock and dolostone fragments, and a black crustose lichen is also common on the rock.

Condition

29a - St. Jean's Point

In 1997, despite the adjacent road and a hiking trail along the southern edge, the St. Jean's Point alvar was in excellent ecological condition with no introduced species found (Jalava 1997). An old utility pole was present, and a few cut stumps were noted.

29b - Sucker Creek

ATV trails cut through the alvars on both the north and south sides of the Sucker Creek wetland, but impacts are limited to the relatively lightly-used trails themselves. Some wood cutting (brought in from nearby forests) has taken place in an alvar clearing in one locale on the north side, where a couple of old campfire sites are also present. The introduced Wall Rocket (*Diplotaxis muralis*) is widespread on the alvars. Overall, however, the Sucker Creek alvars are in excellent condition.

Diversity

The alvar dwarf shrubland community at St. Jean's Point supports at least 38 vascular plant taxa, all of them native, and more than 25% of them (10 taxa) being alvar-associated flora. The alvars at Sucker Creeks support 59 vascular plant taxa (57 native), of which 14 are alvar-associated. Combined, the two adjacent sites support 75 vascular plant species (73 native) and 16 alvar plant species.

Ecological Functions

The Sucker Creek and St. Jean's Point alvars are nested within the relatively unfragmented mixed - coniferous forest and wetland matrix covering much of the western part of the Bruce Peninsula. Ecosystem functions are largely intact in this area, which serves as a corridor for the dispersal and migration of a great diversity of native flora and

fauna. The Sucker Creek wetland, adjacent to the alvars, is an impressive, large, diverse wetland complex that supports a variety of waterfowl and marsh bird species.

Special Features

Tuberous Indian-plantain *Arnoglossum plantagineum* COSEWIC-SC G4S3
Tuberous Indian-plantain is quite common in the fen / alvar complex of the Sucker Creek site, with approximately 2,000 plants seen in 2006 (not all populations counted). Jalava (1997) also found a small population of this Special Concern species along the moist fringes of the alvar at St. Jean's Point.

Stiff Yellow Flax *Linum medium* var. *medium* G5T?S3
The provincially rare Stiff Yellow Flax, which is endemic to Great Lakes shoreline, was found in good numbers in the ecotone between alvar and periodically inundated coastal meadow marsh at St. Jean's Point (Jalava 1997).

Hill's Thistle *Cirsium hillii* COSEWIC – THR, OMNR – THR G3S3
In 2006, 5 flowering Hill's Thistle and 45 rosettes were found by the author along the fringes of the alvar north of the Sucker Creek wetland. Another 3 rosettes were found on the north edge of the alvar on the south side of the wetland. The exact location is not clearly described in NHIC (2006), but it is possible that Hill's Thistle has also been found at St. Jean's Point.

Dwarf Lake Iris *Iris lacustris* COSEWIC – THR, OMNR – THR G3S3
Numerous patches of Dwarf Lake Iris are present within the alvars on both sides of the Sucker Creek wetland, with populations estimated at over 5,800 shoots on the north side and 19,000 shoots on the south side. The species also occurs in adjacent non-alvar communities, which were not surveyed during this study.

Low Nut-rush *Scleria verticillata* G5S3
In 1984, J. Johnson documented 1000 to 2000 fruiting plants of the provincially rare Low Nutrush in the alvar at Sucker Creek on dry mesic open dolomite bedrock pavement, where rock is finely broken up at the surface (NHIC 2006). The species was not recorded during the 2006 site visit, but is almost certainly still present.

Great Plains Ladies-tresses *Spiranthes magnicamporum* G4S3
In 2002, J. Johnson found several dozen Great Plains Ladies-tresses (most in bloom) at the Sucker Creek alvar.

Other Provincially Rare Species Known from the Vicinity of the Site

The endangered Spotted Turtle is known from the in the Sucker Creek wetland (NHIC 2006). Massasauga rattlesnakes undoubtedly also occur throughout the site. In August 2006 the author observed a provincially rare Great Egret in the wetland.

Conclusions and Recommendations

Evaluation and Significance

The Sucker Creek site sustains the best examples of Creeping Juniper dwarf shrub alvar in Ecodistrict 6E-4, if not in Ontario. The adjacent St. Jean's Point site contains a smaller example, but also high quality. These alvars are host to sizeable populations of several provincially rare species, including at least two Threatened species and one species of Special Concern.

Threats

The St. Jean's Point site is well protected as a Nature Preserve of the Grey Sauble Conservation Authority, but is next to Sunset Drive and is easily accessed public land. Potential threats include trampling and illegal off-road vehicle use. The larger Sucker Creek alvars are largely on private land. The site is somewhat protected as part of a provincially significant life science ANSI and provincially significant wetland. Damage to sensitive alvar substrates and vegetation by off-road vehicles using the ATV trail is likely the most serious threat at the present time.

Management

Continued passive management is recommended for these alvars. Private landowners should be informed of the significance and sensitivity of alvar habitats, and their vigilance in watching out for and reporting illegal and ecologically harmful activities should be encouraged.

Future Inventory Needs

1. Fauna, non-vascular plants and invertebrates have not been surveyed at the St. Jean's Point or Sucker Creek alvars.
2. Habitat quality and rare species populations should be regularly monitored.

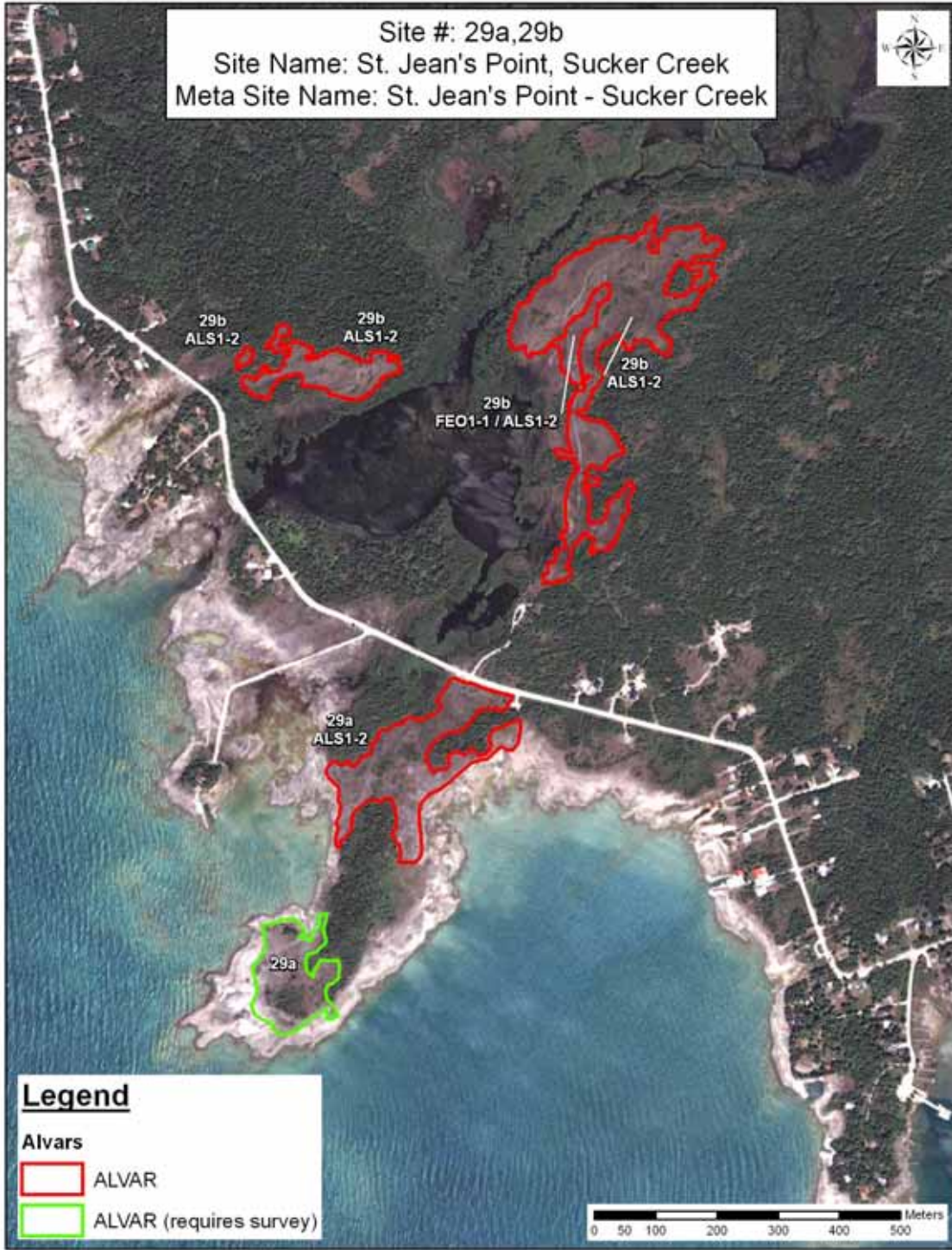
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Vascular Plants of the St. Jean's Point and Sucker Creek Alvars

X (upper case) = observed by J. Jalava (2006, 1997); x (lower case) = observed by J. Johnson (NHIC 2006)

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	29a ALS1-2	29b ALS1-2
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34			X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X
<i>Thalictrum pubescens</i> Pursh	Tall Meadow-rue	G5	S5			X	130		X	
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160			X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X	
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X	X
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234			X
<i>Diplotaxis muralis</i> (L.) DC.	Wall Rocket	G?	SE1			XI	237			X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247			X
<i>Lysimachia quadriflora</i> Sims	Prairie Loosestrife	G5?	S4			X	258		X	X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258			X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277			X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X	X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?		X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286			X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X	
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X	
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338		X	
<i>Linum medium</i> (Planchon) Britton var. <i>medium</i>	Stiff Yellow Flax	G5T?	S3			VU	345		X	
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X	X
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X	X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X	X
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S5			X	399			X
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M		X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X	X
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411		X	X
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416			X
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X	
<i>Arnoglossum plantagineum</i>	Tuberous Indian-plantain	G4G5	S3	S	S	X	423			X
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X	X
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	T	T	X	423	H	?	X
<i>Helenium autumnale</i> L.	Sneezeweed	G5	S5			X	423			X
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423			X
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X
<i>Solidago hispida</i> Muhl.	Hairy Goldenrod	G5	S5			X	423		X	X
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423			X
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E	X	X
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423			X
<i>Juncus bufonius</i> L.	Toad Rush	G5	S5			X	455		X	
<i>Carex buxbaumii</i> Wahl.	Brown Bog Sedge	G5	S5			X	457		X	
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X	
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457			X
<i>Carex flava</i> L.	Yellow Sedge	G5	S5			X	457		X	
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E		X
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X	
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457		X	X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	29a ALS1-2	29b ALS1-2
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X	X
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E	X	X
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457			X
<i>Scirpus cespitosus</i> L. ssp. <i>cespitosus</i>	Deer-grass	G5T	S5			X	457			X
<i>Scleria verticillata</i> Muhlenb. ex Willd.	Low Nut-rush	G5	S3			X	457			x
<i>Agrostis gigantea</i>	Redtop	G5	S5			X	458		X	
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458			X
<i>Andropogon gerardii</i> Vitman	Big Bluestem	G5	S4			X	458			X
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv	Canada Blue-joint	G5	S5			X	458		cf.	
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X	X
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H		X
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458		X	X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X	X
<i>Panicum virgatum</i> L.	Switch Grass	G5	S4			X	458			X
<i>Phleum pratense</i> L.	Timothy	G?	SE5			XI	458			X
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X	
<i>Poa pratensis</i> L. ssp. <i>pratensis</i>	Kentucky Blue Grass	G5T	S5			X	458			X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458			X
<i>Sporobolus vaginiflorus</i> (Torrey ex A. Gray)	Ensheathed Dropseed	G5	S4			X	458			cf.
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475		X	
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's- seal	G5	S5			X	475			X
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5T4	S4?			X	475		X	X
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475			X
<i>Iris lacustris</i> Nutt.	Dwarf Lake Iris	G3	S3	T	T	X	476	M	x*	X
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X	X
<i>Cypripedium calceolus</i> L. var. <i>pubescens</i>	Large Yellow Lady's- slipper	G5T	S5			X	489			X
<i>Spiranthes magnicamporum</i> Sheviak	Great Plains Ladies'- tresses	G3G4	S3			R	489			x
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	G5	S5			X	489			X

ECODISTRICT 6E-2

Site 27. CHIEF'S POINT

Bruce County, Saugeen First Nation, South Bruce Peninsula (formerly Amabel Township)
NTS Map: 41A/11
NAD83 UTM : 17T 476200 4948800
Ownership: Saugeen First Nation
Protection: Saugeen First Nation (100%)
Survey Dates (Surveyors): August 7, 1996 (C. Schaefer, IACI alvar survey); September 10, 2004 (J. Johnson, species-at-risk survey)
Total Extent of Alvar: 101 ha
Overall Alvar Quality Rank: A

Directions: Boat to Chief's Point or to access by land head south from Oliphant along coast to reach north end, or continue to Sauble Falls and head west to the reserve community at the south end. [Schaefer 1996]

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
27. Chief's Point	Rvp	Schaefer 1996 air photo (IACI)	1	14	80 (75)	2

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; i = insects; m = molluscs; b = breeding birds

General Site Description

The Chief's Point alvar habitats occur on the lands of the Saugeen First Nation at Chief's Point. Except for a concentration of houses at the south end of the point, it is largely intact as a natural area. According to Schaefer (1996), "Chief's Point has less alvar habitat than initial air photo interpretation suggested, since much of the open area is permanently wet. The alvar grasslands that are there are exceptional in quality and have some unique attributes. Little Bluestem is the dominant species of the grassland surveyed." Surrounding habitats include coniferous forests, marsh complexes and the waters of Lake Huron.

Alvar Representation

ALO1-3 Dry-fresh Little Bluestem Open Alvar Meadow

According to Schaefer (1996), "The alvar grassland occurs in the drier open areas on the point. Permanently wet marshes lie adjacent to the wetlands [alvars?] [sic] frequently, and the grasslands sometimes grade into graminoid meadows (usually the two habitats are distinct though). There is a significant amount of [Creeping Juniper] shrubs and scattered [Bearberry and Shrubby Cinquefoil]. Rock is exposed for 15-20% of the area.

The herbaceous cover is 70% and the dominant species is [Little Bluestem]. [Big Bluestem] also occurs.”

Condition

Schaefer (1996) observed no on-site human disturbance at the Chief’s Point alvar. However, charcoal, charred woody debris and a charred snag occur on the alvar, indicating past fire. Some dieback of woody plants may be due to past drought (Schaefer 1996). A few introduced species are present.

Diversity

The alvar grassland community at Chief’s Point is habitat for at least 80 vascular plant taxa, of which 75 are native to Ontario, and 14 display an affinity to alvar habitats in the province. Four moss and five lichen taxa were recorded by Schaefer (1996) during an incomplete survey of the alvars of the site.

Ecological Functions

The Chief’s Point alvars occur as small patch communities at the south end of a relatively unfragmented mixed – coniferous forest matrix covering much of the western part of the Bruce Peninsula. Ecosystem functions are largely intact in this area, which serves as a corridor for the dispersal and migration of a great diversity of native flora and fauna.

Special Features

Hill's Thistle *Cirsium hillii* COSEWIC-THR, OMNR-THR G3S3
Schaefer (1996) found 96 Hill’s Thistle plants, seven of them flower and one in seed, in the open Little Bluestem alvar grassland at Chief’s Point.

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR, OMNR-THR G3S3
J. Johnson (NHIC 2006) recorded 6000 and 7500 shoots of Dwarf Lake Iris at Chief’s Point. The habitat is described as open (but partly shaded by adjacent trees) alvar grassland dominated by Little Bluestem overall with very shallow (avg. ~5cm) soils. The soils are sandy loams with high pH (NHIC 2006). Proportion of the overall alvar habitat occupied by the species was estimated by Johnson to be 1-2% for a total area covered of almost 1 ha (NHIC 2006). Schaefer (1996) also noted the species during her survey of the site.

Conclusions and Recommendations

Evaluation and Significance

Chief's Point provides the best (only) representation of Little Bluestem alvar grassland documented in Ecodistrict 6E-2. The habitat quality is excellent, and the site supports some of the southernmost populations of Hill's Thistle and Dwarf Lake Iris in Ontario. The Chief's Point alvar should be considered provincially significant.

Threats

Based on Schaefer (1996) and NHIC (2006) are currently no known or suspected on- or off-site threats at the Chief's Point alvar or adjacent habitats.

Management

Continued passive management for these alvars is recommended, and the Saugeen First Nation is to be commended for their preservation of this site. Information on the significance and stewardship of alvars should be offered to the First Nation.

Future Inventory Needs

Schaefer (1996) notes that she was unable to survey the Chief's Point area adequately and that additional alvar habitat, including the possibility of other alvar vegetation community types, may be present. Specific survey needs include:

1. An overall life science inventory would inform future stewardship activities.
2. Faunal surveys are suggested.
3. Monitoring of rare species populations and their habitat quality is recommended.

References

NHIC (Natural Heritage Information Centre). 2006. Element occurrence, natural areas and Ontario Herpetofaunal Summary databases. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario. Electronic databases.

Schaefer, C. 1996. Fishing Islands and Chief's Point Alvars. International Alvar Initiative Forms, on file, Natural Heritage Information Centre, Peterborough.

Vascular Plants of the Chief's Point Alvar

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	27 ALOI-3
<i>Selaginella eclipses</i> Buck	Buck's Meadow Spike-moss	G4	S4			X	3		X
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33		X
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33		X
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130		X
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160		X
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165		X
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M	X
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218		sp.
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234		X
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X
<i>Lysimachia quadriflora</i> Sims	Prairie Loosestrife	G5?	S4			X	258		X
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258		X
<i>Trientalis borealis</i> Raf. ssp. <i>borealis</i>	Starflower	G5T?	S5			X	258		X
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277		X
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277		X
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277		X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M	X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?	X
<i>Rosa acicularis</i> Lindley ssp. <i>sayi</i>	Prickly Wild Rose	G5TU	S5			X	277		X
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry	G5	S5			X	286		X
<i>Lythrum salicaria</i> L.	Purple Loosestrife	G5	SE5			XI	292		X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307		X
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338		X
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	G5	S5			X	350		X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H	X
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392		X
<i>Mentha arvensis</i> L. ssp. <i>borealis</i> (Michaux)	Field Mint	G5	S5			X	392		X
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M	X
<i>Melampyrum lineare</i> Desr.	Cow-wheat	G5	S4S5			X	399		X
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399		X
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411		X
<i>Houstonia longifolia</i> Gaertner	Long-leaved Houstonia	G4G5	S4?			X	416		X
<i>Linnaea borealis</i> L. ssp. <i>longiflora</i>	Twinflower	G5T?	S5			X	418		X
<i>Lonicera dioica</i> L.	Wild Honeysuckle	G5	S5			X	418		X
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423		X
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X
<i>Cirsium hillii</i> (Canby) Fern.	Hill's Thistle	G3	S3	THR		X	423	H	X
<i>Eupatorium perfoliatum</i> L.	Boneset	G5	S5			X	423		X
<i>Helenium autumnale</i> L.	Sneezeweed	G5	S5			X	423		X
<i>Hieracium aurantiacum</i> L.	Devil's Paintbrush	G?	SE5			XI	423		sp.

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	27 ALOI-3
<i>Prenanthes racemosa Michaux</i>	Smooth White-lettuce	G5T?	SU			X	423		X
<i>Solidago juncea</i>	Early Goldenrod	G5	S5			X	423		X
<i>Solidago nemoralis Aiton ssp. nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423		X
<i>Solidago ohioensis Riddell</i>	Ohio Goldenrod	G4	S4			X	423		X
<i>Solidago ptarmicoides (Nees) B. Boivin</i>	Upland White Goldenrod	G5	S5			X	423	E	X
<i>Solidago uliginosa Nutt.</i>	Bog Goldenrod	G4G5	S5			X	423		X
<i>Juncus alpinoarticulatus Chaix</i>	Alpine Rush	G5	S5			X	455		X
<i>Carex capillaris L.</i>	Hair-like Sedge	G5	S5			X	457		X
<i>Carex eburnea Boott ex Hooker</i>	Bristle-leaf Sedge	G5	S5			X	457		X
<i>Carex flava L.</i>	Yellow Sedge	G5	S5			X	457		X
<i>Carex richardsonii R. Br.</i>	Richardson's Sedge	G4	S4?			X	457	E	X
<i>Carex scirpoidea Michx. ssp. convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H	X
<i>Carex viridula Michaux ssp. viridula</i>	Greenish Sedge	G5?T?	S5			X	457		X
<i>Cladium mariscoides (Muhlenb.) Torrey</i>	Twig-rush	G5	S5			X	457		X
<i>Rhynchospora capillacea Torrey</i>	Hair-like Beak-rush	G5	S4?			X	457		X
<i>Scirpus cespitosus L. ssp. cespitosus</i>	Deer-grass	G5T	S5			X	457		X
<i>Andropogon gerardii Vitman</i>	Big Bluestem	G5	S4			X	458		X
<i>Calamagrostis canadensis (Michaux) P. Beauv</i>	Canada Blue-joint	G5	S5			X	458		X
<i>Danthonia spicata (L.) P. Beauv. ex Roemer</i>	Poverty Oat Grass	G5	S5			X	458		X
<i>Deschampsia caespitosa (L.) P. Beauv.</i>	Tufted Hair Grass	G5	S5			X	458	H	X
<i>Muhlenbergia glomerata (Willd.) Trin.</i>	Marsh Wild-timothy	G5	S5			X	458	M	cf.
<i>Panicum acuminatum Ell. var. fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458		X
<i>Panicum virgatum L.</i>	Switch Grass	G5	S4			X	458		X
<i>Schizachyrium scoparium (Michaux) Nees</i>	Little Bluestem	G5	S4			X	458		X
<i>Sporobolus vaginiflorus (Torrey ex A. Gray)</i>	Ensheathed Dropseed	G5	S4			X	458		sp.
<i>Maianthemum stellatum (L.) Link</i>	Starry False Solomon's-seal	G5	S5			X	475		X
<i>Tofieldia glutinosa (Michaux) Pers. ssp.</i>	False Asphodel	G5T4	S4?			X	475		X
<i>Zigadenus elegans Pursh ssp. glaucus</i>	White Camass	G5T4?	S4			X	475		X
<i>Iris lacustris Nutt.</i>	Dwarf Lake Iris	G3	S3	THR		X	476	M	X
<i>Iris versicolor L.</i>	Wild Blue-flag	G5	S5			X	476		X
<i>Sisyrinchium mucronatum Michaux</i>	Blue-eyed Grass	G5	S4S5			X	476		X
<i>Cypripedium calceolus L. var. pubescens</i>	Large Yellow Lady's-slipper	G5T	S5			X	489		cf.
<i>Epipactis helleborine (L.) Crantz</i>	Helleborine	G?	SE5			XI	489		X

Non-vascular Plants of the Chief's Point Alvar

TAXON	NAME	GRANK	SRANK	27 ALO1-3
A	<i>Gloeocapsa alpina</i>			X
A	<i>Trentepohlia annulata</i>	T	T	X
B	<i>Dicranum fuscescens</i>	G5	S5	X
B	<i>Polytrichum juniperinum</i>	G5	S5	X
B	<i>Schistidium rivulare</i>	G4G4	S5	X
B	<i>Tortella fragilis</i>	G4G5	S4	sp.
L	<i>Cladina rangiferina</i>	G5	S5	X
L	<i>Cladonia cenotea</i>	G5	S4?	sp.
L	<i>Cladonia symphycarpa</i>	G3G5	S?	cf.
L	<i>Placynthium nigrum</i>	G?	S5?	X
L	<i>Protoblastenia rupestris</i>	G?	S5?	cf

Meta-site 28. FISHING ISLANDS

Bruce County, South Bruce Peninsula (formerly Amabel Township)

NTS Map: 41A/11 & 41A/14

NAD83 UTM: 17T 476570 4952867 (site 26a), 475229 4955427 (site 26b), 474701 4954127 (site 26c), 474600 4954750 (site 26d), 476591 4952864 (site 26e), 475884 4952600 (site 26f), 473910 4958131 (site 26g), 475144 4957471 (site 26h)

Ownership: Saugeen First Nation and Chippewas of Nawash First Nation; Private; Grey Sauble Conservation Authority; Town of South Bruce Peninsula; Public Works Canada

Protection: Fishing Islands Management Area Nature Preserve (in part); The Fishing Islands Provincial Life Science ANSI (100%)

Survey Date (Surveyors): 28a = June 2 and 17, 2005, 28b = August 24, 2004 and June 3, 2005, 28c = June 3, 2005, 28e = June 17, 2005, 28f = June 18, 2005, 28g = August 24, 2005, 28h = September 4, 2005 (J. Jalava); 28c and 28d = August 7, 1996 (C. Schaefer).

Total Extent of Alvar: 7.6 ha (28a = 0.4 ha; 28b = 1.8 ha; 28c = 1.3 ha; 28d = 0.3 ha; 28e = 0.5 ha; 28f = 1 ha; 28g = 1.3 ha; 28h = 0.2 ha.)

Overall Alvar Quality Rank: 28a-f AB, 28g-h CD

Directions: The Fishing Islands are best accessed by boat from Oliphant, Red Bay or Howdenvale Bay. Maps and air photos are best used to determine which harbours are nearest to given islands. Weather conditions should be monitored to ensure safe travel, and landowner permission should be obtained before visiting sites on private land. Site visits should also be timed so as not to disturb colonial nesting birds or nesting Bald Eagles.

Site	Inventory Level	Map Source	Alvar Types	Alvar Plant Taxa	Vascular Plant Taxa (Native)	NHIC-Tracked Species
28a. Indian (Frog) Island	Rvpb	Jalava 2006	2	8	51 (47)	0
28b. Main Station Island	Rvpb	Jalava 2006	2	15	87 (82)	1
28c. Bowes Island	Rvpn	Jalava 2006; Schaefer 1996 (IACI)	2	9	52 (47)	0
28d. Rowan (Rownes) Island	Rvp	Jalava 2006	1	5	27 (24)	0
28e. Smokehouse Island	Rvpb	Jalava 2006	2	8	50 (46)	0
28f. Cranberry Island	Rvpb	Jalava 2006	1	6	28 (26)	0
28g. (West) Argyle Island	Rvp	Jalava 2006	1	2	43 (31)	0*
28h. Haystack Island	Rvp	Jalava 2006	1	2	36 (23)	0*
Meta-site Totals			4	19	161 (137)	1*

Inventory level codes: D = Detailed; R = Reconnaissance; S = Brief Site Inspection; v = vegetation; p = vascular plants; n = non-vascular plants; i = insects; m = molluscs; b = breeding birds

* - provincially rare breeding birds (e.g., Bald Eagle, Black-crowned Night-Heron) not included, as they are not alvar-associated species

General Site Description

Many of The Fishing Islands contain areas of alvar and alvar-like habitat that lie adjacent to and often grade into wet, marshy shoreline bedrock pavements or moist sandy coastal meadow marshes. Some of the larger islands have interior patches of alvar, surrounded largely by forest.

Bedrock pavement that is completely flooded by Lake Huron and is exposed to high-energy wave-action in some years is not classified as alvar, but as bedrock shoreline. Bowe's Island, Main Station Island, Frog (Indian) Island, Rowan (Rownes) Island, Smokehouse Island and Cranberry Island each have patches of open bedrock above the average high water mark. These communities support concentrations of plant species typically found in Ontario's alvar habitats and fit the widely-accepted definitions of alvar (Bakowsky 1997, Lee *et al.* 1998, Reschke *et al.* 1999, Brownell and Riley 2000, NHIC 2006).



Figure 1. Flat dolostone bedrock is bleached white at islands with nesting bird colonies

However, the dominant vegetation above the high water mark on open bedrock on islands with nesting colonial waterbirds tends to be made up of taxa that thrive in heavily-disturbed areas. The birds bring with them a variety of adventives and introduced plant species. Another factor influencing the ecological composition of these communities may be the effect on bedrock and soil chemistry that results from the deposition of large amounts of fecal matter (guano) by the nesting birds (Figure 1). The rock-surface algae, *Gloeocapsa alpina*, which gives exposed dolostone on the Bruce Peninsula its

characteristic dark-grey colour (Figure 2), is virtually absent on these islands, and the bedrock appears bleached white. Other algae, lichens and microbial life are no doubt also affected by the bird droppings. Nevertheless, these open bedrock habitats have all the structural attributes of alvar, and have been included in this study as a distinct community type “Adventive Species Open Alvar Pavement” (ALO1-7).

Alvar Representation

ALO1-1 Dry Lichen - Moss Open Alvar Pavement

Small patches of open alvar pavement are found at the north end of Frog (Indian) Island, at a few locations on Main Station Island (Jalava 2004, Jalava 2006), on the north side of Bowes Island (Schaefer 1996, NHIC 2006), on Rowan’s (Rownes) Island (Schaefer 1996, NHIC 2006), at the northeast end of Smokehouse Island, and at the south end of Cranberry Island (Jalava 2006).



Figure 2. Relatively undisturbed open alvar pavement habitat on Cranberry Island, the dark-grey colour indicating the presence of *Gloeocapsa alpina* algae

At Frog Island, the pavement occurs in a mosaic of two community types, Creeping Juniper – Shrubby Cinquefoil dwarf shrub alvar and dry lichen – moss open alvar pavement. Up to 50% of the surface area of this alvar consists of fossiliferous pitted dolostone bedrock covered with the rock-surface algae *Gloeocapsa alpina*, as well as mosses (*Tortella* sp., and others) and crustose lichens. The alvar pavement has a few old White Cedar snags, and has sparsely scattered Shrubby Cinquefoil low shrubs. Along the

shoreline ecotone, the dominant herb is Twig-rush, suggesting occasional inundation by Lake Huron, with Tufted Hairgrass and Acuminate Panic Grass also quite frequent. Associated herbaceous plants are Ticklegrass, Canada Bluejoint and Little Bluestem.

A small patch of alvar pavement is found in the northern interior of Main Station Island (Figure 3). The alvar grades from dry open exposed bedrock dominated by mosses and lichens to a very wet fen-like alvar community along the northern edge. The alvar is flanked by coniferous forests and a wetland. Another alvar, found near the southwest corner of the Main Station Island, consists of a few scattered White Cedar and Tamarack trees, and patches of shrub-sized Red Ash and White Cedar. The dry bedrock has no low shrub layer, whereas moist to wet areas are sparsely dominated by Shrubby Cinquefoil and Swamp Rose, with Alder-leaved Buckthorn, Red Ash and Slender Willow as associates. Herbaceous species are very sparse on the dry bedrock, with Rock Sandwort and Calamint being the most common species. Wetter fen-like areas have an extensive herb layer, with Inland Sedge dominant, Lesser Panicked Sedge as a secondary species. Associates in the wetter areas include Swamp Goldenrod, Slender Sedge and Water Sedge. The rock-surface algae, *Gloeocapsa alpina*, covers the dry bedrock pavement, and *Tortella* spp. and other mosses are also common. Drainage in this gently-sloping alvar community is to the north. Very shallow organic sandy deposits occur in the depressions of the dry portion; shallow organic muck occurs in the wet sections. [Jalava 2004, Jalava 2006]



Figure 3. Lichen – moss alvar pavement in the interior of Main Station Island

ALO1-5 Fresh - Moist Tufted Hairgrass Open Alvar

A very small area of moist alvar dominated by Shrubby Cinquefoil, Twig-rush, Tufted Hairgrass and Acuminate Panic Grass is found along the northeast shoreline of Smokehouse Island (Jalava 2006). Associated herbaceous species include Ticklegrass, Canada Bluejoint and Little Bluestem. Crustose lichens, microbial mats, *Gloeocapsa alpina* algae and mosses are common on the fossiliferous pitted dolostone bedrock. A similar community with Shrubby Cinquefoil, Canada Bluejoint, Buxbaum's Sedge, Calamint and Seneca Snakeroot intergrades with patches of Twig-rush fen on undulating bedrock along the east shore of the south end of Cranberry Island (Figure 2).

ALS1-2 Creeping Juniper - Shrubby Cinquefoil Dwarf Shrub Alvar Type

In a mosaic with the open alvar non-vascular pavement community at Frog Island, scattered copses of White Cedar trees and saplings occur in deeper soiled sections. Creeping Juniper and Bearberry shrubs cover between 30% and 50% of the surface. Herbaceous species are sparse to moderately common, with the most frequent species being Calamint, Poverty Oat Grass, Bristle-leaf Sedge and Rock Sandwort.

The southwest part of Main Station Island, one of the largest and least developed of The Fishing Islands, sustains small areas of alvar dwarf shrubland just inland from the high water mark of Lake Huron. Shrubby Cinquefoil low shrubs are common. Dominant herbs in drier sections are Rock Sandwort and Calamint, with wetter sections being dominated by Inland Sedge and with Sterile Sedge as a secondary species. The rock-surface algae, *Gloeocapsa alpina*, and cushion mosses are common on the exposed bedrock. Adjacent communities include extensive dolostone bedrock shorelines, small fens, thicket swamps and mixed bedrock forests (Figure 4).



Figure 4. Alvar – fen complex at southwest end of Main Station Island

At the northeast end of Smokehouse Island, scattered copses of White Cedar trees and saplings occur in deeper soiled sections of the very small dwarf shrub alvar. Creeping Juniper and Bearberry shrubs cover between 30% and 50% of the overall surface area (Figure 5). Herbaceous species are sparse to moderately common, with the most frequent species being Calamint, Poverty Oat Grass, Bristle-leaf Sedge and Rock Sandwort. A similar small patch of alvar dwarf shrubland is found at the north end of Frog Island, in a mosaic with open alvar pavement. This dry patch has abundant Creeping Juniper, with Little Bluestem being the most common herbaceous plant, with Bristle-leaf Sedge, Scirpus-like Sedge and Bluets as secondary species.



Figure 5. Creeping Juniper - Shrubby Cinquefoil dwarf shrub alvar at Frog Island

ALO1-7 Adventive Species Open Alvar Pavement

Alvar-like habitats at The Fishing Islands that have colonial-nesting birds were not classifiable because their species dominants do not match existing alvar classifications. The closest fit would be “bedrock cultural meadow” (CUM2) in Lee *et al.* (1998), which is defined as open bedrock dominated largely by introduced species that “results from or is maintained by cultural or anthropogenic-based disturbances”. However, although non-native species are often abundant in these communities at The Fishing Islands, colonial-nesting birds cannot be considered an anthropogenic factor. In these communities, the introduced Mossy Stonecrop often forms extensive mats (Figure 6). Other common introduced species in these habitats include Wormseed Mustard, Canada Thistle and Lady’s-thumb. Dominant native plants include Canada Goldenrod, Pringle’s Aster, Panicked Aster, Bushy Knotweed and Baltic Rush. Kentucky Blue Grass, Common Milkweed and Dudley’s Rush occur as associates.



Figure 6. Introduced Mossy Stonecrop is dominant in an alvar-like community on Haystack Island

Condition

The majority of the alvar communities at the Fishing Islands are undisturbed or very lightly disturbed. Some nearby habitats have been impacted by cottage development, off-road vehicle and walking trails and selective logging, and natural disturbances such as windthrow and small wildfires. As noted above, introduced species are common on some of the alvars, particularly those that are used by colonial-nesting waterbirds. At Main Station Island, where there are no nesting bird colonies, 94% of the plant taxa are native. At Haystack Island, which has nesting gulls, only 63% of the alvar plants are native.

Diversity

Four different alvar community types occur on the Fishing Islands. Combined, these communities sustain a very high total of 161 vascular plant taxa, of which 137 are native to Ontario. Among the islands, the alvars at Main Station Island are the most diverse, with 87 plant taxa recorded, 82 of them native, and 15 taxa display a strong affinity to alvars in Ontario. Overall, 19 of the Fishing Islands' plant taxa are alvar-associated.

Ecological Functions

The Fishing Islands ANSI provides corridor functions for the movement of a variety of organisms, and its position along the western shore of the Bruce Peninsula means that it provides important habitat for migrating landbirds and shorebirds. Woody vegetation in the site's wetlands and shorelines helps maintain the water quality and natural hydrological regimes of the various small island watersheds. The integrity of Lake Huron coastal, wetland and alvar ecosystem functions are currently maintained in the undeveloped portions of the ANSI.

Special Features

The Fishing Islands provide habitat for six provincially rare plant species and nine provincially rare fauna. These include the endangered Bald Eagle, the threatened Dwarf Lake Iris, Hill's Thistle, and the provincially rare Low Nut-rush, Arrow-arum, Black-crowned Night-Heron, Great Egret, Caspian Tern. The flat, remote, rocky islands are particularly important to colonial-nesting birds such as Ring-billed Gull, Herring Gull, Double-crested Cormorant, Common Tern, Caspian Tern and Black-crowned Night-Heron. Most of the provincially significant flora and fauna are not specifically alvar-related, although a number of them probably at least occasionally occur on the alvars. Of the vascular plants found on the alvars, five are considered rare or very uncommon on the Bruce Peninsula (BGPC 2003).

Low Nut-rush *Scleria verticillata* G5S3
A population several hundred stems of the provincially rare Low Nut-rush was discovered by the author in August 2004 in an alvar – bedrock fen ecotone near the southwestern end of Main Station Island. The species was also found in 1984 in fen habitat at Cranberry Island (Parker *et al.* 1985).

Dwarf Lake Iris *Iris lacustris* COSEWIC-THR, OMNR-THR G3S3
Dwarf Lake Iris is often associated with shaded White Cedar stands adjacent to alvars, and the species occasionally occurs on the alvars themselves. A small population of the globally and provincially rare and nationally threatened Dwarf Lake Iris was found at The Fishing Islands in 1874, but there are no confirmed reports since then (NHIC 2006), despite a fairly extensive survey of the islands in 1984 and again by the present study in 2004-2005. The population may have been extirpated, perhaps by development, but there is ample suitable habitat on several of the larger islands (e.g., Cranberry, Frog and Main Station), and it is possible that the particular location where it was originally found was not visited during the more recent surveys.

Stiff Yellow Flax *Linum medium* var. *medium* G5T?S3
The provincially rare Stiff Yellow Flax, which is endemic to Great Lakes shoreline habitats, has been found on several of The Fishing Islands, including Cranberry, Montrose, Rownes, Main Station and Frog (Indian and Little Squaw) islands, suggesting a sizable and widespread population in the ANSI. This species is adapted to the cyclically fluctuating water levels of the Great Lakes shorelines and may be abundant one

year and absent in other years, when the populations are dormant in submerged seed banks. It was not recorded during the present study, despite apparently good habitat conditions resulting from low Lake Huron water levels; it could conceivably occur on the margin of alvars near the shoreline.

Hill's Thistle *Cirsium hillii* COSEWIC-THR, OMNR-THR G3S3
Hill's Thistle is globally rare, nationally threatened, provincially rare and restricted to Manitoulin Island and the Bruce Peninsula in Ontario. It is also known from Michigan, Wisconsin, Indiana, Illinois, Minnesota and Iowa (Allen 2004). This thistle is usually found in open, dry, sandy, fire-prone habitats, including prairies, pine and oak barrens and savannahs, sand dunes, open sandy and bedrock woodlands, and alvar habitats (Allen 2004). At The Fishing Islands, a population first documented in 1874 by John Macoun on Wildman's Island (off the southeast end of Jack Island) was last observed in 1984 (Parker *et al.* 1985). No information on population size is available.

Conclusions and Recommendations

Evaluation and Significance

The Fishing Islands provide the best representation in Ecodistrict 6E-2 of dolostone bedrock islands, and the suite of vegetation community types associated with these islands, namely, the sand and bedrock shorelines, Twig-rush fens and Great Lakes coastal meadow marshes. Although the examples are small, the ANSI also provides the best representation of some alvar community types in Ecodistrict 6E-2.

Threats

The greatest threat to habitats at the Fishing Islands is new cottage development and further habitat modification around existing cottages.

Management

It is recommended that the private stewards of the ANSI, and the public land managers, continue to maintain the generally high ecological integrity of the Fishing Islands' bedrock shorelines, alvars, fens, other wetlands and forest communities through appropriate land use planning, passive management and reduction of detrimental impacts.

The following specific recommendations are made:

1. Land use planning and building permits should ensure that the ecological functions and natural heritage values of the ANSI are not negatively impacted by development. Further fragmentation of the habitats through subdivision of lots and construction of buildings will reduce ecological connectivity, interior habitats and corridor functions, and increase edge-effects and potential invasion by introduced species. Infilling during the construction buildings and septic beds has potential hydrological impacts and may also result in the introduction of invasive introduced plants.
2. Use of trails by all-terrain and off-road vehicles in ecologically sensitive habitats within the ANSI should be discouraged. Alvars, rock barrens, bedrock shorelines,

shallow-soiled woodlands, and all wetland communities are particularly susceptible to erosion, soil compaction, damage to vegetation and adverse hydrological impacts.

3. Forestry practices within the ANSI should be undertaken according to appropriate prescriptions or management plans.
4. First Nation and private landowners are encouraged to continue their vigilance in watching out for and reporting inappropriate activities within the ANSI, including trespassing, illegal camping, littering, and disturbance of breeding bird colonies and nesting Bald Eagles.
5. The activities of non-government and government agencies to secure additional key properties for conservation purposes (through easements or acquisition) are encouraged.
6. Exemplary private land stewards should be recognized through presentation of stewardship awards and other creative means.

Future Inventory Needs

1. Ongoing monitoring of habitat quality, bird colonies and rare species populations.
2. Invertebrate and non-vascular plant surveys.
3. Inventories of areas not surveyed in 2004-2005 (areas requiring landowner permission or which were difficult to access due to weather or time constraints).

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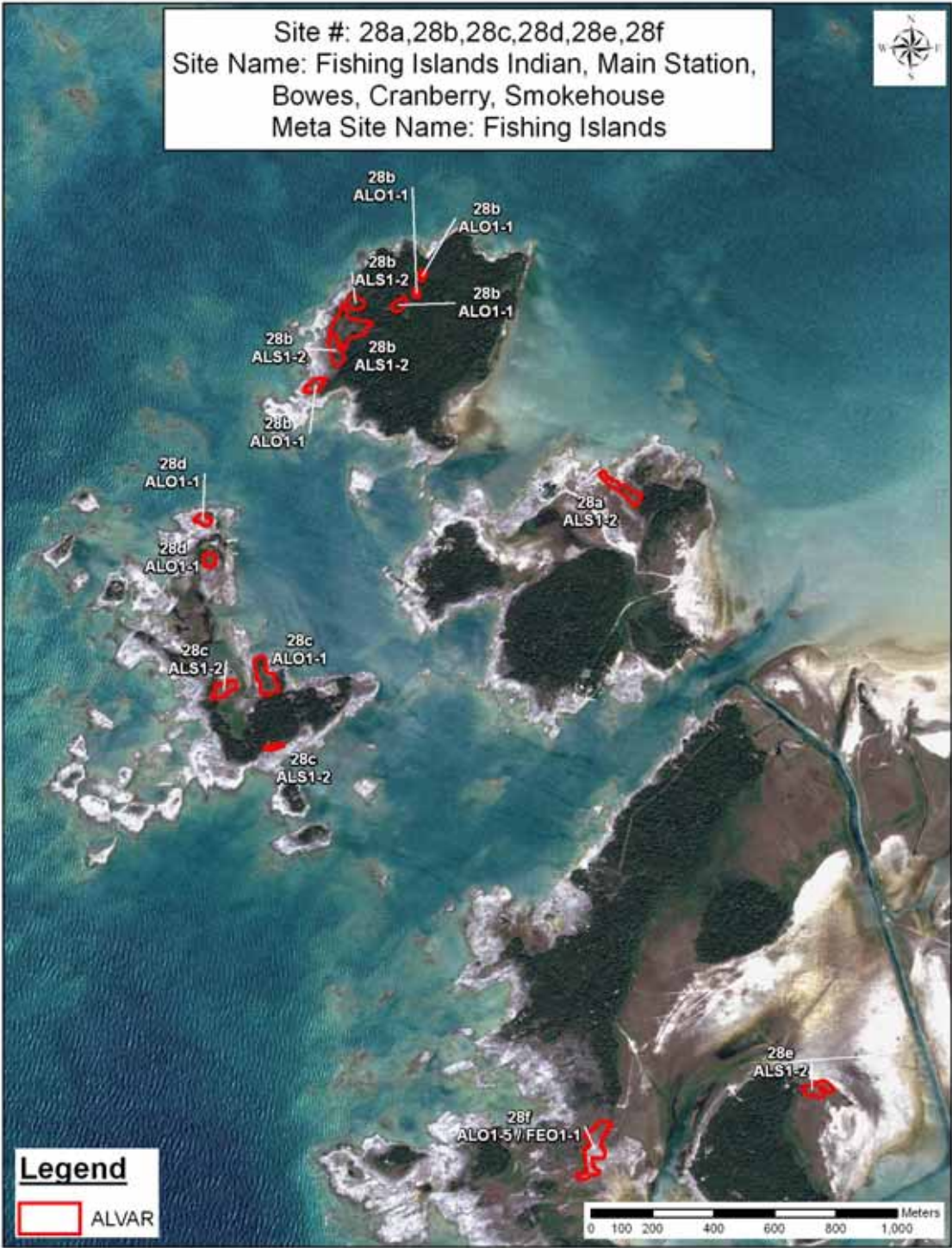
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Vascular Plants of the Fishing Islands Alvars

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar fidelity	28a ALSI-2	28a ALOI-1	28b ALSI-2	28b ALOI-1	28c ALOI-1	28c ALSI-2	28d ALOI-1	28e ALOI-5	28e ALSI-2	28f ALOI-1	28g ALOI-7	28h ALOI-7
<i>Selaginella eclipses</i> Buck	Buck's Meadow Spike-moss	G4	S4			X	3			X			X		X					
<i>Equisetum variegatum</i>	Variiegated Scouring-rush	G5	S5			X	5		X								X			
<i>Thelypteris palustris</i> Schott	Marsh Fern	G5T?	S5			X	17				X		X							
<i>Abies balsamea</i> (L.) Miller	Balsam Fir	G5	S5			X	33		X								X			
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	G5	S5			X	33		X		X	X	X				X	X		
<i>Picea glauca</i> (Moench) Voss	White Spruce	G5	S5			X	33			X								X		
<i>Juniperus communis</i> L. var. <i>depressa</i>	Common Juniper	G5T5	S5			X	34			X										
<i>Juniperus horizontalis</i> Moench	Creeping Juniper	G5	S5			X	34	M	X		X	X					X	X		
<i>Thuja occidentalis</i> L.	White Cedar	G5	S5			X	34		X	X	X	X		X		X	X	X		
<i>Aquilegia canadensis</i> L.	Wild Columbine	G5	S5			X	130				X									
<i>Ulmus americana</i> L.	American Elm	G5?	S5			X	151													X
<i>Pilea pumila</i> (L.) A. Gray	Clearweed	G5	S5			VU	155												X	
<i>Urtica dioica</i> L. ssp. <i>gracilis</i>	American Stinging Nettle	G5T?	S5			X	155												X	X
<i>Myrica gale</i> L.	Sweet Gale	G5	S5			X	160					X						X		
<i>Betula papyrifera</i> Marshall	Paper Birch	G5	S5			X	165				X	X	X	X				X		
<i>Cerastium fontanum</i> Baumg.	Mouse-eared Chickweed	G?	SE5			XI	178					X								
<i>Minuartia michauxii</i> (Fenzl) Farw.	Rock Sandwort	G5	S5			X	178		X	X	X	X	X			X	X			
<i>Polygonum persicaria</i> L.	Lady's-thumb	G?	SE5			XI	179												X	X
<i>Polygonum ramosissimum</i> Michaux	Bushy Knotweed	G5	S4			R	179												X	
<i>Rumex crispus</i> L.	Curly Dock	G?	SE5			XI	179												X	X
<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort	G4	S4			X	200	M		X	X	X	X	X	X	X				
<i>Hypericum perforatum</i> L.	Common St. John's-wort	G?	SE5			XI	200		X						X		X			
<i>Hypericum punctatum</i> Lam.	Spotted St. John's-wort	G5	S5			R	200					X								
<i>Malva neglecta</i> Wallr.	Common Mallow	G?	SE5			XI	205												X	X
<i>Viola nephrophylla</i> E. Greene	Northern Bog Violet	G5	S4			X	218			X					sp.	X			X	
<i>Populus balsamifera</i> L.	Balsam Poplar	G5T?	S5			X	234												X	
<i>Populus tremuloides</i> Michaux	Trembling Aspen	G5	S5			X	234												X	X
<i>Salix candida</i> Fluegge ex Willd.	Hoary Willow	G5	S5			X	234			X										
<i>Salix discolor</i> Muhlenb.	Pussy Willow	G5	S5			X	234												X	X
<i>Salix exigua</i>	Sandbar Willow	G5	S5			X	234												X	
<i>Salix petiolaris</i> J.E. Smith	Slender Willow	G4	S5			X	234				X								X	
<i>Salix serissima</i> (L. Bailey) Fern.	Autumn Willow	G4	S5			X	234												X	X
<i>Arabis hirsuta</i> (L.) Scop.	Hairy Rock-cress	G5T5	S5			X	237	M			X									
<i>Arabis lyrata</i> L. var. <i>lyrata</i>	Lyre-leaved Rock-cress		S4			X	237					X	X							
<i>Cardamine pratensis</i> L. ssp. <i>pratensis</i>	Cuckoo Flower	G5T5	S5			X	237				X									
<i>Erysimum cheiranthoides</i> L.	Wormseed Mustard	G5	SE5			XI	237													X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	28a AI-S1-2	28a AI-O1-1	28b AI-S1-2	28b AI-O1-1	28c AI-O1-1	28c AI-S1-2	28d AI-O1-1	28e AI-O1-5	28e AI-S1-2	28f AI-O1-1	28g AI-O1-7	28h AI-O1-7
<i>Rorippa sylvestris</i> (L.) Besser	Creeping Yellow Cress	G5	SE5			X	237			X						X				
<i>Arctostaphylos uva-ursi</i> (L.) Sprengel	Bear-berry	G5	S5			X	247		X		X						X			
<i>Lysimachia quadriflora</i> Sims	Prairie Loosestrife	G5?	S4			X	258				X									
<i>Lysimachia thyriflora</i> L.	Tufted Loosestrife	G5	S5			X	258					X								
<i>Primula mistassinica</i> Michaux	Bird's-eye Primrose	G5	S4			X	258				X		X	X	X			X		
<i>Ribes hirtellum</i> Michaux	Swamp Gooseberry	G5	S5			X	269						X							
<i>Sedum acre</i> L.	Mossy Stonecrop	G?	SE5			XI	274						X					X	X	X
<i>Sedum sarmentosum</i>	Stringy Stonecrop	G?	SE			XI	274													X
<i>Fragaria vesca</i> L. ssp. <i>americana</i>	Woodland Strawberry	G5T?	S5			X	277				X									
<i>Fragaria virginiana</i> Miller	Wild Strawberry	G5	S5			X	277				X	X		X	X			X		
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	G5	S5			X	277			X					X	X		X		
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	G5	S5			X	277			X				X	X	X			X	X
<i>Potentilla fruticosa</i> L. ssp. <i>floribunda</i>	Shrubby Cinquefoil	G5	S5			X	277	M		X	X	X	X	X	X	X		X		
<i>Potentilla norvegica</i> L.	Rough Cinquefoil	G5	S5			XI	277								X				X	X
<i>Potentilla recta</i> L.	Rough-fruited Cinquefoil	G?	SE5			XI	277													X
<i>Prunus pumila</i> L.	Sand Cherry	G5	S4S5			X	277	Mt?			X									
<i>Rosa palustris</i>	Swamp Rose	G5	S5			X	277					X								
<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i>	Wild Red Raspberry	G5	S5			X	277			X			sp.			X			X	
<i>Medicago lupulina</i> L.	Black Medick	G?	SE5			XI	285													X
<i>Proserpinaca palustris</i> L.	Mermaid-weed	G5	S4			X	289				X									
<i>Lythrum salicaria</i> L.	Purple Loosestrife	G5	SE5			XI	292				X		X		X				X	
<i>Epilobium ciliatum</i> Raf. ssp. <i>glandulosum</i>	Sticky Willow-herb	G5T?	SU			?	301					X	X		X				X	
<i>Oenothera parviflora</i> L.	Small-flowered Evening-primrose	G?	S5?			X	301												sp.	X
<i>Cornus stolonifera</i> Michaux	Red-osier Dogwood	G5	S5			X	307						X		X			X	X	
<i>Comandra umbellata</i> (L.) Nutt.	Bastard-toadflax	G5	S5			X	313		X								X	X		
<i>Rhamnus alnifolia</i> L'Her.	Alder-leaved Buckthorn	G5	S5			X	338					X								
<i>Vitis riparia</i> Michaux	Riverbank Grape	G5	S5			X	340													X
<i>Polygala senega</i> L.	Seneca Snakeroot	G4G5	S4			X	350	H		X						X				
<i>Rhus radicans</i> L. ssp. <i>rydbergii</i>	Rydberg's Poison-ivy	G5T	S5			X	361		X		X	X	X				X	X		
<i>Geranium robertianum</i> L.	Herb Robert	G5	SE5			XI	369					X							X	
<i>Impatiens capensis</i> Meerb.	Spotted Jewelweed	G5	S5			X	372						X						X	
<i>Gentianopsis virgata</i> (Raf.) Holub	Narrow-leaved Fringed Gentian	G5	S4			X	376				X									
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	G5T?	S5			X	378												X	
<i>Asclepias syriaca</i> L.	Common Milkweed	G5	S5			X	379								X				X	X
<i>Solanum dulcamara</i> L.	Climbing Nightshade	G?	SE5			XI	382												X	X

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	28a AI-S1-2	28a AI-O1-1	28b AI-S1-2	28b AI-O1-1	28c AI-O1-1	28c AI-S1-2	28d AI-O1-1	28e AI-O1-5	28e AI-S1-2	28f AI-O1-1	28g AI-O1-7	28h AI-O1-7	
<i>Calystegia sepium</i> (L.) R. Br.	Hedge Bindweed	G5	S5			X	383						X								
<i>Calamintha arkansana</i> (Nutt.) Shinn.	Wild Savory	G5	S4S5			X	392	M	X	X	X	X	X	X	X	X	X	X	X	X	
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Water-horehound	G5	S5			X	392					X	X								
<i>Lycopus uniflorus</i> Michaux	Bugleweed	G5	S5			X	392			X						X				X	
<i>Nepeta cataria</i> L.	Catnip	G?	SE5			XI	392												X	X	
<i>Prunella vulgaris</i> L.	Heal-all	G5	S5			X	392		X								X	X			X
<i>Scutellaria parvula</i> Michx. var. <i>parvula</i>	Small Skullcap	G4T?	S4			VU	392	H					X								
<i>Plantago lanceolata</i> L.	English Plantain	G5	SE5			XI	396												X	X	
<i>Fraxinus americana</i> L.	White Ash	G5	S5			X	398												X		
<i>Fraxinus pennsylvanica</i> Marshall	Red/Green Ash	G5	S5			X	398				X	X									
<i>Agalinis paupercula</i> (A. Gray) Britton	Small-flowered Agalinis	G5	S4S5			X	399				X									X	
<i>Castilleja coccinea</i> (L.) Sprengel	Indian Paintbrush	G5	S5			X	399	M					X	X					X		
<i>Verbascum thapsus</i> L.	Common Mullein	G?	SE5			XI	399				X		X	X					X	X	X
<i>Veronica arvensis</i> L.	Corn Speedwell	G?	SE5			XI	399					X									
<i>Campanula rotundifolia</i> L.	Harebell	G5	S5			X	411		X	X	X		X		X	X	X	X	X		
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	G5	S5			X	411						X		X						
<i>Lobelia spicata</i> Lam.	Pale-spiked Lobelia	G5	S4			X	411		X	X						X	X	X			
<i>Galium aparine</i> L.	Cleavers	G5	S5			X	416					X									
<i>Houstonia canadensis</i> Willd.	Fringed Houstonia	G4G5	S4?			X	416		X		X	X				X	X	X			
<i>Houstonia longifolia</i> Gaertner	Long-leaved Houstonia	G4G5	S4?			X	416			X									X		
<i>Achillea millefolium</i> L.	Yarrow	G5	S5			X	423		X			X					X				
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	G5	S5			X	423													X	
<i>Aster laevis</i> L.	Smooth Aster	G5	S5			X	423												X		
<i>Aster pilosus</i> Willd. var. <i>pringlei</i>	Pringle's Aster	G4G5	S4			X	423	M												X	
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy	G?	SE5			XI	423		X	X						X	X				
<i>Cirsium vulgare</i> (Savi) Tenore	Bull Thistle	G5	SE5			XI	423													X	
<i>Doelleringia umbellata</i>	Flat-topped Aster	G5	S5			X	423						cf.		cf.						
<i>Erigeron philadelphicus</i> L. ssp. <i>philadelphicus</i>	Philadelphia Fleabane	G5T?	S5			X	423													X	X
<i>Eupatorium perfoliatum</i> L.	Boneset	G5	S5			X	423						X		X					X	
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	Grass-leaved Goldenrod	G5	S5			X	423							X						X	X
<i>Helenium autumnale</i> L.	Sneezeweed	G5	S5			X	423				X										
<i>Hieracium aurantiacum</i> L.	Devil's Paintbrush	G?	SE5			XI	423		X								X				
<i>Hieracium piloselloides</i> Villars	King Devil Hawkweed	G?	SE5			XI	423			X						X					
<i>Prenanthes racemosa</i> Michaux	Smooth White-lettuce	G5T?	SU			X	423		X		X						X				
<i>Senecio pauperculus</i> Michaux	Balsam Ragwort	G5	S5			X	423	M	X	X	X			X		X	X	X			

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	28a AL-S1-2	28a AL-O1-1	28b AL-S1-2	28b AL-O1-1	28c AL-O1-1	28c AL-S1-2	28d AL-O1-1	28e AL-O1-5	28e AL-S1-2	28f AL-O1-1	28g AL-O1-7	28h AL-O1-7
<i>Solidago canadensis</i> L.	Canada Goldenrod	G5	S5			X	423		X						X				X	X
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	G5T?	S5			X	423					X								
<i>Solidago ohioensis</i> Riddell	Ohio Goldenrod	G4	S4			X	423		X	X		X	X	X	X					
<i>Solidago ptarmicoides</i> (Nees) B. Boivin	Upland White Goldenrod	G5	S5			X	423	E		X	X	X	X	X						
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	G4G5	S5			X	423		X	X	X	X	X	X			X	X		
<i>Symphyotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Hairy-stemmed Panicled Aster	G5	S5			X	423													X
<i>Symphyotrichum lateriflorum</i>	Calico Aster	G5	S5			X	423			X										
<i>Taraxacum officinale</i> G. Weber	Common Dandelion	G5	SE5			XI	423					X								
<i>Juncus balticus</i> Willd.	Baltic Rush	G5	S5			X	455			X			X							X
<i>Juncus dudleyi</i> Wieg.	Dudley's Rush	G5	S5			X	455				X								X	X
<i>Carex aquatilis</i> Wahlenb.	Water Sedge	G5	S5			X	457				X									
<i>Carex aurea</i> Nutt.	Golden-fruit Sedge	G5	S5			X	457				X									
<i>Carex buxbaumii</i> Wahl.	Brown Bog Sedge	G5	S5			X	457						X							
<i>Carex crawei</i> Dewey	Crawe's Sedge	G5	S4			X	457	E	X	X					X					
<i>Carex diandra</i> Schrank	Lesser Panicled Sedge	G5	S5			X	457				X									
<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge	G5	S5			X	457		X		X	X	X				X			
<i>Carex garberi</i> Fern.	Elk Sedge	G4	S4			X	457		X							X				
<i>Carex hystericina</i> Muhlenb. ex Willd.	Porcupine Sedge	G5	S5			X	457							X						
<i>Carex interior</i> L. Bailey	Inland Sedge	G5	S5			X	457				X									
<i>Carex lasiocarpa</i> Ehrh.	Hairy-fruited Sedge	G5	S5			X	457			X	X									
<i>Carex richardsonii</i> R. Br.	Richardson's Sedge	G4	S4?			X	457	E			X		X							
<i>Carex scirpoidea</i> Michx. ssp. <i>convoluta</i>	Scirpus-like Sedge	G5	S5			X	457	H			X									
<i>Carex sterilis</i>	Sterile Sedge	G5	S5			X	457				X									
<i>Carex viridula</i> Michaux ssp. <i>viridula</i>	Greenish Sedge	G5?T?	S5			X	457					X		X						
<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush	G5	S5			X	457		X			X	X	X	X					
<i>Eleocharis acicularis</i>	Elliptic Spike-rush	G5	S5			X	457												X	X
<i>Eleocharis compressa</i> Sullivant	Flat-stemmed Spike-rush	G4	S4			R	457	E			X									
<i>Eleocharis elliptica</i> Kunth	Elliptic Spike-rush	G5	S5			X	457				X									
<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush	G5	S4?			X	457				X									
<i>Scleria verticillata</i> Muhlenb. ex Willd.	Low Nut-rush	G5	S3			X	457			X										
<i>Agrostis scabra</i> Willd.	Rough Hair Grass	G5	S5			X	458		X	X	X		X		X	X	X			
<i>Calamagrostis canadensis</i> (Michaux) P. Beauv	Canada Blue-joint	G5	S5			X	458			X	X	X	X	X		X				
<i>Calamagrostis stricta</i> (Timm) Koeler ssp.	Northern Reed Grass	G5T5	S5			X	458				X									
<i>Danthonia spicata</i> (L.) P. Beauv. ex Roemer	Poverty Oat Grass	G5	S5			X	458		X		X						X			

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	MNR	BPEN	FAM#	Alvar Fidelity	28a AI-S1-2	28a AI-O1-1	28b AI-S1-2	28b AI-O1-1	28c AI-O1-1	28c AI-S1-2	28d AI-O1-1	28e AI-O1-5	28e AI-S1-2	28f AI-O1-1	28g AI-O1-7	28h AI-O1-7
<i>Deschampsia caespitosa</i> (L.) P. Beauv.	Tufted Hair Grass	G5	S5			X	458	H		X	X	X	X		X	X		X		X
<i>Elymus trachycaulus</i> (Link) Gould in Shinn.	Slender Wheat Grass	G5	S5			X	458				X									
<i>Glyceria striata</i>	Fowl Manna Grass	G5	S5			X	458					X								
<i>Muhlenbergia glomerata</i> (Willd.) Trin.	Marsh Wild-timothy	G5	S5			X	458	M			X									X
<i>Panicum acuminatum</i> Ell. var. <i>fasciculatum</i>	Hairy Panic Grass	G5T5	S5			X	458			X	X	X	X	X	X	X				X
<i>Panicum capillare</i> L.	Witch Grass	G5	S5			X	458													X
<i>Panicum flexile</i> (Gattinger) Scribner	Wiry Witch Grass	G4G5	S4			X	458	H			X									
<i>Panicum virgatum</i> L.	Switch Grass	G5	S4			X	458			X	X					X				
<i>Poa compressa</i> L.	Canada Blue Grass	G?	S5			X	458		X				X				X	X		
<i>Poa pratensis</i> L. ssp. <i>pratensis</i>	Kentucky Blue Grass	G5T	S5			X	458													X
<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem	G5	S4			X	458			X	X					X				
<i>Sporobolus vaginiflorus</i> (Torrey ex A. Gray)	Ensheathed Dropseed	G5	S4			X	458				X									
<i>Lilium philadelphicum</i> L.	Wood Lily	G5	S5			X	475		X								X			
<i>Maianthemum stellatum</i> (L.) Link	Starry False Solomon's-seal	G5	S5			X	475		X		X	X					X			
<i>Tofieldia glutinosa</i> (Michaux) Pers. ssp.	False Asphodel	G5T4	S4?			X	475			X	X					X				
<i>Zigadenus elegans</i> Pursh ssp. <i>glaucus</i>	White Camass	G5T4?	S4			X	475					X								
<i>Iris versicolor</i> L.	Wild Blue-flag	G5	S5			X	476				X	X								
<i>Sisyrinchium montanum</i> E. Greene	Little Blue-eyed Grass	G5	S5			X	476							X						
<i>Sisyrinchium mucronatum</i> Michaux	Blue-eyed Grass	G5	S4S5			X	476		X	X	X	X	X			X	X	X		
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	G?	SE5			XI	489						X							
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	G5	S5			X	489				X									

Non-vascular Plants of the Bowes Island Alvar (Fishing Islands)

(based on Schaefer 1996)

TAXON	NAME	GRANK	SRANK	28c ALO1-1
A	<i>Gloeocapsa alpina</i>			X
A	<i>Nostoc commune</i>			X
A	<i>Trentepohlia annulata</i>	T	T	X
B	<i>Bryum sp.</i>			X
B	<i>Ditrichum flexicaule</i>	G5	S5	X
B	<i>Schistidium rivulare</i>	G4G4	S5	X
L	<i>Cladonia rangiferina</i>	G5	S5	sp.
L	<i>Cladonia symphycarpa</i>	G3G5	S?	cf.
L	<i>Leptogium lichenoides</i>	G5	S5?	X
L	<i>Peltigera canina</i>	G5	S5?	X
L	<i>Placynthium nigrum</i>	G?	S5?	X
L	<i>Toninia sedifolia</i>	G?	S?	sp.

4. CONSERVATION STRATEGY FOR ALVARs OF THE BRUCE PENINSULA

Alvar Conservation Activities to Date

A number of activities and programs have been undertaken or are ongoing that have contributed to the conservation of alvars on the Bruce Peninsula. For example, alvar habitats were identified as being significant as early as the 1970s by Cuddy *et al.* (1976), and alvar sites were consequently included in Candidate Nature Reserves in the Niagara Escarpment Plan Area. This work was followed up by various ANSI studies (*e.g.*, Johnson 1982a-e, Jalava *et al.* 1994, Varga *et al.* 1994, Riley *et al.* 1996, Johnson 2003, Jalava 2005b-c, Jalava 2006a-b), and alvars within ANSIs have received a degree of protection in the municipal land-use planning process.

The International Alvar Conservation Initiative (IACI), coordinated by The Nature Conservancy's Great Lakes Program office in Chicago, Illinois, studied alvars across their range in North America (Reschke *et al.* 1999) and produced detailed, standardized field inventories of the majority of significant alvar sites in Ontario, Michigan, New York and Ohio, including many sites on the Bruce Peninsula. Field work included botanical surveys, vegetation community inventory, classification and mapping, specific studies of insects (Bouchard 1998), land snails (Grimm 1995, 1996), and several taxa new to science were described (Grimm 1996). Ecological processes, grazing impacts (Koh and Bazely 1997), and fire history and natural succession studies were conducted (Schaefer 1996b, Schaefer and Larson 1997, Jones 2000, Jones and Reschke 2005). A master list of sites was prioritized for conservation action. The IACI culminated with a Workshop on North American alvars held in Tobermory in June 1998, involving approximately 100 participants. The IACI led to many subsequent alvar conservation activities in Ontario. For example, the IACI work was followed up by the ecological theme study of Ontario alvars (Brownell and Riley 2000) coordinated by the Federation of Ontario Naturalists (FON). This project evaluated alvars in the context of Ontario's ecodistricts, collected additional field data, ranked sites, and made recommendations on the conservation (*i.e.*, ANSI) status of alvar sites across the province.

Several key alvar sites on the Bruce Peninsula have been secured by non-government conservation organizations such as the FON, The Nature Conservancy of Canada and the Escarpment Biosphere Conservancy. At Bruce Peninsula National Park and at private nature reserves such as FON's Bruce Alvar Nature Reserve (NR), management has focused on maintaining the integrity of alvar habitat. This has included routing trails away from sensitive areas and construction of boardwalks. The boardwalk at FON's Bruce Alvar NR was constructed entirely by volunteers (Jones and Jalava 2005).

Future Alvar Conservation on the Bruce Peninsula

To ensure that actions are undertaken efficiently and are not duplicated by groups working independently, future conservation activities for Bruce Peninsula alvar ecosystems should be done in consultation with the Bruce Peninsula – Manitoulin Island

Recovery Team (RT). The RT is currently finalizing a Recovery Strategy (Jones and Jalava 2005) for the region's alvar ecosystems and featured species-at-risk occurring within them. Because the goals and objectives of the initial RS are primarily focused on the recovery of three of the five featured alvar species (Gattinger's Agalinis, Lakeside Daisy and Houghton's Goldenrod), it is likely that key alvar sites that do not support these species will be lower priority for implementation of recovery activities. The conservation strategy encouraged in this report applies to all the alvars of the Bruce Peninsula region and all the significant flora and fauna occurring on them. As the vast majority of human impacts, threats and corresponding recovery activities are the same whether a featured species is present at an alvar or not, the conservation approach recommended here should be complementary to the RS, and should in fact not differ greatly from it. The Jones and Jalava (2005) report is therefore the primary source used to develop the conservation strategy suggested here.

Inventory, Research and Monitoring

The following activities relating to site and species inventory, ecological and biological research and monitoring should be addressed in a conservation strategy for Bruce Peninsula alvars.

1. Standard site inventories need to be completed for a number of known and potential alvar sites in order to properly evaluate them and compare them with other sites in their respective ecodistricts. Sites that are not referenced in the list below require an inspection to determine if alvar is present. References associated with a site indicate that alvar habitat is present; such sites are in need of a site survey using IACI / NHIC standards.
 - a. Ecodistrict 6E-14
 - i. Additional areas south of George Lake within BPNP
 - ii. Nawash and Saugeen Hunting Grounds (NHIC 2006)
 - iii. Interior areas of Bruce County Forest – Miller Lake Tract ANSI (Johnson 2003)
 - iv. Interior areas west of Cabot Head (probably not alvar)
 - v. South of Upper Andrew Lake (probably not alvar)
 - b. Ecodistrict 6E-4
 - i. Cape Croker - Halfway Point (Schaefer 1996a)
 - ii. Cape Croker - Porcupine Point (Schaefer 1996a)
2. Monitoring of alvar habitat quality, potential on-site and off-site threats and rare species populations should be undertaken systematically and regularly at all priority alvar sites. Jones and Jalava (2005) recommend the development and implementation of a standard alvar monitoring protocol.
3. Research into the biological needs, limiting factors and threats to the many rare species of Bruce Peninsula alvars (refer to Jones and Jalava 2005 for specific research needs relating to the featured species).

4. Jones and Jalava (2005) recommend population viability analyses (PVA's) for alvar species-at-risk.
5. Inventory is particularly needed on invertebrates and non-vascular plants, as both are groups with high diversity on alvars and play critical roles in the functioning of the ecosystem.
6. Research into the status, impacts and control of exotic and invasive species is needed in order to plan recovery of disturbed alvars on the Bruce Peninsula (and the Manitoulin region) (Jones and Jalava 2005).
7. A better understanding of the factors that maintain alvar (fire, hydrology) is needed to ensure alvars are adequately protected for the long-term.
8. Jones and Jalava (2005) recommend an assessment of current and proposed land uses within and adjacent to priority alvar and designated species sites to determine imminent threats and help focus land securement and site stewardship activities.
9. According to Jones and Jalava (2005), "Both Houghton's Goldenrod and Lakeside Daisy are members of the Aster family, which includes a number of species considered noxious weeds. Herbicides designed to control related species could have an effect on these designated species. Also, many alvar pollinators are generalists, so pesticides could potentially affect the reproduction and survival of rare alvar species. While the current impact of pesticides on alvar is probably minor, the potential for inadvertent impacts on alvars may increase as the use of bioengineered pest controls is increased and new bioengineered entities enter native ecosystems."
10. The impact of trails (*e.g.*, Bruce Trail) and the intensity of their use on designated species and significant alvar habitat requires study (Jones and Jalava 2005).
11. NHIC and ELC alvar classification and conservation rankings need to be updated to reflect all the information gathered on alvars since the mid-1990's.

Identifying Key Alvar Sites for Conservation Action

Using the information provided in this report, it is possible to begin prioritizing conservation activities at Bruce Peninsula alvars. Certain sites or meta-sites have exceptionally high concentrations of habitat types, species diversity and rare species. A synopsis of high-ranking sites is provided in Section 2 of this report, and more detailed information on them is provided in tables 2, 3, 5 and 6, as well as individual site summaries and associated maps.

A gap analysis should be conducted to determine which elements (vegetation community types and rare species) are adequately protected within parks, nature reserves,

conservation easements, etc., and which are not. Tables 2, 3, 5 and 6 provide a general indication as to the level of protection of each of the alvar sites.

For key “unprotected” sites on private land, the focus should be on developing stewardship agreements and educating private landowners on the significance and sensitivity of alvar habitats and species. Stewardship education should in particular ensure that human impacts to alvar habitat and ways to minimize such impacts are clearly elucidated. Such private land sites should also be the highest priority for securement by conservation organizations. For key sites on public land, management plans should be developed and implemented to ensure minimal human impacts on alvars.

Site Stewardship and Managing Human Impacts

The impacts identified below are listed in Jones and Jalava (2005) as being the main threats to alvar habitats in the Bruce Peninsula – Manitoulin Island region.

- Shoreline subdivision development constructing buildings on alvar
- Trucking-in fill dirt and gravel (introduces potentially invasive exotic species)
- Building roads across alvar
- Driving heavy machinery across alvar vegetation
- Limestone/dolostone quarrying and removing stone (glacial or limestone erratics) from alvars
- ATV use, especially off-trail, on alvars
- Removing alvar vegetation or clearing of ground
- Planting lawns, trees or non-native species
- Livestock grazing (reduces native species composition, introduces weeds)
- Feeding hay to livestock on alvar (also introduces exotic species)
- Over-browsing by deer (which prefer certain key alvar species)
- Using alvar as staging grounds or roads during logging of adjacent forests
- High usage by visitors and hikers (causing trampling of vegetation and introduction of exotic species)
- Camping activities (such as placing a tent, fire pit, or latrine on alvar)
- Fire suppression (may result in succession to forest on some alvars)
- Intentional burning of alvar habitats
- Filling in or altering adjacent wetlands (hydrological impacts on alvars)
- Any other activities that disturb the soil or vegetation

Private land stewards, First Nations and public land managers should be provided the information, expertise and other forms of assistance necessary to reduce or eliminate the impacts of the activities listed above. Management plans should be developed for priority alvar sites. Existing zoning and management actions for provincial and national park occurrences of significant alvar and rare species habitat should be assessed to ensure that ecologically sensitive features and sites are appropriately addressed.

Where possible, signs may be posted and barriers constructed to reduce damage by pedestrians and vehicles. Programs such as Area of Natural and Scientific Interest

(ANSI), Conservation Land Tax Incentive Program (CLTIP), Habitat Stewardship Program (HSP), Ecological Gifts programs may be used to identify and implement the most appropriate conservation strategies for unprotected priority sites. Stewardship Councils should be involved in the stewardship of alvars and designated species habitat on private lands. Enforcement may be necessary where measures such as education and signage do not appear to be working, as was the case recently at Baptist Harbour, where illegal bonsai collectors were reported, apprehended and charged thanks to the vigilance of watchful neighbours and Bruce Peninsula National Park staff concerned about alvar habitat on private land.

Public Outreach and Education

A considerable amount of public contact and education about alvars has already occurred, mostly in association with the IACI. Contact was made with hundreds of alvar landowners when permission was sought to survey their lands for the IACI. This was followed up with stewardship packages given to many of these landowners. On the Bruce, the Chippewas of Nawash (Cape Croker) and the Saugeen First Nation (Chief's Point) have been engaged in discussions regarding alvar conservation on a number of occasions with the Ontario Ministry of Natural Resources, the Nature Conservancy of Canada and others. The aggregate industry has also been informed about alvars, and the Aggregate Producers Association of Ontario featured alvars in their annual reports in both 2002 and 2003 (OARC 2002, 2003). Various media publicized alvar during the IACI's Alvar Workshop in June 1998. The Nature Conservancy Canada (NCC), Ontario Nature (Federation of Ontario Naturalists) and The Nature Conservancy – Great Lakes Program have featured alvars in their publications and on their web sites. Bruce Peninsula National Park has ongoing public education relating to alvars as part of their interpretive program.

The next steps for outreach and communications according to Jones and Jalava (2005) are:

1. Prepare an alvar recovery “communications strategy” that addresses target audiences, what information should be included, how messages are to be delivered, what products are to be created, costs, and funding sources.
2. Prepare and distribute information to target audiences according through workshops, web site, alvar video, displays for the Manitoulin ferry and Bruce Peninsula NP visitor centre, etc.
3. Provide policy, stewardship and management information to municipalities, agencies and First Nations.
4. Provide habitat information and mapping to planning and review agencies; update mapping as new information becomes available.
5. Plan consultation with parties affected by legislation; include scheduling and

information products to be used.

6. Train public land managers, municipal planners, park wardens, conservation officers and building inspectors on field identification and management of alvar habitats and species-at-risk.
7. Coordinate efforts with agencies and researchers in the United States involved in alvar and designated species research and recovery.
8. Set up a locally-based “Friends of the Alvars” or similar conservation minded group to lobby for awareness and protection of alvars.
9. Seek partnerships to help with implementation of recovery actions.
10. Provide recognition packages and stewardship awards to private land stewards.
11. Coordinate efforts with other recovery teams with overlapping goals and objectives (*e.g.*, the Massasauga Rattlesnake Recovery Team).
12. Encourage policies to protect ANSIs and critical habitat in Official Plans and other municipal planning documents, and encourage consistent approaches across municipalities.
13. Encourage COSEWIC status assessments for other rare alvar taxa.
14. Provide information to planning agencies on legal and policy approaches for protection and recovery of COSEWIC-designated alvar taxa.
15. Identify and map globally and provincially significant alvars not known to contain designated species as Significant Wildlife Habitat, based on provincial guidelines in OMNR (2000).

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APPENDIX 1

CONSERVATION RANKING DEFINITIONS³

Species – Global Rank (GRANK): Global ranks are assigned by a consensus of the network of natural heritage programs (conservation data centres), scientific experts, and [The Nature Conservancy](#) to designate a rarity rank based on the range-wide status of a species, subspecies or variety. The most important factors considered in assigning global (and provincial) ranks are the total number of known, extant sites world-wide, and the degree to which they are potentially or actively threatened with destruction. Other criteria include the number of known populations considered to be securely protected, the size of the various populations, and the ability of the taxon to persist at its known sites. The taxonomic distinctness of each taxon is also considered. Hybrids, introduced species, and taxonomically dubious species, subspecies and varieties have not been included.

G1 Extremely rare; usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 Very rare; usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.

G3 Rare ; usually between 20 and 100 occurrences; or fewer occurrences, but with large number of individuals in some populations; may be vulnerable to large-scale disturbances.

G4 Common; usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 Very common; demonstrably secure under present conditions.

GU Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.

G? Unranked, or, if following a ranking, rank tentatively assigned (e.g. G3?).

Q Denotes that the taxonomic status of the species, subspecies, or variety is **questionable**.

T Denotes that the rank applies to a subspecies or variety.

Species - Provincial Rank (SRANK): Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be ascertained.

S1 Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.

S2 Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

S3 Rare in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.

S4 Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

S5 Very common and demonstrably secure in Ontario.

SH Historically known from Ontario, but not verified recently (typically not recorded in the province in the last 20 years); however suitable habitat is thought to be still present in the province and there is reasonable expectation that the species may be rediscovered.

SR Reported for Ontario, but without persuasive documentation which would provide a basis for either accepting or rejecting the report; **SRF Reported falsely** from Ontario.

SX Apparently extirpated from Ontario, with little likelihood of rediscovery. Typically not seen in the province for many decades, despite searches at known historic sites.

SE Exotic; not believed to be a native component of Ontario's flora.

SZ Not of practical conservation concern, as there are no clearly definable occurrences; applies to long distance migrants, winter vagrants, and eruptive species too transitory and/or dispersed in their occurrence(s) to be reliably mapped; most such species are non-breeders; however, they may occasionally breed. **SZB** Breeding migrants/vagrants; **SZN** Non-breeding migrants/vagrants.

SA Accidental; of accidental or casual occurrence in Ontario; far outside its normal range; some species may occasionally breed in the province. **SAB/SAN** Breeding/non-breeding accidental.

C Captive/Cultivated; existing in the province only in a cultivated state; introduced population not yet fully established and self-sustaining.

S? Not Ranked Yet, or if following a ranking, Rank Uncertain (e.g. S3?).

³ - Source: NHIC (2006) unless otherwise stated.

SU Unrankable, often because of low search effort or cryptic nature of the species, there is insufficient information available to assign a more accurate rank; more data is needed.

Vegetation Communities - Global Rank (GRANK): Heritage Programs such as the NHIC use a combination of global and provincial ranks as a tool to prioritize conservation and protection efforts, focusing efforts first on those elements of diversity that are both globally and provincially rare. Global ranks for each element are assigned by The Nature Conservancy (United States), based upon consideration of the provincial and state ranks assigned by Heritage Programs for the element across the range of its distribution, as well as the opinion of scientific experts. The two major criteria used in determining a community's rank are the total number of occurrences and the total areal extent of the community range-wide. Secondary factors used in determining global rank include measures of the geographic range of an element's distribution, trends in status (*e.g.*, expanding or shrinking range), trends in condition (*e.g.* declining condition of remaining areal extent), threats, and fragility. Until recently, global ranks were unavailable for community types, as there was no overall classification scheme that heritage programs could use to consistently classify vegetation according to similar standards. The Nature Conservancy (U.S.) has been working with Heritage Programs to develop a standardized, hierarchical North American classification system appropriate for conservation planning and management, and for the long-term monitoring of ecological communities and ecosystems. Global ranks are provided by The Nature Conservancy (TNC), Midwestern Regional Office, Minneapolis, Minnesota, in December 1996. Global ranks are defined as follows:

G1 - Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining hectares) or because some factor(s) make it particularly vulnerable to extinction.

G2 - Imperiled globally because of extreme rarity (6 to 20 occurrences or few remaining hectares) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 - Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (*e.g.* a single province or physiographic region) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

Vegetation communities assigned lower ranks, such as **G4** and **G5**, are considered to be globally secure. A rank of **G4** refers to a community that is apparently secure globally, while a rank of **G5** indicates a community is demonstrably secure globally.

Global ranks can be modified further, usually in cases where insufficient information exists for a community type. For example, **G2G3** indicates that an element is rare, but it is not known if it is clearly **G2** or **G3**. Since the global classification has only very recently been developed, and is based in some cases on incompletely documented community occurrences, in some cases there is uncertainty as to the validity or appropriateness of the global community type. In such cases, a rank of **GQ** may be applied. There are numerous information gaps for many communities, hence, a number of global types have insufficient information on which to properly determine rank. These receive an interim rank of **G?**, until more information on the community becomes available.

Vegetation Communities - Provincial Rank (SRANK): The NHIC uses a ranking system that considers the provincial rank of an element (=species or community type) as a tool to prioritize protection efforts. These ranks are not legal designations. The provincial (=subnational) rank is known as SRANK. These ranks have been assigned using the best available scientific information, and follow a systematic ranking procedure developed by The Nature Conservancy (U.S.). The ranks are based on the three factors outlined in the three previous columns, namely: estimated number of occurrences, estimated community areal extent, and estimated range of the community within the province. The provincial ranks are as follows:

S1 - Extremely rare in Ontario; usually 5 or fewer occurrences in the province, or very few remaining hectares.

S2 - Very rare in Ontario; usually between 5 and 20 occurrences in the province, or few remaining hectares.

S3 - Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with some extensive examples remaining.

Communities assigned lower ranks, such as **S4** and **S5**, are considered to be common and widespread in Ontario. A rank of **S4** denotes a community that is apparently secure in the province, with many occurrences, while **S5** indicates it is demonstrably secure in the province. Provincial ranks may be further modified. For example, **S2S3** indicates that an element is rare, but insufficient information exists to accurately assign a single rank. **SH** indicates that an element is known from the province historically, but hasn't been seen in many years, although it is not known conclusively to be extirpated. **SX** indicates that an element is extirpated from the province.

ELEMENT OCCURRENCE RANKING

Ranking Species Element Occurrences: An element occurrence (EO) is a unit of land and/or water with practical conservation value for the element (species/community). Standard EO specifications are developed in consultation with experts on the element; they are taxon-specific (or community-specific), and they may vary with geographic location, since, for example, species sometimes exhibit different habitat requirements and population biology characteristics in different parts of their ranges. EO Specifications are developed in consultation with experts on the element (an animal or plant species, or a vegetation type). EO Ranks are effectively ranks of the “quality” or “predicted long term viability” of an occurrence. They are very useful conservation tools, since they will generally indicate the sites where conservation action and conservation funding will have the greatest probability of success. Sites with multiple highly ranked (i.e., A or B) element occurrences of the rarest species should be the top priority for conservation activities. The following are the element occurrence ranking values and their definitions:

A = Excellent predicted viability (p.v.)

B = Good p.v.

C = Fair p.v.

D = Low p.v.

E = Extant

F = Failed to find

H = Historical (>20 years)

X = Extirpated

EO Location accuracy is coded as: 1 = accurate to within 10m, 2 = accurate to within 100m, 3 = accurate to within 1km, 4 = accurate to within 10km

Ranking Vegetation Community Element Occurrences: The methodology for determining EO ranks for communities is quite complex and will not be fully articulated here, but it is standardized and well documented. The British Columbia Conservation Data Centre has clearly articulated the methodology and posted it on their web site at: <http://srmwww.gov.bc.ca/cdc/ecology/eoranking.htm>. Three major criteria are initially assessed for a community occurrence (size, condition and landscape context).

APPENDIX 2.

2007 FIELDWORK UPDATE

Bruce Peninsula National Park Dwarf Lake Iris and Hill's Thistle Inventories

In anticipation of the preparation of recovery strategies, the Bruce Peninsula – Manitoulin Island Alvar Recovery Team recommended additional inventory work for the Threatened Dwarf Lake Iris (*Iris lacustris*) and Hill's Thistle (*Cirsium hillii*) were. Parks Canada Species at Risk funding was designated in 2007-08 to undertake these inventories. Objectives were to inventory previous records that had not been comprehensively surveyed within the past five years and to search suitable habitat for new records.

The table below summarizes sites surveyed in the Bruce Peninsula National Park Greater Park Ecosystem (GPE) in 2007. **Bolded** sites contained alvar habitat, and ***bolded and italicized*** sites had newly discovered alvar habitat. Additional data on alvar habitats at these sites was gathered, but it was not possible to include it in the present report.

Location	2007 Survey Date
S of Tobermory	June 15
McLander Marsh	June 15
Interior areas south of Dorcas Bay Road at Singing Sands	June 16
Sideroad Creek Alvar	June 16
Dorcas Bay Road at Singing Sands	June 16
<i>William Henry Marsh Alvar and trail</i>	<i>June 17</i>
<i>East of Alvar West of Hwy 6</i>	<i>June 17</i>
Eagle Harbour	June 17
West of Alvar West of Hwy 6	June 17
Niubin Alvar	June 17
Black Creek PP	June 18
NCC Rover Property	August 22
Trail to NCC Rover Property	August 22, September 8
Road Allowance N of Scugog Lake near Johnsons Harbour Rd	August 22
Driftwood Cove alvar	September 8
SW of George Lake – additional areas	September 10
Johnson's Harbour Rd. / Dyer's Bay Rd.	September 11 – 12
Black Creek PP	September 12
Greenough Point – Greenough Harbour	September 12
Mouth of Spring Creek	September 13
Bradley Harbour	September 13
Pine Tree Harbour	September 14
Hopkins Bay	September 14
Bear's Rump Island	September 17
Cove Island	September 17
Doctor Island	September 17

***Species at Risk Inventory Project, Cape Croker and Nawash Hunting Grounds
for Chippewas of Nawash First Nation***

During the fall of 2007 alvar habitats on Chippewas of Nawash First Nation lands were surveyed by a team comprised of Chippewas of Nawash band members and the author of this report. The project was supported by the Chippewas of Nawash First Nation, the Saugeen Ojibway First Nation Environmental Office, the Aboriginal Funds for Species at Risk of the Government of Canada, and was conducted in partnership with Parks Canada, who provided in-kind support and mapping. A considerable amount of new and updated information was gathered on alvar sites and Species at Risk at Cape Croker (Site #22 of this report) as well as at the Nawash Hunting Grounds south of Emmett Lake Road (Site #9 of this report). Data collected during that study are under the custodianship of the Chippewas of Nawash First Nation. The data will be used to assist in land use planning, conservation planning and SAR protection. It is hoped that this project will continue in 2008-2009.

