MANAGEMENT PLAN

BURNT CAPE ECOLOGICAL RESERVE

Parks and Natural Areas Division
Department of Environment and Conservation
Government of Newfoundland and Labrador

2000

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1.0 INTRODUCTION

The Wilderness and Ecological Reserves Act (WER Act) 1980, provides for the protection of important natural areas in Newfoundland and Labrador. These areas are established for preservation of natural ecosystems, outdoor recreation pursuits, scientific research and public education. More specifically, the WER Act provides the following objectives for establishing ecological reserves:

- to provide for scientific research and educational purposes in aspects of the natural environment;
- to preserve the habitat of an animal or plant species that is rare or endangered;
- to provide standards against which the effect of development in other areas may be measured;
- to provide an opportunity for study of the recovery of ecosystems from the effects of modification by human beings;
- to preserve rare botanical, zoological, geological or geographical characteristics;
- to preserve representatives of distinct ecosystems in the province; or
- to preserve organisms in their natural habitat to ensure the preservation of their gene pools.

The WER Act provides for an Advisory Council, appointed by Cabinet, to advise government on all matters relating to reserves. The Advisory Council, in cooperation with Parks and Natural Areas Division, Department of Environment and Conservation, oversees a rigorous establishment process involving an interagency review of reserve proposals, followed by public hearings, before an area is fully designated as a reserve by Cabinet decision. Throughout the process, public input is encouraged, particularly in communities near proposed reserve sites. Following establishment, reserves are managed by Parks and Natural Areas Division.

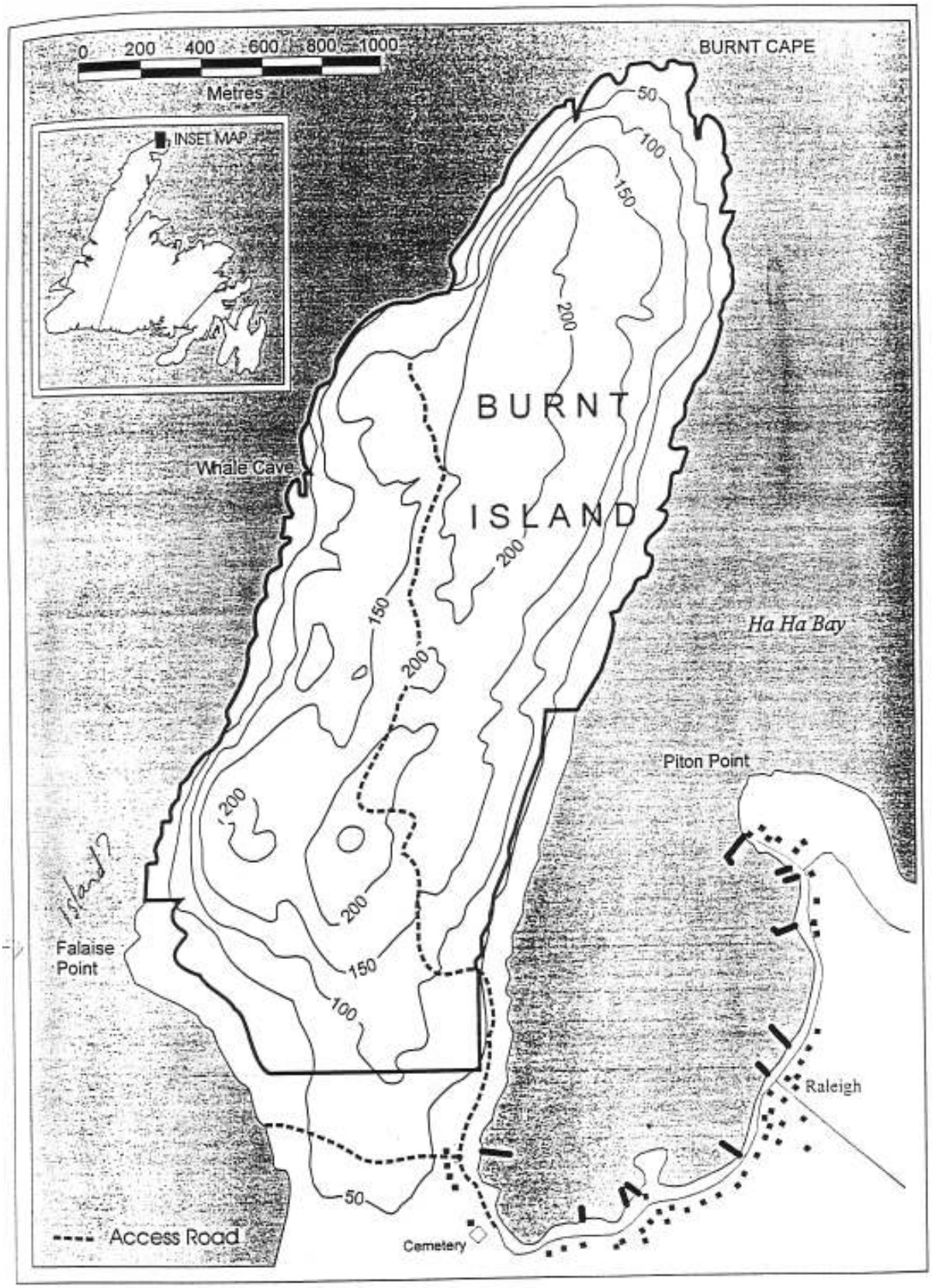


Figure 1: Burnt Cape Ecological Reserve

This document describes the history and biophysical characteristics of the Burnt Cape Island Ecological Reserve. In addition, it outlines the reserve management policies, guidelines and regulations.

2.0 BACKGROUND INFORMATION

Site Location

The Burnt Cape Ecological Reserve is located at the tip of the Northern Peninsula adjacent to the-community of Raleigh (Figure 1). Burnt Cape is a small limestone peninsula, adjoined to the Northen Peninsula by a narrow strip of land. The Reserve does not encompass the entire Cape; its southern boundary is located approximately a half kilometer from the junction of the Cape and the Northern Peninsula. The boundary was designed to exclude private land to the south. As well at the request of the community of Raleigh, the boundary of the provisional reserve was adjusted to exclude two areas: a small coastal meadow along the southeast boundary, which they plan to develop as a picnic and day use area and a beach area along the southwest boundary traditionally used for bonfires . An unpaved road leads from the community of Raleigh to the centre of the Reserve. This service road was originally developed to provide access to former quarry operations on the Cape and will remain as a means of access.

Ecological Significance

Burnt Cape is considered one of the most important botanical sites in insular Newfoundland. The Reserve site supports 34 species of rare plants (refer to Appendix I) and a total of just over 300 species of plants (refer to Appendix II). Beyond its provincial significance, as the only known location in the world for Burnt Cape Cinquefoil (Potentilla usticapensis), the site is of national botanical significance. In 1997, the Committee on Endangered Wildlife in Canada added Fernald's braya (Braya fernaldii), which occurs on Burnt Cape, to its list of threatened species in Canada. Burnt Cape is part of Damman's (1983) Straits of Belle Isle Barrens Eco-region, typified by calcareous barrens, containing a unique and rich mixture of Gulf endemics, Arctic species and calciphiles (calcium loving plants).

In addition to its unique flora, Burnt Cape possesses other characteristics that make it attractive from a natural history perspective. The reserve offers the birdwatchers an opportunity to encounter a number of land-based birds, as well as seabirds. The Reserve is also an interesting fossil location. Burnt Cape is an ideal location for iceberg viewing, whale watching, hiking and exploring accessible sea caves.

History of the Burnt Cape Reserve Proposal

The botanical significance of Burnt Cape was first brought to the attention of the Provincial Government and the Wilderness and Ecological Reserves Advisory Council (WERAC) in December of 1995. Susan Meades, a botanist and former resident of the Province, became concerned that the ongoing removal of gravel and limestone aggregate, as a result of commercial quarrying activity, was threatening the continued survival of Burnt Cape's rare plants. Ms. Meades encouraged Government and WERAC to take action to save Burnt Cape's flora. This quarrying activity had been occurring at the site for over a decade and the local community shared Ms. Meade's concern that Burnt Cape was becoming irrevocably damaged as a result.

As an interim protection measure a Crown Land Reserve was established in June, 1995. In August of 1995 the Department of Mines and Energy did not renew the expired quarry permit for Burnt Cape and placed a ban on future quarry activity at the site. Having held a public information session in the Town of Raleigh, and having consulted with the local town council. and relevant government departments, WERAC recommended that Cabinet establish Burnt Cape as a Provisional Ecological Reserve. On January 23,1998 the Burnt Cape site was officially declared a Provisional Reserve under the ***Wilderness and Ecological Reserves Act.***

In 1997, as part of ongoing efforts to assist in the establishment of protected areas in Canada, the Nature Conservancy of Canada (NCC), a national not-for-profit conservation organization, entered into a partnership with the Provincial Government to establish Burnt Cape permanently as an ecological reserve. As a result of the generous donation of the NCC, a botanical and avifaunal inventory of the site was made possible. In addition, during the summer of 1998, the NCC funded

a community based rehabilitation project employing local residents, under the direction of a professional botanist. The project aimed to ameliorate the damage to the rare plant habitat which had occurred from quarrying and unrestricted road access. By creating a substrate more conducive to the re-establishment of the rare plants, decommissioning secondary roads and transplanting individual rare plants that had been dislocated, or were in jeopardy of becoming trampled, the site has been restored. During the 1999 season the NCC funded the training of local guides/guardians for the Burnt Cape site.

On June 28, 1999 a formal public hearing was held by the Wilderness and Ecological Reserves Advisory Council in cooperation with Parks and Natural Areas Division in the community of Raleigh to gather opinions and answer questions regarding the establishment of Burnt Cape as a permanent ecological reserve. As a result of the hearing, two small boundary changes were made. In the southwestern portion of the reserve the community requested a small deletion to exclude a coastal meadow which the local community wish to develop as a small municipal park. On the southeastern corner of the Reserve the community requested that the area which had traditionally been used for weekly bonfires, beach combing and removal of gravel material by local people, be excluded from the Reserve.

3.0 SITE DESCRIPTION

The site rises to approximately 75 meters above sea level and a decade of open pit quarrying has resulted in reduced relief at some locations. Vegetation appears quite sparse and discontinuous. From a distance Burnt Cape resembles a moonscape. But, upon closer inspection, during the brief period when the plants of this northern windswept limestone peninsula are in full bloom (late-June to mid-July) one is struck by the color, diversity and tenacity of the wildflowers that occur there.

Situated at the tip of the Northern Peninsula, more elevated than the attached mainland and exposed to the frigid Labrador Current flowing southward, the vegetation of Burnt Cape must be well acclimatized to its harsh environment. Not surprisingly, discontinuous low growing miniature plant forms tend to predominate at this northerly location. Many of the species which occur are typically found in a more northern Arctic locale.

4.0 CLIMATE

Burnt Cape is characteristic of the Strait of Belle Isle Eco-region, which has the shortest growing season, the lowest summer temperatures and the lowest mean annual minimum temperatures of any coastal regions in insular Newfoundland (Damman, 1983). Due to its extreme northern location and high elevation, Burnt Cape is the most Arctic location in insular Newfoundland (S. Meades, 1998).

The best available climatological indicators for the Burnt Cape site are provided by the nearest Environment Canada weather station located approximately 10 km to the southeast at St. Anthony. Like Burnt Cape, the St. Anthony site is also an elevated coastal site and at both these sites the maritime influence significantly affects local weather patterns.

The climate normal from the period from 1951-1980, indicate that there are, on average, 1623 degree days above 0°C. A mean annual temperature of 1.1°C, with an average daily minimum of -2.4°C and a maximum of 4.4°C, has been recorded at the St. Anthony station. Table 1 presents a summary of the mean monthly daily temperatures, including the monthly maximas and minimals. The presence of active frost-sorted features (stone circles, polygons and stripes) indicates an intense and repeated cycle of freezing and thawing. This soil disturbance regime is important to the continued survival of a number of the rare plants.

The total average annual precipitation is 1135.9 mm (refer to Table 2) and there are 193 days a year with measurable precipitation. Environment Canada normals indicate 92 days with

TABLE 1:Monthly Mean Daily Temperatures Including the Maximae and Minimae Based on Climate Normals 1951-1980

St. Anthony Station	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY AVERAGE
Daily Maximum Temperature	-6.5	-6.2	-3.3	0.5	6.0	11.9	17.2	16.4	12.0	6.4	1.7	-3.7	4.4
Daily Minimum Temperatue	-13.7	-13.4	-9.2	-4.4	-0.4	3.7	8.3	6.5	4.8	0.5	-3.8	-9.7	-2.4
Daily Temperature	-9.9	-9.6	-5.9	-1.9	2.9	8.0	13.0	12.6	8.3	3.5	-0.9	-6.5	1.1
TABLE 2: MEAN MONTHLY PERCIPITATION AND AVERAGE ANNUAL PERCIPITATION (mm)													
Rainfall	19.1	5.5	10.0	50.8	73.7	91.1	81.5	132.3	111.1	72.3	69.0	28.3	744.5
Snowfall	57.3	60.7	61.9	43.2	11.2	0.4	0.0	0.0	1.1	8.6	38.4	62.6	345.5
Total Precipitation	79.1	73.5	74.6	96.9	89.1	92.5	81.5	132.3	111.5	85.3	114.7	102.8	1135.9

Reference: Envionment Canada Atlantic Region

snow for the year. However, because of the open nature of the site and the constant presence of strong winds, snow only tends to accumulate in areas of tuckamoor and in depressions, leaving most of the site devoid of snow.

A recent avifaunal survey of Burnt Cape stressed that on the Northern Peninsula storm systems associated with strong northeast winds significantly influence the numbers and variety of seabird observations in this locality. Seabirds of the Labrador coast are blown southward and often reach the Northern Peninsula during a NE gale. Table 4 in the faunal section of this plan provides a summary of the abundance and species of seabirds that may be encountered at Burnt Cape during a NE gale (B. Mactavish, 1998).

5.0 GEOLOGY

Burnt Cape is composed predominantly of Early to Middle Ordovician (480 to 470 million years old) limestones that were once part of an ancient tropical marine shelf that stretched for thousands of kilometeres along the eastern margin of the North American continent. As a result of plate tectonics, this limestone margin was thrust westward upon a succession of Middle Ordovician sandstone and shale. During the last glaciation (i.e. Wisconsin approximately 10,000 years before present) Burnt Cape was submerged beneath the ice sheet. Following deglaciation and glacial rebound, the island reemerged but was attached by a narrow land bridge to the Great Northern Peninsula (I. Knight, Unpub).

The rich limestone gravel deposit which was commercially quarried are the result of insitu weathering of the Middle Ordovician limestone. This is also the preferred substrate of many of the rare plants. Both the limestone and the sandstone/shale which occur at Burnt Cape are fossilerous. The island also contains some interesting physiographic features including, raised marine terraces, sea caves frost heaved polygons and modern coastale karst (limestone) topography. A more detailed account of the geological features and fossils of Burnt Cape is provided in Appendix 3.

6.0 FAUNA

Meades (1990) provided a faunal list for the Straits of Belle Isle Eco-region (Table 3). Incidental observations of mammals made during the period of the avifaunal survey confirm the presence of a number of the species included in this Table (i.e. Masked Shrew, Meadow Vole, Red Fox and Moose). In addition, the presence of harp seal, harbour porpoise, minke whale and humpback whale were also recorded along the coastline of the reserve (B. Mactavish, 1998).The Island's relatively small size, its adjacency to the community of Raleigh, and the fact that its vegetation falls predominantly within only two community associations-barrens and tuckamoor, imposes limits on the diversity of wildlife species encountered. Just beyond the southern boundary of the reserve, a small balsam fir forest, 3-10 meters high, occurs, providing important habitat for woodland species that prefer coniferous trees (e.g. Yellow-bellied Flycatcher, Boreal Chickadee, Pine Grosbeak).

The avifauna of Burnt Cape is relatively diverse. The 1998 avifaunal survey recorded 61 species of birds as occurring either within the land boundaries of the reserve, or on the ocean surrounding the reserve. Another 51 species may potentially occur regularly at the site based on habitat assessment and geographic location. Combined, this brings the total to a potential 112 species of birds for the site (refer to Table 5).

Table 3: Faunal List for the Strait of Belle Isle Barrens Ecoregion (S. Meades, 1990)

Mammals:

Barren Habitats:
Caribou
Polar Bear *(occasional)*

Forest and Shrub Habitats:
Moose
Lynx
Snowshoe Hare
Red Squirrel
Little Brown Bat

Ubiquitous:
Red Fox
Ermine
Black Bear
Meadow Vole
Mink Masked Shrew

Amphibians:
None occur in this ecoregions

Fish:
Common:
Threespine Stickleback
Ninespine Stickleback
Atlantic Salmon
Brook Trout
Rainbow Smelt
American Eel

Occasional
Arctic Charr

Avifauna

Barren and Tundra Habitat
Peregrine Falcon
Willow Ptarmigan
Gyrfalcon
Savannah Sparrow

Forest Habitats:
Yellow-rumped Warbler

Shrubby Thicket Habitats:
White-crowned Sparrow

Wetland Habitats
Northern Harrier
Short-eared Owl
Greater Yellowlegs
Lincoln's Sparrow

Freshwater Habitats
Red-throated Loon
Canada Goose
Belted Kingfisher
Red-breasted Merganser
Spotted Sandpiper

Marine Habitats:
Common Eider

Table 4 Predicted Seasonal Occurrence and Abundance of Seabirds During Northeast Gales at Burnt Cape, Burnt Cape Ecological Reserve.

	Winter (Jan – March)	**Spring** (April – May)	**Summer** (June – July)	**early Autumn** (Aug. – Oct.)	**late Autumn** (Nov – Dec.)
Northern Fulmar	rare	rare	uncommon	common to abundant	uncommon to common
Greater Shearwater	none	none	uncommon to abundant	uncommon to abundant	none
Sooty Shearwater	none	none	uncommon to abundant	uncommon to abundant	none
Leach's Storm-Petrel	none	none	none to common	none to common	none
Northern Gannet	none	none	common	common	none
Common Eider	none to common	uncommon to common	rare	uncommon	uncommon to abundant
Red-necked Phalarope	none	none	rare	rare to uncommon	none
Red Phalarope	none	none	rare	rare to abundant	none
Pomarine Jaeger	none	rare	uncommon	uncommon to abundant	rare
Parasitic Jaeger	none	rare	uncommon	uncommon to abundant	none
Long-tailed Jaeger	none	rare	uncommon	rare to uncommon	none
Black-legged Kittiwake	rare to uncommon	rare to uncommon	uncommon to abundant	common to abundant	common to abundant
Ivory Gull	none to common	none to uncommon	none	none	none to uncommon
Dovekie	none to abundant	none to rare	none	none to uncommon	uncommon to abundant
Common Murre	none	none to rare	uncommon	uncommon	rare to uncommon
Thick-billed Murre	none to common	none to common	rare	rare to common	uncommon to abundant
Atlantic Puffin	none	none	uncommon	uncommon	rare to uncommon

Table 5: Birds of Burnt Cape Ecological Reserve: Status, Habitat and Seasonal Occurrence (B. Mactavish, 1998).

STATUS:
S = storm related occurrence
B = breeds on Burnt Island

HABITAT:
BF: 3-10 m = balsam fir 3-10 meters
BF: 1-3m = balsam fir 1-3 meters
BF: 0.2-1m = balsam fir 0.2- 1 meter
Barrens = limestone and herbaceous growth < 20 cm
Intertidal = intertidal zone
Ocean = ocean

OCCURRENCE
Common to Abundant
Uncommon to Fairly Commn
Rare to Scarce

SPECIES	Status	HABITAT						MONTH											
		BF: 3-10m	BF: 1-3m	BF: 0.2-1m	Barrens	Intertidal	Ocean	J	F	M	A	M	J	J	A	S	O	N	D
Red-throated Loon							X												
Common Loon																			
Northern Fulmar	S						X												
Greater Shearwater	S						X												
Sooty Shearwater	S						X												
Manx Shearwater	S						X												
Leach's Storm-Petrel	S						X												
Northern Gannet	S						X												
Canada Goose					X	X													
American Black Duck					X	X													
Northern Pintail					X	X													
Green-winged Teal					X	X													
Greater Scaup							X												
King Eider							X												
Common Eider							X												
Harlequin Duck							X												
Surf Scoter							X												
White-winged Scoter							X												
Black Scoter							X												
Oldsquaw							X												
Common Goldeneye							X												
Red-breasted Merganser							X												
Osprey						X													
Bald Eagle						X													
Northern Harrier					X														
Sharp-shinned Hawk		X	X	X	X														
Northern Goshawk		X	X	X	X														

Table 5 continued

SPECIES		HABITAT						MONTH											
	Status	BF: 3-10m	BF: 1-3m	BF: 0.2-1m	Barrens	Intertidal	Ocean	J	F	M	A	M	J	J	A	S	O	N	D
Rough-legged Hawk	B?				X														
American Kestrel					X														
Merlin		X	X	X	X														
Gyrfalcon					X														
Peregrine Falcon					X														
Willow Ptarmigan				X															
Black-bellied Plover						X													
European Golden-Plover					X														
American Golden-Plover					X	X													
Semipalmated Plover					X	X													
Greater Yellowlegs						X													
Lesser Yellowlegs						X													
Spotted Sandpiper	B					X													
Whimbrel					X	X													
Ruddy Turnstone						X													
Red Knot						X													
Sanderling						X													
Semipalmated Sandpiper						X													
Least Sandpiper						X													
White-rumped Sandpiper						X													
Pectoral Sandpiper						X													
Purple Sandpiper						X													
Dunlin						X													
Buff-breasted Sandpiper					X														
Short-billed Dowitcher						X													
Common Snipe				X	X														
Red-necked Phalarope	S						X												
Red Phalarope	S						X												
Great Skua	S						X												
Pomarine Jaeger							X												
Parasitc Jaeger							X												
Long-tailed Jaeger							X												
Black-headed Gull						X													
Ring-billed Gull					X	X	X												
Herring Gull	B				X	X	X												
Iceland Gull						X	X												
Lesser Black-backed Gull							X												
Glaucous Gull						X	X												
Great Black-backed Gull	B					X	X												

Table 5 continued

SPECIES		HABITAT						MONTH											
	Status	BF: 3-10m	BF: 1-3m	BF: 0.2-1m	Barrens	Intertidal	Ocean	J	F	M	A	M	J	J	A	S	O	N	D
Black-legged Kittiwake							X												
Ivory Gull						X	X												
Common Tern						X	X												
Arctic Tern						X	X												
Dovekie							X												
Common Murre							X												
Thick-billed Murre							X												
Razorbill							X												
Black Guillemot	B						X												
Atlantic Puffin							X												
Snowy Owl					X														
Short-eared Owl					X														
Northern Flicker		X																	
Yellow-bellied Flycatcher	B	X	X																
Northern Shrike		X	X																
Gray Jay	B	X	X																
American Crow	B	X	X	X	X	X													
Common Raven	B	X	X	X	X	X													
Horned Lark	B				X	X													
Tree Swallow		X																	
Boreal Chickadee	B	X	X																
Golden-crowned Kinglet	B?	X	X																
Ruby-crowned Kinglet	B	X	X																
Gray-cheeked Thrush	B	X	X																
American Robin	B	X	X	X	X														
American Pipit	B				X	X													
Yellow-rumped Warbler	B	X	X																
Blackpoll Warbler	B	X	X	X															
Wilson's Warbler	B	X	X																
Savannah Sparrow	B?				X														
Fox Sparrow	B	X	X	X															
Lincoln's Sparrow	B	X	X																
Swamp Sparrow				X															
White-throated Sparrow	B	X	X																
White-crowned Sparrow	B		X	X	X														
Dark-eyed Junco	B?		X																
Lapland Longspur					X	X													
Snow Bunting					X	X													
Pine Grosbeak	B	X	X	X															

Table 5 continued

SPECIES		HABITAT						MONTH											
	Status	BF: 3-10m	BF: 1-3m	BF: 0.2-1m	Barrens	Intertidal	Ocean	J	F	M	A	M	J	J	A	S	O	N	D
Purple Finch		X																	
White-winged Crossbill	B?	X	X																
Common Redpoll	B	X	X	X															
Hoary Redpoll			X																
Pine Siskin		X																	

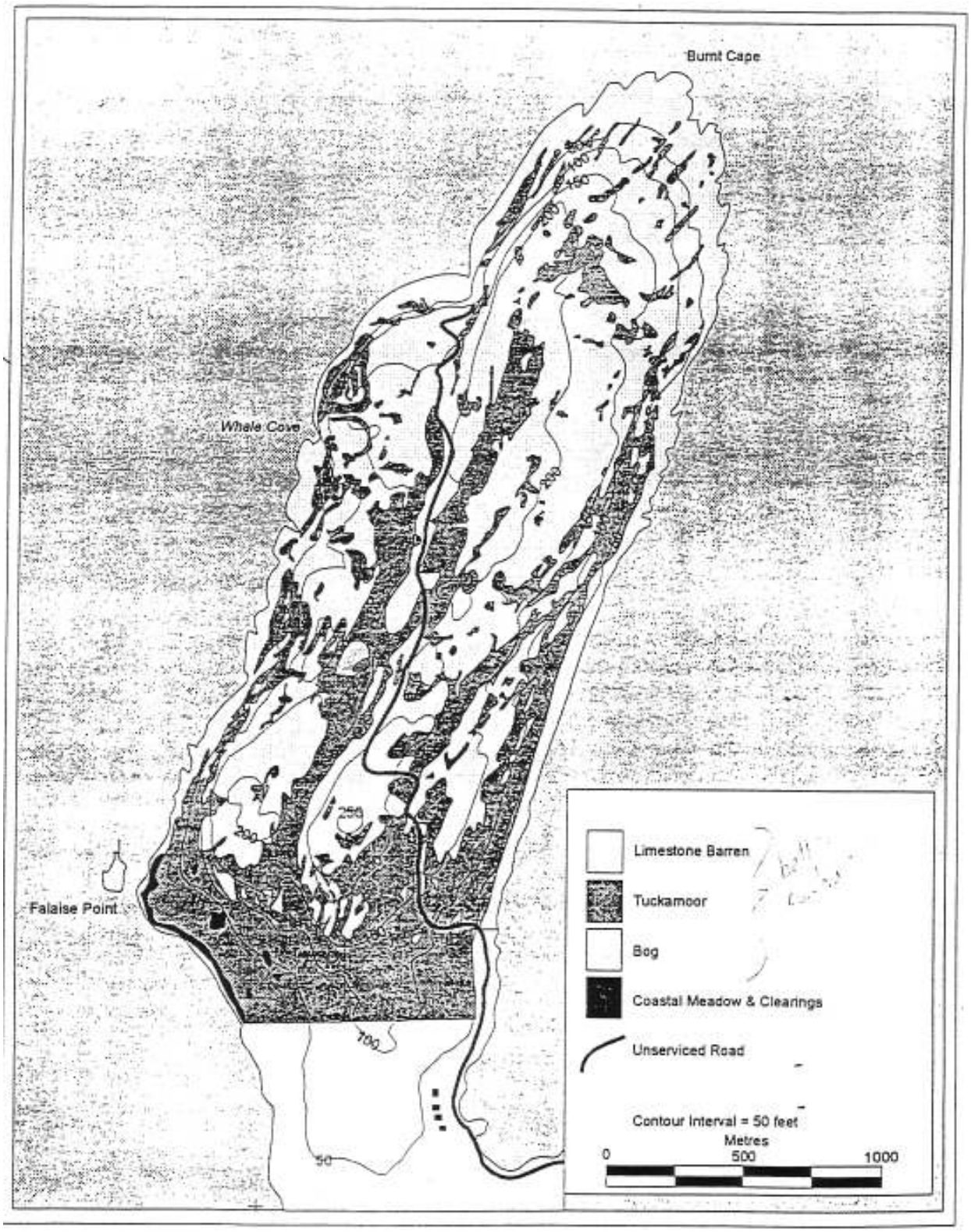
7.0 FLORA

The botanical significance of Burnt Cape was first realized in 1925 when the renowned Harvard botanist M.L. Fernald and his colleagues visited the site. His early accounts are quite effusive with respect to the importance of the site and this excitement over Burnt Cape continues today among those in the botanical field. Following Fernald's original study, very little research was carried out at Burnt Cape until recently (Bouchard, Brouillet and Hay, 1987, S. Meades, 1994-98, Braya Recovery Team,1998). The primary impetus for setting aside Burnt Cape as an Ecological Reserve is the occurrence of such a high number of rare plant species (34). However, in terms of species richness Burnt Cape is also remarkable; over 300 plants species have been listed for this small site (refer to Appendix 1).

Burnt Cape's unique geographic location and physiography are the primary factors responsible for its strong resemblance to a more Arctic landscape. This fact is reflected in the flora of Burnt Cape, which contain some of the southernmost occurrences of a number of Arctic calciphiles: dwarf hawks beard *(Crepis nana),* Arctic lesser dandelion *(Taraxacuin phymatocarpum)* and alpine milk vetch *(Astragalus alpinus var. alpinus).* Some botanists believe that the Burnt Cape cinquefoil *(Potentilla usticapensis)* is the southernmost extension of an arctic cinquefoil, *Potentilla pulchella.* The presence of these rare arctic disjuncts distinguishes Burnt Cape from the other Newfoundland limestone barrens, which are primarily restricted to the terraced coastal limestone formations along the northwest coast of the Northern Peninsula.

The primary purpose for setting aside Burnt Cape as an Ecological Reserve is protection of it's unique flora. Two main vegetation communities predominate at Burnt Cape: limestone barrens and tuckamoor (refer to Figure 2). A more detailed description of these vegetation communities is provided below. There are minor occurrences of salt marsh habitat and narrow beaches along the coastline of Burnt Cape. As well, one small inland bog is situated in a basin near the center of the Reserve.

Figure 2: General Vegetation Communities of Burnt Cape Ecological Reserve.



The Nature Conservancy of Canada generously funded a detailed botanical inventory for the Burnt Cape Ecological Reserve in 1997. The following excerpts from the inventory prepared by Ms. S. Meades provides the best available description of the plant communities of Burnt Cape.

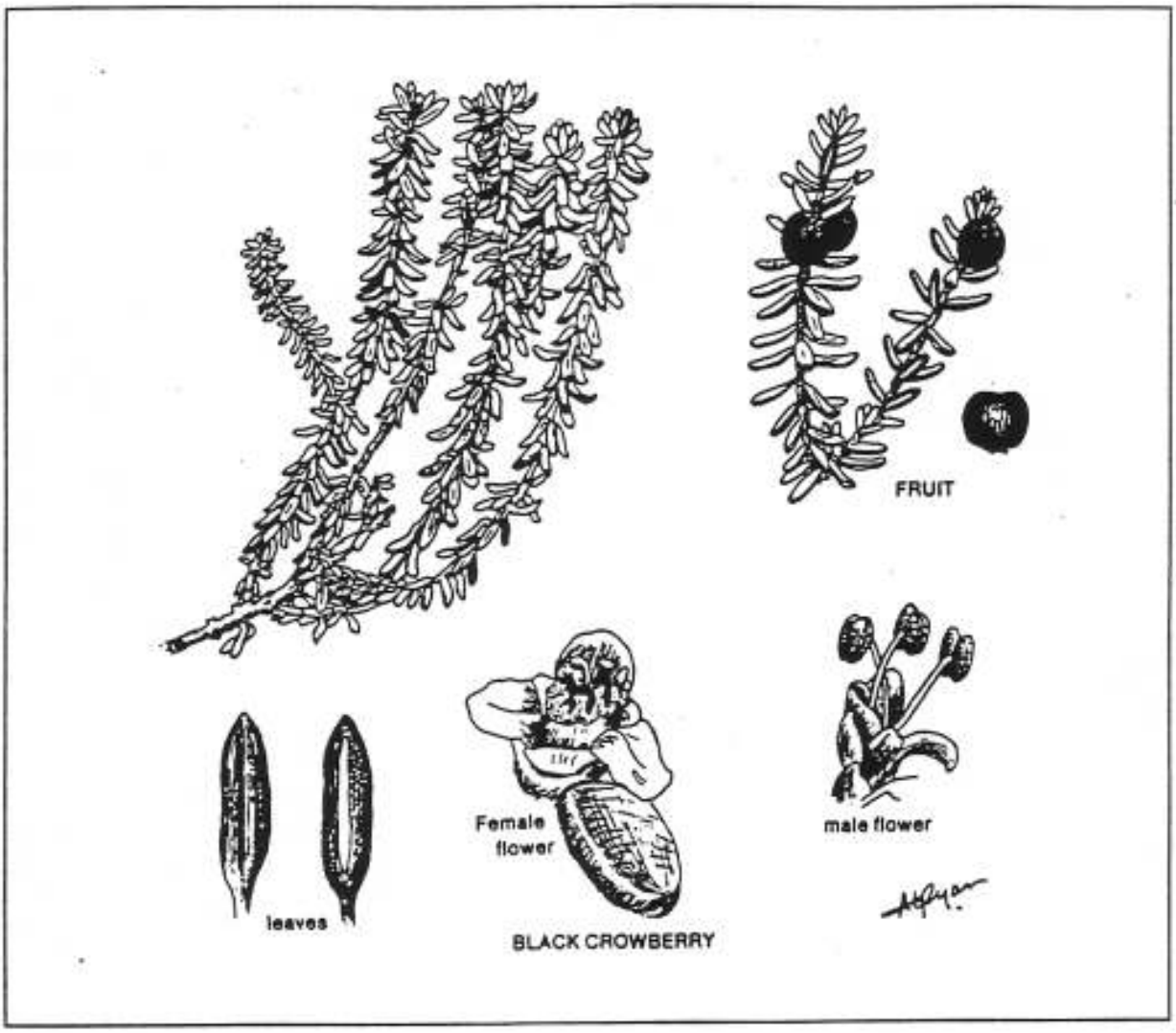
1. Limestone Barrens: consist of flat areas, dominated by calciphiles which form a sparse vegetation cover over calcareous bedrock; and crevices and ravines containing lush herb-dominated snowbed communities. The limestone barrens are easily recognized by the presence of the following species (W. Meades, 1983).

Arctostaphylos alpina	*Betula pumila*
Dryas integrifolia	*Empetrum nigrum*
Juniperus communis	*Salix calcicola*
Salix reticulata	*Salix vestita*
Equisetum scorpiodes	*Carex glacialis (C. terrae-novae)*
Carex scirpoidea	*Conioselinum pumilum (c. chinese)*
Pinguicula vulgaris	*Rhinanthus borealis (R. minor ssp. groenlandicus)*
Rhododendron lapponicum	*Saxifraga oppositifolia*
Solidago hispida	*Thalictrum alpinum*

Three dominant plant associations are characteristic of the limestone barrens of the Northern Peninsula and are well represented at Burnt Cape:

i Empetrum association
ii Heraculetum association
iii Potentilletum association

i **Empetrum association** also referred to as "crowberry lawns" occur on lower exposed coastal terraces and are dominated by dense low growing mats of black crowberry *(Empetrum nigrum)* and several dwarf shrubs, particularly willow *(Salix sp.)* which form a dense carpet. The crowberry lawns of Burnt Cape are characterized and distinguished by the following species: Ungava willow *(Salix cordifolia, S. glauca),* Northern yarrow *(Achillea millefolium var. borealis),* Blue flag iris (*Iris versicolor (I. setosa)),* Soapberry *(Sheperdia canadensis),* Rand's eyebright *(Euphrasia randii)* and Seaside plantain *(Plantago juncoides).*


FRUIT
leaves
Female flower
male flower
BLACK CROWBERRY

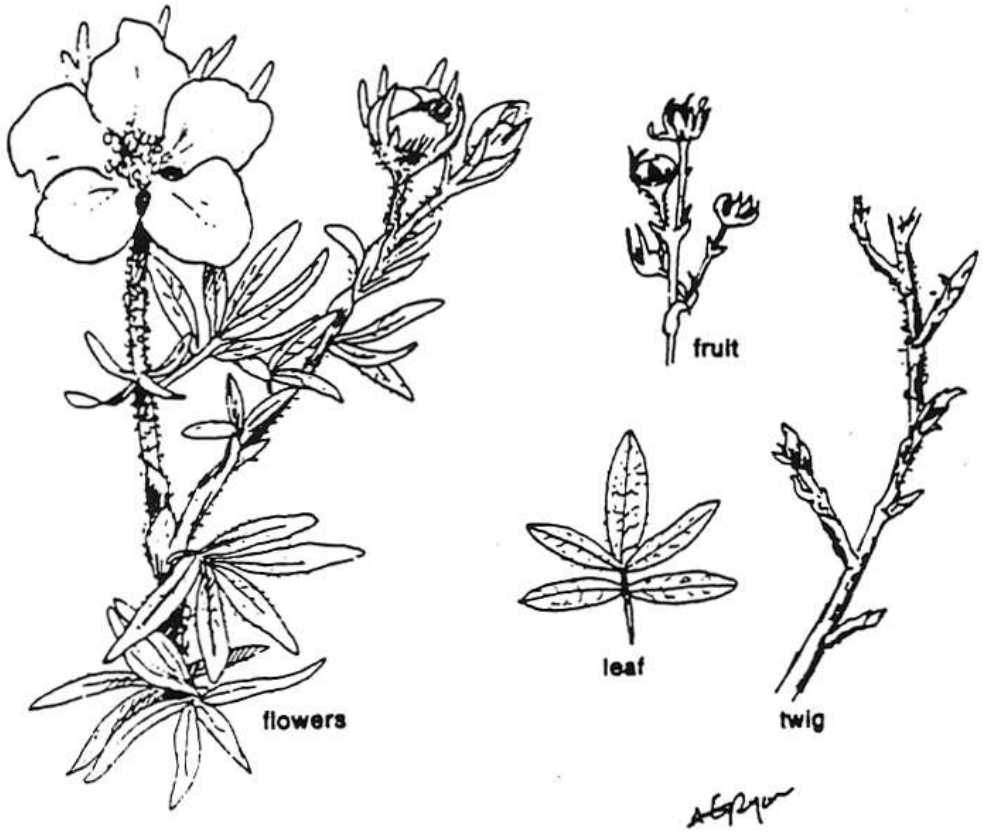
Meades (1983) further divides this plant association into two distinct subassociations, Empetrum-Salicetosum cordifoliae (Esc) and Empetrum-Salicetosum reticulatae (Esr). The Esc subassociation, which occurs on the more exposed sites where snow cover is absent or very shallow, is characterized by the following species: black bearberry *(Arctostaphylos alpina),* Ungava willow *(Salix cordifolia),* Canada mayflower *(Maianthemum canadense),* starflower *(Trientalis borealis),* Black crowberry *(Empetrum nigrum),* Tundra bilberry *(Vaccinium uliginosum)* and Gall-of-the- Earth *(Prenanthes trifoliolata).* While, the Esr subassociation occurs in the somewhat more protected Sites with more snow cover and is characterized by the following species: Net-veined dwarf willow *(Salix reticulata),* Dwarf scouring-rush *(Equisetum scirpoides),* Star chickweed *(Stellaria longifolia),* Waghorn's willow *(Salix vestita),* Twinflower *(Linnaea borealis)* and Huron tansy *(Tanacetum huronense).* It is further distinguished from the Esc subassociation by the cover abundance of the dwarf willows which equal or exceed the coverage by *Empetrum nigrum* or *E. eamesii*. The shrub species of these subassociations grow low to the ground and form dense, compact cushions. .

ii. The **Heraculeturn association,** also referred to as cow parsnip snowbeds, occurs primarily in ravines and is best developed in the protected lower slopes east and south of the steep cliff faces. Here, both snow cover and soil development are more likely. It predominantly occurs in association with White spruce *(Picea glauca)* and Balsam fir *(Abies balsamea)* tuckamoor. The Cow parsnip snowbed shrub component includes Dwarf birch *(Betula pumila)*, Sweet gale (Myrica gale), Alder-leaved buckthorn *(Rhamnus alnifolia)* and Squashberry *(Viburnum edule).* The following herb species are also characteristic: Thin-stemmed Jady's-mantle *(Alchemilla minor, A. filicaulis),* New York aster *(Aster novi-belgii),* Purple avens *(Geum rivale),* bottle brush (*Sanguisorba canadensis*) Virginia grape fern *(Botrychium lunaria)*, Purple-stemmed angelica *(Angelica laurentiana, A. Atropurpurea),* Corn lily *(Clintonia borealis),* Cow parsnip *(Heracleum maximum),* Large-leaved goldenrod *(Solidago macrophylla)* and Blue-joint grass *(Calamagrostis canadensis)*. In addition, this subassociation harbours a number of important species of orchids: the Fairy slipper orchid *(Calypso bulbosa)* , the Small round-leaved orchid *(Amerorchis rotundifolia)*, the Flat-petalled yellow lady's slipper *(Cypripedium parviflorum var. pubescens)* and the Newfoundland orchid *(Pseudorchis albida).*

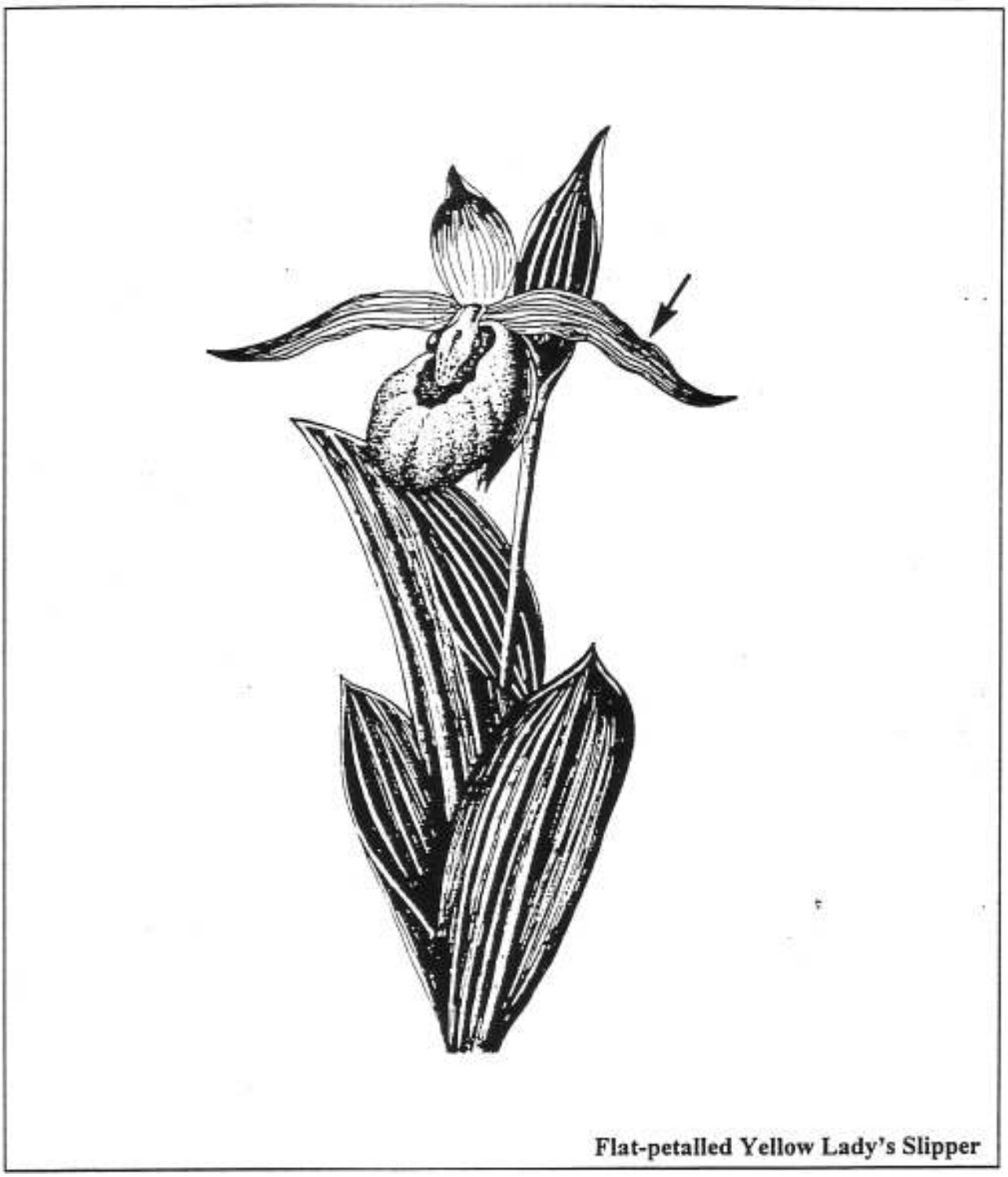
iii. The **Potentilletum association,** commonly called dryas rock gardens, are found on the most exposed site where there is minimal snow accumulation and soil development. This association is predominantly represented by Potentilletum Dryadetosum integrifolia (Pdi). Not surprisingly, plant cover reaches just 50% as a result of wind erosion and frost action within this habitat. Within the dryas rock gardens, dwarf shrubs: White mountain avens *(Dryas integrifolia)* and crowberries *(Empetrum spp)*, shrubby cinquefoil *(Potentilla fructicosa)* and Lime willow *(Salix calcicola)* are the characteristic shrubs. On Burnt Cape, the differential shrubs include: Northern white anemone *(Anemone parviflora),* Hyssop-leaved fleabane *(Erigerion hyssopifolius),* Bearbeny willow *(Salix uva-ursi),* Yellow mountain saxifrage *(Saxifraga aizoon, S. paniculata),* Small false asphodel *(Tofieldia pusilla),* Arctic kobresia *(Kobresia simpliciuscula),* Elegant pussytoes *(Antennaria eucosma),* Yellow mountain saxifrage *(Saxifraga aizoides),* Purple mountain saxifrage *(Saxifraga oppositifolia),* Newfoundland sedge *(Carex glacialis (C. terrae-novae)* and Lapland rosebay *(Rhododendron lapponicum).* This vegetation is maintained by intensive frost action and hence is found in association with well developed frost-sorted features: stone circles, stripes and polygons. The following herb species occur with this subassociation: Low sandwort *(Arenaria humifusa),* Fernald's rockcress *(Braya fernaldii),* Whitlow-grasses *(Draba spp.),* Yukon sandwort *(Minuartia dawsonensis),* Newfoundland..oxytrope *(Oxytropis campestris (0. terrae-novae),* Burnt Cape cinquefoil *(Potentialla usticapensis),* encrusted saxifrage *(Saxifraga paniculata, S. aizoon),* Alpine milk vetch *(Astragalus alpinus var alpinus),* Dwarf hawksbeard *(Crepis nana),* Arctic bladder pod *(Lesquerella arctica),* Reddish sandwort *(Minuartia rubella),* Alpine chickweed *(Cerastium alpinum),* Snow cinquefoil *(Potentilla nivea),* Tufted saxifrage *(Saxifraga cespitosa)* and Moss campion *(Silene acaulis).*

2. Tuckamoor

This term is used to refer to stunted tree growth which commonly occurs throughout coastal locations in Newfoundland (i.e. ravines, lower slopes and the base of cliffs provide the right microclimate). This wind-pruned vegetation type varies in height, from tens of centimeters, to 2 meter high trees of balsam fir and white spruce. In areas of greater soil moisture, black spruce replaces balsam fir as the dominant tree species. On Burnt Cape tuckamoor accounts for 35 % of the vegetation cover. The species which occur are typical of tuckamoor found throughout insular Newfoundland (e.g. *Abies balsamea f. hudsonia),* Corn lily *(Clintonia borealis),* Creeping snowberry *(Gaultheria hispidula),* Heart-leaved twayblade *(Listera cordata),* Starflower *(Trientalis borealis)* and Spinulose wood fern *(Drytoperis spinulosa).* Moss flora is a significant component of this community and includes the following forest floor mosses: red-stemmed moss *(Pleurozium schreberi),* knight's plume *(Ptilium crista-castrensis)* stair-step moss



SHRUBBY CINQUEFOIL, ***Potentilla fruticosa*** **L.**
Rosaceae



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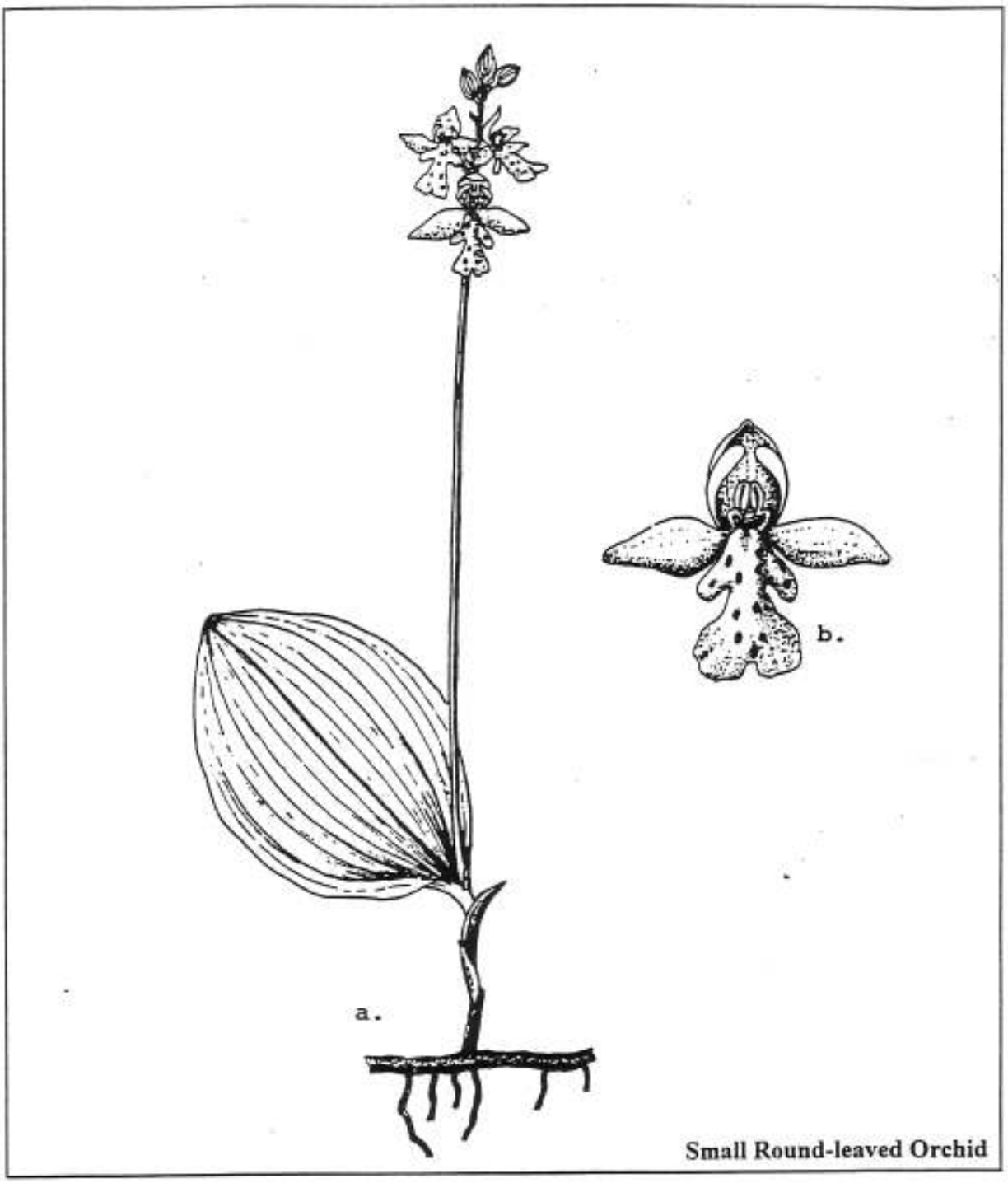
(Hylocomium splendens), common hair-cap moss *(Polytrichum commune),* shaggy moss *(Rhytidiadelphus triquetrus)* and broom moss *(Dicranium* spp.*)*.

8.0 LAND USE ACTIVITIES

As already mentioned Burnt Cape was the site of commercial limestone gravel and aggregate quarrying for more than ten years. Also, small amounts of the limestone resource were removed on a shovel and bucket basis by local residents for domestic use (i.e. gravel for driveways). The boundary of the Reserve was shifted northward at the request of the Town Council to allow for this activity outside of the Reserve and to exclude private land at the southern end of the peninsula.

Local residents traditionally enjoyed many non-consumptive activities at Burnt Cape and these will be allowed to continue: hiking, sightseeing, whale-watching and picnicking. Activities which threaten the survival of the rare plants of the Cape will not be allowed. ATV use in particular causes a high level of disturbance to vegetation and soil, therefore, it will not be permitted at Burnt Cape Ecological Reserve. Snowmobiling is a traditional local activity at Burnt Cape and as the ground is frozen and most plants have died back during the winter period this activity will be permitted to continued. While bird hunting is a consumptive activity, it has traditionally occurred at Burnt Cape and since it does not significantly impact on the plant species which occur there it will be permitted to continue at its present level. Vehicles will be permitted to continue to use the main access road to the Cape. But, no vehicles will be permitted to use areas other than the main road.



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9.0 SUMMARY

The Burnt Cape Ecological Reserve protects the only known occurrence of Burnt Cape cinquefoil and 33 other rare plant species. Hence, it is significant on a provincial scale. It is also significant nationally, as it is the most easterly and southerly occurrence of a number of plant species. A number of activities (i.e. sightseeing, picnicking, hiking, snowmobiling and bird hunting) currently take place at this site, but do not appear to affect the rare plants.

10.0 MANAGEMENT POLICIES

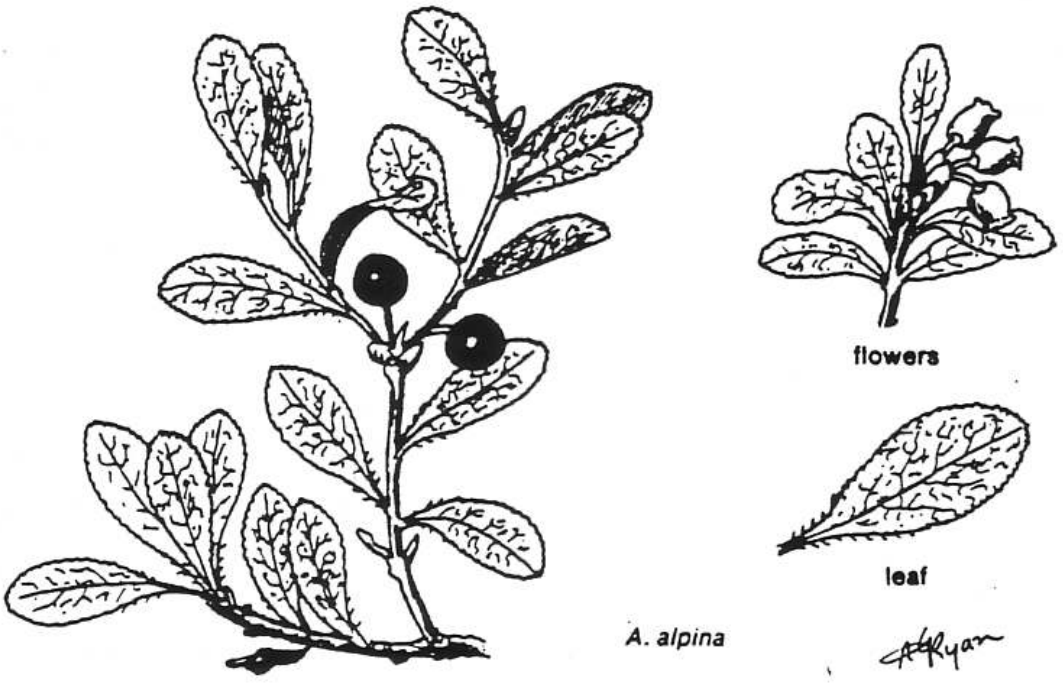
10.1 Introduction

Ecological reserves are established under **The Wilderness and Ecological Reserves Act (1980)** for the preservation of areas in the Province which contain unique or representative ecosystems or natural phenomena. The Burnt Cape Ecological Reserve protects the only known occurrence of Burnt Cape cinquefoil as well as 33 other plant species that are considered rare for the Province.

10.2 Management Goals

The Burnt Cape Ecological Reserve is established to:

- **(a)** preserve 34 species of rare plants in their natural habitat.
- **(b)** protect an excellent example of the limestone barrens ecosystem
- **(c)** provide an educational opportunity for the general public of Newfoundland and Labrador to share in a unique feature of their natural history.
- **(d)** provide opportunities for scientific research of the rare plant species within their natural habitat.
- **(e)** to ensure the preservation of the diversity of the species gene pool.



ALPINE BEARBERRY, *Arctostaphylos alpina* (L.) Spreng.
Ericaceae

10.3 Management Policies

Resource management at the Burnt Cape Ecological Reserve will emphasize the preservation of its rare plant community while at the same time, provide opportunities for public education and scientific research. Bird hunting (seaducks and murres) is a traditional activity which has occurred prior to the establishment of the Reserve. Furthermore, it is not deemed a threat to the survival of the rare plants therefore, it will be permitted to continue (subject to Federal and Provincial laws).

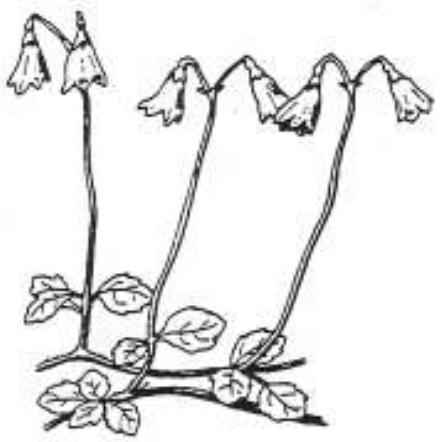
The primary purpose of the Burnt Cape Ecological Reserve is to preserve the natural history of the area and to encourage scientific research that does not conflict with the general objectives of site protection. The following management policies apply:

(a) use of the site for educational purposes will be permitted. Students from local and other institutions will be permitted to visit the Reserve, under supervision, for educational purposes. The supervisor will be responsible for ensuring all regulations are adhered to by the group;

(b) scientific research will be permitted when it does not conflict with the prime objective of site protection. The collection of plant and animal specimens will be controlled by a permit system. Results of such research will be forwarded to Parks and Natural Areas Division;

(c) the introduction of exotic species or the extermination of native species is strictly prohibited;

(d) since this habitat may require further rehabilitation to ensure survival of the rare plants which occur there, some manipulation of the substratum for management purposes may be permitted



TWIN FLOWER

TWINFLOWER, *Linnaea borealis* L.
Caprifoliaceae

10.4 Implementation Guidelines

In addition to the requirements of **The Wilderness and Ecological Reserves Acts (1980),** which apply to all ecological reserves, the following statements are intended to serve as a guide to users and managers of the Burnt Cape Ecological Reserve.

(a) Reserve Management

(1) The managing agency of the Reserve is Parks and Natural Areas Division of the Department of Environment and Conservation.

(2) The boundaries of the reserve will be clearly identified by signs placed along the perimeter.

(3) Patrols will be conducted by the managing agency and/or other designated government officials.

(4) Priority will be given to scientific research aimed at preserving and understanding the unique flora which occurs at Burnt Cape.

(5) For the purpose of monitoring the long-term environmental quality of the Reserve it may be necessary to establish permanent sample plots within the reserve. Permanent plots should be measured at the time the Reserve is established and every five years thereafter.

(b) Scientific Research

Providing areas for long-term scientific research is one of the main reasons for creating and managing the Province's ecological reserves. It is important, therefore, that research be carried out in such a way that the scientific value of the reserve is not destroyed or diminished for future investigators. Accordingly, persons requesting to conduct research within the Ecological Reserve will require a permit from the Parks and Natural Areas Division of the Department of Environment and Conservation.

Application for permits should provide a description and the objectives of the research proposed, methodologies and the time frame involved. The following conditions will apply to each permit issued:

SOAPBERRY, *Shepherdia canadensis* (L.) Nutt.
Elaeagnaceae

(1) All published material related to research done at the site will acknowledge the existence of the reserve, the Parks and Natural Areas Division's permission, and the requirements made of the researcher.

(2) A report of the results of each research project will be filed with the Parks and Natural Areas Division of the Department of Environment and Conservation. A copy of all scientific papers published and unpublished will be forwarded to the Department upon completion.

(c) Educational Use

The site may be used for educational purposes as long as such use does not damage the scientific value of the reserve. Permits will be required for institutions, individuals and groups wishing to utilize the area for educational use. Such permits can be obtained from the Parks and Natural Areas Division of the Department of Environment and Conservation.

(d) Regulations

The Botanical Reserve Regulations (refer to Appendix 1) will apply to the Burnt Cape Ecological Reserve. These Regulations provide for the following exemptions at Burnt Cape Ecological Reserve: bird hunting and snowmobiling will be permitted within the Reserve, as this is a traditional activity pursued by a small number of local people. There is no indication of any direct negative impacts on the rare plants as a result of these activities.

ALDER-LEAVED BUCKTHORN, *Rhamnus alnifolia* L'Her
Rhamnaceae

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APPENDIX 1

RARE PLANT LIST FOR BURNT CAPE

Rare Plant Species (35) of Burnt Cape

There are 35 species of rare vascular plants found at Burnt Cape. Designation of 'rare' is based on *The Rare Vascular Plants of The Island of Newfoundland,* by André Bouchard, Stuart Hay, Luc Brouillet, Martin Jean, and Isabellc Saucier (1991). Known locations of rare species that are restricted to a limited number of sites

Abbreviations for degree of rarity (insular Newfoundland):

SH = historically known from NF, but not collected or relocated in over 20 years;
S1 = vary rare & critically endangered, with less than 5 known populations;
S2 = rare & threatened, with 6 to 20 known populations;
S3 = somewhat rare, with 21-100 known populations.

Shrubs (1): *Arctostaphylos rubra** (red bearberry) [S2]

Ferns (1): *Gymnocarpium robertianum* (limestone oakfern) [S2] (not relocated)

Grasses & Sedges (9):
Carex concinna (low northern sedge) [S2] (not relocated)
Carex maritima (seaside sedge) [S2] (not relocated, near southern coast)
Carex pedunculata (long-stalked sedge) [S2] (not, relocated)
*Carex terrae-novae** (Newfoundland sedge) [S2]
Eriophorum brachyantherum (close-sheathed cottongrass) [S2]
Eriophorum callitrix (sheathed cottongrass) [S2]
Festuca brachvphylla (alpine fescue) [S2] (not relocated)
*Phleum alpinum** (alpine timothy) [S2]
Festuca vivipara (viviparous fescue) [S3] (not relocated)

Forbs (24):
*Antennaria bayardii** (Bayard's pussytoes)
[S1 - now included in *A. pulvinata* Greene.]
Astragalus alpinus var. alpinus (alpine milk vetch)
[S1 - known in insular NF only from Burnt Cape and Quirpon l.]
Bartsia alpina (velvet bells)
[S1 - other sites include Cape Norman and Cook's Harbour]
Calypso bulbosa (fairy slipper orchid)
[S1 - formerly SH: Since 1994. this species has been located at 3 Newfoundland sites (Burnt Cape, Cook's Harbour, and Port-au-Port). Prior to 1994, last collected in 1929 by Drs. M.L. Fernald, B. Long, and J.M. Fogg.]
Crepis nana (dwarf hawksbeard)
[S1 - formerly SH: Relocated in 1994. Prior to this date, it was last collected in 1925 by Drs. M.L. Fernald, K.M. Wiegand, A.S. Pease, B. Long, L. Griscom, F.A. Gilbert & N. Hotchkiss]
Potentilla usticapensis (Burnt Cape cinquefoil)
[S1 - Burnt Cape is the TYPE locality for this species, first collected by Dr. M.L. Fernald in 1926. and is the *only* known locality (worldwide) for this taxon.
Taraxacum phmatocarpum (lesser dandelion) (not relocated)
[SI - known in NF only from Burnt Cape]
Amerorchis rotundifolia (small round-leaved orchid) [S2]
*Antennaria cana** (alpine pussvtoes) [S2 - now included in *A. alpina* (L.) Gaertn. ssp. cana (Fern. & Wieg) Chmielewski]
Braya fernaldii (Fernald's rockcress) [S2]
Cardamine pratensis ssp. *angustifolia* (cuckoo flower, meadow bittercress) [S2]
*Cerastium alpinum** (alpine chickweed) [S2]
Coeloglossum viride var. *viride** (long-bracted frog orchid) [S2]
Cypripedium parviflorum var. *pubescens** (flat-petalled yellow lady's-slipper) [S2]
Draba nivalis (snow whitlow-grass, yellow arctic whitlow-grass) [S2] (not relocated)
Epilobium davuricum (Dahurian willowherb) [S2] (not relocated)
Epilobium lactiflorum (alpine willowherb) [S2]
Gentianella propinqua (four-parted gentian) [S2]
Lesquerella arctica var. *purshii** (arctic bladderpod) [S2]
Osmorhiza depauperata (blunt-fruited sweet cicely) [S2]
Oxytropis deflexa var. *foliolosa* (pendant-pod oxytrope) [S2]
Polygonum boreale (northern knotweed) [S2]
Pseudorchis albida var. *straminea** (Newfoundland orchid) [S2]
Stellaria crassifolio (fleshy stitchwort) [S2] (not relocated)

APPENDIX II

COMPLETE PLANT SPECIES LIST FOR BURNT CAPE

Appendix I: Species List

Plant Species (301) of Burnt Cape, Pistolet Bay, Newfoundland (1998)

Ferns & Fern Allies (16):
Asplenium trichomanes-ramosum L. (syn. A. *viride*) (green spleenwort)
Athyrium felix-femina (L.) Roth ex Mertens var. *angustatum* (Willd.) G. Lawson (lady fern)
Botrychium lunaria (L.) Sw. (moonwort)
Cystopteris fragilis (L.) Berith. (fragile fern)
Dryopteris carthusiana (Villars) H.P. Fuchs (syn. D. *spinulosa*) (spinulose wood fern)
Gymnocarpium dryopteris (L.) Newman (syn. *Dryopteris disjuncta*) (oak fern)
Gymnocarpium robertianum (Hoffm.) Newman (limestone oakfern) [S2j
Phegopteris connectilis (Michx.) Watt. (syn. *Dryopteris phegopteris*) (northern beech fern)
Polystichum braunii (Spenner) Fée (Braun's holly fern)
Polystichum lonchitis (L.) Roth (holly fern)
Equisetum arvense L. (common horsetail)
Equisetum sylvaticum L. (woodland horsetail)
Equisetum variegatum Schleich. *ex* F. Weber & D. Mohr. (variegated horsetail)
Huperzia selago (L.) Bernh. ex Schrank & Mart. (syn. *Lycopodiurn selago*) (mountain or fir clubmoss)
Lycopodium annotinum L. (bristly clubmoss)
Selaginella selaginoides (L.) Beauv. ex Mart. & Schrank (northern spike-moss)

Conifers (7):
Abies balsamea (L.) Mill. (balsam fir)
Larix laricina (DuRoi) K. Koch (larch)
Picea glauca (Moench) Voss (white spruce)
Juniperus communis L. (common juniper)
Juniperus horizontalis Moench (creeping juniper)
Picea mariana (P. Mill.) BSP (black spruce)
Taxus canadensis Marsh. (Canada yew)

Grasses (17):
Calamagrostis canadensis (Michx.) Beauv. (bluejoint)
Calamagrostis stricta (Timm) Koel. (syn. C. *neglecta* var. *borealis*)
Cinna latfolia (T'rev. ex Goepp.) Griseb. (wood reedgrass)
Deschampsia cespitosa (L.) Beauv. (common hairgrass)
Elymus trachycaulus (Link) Gould *ex* Shinners) (slender wheatgrass)
(syn. *Agropyron trachycaulum* var.*novae-angilae* (Scribn.) Fern.)
Festuca brachyphylla J.A. Schultes ex J.A & J.H. Schultes (alpine fescue) [S2]
Festuca rubra L. (red fescue) [introd.]
Festuca vivipara (L.) Sm. (viviparous fescue) [S3]
Hierochloë alpina (Sw. *ex* Wilid.) Roemer & J.A. Schultes (alpine holy grass)
Leymus arenarius (L.) Hochst. (syn. *Elymus arenarius*) (strand wheat)
Phleum alpinum L. (alpine timothy) [S2]
Poa alpina L. (alpine meadow grass)
Poa eminens J. Presl (large-flower speargrass)
Poa glauca Vahl (glaucous speargrass)
Puccinellia tenella (Lange) Holrnb. (syn. P. *paupercula*) (Arctic meadow grass)
Schizachne purpurascens (Tort-.) Swallen (false melic)
Trisetum spicatum (L.) Richter (narrow false oat, spike trisetum)

Sedges & Rushes (34):
Carex aquatilis Wahlcnh. (water sedge)
Carex aurea Nutt. (golden sedge)
Carex brunnescens (Pers.) Poir. (brownish sedge)
Carex capillaris L. (hair-like sedge)
Carex concinna R.Br. (low northern sedge) [S2]
Carex cordorrhiza Ehrh. (creeping sedge)
Carex eburnea Boott. (bristle-leaved sedge)
Carex livida (Wahlenh.) Willd. (livid sedge)
Carex maritima Gunn. (seaside sedge) [S2]
Carex nigra (L.) Reichard (black sedge)
Carex paleacea Schreh. *ex* Wahlenb. (seaside sedge)
Carex pedunculata Mühl. *ex* Wilid. (long-stalked sedge) [S2]
Carex rariflora (Wahlenb.) Sm. (loose-flowered alpine sedge)
Carex rupestris All. (rock sedge)
Carex salina Wahlenb. (salt marsh sedge)
Carex saxatilis L. (russet sedge)
Carex scirpoidea Michx. (Scirpus-like sedge)
Carex subspathacea Wormskj. *ex* Hornem. (Hoppner's sedge)
Carex terrae-novae Fern. (syn. C. *glacialis*) (Newfoundland sedge) [S2]
Carex trisperma Dewey (three-fruited sedge)
Carex vaginata Tausch (sheathed sedge)
Carex viridula Michx. (little green sedge)
Eriophorum alpinum L. (syn. *Scirpus hudsonianus*) (alpine cottongrass)
Eriophorum brachyantherum Trautv. & C.A. Meyer (close-sheathed cottongrass) [S2]
Eriophorum callitrix Cham. *ex* C.A. Meyer (sheathed cottongrass) [S2]
Eriophorum gracile W.D.J. Koch (slender cottongrass)
Kobresia simpliciuscula (Wahlenb.) Mackenzie (Arctic kobresia)
Scirpus cespitosus L. (deergrass)
Scirpus microcarpus J.& K. Presl (syn. S. *rubrozinctus*) (reddish bulrush)
Juncus albescens (Lange) Fern. (3-flowered rush) -
Juncus alpino-articulatus Chaix (syn. *J. alpinus*) (alpine rush)
Juncus balticus Willd. (Baltic rush)
Juncus ambiguus Guss. (syn. J. *bufonius* var. *halophilus*) (saltmarsh toad rush)
Luzula parviflora (Ehrh.) Desv. (small-flowered woodrush)

Trees, Shrubs and Dwarf Shrubs (Angiosperms) (46):
Alitus viridis (Villars) DC. ssp. *crispa* (Dryand. *ex* Alt.) Turrill (syn. A. *crispa*) (mountain alder)
Andromeda polifolia L. var. *glaucophylla* (Link) DC. (syn. A.*glaucophylla*) (bog rosemary)
Arctostaphylos alpina (L.) Spreng. (alpine bearberry)
Arctostaphylos rubra (Rehd. & Wilson) Fern. (red bearberry) [S2]
Arctostaphylos uva-ursi (L.) Spreng. (common bearberry)
Betula cordifolia Regel (heartleaf birch)
Betula michauxii (Newfoundland dwarf birch)
Betula papyrifera Marsh. (white birch)
Betula pumila L. (syn. B. *borealis*) (bog birch, northern dwarf birch)
Chamaedaphne calyculata (L.) Moench (leatherleaf)
Cornus sericea L. (syn. C. *stolonifera*) (red-osier dogwood)
Dryas integrifolia Vahl (white mountain avens)
Empetrum eamesii Fern. & Wieg. (pink crowberry)
Empetrum nigrum L. (black crowberry)
Gaultheria hispidula (L.) Mühl. *ex* Bigel. (creeping snowberry)
Kalmia angustifolia L. (sheep laurel)
Kalmia polifolia Wangenh. (bog laurel)
Ledum groenlandicum Oeder (Labrador tea)
Loiseleuria procumbens(L.) Desv. (alpine azalea)
Lonicera villosa (Michx.) Roemer & Schultes (northern fly-honeysuckle)
Myrica gale L. (sweet gale)
Populus balsamifera L. (balsam poplar)
Potentilla fruticosa auct. non L. (shrubby cinquefoil)
Rhamnus alnifolia L'Hér.. (alder-leaved buckthorn)
Rhododendron lapponicum (L.) Wahlenb. (Lapland rosebay)
Ribes glandulosum Grauer (skunk currant)
Ribes hirtellum Michx. (smooth gooseberry)
Ribes lacustre (Pers.) Poir. (bristly black currant)
Ribes triste Pallas (swamp red currant)
Rubus idaeus L. (wild red raspberry) [introduced]
Rubus pubescens Raf. (dewberry)
Salix calcicola Fern. & Wieg. (lime willow)
Salix x cryptodonta Fern. (hidden tooth willow)
Salix glauca L. var. *callicarpaea* (Trautv.) Böcher (syn. *S. cordifolia*) (northern willow)
Salix planifolia Pursh (flat-leaved willow)
Salix reticulata L. (net-veined willow)
Salix uva-ursi Pursh (bearberry willow)
Salix vestita Put-sb (hairy willow)
Shepherdia canadensis (L.) Nutt. (soapberry)
Sorbus decora (Sarg.) Schneid. (showy mountain ash)
Vaccinium angustifolium Ait. (lowbush blueberry)
Vaccinium oxycoccus L. (small cranberry)
Vaccinium uliginosum L. (alpine bilberry)
Vaccinium vitis-idaea L. ssp. *minus* (Lodd.) Huh. (partridgeberry)
Viburnum edule (Michx.) Raf. (squashberry)
Viburnum opulus L. var. *americanum* Alt. (syn. *V. trilobum*). (highbush cranberry)

Forbs (l8l):
Achillea millefolium L. var. *borealis* (Bong.) Farw. (syn. A. *borealis*) (northern yarrow)
Alchemilla filicaulis Buser (syn. *A. minor*) (thin-stemmed lady's-mantle)
Anemone parviflora Michx. (northern anemone)
Angelica atropurpurea L. (purple-stemmed angelica)
Angelica lucida L. (syn. *Coelopleurum lucidum*) (seaside angelica)
Amerorchis rotundifolia (Banks ex Pursh) Hull. (small round-leaved orchid) [S2]
Antennaria albicans Fern. (whitish pussytoes) [SH]
Antennaria alpina (L.) Gaertn. ssp. cana (Fern. & Wieg.) Chmielewski (alpine pussytoes)
(syn. *A. cana* (Fern. & Wieg.) Fern.) [S2]
(syn. *A. vexillifera* Fern.)
Antennaria eucosma Fern. & Wieg. (elegant pussytoes)
Atennaria howellii Greene ssp. *Howellii* (Howell's pussytoes)
(syn. *A. canadensis* Greene)
(syn. *A. spathulata* (Fern.) Fern.)
(syn. *A. splathulata* (Fern.) Fern. var.*continentis* Fern. & St. John)
Antennaria pulvinata Greene (pulvinate pussytoes)
(syn. *Antennaria bayardii* Fern.) [S1]
Antennaria straminea Fern. (straw-coloured pussytoes)
Arabis alpina L. (alpine rockcress)
Aralia nudicaulis L. (wild sarsaparilla)
Arenaria humifusa Wahlenb. (syn. *A. cylindrocarpa*) (low sandwort)
Arnica angustifolia Vahl ssp. *angustifolia* (syn. *A. terrae-novae*) (alpine arnica)
Arnica lonchophylla Greene (syn. *A. chionopappa*) (white-plumed arnica)
Astragalus alpinus L. var. *alpinus* (alpine milk vetch) [S1]
Astragalus eucosmus Robins. (elegant milk-vetch)
Aster novi-belgii L. (New York aster)
Aster puniceus L. (purple-stemmed aster)
Aster radula Ait. (rough-leaved aster)
Atriplex glabriuscula Edmonston (orache)
Barbarea orthoceros Ledeb. (spring yellow rocket)
Bartisa alpina L. (velvet bells) [S1]
Braya fernaldii Abbe (Fernald's rockcress) [S2]
Calypso bulbosa (L.) Oakes (fairy slipper orchid) [S1]
Campanula rotundifolia L. (harebell)
Cardamine pratensis L. ssp. *angustifolia* Hook. (meadow bittercress) [S2]
Carum carvi L. (wild caraway) [introduced]
Castilleja septentrionalis Lindll. (northern paintbrush)
Cerastium alpinum L. (alpine chickweed) [S2]
Cerastium arvense L. (field chickweed)
Circaea alpina L. (dwarf enchanter's nightshade)
Cirsium muticum Michx. (swamp thistle)
Cirsium palustre (L.) Scop. (marsh thistle)
Clintonia borealis (Ait.) Raf. (cornlily, yellow clintonia, bluebead lily, poisonberry)
Cochlearia officinalis L.(syn. C. *groenlandica*) (common scurvygrass)
Cochlearia tridactylites Banks *ex* DC. (syn. *C. cyclocarpa*) (round-fruited scurvygrass)
Coeloglossum viride (L.) Hartman var. *viride* (long-bracted frog orchid) [S2]
Comandra umbellata (L.) Nutt. (bastard toadflax)

Conioselinum chinense (L.) BSP (syn. *C. pumilum*) (hemlock parsley)
Coptis trifolia (L.) Salisb. (syn. *C. groenlandica*) (goldthread)
Cornus canadensis L. (bunchberry, crackerberry)
Comas suecica L. (Swedish hunchberry)
Cornus x unalaschkensis Ledeb. (hybrid hunchbeny)
Corallorhiza trifida Châtelain (early coralroot orchid)
Crepis nana Richards. (dwarf hawksbeard) [S1]
Cypripedium parviflorum var.*pubescens* (Fern.) Morris & Eames (syn. *C. calceolus* var. *planipetalum*) (flat-petalled yellow lady's-slipper) [S2]
Draba glabella Pursh (syn. *D. hirta; syn. D. megasperma*) (smooth whitlow-grass)
Draba incana L. var. *confusa* (Ehrh.) Lilj. (hoary whitlow-grass)
Draba nivalis Lilj. (snow whitlow-grass, yellow arctic whitlow-grass) [S2]
Draba norvegica Gunn. (syn. *D. rupestris*) (Norwegian whitlow-grass)
Drosera rotundifolia L. (round-leaved sundew)
Epilobium angustifolium L. (fireweed)
Epilobium davuricum Fisch. *ex* Hornem. (Dahurian willowherb) [S2]
Epilobium ciliatum Raf. ssp. *glandulosurn* (Lehm.) Hoch & Raven (syn. *E. glandulosum*) (northern willowherb)
Epilobium lactiflorum Hausskn. (syn. *E. alpinum*) (alpine willowherb) [S2]
Epilobium latifolium L. (river beauty)
Epilobium palustre L. (marsh willowherb)
Erigeron hyssopifolius Michx. (hyssop-leaved fleabane)
Erysimum cheiranthoides L. (wormseed mustard)
Euphrasia frigida Pugsley (syn. *E. archica*) (Arctic eyebright)
Euphrasia suborbicularis Sell & Yeo (Laurentian eyebright)
Euphrasia nernorosum (Pers.) Wallr. (syn. *E. americana*) (common eyebright) [introduced]
Euphrasia oakesii Wettst. (Oakes' eyebright)
Euphrasia randii B.L. Robins. (syn. *E. purpurea* var. *randii*) (Rand's eyebright)
Fragaria virginiana Duchesne ssp. *glauca* (Wats.) Staudt (northern wild strawberry)
Galium labradoricum (Wieg.) Wieg. (Labrador bedstraw)
Galium palustre L. (marsh bedstraw)
Genuianella aniarella (L.) Börner ssp. *acuta* (Michx) Gillett (northern felwort)
Gentianella propinqua (Richards.) Gillett (four-parted gentian) [S2]
Gentianopsis nesophila (Hoim) Iltis (syn. *Gensiana nesophila*) (island gentian)
Geranium pratense L. (meadow geranium) [introduced]
Geocaulon lividum (Richards.) Fern. (northern comandra)
Geum rivale L. (purple avens)
Glaux maritima L. (sea milkwort)
Halenia deflexa (Sm.) Griseb. (spurred gentian)
Hedysarum alpinum L. (alpine hedysarum)
Heracleum maximum Bartr. (syn. *H. lanatum*) (cow parsnip)
Hieracium groenlandicum Almq. (Greenland hawkweed)
Honckenva peploides (L.) Ehrh. (seabeach sandwort)
Iris setosa Pallas ex Link (syn. *I. hookeri*) (beach-head iris)
Lamium purpureum L. (purple deadnettle) [introduced]
Lathyrus japonicus Willd. (syn. *L maritiumus*) (beach pea)
Lathyrus palustris L. (marsh pea)
Leontodon autumnalis L. (fall dandelion)
Lesquerella arctica (Wormsk. *ex* Hornem.) Wats. var. *purshii* (syn. L. *purshii*) (arctic bladderpod) [S2]

Ligusticum scothicum L. (scotch lovage)
Linnaea borealis L. (twinflower)
Listera convallarioides (Sw.) Torr. (broad-lipped twayblade)
Listera cordata (L.) R.Br. ex Ait. f. (heart-leaved twayblade)
Lomatogonium rotatum (L.) Fries ex Fern. (marsh felwort)
Maianthemum canadense Desf. (wild lily-of-the-valley)
Mertensia maritima (L.) S.F. Gray (oysterleaf)
Minuartia rubella (Wahlenb.) Hiern (reddish sandwort)
Minuartia dawsonensis (Britt.) House (Yukon sandwort)
Mitella nuda L. (naked mitrewort)
Moehringia lateriflora (L.) Fenzl (grove sandwort)
Moneses uniflora (L.) Gray (one-flowered wintergreen)
Orobanche uniflora L. (syn. *O. terrae-novae*) (one-flowered cancer root)
Orthilia secunda (L.) House (syn. *Pyrola secunda*) (one-sided wintergreen)
Osmorhiza depauperata Phil. (blunt-fruited sweet cicely) [S2]
Oxvtropis campestris (L.) DC. (syn. *O. terrae-novae*) (Nfld. oxytrope)
Oxytropis deflexa (Pallas) DC. var. *foliosa* (Hook.) Barneby (pendant-pod oxytrope) [S2]
Parnassia multiseta (Ledeb.) Fern. (syn. *P. palustris*) (northern grass-of-Parnassus)
Petasites frigidus (L.) Fries var. *palmatus* (All.) Cronq. (syn. *P. palmatus*) (sweet coltsfoot)
Pinguicula vulgaris L. (butterwort)
Plantago maritima L. var. *juncoides* (Lam.) Gray (syn. *P. juncoides*) (seaside plantain)
Platanthera dilatata(Pursh) Lindl. *ex* Beck (scent bottle)
Platanthera hyperborea (L.) Lindl. (northern bog orchid)
Platanthera obtusata (Banks ex Pursh) (blunt-leaved orchid)
Polygonum boreale (Lange) Small (northern knotweed) [S2]
Polygonum fowleri Robins. (Fowler's knotweed)
Polygonum viviparum L. (alpine bistort)
Potentilla anserina L. (silverweed)
Potentilla nivea L. (snowy cinquefoil)
Potentilla norvegica L. (rough cinquefoil) [introduced]
Potentilla palustris (L.) Scop. (marsh cinquefoil)
Potentilla tabernaemontana Aschers. (syn. *P. cranzzii*) (Crantz's cinquefoil)
Potentilla tridentata Solander ex Alt. (three-toothed cinquefoil)
Potentilla usticapensis Fern. (syn. *P. pulchella* R.Br.) (Burnt Cape cinquefoil) [S1]
Prenanthes trifoliolata (Cassini) Fern. (gall-of-the--earth)
Primula egaliksensis Wormsk. *ex* Hornem. (Greenland primrose)
Primula laurentiana Fern. (syn. *P. farinosa*) (Laurentian primrose)
Primula mistassinica Michx. (Mistassini primrose)
Pseudorchis albida (L.) A.& D. Löve var. *straminea* (L.) A.& I). Löve (Newfoundland orchid) [S2]
Pyrola asarifolia Michx. (pink pyrola, bog wintergreen)
Pyrola chlorantha Swartz (syn. *P. virens*) (greenish pyrola)
Pyrola minor L. (lesser pyrola)
Ranunculus acris L. (tall buttercup) [introduced]
Ranunculus cymbalaria Pursh (seaside spearwort)
Ranunculus flammula L. var. *ovalis* (Bigel.) Benson (spearwort)
Ranunculus repens L. (creeping buttercup) [introduced]
Rhinanthus minor L. ssp. *groenlandicus* (Chabert) L. Neum. (syn. *R. borealis*) (northern yellow rattle)
Rhinanthus minor L. ssp. *minor* (syn. *R. crista-galli*) (yellow rattle) [introduced]

Rubus arcticus L. ssp. *acaulis* (Michx.) Focke (plumboy)
Rubus chamaemorus L. (bakeapple)
Sagina nodosa (L.) Fenzl (knotty pearlwort)
Sagina procumbens L. (procumbent pearlwort)
Salicornia maritima Wolff & Jeffer. (syn. *S. europaea auct. non* L) (jointed glasswort, samphire)
Sanguisorba canadensis L. (bottlebrush)
Sarracenia purpurea L. (pitcher plant)
Saxifraga aizoides L. (yellow mt.-saxifrage)
Saxifraga cespitosa L. (tufted saxifrage)
Saxifraga oppositifolia L. (purple mt. saxifrage)
Saxifraga paniculata Mill. (syn. *S. aizoön*) (encrusted saxifrage)
Sedum rosea (L.) Scop. (roseroot)
Senecio pauperculus Michx. (balsam ragwort)
Senecio pseudoarnica Less. (false arnica)
Silene acaulis L. var. *exscapa* (All.) DC. (moss campion)
Solidago hispida Mühl. *ex* Willd. (hairy goldenrod)
Solidago macrophylla Pursh (large-leaved goldenrod)
Solidago multiradiata Alt. (northern goldenrod)
Solidago uliginosa Nutt. (bog goldenrod)
Sepgularia canadensis (Pers.) G. Don (northern sand spurry)
Stellaria borealis Bigel. (syn. *S. calycantha*) (northern stitchwort)
Stellaria crassifolia Ehrh. (fleshy stitchwort) [S2]
Stellaria graminea L. (common stitchwort)
Stellaria humifusa Rottb. (low chickweed)
Stellaria longipes Goldie (long-stalked stitchwort)
Streptopus amplexifolius (L.) DC. (white mandarin)
Streptopus lanceolatus (Alt) Reveal var. *roseus* (syn. *S. roseus*) (rose mandarin)
Streptopus x oreopolus Fern. (hybrid twisted stalk)
Tanacetum bipinnatum (L.) Schultz-Bip. ssp. *huronense* (Nutt.) Breitung (syn. *T. huronense*)(dwarf tansy)
Taraxacum lacerum Greene (cut-leaf dandelion)
Taraxacum lapponicum Kihlman (Lapland dandelion)
Taraxacum officinale G.H. Weber ex Thell. ssp. *officinale* (common dandelion) [introduced]
Taraxacuni phymatocarpum Vahl (lesser dandelion) [S1]
Thalictrum alpinum L. (alpine meadowrue)
Thalictrum pubescens Pursh (syn. *T. polygamum*) (tall meadowrue)
Tofieldia glutinosa (Michx.) Pers. (sticky tofieldia)
Tofieldia pusilla (Michx.) Pers. (small false asphodel)
Trientalis borealis Raf. (starflower)
Trifolium repens L. (white clover) [introduced]
Triglochin maritima L. (sea arrowgrass)
Urtica dioica L. (syn. *U. viridis*) (stinging nettle) [introduced]
Viola labradorica Schrank (Labrador violet)
Viola macloskeyi Lloyd ssp. *pallens* (Banks *ex* DC.) M.S. Baker (syn. *V. pallens*) (northern white violet)
Viola nephrophylla Greene (northern bog violet)
Viola renifolia Gray (kidney-leaved violet)

Dicranum sp. (broom moss)
Hylocomium splendens (Hedw.) Bry. Eur. (stair-step moss)
Pleurozium schreberi (Brid.) Mitt. (Schreber' s feathermoss)
Polytrichum commune Hedw. (haircap moss)
Ptilium crista-castrensis (Hedw.) De Not. (plume moss)
Rhytidiadelphus triquetrus (Hedw.) Warnst. (shaggy moss)
Sphagnum fuscum (Schimp.) Klinggr. (brown peatmoss)
Sphagnum capillifolium (Ehrh.) Hedw. (syn. *S. rubellum* Wils.) (red peatmoss)
Thuidium recognitum (Hedw.) Lindb.
Tomenthypnum nitens (Hedw.) Loeske

Lichens
Cetraria islandica (L.) Ach. (Iceland cetraria)
Cetraria nivalis (L.) Ach. (snowy cetraria)
Cladina stellaris (Opiz) Brodo (syn. *Cladonia alpestris*)
Cladina arbuscula (Walir.) Hale & W. Culb. (syn. *Cladonia*) (reindeer lichen)
Cladina rangiferina (L.) Nyl. (syn. *Cladonia*) (reindeer lichen)
Cladonia uncialis (L.) Wigg.
Coelocaulon aculeata (Schreber) Link (syn. *Cornicularia*)
Hypogymnia physodes (L.) W. Wats.
Ochrolechia frigida (Swartz) Lynge
Sphaerophorus globosus (Huds.) Vainio
Thamnolia vermicularis (Swartz) Ach.
Umbilicaria sp. (rock tripe) - on boulders
Xanthoria candelaria (L.) Th. Fr. - on boulders where birds perch

APPENDIX III

DETAILED GEOLOGY OF THE BURNT CAPE SITE

Geological Features of Burnt Cape, Pistolet Bay

by Ian Knight

Burnt Cape is a prominent limestone peninsula projecting into the east side of Pistolet Bay. Once an island that gradually emerged from the sea after Post-Wisconsin deglaciation, the island was eventually connected to the mainland by an isthmus of sand that separates isthmus Cove from Ha Ha Bay. The island is held up by a succession of Limestones of Early to Middle Ordovician age (480 to 470 million years old). The limestones are part of an ancient tropical. shallow water shelf that stretches thousands of kilometers along the eastern side of the North American continent. The shelf and its calcium carbonate rich sedimentary rocks are similar to the modern carbonate shelf of the Bahamas banks.

The limestones were carried upon a thrust fault Westward over a succession of Middle Ordovician sandstone and shale. This thrust and the contact of limestone upon sandstone/shale can be seen along the shoreline at the west side of the peninsula. Both limestone and the sandstone/shale are fossiliferous. The island also is host to an interesting array of recent physiographic features including sea caves, frost heaved polygons of considerable size, and a modern coastal limestone karst, Exploration of limestone gravel (the residue of insitu weathering of the Middle Ordovician limestone) has been on going since 1985, when it was already threatening the scenic beauty of the peninsula, the local Arctic limestone flora and the frost heaved polygons. which formed in the limestone gravel.

Geologic Features

I. **Isthmus Point -** Sandstone and shale of Middle Ordovician age, belonging to a local rock unit known as the Goose Tickle Group, are exposed at low tide. In the sandstones and shales are graptolites - small, black, chitinous leaf-like fossils. The graptolites are believed to be pelagic hemichordates that once floated in the surface waters of the Ordovician ocean before being buried in deep basin muds and sands. The sandstone, because of their sedimentary structures, are interpreted as deposits of a deep ocean basin, carried there by gravity driven, sediment laden turbidity currents.

2. **Falaise Point** (also called **Shellbird Point**) **-** The thrust fault that carried the Ordovician limestone over the sandstone and the shale of the Goose Tickle Group is exposed at the foot of the cliff at the point and can be traced north into the next cove.

3. **Whale Cave -** A yawning marine cave, known locally as the **'Big Oven"**, is cut into dark grey limestone of the Catoche Formation. This is one of a number of limestones that make up the St. George Group of Early Ordovician age. The limestones feature large fossil mounds of blue-green algae, sponges, large molluscs, and a number of other organisms, including trilobites. They are part of an ancient barrier reef system that stretched along the ancient coast of western Newfoundland 475 million years ago from Pistolet Bay south to Port au Port Peninsula. The cave, which is an impressive arch, is generally clean of fallen rock and contains a sea pool and shingle gravels. It can be entered at very lowest tide, but care needs to be taken to reach it.

4. **Unnamed cove and rock ledges -** This is the location of a small cave, known as the “Little Oven” and of a series of small rounded holes in limestone, locally known as “The Cannonholes”. The “Little Oven” occurs at the head of a narrow, erosional cleft eroded in the prominent cliffs along a vertical fault zone. A ledge below the cliffs leads down to “The Cannon holes”. These are exhumed small caves of an ancient karst system that formed in the Catoche Limestone during a time when the Ordovician limestone shelf was exposed and stranded by a fall of sea level. They were filled by a green mud (shale) and this soft sediment was easily eroded to leave the rounded holes.

The cliff consists of a pure white limestone that contains fossil trilobites and some fossil algal mounds. Careful study of the limestone at the top of the cliff shows there are large numbers of fractures filled by yellow sediment known as dolostone. The fractures can be traced to an irregular surface at the base of a stranded cliff. This is the St. George Unconformity. a geological feature that represents the ancient land surface produced during the fall of sea level, discussed above.

Above these cliffs is a stranded raised marine terrace. The terrace occurs beneath black limestone cliffs. Weathering of the black limestone at this terrace produced a thick deposit of centimeter-sized limestone gravel. It is in this gravel that the frost heaved polygons are formed and where the gravel for building material is excavated.

5. **Burnt Cape -** A point with an excellent marine karst carted in black limestones of the Middle Ordovician Table head Group. The limestones are locally rich in fossils, mostly gastropods and cephalopods.

Fossils of Burnt Cape

Fossil trilobites identified from Burnt Cape are fairly large and represent a deeper water fauna than elsewhere in the Table Head Group. Some of these specimens may represent new species, but there are no current plans by Mines & Energy to investigate this group of fossils further (pers. comm. Doug Boyce). The following description and list of Burnt Cape fossils is from W,D. Boyce, J.S. Ash and I. Knight, *Current Research* (1988) Newfoundland Department of Mines. Mineral Development Division, Report 88-1:75-83. References and figures, not reproduced in this excerpt, can be seen in the article referenced above.

“On Burnt Cape, detailed biostratigraphic sampling of the upper bioturbated and white limestone members (Knight, I986) of the Catoche Formation was completed. Two sections were investigated. One was on the plateau on the west side of Burnt Cape; the other was along the northwest shore.

Twenty-eight new macro fossil horizons were sampled in 1987 on Burnt Cape, augmenting the eighteen collections made in 1985. The latter horizons were also re-sampled.

Altogether, forty-six collections have been made on Burnt Cape for trilobites and conodonts. Of these, thirty were obtained from the plateau section. The remaining sixteen were obtained from the shoreline section. The plateau section was more intensely studied than shoreline section because it was apparently the more fossiliferous of the two. Furthermore, Kindle (1945) and Johnson (1949) obtained their specimens from the plateau section. ...“

"Johnson (1949, page 45) reported the following trilobite species from white limestone beds of the St. George Group exposed on the west side of Burnt Cape:

Bathyureilus fraternus Billings. 1965 [probably *Uromystrum affine* (Poulsen. 1937)]
Bathyurus glandicephalus Whitfield, 1890
Bolbocephalus sp. I [probably *Bolbocephalus convexus* (Billings. 1865)]
Bolbocephalus sp. 2 [probably *Bolbocephalus kindlei* Boyce. *in press*]
Gignopeltis rara (Billings. 1865)
Illaenus fraternus? Billings. 1865 [probably *Illaenus* sp. nov.]
*Jeffersonia timon (*Billings. 1865)
Niobe? sp. [possibly *Isoteloides latimarginatus* Fortey. 1979]
Onchonotus globosus (Billings. 1860) [possibly *Ischyrotama anataphra* Fortey, 1979]

The upper bioturbated member of the Catoche Formation yielded the following trilobites:

Bathyureilus platypus Fortey. 1979
Benthamaspis gibberula (Billings. 1865)
Bolbocephalus kindlei Boyce. *in press*
?Carolinites sp. undet.
Illaenus sp. nov.
Isoteloides latimarginatus Fortey, 1979
Jeffersonia angustimarginata Boyce. *in press*
Jeffersonia timon (Billings, 1865)
Petigurus nero (Billings, 1865)
Strotactinus insularis (Billings, 1865)

The above fauna correlates with that of the *Strigigenclis caudata* Zone of the Boat Harbour-Cape Norman (Figure 2) and Eddies Cove West-Port au Choix (Boyce. 1986, Figure 2) areas. It is also correlative with Ross-Hine Zones G_2 to H and the lower part of the Cassinian Sage of the Canadian Series... ."

"The white limestone member of the Catoche Formation yielded the following trilobites:

Bathyurellus platypus Fortey, 1979
Benthamaspis gibberufa (Billings. 1865)
?Benthamaspis sp. undet.
Bolbocephalus convexus (Billings. 1865)
Bolbocephalus kindlei Boyce. *in press*
Gignopeltis rara (Billings, 1865)
?*Goniotelina* sp. undet.
Illaenus sp. nov.
Ischyrotoma sp. undet.
Isoteloides latimarginatus Fortey, 1979
Jeffersonia angustimarginata Boyce. *in press*
Jeffersonia timon (Billings, 1865)

?Kawina sp. undet.
Peltabellia glandicephalus (Whitfield. !890)
?Punka sp. undet.
?Raymondaspis sp. undet.
Strotactinus insularis (Billings, 1865)
Uromystrum sp. nov.
Uromystrum affine (Poulsen, 1937)

The above fauna correlates with that of the *Strigigenalis caudata* Zone of the Eddies Cove West-Port au Choix area (Boyce. 1986, Figure 2). It is also correlative with Ross-Hintze Zones H to I and the upper part of the Cassinian Sage of the Canadian Series... ."

APPENDIX IV

BOTANICAL ECOLOGICAL RESERVE REGULATIONS

Published by Authority

NEWFOUNDLAND REGULATION 64/97

Amended by:

33/99

50/00

Botanical Ecological Reserve Regulations
under the
Wilderness and Ecological Reserves Act
(O.C. 97-247)

OFFICE OF THE QUEEN'S PRINTER

Print Date: March 22, 2001

Published by Authority

NEWFOUNDLAND REGULATION 64/97

Botanical Ecological Reserve Regulations
under the
Wilderness and Ecological Reserves Act
(O.C. 97-247)

(Filed May 21, 1997)

Under the authority of sections 25 and 29 of the Wilderness and Ecological Reserves Act, the Lieutenant-Governor in Council makes the following regulations.

Dated at St. John's, May 13, 1997.

John Cummings
Deputy Clerk of the Executive Council

REGULATIONS

Analysis

Short title **1.** These regulations may be cited as the Botanical Ecological Reserve Regulations

6497 sl

Definitions **2.** In these regulations

(a) "Act" means the Wilderness and Ecological Reserves Act;

(b) "managing agency" means the Parks and Natural Areas Division of the Department of Tourism, Culture and Recreation;

(c) "management plan" means the management plan for a declared botanical ecological reserve on file with the managing agency;

(d) "permit" means a permit issued and valid under these regulations;

(e) "personal water craft" includes jet-skis, sea-doos, wave-runners and the like but excludes ordinary motorized boats, kayaks and canoes;

(f) "reserve" means a botanical ecological reserve set aside under the Act and listed in the Schedule;

(g) "structure" means a man-made object intended to be permanent or semi-permanent in nature and includes, but is not limited to, buildings, houses, cottages, cabins, wharves, docks, boathouses, slipways, trailers, mobile homes, tents, tent platforms, and recreational vehicles used for any purpose but does not, include semi-permanent blinds and signs erected under the authority of the management plan; and

(h) "wildlife" means an animal or plant

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Restrictions **3.** Within a reserve, a person shall not

(a) remove or dislocate a botanical specimen except for scientific study an& this only when the researcher is the holder of a valid permit;

(b) pollute or obstruct a stream or other body of water or dispose of any garbage;

(c) build or erect or cause to have built or erected any structure;

(d) destroy, damage, remove, disturb, or handle the home, den, or nest of wildlife;

(e) destroy, damage, remove, disturb, or handle an egg of any wild bird;

(f) destroy, damage and remove any wildlife, fossil or other natural object;

(g) destroy, damage, or remove a sign or other government property;

(h) remove sand, stone, or gravel;

(i) prospect, claim stake, mine or quarry;

(j) use, operate or be in possession of a motor car, motor truck, four-wheel drive vehicle, all-terrain vehicle, snowmobile, personal water craft or other motorized conveyance;

(k) land an aircraft;

(l) operate a commercial establishment or commercial enterprise within the reserve, except guiding, touring and outfitting;

(m) display, post or broadcast an advertisement;

(n) herd or graze animals within a reserve;

(o) light a fire; and

(p) camp.

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Exception

4. A person engaged in the administration or management of a reserve in the normal course of his or her duties is exempt from paragraphs 3(a), (d), (e), (f), (g), (k) and (m).

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Research in reserve

5. Scientific research within a reserve shall require a permit and those permits may be obtained from the managing agency on submission of a written request outlining the research project, and subject to the terms and conditions that the managing agency may determine.

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Exception for research

6. A person engaged in scientific study which is approved by the managing agency and for which a permit has been issued under section 5 may be exempted from paragraphs 3(a),(c), (d), (e) and (f).

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Exceptions

7. (1) Notwithstanding paragraph 3(f), all hunting and fishing within the West Brook and Watts Point Reserves is allowed in accordance with permits and licences issued under the Wild Life Act, the Migratory Birds Convention Act (Canada) and the Fisheries Act (Canada).

(2) Notwithstanding paragraphs 3(f), (j) and (p), all hunting, trapping, fishing, camping, snowmobiling and access by motorized boat within the Redfir Lake - Kapitagas Channel Ecological Reserve is allowed in accordance with permits and licences issued under the Wild Life Act, the Migratory Birds Convention Act (Canada) and the Fisheries Act (Canada).

(3) Notwithstanding paragraphs 3(f) and (j), bird hunting and vehicular access on the existing road as identified in the management plan is permitted within the Burnt Cape Ecological Reserve in accordance with permits and licences issued under the Wild Life Act, the Migratory Birds Convention Act (Canada) and the Highway Traffic Act.

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Permit required

8. (1) A person engaged in a touring, guiding or outfitting enterprise shall obtain a permit for the enterprise from the managing agency.

(2) Applications for a permit shall provide a full description of the enterprise planned.

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Application of regulations

9. These regulations shall apply to the botanical ecological reserves listed in the Schedule, except to the extent that they have been modified by the Order declaring a given botanical ecological reserve in effect.

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Schedule

1. Hawke Hill Ecological Reserve.
2. Watt's Point Ecological Reserve.
3. West Brook Ecological Reserve.
4. King George IV Ecological Reserve.
5. Redfir Lake - Kapitagas Channel Ecological Reserve.
6. Burnt Cape Ecological Reserve.

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