Rare Lichens of Canada

A Review and Provisional Listing

by

Trevor Goward
Enlichened Consulting Ltd.
Edgewood Blue, Clearwater, BC V0E 1N0

Irwin M. Brodo
Canadian Museum of Nature
P.O. Box 3443, Station D, Ottawa, ON K1P 6P4

Stephen R. Clayden
New Brunswick Museum
277 Douglas Avenue, Saint John, NB E2K 1E5

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COSEWIC

Preface

This report has been prepared to provide an overview of lichen floristics in Canada and a provisional list of rare lichens. It is meant to serve as the initial step in a process of preparing a comprehensive list of rare lichens that will serve as candidates for the preparation of COSEWIC status reports. The provisional nature of the present listing must be stressed in view of the current state of understanding of lichen floristics and the limited funds available for the preparation of this report.

The report is being circulated to COSEWIC members, lichenologists, knowledgeable amateurs and Conservation Data Centres and Natural Heritage Information Centres across Canada for comment and information update.

It is our hope that knowledgeable individuals will assist in the updating of information contained in this report by contacting the authors or the chair of the Subcommittee for Vascular Plants, Mosses and Lichens with new information that will enable us to revise the candidate list of species for status report preparation.

Erich Haber
Chair, Subcommittee for Vascular Plants, Mosses and Lichens
c/o Committee on the Status of Endangered Wildlife in Canada
Canadian Wildlife Service, Environment Canada, Ottawa, Canada K1A 0H3

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INTRODUCTION

Canada is home to one of the world's richest lichen floras, estimated to exceed 2,500 species. As in other northern countries, lichens are a conspicuous component of many Canadian ecosystems, and often perform important ecological functions. Notwithstanding this, Canada has traditionally supported very few professional lichen taxonomists; only three such positions exist at the present time, for example. It is therefore not surprising that Canada's lichen flora is still rather poorly known, with many regions having received little or no attention at all from lichenologists.

By world standards, Canada is a young, sparsely populated country in which most natural ecosystems remain intact. Until rather recently, the impact of human activity has been negligible in most portions of the country, and conservation efforts have received low priority. By contrast, the impact of human activity has long been much more pronounced in a majority of the world's other industrialized nations -- most of which have accordingly been prompted to fund research on lichens both in recognition of their value as biological indicators and in an attempt to conserve them. Denmark, for example, has already lost, or is about to lose roughly 634 lichen species, or 70% of its original flora (Anonymous 1991). Even Sweden, in which environmental conditions are more comparable to those in Canada, recently included 238 species (roughly 13% of the lichen flora) in its "Red Data Book of Plants" (Aronsson et al. 1995). From these observations, it may be inferred that at least some components of Canada's lichen flora are also likely to be in decline: a trend which can be expected to deepen as Canada's natural ecosystems are increasingly affected by agriculture, urbanization, air pollution, and various forms of resource extraction.

Any serious attempt to develop a coherent conservation strategy on behalf of Canadian lichens must depend on: 1) an understanding of the scope and limits of past research; and 2) on-going assessments of those species judged to be at risk of extirpation. To date, no such efforts have been undertaken at a national level, though Goward (1996) did attempt to provide a summary of rare lichens in British Columbia. The following report expands on Goward's work, and undertakes, in a preliminary way, to lay the foundations for a national effort to maintain Canada's lichen flora at historic levels. The report thus consists of three sections: Section 1 provides a short history of lichen floristics in Canada; Section 2 is an annotated listing of lichen species thought to be at risk of extirpation; and Section 3 gives a prioritized summary of candidate species for which status reports are most urgently needed. Following the report is a bibliographic listing of the most important publications pertaining to lichen floristics in Canada.

Species coverage is regrettably very uneven in the following report. Though foliose, squamulose and fruticose lichens are all reasonably well represented here, crustose lichens have for the most part been omitted, owing to a lack of available information. We emphasize that this omission is by no means trivial: the inclusion of truly rare or endangered crustose lichens would probably more than double the length of this report.

Listed below are 112 lichen species considered to be at risk in Canada. This figure includes at least thirty species currently believed to be in serious decline, and another six species that appear already to have become extirpated: *Alectoria fallacina*, *Heterodermia hypoleuca*, *Leptogium azureum*, *L. byssinum*, *L. dactylinum* and *L. rivulare*. Perhaps not surprisingly, a majority of these lichens are restricted to southern regions of Canada -- especially south coastal British Columbia, southern Ontario, and, to a lesser extent, New Brunswick and Nova Scotia -- where human activity has been more pronounced than elsewhere. By contrast, lichen diversity in northern Canada appears to have been little affected by human activity, though a number of northern species have been included by reason of rarity.

To judge from the number of primarily corticolous species included in the list (47%), lichens of forest ecosystems appear to have been more adversely affected than lichens in other ecosystems. Some recent studies point to the special sensitivity of epiphytic lichens dependent on oldgrowth forests (Goward 1994, 1995, Selva 1994). Whether as a result of logging or, in central and eastern Canada, as a result of both logging and acid rain, many such species are apparently already in rapid decline. Meanwhile, elsewhere in the country, terrestrial lichens of various kinds are also in decline, as are aquatic and semi-aquatic lichens subject to industrial effluent or agricultural runoff. These comments again apply primarily to southern portions of the country.

ACKNOWLEDGMENTS

The following colleagues are warmly thanked for assistance with this project: Teuvo Ahti for information on the lichens of Newfoundland; Joan Crowe for comments on the lichens of the Thunder Bay district; Bernard Goffinet for his preliminary listing of the rare lichens of Alberta; Tor Tønsberg for his opinions on the frequency status of various crustose lichens; and Bernard de Vries for his listing of the rare macrolichens of Saskatchewan. In the United States: John Christy provided information on the rare lichens of Oregon; Fred Rhoades made available the most recent publication on the rare lichens of Washington; and Gwen Thunhorst and Larry Morse, of The Nature Conservancy, both provided information on the global and American (i.e., United States) rankings of various species, and made helpful comments on the report.

SECTION I: LICHEN FLORISTICS IN CANADA: A SHORT HISTORY

Canadian lichenology may be said to have begun in 1766, when British explorer-naturalist Joseph Banks (1743-1820) collected 16 lichen specimens from Newfoundland and Labrador (Lysaght 1971). A few decades later, in 1784-1786, Archibald Menzies (1754-1842), also from Britain, collected 23 lichen specimens from Nova Scotia (Galloway 1995). One of these specimens was later published as *Usnea trichodea* Ach. (Acharius 1803): the first lichen species to be described from eastern North America. Menzies also took part in two expeditions along the west coast: first in 1787-1789, and then again with Captain George Vancouver in 1791-1795. During these voyages, he collected more than 100 lichen specimens (Galloway 1995), at least some of which came from territories later claimed by Canada. A few of these collections were also later published by Acharius (1803), and thus became the first lichen species to be recorded from western North America.

During the late 18th and early to mid 19th centuries, considerable energy was devoted to the search for an ice-free "northwest passage" across the roof of North America. As a result of this effort, most early contributions to Canadian lichenology pertained to arctic regions, rather than to populated regions farther south. The first floristic paper on Canadian lichens, for example, reported on collections made during the 1817 Ross expedition to Baffin Bay (Brown 1819). In the half century that followed, more than a dozen additional floristic accounts of the lichens of northern Canada were published. The results of these studies, and the results of collecting efforts by B. Billings, Jr., John Macoun, D.A.P Watt and A.T. Drummond in more populated regions of Canada, were later summarized in Watt's "A provisional catalogue of Canadian Cryptogams", in which approximately 200 lichen taxa were listed, all based on specimens verified by Tuckerman (Drummond 1865).

It was not until the latter half of the 19th century, however, that the first extensive Canadian lichen collection came to be assembled. This was the work of John Macoun (1831-1920), a naturalist who emigrated to Canada from Ireland in 1850. Initially employed as a teacher in Belleville, Macoun's reputation as a botanist grew, and in 1872 he joined an expedition across western Canada to help locate a feasible route for the Canadian Pacific Railway. His prodigious knowledge of the Canadian flora, especially that of the prairies, and his many important collections and explorations led in 1872 to his being appointed botanist with the Geological Survey of Canada (now, in part, the Canadian Museum of Nature). In that capacity, Macoun criss-crossed the country many times over the following four decades, amassing an enormous collection of vascular plants, bryophytes and lichens. Eventually he published a summary of his lichen collections in Part 7 of his *Catalogue of Canadian Plants* (Macoun 1902), in which 614 species were included.

During the first half of the 20th century, lichenology in Canada languished somewhat, and was indeed kept alive primarily by the efforts of A.T. Drummond (1843-1923), from Kingston, Ontario. Drummond, a student of the great Canadian botanist, George Lawson (1815-1895), published the first list of Canadian lichens as part of Watt's Catalogue of 1865, and later helped Macoun name his lichen collections. Though an amateur naturalist, he remained Canada's only knowledgeable student of lichens until the time of his death. Drummond's early studies benefitted from the help and encouragement of the great American lichenologist, E. Tuckerman (1817-1886). Indeed, the most important contributions to Canadian lichenology during this period were made by lichen specialists from outside the country, who

routinely received lichen collections gathered in connection with geological, archaeological or other expeditions. Among the most notable of these foreign specialists were L.W. Riddle (1880-1921), G.K. Merrill (1864-1927) and E. Tuckerman from the United States, and B. Lynge (1884-1942) from Norway.

The remainder of our discussion will be organized by region.

British Columbia

Prior to World War II, systematic fieldwork in British Columbia was severely hampered by the inaccessibility of most regions of the province. This situation changed as increased prosperity following the War led to the development of numerous highways and secondary roads, as well as to substantial improvements in helicopter and fixed-winged access. By the mid 60s, the botanical explorations of Wilf Schofield and George Otto (UBC), and Teuvo Ahti and Leena Hämet-Ahti (Helsinki) had considerably increased available knowledge of British Columbia's lichen flora. In 1967, a first checklist of British Columbia lichens appeared, reporting 569 taxa in 99 genera (Otto & Ahti 1967).

Between about 1950 and 1980, Vladimir Krajina, of the University of British Columbia, directed a series of doctoral theses on the biogeoclimatic zones of British Columbia (Meidinger & Pojar 1991). Dr. Krajina's students were encouraged to incorporate lichenological data in their ecological-vegetational studies. The most important collections to result from this work are those of Christopher Brayshaw (from southern inland regions), Adam Szczawinski (from Vancouver Island), and Krajina himself (from all portions of British Columbia).

By the time the second British Columbia lichen checklist appeared (Noble et al. 1987), the provincial lichen flora had more than doubled to 1,066 taxa in 205 genera. This dramatic increase in part reflects a period of growing environmental awareness, during which field studies were often stimulated by a desire to document British Columbia's floristic diversity prior to incursion by logging, mining, urban sprawl, or other forms of human activity. Important additional contributions made during this period include those of Ahti et al. (1987: additions to the provincial flora), Benton et al. (1977: Bamfield, on the west coast of Vancouver Island), Bird & Bird (1973: Salt Spring Island, Strait of Georgia), Brodo et al. (1987: additions to the provincial checklist), Goward & Schofield (1983: Burns Bog, near Vancouver), Noble (1982: southeast Vancouver Island and the adjacent Gulf Islands), and Ohlsson (1973: macrolichens of coastal regions). It is important to emphasize that only four of the studies listed (Bird & Bird 1973; Benton et al. 1977; Noble 1982; Goward & Schofield 1983; Noble 1982) attempt to document all lichen species occurring within a given area; the rest include only the larger "macrolichens" or are based on spotty sampling.

Since publication of the second checklist, our knowledge of British Columbia's lichen flora has continued to grow rapidly. At the present time, the provincial flora stands at roughly 1400 taxa (Goward, unpublished checklist). Major floristic contributions since 1987 include Alstrup & Cole (1997: additions to the lichenicolous fungi of British Columbia), Aptroot (1996: additions to the provincial lichen flora from south coastal regions), Brodo (1995: additions to the British Columbia lichen flora from the Queen Charlotte Islands), Brodo & Ahti (1996: Cladoniaceae of the Queen Charlotte Islands), Goward & Ahti (1992: macrolichens of Wells Gray Provincial Park), Goward & Thor (1992: additions to the provincial checklist); Goward et al. (1994: additions to the provincial checklist); Goward et al. (1994a: illustated keys to foliose and squamulose species); Goward et al. (1995: the genus *Peltigera* in British Columbia); Goward et al. (1996: additions to the provincial checklist); and Halonen et al. (1998: the genus *Usnea* in British Columbia). More recently, Goward, Ahti, Brodo & Miège (unpublished) have prepared a catalogue and bibliography of British Columbia macrolichens, in which nearly 550 titles are incorporated.

Important collections either partly or wholly held in Canadian institutions include those of Charles Bird (PMAE), Irwin Brodo (CANL), George Douglas (V), Trevor Goward (UBC, herb. T. Goward), Willa Noble (UBC), Karl Ohlsson (MSC, CANL), George Otto (UBC, CANL), Jim Pojar (UBC), Mike Ryan (UBC), Wilf Schofield (UBC) and George Scotter (WIS, CANL, H). As a result of the collecting efforts of Teuvo Ahti, important British Columbia collections are also held at the University of Helsinki (H). Approximately 40,000 lichen specimens are currently on deposit at the University of British Columbia lichen herbarium, where Trevor Goward is now Honorary Curator of Lichens. Other

important collections are kept at the Royal British Columbia Museum (Victoria), at the University of Victoria, and at various regional Ministry of Forests offices throughout the province, especially those in Kamloops and Smithers.

The Prairie Provinces: Alberta, Saskatchewan and Manitoba

Somewhat paradoxically, the prairie provinces -- located near the geographic centre of Canada -- have received proportionately little attention from students of lichens. As late as 1972, only about ten papers had been published pertaining specifically to the lichens of Alberta, Saskatchewan and Manitoba combined. However, lichens have always figured to some extent in ecological studies of various kinds (see Bird 1972).

The earliest papers to document the lichens of this region appeared shortly after World War I, when Lucy Raup (1928, 1931) published checklists of the lichens of the Athabasca Lake region, and K.S. Wright (1929) produced a listing of the lichens of Manitoba. A quarter century later, in the early 1950s and 1960s, John Thomson, of the University of Wisconsin, initiated a second wave of lichenological activity with his floristic summaries of the lichens of northern Manitoba (Thomson 1953) and northern Saskatchewan (Thomson & Scotter 1961). This was followed by floristic and ecological studies by one of Thomson's students -- Jan Looman (1962, 1964, 1964a) -- on the lichens of southern Saskatchewan.

During this period Charles Bird took up professorship at the University of Calgary. From the mid 1960s until the late 1970s, Bird and his students documented the lichens of Alberta in a series of papers, including treatments of the Cladoniaceae, Parmeliaceae and Umbilicariaceae of southwestern Alberta (Bird & Marsh 1972, 1973, 1973a). Bird and his students also undertook studies on atmospheric pollution (Case 1978), epiphytic lichens (Kalgutkar & Bird 1969, Case 1977), and produced a number of more general floristic accounts (Beder & Ogilvie 1967, Bird 1973).

Farther east, in Saskatchewan, lichenology was being kept alive by John Sheard and his students at the University of Saskatchewan, who were especially interested in the epiphytic lichens of Trembling Aspen (Jonescu 1970, Jesberger & Sheard 1973, Sheard & Jonescu 1974). Meanwhile, in Manitoba, Paul and Muriel Stringer published on lichens as indicators of air pollution (Stringer & Stringer 1974), and contributed several new species to the province's lichen flora (Stringer & Stringer 1974a).

More recently, Edmonton has become a centre for lichenological research in the prairie provinces. Working out of the University of Alberta, for example, A.C. Skorepa & Dale Vitt (1976) studied the use of lichens as indicators of air pollution in Rocky Mountain House. Dale Vitt, Janet Marsh and Robin Bovey (1988) later went on to publish a popular account of western mosses, lichens and ferns. During the same period, Elisabeth John (1989) conducted detailed studies of saxicolous lichens of the Jonas Rockslide, in Jasper National Park, and Bernard Goffinet & Ross Hastings (1994) summarized the genus *Peltigera* in Alberta.

Important collections from the prairie provinces include those of Charles Bird, Bernard Goffinet, Ross Hastings, Jan Looman, Mike Ostafichuk, George Scotter and John Thomson. These collections are now housed primarily at the University of Alberta (ALTA) and the Provincial Museum of Alberta (PMAE), both in Edmonton, as well as at the University of Saskatchewan, in Saskatoon (SASK). Many duplicate specimens are also located at UBC, CANL and WIS. Unfortunately, only a single catalogue covering the lichens of Alberta, Saskatchewan and Manitoba has been prepared to date (Bird 1972), and even this is apparently no longer available. An updated checklist of the lichens of Alberta does exist, however (Editorial Services 1993), though the bibliography accompanying it appears to be incomplete.

Ontario and Quebec

The lichens of the most populous provinces of Canada -- Ontario and Quebec -- did not receive attention until some time after the famous arctic expeditions of the early 19th century. Among the first to collect Ontario lichens was the great American naturalist, Louis Agassiz. Agassiz sampled the rich lichen flora along the north shore of Lake Superior,

and sent his collections to Tuckerman for identification (Tuckerman 1850). B. Billings and A.T. Drummond, both of Kingston, probably collected together, but only Billings published specifically on Ontario lichens (Billings 1862). Billings also identified the Great Lakes collections of Robert Bell (Bell 1861). Other than J.H. Faull's (1913) list of common lichens near Toronto, almost no additional literature appeared dealing with Ontario lichens until the 1960s. Between the 1930s and the early 1970s, however, Roy Cain, a mycologist of broad interests and talents at the University of Toronto, did a great deal of collecting throughout Ontario.

In 1964, Teuvo Ahti published his monumental study of the distribution of macrolichens in northern Ontario (Ahti 1964), which remains the most comprehensive lichen study yet conducted in the province. Noteworthy contributions to our knowledge of the ecology and ecophysiology of Ontario lichens have been made by Roland Beschel, Dianne Fahselt, Kenneth Kershaw, Douglas Larson and G.A. Yarranton. Major floristic contributions include those of Brodo (1981, 1988) and Wong & Brodo (1973, 1990, 1992) for the Ottawa region and southern Ontario respectively. Various studies on boreal portions of the province have also appeared, including those of Sjors (1961), Carleton (1982, 1990), Carleton & Maycock (1981), Brumelis & Carleton (1989), Kenkel (1986, 1987) and Nimis (1985). The lichens of the Thunder Bay District were summarized by Joan Crowe (1994; Ahti & Crowe 1995). Recently, a checklist of the lichens of Ontario was compliled from literature reports by Steven Newmaster, under the auspices of the Ontario Ministry of Natural Resources (Newmaster et al. 1998).

The earliest paper on Quebec lichens is that of A.T. Drummond (1869) on a collection from Tadoussac ("Côte nord" of the lower St. Lawrence) and another (1875) from Lake Memphramagog near Sherbrooke in the Eastern Townships. Apart from these early efforts, our knowledge of the lichens of Quebec derives largely from the efforts of l'abbé Ernest Lepage of Rimouski. Lepage published his first list of Quebec lichens in 1947-49 containing 495 species and many varieties and forms. His revision of 1958 contained 525 species, and his final list (1972) included 647 species. This energetic and versatile lichenologist did a great deal of collecting, often by canoe in inaccessible northern sectors of the province. Jacques Rousseau also made collections during the 1940s along the George and other rivers in northern Quebec, as well as in the vicinity of Lake Mistassini (see Rousseau 1968). Lepage's work was aided also by the collections and papers of Frère Fabius LeBlanc (1963) and Rev. Marie-Victorin (1916), as well as those of Pierre Masson (1954, 1955) and C. Le Gallo (1952). Some Americans also travelled north of the Canadian border to collect lichens in Quebec: Arthur F. Allen (1930), Carrol Dodge (1926), Lincoln Ware Riddle (1909), and Raymond Torrey (1934, 1937, 1938) in the Gaspé Peninsula, and W.L. Dix (1956) in the Ungava.

Important recent studies include those of Clayden & Bouchard (1983) on the Abitibi area, Reilly (1972) on the Magdalen Islands, Shchepanek (1973) on the Otish Mountains, and Sirois et al. (1988) on Mont Albert in the Gaspé. A thesis on the lichens of les Isles de Mingans was prepared by Pierre Grondin (Grondin & Mélançon 1997) at l'Univerité Laval, but was never published. Our knowledge of the lichens of boreal Quebec has been deepened through various ecological studies conducted in the Ungava Peninsula (Nouveau Quebec) by Serge Payette and his coworkers at the Université Laval. Brodo (1981, 1988) added many records for the region lying north of Ottawa. Claude Roy, Curator of the Louis-Marie Herbarium at Laval, is actively collecting lichens and is preparing a major paper on additions to the Quebec lichen flora.

Important collections from Ontario and Quebec by John Macoun and others prior to 1930, as well as more modern collections by Brodo, Wong, Ahti and many others are found at the National Herbarium in Ottawa (CANL), part of the Canadian Museum of Nature. Large collections of Ontario and Quebec lichens, expecially those of Roy Cain, John Krug and Beth Denison-Kantrud are at the University of Toronto (TRTC). Lichens gathered by Roland Beschel, A.T. Drummond and others are at Queens University in Kingston (QK), and Clayden's collection of approximately 2,000 specimens from the Quebec Clay Belt regions is currently housed in his personal herbarium. Lichens from the upper Great Lakes regions can be found at Lakehead University (LKHD), which houses the collections of Garton, Barclay and Crowe among others.

Quebec lichens are best represented at l'Université Laval (QFA) with the collections of Serge Payette, Fabius LeBlanc, Ernst LePage, Claude Roy, François Lutzoni, Luc Sirois and generations of students specializing in the ecology of northern Quebec.

Eastern Canada: New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador

The earliest known collections from New Brunswick were made in the 1860s by James Fowler (1829-1923), a Presbyterian minister and self-taught naturalist, later the first professor of botany at Queen's University in Ontario. Fowler (1879, 1880) reported a total of 57 lichen taxa in his annotated "List of New Brunswick plants" (specimens at CANL, NBM). George Upham Hay (1843-1913) and John Moser (1826-1907) also made scattered collections of lichens in New Brunswick during the 1880s and 1890s (CANL, NBM); these were forwarded to and cited by Macoun (1902; see also the biographical sketches of Moser and Hay by Clayden 1994, 1998). Tuckerman's associate Henry Willey (1824-1907) visited the island of Grand Manan in the Bay of Fundy in 1879 (US); some of his specimens were reported in the second volume of Tuckerman's "Synopsis of North American lichens" (1888), which Willey completed following Tuckerman's death in 1886. The pioneering ecologist William Francis Ganong (1864-1941) recorded 12 lichen taxa, identified by Clara E. Cummings, in a study of raised peat bogs near the Bay of Fundy (Ganong 1897).

Lichenology in New Brunswick was no less desultory during the first half of the 20th century. In July 1902, the noted Harvard mycologist William G. Farlow (1844-1919) collected on Campobello Island while on summer vacation; his collections included what is now the type specimen of *Erioderma pedicellatum* (Hue) P. M. Jørg.. Nearly three decades later, in 1930, the Finnish agronomist Tapio Reijonen made collections of 46 species near Dalhousie (Räsänen 1933: H); included here is the holotype of *Pertusaria rubefacta* Erichs. Modest collections were made also near Grand Falls by Herbert Habeeb (1917-1987) in the 1940s (CANL, NBM, US), and at various locations by Robert R. Ireland in the late 1960s and early 1970s (CANL). In 1960, Henry Imshaug collected about 100 specimens (MSC) in Fundy National Park.

By the late 1970s, New Brunswick lichens began to attract more sustained attention. Harold Hinds of the University of New Brunswick made extensive collections in the Saint John area while developing a lichen-based index of atmospheric pollution (Hinds 1977; NBM). Also around this time, Hinrich Harries of Mount Allison University began studying and collecting epiphytic lichens in the New Brunswick-Nova Scotia border region (herb. H. Harries). Over the years, Harries' studies have stimulated several of his students to an interest in lichenology, including Stephen Clayden, Sharon Gowan, Trevor Goward, Ian Walker, and most recently, Cynthia Spicer (Spicer 1997). In 1978, Keith Egger collected about 1100 specimens, comprising 179 species, from Kouchibouguac National Park (Gowan 1980, unpublished; CANL). More recently, Steven Selva of the University of Maine at Fort Kent has surveyed the diversity of stubble lichens (Caliciales) and other corticolous taxa in Mount Carleton Provincial Park (Selva 1990, 1994, 1996; NBM, herb. S. Selva) and other localities in the Maritime Provinces in relation to the age and continuity of forest stands.

By far the most substantial contribution to our knowledge of New Brunswick lichens, however, has resulted from studies conducted by Sharon Gowan in Fundy National Park during the early 1980s (Gowan 1983; Gowan and Brodo 1988; CANL). Astonishingly, nearly three-quarters of the more than 470 species reported in the latter paper represent first records for New Brunswick! In 1989, Gowan made another important collection along the Restigouche River (NBM). These collections, along with others made by Stephen Clayden throughout the province, bring the known lichen flora of New Brunswick to approximately 570 species (Clayden, Gowan & Selva, unpublished). In 1987, Clayden established a lichen herbarium at the New Brunswick Museum (NBM), which now houses approximately 8,000 specimens. A catalogue of New Brunswick macrolichens is currently in preparation (Clayden, Gowan & Goward, unpublished).

As previously noted, lichenology in Nova Scotia may be said to have begun in the late 18th century, with a small but important collection made by Archibald Menzies during his posting to Halifax between 1784 and 1786. It was not until a century later, however, in 1880, that the versatile educator and scientist Alexander H. MacKay (1848-1929)

assembled the first sizable lichen collection, consisting of approximately 260 specimens (NSPM). This collection, mostly from the vicinity of Pictou, formed the basis of MacKay's liberally titled "Lichens of Nova Scotia", which included about 115 species (MacKay 1881; McDonald 1973; NSPM). Also active during this period was John Macoun, who spent the summers of 1893 and 1898 in Nova Scotia, in the latter year collecting more than 120 specimens from

Cape Breton Island (Macoun 1902; Lamb 1954; CANL). In 1899, he visited Sable Island, where he collected 19 taxa (Macoun 1902, Erskine 1954).

The first half of the 20th century saw another lull in Nova Scotian lichenology. With the exception of a few ecological studies noting only a handful of common species (Nichols 1918; Gorham 1947), no lichen field work at all was conducted until 1952. During that year, Ian Mackenzie Lamb of the National Museum of Canada spent three months collecting on Cape Breton Island. He subsequently produced a detailed floristic and taxonomic treatment, based on his own, Macoun's and other collections, and this remains the most important contribution on Nova Scotia lichens (Lamb 1954; CANL). Nonetheless, this paper documents only 199 species for Cape Breton, probably less than half the total number actually present on that island. Cape Breton lichens have also been treated in various ecological investigations, including those of Scotter (1966, unpublished), Wein & Speer (1975; CANL, NBM) and Comeau & Beil (1984). Meanwhile, on the mainland, Brawn & Ogden (1977) examined the impact of motorized vehicle traffic on lichen diversity in the city of Halifax.

Also incorporating Nova Scotia lichens are various wide-ranging studies. R.M. Taylor (1974; MSC), for example, investigated the littoral lichens of Nova Scotia and Newfoundland, recording 21 species at a total of 18 collecting sites. Beginning in the 1980s, Wolfgang Maass and collaborators have made intensive studies of certain epiphytic lichens restricted in Atlantic Canada to the most oceanic climatic sectors of Nova Scotia, Newfoundland and southern Labrador; this work has focused especially on *Erioderma pedicellatum* and other taxa with blue-green photobionts (Maass 1980, 1981, 1983, 1987; Hoisington & Maass 1982; Maass et al. 1986; see also Clayden 1997; CANL, herb. W.S.G. Maass). More recently, Ulf Arup (1994; LD) studied the genus *Caloplaca* on seashore rocks in Nova Scotia, Newfoundland and New Brunswick. Other notable collections of Nova Scotia lichens have been made by Irwin Brodo (CANL), Karen Casselman (NSPM), Stephen Clayden (NBM) and John S. Erskine (1900-1981; ACAD, NSPM).

Few parts of Canada have been more profoundly subjected to ecosystem loss -- mostly through conversion to farmland -- than Prince Edward Island. Given this fact, it is unfortunate that the lichen flora of Prince Edward Island has correspondingly received less attention than that of any other Canadian province. Indeed, no detailed studies at all have been conducted here, and no herbarium with significant lichen holdings has yet been established (Martin 1983). John Macoun visited the island in the summer of 1888 and collected a small number of lichens at Brackley Point and a few other localities on the north shore (Macoun 1902). During the 20th century, the only reports to date have been those of Fabiszewski (1975 -- not seen) and Coleman & Skorepa (1982), both of which included only small numbers of common species. Recently, Stephen Clayden and Steven Selva made localized collections (NBM; University of Maine at Fort Kent).

The history of lichenological exploration on the island of Newfoundland dates from the collections of Joseph Banks in 1766 (see above), and has been reviewed by Ahti (1974, 1983). The lichens of the neighbouring French islands of St-Pierre and Miquelon, and their collectors, have been catalogued most recently by C. Le Gallo (1952). The most important 19th century collector of Newfoundland lichens was Arthur C. Waghorne (1851-1900), for 25 years a missionary of the Society for the Propagation of the Gospel at various coastal settlements around the island and in southern Labrador (see Brassard 1980). Waghorne's collections were identified and reported by Eckfeldt (1895; see also Macoun 1902; PH), Hulting (1896) and, most importantly, Arnold (1896a,b, 1899; M). Eckfeldt's and Hulting's lists generally do not distinguish between Labrador and Newfoundland or note specific localities.

More than half a century would pass until the next major contribution to Newfoundland lichenology was made by Teuvo Ahti. In 1956, Ahti was engaged by the provincial government to carry out an extensive survey of caribou habitat (Ahti 1959). During the course of this work, he assembled approximately 3,500 specimens (H, duplicates at

CANL, NFLD, and other herbaria) at 79 localities across central and southern Newfoundland (Ahti 1974). These collections have subsequently furnished materials for various floristic papers dealing with individual lichen families, genera or species (references in Ahti 1983). Ahti (1983) provides a thorough review of the state of Newfoundland lichenology; he indicates that about 585 species are known from the island of Newfoundland, and 610 from Newfoundland and Labrador combined. Ahti (1974, 1983) should be consulted for a listing of collectors, collections, and publications up to the early 1980s. For example, Antoni Damman collected about 400 specimens between 1957 and 1967 in connection with his extensive ecological studies of the island (see Damman 1983); R.M. Taylor studied littoral lichens, as noted above; and limited collections were made in Newfoundland's two national parks -- Terra Nova and Gros Morne -- by Harold MacCausland and by André Bouchard and Stuart Hay, respectively. More recently, additional important collections have been made by Irwin Brodo (CANL), Stephen Clayden (herb. S.R. Clayden) and Wolfgang Maass (herb. W.S.G. Maass).

Labrador lichens were apparently first mentioned in print by Meyer (1830 -- not seen, cited by Lynge 1947), who noted 17 common species collected by a Moravian missionary at Okkak (probably Johann Georg Herzberg: see Pringle 1992; Cayouette & Darbishire 1994). The contributions of A. C. Waghorne and subsequent collectors to the mid-1930s were compiled by Lynge (1947). Waghorne's collections were made during annual summer trips from 1891 to 1894 along the coast of southern Labrador between the Strait of Belle Isle and Hamilton Inlet (Lynge 1947; Brassard 1980). In the mid 1930s, valuable collections and ecological observations were made also by Nicholas Polunin at Port Burwell on the northern tip of Labrador (Lynge 1947; Polunin 1948). Also during the 1930s, Gardner (1949) made sporadic collections of macrolichens along the Labrador coast.

A few years later, I. Hustich (1951) studied the potential of the vast lichen woodlands of Labrador and Quebec to support domesticated reindeer. During this same period, exploration of the Labrador interior was made easier by construction of the Quebec North Shore and Labrador Railway, which served the iron ore mines at Carol Lake (now Labrador City) and Knob Lake (now Schefferville, Quebec). The subsequent establishment of McGill University's Subarctic Research Station at Schefferville also stimulated lichenological studies in this region. Lichenological contributions resulting from this improved access include those of W.L. Dix (1956), based on collections made by Francis Harper in 1953 (PH, CANL, US), and P. Kallio and L. Kärenlampi (1966; TUR), who collected at Churchill Falls and around the head of Hamilton Inlet, as well as near Schefferville, recording a total of 107 macrolichen taxa. More recently, additional collections have been made in the vicinity of Schefferville (including Quebec) by Irwin Brodo (CANL) and Stephen Clayden (CANL; herb. S.R. Clayden).

The North: The Yukon and the Northwest Territories

Apart from the collections of various early explorers, already briefly summarized, the lichen flora of Canada's far north received comparatively little attention until the early years of the twentieth century. It was during this period that the Canadian government, acting on the principle of territorial sovereignty, mounted numerous expeditions and patrols to the Canadian arctic. Most of the resulting lichen collections were made by scientists from other disciplines; presumably their collections were stimulated by the sheer visual dominance of lichens in boreal and arctic ecosystems. Prominent among this material are the collections of Nicholas Polunin, gathered between 1931 and 1936 (Lynge 1947). For detailed summaries of lichen collecting in eastern and western portions of the Northwest Territories during this early period, see Lynge (1947) and Bird et al. (1980), respectively. The latter paper also contains a brief summary of early lichen collecting in the Yukon.

With the advent of commercial air transport in the 1940s, scientific activity in northern Canada greatly increased, though most collections have continued to be made by non-lichenologists visiting the north in other pursuits. In 1948, for example, meteorologist Alan Innes-Taylor assembled an important collection from various arctic islands (Thomson 1960). A few years later, in 1955, bryologist Rudolph Schuster collected 108 lichen species from Ellesmere Island (Schuster et al. 1959). In the 1960s, ecologist Paul Barrett made a substantial collection from Devon Island (Barrett & Thomson 1975), whereas in 1990 and 1991, biologist William Gould assembled more than two thousand specimens from the Coppermine, Hood and Thomsen Rivers (Gould 1994). Certainly the most prolific collector, however, has

been biologist George Scotter, whose studies of caribou and other wildlife have taken him to many different regions of the Canadian north, and whose resulting lichen collections have been incorporated in several important floristic studies, including Scotter & Thomson (1966), Thomson et al. (1969), Ahti et al. (1973), Bird et al. (1980, 1981) and Thomson & Scotter (1983, 1984, 1985, 1992, 1995). Thomson (1990) lists numerous other collectors.

Among the professional lichenologists who have visited northern Canada are Teuvo Ahti, Roland Beschel, Charles Bird, Irwin Brodo, Dianne Fahselt, Mason Hale, Per Luigi Nimis, John Thomson and William Weber. In 1950, Mason Hale amassed a large collection from Baffin Island (Hale 1954), while in 1959 John Thomson and William Weber visited various other portions of the eastern Arctic (Thomson & Weber 1992). In 1961 through 1964 Teuvo Ahti and/or John Thomson visited various portions of the western and central Northwest Territories (e.g., Thomson et al. 1969, Ahti et al. 1973, Thomson & Ahti 1994), mostly within the drainage of the MacKenzie River, but also at the mouth of the Coppermine River. Between 1971 and 1978, Charles Bird likewise made several collections in the MacKenzie River basin (Bird et al. 1980, 1981), as well as in the eastern arctic archipelago (Bird 1975). In 1973, Irwin Brodo collected approximately 175 species on Bathurst Island (unpublished). More recently, Dianne Fahselt examined the lichens of calcareous screes on Ellesmere Island (Maycock & Fahselt 1992), whereas D. Lausi & Per Luigi Nimis (1991) studied lichen phytosociology in the Yukon.

By far the most sustained contribution to northern lichenology has been that of John Thomson, who between 1959 and 1978 visited the Yukon and Northwest Territories on seven different occasions. Thomson has published more than a dozen floristic papers on arctic lichens, and has collaborated on several other papers, including those listed above. More recently, his northern studies have culminated in two landmark books, Macrolichens of the American Arctic (Thomson 1984) and Microlichens of the American Arctic (Thomson, 1997: in press). Thomson (1990) has also published a historical review of lichenological activities in the Canadian Arctic Archipelago, whereas lichenological work in western regions to 1980 has been summarized by Bird et al. (1980).

The most comprehensive collections of lichens from northern Canada are housed at the Canadian Museum of Nature (CANL) and the University of Wisconsin (WIS). Smaller collections are located at Harvard University (FH), the University of Alberta (ALTA), the Provincial Museum of Alberta (PMAE) and the University of Helsinki (H).

SECTION II: THE RARE LICHENS OF CANADA: ANNOTATED CHECKLIST

At time of writing, Conservation Data Centres (CDCs) have been established in all 50 American states as well as in seven Canadian provinces. The primary function of these centres is to gather and coordinate information on rare species in various taxonomic groups. Similar work in other portions of the world clearly suggests that lichens are highly vulnerable to extirpation as a result of human activities (Wolseley 1995). Notwithstanding this, only about 16 North American Data Centres currently include lichens in their data bases; and most of these include very incomplete species listings. Only in a few jurisdictions, such as British Columbia (Goward 1996), Oregon (Oregon Natural Heritage Program 1995) and Washington (Washington Natural Heritage Program 1997), has a concerted effort been made to fully integrate rare lichens into the existing tracking lists.

Based on available data, most of the following lichen species are believed to be rare in Canada as a whole. In a few cases we have included species which, though well established in one portion of the country, include disjunct populations at much greater risk of extirpation. Such species have been included on the assumption that widely disjunct populations may have undergone substantial genetic divergence, and that the disappearance of the smaller, isolated population(s) would represent a significant loss in genetic diversity.

Each species account is organized as follows:

NAME:

Except in cases of recent taxonomic revision, species names and author citations follow Esslinger & Egan (1995).

SYNONYM:

Only synonyms presumed to be of importance for North American students of lichens appear here; other synonyms have been excluded.

COMMON NAME:

Common names are based on Brodo, Duran Sharnoff & Sharnoff (in prep.), Goward et al. (1994a) and Goward (in prep.).

TAXONOMY:

Taxonomic difficulties are briefly mentioned here.

PROVINCE(S):

Canadian provinces and territories are organized from west to east, and south to north, beginning with British Columbia, and concluding with the Northwest Territories. The following abbreviations are used: BC (British Columbia), AB (Alberta), SK (Saskatchewan), MB (Manitoba), ON (Ontario), QC (Québec), NB (New Brunswick), NS (Nova Scotia), PE (Prince Edward Island), NF (Newfoundland), YK (Yukon), and NT (Northwest Territories).

STATE(S):

American states are organized from west to east and north to south, beginning with Alaska and Washington, and concluding with Florida. The following abbreviations are used: AL (Alabama), AK (Alaska), AZ (Arizona), AR (Arkansas), CA (California), CO (Colorado), CT (Connecticut), DE (Delaware), DC (District of Columbia), FL (Florida), GA (Georgia), ID (Idaho), IL (Illinois), IN (Indiana), IA (Iowa), KS (Kansas), KY (Kentucky), LA (Louisiana), ME (Maine), MD (Maryland), MA (Massachusetts), MI (Michigan), MN (Minnesota), MS (Mississippi), MO (Missouri), MT (Montana), NE (Nebraska), NV (Nevada), NH (New Hampshire), NJ (New Jersey), NM (New Mexico), NY (New York), NC (North Carolina), ND (North Dakota), OH (Ohio), OK (Oklahoma), OR (Oregon), PA (Pennsylvania), RI (Rhode Island), SC (South Carolina), SD (South Dakota), TN (Tennessee), TX (Texas), UT (Utah), VT (Vermont), VA (Virginia), WA (Washington), WV (West Virginia), WI (Wisconsin), and WY (Wyoming). The distributions of species occurring in more than five states are generalized.

ECOZONE(S):

The ecological units adopted here follow "A National Ecological Framework for Canada" (Ecological Stratification Working Group 1995).

HABITAT:

A brief summary is provided of substrate, ecological setting and regional climatic conditions.

GLOBAL RANGE:

Total range in the northern hemisphere is expressed using the following distributional units: 1) western N Am; 2) eastern N Am; 3) western Eurasia; 4) eastern Eurasia; 5) incompletely circumpolar; and 6) circumpolar. Occurrence in the southern hemisphere is also usually indicated.

THREATS:

Factors presumed to result in population decline.

CANADIAN NATIONAL STATUS:

For most species, only a preliminary assessment of endangerment is provided; such assessments are followed by a question mark. Assessments followed by an exclamation mark are based on existing COSEWIC status reports, and reflect current official status.

CANADIAN PROVINCIAL STATUS:

Based on published lichen status reports in which the ranking system of The Nature Conservancy has been adopted; see Appendix 2. To date, only one such report -- for British Columbia -- has been prepared (Goward 1996). This document is cited as "BC". A few unpublished lists are also known to us, but as these are in various stages of preparation, they have not been included here.

AMERICAN STATE STATUS:

Based on published United States lichen status reports in which the ranking system of The Nature Conservancy (see Appendix 2) has been adopted. To date, only two such reports have been prepared: one for Oregon (Oregon Natural Heritage Program 1995); and one for Washington (Washington Natural Heritage

Program 1997). These documents are cited as "OR" and "WA", respectively. Unpublished lists have not been included.

GLOBAL STATUS:

Based primarily on Thor (1996: unpublished "Red-listed lichens of the world") and The Nature Conservancy (1997: March). These sources are cited as "Thor" and "TNC", respectively. A few additional records derive from the Oregon Natural Heritage Program (1995), and are cited as "OR". See Appendix 2 for notes on the ranking system used.

RESPONSIBILITY:

The country listed here supports a majority of the North American range of the species in question, and must therefore assume primary responsibility for its conservation. In cases where the distribution area is shared equally between Canada and the United States, both countries are listed.

REFERENCE(S):

Only the most important references are given. Further distributional and other information may be found also in Brodo (1968); Hale (1979); Gowan & Brodo (1988); Goward & Ahti (1992); Goward et al. (1994a); McCune & Goward (1995); and McCune & Geiser (1997).

NOTES:

General observations on the species.

Rare Lichen List

NAME: ***Acroscyphus sphaerophoroides*** Léveillé
SYNONYM(S): None.
COMMON NAME: Eyed crab.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S): Pacific Maritime.
HABITAT: Conifers and vertical rock faces in humid oceanic regions.
GLOBAL RANGE: Western N Am - western Eurasia - eastern Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Tibell (1984); Goward et al. (1994).
NOTES: Outside of British Columbia, known in North America only from Mexico.

NAME: ***Agrestia hispida*** (Mereschk.) Hale & Culb.
SYNONYM(S): *Aspicilia hispida* Mereschk.
COMMON NAME: Desert Tumbleweed.
TAXONOMY: OK. Some authors prefer to include this species in *Aspicilia.*
PROVINCE(S): BC, SK.
STATE(S): WA, OR, SD, CO, WY, NM.
ECOZONE(S): Montane Cordillera.
HABITAT: Thin granular volcanic soil in semi-arid regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Grazing by livestock; trail construction.

CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: GU.
RESPONSIBILITY: United States.
REFERENCE(S): Thomson (1960); Brodo (1977 ["1976"]); Goward & Thor (1992).
NOTES:

NAME: ***Alectoria fallacina*** Mot.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: Closely related to and perhaps to be synonomized with *A. sarmentosa.*
PROVINCE(S): NB.
STATE(S): NH, NC, TS, WV (Appalachians).
ECOZONE(S):
HABITAT: Conifers in open forests in humid montane (Appalachian) and coastal (Fundy) regions.
GLOBAL RANGE: Eastern N Am.
THREATS: Acid rain, air pollution, logging, or insect infestations resulting in decline of montane and coastal red spruce–balsam fir forests (see Eagar & Adams 1992).
CANADIAN NATIONAL STATUS: Possibly extirpated?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G2.
RESPONSIBILITY: United States.
REFERENCE(S): Brodo & Hawksworth (1977).
NOTES: In Canada, known from a single collection made on Grand Manan Island, NB, in 1879 (Brodo & Hawksworth 1977).

NAME: ***Alectoria imshaugii*** Brodo & D. Hawksw.
SYNONYM(S): None.
COMMON NAME: Spiny witch's hair.
TAXONOMY: OK.
PROVINCE(S): BC, AB.
STATE(S): WA, ID, MT, OR, CA.
ECOZONE(S): Montane Cordillera.
HABITAT: Conifers in somewhat humid intermontane regions.
GLOBAL RANGE: Western N Am, n to Canada.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G5.
RESPONSIBILITY: United States.
REFERENCE(S): Brodo & Hawksworth (1977).
NOTES: Frequent in United States, but rare in Canada.

NAME: ***Amygdalaria continua*** Brodo & Hertel
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.

PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S): Pacific Maritime.
HABITAT: Exposed rock or rock near streams at high elevations in humid coastal regions.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable? (but see Notes, below).
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Brodo & Hertel (1987); Geiser et al. (1998).
NOTES:

NAME: ***Amygdalaria haidensis*** Brodo & Hertel
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S): Pacific Maritime.
HABITAT: Partially submerged or dry rocks at subalpine and alpine elevations in humid coastal regions.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Brodo & Hertel (1987); Geiser et al. (1998).
NOTES:

NAME: ***Anaptychia ulotrichoides*** (Vainio) Vainio
SYNONYM(S): None.
COMMON NAME: Cryptic Centipede.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): UT, AZ, CO.
ECOZONE(S): Montane Cordillera.
HABITAT: Vertical rock outcrops in dry intermontane regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Kurokawa (1962); Moberg (1980); Goward et al. (1996).
NOTES:

NAME: ***Bactrospora brodoi*** Egea & Torrente

SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, NF.
STATE(S): None.
ECOZONE(S):
HABITAT: At type locality in NB, on bark of very large, old ***Betula alleghaniensis*** in ***Picea rubens–Betula*** forest; habitat in NF unknown.
GLOBAL RANGE: Eastern N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Brodo (1984); Egea & Torrente (1993), Nordin (1996).
NOTES: Probably overlooked, but perhaps restricted to old-growth forests.

NAME: ***Brigantiaea fuscolutea*** (Dickson) R. Sant.
SYNONYM(S): *Lopadium fuscoluteum* (Dickson) Mudd
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC, NT.
STATE(S): AK.
ECOZONE(S):
HABITAT: On soil and dead vegetation in open arctic-alpine sites.
GLOBAL RANGE: Western N Am - eastern (arctic) N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Noble et al. (1987); Thomson (1997).
NOTES: Remarkable disjunct from high arctic to alpine Queen Charlotte Islands. Overlooked?

NAME: ***Bryoria carlottae*** Brodo & D. Hawksw.
SYNONYM(S): None.
COMMON NAME: Spiny horsehair.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S): Pacific Maritime.
HABITAT: Conifers in exposed sites in humid coastal regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States

REFERENCE(S): Brodo & Hawksworth (1977).
NOTES: Overlooked?

NAME: ***Bryoria cervinula*** Brodo & D. Hawksw.
SYNONYM(S): None.
COMMON NAME: Spiny horsehair.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S): Pacific Maritime.
HABITAT: Soil, duff and conifers in humid coastal regions at middle and upper forested elevations.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Brodo & Hawksworth (1977).
NOTES:

NAME: ***Bryoria salazinica*** Brodo & D. Hawksw.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: Possibly a chemical race of *B. implexa* sensu lato.
PROVINCE(S): NB, NS, PE, NF.
STATE(S): MA, ME.
ECOZONE(S):
HABITAT: Mainly on conifers in coastal region; also recorded on *Acer rubrum* (Gowan & Brodo 1988)
GLOBAL RANGE: Eastern N Am.
THREATS: Uncertain.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Brodo & Hawksworth (1977).
NOTES:

NAME: ***Buellia dialyta*** (Nyl.) Tuck.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, QC.
STATE(S): TN, PA, NY, CT, MA, VT, NH, ME.
ECOZONE(S):
HABITAT: On bark of *Tsuga canadensis*, less often *Pinus* or *Quercus* spp., in mature forests.
GLOBAL RANGE: Eastern N Am (but see notes, below).
THREATS: Logging.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.

AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Degelius (1941); Imshaug (1951); Brodo (1968, 1988).
NOTES: The NB records (Clayden 8990, 9102, 9126, 9148, 9157; NBM) are unpublished. The species is probably present, but overlooked, in NS; in NB, it is locally frequent on hemlock in old-growth mixed-wood forests. The global range appears to be eastern North America, except for the holotype specimen, which is labelled (apparently erroneously: Imshaug 1951) as "California".

NAME: ***Cetraria kamczatica*** Savicz
SYNONYM(S): None.
COMMON NAME: Icelandmoss.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): AK.
ECOZONE(S): Southern Arctic.
HABITAT: Soil and plant debris in open tundra at high latitudes.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Kärnefelt (1979).
NOTES: More abundant in Alaska than in Canada.

NAME: ***Cetrelia alaskana*** (C. Culb. & Culb.) Culb. & C. Culb.
SYNONYM(S): *Cetraria alaskana* C. Culb & Culb.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): AK.
ECOZONE(S): Southern Arctic.
HABITAT: Moist ground in open tundra at high latitudes.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G2G4.
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Culberson & Culberson (1966); Thomson (1984).
NOTES:

NAME: ***Cladina ciliata*** (Stirton) Trass s. lat.
SYNONYM(S): *Cladina ciliata* (Stirton) Trass var. *tenuis* (Flörke) Ahti & M.J. Lai, *Cladina leucophaea* (Abbayes) Hale & W.L. Culb., *Cladina tenuis* (Flörke) Hale & W.L. Culb., *Cladonia leucophaea* Abbayes, *Cladonia tenuis* (Flörke) Harm.
COMMON NAME: Starved reindeer.
TAXONOMY: Includes two chemical strains: one contains usnic acid (= *Cladina ciliata* s. str.), whereas the other does

not.
PROVINCE(S): BC, NF.
STATE(S): AK.
ECOZONE(S):
HABITAT: Moss and thin soil in open coastal bogs and outcrops at lower elevations.
GLOBAL RANGE: Incompletely circumpolar, restricted to oceanic regions.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable? (eastern population only).
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Ahti (1961).
NOTES: In eastern N Am, restricted to most oceanic portion of southern NF; not rare in western N Am, but there are subtle morphological differences between the west and east coast populations (Ahti 1961).

NAME: ***Cladina subtenuis*** (des Abb.) Hale & W. Culb.
SYNONYM(S): *Cladonia subtenuis* (des Abb.) Mattick, *Cladonia subtenuis* (des Abb.) A. Evans
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NS.
STATE(S): Eastern states, FL to ME.
ECOZONE(S):
HABITAT: In US, in open, dry, pine or oak woods or sandy pastures and clearings; single Canadian record from a treeless raised bog.
GLOBAL RANGE: Eastern N Am, also West Indies.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G5.
RESPONSIBILITY: United States.
REFERENCE(S): Ahti (1961, 1984); Brodo (1968).
NOTES:

NAME: ***Cladonia labradorica*** Ahti & Brodo
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): QC, NF.
STATE(S): None.
ECOZONE(S): Taiga Shield.
HABITAT: Sandy ground in open boreal forests.
GLOBAL RANGE: Eastern N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Ahti & Brodo (1981).

NOTES:

NAME: ***Cladonia luteoalba*** Wheldon & A. Wilson
SYNONYM(S): None.
COMMON NAME: Lemon pixie.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK, ID.
ECOZONE(S): Montane Cordillera.
HABITAT: Mossy soil in open, snowy intermontane regions.
GLOBAL RANGE: Western N Am - western Eurasia - eastern Eurasia, also southern S Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: ID: S1.
GLOBAL STATUS: TNC: G2.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Stenroos (1990).
NOTES:

NAME: ***Cladonia prolifica*** Ahti & Hammer
SYNONYM(S): None.
COMMON NAME: Phantom pixie-cup.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): ID, CA.
ECOZONE(S): Pacific Maritime.
HABITAT: Acidic soil, especially thin soil over rock in humid regions.
GLOBAL RANGE: Western N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Hammer (1995); Brodo & Ahti (1996).
NOTES:

NAME: ***Cladonia schofieldii*** Ahti & Brodo
SYNONYM(S): None.
COMMON NAME: Greater pixie-scales.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S): Pacific Maritime.
HABITAT: Acidic soil or rock in humid oceanic regions.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.

GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Brodo & Ahti (1996).
NOTES:

NAME: ***Cladonia subcervicornis*** (Vainio) Kernst.
SYNONYM(S): None.
COMMN NAME: None.
TAXONOMY: OK, but see notes, below.
PROVINCE(S): NF.
STATE(S): None.
ECOREGION(S):
HABITAT: Acidic rock and soil in oceanic coastal regions; NF collection is from distrubed ground in a lichen-rich heath community.
GLOBAL RANGE: Eastern N Am - western Eurasia.
THREATS: Unknown

CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCES(S): Purvis et al. (1992).
NOTES: Known in North America from a single specimen collected in southeastern NF in 1956 (Ahti 2526); previous reports have been based on misidentifications (see Esslinger & Egan 1995).

NAME: ***Cladonia thomsonii*** Ahti
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): AK.
ECOZONE(S): Taiga Plains.
HABITAT: Ground in open tundra at high latitudes.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Ahti (1978); Thomson (1984).
NOTES: Readily confused with *C. wainioi*.

NAME: ***Cliostomum leprosum*** (Räsänen) Holien & Tønsb.
SYNONYM(S): *C. luteolum* Gowan
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC, NB, NS.
STATE(S): MA.
ECOZONE(S):

HABITAT: Conifers in old forests.
GLOBAL RANGE: Western N Am - eastern N Am - western Eurasia.
THREATS: Logging; air pollution causing red spruce decline in eastern N Am?
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Tønsberg (1992); Dietrich & Scheidegger (1996); Goward et al. (1996).
NOTES: Perhaps overlooked. Apparently somewhat more common in western Canada than in eastern Canada.

NAME: ***Coccocarpia palmicola*** (Sprengel) Arv. & D.J. Galloway
SYNONYM(S): *C. cronia* (Tuck.) Vainio
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, NS, NF.
STATE(S): southeastern states, especially coastal plain, north to ME.
ECOZONE(S):
HABITAT: On coniferous or deciduous trees and on mossy rocks in moist forests or ravines.
GLOBAL RANGE: Eastern N Am - eastern Eurasia, pan-tropical and subtropical.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G5.
RESPONSIBILITY: United States.
REFERENCE(S): Arvidsson (1982).
NOTES: Maass (1980, 1983) notes that in NS and NF, *C. palmicola* is a nearly constant associate of the much rarer *Erioderma pedicellatum*, and may possibly provide a source of that species' photobiont (*Scytonema*).

NAME: ***Collema auriforme*** (With.) Coppins & Laundon
SYNONYM(S): *Collema auriculatum* Hoffm.
COMMON NAME: Jelly tarpaper.
TAXONOMY: The local material may be referrable to another species, possibly undescribed (Goward et al. 1994a).
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S): Pacific Maritime?; Montane Cordillera.
HABITAT: Deciduous trees in humid regions.
GLOBAL RANGE: Western N Am - western Eurasia - eastern Eurasia.
THREATS: Logging; air pollution.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Goward et al. (1994; 1994a).
NOTES:

NAME: ***Collema callopismum*** Massal. var. ***rhyparodes*** (Nyl.) Degel.
SYNONYM(S): None.
COMMON NAME: Tripe tarpaper.

TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S): Montane Cordillera.
HABITAT: Calcareous rock in open sites in forested intermontane regions.
GLOBAL RANGE: Incompletely circumpolar.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Degelius (1974); Thomson (1984).
NOTES: In North America, known only from Yoho National Park. Overlooked?

NAME: ***Collema glebulentum*** (Crombie) Degel.
SYNONYM(S): None.
COMMON NAME: Amphibious tarpaper.
TAXONOMY: OK.
PROVINCE(S): BC, ON, NT.
STATE(S): AK, CO.
ECOZONE(S): Montane Cordillera.
HABITAT: Seasonally inundated rocks at the edges of lakes and streams.
GLOBAL RANGE: Circumpolar.
THREATS: Pollution.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Degelius (1974); Thomson (1984).
NOTES: Overlooked?

NAME: ***Collema limosum*** (Ach.) Ach.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): MB, NT.
STATE(S): CA, IO, IL, NY, SC.
ECOZONE(S): Prairies. Southern Arctic.
HABITAT: Calcareous soil in open sites in inland and arctic regions.
GLOBAL RANGE: Circumpolar.
THREATS: Trampling.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Degelius (1974); Thomson (1984).
NOTES: Overlooked?

NAME: ***Degelia plumbea*** (Lightf.) P.M. Jørg. & P. James
SYNONYM(S): *Parmeliella plumbea* (Lightf.) Vainio
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, NS, NF.
STATE(S): ME.
ECOZONE(S):
HABITAT: Rocks and trees in humid coastal regions; in Europe, normally a member of the Lobarion (Jørgensen 1978).
GLOBAL RANGE: Eastern N Am – western Eurasia, northwestern Africa, Macaronesia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Tuckerman (1882); Lamb (1954); Jørgensen (1978); Ahti (1983).
NOTES: Literature report (Tuckerman 1882) for NB unverified, based on material from "a birch stump and on exposed rocks" on Grand Manan by H. Willey. Recorded from only six localities in North America: ME (1), NB (1), NS (1), NF (2), St-Pierre and Miquelon (1).

NAME: ***Dermatocarpon linkolae*** Räsänen
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S): Montane Cordillera.
HABITAT: Rock outcrops in dry forested intermontane regions.
GLOBAL RANGE: Western N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Goward et al. (1996).
NOTES: Possibly overlooked.

NAME: ***Dermatocarpon moulinsii*** (Mont.) Zahlbr. s. lat.
SYNONYM(S): None.
COMMON NAME: Shag stippleback.
TAXONOMY: The North American material appears to include two taxa; see McCune & Goward (1995).
PROVINCE(S): BC, AB.
STATE(S): Various western states: see Hale (1979).
ECOZONE(S): Montane Cordillera.
HABITAT: Calcareous rock.
GLOBAL RANGE: Western N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.

GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Hale (1979); Breuss (1995); Goward et al. (1996).
NOTES:

NAME: ***Dictyonema moorei*** (Nyl.) Henssen
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S): Pacific Maritime.
HABITAT: Conifers in sheltered forests in humid coastal regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.

REFERENCE(S): Henssen (1963); Hoffmann & Budel (1992); Brodo (1995).
NOTES: Overlooked?

NAME: ***Erioderma mollissimum*** (Samp.) Du Rietz
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, NS.
STATE(S): NC, TN.
ECOZONE(S):
HABITAT: Deciduous or coniferous trees in strongly humid coastal and montane regions; rarely on mossy rocks.
GLOBAL RANGE: Eastern N Am - western Eurasia, also S Am.
THREATS: Logging; acid rain.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Du Rietz (1926); Degelius (1941); Jórgensen (1972); Maass (1980, 1983); Gowan & Brodo (1988).
NOTES:

NAME: ***Erioderma pedicellatum*** (Hue) P.M. Jórg.
SYNONYM(S): *Erioderma boreale* Ahlner
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, NS, NF.
STATE(S): None.
ECOZONE(S):
HABITAT: Conifers, especially *Abies balsamea*, in open forests in humid coastal regions.
GLOBAL RANGE: Eastern N Am.

THREATS: Logging; acid rain.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: Thor: G1; TNC: GH.
RESPONSIBILITY: Canada.
REFERENCE(S): Maass (1980, 1983); Ringius (1997); Tønsberg et al. (1996).
NOTES: Probably extirpated in NB. Intensive searching for this species in Atlantic Canada has uncovered 5 sites in NS (Maass 1983), and 34 sites (total of 677 thalli) in NF (Ringius 1997). *Erioderma pedicellatum* is apparently extirpated in Europe (P.M. Jørgensen, personal communication).

NAME: ***Erioderma sorediatum*** D.J. Galloway & P.M. Jørg.
SYNONYM(S): None.
COMMON NAME: Treepelt.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): WA, OR.
ECOZONE(S): Pacific Maritime.
HABITAT: Conifers in open, but sheltered, forests in humid coastal regions.
GLOBAL RANGE: Western N Am, tropical regions, southern hemisphere.
THREATS: Logging.

CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: OR: S1.
GLOBAL STATUS: TNC: G3.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Galloway & Jørgensen (1975); Goward et al. (1994a); McCune et al. (1997).
NOTES:

NAME: ***Everniastrum catawbiense*** (Degel.) Sipman
SYNONYM(S): *Cetrariastrum catawbiense* (Degel.) Culb. & C. Culb.; *Parmelia catawbiense* (Degel.) Hale & M. Wirth
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, NS.
STATE(S): TN, VA, NC, ME (Appalachians).
ECOZONE(S):
HABITAT: On trees and rocks in montane and coastal forests; in Canadian portion of range, known only from conifers (*Abies* and *Picea*) in moist ravine or bog-margin forests.
GLOBAL RANGE: Eastern N Am, Central and South Am, Africa (Uganda), Papua New Guinea.
THREATS: Logging; air pollution.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Culberson & Culberson (1981); Gowan & Brodo (1988); Sullivan (1996).
NOTES: In NB, not rare in coniferous forests bordering on bogs near the Bay of Fundy.

NAME: ***Fuscopannaria laceratula*** (Hue) P.M. Jørg.
SYNONYM(S): *Pannaria laceratula* Hue
COMMON NAME: Cushion mouse.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S): Pacific Maritime.
HABITAT: Mossy conifers and mossy rock in open forests in humid coastal regions.
GLOBAL RANGE: Apparently western N Am - eastern Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Brodo & Wong (1993).
NOTES:

NAME: ***Fuscopannaria leucosticta*** (Tuck.) P.M. Jørg.
SYNONYM(S): *Pannaria leucosticta* (Tuck.) Nyl.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NS, ON, QC.

STATE(S): Southeastern states, N to ME; SD, MN, WI, MI.
ECOZONE(S):
HABITAT: On bark of deciduous trees (*Acer*, *Quercus*, etc.) and *Thuja*, rarely mossy rock, in forests.
GLOBAL RANGE: Eastern N Am - western Eurasia (where apparently extirpated) - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Wetmore (1967); Jørgensen (1978); Maass et al. (1986).
NOTES:

NAME: ***Glypholechia scabra*** (Pers.) Müll. Arg.
SYNONYM(S): *Acarospora saxicola* Fink; *A. scabra* (Pers.) Th. Fr.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC, AB, SK, NT.
STATE(S): AK, CO, UT.
ECOZONE(S): Montane Cordillera. Prairies.
HABITAT: Calcareous rock in dry, open inland regions.
GLOBAL RANGE: Western N Am - western Eurasia - eastern Eurasia.
THREATS: Quarrying; rockclimbing.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Vitt et al. (1988); McCune & Goward (1995); Tønsberg (1996); Thomson (1997).
NOTES:

NAME: ***Gypsoplaca macrophylla*** (Zahlbr.) Timdal
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC, YK, NT.
STATE(S): AK, CO, UT.
ECOZONE(S): Montane Cordillera. Taiga Cordillera.
HABITAT: Calcareous soils in arid and semi-arid regions.
GLOBAL RANGE: Apparently western N Am - western Eurasia; also present in the arctic and subarctic.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Timdal (1990); Goward et al. (1996).
NOTES:

NAME: ***Heterodermia hypoleuca*** (Muhl.) Trev.
SYNONYM(S): *Anaptychia hypoleuca* (Muhl.) A. Massal.

COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON, QC.
STATE(S): Eastern, mostly Appalachians and Ozarks.
ECOZONE(S):
HABITAT: On bark in deciduous forests.
GLOBAL RANGE: Eastern N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Extirpated?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G5.
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Wong & Brodo (1992).
NOTES: Though this species is rather frequent in some parts of the United States, no recent Canadian records are known to us.

NAME: ***Heterodermia leucomelos*** (L.) Poelt
SYNONYM(S): *Heterodermia "leucomelaena"* (L.) Poelt
COMMON NAME: Elegant centipede; elegant fringed lichen.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): WA, OR, CA, AZ, NM; also widespread in eastern states.
ECOZONE(S): Pacific Maritime.
HABITAT: On conifers (west coast) and deciduous trees (eastern N Am) in humid regions.
GLOBAL RANGE: Incompletely circumpolar.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G3G5.
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Kurokawa (1962, 1973); Hale (1979).
NOTES:

NAME: ***Heterodermia obscurata*** (Nyl.) Trev.
SYNONYM(S): *Anaptychia heterochroa* Vainio; *A. hypoleuca* (Muhl.) A. Massal. var. *colorata* Zahlbr.; *A. obscurata* (Nyl.) Vainio; *A. sorediifera* (Müll. Arg.) Du Rietz & Lynge
COMMON NAME: Fringe lichen.
TAXONOMY: OK.
PROVINCE(S): ON, NB.
STATE(S): AZ, NM; also widespread in southeastern states.
ECOZONE(S):
HABITAT: On tree bark of various kinds, rarely on mossy rock, in moderately shaded mixed forests.
GLOBAL RANGE: Pantemperate and pantropical, also in southern hemisphere.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.

REFERENCE(S): Gowan & Brodo (1988); Wong & Brodo (1992).
NOTES: Very rare and perhaps extirpated in southern Ontario; scattered along Bay of Fundy in southern New Brunswick.

NAME: ***Heterodermia sitchensis*** Goward & W. Noble
SYNONYM(S): None.
COMMON NAME: Seaside centipede.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S): Pacific Maritime.
HABITAT: Conifers in open, but sheltered, seaside localities.
GLOBAL RANGE: Western N Am.
THREATS: Logging; collection of firewood.
CANADIAN NATIONAL STATUS: Endangered! (COSEWIC: Goward 1996c).
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: Thor: G1; TNC: G1G2.
RESPONSIBILITY: Canada.
REFERENCE(S): Goward (1984, 1996c).
NOTES: The holotype was collected from near Tofino, British Columbia.

NAME: ***Heterodermia squamulosa*** (Degel.) Culb.
SYNONYM(S): *Anaptychia squamulosa* Degel.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB, NS.
STATE(S): NC, TN, VA, GA, WV, MI.
ECOZONE(S):
HABITAT: On deciduous trees, especially mossy tree trunks; in NB, recorded from *Acer saccharum* and *Betula alleghaniensis*.
GLOBAL RANGE: Eastern N Am (Appalachians), Mexico.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Culberson (1966); Hale (1975); Dey (1978); Maass et al. (1986); Gowan & Brodo (1988).
NOTES: The NB locality is located in and adjacent to Fundy National Park (Gowan & Brodo 1988; Clayden 7852, NBM). Reported also for NS, without a specimen citation, by Maass et al. (1986).

NAME: ***Hydrothyria venosa*** J.L. Russell
SYNONYM(S): None.
COMMON NAME: Waterfan.
TAXONOMY: OK.
PROVINCE(S): BC, QC, NB.
STATE(S): Various western and eastern: see McCune (1984).
ECOZONE(S): Montane Cordillera. Atlantic Maritime.
HABITAT: Permanently submerged rocks in small subalpine streams.
GLOBAL RANGE: Western N Am - eastern N Am.

THREATS: Pollution.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G3.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): McCune (1984).
NOTES:

NAME: ***Hypogymnia heterophylla*** L.H. Pike
SYNONYM(S): None.
COMMON NAME: Seaside bone.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): WA, OR, CA.
ECOZONE(S): Pacific Maritime.
HABITAT: Conifers in open coastal regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable! (COSEWIC: Goward 1996b).
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: WA: S3.
GLOBAL STATUS: TNC: G3.
RESPONSIBILITY: United States.
REFERENCE(S): Pike & Hale (1982); Goward (1996b).
NOTES: Much more common in the American Pacific Northwest than in adjacent Canada.

NAME: ***Hypogymnia pulverata*** (Crombie) Elix
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): QC.
STATE(S): OR.
ECOZONE(S): Taiga Shield.
HABITAT: Conifers in open boreal forests.
GLOBAL RANGE: Eastern N Am - eastern Eurasia, southern hemisphere.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Elix (1979); Brodo (1989); McCune et al. (1997).
NOTES: Known only from two localities in N Am.

NAME: ***Hypotrachyna imbricatula*** (Zahlbr.) Hale
SYNONYM(S): *Parmelia imbricatula* Zahlbr.; *P. lobulifera* Degel.; *P. lobulifera* Degel. var. *luteoreagens* Degel.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NS?
STATE(S): NC, TN, VA.

ECOZONE(S):
HABITAT: On conifers in montane spruce-fir forests, also infrequently on deciduous trees or rock.
GLOBAL RANGE: Eastern N Am - eastern Eurasia?, Caribbean, Central Am, South Am, Australia?
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G5.
RESPONSIBILITY: United States.
REFERENCE(S): Dey (1978); Maass et al. (1986).
NOTES: Reported for NS, without a specimen citation, by Maass et al. (1986).

NAME: ***Koerberia sonomensis*** (Tuck.) Henssen
SYNONYM(S): *Pannaria sonomensis* Tuck.
COMMON NAME: Brownette.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): MT, CA, AZ.
ECOZONE(S): Pacific Maritime.
HABITAT: Acid rock in open, but somewhat sheltered sites in coastal regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Henssen (1963a).
NOTES: Overlooked?

NAME: ***Leioderma sorediatum*** D.J. Galloway & P.M. Jørg.
SYNONYM(S): None.
COMMON NAME: Treepelt.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): OR.
ECOZONE(S): Pacific Maritime.
HABITAT: Conifers in open humid coastal regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: OR: S1.
GLOBAL STATUS: TNC: G3.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Galloway & Jørgensen (1987); McCune et al. (1997).
NOTES:

NAME: ***Lempholemma polyanthes*** (Bernh.) Malme
SYNONYM(S): *Lempholemma myriococcum* (Ach.) Th. Fr.
COMMON NAME: None.

TAXONOMY: OK.
PROVINCE(S): BC, ON, QC, NB, NS.
STATE(S): AK, MT, CA, CO.
ECOZONE(S): Montane Cordillera.
HABITAT: Over mossy rock in humid regions.
GLOBAL RANGE: Possibly incompletely circumpolar.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Goward et al. (1996).
NOTES: Possibly overlooked.

NAME: ***Leptogium arcticum*** P.M. Jórg.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): AK.
ECOZONE(S): Southern Arctic.
HABITAT: Ground in sheltered sites in arctic regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Jórgensen (1973); Thomson (1984).
NOTES:

NAME: ***Leptogium azureum*** (Sw.) Mont.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON.
STATE(S): Various southeastern states.
ECOZONE(S): Mixedwood Plains.
HABITAT: Deciduous trees in sheltered forests in humid regions.
GLOBAL RANGE: Eastern N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Extirpated?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Sierk (1964); Jórgensen & James (1983).
NOTES:

NAME: ***Leptogium brebissonii*** Mont.
SYNONYM(S): None.
COMMON NAME: Jellied vinyl.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): WA, OR.
ECOZONE(S): Pacific Maritime.
HABITAT: Over deciduous shrubs in humid regions.
GLOBAL RANGE: Western N Am - western Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Goward et al. (1994); McCune et al. (1997).
NOTES:

NAME: ***Leptogium byssinum*** (Hoffm.) Nyl.
SYNONYM(S): *Leptogium amphineum* Nyl.; *L. caesiellum* Tuck.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON.
STATE(S): CO and various eastern states: Sierk (1964).
ECOZONE(S):
HABITAT: Soil in humid regions.
GLOBAL RANGE: Probably incompletely circumpolar at temperate latitudes.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Extirpated?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Sierk (1964); Wong & Brodo (1992).
NOTES:

NAME: *Leptogium corticola* (Taylor) Tuck.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON, NB.
STATE(S): Various eastern states: see Sierk (1964).
ECOZONE(S):
HABITAT: Trees and mossy ground in humid regions.
GLOBAL RANGE: Eastern N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.

REFERENCE(S): Sierk (1964); Jórgensen & James (1983); Wong & Brodo (1992).
NOTES: Known in NB from a single recent collection by Clayden (9004; NBM), on trunk of *Thuja occidentalis* in swampy woods bordering on a domed peat bog, near the Bay of Fundy. The ON localities should be reexamined.

NAME: ***Leptogium dactylinum*** Tuck.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON.
STATE(S): Various eastern states: see Sierk (1964).
ECOZONE(S):
HABITAT: Calcareous rocks, also trees, in humid regions.
GLOBAL RANGE: Eastern N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Extirpated?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Sierk (1964); Wong & Brodo (1992).
NOTES:

NAME: ***Leptogium laceroides*** (de Lesd.) P.M. Jórg.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): QC, NB.
STATE(S): NC, TN, NY, CT, NH, MA, ME (Appalachians).
ECOZONE(S):
HABITAT: Deciduous forest, on trees.
GLOBAL RANGE: Eastern N Am - western Eurasia (Portugal), also S Am, montane east Africa, Tristan da Cunha, New Zealand.
THREATS: Logging, acid rain.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G5.
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Sierk (1964); Gowan & Brodo (1988); unpublished records (Clayden 7741, Selva 4123 p.p.; NBM).
NOTES: All three NB populations are on *Acer* -- two on *A. saccharum*, one on *A. rubrum*.

NAME: ***Leptogium polycarpum*** P.M. Jórg. & Goward
SYNONYM(S): None.
COMMON NAME: Peacock vinyl.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): WA, OR.
ECOZONE(S):
HABITAT: Deciduous trees in humid coastal regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging; pollution.

CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Jørgensen & Goward (1994).
NOTES:

NAME: ***Leptogium rivulare*** (Ach.) Mont.
SYNONYM(S): *Leptogium crenatellum* (Nyl.) Tuck.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON.
STATE(S): IL, VT.
ECOZONE(S):
HABITAT: Periodically inundated margins of ponds and sluggish rivers in humid regions.
GLOBAL RANGE: Eastern N Am - western Eurasia - eastern Eurasia.
THREATS: Pollution.
CANADIAN NATIONAL STATUS: Extirpated?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Sierk (1964); Jørgensen & James (1983); Wong & Brodo (1992).
NOTES: Rare throughout its range. Possibly no longer present at the only Canadian locality.

NAME: ***Leptogium subtile*** (Schrader) Torss.
SYNONYM(S): *Leptogium minutissimum* (Flörke) Fr.
COMMON NAME: Appressed vinyl.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): Apparently none.
ECOZONE(S):
HABITAT: Decaying bark and mossy rock in humid intermontane regions.
GLOBAL RANGE: Apparently western N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Jørgensen (1994)
NOTES: Distribution poorly understood. Overlooked?

NAME: ***Lichinodium canadense*** Henssen
SYNONYM(S): None.
COMMON NAME: Oldgrowth woollybear.
TAXONOMY: Probably OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S):

HABITAT: Conifers in old forests in humid regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Henssen (1968).
NOTES: The holotype specimen was collected near Sicamous, British Columbia.

NAME: ***Lithographa tesserata*** (DC.) Nyl.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC, QC, NF.
STATE(S): AK.
ECOZONE(S):
HABITAT: Rock in humid montane, subalpine, and alpine localities.
GLOBAL RANGE: Western N Am - eastern N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Sirois et al. (1988); Flock (1989); Brodo (1995).
NOTES: A distinctive crustose lichen, unlikely to have been overlooked. The unpublished NF record is from Gros Morne National Park (Clayden 8313, 8327; herb. S.R. Clayden). This species is also rare in Europe.

NAME: ***Lobaria retigera*** (Bory) Trevisan
SYNONYM(S): None.
COMMON NAME: Smoker's lung.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S):
HABITAT: Conifers in humid intermontane regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Jordan (1973).
NOTES:

NAME: ***Lobaria silvae-veteris*** (Goward & Goffinet) Goward & Goffinet
SYNONYM(S): *Nephroma silvae-veteris* Goward & Goffinet
COMMON NAME: Oldgrowth lung.

TAXONOMY: Some authors consider this species to be a photomorph of *Lobaria oregana.*
PROVINCE(S): BC.
STATE(S): WA, OR.
ECOZONE(S):
HABITAT: Conifers in humid intermontane regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Goward & Goffinet (1993); Goffinet & Goward (1998).
NOTES: The holotype specimen was collected near Hazelton, British Columbia.

NAME: ***Massalongia microphylliza*** (Hasse) Henssen
SYNONYM(S): *Placynthium dubium* Herre; *P. microphyllizum* (Hasse) Hasse
COMMON NAME: Soil mouse.
TAXONOMY: The Canadian material possibly represents an undescribed taxon.
PROVINCE(S): BC.
STATE(S): CA, CO.
ECOZONE(S):
HABITAT: Soil in open, semi-arid intermontane regions.
GLOBAL RANGE: Western N Am.
THREATS: Trampling, especially by grazing livestock.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Henssen (1963b); Goward et al. (1994).
NOTES: Overlooked?

NAME: ***Neofuscelia subhosseana*** (Essl.) Essl.
SYNONYM(S): *Parmelia subhosseana* Essl.
COMMON NAME: Blistered brown.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): WA, OR, CA, CO, NE.
ECOZONE(S):
HABITAT: Rock in open sites in semi-arid intermontane regions.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Esslinger (1977).
NOTES: Overlooked?

NAME: ***Nephroma occultum*** Wetm.
SYNONYM(S): None.
COMMON NAME: Cryptic paw.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): WA, OR.
ECOZONE(S):
HABITAT: Conifers in open to rather shady forests in humid regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable! (COSEWIC: Goward 1995a).
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: OR: S1.
GLOBAL STATUS: TNC: G4.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Wetmore (1980); Goward (1995; 1995a).
NOTES:

NAME: ***Ochrolechia yasudae*** Vainio
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NS?
STATE(S): ME to GA (Appalachians) and AR, MO (Ozarks)
ECOZONE(S):
HABITAT: Deciduous forests, especially at higher elevations
GLOBAL RANGE: Eastern N Am - eastern Eurasia.
THREATS: Pollution, habitat reduction (but most American localities are situated in protected areas).
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: TNC: NC: S1?
GLOBAL STATUS: TNC: G3G4.
RESPONSIBILITY: United States.
REFERENCE(S): Brodo (1991).
NOTES: Reported for NS, without a specimen citation, by Maass et al. (1986).

NAME: ***Ophioparma rubricosa*** (Müll. Arg.) S. Ekman
SYNONYM(S): *Bacidia herrei* Zahlbr.; *B. rubricosa* (Müll. Arg.) Zahlbr.; *Haematomma californicum* Sigal & D. Toren
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): ID, OR, CA.
ECOZONE(S):
HABITAT: On smooth wood or bark of various trees (e.g., *Pseudotsuga*, *Adenostoma* spp.), rarely rock.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?

RESPONSIBILITY: United States/Canada.
REFERENCE(S): Kalb & Staiger (1995); Ekman (1996).
NOTES: Overlooked?

NAME: ***Pannaria hookeri*** (Sm.) Nyl.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): MB, QC, YK, NT.
STATE(S): AK.
ECOZONE(S):
HABITAT: Over wet soil or rocks.
GLOBAL RANGE: Circumpolar, also present in southern hemisphere.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Jørgensen (1978); Thomson (1984).
NOTES:

NAME: ***Parmeliella arctophila*** (Th. Fr.) Malme
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: This species appears to belong neither in *Parmeliella* nor in *Pannaria*.
PROVINCE(S): NF, NT.
STATE(S): AK.
ECOZONE(S):
HABITAT: Moss and soil in open arctic-alpine regions.
GLOBAL RANGE: Probably circumpolar.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Jørgensen (1978); Thomson (1984).
NOTES: Overlooked? The lectotype was collected in NF.

NAME: ***Parmelinopsis minarum*** (Vainio) Elix & Hale
SYNONYM(S): *Parmelina dissecta* (Nyl.) Hale; *P. minarum* (Vainio) Skorepa; *Parmelia dissecta* Nyl.; *P. hubrichtii* E.C. Berry.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB.
STATE(S): Eastern US states north to PA.
ECOZONE(S):
HABITAT: Open forests, on trees and rock; in NB, on trunk of *Thuja occidentalis* in swampy woods bordering on a peat bog.
GLOBAL RANGE: Eastern N Am, pantemperate and montane pantropical.

THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Hale (1976, 1979).
NOTES: The only known Canadian population (Clayden 7663; NBM, unpublished) is located less than 100 m from the edge of a large clearcut; this is considerably disjunct from the species' main range in the eastern US, where it is common.

NAME: ***Parmotrema mellissii*** (C.W. Dodge) Hale
SYNONYM(S): *Parmelia mellissii* C.W. Dodge
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NS?
STATE(S): Southeastern states.
ECOZONE(S):
HABITAT: Open woods, on trees and rocks.
GLOBAL RANGE: Eastern N Am - eastern Eurasia, Central and South Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Dey (1978); Hale (1979).
NOTES: Reported for NS, without a specimen citation, by Maass et al. (1986).

NAME: ***Pertusaria globularis*** (Ach.) Tuck.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NB.
STATE(S): ME to AL, IL to AR (Appalachians and Ozarks).
ECOZONE(S):
HABITAT: Over mossy rocks and tree bases in forests; in NB, on *Acer saccharum.*
GLOBAL RANGE: Eastern N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Uncertain.
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Dibben (1980); Brodo & Gowan (1988).
NOTES: The only site known in Canada is protected in Fundy National Park.

NAME: ***Pertusaria hakkodensis*** Räsänen
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.

PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S):
HABITAT: Deciduous shrubs in humid coastal regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Brodo (1995).
NOTES: Only one N Am locality (on the Queen Charlotte Islands) has been recorded to date. Overlooked?

NAME: ***Phaeophyscia imbricata*** (Vainio) Essl.
SYNONYM(S): *Physcia imbricata* Vainio; *P. lacinulata* auct, non Müll. Arg.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON.
STATE(S): Various eastern states: see Hale (1979).
ECOZONE(S):
HABITAT: Deciduous trees and mossy limestone outcrops in open forests.
GLOBAL RANGE: Eastern N Am, also Central America.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G3G4.
RESPONSIBILITY: United States.
REFERENCE(S): Thomson (1963); Moore (1974); Wong & Brodo (1992).
NOTES: The NB record (Gowan 5752, 5756; NBM) is unpublished.

NAME: ***Physcia callosa*** Nyl.
SYNONYM(S): None.
COMMON NAME: Beaded rosette.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): Various western states: see Thomson (1963).
ECOZONE(S):
HABITAT: Rock or mossy rock in sheltered sites in dry forested regions.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G3G4.
RESPONSIBILITY: United States.
REFERENCE(S): Thomson (1963); Goward et al. (1994).
NOTES:

NAME: ***Physcia dimidiata*** (Arnold) Nyl.

SYNONYM(S): None.
COMMON NAME: Frosted rosette.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): ND, CO.
ECOZONE(S):
HABITAT: Shrubs in semi-arid intermontane regions.
GLOBAL RANGE: Western N Am - western Eurasia.
THREATS: Fire.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S2.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G3.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Esslinger (1979); Goward & Thor (1992).
NOTES:

NAME: ***Physconia thomsonii*** Essl.
SYNONYM(S): None.
COMMON NAME: Anomalous frost.
TAXONOMY: OK.
PROVINCE(S): BC, AB.
STATE(S): WA, ID, CO, NV, UT.
ECOZONE(S):
HABITAT: Calcareous rock outcrops in dry, forested regions.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Esslinger (1994); Goward et al. (1996).
NOTES: Possibly overlooked.

NAME: ***Pilophorus cereolus*** (Ach.) Th. Fr.
SYNONYM(S): None.
COMMON NAME: Powdered matchstick.
TAXONOMY: OK.
PROVINCE(S): BC, QC, NF, YK.
STATE(S): MN, NY, NC.
ECOZONE(S):
HABITAT: Calcium-rich rocks in humid regions.
GLOBAL RANGE: Western N Am - eastern N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.

REFERENCE(S): Jahns (1981); Goward & Thor (1992).
NOTES:

NAME: ***Pilophorus nigricaule*** Satô
SYNONYM(S): *Pilophorus nigricaulis* Satô
COMMON NAME: Charred matchstick.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK, OR.
ECOZONE(S):
HABITAT: Acid rock in humid oceanic regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: OR: S2.
GLOBAL STATUS: OR: G4.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Jahns (1981); Goward & Thor (1992).
NOTES:

NAME: ***Pilophorus robustus*** Th. Fr.
SYNONYM(S): None.
COMMON NAME: Octopus' matchstick; branched matchstick.
TAXONOMY: OK.
PROVINCE(S): BC, NT.
STATE(S): AK.
ECOZONE(S):
HABITAT: Acid rock in humid oceanic regions.
GLOBAL RANGE: Circumpolar.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Jahns (1981); Thomson (1984); Brodo (1995).
NOTES:

NAME: ***Pilophorus vegae*** Krog
SYNONYM(S): None.
COMMON NAME: Headless matchstick.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S):
HABITAT: Acid rock in humid oceanic regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S1.

AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Jahns (1981).
NOTES:

NAME: ***Polychidium contortum*** Henssen
SYNONYM(S): None.
COMMON NAME: Woolly woollybear.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S):
HABITAT: Conifers in humid coastal regions.
GLOBAL RANGE: Western N Am, New Zealand.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Henssen (1963); Brodo (1995).
NOTES:

NAME: ***Pseudevernia cladonia*** (Tuck.) Hale & Culb.
SYNONYM(S): *Parmelia cladonia* (Tuck.) Du Rietz
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): QC, NB, NS.
STATE(S): Appalachians (southern and northern sectors; apparently absent in Catskills and PA).
ECOZONE(S):
HABITAT: Coniferous forests in humid montane (Appalachian) and coastal (Fundy) regions.
GLOBAL RANGE: Eastern N Am.
THREATS: Logging; suburban development.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Lepage (1947-1949); Hale (1968); Gowan & Brodo (1988).
NOTES: Five populations are known in NB (Gowan & Brodo 1988; Clayden 7154, 5166, 9158, 9159; NBM, unpublished). With one exception, these consist of only a few thalli. The largest population is threatened by a housing development.

NAME: ***Pseudocyphellaria rainierensis*** Imshaug
SYNONYM(S): None.
COMMON NAME: Oldgrowth specklebelly.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK, WA, OR.
ECOZONE(S):

HABITAT: Conifers in old forests in oceanic regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable! (COSEWIC: Goward 1996a).
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: WA: S2.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Imshaug (1950); Goward (1996a); Sillett & Goward (1998).
NOTES:

NAME: ***Psora tenuifolia*** Timdal
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): AK.
ECOZONE(S):
HABITAT: Ground in arctic tundra.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Timdal (1987 ["1986"]).
NOTES:

NAME: ***Psora vallesiaca*** (Schaerer) Timdal
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): None.
ECOZONE(S):
HABITAT: Ground in arctic tundra.
GLOBAL RANGE: Western N Am - western Eurasia (including Greenland). Also northern Africa.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Timdal (1987 ["1986"]).
NOTES: Only one record currently exists for N Am. Overlooked?

NAME: ***Punctelia borreri*** (Sm.) Krog
SYNONYM(S): *Parmelia borreri* (Sm.) Turner; *P. pseudoborreri* Asah.
COMMON NAME: None.
TAXONOMY: OK.

PROVINCE(S): ON.
STATE(S): WV, OH.
ECOZONE(S):
HABITAT: On bark of deciduous trees.
bbbGLOBAL RANGE: Eastern N Am - Western Eurasia - Eastern Eurasia, also in the southern hemisphere.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Hale (1979); Wong & Brodo (1992).
NOTES: Only one Canadian locality (near Ottawa). Apparently rare throughout its range.

NAME: ***Sclerophora peronella*** (Ach.) Tibell
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): None.
ECOZONE(S):
HABITAT: Over deciduous trees in humid regions.
GLOBAL RANGE: Western N Am - western Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Middelborg & Mattsson (1987); Goward et al. (1996).
NOTES: Overlooked?

NAME: ***Stereocaulon depreaultii*** Nyl.
SYNONYM(S): *S. paschale* subsp. *depreaultii* (Del.) Lamb
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NS?, NF.
STATE(S): None.
ECOZONE(S):
HABITAT: Rock, thalli firmly attached.
GLOBAL RANGE: Eastern N Am - eastern Eurasia (Japan).
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Lamb (1954, 1977); Ahti (1983).
NOTES: Collected by T. Ahti in 1956 at two localities in eastern NF (Ahti 502,541; H); otherwise known in NF only from the type specimen (locality unknown), probably collected in 1827 or 1828. The tentative record for NS is based

on an undated specimen (H), collected no later than the late 1800s, and labelled only "alpinum Halifax Jardin"; "Jardin" may be the name of the collector (Lamb 1977).

NAME: ***Stereocaulon tennesseense*** Degel.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NF.
STATE(S): NY, NC, VA, WV, TN (Appalachians).
ECOZONE(S):
HABITAT: On rock, thalli firmly attached.
GLOBAL RANGE: Eastern N Am – eastern Eurasia (Japan).
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States.
REFERENCE(S): Lamb (1977).
NOTES: The NF specimens (CANL, H) were collected in the 1950s.

NAME: ***Sticta arctica*** Degel.
SYNONYM(S): None.
COMMON NAME: Arctic moon.
TAXONOMY: OK.
PROVINCE(S): BC, NT.
STATE(S): AK, WA.
ECOZONE(S):
HABITAT: On mossy outcops in humid coastal regions.
GLOBAL RANGE: Incompletely circumpolar.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: United States/Canada.
REFERENCE(S): McCune et al. (1997).
NOTES:

NAME: ***Sticta canariensis*** (Bory) Delise
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): ON.
STATE(S): None.
ECOZONE(S):
HABITAT: On mossy boulder (and trees?) in humid regions.
GLOBAL RANGE: Eastern N Am - western Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.

AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Brodo (1994).
NOTES: The species is not abundant in the single N Am locality from which it is known. Only the cyanomorph occurs here.

NAME: ***Sticta oroborealis*** Goward & Tønsb., ined.
SYNONYM(S): *Dendriscocaulon intricatulum* auct., non (Nyl.) Henssen
COMMON NAME: Bonsai moon.
TAXONOMY: OK. The common, shrubby form of this species has until now been referred to *Dendriscocaulon intricatulum.*
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S):
HABITAT: Conifers in old forests in humid regions.
GLOBAL RANGE: Western N Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Tønsberg & Goward (1998).
NOTES: Only the foliose form of *S. oroborealis* is in danger of extirpation at the present time; the shrubby form is probably appropriately classified as vulnerable. The holotype was collected from near Hazelton, British Columbia.

NAME: ***Sticta wrightii*** Tuck.
SYNONYM(S): None.
COMMON NAME: Green moon.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): AK.
ECOZONE(S):
HABITAT: Conifers in old forests in humid inland regions.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Krog (1968); Yoshimura (1974); Goward et al. (1994, 1944a).
NOTES:

NAME: ***Teloschistes arcticus*** Zahlbr.
SYNONYM(S): None.
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): None.

ECOZONE(S):
HABITAT: Gravelly soils in exposed arctic tundra.
GLOBAL RANGE: Arctic N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Thomson (1984).
NOTES: The holotype specimen was collected from Canada's arctic archipelago.

NAME: ***Tuckermannopsis inermis*** (Nyl.) Kärnefelt
SYNONYM(S): *Cetraria inermis* (Nyl.) Krog
COMMON NAME: None.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): AK.
ECOZONE(S):
HABITAT: Mossy ground and deciduous shrubs in the open arctic tundra.
GLOBAL RANGE: Western N Am - eastern Eurasia.
THREATS: Oil exploration?
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Kärnefelt (1979); Thomson (1984).
NOTES:

NAME: ***Umbilicaria aprina*** Nyl.
SYNONYM(S): None.
COMMON NAME: Ashen rocktripe.
TAXONOMY: OK.
PROVINCE(S): BC, NT.
STATE(S): None.
ECOZONE(S):
HABITAT: Acid rock in exposed outcrops in arctic-alpine regions.
GLOBAL RANGE: Western N Am - eastern arctic N Am - western Eurasia, Ethiopia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Hale (1954); Thomson (1984); Goward et al. (1994).
NOTES: Known only from two localities in N Am.

NAME: ***Umbilicaria caroliniana*** Tuck.
SYNONYM(S): None.
COMMON NAME: None.

TAXONOMY: OK.
PROVINCE(S): YT, NT.
STATE(S): AK, NC, TN.
ECOZONE(S):
HABITAT: Acidic rock in exposed arctic-alpine regions.
GLOBAL RANGE: Western N Am - eastern N Am - eastern Eurasia.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Llano (1950); Thomson (1984).
NOTES:

NAME: ***Umbilicaria hirsuta*** (Westr.) Hoffm.
SYNONYM(S): None.
COMMON NAME: Powdered rocktripe.
TAXONOMY: OK.
PROVINCE(S): BC, AB, ON, QC, NB, NT.
STATE(S): AK, MT, CA, CO, VT, NH.
ECOZONE(S):
HABITAT: Rock, especially talus slopes, mostly in semi-arid regions.
GLOBAL RANGE: Western N Am - eastern N Am - western Eurasia.
THREATS: Quarrying.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Llano (1950); Thomson (1984); Goward et al. (1996).
NOTES: Both the NB collection (Goward 78-163; herb. T. Goward) and the QC collection (Clayden 1028, 1609; herb. S.R. Clayden) are unpublished.

NAME: ***Umbilicaria leiocarpa*** DC.
SYNONYM(S): *Agyrophora leiocarpa* (DC.) Gyelnik
COMMON NAME: Roughened rocktripe.
TAXONOMY: OK.
PROVINCE(S): BC, NT.
STATE(S): None.
ECOZONE(S):
HABITAT: Siliceous rock in exposed arctic-alpine localities.
GLOBAL RANGE: Western N Am - eastern N Am - western Eurasia; also in southern hemisphere.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada.
REFERENCE(S): Goward et al. (1996).
NOTES:

NAME: ***Usnea ceratina*** Ach.
SYNONYM(S): None.
COMMON NAME: Lady's beard.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): CA.
ECOZONE(S):
HABITAT: Conifers on humid coastal regions.
GLOBAL RANGE: Western N Am - western Eurasia.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Motyka (1936-1938); Halonen et al. (1998).
NOTES:

NAME: ***Usnea esperantiana*** Clerc
SYNONYM(S): None.
COMMON NAME: Seaside beard.
TAXONOMY: OK.
PROVINCE(S): BC.
STATE(S): CA?
ECOZONE(S):
HABITAT: On conifers in humid coastal regions.
GLOBAL RANGE: Western N Am - western Eurasia, S Am.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Halonen et al. (1998).
NOTES:

NAME: ***Usnea rigida*** (Ach.) Mot.
SYNONYM(S): *Usnea florida* auct., non (L.) F.H. Wigg.
COMMON NAME: Eyed beard.
TAXONOMY: The material from the northwestern United States and southwestern British Columbia is chemically distinct, and may represent a separate, undescribed taxon.
PROVINCE(S): BC.
STATE(S): Various western states.
ECOZONE(S):
HABITAT: Deciduous trees in humid coastal regions.
GLOBAL RANGE: Western N Am (- western Eurasia?).
THREATS: Logging; air pollution.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: BC: S1 [as *U.* cfr. *florida* (L.) Wigg.]
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?

RESPONSIBILITY: Canada/United States.
REFERENCE(S): Halonen et al. (1998).
NOTES:

NAME: ***Usnea rubicunda*** Stirton
SYNONYM(S): None.
COMMON NAME: Red beard.
TAXONOMY: OK.
PROVINCE(S): BC, ON?, NB.
STATE(S): OR, CA and various southeastern states, north to New England (Hale 1979).
ECOZONE(S):
HABITAT: On conifers.
GLOBAL RANGE: Incompletely pantemperate to pantropical.
THREATS: Logging.
CANADIAN NATIONAL STATUS: Endangered?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: OR: S2.
GLOBAL STATUS: OR: G4.
RESPONSIBILITY: United States/Canada.
REFERENCE(S): Halonen et al. (1998).
NOTES: Rare in BC, but probably not rare in some parts of Atlantic Canada.

NAME: ***Usnea sphacelata*** R. Br.
SYNONYM(S): *Neuropogon lambii* Imshaug; *N. sulphureus* (J. König) Hellbom
COMMON NAME: Tundra beard.
TAXONOMY: OK.
PROVINCE(S): NT.
STATE(S): WA, OR.
ECOZONE(S):
HABITAT: Acidic rock in exposed outcrops in arctic-alpine regions.
GLOBAL RANGE: Western N Am - eastern N Am - western Eurasia (Iceland).
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: OR: S1.
GLOBAL STATUS: TNC: G4.
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Imshaug (1954); Thomson (1984).
NOTES:

NAME: ***Xanthoparmelia planilobata*** (Gyelnik) Hale
SYNONYM(S): None.
COMMON NAME: Mini rockfrog.
TAXONOMY: Apparently OK.
PROVINCE(S): BC.
STATE(S): "Western USA" (Hale 1990).
ECOZONE(S):
HABITAT: Acid rock in semi-arid intermontane regions.
GLOBAL RANGE: Western N Am.
THREATS: Unknown.
CANADIAN NATIONAL STATUS: Vulnerable?

CANADIAN PROVINCIAL STATUS: None.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: TNC: G1G2.
RESPONSIBILITY: United States.
REFERENCE(S): Hale (1990).
NOTES:

NAME: ***Zahlbrucknerella calcarea*** (Herre) Herre
SYNONYM(S): None.
COMMON NAME: Limestone woollybear.
TAXONOMY: OK.
PROVINCE(S): BC, AB, NT.
STATE(S): WY, CA, CO.
ECOZONE(S):
HABITAT: Calcareous rock in dry forested inland regions.
GLOBAL RANGE: Circumpolar.
THREATS: Quarrying; rockclimbing.
CANADIAN NATIONAL STATUS: Vulnerable?
CANADIAN PROVINCIAL STATUS: BC: S1.
AMERICAN STATE STATUS: None.
GLOBAL STATUS: G?
RESPONSIBILITY: Canada/United States.
REFERENCE(S): Henssen (1977); Thomson (1984).
NOTES: Possibly overlooked.

SECTION III: CANDIDATE LICHENS FOR COSEWIC STATUS REPORTS

The following lichen species are judged to be at risk of extirpation in Canada -- either as a consequence of rarity or owing to human activity. It must be stressed, however, that not all the species listed are equally at risk; levels of endangerment vary markedly from species to species. On the assumption that species with restricted distributions are inherently more at risk than species with more widespread distributions, the following list is organized into six phytogeographic categories based on global distribution.

Listed at one extreme are those North American endemics which have most or all of their ranges in Canada (Category 1). At the other extreme are various wide-ranging species restricted in North America primarily to the United States (Category 6). Within each category, species perceived as being at greatest risk are preceded by an asterisk, whereas species thought to be extirpated in Canada are denoted by two asterisks. Generally speaking, the highest priority for status reports should be accorded to asterisked species in Categories 1 and 2. Asterisked species in Categories 4 and 5 should receive second-level priority, while species in Categories 3 and 6 stand at third-level priority. Species for which COSEWIC status reports have already been prepared, or are in the process of being prepared, appear within a box.

CATEGORY 1:

North American Endemic Lichens Occurring Entirely or Primarily in Canada

Cladonia labradorica

Erioderma pedicellatum (extirpated in Europe)

Heterodermia sitchensis

Lichinodium canadense

Sticta oroborealis (chloromorph only)

CATEGORY 2:

North American Endemic Species Occurring Equally in Canada and the United States

Amygdalaria continua
Amygdalaria haidensis
Brigantiaea fuscolutea
Bryoria carlottae
Bryoria cervinula
Bryoria salazinica
Cetrelia alaskana
Cladonia schofieldii
Cladonia thomsonii
Heterodermia squamulosa
Hydrothyria venosa
**Leptogium polycarpum*
**Lobaria silvae-veteris*
Massalongia microphylliza
Nephroma occultum
Ophioparma rubricosa
Physconia thomsonii
Pseudevernia cladonia
Pseudocyphellaria rainierensis
Psora tenuifolia
Teloschistes arcticus
**Usnea rigida*

CATEGORY 3:

North American Endemic Species Occurring Primarily in the United States

***Alectoria fallacina*
Alectoria imshaugii
Buellia dialyta
Hypogymnia heterophylla
***Leptogium dactylinum*
Neofuscelia subhosseana
**Ophioparma rubricosa*
Pertusaria globularis
Phaeophyscia imbricata
Physcia callosa
Xanthoparmelia planilobata

CATEGORY 4:

Widespread Species Occurring in North America Entirely or Primarily Within Canada

**Acroscyphus sphaerophoroides*
Bactrospora brodoi
Cliostomum leprosum
**Cladonia subcervicornis*
**Collema auriforme*
**C. callopismum*
**Degelia plumbea*
Dermatocarpon linkolae
**Dictyonema moorei*
Leptogium subtile
**Pertusaria hakkodensis*
Polychidium contortum
**Psora vallesiaca*
**Sclerophora peronella*
**Stereocaulon depreaultii*
**Sticta canariensis*
Umbilicaria aprina
Umbilicaria leiocarpa

CATEGORY 5:

Widespread Species Occurring in North America Equally in Canada and the United States

Cetraria kamczatica
Cladina ciliata
Cladonia luteoalba
Collema glebulentum
Collema limosum
**Erioderma sorediatum*
Everniastrum catawbiense
Fuscopannaria laceratula
Glypholechia scabra
Gypsoplaca macrophylla
***Heterodermia hypoleuca*
Heterodermia leucomelos
**Hypogymnia pulverata*
**Leioderma sorediatum*
Lempholemma polyanthes
Leptogium arcticum
**Leptogium brebissonii*
Leptogium laceroides
Lithographa tesserata
Lobaria retigera
Pannaria hookeri
Parmeliella arctophila
Physcia dimidiata
Pilophorus cereolus
Pilophorus robustus
Piliphorus vegae
**Sticta arctica*
**Sticta wrightii*
Tuckermannopsis inermis
Umbilicaria caroliniana
Umbilicaria hirsuta
Usnea ceratina
**Usnea esperantiana*
**Usnea rubicunda*
Usnea sphacelata
Zahlbrucknerella calcarea

CATEGORY 6:

Widespread Species Occurring in North America Primarily Within the United States

Agrestia hispida
Anaptychia ulotrichoides
Cladina subtenuis
**Cladonia prolifica*
Coccocarpia palmicola
Dermatocarpon moulinsii
**Erioderma mollissimum*
Heterodermia obscurata
Hypotrachyna imbricatula
Koerberia sonomensis
Leptogium azureum
***Leptogium byssinum*
**Leptogium corticola*
***Leptogium rivulare*
Ochrolechia yasudae
**Parmelinopsis minarum*
Parmotrema mellissii
**Punctelia borreri*
Stereocaulon tennesseense

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APPENDIX 1

TAXONOMIC SUPPORT

A) PRIMARY HERBARIA

The most important collections of Canadian lichens are located in the following herbaria:

ALTA

Herbarium, Department of Biological Sciences, University of Alberta, Edmonton, Alberta T6G 2E9

CANL

Collection Division, Natural Herbarium of Canada, Canadian Museum of Nature, P.O. Box 3443, Station 'D', Ottawa, Ontario K1P 6P4

FH

Farlow Herbarium and Herbarium of Cryptogamic Botany, Harvard University, 20 Divinity Avenue, Cambridge, Massachusetts, U.S.A. 02138

H

Botanical Museum (Mycology), University of Helsinki, P.O. Box 47, FIN-00014 University of Helsinki, Finland

LKHD

Claude Garton Herbarium, Department of Biology, Lakehead University, Thunder Bay, Ontario P7B 5E1

NBM

Herbarium, New Brunswick Museum, 277 Douglas Ave., St. John, New Brunswick E2K 1E5

NSPM

Nova Scotia Museum, 1747 Summer Street, Halifax, Nova Scotia B3H 3A6

QFA

Herbier Louis-Marie, local 0262, Pavillon Charles-Eugène-Marchand, Université Laval, Quebec, P.Q. G1K 7P4

QK

Fowler Herbarium, Queens Univeristy, Kingston, Ontario K7L 3N6

PMAE

Provincial Museum of Alberta, 12845 - 102 Avenue, Edmonton, Alberta T5N 0M6

SASK

The W.P. Fraser Herbarium, University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0

TRTC

Cryptogamic Herbarium, Department of Botany, University of Toronto, 25 Willcocks Street, Toronto, Ontario M5S 3B2

UBC

Herbarium, Department of Botany, University of British Columbia, Vancouver, British Columbia V6T 1Z4

B) SECONDARY HERBARIA

Other herbaria containing notable Canadian lichen collections include:

ACAD

E.C. Smith Herbarium, Biology Department, Acadia University, Wolfville, Nova Scotia B0P 1X0

herb. S.R. Clayden (Saint John, NB)

herb. T. Goward (Clearwater, BC)

herb. H. Harries (Sackville, NB)

herb. W.S.G. Maass (Halifax, NB)

herb. S. Selva (University of Maine at Fort Kent)

LD

Herbarium, Botanical Museum, Ö. Vallgatan 18, S-223 61 Lund, Sweden

MSC

Herbarium, Botany and Plant Pathology Department, 166 Plant Biology Building, Michigan State University, East Lansing, Michigan 48824-1312

NFLD

Ayre Herbarium, Biology Department, Memorial University of Newfoundland, St. John's, Newfoundland A1B 3X9

PH

Herbarium, Botany Department, Academy of Natural Sciences, 19th and Parkway, Philadelphia, Pennsylvania 19103

TUR

Herbarium, Biology Department, Queen's University, Kingston, Ontario K7L 3N6

US

United States National Herbarium, Botany Department, NHB-166, Smithsonian Institution, Washington, DC 20560-0001

V

Herbarium, Royal British Columbia Museum, Box 9815 Stn Prov Gov Street, Victoria, British Columbia V8W 9W2

C) KNOWLEDGEABLE INDIVIDUALS

The following individuals were contacted in connection with this report, and were invited to contribute records.

Teuvo Ahti
John Christy
Darwyn Coxson
Joan Crowe
John Davis
Anne DeBolt
Kat Enns
Ted Esslinger
Sharon Gowan
Bernard Goffinet
Dianne Fahselt
John Krug
Martin Lechowicz
Doug Larson
François Lutzoni
Bruce McCune
Janet Marsh
Wolfgang Maass
Willa Noble
David Richardson
Roger Rosentreter
Steve Selva
John Sheard
Susan Stevenson
John Thomson
Tor Tønbserg
Bernard de Vries
Pak Yau Wong

APPENDIX 2

THE NATURE CONSERVANCY RANKING SYSTEM

Each element (for example, a species) on a Conservation Data Centre's list is ranked using the system developed over the last 20 years by The Nature Conservancy. This system is now in use in seven Canadian provinces, all American states, and a number of Latin American countries. Most government agencies within these jurisdictions have also adopted this ranking system.

Each element is ranked at three levels: global (G), national (N), and provincial, or "subnational" (S). The global rank is based on the status of the element throughout its entire range, whereas the provincial rank is based solely on its status within the province. The global rank is established by a biologist assigned to that element by The Nature Conservancy; the provincial rank cannot exceed the global rank.

The status of an element is indicated on a scale of 1 to 5; the score is based primarily on the number of extant occurrences of the element, but other factors such as abundance, range, protection, and threats are also considered if the information is available. Generally speaking, a Conservation Data Centre will track only those species with ranks of 1-3. In addition to the ranks 1-5, there are several letter ranks; all are defined below.

1= Critically imperilled because of extreme rarity (5 or fewer extant occurrences or very few remaining individuals) or because of some factor(s) making it vulnerable to extirpation or extinction.

2= Imperilled because of rarity (typically 6-20 extant occurrences or very few remaining individuals) or because of some factor(s) making it vulnerable to extirpation or extinction.

3= Rare or uncommon (typically 21-100 occurrences); may be susceptible to large-scale disturbances (e.g., may have lost extensive peripheral populations).

4= Frequent to common (greater than 100 occurrences); apparently secure but may have a restricted distribution, or there may be perceived future threats.

5= Common to very common; demonstrably secure and essentially ineradicable under present conditions.

H= Historical occurrence; usually not verified in the last 40 years, but with the expectation that it may someday be rediscovered.

X= Apparently extinct or extirpated, without the expectation that it will be rediscovered.

U= Status uncertain, often because of low search or cryptic nature of the element; uncertainty spans a range of 4 or 5 ranks.

R= Reported from the province, but without persuasive documentation for either accepting or rejecting the report.

RF= Reported in error, but this error has persisted in the literature.

?= No information is available, or the number of extant occurrences is estimated.

A= An element (usually an animal) that is considered accidental or casual in provinces; a species that does not appear on an annual basis.

E= An exotic or introduced species to the province.

Z= Occurs in the province but as a diffuse, usually moving population; difficult or impossible to map static occurrences.

In addition to the above ranks, there are four letter qualifiers sometimes used in conjunction with them:

T= Designates a rank associated with a subspecies.

B= Breeding; the associated rank refers to breeding occurrences of mobile animals.

N= Non-breeding; the associated rank refers to non-breeding occurrences of mobile animals.

Q= Taxonomic validity of the element is not clear, or in question.