A Reconnaissance Level Survey of Cryptogams in Selected Karst Topography in Cape Breton

Prepared for Nova Scotia Department of Natural Resources

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Introduction Surveys for ground inhabiting lichens and bryophytes conducted in 2010 at various karst topography sites in the province of Nova Scotia resulted in the discovery of four lichen species and two bryophyte species new to the province. Several other species were found that are either uncommon or rare. Given these positive results it was decided that continuing this field work would further help to develop an understanding of the diversity of lichens and bryophytes found in karst topography in the province. For this project, it was decided to focus on sites in Cape Breton.

Method With the help of DNR staff at the Wildlife Division, sites were selected based on previous field work conducted by ecologists and botanists. Field work done in 2010 identified exposed gypsum/anhydrite cliffs and outcrops, soils and rock as having the greatest potential for species of interest. Sites with these features were targeted.

Sites visited were Tom's Brook in Richmond County, Glendyer in Inverness County and Plaister Ponds, Ninevah, Big Harbour and Jamesville in Victoria County. Field work occurred during October 7-10, and November 9, 2013.

Results Fifty-six bryophyte species and twenty lichen species were collected and identified from six sites. Species collected were limited to those found on exposed rock and soil. A list of the rare and uncommon species found is provided for each site. A detailed discussion of the more notable species found is provided in the discussion section.

Image: Exciting Habitat

Glendyer, Inverness County 20 T 627337 5103398

Image: *Tortella fragilis*

Lichens

Genus	Species	S Rank	General Status	National Status
Leptogium	*tenuissimum*	SU	not assessed	not assessed

Bryophytes

Genus	Species	S Rank	General Status	National Status
Fissidens	*exilis*	n/a	n/a	sensitive
Anomodon	*viticulosus*	S2?	sensitive	secure
Fissidens	*taxifolius*	S2?	sensitive	secure
Platydictya	*jungermannioides*	S2?	sensitive	secure
Metzgeria	*furcata*	S?	n/a	n/a

Big Harbour, Victoria County 20 T 681860 5113162

Image: *Fissidens exilis* Habitat

Lichens

Genus	Species	S Rank	General Status	National Status
Collema	*tenax var. tenax*	n/a	not assessed	not assessed
Leptogium	*subtile*	S1S3	yellow	undetermined
Leptogium	*tenuissimum*	SU	not assessed	sensitive

Bryophytes

Genus	Species	S Rank	General Status	National Status
Fissidens	*exilis*	n/a	n/a	sensitive

Image: *Rhodobryum ontariense*

Jamesville, Victoria County 20 T 667925 5091059

Image: Small Pond, Jamesville

Lichens

Genus	Species	S Rank	General Status	National Status
Collema	*bachmanianum*	SU	not assessed	secure
Collema	*cristatum*	SNR	undetermined	may be at risk
Collema	*tenax var. tenax*	n/a	not assessed	undetermined
Collema	*tenax var. corallinum*	n/a	not assessed	undetermined (rated only by BC)
Leptogium	*tenuissimum*	SU	not assessed	sensitive

Bryophytes

Genus	Species	S Rank	General Status	National Status
Rhodobryum	*ontariense*	S4S5	secure	secure
Bryoerythrophyllum	*recurvirostrum*	S4S5	Secure	secure
Calliergon	*giganteum*	S2S3	sensitive	secure

Plaister Pond/Ninevah, Victoria County 20 T 660192 5091950

Image: Ninevah

Lichens

Genus	Species	S Rank	General Status	National Status
Leptogium	*intermedium*	SU	undetermined	undetermined
Leptogium	*schraderi*	n/a	not assessed	may be at risk
Solorina	*saccata*	S1	red	secure

Bryophytes

Genus	Species	S Rank	General Status	National Status
Scorpidium	*scorpioides*	S2?	sensitive	secure
Tortella	*fragilis*	S2S3	sensitive	secure
Sphagnum	*quinquefarium*	SNR	undetermined	secure

Image: Cave at Plaister Ponds

Tom's Brook, Richmond County 20 T 677433 5068188

Image: Tom's Brook

Lichens

Genus	Species	S Rank	General Status	National Status
Solorina	*saccata*	S1	may be at risk	secure
Collema	*undulatum var. granulosum*	n/a	undetermined	sensitive
Leptogium	*lichenoides*	S1S2	may be at risk	secure

Bryophytes

Genus	Species	S Rank	General Status	National Status
Encalypta	*procera*	S4S5	secure	secure
Campylium	*polygamon*	SNR	secure	undetermined

Discussion

Bryophytes In addition to providing the S-rank given by the Atlantic Canada Conservation Data Center (ACCDC), a search of herbarium collections at the Consortium of North American Bryophyte Herbaria (CNABH) was done to get some idea of the frequency of collections of the species of interest in the province of Nova Scotia. S-ranks do not always reflect the low number of collections for the province which may indicate inaccuracies with the ranking.

Fissiden exilis (Dwarf Pygmy Pocket Moss) CNABH: 1 *Fissidens exilis* was observed at two sites, Big Harbour in Victoria County and Glendyer in Inverness County. Colonies at both sites were large, healthy and with abundant sporophytes. A status report for this species was prepared by COSEWIC in 2005. At that time the distribution for this species in Canada was limited to Ontario and Quebec. In 2010 it was found in White Head, Hants County while surveying karst topography for lichens and bryophytes. Since then a record at the University of British Columbia herbarium for this species has been located and the collection was made in 1987 in Annapolis County. This record was overlooked when the status report was prepared in 2005. Since the time of the collection at White Head several more records have been made in addition to those at Big Harbour and Glendyer, the most recent being made at Bishop Brook in Kings County in 2014. Other records include the Herbert River, Teare Brook and Glen Brook in Hants County. The scattered collections in Nova Scotia are significant. There is some thought that *F. exilis* is an introduced species and is reported as such in the Bryophyte Flora of North America and Bryophytes du Quebec-Labrador. Early collections were made in urban environments. The recent Nova Scotia records will be helpful in determining the nativity of this species.

Image: *Fissidens exilis* in Habitat

Bryophytes Continued

Anomodon viticulosus CNABH collections:4 A calciphile on shaded cliffs and boulders.

Fissidens taxifolius CNABH collections: 2 Shaded soil, humus, rocks.

Platydictya jungermannioides CNABH collections: 2 A calciphile on damp soil, humus, sheltered locations, in crevices in sinkholes , under tree roots

Tortella fragilis CNABH collections:3 Acid or calcareous rock, cliffs, ledges.

Scorpidium scorpioides Characteristic of rich fens, high pH

Calliergon giganteum CNABH collections: 3 Calcareous fens

Lichens In 2010, a national macrolichen assessment took place, in part to provide COSEWIC with a way to compare species frequencies in order to assign status reports. Participation from each province was uneven because of varying data availability and because interest in assessing provincial lichen records was/is also variable. We have included the National Ranks to provide a broader perspective to the notable species

Leptogium schraderi is a tiny brown fruticose lichen found in calcareous dry grasslands or among calciphilous mosses in dry locations. Considered rare in much of Scandinavia and Italy, most North American collections have been made in the mountainous western states, British Columbia and Nunavut. One other site is known in Nova Scotia, at Hayes Cave high on a gypsum cliff. Since calcareous areas in the province have been little explored for lichens, it may well occur at other sites. The Canadian National Macrolichen Assessment of 2010 rates it as 2: May be At Risk. It was not known from Nova Scotia when the provincial assessment was done. It was found only at Plaister Ponds in this survey

Image: ***Leptogium schraderi*** Plaister Ponds

Collema tenax is generally believed to encompass nine varieties. These are seldom included in identifications, resulting in many specimens appearing as simply *C. tenax*. To date, molecular work has not been done to support the division into so many varieties, which have been based on morphology and ecology. The most common variety found in this survey is *C. tenax var. tenax*. The National Macrolichen Assessment included only two varieties (*corallinum* and *crustaceum*); the others were rated under *C. tenax* and assessed at 4 Secure, with 5 provinces not having sufficient information on the species' frequency. *Collema tenax s.l.* is distinctly a calciphile so would be restricted to those areas. It was found at all sites except Glendyer.

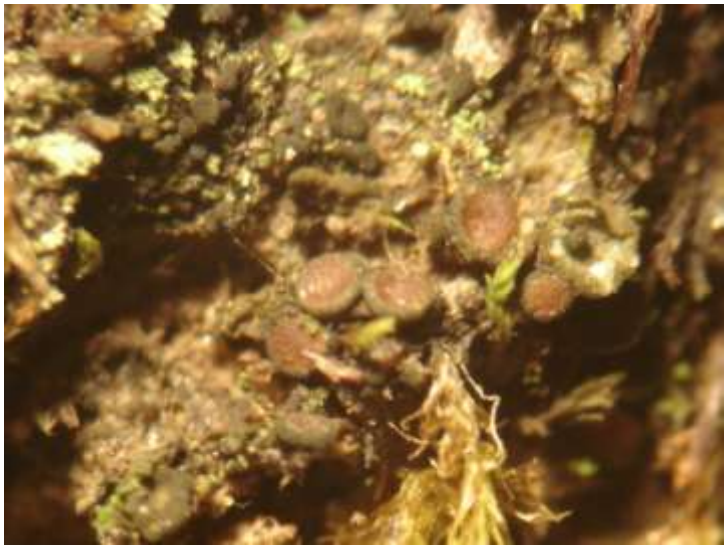

Image: ***Collema tenax var. tenax*** **Jamesville**

Solorina saccata is usually moderately abundant when it occurs, so it is worth noting that it occurs only occasionally at these exposed gypsum locations.

Image: *Solorina saccata* **Plaister Ponds**

Collema cristatum is so far known only from Jamesville in Nova Scotia. It was moderately abundant in 2010 when it was first found in a patch of perhaps 25 cm, but the gypsum cliff supporting it experienced a collapse from above in the interim, reducing the area where it was found to less than 10 cm. Widespread globally, it is usually considered a species of mountainous areas. It was ranked as May Be At Risk by the three provinces that felt they had enough information to rank it. While it may be overlooked at some provincial calcareous sites, it may also occur at hitherto unexplored locations.

Image: *Collema cristatum* Jamesville

Collema undulatum var. granulosum grows on rock as well as on soil. It prefers periodically moistened moderately calciferous rock. This is the only known collection of this species in the province. Considered an arctic species primarily, it is also known from mountainous regions, even from the southern US.

Image: *Collema undulatum var. granulosum* Tom's Brook

Bryophytes Collected

Amblystegium	*serpens*
Aneura	*pinquis*
Anomodon	*viticulosus*
Anomodon	*rostratus*
Atrichum	*undulatum*
Barbula	*fallax*
Barbula	*unquiculata*
Bartramia	*pomiformis*
Bryoerythrophyllum	*recurvirostrum*
Bryum	*pseudotriquetrum*
Bryum	*lisae var. cuspidatum*
Calliergon	*giganteum*
Calliergon	*stramineum*
Calliergonella	*cuspidata*
Campylium	*polygamon*
Climacium	*dendroides*
Climacium	*dendroides*
Dicranella	*varia*
Drepanocladus	*aduncus*
Drepanocladus	*uncinatus*
Drepanocladus	*exannulatus*
Encalypta	*procera*
Fissidens	*exilis*
Fissidens	*taxifolius*
Fissidens	*adiantoides*
Fissidens	*cristatus*
Grimmia	*apocarpa var. gracilis*
Gymnostomum	*recurvirostrum*
Homalia	*trichomanoides*
Hylocomium	*umbratum*
Hypnum	*lindbergii*
Lepidozia	*reptans*
Marchantia	*polymorpha subsp. polymorpha*
Metzgeria	*furcata*
Mnium	*marginatum*
Myurella	*sibirica*
Neckera	*complanata*
Philonotis	*fontana var. americana*
Plagiochila	*porelloides*
Plagiomnium	*medium*
Plagiothecium	*laetum*

Platydictya	*jungermannioides*
Pressia	*quadrata*
Rhacomitrium	*canescens*
Rhizomnium	*punctatum*
Rhodobryum	*ontariense*
Rhytidiadelphus	*triquetris*
Rhytidiadelphus	*subpinnatus*
Riccardia	*palmata*
Scorpidium	*scorpioides*
Sphagnum	*palustre*
Sphagnum	*squarrosum*
Sphagnum	*quinquefarium*
Thuidium	*recognitum*
Tortella	*tortuosa*
Tortella	*fragilis*

Lichens Collected

Catapyrenium	*squamulosum*
Collema	*bachmanianum*
Collema	*tenax var. tenax*
Collema	*cristatum*
Collema	*undulatum var. granulosum*
Collema	*tenax var. corallinum*
Collema	*tenax var. tenax*
Leptogium	*intermedium*
Leptogium	*lichenoides*
Leptogium	*schraderi*
Leptogium	*subtile*
Leptogium	*tenuissimum*
Peltigera	*aphthosa*
Peltigera	*collina*
Peltigera	*horizontalis*
Peltigera	*leucophlebia*
Peltigera	*membrancea*
Peltigera	*polydactylon*
Protopannaria	*pezizoides*
Solorina	*saccata*

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