

**COSSARO Candidate Species at Risk Evaluation
for
Incurved Grizzled Moss (*Ptychomitrium incurvum*)**

Committee on the Status of Species at Risk in Ontario (COSSARO)

Assessed by COSSARO as EXTIRPATED

May 2012

Final

La **Ptychomitre à feuilles incurvées** (*Ptychomitrium incurvum*) a été acceptée comme membre légitime de la flore ontarienne et canadienne dans toutes les flores, listes de vérification et autres publications de bryologie (COSEPAC 2012), indiquant ainsi que les bryologistes ont universellement accepté l'origine canadienne de la collection Drummond. Même avec de nombreuses autres années de relevés bryologiques intensifs, on ne pourra être absolument certain qu'une espèce de mousse est disparue de l'Ontario. Dans ce cas cependant, il existe des preuves circonstancielle solides que *Ptychomitrium incurvum* est disparue.

(1) Près de 200 ans se sont écoulés depuis que le seul spécimen connu a été recueilli en Ontario et son habitat naturel de la région des chutes Niagara a été fortement altéré depuis.

(2) Bien qu'il s'agisse d'une mousse de taille modeste, *Ptychomitrium incurvum* est facile à reconnaître sur le terrain et la région des chutes Niagara a fait l'objet d'études bryologiques plus extensives que les autres régions de l'Ontario.

(3) La région des chutes Niagara est l'une des plus visitées en Amérique du Nord et les habitats situés près des chutes, où l'espèce a été observée en 1828, ont été profondément transformés par la présence humaine. Un récent relevé des plantes vasculaires de la région des chutes Niagara (Varga et Kor, 1993) a permis de conclure que 141 (64 p. 100) des plantes vasculaire rares historiquement relevées avaient disparu.

Par conséquent, la Ptychomitre à feuilles incurvées est classée comme espèce **disparue** en Ontario.

Cette publication hautement spécialisée, COSSARO Evaluation for Incurved Grizzled Moss n'est disponible qu'en anglais en vertu du Règlement 671/92 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez contacter le secrétariat de COSSARO par courrier électronique à l'adresse COSSAROsecretariat@ontario.ca.

PART 1: Current status and distribution

Current designations:

GRANK – G4_ (NatureServe, accessed 13/05/2012)

NRANK Canada – NX (Assessed: Not assessed because of incomplete data)
(NatureServe, accessed 13/05/12)

COSEWIC – Extirpated (COSEWIC, 2012)

SARA – Extirpated (Schedule 1) (Environment Canada, 2012)

ESA 2007 – Extirpated (Ministry of Natural Resources, 2008)

SRANK – SX (NHIC/NatureServe, accessed 13/05/2012) SX?

Distribution in Ontario:

A single historical record (1828) of this species constitutes the only known Canadian collection of Incurved Grizzled Moss. The herbarium label for this collection bears no more detail than "On a rock, near the Falls of Niagara, Ontario". The precise location is uncertain and no extant populations are known. Given the fact that almost 200 years have passed without the species being rediscovered despite active collection in the region, it is unlikely that *Ptychomitrium incurvum* still exists as part of the Canadian flora. (Crum and Anderson 1981; Missouri Botanical Garden 2012; New York Botanical Garden 2012; COSEWIC 2012).

Distribution and status outside Ontario:

Ptychomitrium incurvum has a temperate global distribution, with most populations occurring in eastern North America. It also occurs in some mountainous regions of Europe (Doubt 2002). *Ptychomitrium incurvum* is relatively widespread in eastern North America although its distribution is concentrated in the southern United States (Doubt 2002). In the northeastern United States, it is known from relatively few, mostly historical, locations. The distributional limits of *Ptychomitrium incurvum* appear to have changed over the last century. Many northeastern U.S. localities of *P. incurvum* are recorded in herbaria, but these collections are mostly from before 1940. The status list for rare New York mosses (Clemants & Ketchledge 1993) indicates that it is known only historically in that state, although few botanists have looked for the species recently in New York. In neighbouring northeast states, few recent collections are reported at the New York Botanical Garden (NY), the Missouri Botanical Garden (MO), or the University of Alberta (ALTA) (COSEWIC 2002). There is a recent apparent record from Vermont from 2003 (COSEWIC 2012).

PART 2: Eligibility for Ontario status assessment

2.1 Application of eligibility criteria

Taxonomic distinctness

Yes. *Ptychomitrium incurvum* is the current accepted name for a valid taxon (Reese 2007, Missouri Botanical Garden 2012) that has been recognized since 1823. Its nativity in Canada is based on a single confirmed herbarium specimen (CANM 152283) collected in 1825 at Niagara Falls.

Designatable units

Given there is only one collection site it is assumed there is only one Designatable Unit.

Native status

Yes Doubt (2002) has suggested the possibility that the 1828 Drummond collection from Niagara Falls could have been mislabelled, because other Drummond collections from 1828 were mislabelled. She also questioned whether the Canada–U.S. border was strictly observed on Drummond's specimen labels. However, it is quite likely that Drummond knew which side of the large Niagara River he was on and that if the specimen is specifically labeled from "Upper Canada", then it was probably collected on the Canadian side of the river. The historical existence of the species at Niagara Falls is phytogeographically plausible given the proximity of historical sites in New York, Ohio, Pennsylvania, Vermont, and Michigan (Doubt 2002). *Ptychomitrium incurvum* has been accepted as a legitimate member of the Canadian moss flora in all floras, checklists, and other related bryological publications (e.g., Ireland and Cain 1975, Ireland et al. 1980, Crum and Anderson 1981, Crum 1983, Ireland et al. 1987, Ireland and Ley 1992, Belland 1998, Newmaster et al. 1998, Tan et al. 2000, Doubt 2002, NHIC 2002), indicating that bryologists have universally accepted the Drummond collection as having come from Canada.

Presence/absence

Extirpated in Ontario, the only known record for this moss is from a single site (a stone) in Carolinian southern Ontario near Niagara Falls in 1825. Despite many years of collection made in the region, the species has never been rediscovered. No extant populations have been discovered since the species' last assessment in 2002.

2.2 Eligibility results

1. The putative taxon or DU is valid. Yes
2. The taxon or DU is native to Ontario. Yes
3. The taxon or DU is present in Ontario, extirpated from Ontario or extinct?
Extirpated

PART 3: Ontario status based on COSSARO evaluation criteria

3.1 Application of primary criteria (Rarity and Declines)

Not applicable

3.2 Application of secondary criteria (Threats and Vulnerability)

Not applicable

3.3 COSSARO evaluation results

1. Criteria satisfied in each status category

List the number of primary and secondary criteria met in each status category:

Endangered – [0/0]

Threatened – [0/0]

Special concern – [0/0]

Endangered – [0]

Threatened – [0]

Special concern – [0]

2. Data Deficiency

No. Criterion does not apply – no Canadian observations of this species since 1825.

3. Status Based on COSSARO Evaluation Criteria

The application of COSSARO evaluation criteria suggests that Incurved Grizzled Moss is Extirpated in Ontario.

PART 4: Ontario status based on COSEWIC evaluation criteria

4.1 Application of COSEWIC criteria

Regional (Ontario) COSEWIC criteria assessment

Criterion A – Decline in total number of mature individuals

Criterion does not apply – no Canadian observations of this species since 1825.

Criterion B – Small Distribution Range and Decline or Fluctuation

Criterion does not apply – no Canadian observations of this species since 1825.

Criterion C – Small and Declining Number of Mature Individuals

Criterion does not apply – no Canadian observations of this species since 1825.

Criterion D – Very Small or Restricted Total Population

Criterion does not apply – no Canadian observations of this species since 1825.

Criterion E – Quantitative Analysis

Criterion does not apply – no Canadian observations of this species since 1825.

Rescue Effect

Unknown. It seems possible that the species could re-establish in Ontario if spores dispersed from a nearby Michigan population. However, this does not appear to have occurred in nearly 200 years.

Special Concern Status

No. Criterion does not apply – no Canadian observations of this species since 1825.

4.2 COSEWIC evaluation results

1. Criteria satisfied in each status category
 - Endangered – [no]
 - Threatened – [no]
 - Special concern – [no]
2. Data Deficiency
 - No. The species has not been observed in Ontario since 1825 despite many searches of the areas around where it was last reported in 1825.
3. Status Based on COSEWIC Evaluation Criteria
 - The application of COSEWIC evaluation criteria suggests that Incurved Grizzled Moss is Extirpated in Ontario.

PART 5: Ontario status determination

5.1 application of COSSARO and COSEWIC criteria

COSSARO and COSEWIC criteria give the same result. Yes

5.2 Summary of status evaluation

Incurved Grizzled Moss is classified as Extirpated in Ontario.

Incurved Grizzled Moss (*Ptychomitrium incurvum*) has been accepted as a legitimate member of the Ontario and Canadian moss flora in all floras, checklists, and other related bryological publications (COSEWIC 2012), indicating that bryologists have universally accepted the Drummond collection as having come from Canada. Even with many more years of intense bryological surveys one could not be absolutely certain that a moss species is extirpated from Ontario. However, in this case there is good circumstantial evidence suggesting *Ptychomitrium incurvum* is extirpated.

1. Almost 200 years have passed since the only Ontario specimen was collected and natural habitats in the Niagara Falls area have been extensively altered in that time.
2. Although it is a small moss, *Ptychomitrium incurvum* is easily distinguishable in the field and the Niagara Falls area has been more extensively botanized bryologically than other parts of Ontario.
3. The Niagara Falls area is one of the most heavily visited locations in North America and habitats near the Falls, where the species was recorded in 1828, have been greatly altered by human impacts. A recent vascular plant survey of the Niagara Falls area (Varga and Kor 1993) concluded that 141 (64%) of the historically-documented rare vascular plant flora had been extirpated.

Therefore, the Incurved Grizzled Moss is assessed as Extirpated in Ontario.

Information sources

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2. Community and Aboriginal Traditional Knowledge Sources

No Community or Aboriginal Traditional knowledge was received through submissions to COSSARO.

3. Acknowledgements

No information obtained through personal communications or review of the evaluation.

Appendix 1: Northeastern North America ranks, status and decline

| Jurisdiction | Ranks, status and decline |
|--------------|--|
| CT | Most recent collection documented by Doubt (2002) is from 1909. |
| DE | Most recent collection documented by Doubt (2002) is from 1891. |
| IL | Most recent collection documented by Doubt (2002) is from 1993. |
| IN | Not present according to Reese (1999), but listed from one Indiana county ("on exposed rock; Morgan County") by Welch (1957). |
| IA | Not present (Reese 1999) |
| KY | Most recent collection documented by Doubt (2002) is from 1947. |
| LB | Not present (Reese 1999) |
| MA | Not present (Reese 1999) |
| MB | Not present (Reese 1999) |
| MD | Most recent collection documented by Doubt (2002) is from 2001. |
| ME | Not present (Reese 1999) |
| MI | Present (Reese 1999) Probably rare, since according to Crum (1983) it was "found on a conglomerate rock near Ann Arbor, Washtenaw Co.". Considered rare (i.e.S1, S2, SH, or SX) for the purposes of this evaluation. |
| MN | Not present (Reese 1999) |
| NB | Not present (Reese 1999) |
| NF | Not present (Reese 1999) |
| NH | Not present (Reese 1999) |
| NJ | Present (Reese 1999) |
| NS | Not present (Reese 1999) |
| NY | SH (Clemants and Ketchledge 1990, 1993). Of 25 NY state specimens in the New York Botanical Garden herbarium, all were collected before 1940. Of 7 NY state specimens in the New York State Museum herbarium, the most recent if from 1960 (Doubt 2002). |
| OH | Most recent collection documented by Doubt (2002) is from 1960. |
| ON | SX (Ontario Natural Heritage Information Centre 2002) Single record is from 1828. |
| PA | Most recent collection documented by Doubt (2002) is from 1938. |
| PE | Not present (Reese 1999) |
| PQ | Not present (Reese 1999) A literature report for Quebec was indicated by Ireland et al. (1980), but the species was later excluded from Quebec by Ireland et al. (1987). |
| RI | Not present (Reese 1999) |
| VA | Most recent collection documented by Doubt (2002) is from 1964. |
| VT | Not present (Reese 1999) |
| WI | Not present (Reese 1999) |
| WV | Most recent collection documented by Doubt (2002) is from 1961. |

Occurs in 13 of 29 northeastern jurisdictions (45%)

SRANK or equivalent information available for 3 of 13 jurisdictions (23%)

S1, S2, SH, or SX in 3 of 13 jurisdiction (23%)