

Ontario Species at Risk Evaluation Report for
Incurved Grizzled Moss
Ptychomitre à feuilles incurvées
(*Ptychomitrium incurvum*)

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

Assessed by COSSARO as Extirpated

March 2022

Final

Executive summary

Incurved Grizzled Moss (*Ptychomitrium incurvum*) is a small moss species that grows in blackish-green to yellow-brown tufts on rocky substrates. The only record of this species in Ontario is from 1825. It is still present within the eastern United States where it is commonly found in hardwood forests, inhabiting surfaces or tiny crevices of exposed or protected rocks of variable chemistry. It can also occur at the bases of trees or on logs, but rarely so. The fact that *P. incurvum* can inhabit a variety of anthropogenic and natural rock substrates suggests that substrate availability does not limit its distribution. Therefore, the absence of these species from Ontario may rather be a climatic limitation (COSEWIC, 2002). Other reasons for its disappearance could be a combination of factors including habitat destruction and pollution, however, the cause of its disappearance are not well understood. Since no living Canadian populations are known, threats cannot be assessed.

P. incurvum is autoicous where the sperm-producing antheridia and egg-producing archegonia occur together on each plant and presumably self-fertilizes.

Ptychomitrium incurvum is small and inconspicuous enough that it is likely to be overlooked or neglected in the field, especially since the plants resemble members of the notoriously difficult family Pottiaceae. To anyone looking specifically for this species, however, it is easily distinguishable in the field. As indicated in COSEWIC, 2002 by Reese (1999), these dark-green little plants growing on rock, with their glossy leaves tightly crispate when dry, are unmistakable.

Incurved Grizzled Moss (*Ptychomitrium incurvum*) is classified as Extirpated in Ontario.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Incurved Grizzled Moss (*Ptychomitrium incurvum*) is the current accepted name for a valid taxon that has been recognized since 1823 (COSSARO, 2012).

1.1.2. Designatable units

This has been only one collection site near Niagara Falls, and therefore it is assumed that there is only one Designative Unit.

1.1.3. Native status

Incurved Grizzled Moss has been accepted as a legitimate member of the Canadian moss flora in all floras, checklists, and other related bryological publications (COSSARO, 2012).

1.1.4. Occurrence

The only known record for this moss is from a single site (a stone) near Niagara Falls in 1825, despite many years of collection made in the region.

1.2. Eligibility results

Incurved Grizzled Moss (*Ptychomitrium incurvum*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G4 (NatureServe 2022)
- IUCN: NA (March 2022)
- NRANK Canada: NX
- COSEWIC: Extirpated (December 2021)
- SARA: Extirpated (Schedule 1)
- ESA 2007: Extirpated (August, 2018)
- SRANK: SX (ranked in 2002)

2.2. Distribution in Ontario

A single historical record 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 (COSEWIC, 2002; COSEWIC, IN PRESS 2021).

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

Incurved Grizzled Moss can be found, but not ranked, in the eastern to southeastern United States. It is found in reduced numbers in Pennsylvania, Tennessee, Delaware and Vermont where it is considered critically imperiled and vulnerable. It is possibly extirpated in New York (NatureServe, 2022). Historical collections occur in Washington County (COSEWIC, 2002).

The broader biologically relevant geographic range generally includes the eastern United States where it is present given that its habitat requirements are limited to rock surfaces and not a particular ecozone (COSEWIC, 2002).

Table 1. Condition of the Species in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Quebec	No	-	
Manitoba	No	-	
Michigan	Yes	SNR	NatureServe, 2022
Minnesota	Yes	-	

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Nunavut	No	-	
New York	Yes	SH	NatureServe, 2022
Ohio	Yes	SX	NatureServe, 2022
Pennsylvania	n/a	S2S4	NatureServe, 2022
Wisconsin	n/a	S1	NatureServe, 2022
<i>Other Relevant Jurisdiction</i>			
Vermont	Yes	S1	NatureServe, 2022
Tennessee	Yes	S3	NatureServe, 2022
Delaware	Yes	S1S2	NatureServe, 2022

2.4. Ontario conservation responsibility

Incurved Grizzled Moss once occurred in Ontario but is now extirpated.

2.5. Direct threats

Threats cannot be assessed since no living Canadian populations are known. Reasons for the disappearance of Incurved Grizzled Moss from Canada could be a combination of factors including habitat destruction and pollution. The fact that Incurved Grizzled Moss can inhabit a variety of anthropogenic and natural rock substrates suggest that substrate availability does not limit its distribution. Therefore, the absence of these species from Ontario may rather be a climatic limitation (COSEWIC, 2002).

2.6. Specialized life history or habitat use characteristics

Incurved Grizzled Moss (*Ptychomitrium incurvum*) is a small moss species that grows 2-6mm in height in blackish-green to yellow-brown tufts on rocky substrates. The only record of this species in Ontario is from 1825. It is still present within the eastern United States where it is commonly found in hardwood forests, inhabiting surfaces or tiny crevices of exposed or protected rocks of variable chemistry. It can also occur at the bases of trees or on logs, but rarely so.

Incurved Grizzled Moss is small and inconspicuous enough that it is likely to be overlooked or neglected in the field, especially since the plants resemble members of the notoriously difficult family Pottiaceae. To anyone looking specifically for this species, however, it is easily distinguishable in the field. As indicated in COSEWIC, 2002 by Reese (1999), “these dark-green little plants growing on rock, with their glossy leaves tightly crispate when dry, are unmistakable.”

2.7. Existing Conservation and Recovery Actions

Reasons for the disappearance of Incurved Grizzled Moss are not known, therefore it was determined that the recovery of the Incurved Grizzled Moss in Canada is not technically or biologically feasible at this time (Environment Canada, 2007).

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

3.1.1. Criterion A – Decline in total number of mature individuals

Does not apply. No Ontario observations of this species since 1825.

3.1.2. Criterion B – Small distribution range and decline or fluctuation

Does not apply. No Ontario observations of this species since 1825.

3.1.3. Criterion C – Small and declining number of mature individuals

Does not apply. No Ontario observations of this species since 1825.

3.1.4. Criterion D – Very small or restricted total population

Does not apply. No Ontario observations of this species since 1825.

3.1.5. Criterion E – Quantitative analysis

Does not apply. No Ontario observations of this species since 1825.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply. Extirpated from Ontario.

3.3.2. Status modification based on level of risk in broader biologically relevant geographic range

Does not apply. Incurved grizzled moss is extirpated from Ontario.

3.3.3. Rescue Effect

Unlikely considering its rare status in neighbouring jurisdictions.

3.4. Other status categories

3.4.1. Data deficient

Does not apply. The species has not been observed in Ontario since 1825 despite many searches of the areas around where it was last reported in 1825.

3.4.2. Extinct or extirpated

Incurved Grizzled Moss is extirpated from Ontario.

3.4.3. Not at risk

Does not apply. Incurved Grizzled Moss is extirpated from Ontario.

4. Summary of Ontario status

Incurved Grizzled Moss (*Ptychomitrium incurvum*) is classified as Extirpated in Ontario.

This status of this species is consistent with the definition of Extirpated under the Endangered Species Act, 2007.

5. Information sources

COSEWIC. 2021. IN PRESS. COSEWIC Rapid Review of Classification on the Incurved Grizzled Moss *Ptychomitrium incurvum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix pp.
(<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>).

COSEWIC. 2002. COSEWIC assessment and status report on the incurved grizzled moss *Ptychomitrium incurvum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 14pp.

COSSARO. 2012. COSSARO Candidate Species at Risk Evaluation for Incurved Grizzled Moss (*Ptychomitrium incurvum*)

Environment Canada. 2007. Recovery Strategy for the Incurved Grizzled Moss (*Ptychomitrium incurvum*) in Canada. *Species at Risk Act Recovery Strategy Series*. Environment Canada. Ottawa. iv + 8pp.

Appendix 1: Technical summary for Ontario

Species: Incurved Grizzled Moss (*Ptychomitrium incurvum*)

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	unknown
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Extirpated
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Extirpated
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Extirpated
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Extirpated
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Extirpated
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	Extirpated
Are there extreme fluctuations in number of mature individuals?	Extirpated

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EEO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	0 km ²
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	0 km ²
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy in habitat patches that are:	Extirpated

Extent and occupancy attributes	Value
(a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	
Number of locations. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.</i>	0
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	0
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Extirpated
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Extirpated
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Extirpated
Is there an observed, inferred, or projected continuing decline in number of locations?	Extirpated
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Extirpated
Are there extreme fluctuations in number of populations?	Extirpated
Are there extreme fluctuations in number of locations?	Extirpated
Are there extreme fluctuations in extent of occurrence?	Extirpated
Are there extreme fluctuations in index of area of occupancy?	Extirpated

Number of mature individuals in each sub-population or total population (if known)

Sub-population (or total population)	Number of mature individuals
Extirpated	

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is not applicable (extirpated).

Threats

No formal threat assessment has been conducted for this species in Canada.

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Status of outside population(s) most likely to provide immigrants to Ontario	Vermont (S1), Tennessee (S3), Michigan (SNR)
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	No
Would immigrants be adapted to survive in Ontario?	Unknown
Is there sufficient suitable habitat for immigrants in Ontario?	Unknown
Are conditions deteriorating in Ontario?	Possibly
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	No

Sensitive species

No

Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada
 COSSARO: Committee on the Status of Species at Risk in Ontario
 ESA: Endangered Species Act
 EO: Element occurrence (as defined by NHIC)
 EOO: extent of occurrence
 GRANK: global conservation status assessments
 IAO: index of area of occupancy
 IUCN: International Union for Conservation of Nature and Natural Resources
 MNRF: Ministry of Natural Resources and Forestry
 NHIC: Natural Heritage Information Centre
 NNR: Unranked
 NRANK: National conservation status assessment
 SARA: Species at Risk Act
 SNR: unranked
 SRANK: subnational conservation status assessment
 S1: Critically Imperiled
 S2: Imperiled

Template last updated: Oct. 14, 2021.
Previous version: Oct 14, 2020.

S3: Vulnerable

S4: Apparently Secure

S5: Secure

IUCN: International Union for Conservation of Nature and Natural Resources

CDSEPO: Le Comité de détermination du statut des espèces en péril en Ontario