

COSSARO Candidate Species at Risk Evaluation
for
Hoary Mountain-mint (*Pycnanthemum incanum*)

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

Assessed by COSSARO as ENDANGERED

December 2011

Final

Le **Pycnanthème gris** (*Pycnanthemum incanum*) est une plante herbacée vivace parfumée qui peut atteindre jusqu'à 1 mètre de haut et vivre longtemps. Il est présent dans l'est de l'Amérique du Nord et atteint la limite nord de son aire de répartition en Ontario. La plante a été observée dans la région de Hamilton-Burlington en 1880-1900, mais n'a ensuite pas été vue pendant plusieurs décennies avant sa redécouverte en 1981. On connaît maintenant deux populations de moins de 1 000 plants sur des pentes raides et instables le long des falaises de Hamilton-Burlington. Ailleurs dans son aire de répartition du nord-est de l'Amérique du Nord, la plante occupe des zones perturbées comme les fourrés et les pâturages, le long des routes et des servitudes, et n'est pas considérée menacée dans 72 p. 100 des territoires, notamment dans l'État de New York, la Pennsylvanie et l'Ohio. Cependant, les populations ontariennes sont situées à plus de 115 km de la population américaine la plus proche. En Ontario, les sites ouverts préférés par le Pycnanthème gris sont vulnérables à l'empiètement par les espèces concurrentes et envahissantes et à l'ombrage des arbustes ligneux. Les mesures de rétablissement ont permis de réduire les menaces, mais le contrôle des plantes concurrentes exige une gestion constante. Un seul événement d'érosion sur ces pentes instables pourrait éliminer une forte proportion de la petite population ontarienne. Parce que les populations de Pycnanthème gris sont peu nombreuses, confinées dans deux sites instables et sujettes à la concurrence d'espèces végétales envahissantes, l'espèce a été classée **en voie de disparition** en Ontario.

Cette publication hautement spécialisée, COSSARO Evaluation for Hoary Mountain-mint 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 – G5 (Assessed 23 Jan. 1996) (NatureServe, accessed 8 Nov. 2011)

NRANK Canada – N1 (NatureServe, accessed 8 Nov. 2011)

COSEWIC – ENDANGERED (COSEWIC, 2011)

SARA – ENDANGERED (Schedule 1) (Environment Canada, 2000)

ESA 2007 – ENDANGERED (Ministry of Natural Resources, 2011)

SRANK – S1 (NHIC, 2011; NatureServe, 2011)

Distribution in Ontario

Hoary Mountain-mint is one of 6 species of mountain-mint (*Pycnanthemum*) found in Ontario (Thompson and Rothfels 2006, University of Guelph FLORA Ontario). In Ontario, well documented records of Hoary Mountain-mint from 1981 to 2008 are within a few kilometres of each other in the Hamilton-Burlington area (the “Hamilton Bluffs shoreline” or “Hamilton Harbour Shoreline”). There are additional, scattered historical observations from 1885 to 1900 from this general area (Thompson and Rothfels 2006), but there is no information on the size of the population or its distribution at that time. The species was rediscovered in Ontario in 1981, and since then plants have been found at 3 sites (2 sites on private land and 1 on Crown land). One of these sites, where one stem was found in 1991, is no longer occupied.

Distribution and status outside Ontario

Outside Ontario, Hoary Mountain-mint occurs in 25 states in eastern North America. From Ontario, which is at the northern limit of its range, it occurs southward to Florida and Louisiana, and in all of the easternmost states as far north as New Hampshire and Vermont (NatureServe 2011). The species is ranked S1 in New Hampshire, Vermont, and Delaware. However, it is considered to be secure (S5), “not at risk”, or “not rare” in 72% of the states in the northeast including the states immediately south of Ontario (New York, Ohio, Pennsylvania (Appendix 1)).

PART 2: Eligibility for Ontario status assessment

2.1 Application of eligibility criteria

Taxonomic distinctness

Yes. Hoary Mountain-mint is a recognized species. NatureServe identifies two varieties: (1) *P. incanum* var. *incanum* (L.) Michx., which includes those present largely in the Northeast including Ontario, and (2) *P. incanum* var. *puberulum* (E. Grant & Epling) Fern., which occurs in Ohio, West Virginia and in the more southern states.

Designatable units

There is no known differentiation within the species in Ontario that would merit consideration of more than one designatable unit.

Native status in Ontario

Yes. There are scattered historical observations dating back 100 years or more from the general area where the species occurs today. Thomson and Rothfels (2006) noted that while it was documented several times between 1885 and 1900 near Burlington, Ontario, it was not seen again until 1981 when it was collected by Bill Crins (OMNR) in the same general area.

Presence/absence

Present. The species occurs at 2 sites in southern Ontario along the bluffs near the Hamilton- Burlington shoreline.

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. **Present.**

PART 3: Ontario status based on COSSARO evaluation criteria

3.1 Application of primary criteria (rarity and declines)

1. Global Rank

Not in any category. Hoary Mountain-mint is ranked G5 (NatureServe, 2011).

2. Global decline

Not in any category. The species status as G5 suggests it is generally secure - common, widespread, and abundant. Regionally, it is ranked as secure (S5), apparently secure (S4), or is perceived to be “not rare” in 72% of the jurisdictions in the northeast (Appendix 1). This supports the idea that if declines have occurred, they have not been sufficient to threaten the species' persistence (see Appendix 1 and Section 3). Thompson and Rothfels (2006) state “there does not seem to be a decline in global trend”.

3. Northeastern North America Ranks

Special Concern. Hoary Mountain-mint is a native species in 17 of 29 northeastern jurisdictions (see Appendix 1). Ranking information is available for 9 (53%) of these jurisdictions, and ranking or equivalent information is available for 14 of 17 jurisdictions (82%).

Hoary mountain-mint is ranked as rare (S1, S2, or S3) in 4 of 14 jurisdictions (28%), which qualifies the species for special concern status under this criterion. The species is considered to be secure (S5) in New York and “not rare” in Pennsylvania and Ohio (according to staff at Conservation Data Centres), the 3 states immediately adjacent to Ontario (Appendix 1).

4. Northeastern North America Decline

Not in any Category. In general, there is little information to support the possibility that the species has declined enough to qualify as endangered ($\geq 50\%$ non-cyclic decline) or threatened ($\geq 30\%$ non-cyclic decline) under this criterion. In the northeastern states in which it is ranked S1, staff at the conservation data centres said the following when asked about status and decline (personal communication Eric Snyder, OMNR SAR Branch, and Mike Oldham OMNR NHIC, November 2011):

- New Hampshire: S1. “Since these EOs were first documented, it is hard to say based on the type of data collected to-date whether or not there is overall evidence of decline. Some occurrences are doing better than we have seen. One occurrence (Fox State Forest) has not been seen in decades and may be extirpated.”

- Delaware: S1. "It is primarily known from the Coastal Plain province where it occurs on unique soil types that are rare in the province. The species has likely always been rare due to soil requirements."
- Vermont - S1 with no further comment.

As explained in section 3, Hoary Mountain-mint is ranked as secure or is considered to be "not rare" in 72% of the jurisdictions in the northeast. NatureServe (2011) suggests it has not been extirpated from any jurisdiction.

5. Ontario occurrences

Endangered. There are only 2 known sites (element occurrences) in Ontario that continue to be occupied by Hoary Mountain-mint (Willow Point and Woodland Cemetery near Hamilton-Burlington). The history of these sites is recorded in Table 1. Since there are <5 occurrences in Ontario, the species qualifies for endangered status under this criterion.

Table 1. Record of occurrences of Hoary Mountain-mint in Ontario (empty cells indicate a lack of survey data).

Site	1984	1988	1991	1997	2000	2005	2008	2010	2011
1 - Willow Pt or Holy Sepulchre	41 stems	~40 stems		48 stems	12 plants	15 stems	198 stems		
2a – Woodland Cemetery			39 stems	1 stem where there were 39	2 plants	5 stems	0 – habitat lost to erosion		
2b – Woodland Cemetery					12-15 plants		0		
2c – Woodland Cemetery					~6 plants		0		
2d – Woodland Cemetery					~750 plants		750		
2e – Woodland Cemetery								15 seedlings	36 stems
3 - Carroll's Pt			1 stem, or 3 plants & numerous stems	None	None				

Sources: for 1984-2005 Hoary Mountain-mint Recovery Team (2007); for 2008-2010 COSEWIC (2011); for 2011 personal communication Graham Buck Guelph District MNR.

6. Ontario decline

Not in Any Category. The recovery strategy for Hoary Mountain-mint indicates that “The species was documented several times between 1885 and 1900 near Burlington, Ontario (Thompson and Rothfels 2006), but there is no information on the size of the historical population. Since surveys began in 1984, the species has been seen at 3 sites (3 EOs), but only 2 are still occupied, and all are within a 20 km² area (COSEWIC 2011, and see Table 1 above). There appears to be some flux in the actual patches within these sites where plants are found (site 2 in Table 1). The plant reproduces by rhizomes (underground stems) or seeds. Unfortunately, surveys have not always differentiated between plants and stems from the same plant when recording occurrences, making it impossible to comment on trends of the population of mature plants.

Hoary Mountain-mint is absent from 1 of the 3 EOs discovered since historical times (33% of the documented sites; Table 1). However, the missing EO had only 3 plants when discovered at Carroll’s Point in 1991 (Table 1 and Thompson and Rothfels 2006), which is <0.5% of all the plants or stems currently known in Ontario. Available data suggest the overall number of stems has increased since the species was rediscovered in 1981. As shown in Table 1, the Woodland Cemetery site has included as many as four sub-populations with mature individuals, but three of these had no mature individuals in 2008. A fourth subpopulation of roughly 750 plants was discovered in 2000 and about the same number was observed there in 2008. An additional subpopulation (designated 2e in Table 1) was newly discovered in 2010, and appears to have become established from an existing seed bank following site restoration initiated in Fall 2008; 36 stems representing mature individuals were confirmed in 2011. The Willow Point population has increased from 48 stems in 1997 to 198 stems in 2008 following management activities.

There is uncertainty regarding population size and trends because of the lack of a known relationship between the number of stems or plants and the number of individuals, the fact that some subpopulations have both become established and lost during this time, and some new populations have been discovered. The evidence (Table 1) points to overall stability or an increase in the overall number of individuals since monitoring began at the two sites since in the 1980s. Therefore the species is not assigned to a risk category under this criterion.

7. Ontario's Conservation Responsibility

Not in Any Category. Maps of occurrence (ROM 2011, NatureServe 2011) suggest Ontario accounts for less than 1% of the species range.

3.2 Application of secondary criteria (threats and vulnerability).

8. Population Sustainability

Not in Any Category. Overall, there is evidence of some reproduction by rhizomes and seeds at the 2 extant sites in Ontario (Table 1; COSEWIC 2011, Thompson and Rothfels 2006).

9. Lack of Regulatory Protection for Exploited Wild Populations

Not in Any Category. The wild populations are not being exploited. According to COSEWIC (2011) the 2 extant sites are on private land and the landowners are involved in stewardship activities. Illegal harvesting does not appear to be occurring.

10. Direct Threats

Endangered. Hoary Mountain-mint plants in Ontario are confined to two sites on the Hamilton-Burlington Bluffs. Both are in groundwater seepage areas characterized by steep, unstable slopes susceptible to slumping and erosion. Slumping is suspected to have caused the loss of one subpopulation (2a in Table 1; COSEWIC 2011). The largest subpopulation at the Woodland Cemetery site (2d in Table 1) is located on a steep, unstable south-facing bluff, and if this site was to be lost, the provincial population of Hoary Mountain-mint would be greatly reduced. Thompson and Rothfels (2006) note that slumping threatens established populations but could also produce new habitat patches that may be colonized by this plant. Since slumping is a stochastic process to which Hoary Mountain-mint has a demonstrated vulnerability, it is a threat to persistence of the species in the province.

An ongoing threat to all populations appears to be the encroachment of invasive and native woody and non-woody competing plants. Thompson and Rothfels (2006) indicated that Hoary Mountain-mint requires "sunny openings in dry areas". They also note that there is an "unusually high diversity" of exotic plants in these areas due to horticultural activity in adjacent areas. At the Willow Point site, for example, dumping of waste from the adjacent cemetery took place until recently, and is considered to be responsible for the establishment of several alien plant species (Melinda Thompson-Black, Species at Risk Biologist, OMNR Aurora). Shrubs such as Tartarian Honeysuckle (*Lonicera tatarica*), European Buckthorn (*Rhamnus cathartica*), and understory plants such as Garlic Mustard (*Alliaria petiolata*) have been the main species of concern, but other species that have a demonstrated ability to spread and cover large areas are also encroaching on the site, such as Black Swallowwort (*Cynanchum louiseae*), Bluegrass (*Poa* sp.), and Wild Grape (*Vitis riparia*) (COSEWIC 2011). Invasive species are regarded as the reason for the loss of the Carroll's point site, which is now considered extirpated (Thompson and Rothfels 2006).

Since 2005, prescribed burns undertaken at the Willow Point site to control the spread of woody invasive species (and some competing native species) have been having a positive effect on Hoary Mountain-mint. However, native Woodland Sunflower (*Helianthus divaricatus*) has also expanded, having formerly occupied < 10% of the area and currently covering ~ 40% of the area in response to the burning (personal communication Graham Buck, OMNR – Guelph District). Active management by burning or other means to control competing plants such as Black Swallowwort will be required to ensure continued occupancy of the Willow Point site. At Woodland Cemetery, actions to control invasive species have included mechanical pulling and prescribed burning (COSEWIC 2011). Some native willows (*Salix eriocephala*) planted on parts of the slope in the early 1980s to combat erosion are also encroaching on the habitat of the Hoary Mountain-mint (Thompson and Rothfels 2006). Controlled burns are also meant to control succession of other native woody shrubs such as Staghorn Sumac (*Rhus typhina*), Grey Dogwood (*Cornus racemosa*), Wild Grape, Black Raspberry (*Rubus occidentalis*) and Choke Cherry (*Prunus virginiana*).

Both extant sites are not at risk of being developed due to their steep character. Dumping of garden waste at Willow Point by the neighbouring cemetery has ceased, although at least some of these sites are reportedly still used as dumping grounds by local residents.

In summary, the combination of threats and potential threats to the persistence of the sites through erosion, slumping, competition from other plants, and canopy closure raise the risk level for this species. It appears that mitigation of the major ongoing threat of invasive species encroachment on Hoary Mountain-mint habitat is completely reliant on ongoing management. Targeted removal (or burning) of the shrubs and invasive species appear to be helping, but removal may also destabilize the slopes (Thompson and Rothfels 2006). A single erosion event could eliminate a large proportion of the Ontario population. Because Ontario's Hoary Mountain-mint populations are confined to these small, unstable areas, they are at continued risk of disappearance or serious decline at both extant sites, qualifying this species for Endangered status under this criterion.

11. Specialized life history or habitat-use characteristics

Special Concern. COSEWIC (2000) states that in Canada the species requires "open, dry, sandy-clay habitats in open-canopied deciduous woods on warmer-than-normal slopes that can be very steep", and Thompson and Rothfels (2006) suggest it needs "sunny openings in dry areas". At the core of its range in northeastern North America, Hoary Mountain-mint is known to be more common and generalized in its requirements (Thompson and Rothfels 2006). Outside Ontario habitat is described as thickets and pastures, woodland thickets and edges, roadsides, and rights-of-way. In neighboring New York state the species uses "dry-mesic hardwood forests, woodlands, rocky

summits, and edges of fields” (New York Flora Atlas 2011). In Pennsylvania, habitat of Hoary Mountain-mint is described as “old fields, thickets, and barrens” (Pennsylvania Flora Project). However, from the time of its discovery in Ontario over 100 years ago, hoary mountain-mint is not known to have been found outside its very limited habitat in Ontario. The occurrence of Hoary Mountain-mint in Ontario only along steep bluffs suggests some degree of habitat specialization for this species in the province.

3.3 COSSARO evaluation results

1. Criteria satisfied in each status category

The number of primary and secondary criteria met in each status category are:

Endangered – [1/1]

Threatened – [0/0]

Special Concern – [1/1]

The number of Ontario-specific criteria met in each status category: (These are primary criteria numbers 5, 6 and 7.)

Endangered – [1]

Threatened – [0]

Special Concern – [1]

2. Data deficiency

No. There was sufficient information to assess the species in Ontario.

3. Status based on COSSARO evaluation criteria

The application of COSSARO evaluation criteria suggests that Hoary Mountain-mint is **Endangered** 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

Not in any category. The number of plants and stems has remained relatively stable or increased (Table 1 COSEWIC 2011, Thompson and Rothfels 2006).

Criterion B – Small Distribution Range and Decline or Fluctuation

Endangered B1ab(iii, iv) and 2ab (iii, iv). The range, estimated by COSEWIC (2011) to be 20 km², is not thought to have declined overall during the last 25 years and is not severely fragmented. However, there are only 2 known sites and the area occupied is < 5,000 km², it occurs in <5 locations, the quality of habitat is declining owing to invasive species, one location has been lost, and one population is likely extirpated. Therefore, the species meets Endangered B1ab(iii,iv)+2ab(iii,iv).

Criterion C – Small and Declining Number of Mature Individuals

Not in any category. Not applicable as there is no evidence for an overall decline in number of mature individuals (Table 1).

Criterion D – Very Small or Restricted Total Population

Threatened D1. Meets Threatened D1, with fewer than 1000 mature individuals and Threatened D2, with an index of area of occupancy of <20 km², and < 5 locations vulnerable to rapid loss.

Criterion E – Quantitative Analysis

Insufficient information. No PVA or other population projection has been conducted.

Rescue Effect

No. Hoary Mountain-mint is confined in Ontario to 2 small populations that are geographically separated from the nearest population in New York State by at least 115 km. Given the lack of evidence of naturally occurring plants outside of this small area of steep shoreline habitat in Ontario, it is unlikely that propagules from elsewhere would become established in Canada. Thus, rescue of Canadian populations from the U.S. is considered unlikely.

4.2 COSEWIC evaluation results

1. Criteria satisfied in each status category

Endangered – Yes

Threatened – Yes

Special Concern – No

2. Data Deficiency

No. A quantitative analysis under criterion E was not performed, but there is sufficient information to assess the species under the other criteria.

3. Status based on COSEWIC evaluation criteria

The application of COSEWIC evaluation criteria suggests that Hoary Mountain-mint is **Endangered** 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

Hoary Mountain-mint (*Pycnanthemum incanum*) is a fragrant, perennial, herbaceous plant that can attain 1 m tall and may be long-lived. It occurs in eastern North America and reaches the northern edge of its range in Ontario. Records from the Hamilton-Burlington area exist from 1880-1900, but the species was not seen for decades until rediscovered in 1981. It now occurs in 2 populations of fewer than 1,000 plants on steep, unstable slopes along the Hamilton-Burlington bluffs. Elsewhere within its range in northeastern North America it occupies disturbed areas such as “thickets and pastures” as well as roadsides and rights-of-way, and is secure or “not at risk” in 72% of the jurisdictions, including neighboring New York State, Pennsylvania, and Ohio. However, the Ontario plants are >115 km from the nearest population in the USA. In Ontario, the open sites preferred by Hoary Mountain-mint are vulnerable to encroachment by competing, invasive species, and shading by woody shrubs. Recovery actions have helped reduce the threats, but the control of competing plants will require constant management. One erosion event on these unstable slopes could eliminate a large proportion of the small Ontario population. Because Hoary Mountain-mint populations are small, confined to 2 unstable sites, and subject to competition from invasive plants, the species has been classified as Endangered in Ontario.

Information sources

1. Literature Cited

COSEWIC. 2000. COSEWIC assessment and update status report on the hoary mountain-mint *Pycnanthemum incanum* in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.

COSEWIC. 2011. COSEWIC status appraisal summary on hoary mountain-mint in Canada. 2-month Status Appraisal Summary, Sept. 2011. Committee on the Status of Endangered Wildlife in Canada, Ottawa.

New York Flora Atlas web site. Accessed Nov. 22, 2011.
<http://newyork.plantatlas.usf.edu/Plant.aspx?id=1754>

Thompson, M.J. and C.J. Rothfels. 2006. Recovery Strategy for Hoary Mountain-mint 77 (*Pycnanthemum incanum* (L.) Michx.) in Canada. Hoary Mountain-mint Recovery Team (available at www.sararegistry.gc.a).

University of Guelph. FLORA Ontario - Integrated Botanical Information System (FOIBIS), Phase I, 2005 web site. http://www.uoguelph.ca/foibis/search_db.cfm. Accessed Nov. 11, 2011.

2. Community and Aboriginal Traditional Knowledge Sources

No community or Aboriginal traditional knowledge received through submissions to COSSARO.

3. Acknowledgements

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Appendix 1: Northeastern North America status rank and decline

(Blanks indicate a species is absent in a jurisdiction)

	Subnational Rank	Sources	Decline	Sources
CT	SNR; probably not rare – not tracked. There are 25 specimens in the UCONN herbarium. One label for specimen no. 189555 collected in 1904 says “not common”, which may refer to Litchfield County, not the state. Habitat data on the specimens indicates that the plant is found in vegetation communities that are likely common in Connecticut: old fields, open woods, rocky “scrub” and rock outcrops.	NatureServe; Connecticut State Conservation Data centre contacted by Mike Oldham (OMNR NHIC) and Eric Snyder (OMNR SAR)		
DE	S1- has likely always been rare owing to unique soil requirements along coastal plains in the state	NatureServe and Oldham & Snyder (see above)		
IL	SNR - probably not rare	NatureServe and Oldham & Snyder (see above)		
IN				
IA				
LB				
KY	S5	NatureServe		
MA	SNR - not rare	NatureServe and Oldham & Snyder (see above)		
MB				
MD	SNR - infrequent but too common to track in the state. Occurs in woodland thickets and edges	NatureServe; Oldham & Snyder (see above)		
ME				
MI	present	Eric Snyder, OMNR, Personal communication		
MN				
NB				
NF				
NH	S1 - conservation data centre suggests it is difficult	NatureServe and Oldham &		

	Subnational Rank	Sources	Decline	Sources
	to determine if there has been a decline. Some occurrences are “doing better than we have seen” but one may be extirpated	Snyder (see above)		
NJ	S5	Oldham & Snyder (see above)		
NS				
NY	S5	NatureServe		
OH	SNR- not tracked but relatively common in eastern Ohio in various dry habitats such as roadbanks and fields	NatureServe and Oldham & Snyder (see above)		
ON	S1	NatureServe		
PA	SNR - not rare	NatureServe; and Oldham & Snyder (see above)		
PE				
QC				
RI	SNR - not rare	NatureServe and Oldham & Snyder (see above)		
VA	S5	NatureServe		
VT	S1	NatureServe		
WI				
WV	S5	NatureServe		

Occurs as a native species in 17 of 29 northeastern jurisdictions

Strank information available for 9 of 17 jurisdictions = (53%)

S1, S2, SH, or SX in 4 of 17 = (23%)

Strank **or equivalent** information available for 14 of 17 jurisdictions = (82%)

S1, S2, SH, or SX in 4 of 14 = (28%)