COSEWIC
Status Appraisal Summary

on the

Hoary Mountain-mint
Pycnanthemum incanum

in Canada

ENDANGERED
2011

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada

COSEPAC
Comité sur la situation
des espèces en péril
au Canada

COSEWIC status appraisal summaries are working documents used in assigning the status of wildlife species suspected of being at risk in Canada. This document may be cited as follows:

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COSEWIC
Assessment Summary

Assessment Summary – November 2011

Common name
Hoary Mountain-mint

Scientific name
Pycnanthemum incanum

Status
Endangered

Reason for designation
This perennial plant has a historically small distribution in Canada, where it is known to occur in just two populations along the Hamilton bluffs in Ontario. Its highly specific habitat, which is limited to a small shoreline area of the bluffs, makes this species especially vulnerable. The main threats to its persistence are the encroachment of invasive species, the loss of habitat to erosion and fire suppression, which contributes to succession to unsuitable habitat types.

Occurrence
Ontario

Status history
Designated Endangered in April 1986. Status re-examined and confirmed Endangered in April 1998, May 2000, and November 2011.

COSEWIC
Status Appraisal Summary

Pycnanthemum incanum
Hoary Mountain Mint — Pycnanthème gris
Jurisdictions: ON

Current COSEWIC Assessment:

Status category:

☐ **XT** ☒ **E** ☐ **T** ☐ **SC**

Date of last assessment: May 2000

Reason for designation at last assessment: Two very small nearby populations with drastic decline in plant numbers and increased threat from exotic plants.

New reason for designation (only if different from above): This perennial plant has a historically small distribution in Canada, where it is known to occur in just two populations along the Hamilton bluffs in Ontario. Its highly specific habitat, which is limited to a small shoreline area of the bluffs, makes this species especially vulnerable. The main threats to its persistence are the encroachment of invasive species, the loss of habitat to erosion and fire suppression, which contributes to succession to unsuitable habitat types.

Criteria applied at last assessment: B1+2cde; C2a; D1

If earlier version of criteria was applied[1], provide correspondence to current criteria:
B1ab(iii,iv,v)+2ab(iii,iv,v); C2a(i); D1

If different criteria are proposed based on new information, provide explanation:
The proposed criteria are B1ab(iii,iv)+2ab(iii,iv). Subcriterion v is no longer applicable, as documentation of decline in mature individuals is lacking, and in fact, the number of known individuals is greater than at the time of the previous assessment. The species no longer meets the C2 or D1 criteria for endangered. No decline in mature individuals is documented, and owing to new discoveries, the population now includes more than 250 individuals.

If application of current specific criteria is not possible, provide explanation:

Reason:

☒sufficient information to conclude there has been no change in status category

☐not enough additional information available to warrant a fully updated status report

[1] An earlier version of the quantitative criteria was used by COSEWIC from October 1999 to May 2001 and is available on the COSEWIC website: http://www.cosewic.gc.ca/eng/sct0/original_criteria_e.cfm

Evidence (indicate as applicable):

Wildlife species:

Change in eligibility, taxonomy or designatable units: yes ☐ no ☒

Explanation:

No additional information since the previous assessment.

Range:

Change in Extent of Occurrence (EO): yes ☐ no ☒ unk ☐
Change in Area of Occupancy (AO): yes ☒ no ☐ unk ☐
Change in number of known or inferred current locations: yes ☒ no ☐ unk ☐
Significant new survey information yes ☒ no ☐

Explanation:

Two locations were known at the time of the last assessment: The Willow Point population and subpopulation 2a at Woodland Cemetery (Table 1). Each was considered a distinct location. One of these (2a) has been lost due to erosion. Three additional subpopulations (2b, 2c. 2d) were discovered in 2000, but two of these had no individuals in most recent surveys. No individuals have been observed at Carrolls Point (population 3) since 1991. These changes have not changed the EO or IAO, though there has been a slight change in the actual area occupied by the species (AO). Each of the three subpopulations at Woodland Cemetery (2b-2d) is considered a location, as is the Willow point population. Thus, the number of locations has increased from two to four since the last assessment. The situation at Carrols Point is unchanged.

Population Information:

Change in number of mature individuals: yes ☒ no ☐ unk ☐
Change in total population trend: yes ☐ no ☐ unk ☒
Change in severity of population fragmentation: yes ☐ no ☒ unk ☐
Change in trend in area and/or quality of habitat: yes ☐ no ☐ unk ☒
Significant new survey information yes ☒ no ☐

Explanation:

The previous assessment in 2000 included field survey data up to 1997. Field survey data either count the number of flowering stems, or estimate the number of plants (mature individuals). The number of stems per plant is highly variable, with more stems occurring on larger, more robust individuals. Some individuals have been observed with more than 30 stems, but the mean number of stems per individuals is not known. Thus, numbers are reported without attempting to relate the number of stems to the number of individuals. However, it should be noted that the number of mature individuals is necessarily lower than the number of stems.

Since the previous assessment, additional subpopulations have been discovered at the Woodland Cemetery population (designated sites 2a-2d in the Recovery Strategy). Three of these four subpopulations had no individuals in 2008. Site 2a had 2 plants in 2000, 5 stems in 2005, and no stems in 2008 and was ultimately lost due to slope erosion. Site 2b had 12-15 stems when it was discovered in 2000 and no stems in 2008. Site 2c had 6 stems when discovered in 2000 and no stems in 2008 (M. Thompson, pers. comm.). Site 2d remains unchanged with roughly 750 plants observed in 2000 and 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. This subpopulation consisted only of seedlings, and thus this subpopulation is not part of the count of mature individuals.

At Willow Point (also known as Holy Sepulchre Cemetery), the number of individuals has increased since the previous assessment. In 1997 only 48 stems where found whereas 198 stems were counted in 2008. It appears that plants have responded positively to recent management actions that include prescribed burns at Willow Point in 2005, 2006 and 2007, as well as additional control of invasive native and exotic woody species, including Staghorn Sumac (*Rhus typhina),* Lesser Periwinkle (*Vinca minor)*, and European Buckthorn (*Rhamnus cathartica*). These actions seem to be benefiting Hoary Mountain-mint by increasing light levels and reducing competition, with population monitoring over the course of four years showing marked increases in the number of stems with 15 in 2005, 70 in 2006, 170 in 2007, and 198 in 2008 (K. Beriault, pers. com.).

No individuals have been observed at the Carrolls Point population since 1991, and this population may be extirpated. Taken together, additional discoveries and survey information from all known Canadian sites indicate that despite the definite loss of one subpopulation at Woodland Cemetery (2a) and the possible loss of two others (2b, 2c), in addition to the failure of recruitment and possible extirpation of the Carrolls Point populations, the overall number of plants has increased since the last assessment.

Habitat quality has been improved through vegetation management at some of the existing sites, but site 2a has been lost due to erosion. It should be noted that while shrub removal likely benefits Hoary Mountain Mint by providing more light, this action might also contribute to destabilizing slopes. In addition, invasive encroachment is an ongoing threat to habitat quality. Because the net outcome of these conflicting forces is unclear, trends in the overall quality of habitat are described as unknown.

Threats:

Change in nature and/or severity of threats: yes ☒ no ☐ unk ☐

Explanation:

The previous assessment listed habitat disturbance, shoreline erosion/ slumping, encroachment of woody shrubs and invasive species as threats to Hoary Mountain Mint.

Habitat disturbance related to operations of the adjacent cemetery at Willow Point (i.e. dumping of garden waste) has been minimized since the landowner has been made aware of the presence of the species and ongoing communication with this landowner is maintained. Dumping by local residents other than landowners is listed as an additional potential threat in the Recovery Strategy for this species (Thompson and Rothfels 2006).

Encroachment by woody shrubs and non-native species has also been recently addressed at Willow Point and Woodland Cemetery. Prescribed burns and invasive species control by means of mechanical removal of individuals at Willow Point appear to be having a positive effect as higher stem counts have been reported since management began in 2005. However, the exotics Lesser Periwinkle, European Buckthorn, and Norway Maple (*Acer platanoides*), and the native Staghorn Sumac represent new threats in addition to those listed in the previous assessment (the exotics Garlic Mustard (*Alliaria petiolata)* and Tatarian Honeysuckle (*Lonicera tatarica*)), and ongoing management to prevent encroachment will likely be necessary. A prescribed burn was also carried out at the Woodland Cemetery site in 2009 to reduce woody encroachment and invasive species cover. It is too early to determine the success of this burn, although permanent photo-monitoring plots were established in 2008 to monitor the changes.

Shoreline erosion and slumping remain potential threats at most sites. Subpopulations that occur along bluffs are inherently unstable, in part due to groundwater seepage, which may lead to slumping. Thompson and Rothfels (2006) note that while slumping threatens established populations, this process can also produce new habitat patches that may be colonized by Hoary Mountain Mint.

Habitat degradation in the form of woody and invasive plant encroachment, as well as erosion and slumping are interpreted as the most severe threat to Hoary Mountain Mint in Canada. Based upon the scope and scale of these threats, 4 or 5 locations are identified; one for the population at Willow Point, and 1 each for the three subpopulations (2b, 2c and 2d) at Woodland Cemetery. Subpopulation 2a is inferred to be lost due to slumping at this site. If the population at Carrolls Point is treated as extant a fifth location would be counted for this population.

Protection:

Change in effective protection: yes ☒ no ☐

Explanation:

Hoary Mountain-mint is listed as Endangered under the Ontario *Endangered Species Act 2007*, Schedule 1 (ESA, 2007). The two populations known to be extant are on private land (COSEWIC 2000), and landowners are aware of the species, and are involved in stewardship activities (Thompson and Rothfels, 2006). A recovery plan has been finalized and focuses on the protection and enhancement of extant populations, potential habitat augmentation, and potential restoration of historical populations (Thompson and Rothfels, 2006). Seeds have been collected, and the species is under cultivation at the Royal Botanical Gardens, Hamilton.

Rescue Effect:

Evidence of rescue effect: yes ☐ no ☒

Explanation:

The two small and geographically isolated Canadian populations are not contiguous with those to the south in the U.S. and it is unlikely that propagules from elsewhere would become established in Canada. Thus, rescue of Canadian populations from the U.S. is considered unlikely.

Quantitative Analysis:

Change in estimated probability of extirpation: yes ☐ no ☒ unk ☐

Details:

No change since previous assessment; no quantitative analyses have been conducted

Summary and Additional Considerations:

There are two populations of this species that are known to be extant, extending between Hamilton and Burlington on bluffs and slopes near the Hamilton Harbour shoreline. The Woodland Cemetery site has included as many as four subpopulations with mature individuals, but three of these had no mature individuals in 2008, and the habitat at one of these sites has been lost due to erosion. A fifth new site, discovered in 2010 (2e), thus far includes only seedlings. The Willow Point population has increased from 48 stems in 1997 to 198 stems in 2008. The Carrolls Point population, last known to contain individuals in 1991, may be extirpated.

Several recovery actions have been initiated since the previous assessment in 2000. Small-scale removal of invasive woody species at the Woodland Cemetery population has been undertaken, and prescribed burns have been conducted at Willow Point in 2006. Seven permanent plots were established in the area in which the prescribed burn occurred to track changes in species composition and vigour. More recently, a prescribed burn was carried out at the Woodland Cemetery site in 2009 and permanent photo-monitoring plots were established in the fall of 2008 to monitor the long-term effectiveness of burns. Seed and plant material were collected by the Royal Botanical Gardens in 1999/2000 and an ex situ population has been established there to study germination requirements and seedbank properties. Propagation studies conducted by the Royal Botanical Gardens indicated high germination rates (83%) as well as high survival rates (P. O'Hara pers. comm. to M. Thompson 2001) under cultivation. Detailed Ecological Land Classification surveys have been completed for habitat polygons containing Hoary Mountain-mint at both sites.

List of authorities contacted to review the status appraisal:

*Denotes that information was provided by authority contacted.

*Karine Beriault, Species at Risk Biologist, Ontario Ministry of Natural Resources, Vineland, Ontario

*Melinda Thompson, Species at Risk Biologist, Ontario Ministry of Natural Resources, Aurora, Ontario

*Mike Oldham, Botanist/Herpetologist, Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario

Sources of information:

COSEWIC 2000. COSEWIC assessment and update status report on the Hoary Mountain-mint *Pyncnanthemum incanum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa 1-6 pp.

Endangered Species Act, 2007. Website accessed April 9 2010. Available at http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_07e06_e.htm

Thompson, M.J. and C.J. Rothfels. 2006. Recovery Strategy for Hoary Mountain-mint (*Pycnanthemum incanum* (L.) Michx.) in Canada. Hoary Mountain-mint Recovery Team, vii + 18 pp.

White, D.J. 1998. Update COSEWIC status report on the Hoary Mountain-mint *Pycnanthemum incanum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vi + 6 pp.

Author of status appraisal summary: Samuel R. Brinker

Table 1: Population survey information by survey year for the three recently extant sites since the last assessment[1].

Site (date of first discovery)	1997	2000	2005	2008	2010
1. Willow Point (1981)	48 stems	12 plants	15 stems	198 stems	
2 Woodland Cemetery					
2a (1991)	1 stem	2 plants	5 stems	0 stems	
2b (2000)		12-15 plants		0 stems	
2c (2000)		6 plants		0 stems	
2d (2000)		750 plants		750 plants	
2e (2010)					15 seedlings
3. Carrolls Point (1991)	0 plants	0 plants	0 plants	0 plants	

1. Blank cells indicate that no survey information is available
2. The average number of stems per plant has not been established, but single clumps, presumed to represent single individuals, have been observed with 1-35 stems.

TECHNICAL SUMMARY

Pycnanthemum incanum
Hoary Mountain-mint Pycnanthème gris
Range of occurrence in Canada: Ontario

Demographic Information

Generation time *Perennial reproducing by rhizomes – could be very long-lived.*	Unknown, but likely long and with a seed bank.
Is there an observed continuing decline in number of mature individuals? *Survey data are not sufficiently detailed to allow evaluation of trends in number of mature individuals. Two sites have shown increases in numbers of individuals since the last assessment.*	No
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations	n/a
Observed percent reduction or increase in total number of mature individuals over the last 10 years, or 3 generations. *Generation time is unknown and population sizes are not sufficiently well documented to indicate trends.*	n/a
Projected percent increase in total number of mature individuals over the next 10 years. *Although increases have been observed at two sites, three additional sites had no individuals in most recent surveys. Vegetation management coincides with the appearance of seedlings at an additional site. Trends cannot be assessed with confidence.*	Unknown
Inferred percent increase in total number of mature individuals over any 10 years, or 3 generations period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased?	n/a
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence	20 km²
Index of area of occupancy (IAO)	8 km^2 (2x2 km)
Is the total population severely fragmented?	No
Number of "locations∗" *Based on the two most severe threats, 1. habitat degradation through woody and invasive encroachment and, 2. erosion/ slumping. Locations are as follows:* *1. Willow Point* *2. Woodland Cemetery subpopulation 2b* *3. Woodland Cemetery subpopulation 2c* *4. Woodland Cemetery subpopulation 2d* 5. *Carrolls Point (likely extirpated)*	4-5
Is there an observed continuing decline in extent of occurrence?	No
Is there an observed and projected continuing decline in index of area of occupancy?	No

∗ See definition of location.

Is there an observed continuing decline in number of populations? *Three subpopulations at the Woodland Cemetery population had no mature individuals in recent surveys, but it is unknown whether a seed bank persists at two of these sites (2b and 2c). Subpopulation 2a has been lost to erosion. No individuals have been observed at the Carrols Point population since 1991, and this population appears to be extirpated. Thus, a decline in the number of populations is infered.*	Yes
Is there an observed continuing decline in number of locations? *Subpopulation 2a at Woodland Cemetery appears to have been lost to erosion. Three additional subpopulations (considered locations) have been discovered (2b-2d), but two of these contained no individuals in 2000.*	No
Is there an observed continuing decline in quality of habitat? *Vegetation management through removal of woody shrubs and invasive species, along with controlled burns, appear to be enhancing habitat for the species. However, these measures have not been undertaken at all locations, and their effects on the probability of erosion events that could wipe out subpopulations are unknown, but unlikely to be positive. Three subpopulations had no individuals in recent surveys, perhaps due to habitat deterioration.*	Yes
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations∗?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each population)

Population (Numbering follows Thompson and Rothfels, 2007)	**Number of Mature Individuals[1]**
1. Willow Point (48 in 2000)	198 stems (2008)
2. Woodland Cemetery with 5 Subpopulations (only 1 known in 1998)	
2a. (2 plants in 2000)	5 stems (2005)
2b. (12-15 plants in 2000)	0
2c. (6 plants in 2000)	0
2d. (750 in 2000)	750 plants (2008)
(2e. Discovered in Sept 2010, 15 seedlings)	
3. Carrolls Point (0 in 2000)	0
Total	<1000

1. The relationship between the number of stems and the number of mature individuals has not been established, but is certainly >1 stem per individual on average. Thus stem counts necessarily exceed the number of mature individuals.

Quantitative Analysis

Probability of extinction in the wild	Not done

Threats (actual or imminent, to populations or habitats)

Encroachment by exotic and native vegetation, possibly linked to fire suppression; erosion on the steep slopes on which the species occurs.

∗ See definition of location.

Rescue Effect (immigration from outside Canada)

Status of outside population(s)? *Closest outside populations are in New York (S5) and Pennsylvania, New Jersey, Ohio (all SNA). Globally secure (G5)*	
Is immigration known or possible? *Populations are not contiguous with those to the south in the U.S.*	Unlikely
Would immigrants be adapted to survive in Canada?	Possibly
Is there sufficient habitat for immigrants in Canada?	Unknown
Is rescue from outside populations likely?	No

Current Status

COSEWIC: Endangered (November 2011)

Status and Reasons for Designation

Status:	**Alpha-numeric code:**
ENDANGERED	B1ab(iii,iv)+2ab(iii,iv)
Reasons for designation: This perennial plant has a historically small distribution in Canada, where it is known to occur in just two populations along the Hamilton bluffs in Ontario. Its highly specific habitat, which is limited to a small shoreline area of the bluffs, makes this species especially vulnerable. The main threats to its persistence are the encroachment of invasive species, the loss of habitat to erosion and fire suppression, which contributes to succession to unsuitable habitat types.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. Although 3 subpopulations had no individuals in most recent surveys, another population has seen significant increases.
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered B1ab(iii,iv)+2ab(iii,iv), with a small EO and IAO falling below the thresholds for Endangered. The species occurs in 4-5 locations, and the quality of habitat has declined. One location has been lost, and one population is likely extirpated.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. No evidence of continuing decline in mature individuals.
Criterion D (Very Small or Restricted Total Population): Meets Threatened D1, with fewer than 1000 mature individuals and D2, with an IAO <20 km^2, 4-5 locations subject to rapid loss due to small populations.
Criterion E (Quantitative Analysis): Not done.

COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS
(2011)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.

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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.