

COSEWIC
Status Appraisal Summary

on the

Small Whorled Pogonia
Isotria medeoloides

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 – May 2011

Common name

Small Whorled Pogonia

Scientific name

Isotria medeoloides

Status

Endangered

Reason for designation

This small orchid, previously known only from a single swamp in Ontario, requires mixed damp woods. It was assessed as Endangered in 2000. Its habitat continues to decline in quality due to trampling and exotic earthworms. It was last seen in 1998, though its potential for dormancy means it may still be extant.

Occurrence

Ontario

Status history

Designated Endangered in April 1982. Status re-examined and confirmed in April 1998, May 2000, and May 2011.

Population Information:

Change in number of mature individuals: yes no

Change in total population trend: yes no

Change in severity of population fragmentation: yes no

Change in trend in area and/or quality of habitat: yes no

Significant new survey information: yes X no

Explanation:

No additional population data since previous assessment. Annual monitoring of previously occupied locations within Calton Swamp continue to be carried out by Catfish Creek Conservation Authority staff (Defazio, pers. comm.), though Small Whorled Pogonia has not been observed since 1998. While dormancy complicates survey efforts, dormancy rates are still a matter of contention, with early observations suggesting the species could remain dormant for 10 to 20 years (Correll, 1950), though this has not been substantiated. Mehrhoff (1989) found plants would not emerge after three or more consecutive years of dormancy, whereas Brumback and Fyler (1988) found dormancy lasted for up to four years. Holsinger *et al.* (1996) have shown that there is a 90% chance that plants dormant for five years or more will not re-emerge and Brumback *et al.* (2008) did not monitor plants that had been dormant for ten years or more in an experimental habitat management site in New Hampshire assuming they were dead.

Threats:

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

Explanation:

White (1998) noted all-terrain vehicle traffic was a threat to habitat at Calton Swamp and had already destroyed station #2. Since then, Catfish Creek Conservation Authority has implemented a number of initiatives to close trails in the area and prohibit the operation of motorized vehicles on the property to eliminate further damage to habitat and individuals (Defazio, pers. comm.). The impacts of exotic earthworms have not been addressed in the previous assessment or recent recovery strategy but warrants consideration as a new threat to the species. This threat was listed as a medium-to-high threat to Large Whorled Pogonia, a species with a similar reliance on thick duff and rich humus layers as well as soil-inhabiting fungi for growth and survivorship. Exotic earthworms have been shown to reduce the duff and humus layers in northern temperate forests by increasing rates of litter decomposition as well as reducing fungal diversity in the soil, shifting decomposition from fungal-dominated systems to faster, bacterial-dominated systems (Hendrix and Bohlen 2002; Wardle 2002; Bohlen *et al.* 2004; Hale *et al.* 2005). Small Whorled Pogonia, as with all other orchids (McCormick *et al.* 2004; Shefferson *et al.* 2005) relies on mycorrhizal associations with soil-inhabiting fungi for successful seedling establishment and overall fitness throughout all life stages. Thus, the survival of Small Whorled Pogonia is likely tied to the edaphic requirements of its mycorrhizal host(s). Impacts to the soil fungal community from exotic earthworms may render Small Whorled Pogonia plants more susceptible to drought or herbivory, as well as reduce its ability to germinate. As well, air and precipitation-borne nutrient loading (increases in available nitrogen) have been shown to negatively impact on fungal diversity (Arnolds 1991), and are therefore further potential threats to the mycorrhizal associations required by Small Whorled Pogonia. Threats of herbivory by deer and slugs continue (McConnell 2007).

Protection:

Change in effective protection:

yes no

Explanation:

Small Whorled Pogonia has been listed as Endangered under the Ontario *Endangered Species Act 2007*, Schedule 1 (ESA 2007). A national recovery plan has also been drafted and focuses on continued monitoring, determination of habitat characteristics at Calton Swamp, and exploring techniques and feasibility of augmenting the extant population or restoring the species if it is deemed extirpated from the site (McConnell 2007). It was designated Endangered in April 1982. Status re-examined and confirmed in April 1998 and in May 2000. It continues to be listed as Endangered on Schedule 1 of the federal *Species at Risk Act (SARA)*.

Rescue Effect:

Evidence of rescue effect:

yes no

Explanation:

No additional information or change in rescue effect since previous assessment. The only Small Whorled Pogonia population in Canada (if extant) remains geographically isolated with little chance of immigration from adjacent areas to the south in New York or Michigan. The Canadian population is not contiguous with any U.S. populations and it is unlikely that propagules from elsewhere would become established in Canada. Small Whorled Pogonia is rare throughout its northeastern North American range and populations tend to be small.

Quantitative Analysis:

Change in estimated probability of extirpation:

yes no

Details:

No additional data since previous assessment; no quantitative analyses have been conducted.

Summary and Additional Considerations:

Small Whorled Pogonia has not been observed at its only Canadian location at Calton Swamp since 1998 despite consistent searches. The species may be extirpated. Recovery efforts to date have included monitoring of the site and habitat delineation and classification as well as threat elimination of ATV traffic. In the U.S., the number of known extant populations within the last 10 years has increased considerably mainly in the southern tier of the species' range due to increased survey efforts. Most of these new sites are small with less than 20 stems and are not considered viable however (U.S. Fish and Wildlife Service 2008). Experimental canopy manipulations in some northeastern U.S. populations have resulted in increased number of stems within populations, but have not resulted in population expansion into adjacent habitat (Brumback *et al.* 2008). Experimental seed research in the U.S. examining seed germination and viability has been underway since 2003 in a cooperative effort with the Smithsonian Institution. Although no seeds germinated over the course of five years, fungal hosts were present and the seeds continued to remain viable with healthy embryos raising the possibility of a long-term seedbank for this species (Brumback *et al.* 2008).

Note:

Guidelines for use of Extinct or Extirpated (COSEWIC 2011)

A wildlife species may be assessed as extinct or extirpated from Canada if:

- there exists no remaining habitat for the wildlife species and there have been no records of the wildlife species despite recent surveys; or
- 50 years have passed since the last credible record of the wildlife species, despite surveys in the interim; or
- there is sufficient information to document that no individuals of the wildlife species remain alive.

Consultations:

Michael Oldham, Botanist/Herpetologist, Natural Heritage Information Centre, Ontario
Ministry of Natural Resources, Peterborough, Ontario.

Ron Gould, Species at Risk Biologist, Ontario Ministry of Natural Resources, Chatham,
Ontario.

Susi von Oettingen, Endangered Species Biologist, US Fish and Wildlife Service,
Concord, New Hampshire.

Tony Difazio, Resource Planning Coordinator, Catfish Creek Conservation Authority,
Aylmer, Ontario.

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Author of status appraisal summary:

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TECHNICAL SUMMARY

Isotria medeoloides

Small Whorled Pogonia

Range of occurrence in Canada: Ontario

Isotrie fausse-médéole

Demographic Information

Generation time (likely > 10 years)	unknown
Is there an observed continuing decline in number of mature individuals? (<i>No Canadian reports since 1998</i>)	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.	100%
Projected percent increase in total number of mature individuals over the next 10 years.	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?	unknown
Are there extreme fluctuations in number of mature individuals? (No mature individuals are known)	n/a

Extent and Occupancy Information

Estimated extent of occurrence	0 km ²
Index of area of occupancy (IAO)	0 km ² (2x2 km)
Is the total population severely fragmented? (No extant populations known)	n/a
Number of "locations*"	0
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
Is there an observed continuing decline in number of populations? (<i>historical decline</i>)	No
Is there an observed continuing decline in number of locations?	No
Is there an observed continuing decline in quality of habitat? (<i>exotic earthworms continue to degrade the habitat</i>)	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	Number of Mature Individuals
Calton Swamp	0
Total	0

* See definition of location.

Quantitative Analysis

Probability of extinction in the wild <i>Not done, no individuals known</i>	N/A
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Threats (actual or imminent, to populations or habitats)

Habitat damage through the removal of duff, humus and litter layer by exotic earthworms continues. Herbivory by earthworms, slugs and possibly deer continue to be a threat.
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Rescue Effect (immigration from outside Canada)

Status of outside population(s)? Globally Imperilled (G2); Listed Threatened in the US and Imperilled (N2); Connecticut (S1), Delaware (S1.1), District of Columbia (SX), Georgia (S2), Illinois (S1), Maine (S2), Maryland (SH), Massachusetts (S1), Michigan (S1), Missouri (SH), New Hampshire (S2), New Jersey (S1), New York (SH), North Carolina (S2), Ohio (S1), Pennsylvania (S1), Rhode Island (S1), South Carolina (S2), Tennessee (S1), Vermont (SX), Virginia (S2), West Virginia (S1)	
Is immigration known or possible?	unlikely
Would immigrants be adapted to survive in Canada?	unknown
Is there sufficient habitat for immigrants in Canada?	no
Is rescue from outside populations likely? <i>The only Small Whorled Pogonia population in Canada (if extant) remains geographically isolated with little chance of immigration from adjacent areas to the south in New York or Michigan. The Canadian population is not contiguous with any U.S. populations and it is unlikely that propagules from elsewhere would become established in Canada. Small Whorled Pogonia is rare throughout its northeastern North American range and populations tend to be small.</i>	no

Current Status

COSEWIC: ENDANGERED (May 2011)

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: A2a; B1ab(iii)+2ab(iii); D1
Reasons for designation: This small orchid, previously known only from a single swamp in Ontario, requires mixed damp woods. It was assessed as Endangered in 2000. Its habitat continues to decline in quality due to trampling and exotic earthworms. It was last seen in 1998, though its potential for dormancy means it may still be extant.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Meets Endangered A2a: decline of 100% since 1998 due to habitat damage through ATV use, trampling and possibly exotic earthworms.
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered B1ab(iii)+2ab(iii): EO <5000, IAO <500, known to exist <5 locations and continued decline suspected in the quality of habitat due to trampling and possibly exotic earthworms.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable because with no known living individuals since 1998 there is no longer a continuing decline.
Criterion D (Very Small or Restricted Total Population): Meets Endangered D1: population estimated to have <250 mature individuals
Criterion E (Quantitative Analysis): None conducted.



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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