Photo: Allen Woodliffe

Small Whorled Pogonia

(Isotria medeoloides) in Ontario

Ontario Recovery Strategy Series

Recovery strategy prepared under the *Endangered Species Act, 2007*

February 2011

Natural. Valued. Protected.

Ministry of Natural Resources

Ontario

About the Ontario Recovery Strategy Series

This series presents the collection of recovery strategies that are prepared or adopted as advice to the Province of Ontario on the recommended approach to recover species at risk. The Province ensures the preparation of recovery strategies to meet its commitments to recover species at risk under the Endangered Species Act, 2007 (ESA, 2007) and the Accord for the Protection of Species at Risk in Canada.

What is recovery?

Recovery of species at risk is the process by which the decline of an endangered, threatened, or extirpated species is arrested or reversed, and threats are removed or reduced to improve the likelihood of a species' persistence in the wild.

What is a recovery strategy?

Under the ESA, 2007, a recovery strategy provides the best available scientific knowledge on what is required to achieve recovery of a species. A recovery strategy outlines the habitat needs and the threats to the survival and recovery of the species. It also makes recommendations on the objectives for protection and recovery, the approaches to achieve those objectives, and the area that should be considered in the development of a habitat regulation. Sections 11 to 15 of the ESA, 2007 outline the required content and timelines for developing recovery strategies published in this series.

Recovery strategies are required to be prepared for endangered and threatened species within one or two years respectively of the species being added to the Species at Risk in Ontario list. There is a transition period of five years (until June 30, 2013) to develop recovery strategies for those species listed as endangered or threatened in the schedules of the ESA, 2007. Recovery strategies are required to be prepared for extirpated species only if reintroduction is considered feasible.

What's next?

Nine months after the completion of a recovery strategy a government response statement will be published which summarizes the actions that the Government of Ontario intends to take in response to the strategy. The implementation of recovery strategies depends on the continued cooperation and actions of government agencies, individuals, communities, land users, and conservationists.

For more information

To learn more about species at risk recovery in Ontario, please visit the Ministry of Natural Resources Species at Risk webpage at: **www.ontario.ca/speciesatrisk**

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ADOPTION OF RECOVERY STRATEGY

The *Endangered Species Act, 2007* (ESA) requires the Minister of Natural Resources to ensure recovery strategies are prepared for all species listed as endangered or threatened on the Species at Risk in Ontario (SARO) List. Under the ESA, a species' recovery strategy may incorporate all or part of an existing plan that relates to that species (s.15).

Small Whorled Pogonia is listed as endangered on the SARO List. The species is also listed as endangered under the federal *Species at Risk Act* (SARA). The Recovery Strategy for Small Whorled Pogonia in Canada was prepared prior to June 30, 2008 to meet the Ontario government's commitments under the *Accord for the Protection of Species at Risk in Canada*. The recovery strategy was published in 2007 to the SARA Public Registry to meet the requirements of the federal SARA. This recovery strategy is hereby adopted under the ESA. With the additions indicated below, the enclosed strategy meets all of the content requirements outlined in the ESA.

1.0 Habitat Needs

The ESA requires that a recovery strategy include an identification of the habitat needs of the species. Section 1.2 of the recovery strategy provides a description of the habitat and biological needs of the species. The information provided in this section is considered to meet the requirements under the ESA. However, since the original publication of the recovery strategy the following new information has become available.

MMM Group Limited was retained to provide site-based information that would assist in determining the condition and amount of habitat for Small Whorled Pogonia at Calton Swamp, the only known occurrence for the species in Canada. This information addresses the knowledge gaps in section 1.5 of the recovery strategy related to topography, soil conditions, and associated species at the Ontario sites and partially addresses the knowledge gap related to light conditions. Intensive surveys of the vegetation at and surrounding two of the four known sites were conducted by William Draper of MMM Group Limited in July and August of 2007. Although Small Whorled Pogonia was not observed at either of the sites during the fieldwork, the surveys indicate that Small Whorled Pogonia is typically found in dry to mesic second-growth deciduous or deciduous-coniferous forests with light to moderate leaf litter, acidic soil, sparse to moderate herb layer, moderate to sparse shrub layer and lateral water drainage. Canopy dominants at known Ontario sites are Red Maple (*Acer rubrum*) and Yellow Birch (*Betula alleghaniensis*) with sparse to abundant Sugar Maple (*A. saccharum*), Eastern Hemlock (*Tsuga canadensis*) and American Beech (*Fagus grandifolia*). Eastern Hemlock (*Tsuga canadensis*) was identified

as a primary indicator of Small Whorled Pogonia habitat. The sites are found in Ecological Land Classification (ELC) vegetation types FOD6-3 (Fresh-Moist Sugar Maple – Yellow Birch Deciduous Forest) and FOD6-1 (Fresh-Moist Sugar Maple – Lowland Ash Deciduous Forest) as defined by Lee et al. (1998) (MMM Group Limited 2007). These vegetation types were mapped as areas (polygons) of consistent vegetation types within the study area (MMM Group Limited 2007). The documented locations of Small Whorled Pogonia plants within those polygons varied with respect to the boundaries of the polygons.

MMM Group Limited (2007) identified the presence of the following species in the herb layer or shrub layer as an indicator of Small Whorled Pogonia habitat where Eastern Hemlock and acidic soils with modest to deep layer of partially decomposed organic matter (F horizon) are also present: Indian Cucumber-root (*Medeola virginiana*), Creeping Partridge Berry (*Mitchella repens*), Canada Mayflower (*Maianthemum canadense*), Ground-pine (*Lycopodium obscurum*), Northern Running-pine (*Diphasiastrum complanatum*), New York Fern (*Thelypteris novaboracensis*), Downy Rattlesnake-plantain (*Goodyera pubescens*), Rattlesnake Fern (*Botrychium virginianum*), Daisy-leaf Moonwort (*Botrychium matricariaefolium*), and Witch-hazel (Hamamelis *virginiana*).

2.0 Area for Consideration in Developing a Habitat Regulation

Under the ESA, a recovery strategy must include a recommendation to the Minister of Natural Resources on the area that should be considered in developing a habitat regulation. A habitat regulation is a legal instrument that prescribes an area that will be protected as the habitat of the species. The recommendation provided below by the author will be one of many sources considered by the Minister when developing the habitat regulation for this species.

The contiguous ELC vegetation type polygons of FOD6-3 (Fresh-Moist Sugar Maple – Yellow Birch Deciduous Forest) and FOD6-1 (Fresh-Moist Sugar Maple – Lowland Ash Deciduous Forest) in Calton Swamp, in which Small Whorled Pogonia was known to have occurred, should be prescribed as habitat in a habitat regulation for Small Whorled Pogonia. The ELC vegetation type scale is recommended because MMM Group Limited (2007) mapped the ELC polygons at two of the Small Whorled Pogonia sites at this scale. In addition, the prescribed area should include an area extending 50 m on all sides of each of the polygons. Given the variability of the locations of plant sightings within the polygons, the low tolerance of Small Whorled Pogonia to major changes in the light regime, and the very cryptic nature of the species (e.g., possible dormancy periods of between 3 (Mehrhoff 1989) and 20 (U.S Fish and Wildlife Service 1985 in Difazio 2003) years), the 50 m distance is recommended to protect the habitat for this species. Fifty metres is twice the average tree height in the area

(R. Gould, pers. comm. 2010), and will maintain the current light regime for known and possible dormant plant locations regardless of their position within the polygons, as well as providing a buffer to maintain the current ELC vegetation types.

In addition, to be consistent with the recovery goal and objectives in the recovery strategy, it is recommended that potential recovery habitat be included in the habitat regulation. The report by MMM Group Limited (2007) identified FOD 6-3, FOD6-1, FOD6-5a, and FOD6-2 ELC vegetation type polygons in which Eastern Hemlock was found during the Ecological Land Classification of Calton Swamp as potential habitat for Small Whorled Pogonia. Therefore, it is recommended that all the FOD 6-3, FOD6-1, FOD6-5a, and FOD6-2 ELC polygons within 1 km of historical and/or current sites should also be prescribed as habitat in a regulation. A 1 km distance is recommended because all the known sites occur within a few hundred meters of each other (COSEWIC 2000, R. Gould, pers. comm. 2010) and 1 km is the minimum separation distance for plant Element Occurrences (NatureServe 2004). This distance would be sufficient to encompass naturally occurring colonization of new sites from current sites, and provide for the existence of a self-maintaining metapopulation. If these polygons are confirmed to contain Small Whorled Pogonia, it is recommended that the above regulations for known sites come into effect.

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APPENDIX

Recovery Strategy for the Small whorled pogonia (*Isotria medeoloides*) in Canada

May 2007

Photo: Glen D. Martin

Recovery Strategy for the Small whorled pogonia (*Isotria medeoloides*) in Canada

May 2007

Under the Accord for the Protection of Species at Risk (1996), the federal, provincial, and territorial governments agreed to work together on legislation, programs, and policies to protect wildlife species at risk throughout Canada.

In the spirit of cooperation of the Accord, the Government of Ontario has given permission to the Government of Canada to adopt the Recovery Strategy for the Small whorled pogonia (*Isotria medeoloides*) in Canada under Section 44 of the *Species at Risk Act* (SARA). Details are provided in the addenda of this document.

This recovery strategy is the recovery strategy of the Minister of the Environment of Canada for this species.

May 2007

Recommended citation:

McConnell, A. 2007. Recovery Strategy for the Small whorled pogonia (*Isotria medeoloides)* in Canada. 13 pp.

Additional copies:

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Cover illustration: Glen D. Martin

Également disponible en français sous le titre
« Programme de rétablissement de l'isotrie fausse-médéole (*Isotria medeoloides)* au Canada »

RESPONSIBLE JURISDICTIONS

Ontario Ministry of Natural Resources
Canadian Wildlife Service

AUTHOR

This recovery strategy was developed by Angela McConnell, Canadian Wildlife Service – Ontario. The first draft Recovery Strategy was developed by Tony Difazio, Catfish Creek Conservation Authority in 2003.

ACKNOWLEDGMENTS

This strategy utilizes information from the first draft strategy which was developed by Tony Difazio (2003), Catfish Creek Conservation Authority and which was funded by the Ontario Ministry of Natural Resources.

Many thanks to Ric Wellwood for providing information on the occurrence within Calton Swamp and for reviewing the document.

PREFACE

The Small whorled pogonia is under the management jurisdiction of the Ontario provincial government. The *Species at Risk Act* (SARA, Section 37) requires the competent minister to prepare recovery strategies for listed extirpated, endangered or threatened species. The Small whorled pogonia was listed as Endangered under SARA in June 2003. The Ontario Ministry of Natural Resources and the Canadian Wildlife Service – Ontario, Environment Canada worked in cooperation to develop this Recovery Strategy. All responsible jurisdictions reviewed and acknowledged receipt of the strategy. The strategy meets SARA requirements in terms of content and process (Sections 39-41). This recovery strategy was developed in consultation with the Catfish Creek Conservation Authority.

EXECUTIVE SUMMARY

Small whorled pogonia (*Isotria medeoloides)* is a small orchid which inhabits portions of eastern North America, and has been found in only one location in Canada. It was designated as endangered by the Committee on the Status of Endangered Wildlife In Canada (COSEWIC) in 2000. Little is understood about the specific biological requirements of this species which grows in the damp mixed woods of Calton Swamp.

The only known occurrence of Small whorled pogonia is located on Catfish Creek Conservation Authority (CCCA) property but the species has not been seen since 1998. It is unknown whether the species is extirpated or is still present in low numbers. Two known threats to this population are habitat degradation and trampling. Other possible threats include herbivory, collection, and loss of genetic diversity.

The recovery of Small whorled pogonia is considered feasible. The recovery goal is to protect extant populations and viable habitat to ensure a self sustaining population exists within the historical Canadian range. Recovery objectives are:

1. Survey and, if extant, monitor individual plants within the area of the four recorded historical subpopulations.
2. Determine population dynamics and habitat characteristics of the Calton Swamp colony.
3. Develop strategies for the protection of the population and supporting habitat.
4. Investigate techniques and feasibility of augmenting the extant population or restoring the species to historic locations if it is deemed to be extirpated.
5. Initiate research to address knowledge gaps

Identification of critical habitat for this species is being deferred to the action plan stage.

A number of specific actions and evaluation methods are also outlined in this strategy.

This recovery approach will not have any anticipated negative effects on other species in the area.

An action plan will be developed for Small whorled pogonia by 2011, dependent on the capacity of the lead agencies to complete the plan.

TABLE OF CONTENTS

SPECIES INFORMATION

Date of Assessment:	2000
Common Name:	Small whorled pogonia
Scientific Name:	*Isotria medeoloides*
Status:	Endangered
Reason for Designation:	Single small population, rare throughout its range, with plants appearing irregularly and none seen since 1989.
Occurrence:	Ontario
Status History:	Designated Endangered in April 1982. Status re-examined and confirmed in April 1998 and in May 2000. Last assessment based on an existing report.

(COSEWIC 2000)

1. BACKGROUND

1.1 Description

1.1.1 Description of the species

Small whorled pogonia (*Isotria medeoloides)* is a small orchid which stands between 9.5-25.0cm tall (Brownell 1982). Five to six leaves form a single whorl at the top of the stem (White 1998). These glaucous leaves are elliptic to elliptic-obovate and pale milky green in colour (U.S. Fish and Wildlife Service 1992).

The leaves may be overtopped by one or two flowers which are yellowish-green in colour. The sepals of the flower tend to be slightly longer than the petals (White 1998). When it is not in flower, the Small whorled pogonia can be mistaken for the more common Indian Cucumber-root (*Medeola virginiana)* (U.S. Fish and Wildlife Service 1992).

1.1.2 Populations and distribution

The Small whorled pogonia inhabits portions of eastern North America. In the United States, the species occurs from New England and Michigan south to Missouri and South Carolina. The only Canadian occurrence is in Elgin County in southwestern Ontario (White 1998) (Figure 1).

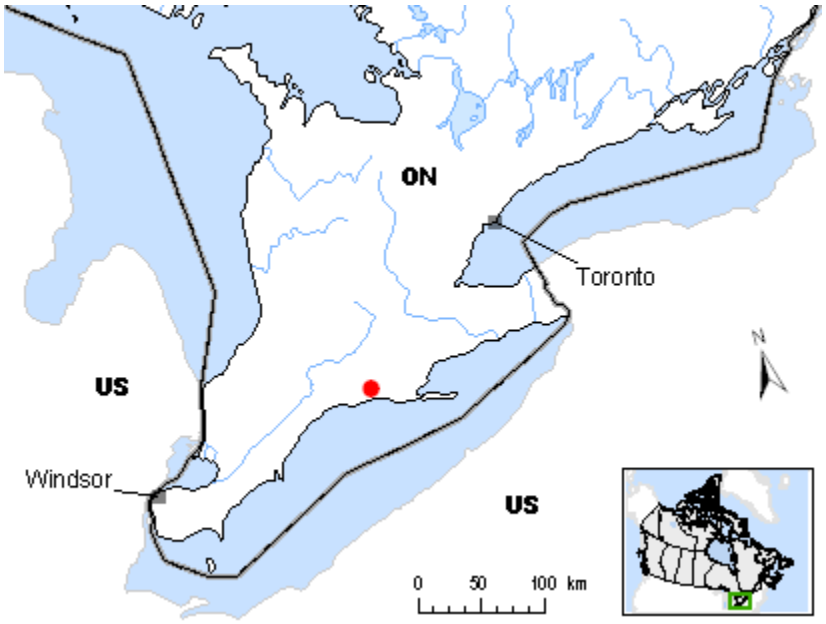

Figure 1. Canadian Distribution of Small whorled pogonia

The Small whorled pogonia's distribution has led to the species being referred to as an Atlantic Coastal Plain disjunct, resulting from past geological and climate events (Brownell 1982).

Currently, Small whorled pogonia is considered globally imperiled (G2). In the United States, it is listed as nationally imperiled (N2). The species is identified as critically imperiled (S1) in 13 states, imperiled (S2) in 4, historical (SH) in 4 and is considered extirpated (SX) from District of Columbia. In Canada, Small whorled pogonia is listed as nationally critically imperiled (N1). In Ontario, it is considered critically imperiled (S1) (NatureServe 2006) (Table 1).

Once considered Endangered in both Canada and the United States, Small whorled pogonia has been reclassified as Threatened in the United States due to an increase in the number of known populations from 34 in 1985 to 104 in 1993, with at least 25% of the plant's self sustaining populations protected through public ownership or private landowner management agreements (U.S. Fish and Wildlife Service 2006). It remains designated as Endangered within Canada. In Ontario, the species is designated as Endangered and is regulated under the Ontario *Endangered Species Act*.

In Canada, the species is found at only one location in southwestern Ontario, in the Calton Swamp of Elgin County (Environment Canada 2004). This property is owned by Catfish Creek Conservation Authority (CCCA). The species has been noted in four distinct areas within a few hundred metres of one another (White 1998).

The species was first discovered in 1977 by Mr. W.G. Stewart, who located a total of 4 plants (Brownell 1982). No thorough inventory has been undertaken to determine the extent of the occurrence, however, searches have located plants in 4 locations on CCCA property (White 1998). In 1989, a single vegetative plant was located at the site but was not reported again until

1998 (see Table 2). The last recorded sighting of the species was in 1998 when a single vegetative individual was noted by Mr. Glen Martin (Oldham, pers. comm. 2006). Since the orchid could stay in dormancy for up to twenty years (see section 1.2.1), it is unknown whether it has become extirpated or still exists in low numbers within Calton Swamp (White 1998). This represents less than 1% of its global distribution.

Table 1. Subnational ranks for the Small whorled pogonia (NatureServe 2006)

S-Rank	State
S1- Critically Imperiled	Connecticut, Delaware, Illinois, Massachusetts, Michigan, New Jersey, North Carolina, Ohio, Ontario, Pennsylvania, Rhode Island, South Carolina, Tennessee, West Virginia.
S2 – Imperiled	Georgia, Maine, New Hampshire, Virginia.
SH – Historical	Maryland, Missouri, New York, Vermont.
SX – Extirpated	District of Columbia.

Table 2. Last reported sightings of Small whorled pogonia (White 1998)

Station	Last observed (#)
Station 1	1981 (3)
Station 2	1980 (1) * Destroyed by bike trail
Station 3	1982 (2)
Station 4	1989 (1)

Note: The 1998 report did not specify the station location

1.2 Description of the species' needs

1.2.1 Ecological role, biological needs, and limiting factors

Populations of Small whorled pogonia typically consist of plants that may be in any of four life stages: dormant, vegetative, with abortive bud, or flowering (U.S. Fish and Wildlife Service 1992). Flowering plants tend to be taller and have larger whorls than those plants with abortive buds or which are vegetative (U.S. Fish and Wildlife Service 1992).

Small whorled pogonia generally flowers from mid-May to mid-June with flowers lasting from a few days to almost two weeks (U.S Fish and Wildlife Service 1992; U.S. Fish and Wildlife Service 2006). The plants are thought to be primarily self pollinated, as the flowers lack nectar guides and fragrance (U.S Fish and Wildlife Service 1992; U.S. Fish and Wildlife Service 2006). If pollination occurs, a seed capsule containing thousands of tiny seeds may be formed and it is estimated that approximately 83% of flowers form capsules (Brownell 1982). The species only occasionally reproduces vegetatively but this is not its primary reproductive strategy (U.S Fish and Wildlife Service 1992). Other aspects of the plant's life history are not fully understood including seed dispersal and seed germination.

Like other orchid species, Small whorled pogonia has an interdependence on mycorrhizal fungi. Such fungi have been noted in the tissues of mature individuals although no specific mycorrhizal fungi have been identified.(U.S Fish and Wildlife Service 1992).

Questions still remain around dormancy. Some studies suggest that the plant may undergo periods of dormancy lasting up to 20 years (U.S Fish and Wildlife Service 1985 in Difazio 2003). However, other studies have found that no plants emerged after 3 consecutive years of dormancy (Mehrhoff 1989). Research into this aspect of the plant's biology is necessary.

No specific information is available related to the ecological role of the Small whorled pogonia at the Calton Site. The fact that the plant has only been identified at one site in Canada would suggest that studies are required to determine if the plant is an ecological indicator of a rare habitat type or ecological pattern on the landscape (Difazio 2003).

Shading is a limiting factor for the species. One study, conducted in the United States, found that sites where colonies of Small whorled pogonia had become extirpated were more shaded by vegetation than were the extant sites (Mehrhoff 1989). In New Hampshire, canopy defoliation from Gypsy Moths, preceded the discovery of the orchid at several sites in the 1980s (Difazio 2003). In addition, the populations at Calton are located within a few metres of an old logging road that had resulted in reduced canopy cover and an associated decrease in shading (Difazio 2003). Alterations in the microclimate of the site, such as increase in temperature or a decrease in moisture due to natural processes, human disturbance, or climate change, may also limit the species ability to survive (Brownell 1982). Such changes may cause plants to become dormant or die out completely.

Small whorled pogonia is rare throughout North America. The possibility that the occurrence represents very few plants implies that the genetic diversity of the population may be very low, and this may limit its long term viability. The species susceptibility to site disturbance, low reproductive rates, wide population fluctuations, complex life history and extended periods of dormancy all contribute to limiting the plants survival throughout North American (Difazio 2003).

1.2.2 Habitat needs

Small whorled pogonia inhabits damp mixed woods with an acidic soil (White 1998). There is usually abundant leaf mould and limited shrub and herbaceous cover (Brownell, 1982). Various types of decaying vegetation are usually found in Small whorled pogonia habitat, including fallen trunks and limbs, leaf litter, bark, stumps, and roots of dead trees (U.S Fish and Wildlife Service 1992). The orchid prefers a habitat with flatter terrain and a canopy with small openings to provide light (Brownell 1982).

When openings in the tree canopy allow more light to reach the forest floor, Small whorled pogonia plants typically respond favourably, at least in the short term. One study reported exceptional vigour in plants adjacent to a recent clear cut, and smaller, less vigorous plants away from the clearing. (NatureServe 2006).

1.3 Threats

1.3.1 Trampling

Due to the plant's high profile as a very rare orchid, the site has been visited by many naturalists, orchid enthusiasts, and photographers. This puts the plant at considerable risk from inadvertent trampling (Difazio 2003).

1.3.2 Habitat degradation

A possible threat to the Canadian population of Small whorled pogonia is lack of suitable habitat in the heavily modified Carolinian Zone of southwestern Ontario. In the past, a trail used by dirt bikes and ATVs passed through the Calton Swamp site, with at least one subpopulation being destroyed by these activities (Difazio 2003). However, Catfish Creek Conservation Authority (CCCA) has implemented initiatives to close trails in the area and prohibit the operation of motorized vehicles on the property to eliminate further destruction of habitat and populations. (Difazio 2003).

Events causing dramatic increases in the amount of light reaching the forest floor might cause the herbaceous layer to flourish. This would result in more competition and increased shading which would in turn reduce the suitability of the habitat (U.S. Fish and Wildlife Service 1992).

1.3.3 Herbivory

Herbivory by deer is a known threat to Small whorled pogonia populations in the United States and may be a threat in Canada. In New England, herbivory by slugs is considered by some to be a serious threat to the orchid (U.S. Fish and Wildlife Service 1992). It has been suggested that "touching the plants may leave salts on the leaves that are, in turn, attractive to slugs" (U.S. Fish and Wildlife Service 1992), so there may be a compounding effect from visitors touching the orchids, resulting increased susceptibility to slugs. Slugs have not been identified as a known threat to the species in Canada, however it should be considered a potential threat to the Canadian population.

1.3.4 Collection

Although collection has not been recorded within the Canadian population, this activity is a potential threat. The release of locational information on Small whorled pogonia population increases the potential for collection. For example, "within days after a newspaper article was published revealing the location of a site in Connecticut, the plants had been dug up and removed" (U.S. Fish and Wildlife Service 1992).

1.3.5 Loss of genetic diversity

Reductions in population size can decrease the genetic viability of populations over time and this can, in turn, lead to lower individual fitness and population viability. The Canadian population of Small whorled pogonia may be vulnerable to genetic loss due to its small size. As well, pollen transfer and seed immigration from populations in the United States is very unlikely to occur due to the distance separating the populations.

1.4 Actions already completed or underway

In August of 1994, the Catfish Creek Conservation Authority (CCCA) completed an "Interim Operational Plan" for properties near Calton Swamp. The property containing the Small whorled pogonia has site specific policies in place to protect the plant and supporting habitat. Policies state that the property is not to be altered in any way without an Environmental Impact Assessment being conducted to ensure that no harmful impacts to the Pogonia sites will result.

In July of 2001, the CCCA completed the "Small Whorled Pogonia Biological Inventory Project". A report was prepared to summarize local biological information on the Small whorled pogonia population at Calton, including all known sightings and occurrence reports. The report also provided recommendations on future recovery efforts and management strategies.

1.5 Knowledge Gaps

The biological needs of the Canadian population are not well understood. Therefore, information on the topography, soil conditions, associated species, seed dispersal, and light conditions must be studied to fill in these information gaps.

It is believed that too much shading may be a limiting factor for the species, however it is unknown if this is a current limiting factor to the population in Ontario. It is also unknown if the species would benefit from forest management to maintain optimum light levels. Research into these aspects of the plant's biology should be undertaken to fill these gaps and guide site management.

As only one occurrence has been noted for this species in all of Canada, studies should be undertaken to determine if the species exists in similar habitat in the other parts of southwestern Ontario.

The issue of dormancy in Small whorled pogonia still remains a matter of debate among researchers. Early research suggested that dormancy could extend from 10-20 years while other studies suggested dormancy periods of up to 4 years (U.S. Fish and Wildlife Service 1992). Dormancy for this species should be studied as it has direct impact on the recovery of this species.

Small whorled pogonia, like other orchid species, has a relationship with mycorrhizal fungi. Mycorrhizal fungi have been seen in the tissue of mature individuals; however no specific mycorrhizal fungus has been identified. This aspect of the species biology should be investigated. Such information may aid in the reintroduction of the species if it is deemed necessary in the future.

2. RECOVERY

2.1 Recovery Feasibility

The recovery of Small whorled pogonia is deemed technically and biologically feasible for the following reasons:

1. There are individuals within the North American range which are currently available to improve population growth rate and population abundance. However, it is currently unknown if these individuals are genetically suitable donor populations.
2. There is currently habitat available to support the species in its original occurrence area.
3. Significant threats to the species are likely to be avoided or mitigated through recovery actions and site management plans.
4. There are some recovery techniques which would be effective in ensuring the habitat remains suitable for this species. However, it is unknown whether the necessary techniques to reintroduce the species would be effective for this species, if the species was found to be extirpated.

2.2 Recovery Goal, objectives and corresponding approaches

2.2.1 Recovery Goal

The long-term goal (2006-2026) of this recovery strategy is to maintain the persistence and viability of Canada's only population.

2.2.2 Recovery Objectives

The short-term recovery objectives for this population are to:

1. Survey and, if extant, monitor individual plants within the area of the four recorded historical subpopulations.
2. Determine population dynamics and habitat characteristics of the Calton Swamp Colony.
3. Develop strategies for the protection of the population and supporting habitat.
4. Investigate techniques and feasibility of augmenting the extant population or restoring the species to historic locations if it is deemed to be extirpated.

5. Initiate research to address knowledge gaps related to the species' biology and ecology.

2.2.3 Broad Strategy to be taken to address threats

The strategies detailed in this section have been grouped into four categories:

1. Population/Habitat Assessment
2. Population/Habitat Protection
3. Education/Stewardship and Regulatory Control
4. Research

Table 3: Strategies to effect recovery of Small whorled pogonia in Canada. 'Obj. No.' refers to recovery objective as defined in section 2.2.2.

Priority	Obj. No.	Broad Approach/ Strategy	Threat Addressed	General Steps	Outcomes
Urgent	1	Population Assessment	All	Conduct plant surveys and studies to estimate the population (presence/absence) and its trend. This includes surveys to relocate the population.	Updated information and assessments of existing population status and range
Urgent	1	Population/Habitat Mapping	Habitat degradation	Utilize new technologies (GPS and Electronic Mapping) to delineate/map extent of populations and their critical habitat.	Permanent Spatial Data/Maps to assist long-term monitoring efforts. Mapping of critical habitat
Urgent	2	Habitat Assessment	Habitat degradation	Determine population dynamics and requirements through detailed studies.	Improved understanding of critical habitat and population status.
Necessary	3	Habitat Restoration	Habitat degradation	Identify and develop strategies to increase habitat in the areas surrounding the known population.	Improve/increase habitat
Necessary	all	Community Education	Habitat degradation, trampling, collection	Utilize workshops, printed materials and site visits with adjacent landowners to educate and demonstrate appropriate land stewardship	Obtain support from the community and allow detailed surveys of potential habitat.
Necessary	4,5	Communication/ cooperation	all	Initiate communication with the U.S. Small whorled pogonia recovery team and determine how best to coordinate recovery and research efforts.	Coordinated recovery across the species' range.
Beneficial	all	Habitat protection	Habitat degradation	Protection of known and/or potential habitat using appropriate techniques such as: conservation easements, convenants, etc.	Long-term protection of critical habitat.

Priority	Obj. No.	Broad Approach/ Strategy	Threat Addressed	General Steps	Outcomes
Beneficial	4	Research	Loss of genetic diversity	Investigate techniques and feasibility of augmenting current population, or reintroducing the species if it is extirpated.	Increased likelihood of population survival.
Beneficial	5	Research	All	Conduct scientific research on knowledge gaps, eg: fungal relationship, population genetic research.	Fill knowledge gaps related to the species' biology and ecology.
Beneficial	3,4	Research	Habitat degradation	Conduct scientific research on the light requirements of the Ontario population and what forest management techniques would optimize growth.	Fill knowledge gaps, provide information for the successful management of the species.

2.3 Critical Habitat

2.3.1 Identification of the critical habitat of Small whorled pogonia

Identification of critical habitat will be deferred to the Action Plan stage, pending the completion of intensive site inventories. It is questionable whether any individuals currently survive in Canada. If they are extant within Ontario, the extent of the populations must be determined prior to the identification of critical habitat. Inventories should focus on the three sites where Small whorled pogonia was last known to occur and, more specifically, on those areas with similar habitat characteristics as described in Section 1.4.1.

Small whorled pogonia habitat includes the vegetation community in Calton Swamp in "partial shade at the open edge of deciduous second growth, adjacent to a stand of mature hemlocks. Other species in the area include Yellow Birch, Sugar Maple, Red Ash, Large-toothed Aspen, American Chestnut, Red Oak and Black Cherry" (Brownell 1982). The vegetation community should be described and mapped to the level of Ecosite Type following the Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998).

A schedule of studies will allow for identification of critical habitat and assessment of feasibility for reintroduction of the species. It is recommended that monitoring, evaluation, and updating of the critical habitat boundaries be conducted as necessary and as additional information becomes available.

2.3.2 Existing and recommended approaches to habitat protection

The Small whorled pogonia is currently listed as Endangered-Regulated within Ontario and is protected under the Ontario *Endangered Species Act* from willful harm and destruction of the species individuals or its habitat. It also receives protection under Section 2.0 of the Provincial Policy Statement, under Ontario's *Planning Act*, which protects 'significant habitat' of endangered and threatened species from 'development and site alteration'.

All known critical habitat for Small whorled pogonia in Canada is under the ownership of the Catfish Creek Conservation Authority and is considered to be protected from development pressures. No land acquisition or policy approaches are required unless new sites are discovered. Protecting habitat at this site is related only to managing threats if required. Other approaches may be necessary if new populations are discovered.

2.3.3 Schedule of studies

To further refine the critical habitat definition, the following studies should be completed**:**

Description of Activity	Expected Results	Estimated time to completion
Conduct field surveys to determine if the population is still extant, if so, determine the extent of the current population. These surveys may take a number of years to ensure that the population is extant.	Verification of population existence.	5 years (2011)
Conduct ELC mapping for extant site; map critical habitat	Definition of existing and potential habitat.	1 year after population relocated
Evaluate suitability of habitat in the Calton Swamp area for potential reintroduction.	Identification of potential sites for augmenting the population.	5 years (2011)

2.4 Effects on other species

Negative impacts on other native species are not anticipated as a result of the completion of these recovery activities. Generally speaking the protection and enhancement of habitat from further degradation will benefit all species at affected sites. Any research and monitoring activities should be structured in such a way that neither the site nor the activities themselves result in any modifications or damage to the site or its resident biota. The effects of the proposed recovery activities should be monitored to ensure that they are resulting in tangible positive benefits.

2.5 Performance Measures

Recovery can be considered successful if the following have been met:

- Objective 1 - Survey/monitoring data has determined whether the species is extant or extirpated from Ontario.
- Objective 2 - Population dynamics and habitat characteristics of any extant populations have been studied.
- Objective 3 - Protection of Small whorled pogonia has been incorporated into any new management plans or other relevant documents for Catfish Creek Conservation Authority.

Critical habitat has been mapped.
Any research results have been used to improve management activities.

- Objective 4 - Reintroduction techniques have been investigated and their feasibility for use in Canada has been determined.
- Objective 5 - Studies on biological and ecological needs of Small whorled pogonia initiated.

2.6 Statement of when One or More Action Plans in Relation to the Recovery Strategy will be Completed

An action plan will be completed for the Small whorled pogonia by 2011.

3.0 REFERENCES

Brownell, V.R. 1982. Status report on the Small whorled pogonia, *Isotria medeoloides,* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

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Difazio, T. 2003. Draft Small whorled pogonia (*Isotria medeoloides)* Recovery Strategy. Catfish Creek Conservation Authority (unpublished).

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Mehrhoff, L.A. 1989. The dynamics of declining populations of an endangered orchid, *Isotria medeoloides.* Ecology, 70:783-786.

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White, D.J. 1998. Update COSEWIC status report on the Small whorled pogonia, *Isotria medeoloides,* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

Personal Communications

Oldham, M. personal communication via email. Feb. 13, 2006.

4.0 CONTACTS

4.1 Responsible Jurisdictions

Ontario Ministry of Natural Resources
Canadian Wildlife Service

4.2 Technical Advisory Team Members

Tony Difazio (Chair)
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Jane Bowles
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ADDENDA

Jurisdiction responses

Ontario

Acknowledgement of Receipt of the
Recovery Strategy for the Small whorled pogonia (May 2006)
by the Ontario Ministry of Natural Resources
on behalf of the Province of Ontario

This Recovery Strategy for the Small whorled pogonia has been prepared in cooperation with Canadian Wildlife Service (CWS) and the Ontario Ministry of Natural Resources (OMNR). It represents advice to the responsible jurisdictions on the recovery goals, approaches and objectives that are recommended to protect and recover the species. It does not necessarily represent the views of the official positions of the organizations with which the individual committee members are associated. The goals, objectives and recovery approaches identified in the strategy are based on the best existing knowledge and are subject to modifications resulting from new findings and revised objectives. Implementation of the plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

Received by: Cameron Mack
Director, Fish and Wildlife Branch
Natural Resource Management Division
Ontario Ministry of Natural Resources
On behalf of the Province of Ontario

Date: September 2006

Species at risk – act today so they have tomorrow

DECLARATION FROM ENVIRONMENT CANADA

This recovery strategy has been prepared in cooperation with the jurisdictions responsible for the small whorled pogonia. Environment Canada has reviewed and accepts this document as its recovery strategy for the small whorled pogonia, as required under the *Species at Risk Act*. This recovery strategy also constitutes advice to other jurisdictions and organizations that may be involved in recovering the species.

The goals, objectives and recovery approaches identified in the strategy are based on the best existing knowledge and are subject to modifications resulting from new findings and revised objectives.

This recovery strategy will be the basis for one or more action plans that will provide details on specific recovery measures to be taken to support conservation and recovery of the species. The Minister of the Environment will report on progress within five years.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy and will not be achieved by Environment Canada or any other jurisdiction alone. In the spirit of the Accord for the Protection of Species at Risk, the Minister of the Environment invites all responsible jurisdictions and Canadians to join Environment Canada in supporting and implementing this strategy for the benefit of the small whorled pogonia and Canadian society as a whole.

STRATEGIC ENVIRONMENTAL ASSESSMENT

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals.* The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts on non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below.

This recovery strategy will clearly benefit the environment by promoting the recovery of the small whorled pogonia. The potential for the strategy to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this strategy will clearly benefit the environment and will not entail any significant adverse effects. The reader should refer to the following sections of the document in particular: Description of the species' needs – ecological role, biological needs, and limiting factors; Effects on other species; and Broad Strategy to be taken to address threats.

RESIDENCE

SARA defines residence as: *a dwelling-place, such as a den, nest or other similar area or place, that is occupied or habitually occupied by one or more individuals during all or part of their life cycles, including breeding, rearing, staging, wintering, feeding or hibernating* **[Subsection 2(1)]**.

Residence descriptions, or the rationale for why the residence concept does not apply to a given species, are posted on the SARA public registry: www.sararegistry.gc.ca/plans/residence_e.cfm