

**Ontario Species at Risk Evaluation Report for Spotted
Wintergreen (*Chimaphila maculata*)**

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

Assessed by COSSARO as Threatened

November 2017

Final

Chimaphile maculée (*Chimaphila maculata*)

La chimaphile maculée est une plante vivace à croissance rapide et à feuillage persistant de la famille des Éricacées (*Ericaceae*). Ses feuilles dentées possèdent une bande blanche distinctive le long de la nervure centrale. De petites fleurs blanches ou rosâtres poussent au bout de sa tige à la fin de juillet et en août.

La chimaphile maculée est présente dans l'Est de l'Amérique du Nord, au Mexique et en Amérique centrale. Les 13 sous-populations indigènes enregistrées au Canada se trouvent toutes en Ontario. On les retrouve principalement dans le Sud-Ouest de la province, bien qu'elles aient aussi été repérées dans la région centrale (Wasaga Beach et district de Muskoka).

Dans toute son aire de répartition, la chimaphile maculée est une plante de sous-bois principalement associée aux forêts de chênes et de pins et aux terrains boisés offrant une terre bien égouttée. Les plantes peuvent former des parcelles par clonage ou se reproduire sexuellement par la dissémination de petites graines transportées par le vent. Cette espèce dépend des associations mycorhiziennes dans le sol pour croître et se développer.

Sur les 13 sous-populations canadiennes, six sont existantes, cinq sont disparues et deux sont considérés comme historiques. On compte environ 3 600 tiges au total, même si on ne connaît pas le nombre d'individus génétiques. Les parcelles des sous-populations de St. Williams et de Turkey Point sont stables ou en hausse, grâce au travail de recherche et de gestion de l'habitat. Parmi les sous-populations existantes, trois ont été découvertes ces dix dernières années, sans doute grâce à l'intensification des activités de recherche et de signalement.

La principale menace qui pèse sur la chimaphile maculée est probablement l'usage récréatif de son habitat. Les terres privées font l'objet de pressions en matière d'aménagement. Parmi les autres menaces possibles, mentionnons la suppression des incendies et la dégradation des habitats.

En Ontario, la chimaphile maculée est une espèce menacée en raison de sa petite aire de répartition, qui ne cesse d'ailleurs de reculer.

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Executive summary

Spotted Wintergreen is a low-growing, evergreen perennial in the Heath (Ericaceae) family. Its toothed leaves have a distinctive white stripe along the mid-rib. Small white or pinkish flowers appear on a flowering stalk in late July and August.

Spotted Wintergreen occurs across eastern North America and ranges into Mexico and Central America. All 13 documented native Canadian subpopulations are found in Ontario. These are mainly found in southwestern Ontario, although outlying occurrences have been found in central Ontario (Wasaga Beach and Muskoka district).

Throughout its range, Spotted Wintergreen is a woodland understory species, associated mainly with oak and oak-pine forests and woodlands on well-drained soils. Plants may form clonal patches, or can reproduce sexually via tiny seeds that are spread on the wind. This species is dependent on soil mycorrhizal associations for its growth and development.

Six subpopulations in Canada are extant, five are extirpated, and two are considered historical. The total population is about 3600 stems, although the number of genetic individuals is unknown. Patches in the St. Williams and Turkey Point subpopulations are stable to increasing due to habitat management and search effort. Three of the extant subpopulations have been discovered in the last decade, probably due to increased search effort and reporting.

The main threat to Spotted Wintergreen is probably recreational use in its habitat. Privately owned sites may be subject to development pressure. Other possible threats include fire suppression and habitat degradation.

Spotted Wintergreen is classified as Threatened in Ontario due to its small and declining range in the province.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Yes. Spotted Wintergreen (*Chimaphila maculata* (L.) Pursh) is a recognized native North American species in the Heath (Ericaceae) family (Kartesz 1999).

1.1.2. Designatable units

No. All Ontario plants are considered to be a single designatable unit. There is no morphological or genetic evidence to suggest otherwise.

1.1.3. Native status

Yes. *Chimaphila maculata* is recognized as a native component of the Ontario flora by VASCAN (Brouillet et al. 2010) and the NHIC (NHIC 2017).

1.1.4. Occurrence

Yes. Spotted Wintergreen is extant in six subpopulations in Ontario, and was previously documented at seven others (COSEWIC 2017).

1.2. Eligibility results

Spotted Wintergreen (*Chimaphila maculata*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe 2017)
- NRANK Canada: N2
- COSEWIC: Threatened (April 2017)
- SARA: Endangered (Schedule 1)
- ESA 2007: Endangered (June 2008)
- SRANK: S2

2.2. Distribution in Ontario

There are 13 documented subpopulations in Ontario. Six of these are extant (figure 1), two are “historical” and five are extirpated.

The current stronghold of Spotted Wintergreen in Ontario is on the sandy soils of Norfolk County, in the St. Williams – Turkey Point area. An increased level of survey

effort and restoration in both of these areas has probably contributed to an apparent increase in the number of stems observed. Together, these two subpopulations contain over 80% of the number of stems in the province (which is taken as a surrogate for abundance). The nearby Fishers Glen subpopulation (EO) also contains two separate patches, one of which was rediscovered in 2011.

Three other very small subpopulations occur in Niagara Region, Ojibway Park (City of Windsor), and near the tip of Long Point, Ontario (discovered in 2017 and not included in COSEWIC 2017). All have been discovered within the last decade. There are four extirpated subpopulations from settled areas of southwestern Ontario; these are over 50 years old with vague locality details.

COSEWIC considers that there are 7-9 “locations” for Spotted Wintergreen based on the primary threat of fire. Although there are only six extant subpopulations (=EOs), three of these (St. Williams Forest, Turkey Point, Fishers Glen) were recently consolidated from multiple EOs, and consist of several sites (5 to 11 separate sites ranging up to 2-3 km apart, see Table 1 in COSEWIC 2017). For this reason, COSEWIC considers these larger subpopulations to be more than one “location” because they would not be entirely lost due to a single threat. Hence, the number of locations has been identified as a range (7-9). This range has not been changed for this report despite the recent observation of a small patch at Long Point National Wildlife Area.

Spotted Wintergreen formerly ranged into central Ontario, with specimens collected from Wasaga Beach and in the Muskoka District. It may still be rediscovered in suitable habitat there.

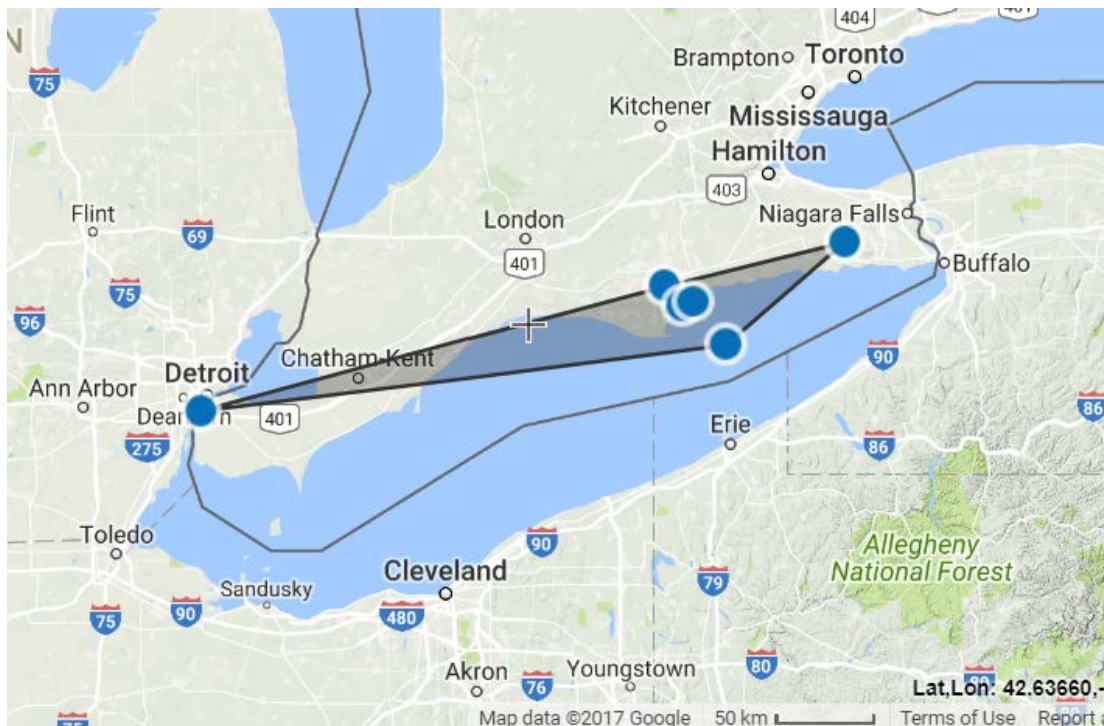


Figure 1. Extant Spotted Wintergreen subpopulations in Ontario. Created for this report

using [GeoCAT](#). For additional information on extirpated and historical subpopulations please see COSEWIC (2017).

2.3. Distribution and status outside Ontario

Spotted Wintergreen occurs across much of the eastern United States, and is a common and stable species in the core of its range. It is considered rare in some states at the periphery of its range (e.g. Maine, Vermont, Illinois). No declines have been reported, and some northern populations may be increasing (COSEWIC 2017).

The species also has a disjunct range from Arizona and New Mexico, south into Mexico. A few plants were reported from a site in Quebec, but these are thought to have been planted.

2.4. Ontario conservation responsibility

The percentage of the global range and population of Spotted Wintergreen that occur in Ontario is not known, but is probably less than 1%.

2.5. Direct threats

Based on results from a COSEWIC threats analysis, the main threat to Spotted Wintergreen is thought to be recreational activities. The largest populations (St. Williams' Forest, Turkey Point) are on public land with multi-use trails, and damage from ATVs has been observed in the past. Two sites are probably privately owned and may be developed or otherwise destroyed.

Other threats are somewhat speculative. Species such as White-tailed Deer and Wild Turkey, which are native but in artificially high populations in this area, may browse on Spotted Wintergreen or uproot plants or their rootstocks. There are some observations thought to be related to these species.

The effects of fire suppression are unknown: fire itself may damage plants which are probably not tolerant of fire, but may also open the habitat and allow light penetration, thus benefitting plants. Similarly, the effects of forestry are not well understood. Invasive species do not appear to present a major threat in the very dry habitat favored by Spotted Wintergreen.

2.6. Specialized life history or habitat use characteristics

Like some other plants such as orchids, Spotted Wintergreen requires the presence of fungal mycorrhizal symbionts for the growth and development of its tiny seeds. Its dependence on other organisms may render it more sensitive to disturbances such as logging, nitrogen deposition, fire, or earthworm invasion, all of which may change habitat suitability for its mycorrhizal symbionts. This fungal association also makes Spotted Wintergreen difficult to propagate from seed (COSEWIC 2017).

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

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

Does not apply. There is no clear decline in the number of mature individuals in Ontario. In part, this is because there is little information on historical abundance. While several subpopulations are extirpated, at least four have been discovered in the last decade, and populations in the St. Williams – Turkey Point areas are stable to increasing.

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

Threatened. The EOO (5152 km²) meets the threshold for Threatened under B1, and nearly meets the Endangered threshold. The IAO (24 km²) meets the Endangered threshold under B2. The number of locations (7-9) meets the threshold for Threatened, satisfying subcriterion (a). Declines have been observed in EOO, IAO and the number of subpopulations because six subpopulations are thought to be extirpated or historical. Continued loss is possible because of threats including recreational use, development and fire. This satisfies subcriterion (b). This species does not undergo fluctuations, so subcriterion (c) does not apply. Therefore, the highest threat category met by either B1 or B2, and two of (a), (b) or (c) is Threatened.

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

Does not apply. The number of “mature stems” is estimated at 3600, meeting the threshold for Threatened under Criterion C. However, listing under Criterion C also requires evidence of decline to satisfy subcriteria C1 or C2. As the available evidence does not show decline, Criterion C does not apply.

3.1.4. Criterion D – Very small or restricted total population

Does not apply. Using the number of mature stems as a proxy for mature individuals, Spotted Wintergreen does not meet the threshold for D1. The IAO and number of locations exceed thresholds for criterion D2.

3.1.5. Criterion E – Quantitative analysis

Insufficient information. No quantitative analysis is available.

3.2. Application of Special Concern in Ontario

Does not apply. Criteria met under Threatened.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Because of Spotted Wintergreen's secure status throughout a broad range of North America, Ontario's Conservation Responsibility for this species is very low. Less than 1% of the global population and range exists in Ontario.

3.3.2. Rescue effect

The likelihood that Spotted Wintergreen populations would be rescued by those in adjacent US states is possible, but low. Some bordering populations are secure (e.g. Michigan, New York, Ohio) and the small seeds can be transported by wind. Plants that arrive would be likely be adapted to survive in southern Ontario. It is even possible that any of the four recently discovered subpopulations is a recent arrival from another location. However, this species requires a mycorrhizal association to germinate and grow, and the availability of this is not known.

3.4. Other status categories

3.4.1. Data deficient

Not applicable.

3.4.2. Extinct or extirpated

Not applicable.

3.4.3. Not at risk

Not applicable.

4. Summary of Ontario status

Spotted Wintergreen (*Chimaphila maculata*) is classified as Threatened under criterion B1ab(i,iv)+B2ab(i,iv). This is a downlisting from the previous designation of Endangered, made in 2007. This change reflects a change in the criteria used by COSSARO, and a revised estimate of population size. The apparent population increase is due to increased survey effort, rather than an actual increase in the number of mature individuals. As such, this is a "non-genuine*" change in status. Ongoing restoration efforts associated with the larger subpopulations may have led to actual population increases (i.e., a "genuine" improvement), but there is no data to confirm this at this time.

5. Information sources

Brouillet, L., F. Coursol, S.J. Meades, M. Favreau, M. Anions, P. Bélisle & P. Desmet. 2010+. [VASCAN, the Database of Vascular Plants of Canada](#). [website accessed on October 24, 2017].

COSEWIC. 2017. [COSEWIC assessment and status report on the Spotted Wintergreen *Chimaphila maculata* in Canada](#). Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 39 pp. ([Species at Risk Public Registry website](#)).

Kartesz, J.T. 1999. A synonymized checklist and atlas with biological attributes for the vascular flora of the United States, Canada, and Greenland. First edition. In: Kartesz, J.T., and C.A. Meacham. Synthesis of the North American Flora, Version 1.0. North Carolina Botanical Garden, Chapel Hill, N.C.

Natural Heritage Information Centre. 2017. Element Occurrence Database.

NatureServe. 2017. NatureServe Explorer: An online encyclopedia of life [web application]. [Chimaphila maculata](#). NatureServe. [website accessed March 20, 2018].

*A change in the classification of a species during reassessment by COSSARO may be for genuine or non-genuine reasons. Genuine reasons may include a reduction in threats to a species such that status of the species has improved, or the continuation of threats to the species such that the status of the species has further deteriorated. Non-genuine reasons may include new information on population size or threats that was not available during a previous assessment, the use of previous COSSARO criteria that may have yielded a different result or, taxonomic revisions that result in changes in range, population sizes or designatable units.

Appendix 1: Technical summary for Ontario

Species: Spotted Wintergreen (*Chimaphila maculata*)

Demographic information

Demographic attribute	Value
Generation time.	Unknown, but at least 10 years and possibly much longer
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	No
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Population probably stable to increasing. Note that the decline in IAO is due to the loss of small subpopulations, which have a negligible impact on the total population size.
Observed, estimated, inferred, or suspected percent increase in total number of mature individuals over the last 10 years or 3 generations.	Population probably stable to increasing
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Unknown
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	Not applicable
Are there extreme fluctuations in number of mature individuals?	No

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO) – current. Calculated using GeoCAT and including 2017 (Long Point) subpopulation.	5151 km ²
Index of area of occupancy (IAO) - current Calculated using GeoCAT	24 km ²

Extent and occupancy attributes	Value
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy in habitat patches that are: (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	a. Unknown b. Unknown
Number of locations. See discussion on locations in COSEWIC (2017).	7-9
Number of NHIC Element Occurrences	13 (1 discovered 2017)
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	No
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Yes, 22% decline observed since 2000 (but not including 2017 occurrence). Note that the total population size is dominated by a few large subpopulations, while the decline in IAO is due to the loss of a number of very small subpopulations. Thus IAO has declined while the total population remains stable.
Is there an observed, inferred, or projected continuing decline in number of populations?	No
Is there an observed, inferred, or projected continuing decline in number of locations?	No
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Unknown
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 sub-population or total population (if known)

Sub-population (or total population)	Number of mature individuals (stems)
St. Williams Forest	2065 stems
Turkey Point area	928 stems

Fishers Glen area	579 stems
Perry Road, Wainfleet area	5 stems
Ojibway Park, Windsor	10 stems
Long Point (discovered summer 2017)	6 stems

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

Recreational activities and habitat degradation present the most likely threats to Canadian subpopulations. Fire may damage local populations since this species is not fire-tolerant. Other minor threats include the possibility of development on private lands, as well as fire suppression. Invasive species are present at low levels within habitat, but their impact is unknown.

Rescue effect

Rescue effect attribute	Value
Status of outside population(s) most likely to provide immigrants to Ontario	Stable and possibly increasing in northern American states
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible, but unlikely
Would immigrants be adapted to survive in Ontario?	Probably
Is there sufficient suitable habitat for immigrants in Ontario?	Probably
Are conditions deteriorating in Ontario?	Overall no, but conditions at two sites are probably declining
Is the species of conservation concern in bordering jurisdictions?	Listed as Exploitably Vulnerable in New York, reflecting that it is currently relatively abundant, but may become threatened if collection pressure is not limited; present but not considered of conservation concern in Ohio, Pennsylvania and Michigan.
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	Not likely, but possible.

Sensitive species

No.

Appendix 2: Adjoining jurisdiction status rank and decline Information regarding rank and decline for Spotted Wintergreen (*Chimaphila maculata*)

Jurisdiction	Subnational rank	Population trend	Sources
Ontario	S1	Stable to increasing	COSEWIC 2017
Quebec	SX	Considered a non-native introduction	COSEWIC 2017
Manitoba	Not present	Not applicable	Not applicable
Michigan	SNR	Unknown	NatureServe 2017
Minnesota	Not present	Not applicable	Not applicable
Nunavut	Not present	Not applicable	Not applicable
New York	S4	Unknown, not tracked	S. Young, pers. comm. 2016
Ohio	SNR	Unknown	NatureServe 2017
Pennsylvania	SNR	Unknown	NatureServe 2017
Wisconsin	Not present	Not applicable	Not applicable

Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

COSSARO: Committee on the Status of Species at Risk in Ontario

ESA: Endangered Species Act

EO: element occurrence (as defined by NHIC)

EOO: extent of occurrence

GRANK: global conservation status assessments

IAO: index of area of occupancy

MNRF: Ministry of Natural Resources and Forestry

NHIC: Natural Heritage Information Centre

NNR: Unranked

NRANK: National conservation status assessment

SARA: Species at Risk Act

SNR: unranked

SRANK: subnational conservation status assessment

S1: Critically imperiled

S3: Vulnerable

S5: Secure

IUCN: International Union for Conservation of Nature and Natural Resources

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