

**COSSARO Candidate Species at Risk Evaluation**

**for**

**Large Whorled Pogonia (*Isotria verticillata*)**

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

Assessed by COSSARO as ENDANGERED

December 2011

**Final**

**L'Isotrie verticillée** (*Isotria verticillata*) est une orchidée de taille moyenne dont la fleur porte des pétales de couleur jaune verdâtre, une lèvre blanche et pourpre-violet, et trois sépales violet foncé. Aux États-Unis, l'isotrie verticillée est présente depuis la Nouvelle-Angleterre et le Michigan vers le sud jusqu'au Texas et à la Géorgie. Dans le sud-est de l'Ontario, cette plante croît dans les sols acides des forêts de feuillus et des forêts mixtes de la zone carolinienne. Cette orchidée a été observée dans quatre sites des comtés de Middlesex, Oxford et Norfolk; dans un de ces sites, elle n'a pas été observée depuis 1879; elle n'a pas été observée depuis 1990 dans deux autres et a été vue pour la dernière fois en 1996 au quatrième site. L'isotrie verticillée est connue pour sa tendance à entrer en phase de dormance pendant de longues années, durant lesquelles aucune partie de la plante n'apparaît au-dessus du sol. Il est donc possible que la plante soit toujours présente dans d'anciens sites même si elle n'y a pas été vue depuis de nombreuses années. Les menaces en Ontario comprennent la perte et la dégradation de l'habitat; la dissémination des espèces envahissantes, comme les vers de terre exotiques et l'alliaire officinale; l'inondation par les castors; et l'exploitation forestière. En raison du petit nombre de sites et de la très faible population observée au cours des dernières années l'isotrie verticillée est classée parmi les espèces en voie de disparition en Ontario.

*Cette publication hautement spécialisée, COSSARO Evaluation for Large Whorled Pogonia n'est disponible qu'en anglais en vertu du Règlement 671/92 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez contacter le secrétariat de COSSARO par courrier électronique à l'adresse [COSSAROsecretariat@ontario.ca](mailto:COSSAROsecretariat@ontario.ca).*

## **PART 1 Current status and distribution**

### **Current designations:**

GRank – G5 (Assessed 9 April 1984) (NatureServe, accessed Dec. 2011)

NRank Canada – N1 (NatureServe, accessed Dec. 2011)

COSEWIC – Endangered (COSEWIC, Nov. 2011)

SARA – Endangered - Schedule 1 (Environment Canada, 2011)

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

SRANK – S1 (NHIC, 2011)

### **Distribution in Ontario:**

Large Whorled Pogonia is restricted to southwestern Ontario (Middlesex, Oxford, and Norfolk Counties) which is at the northern limit of the species' range (Jones et al., 2011).

### **Distribution and status outside Ontario:**

Large Whorled Pogonia is endemic to Northeastern North America. It occurs from Michigan and New England south to Texas and Georgia (Jones et al., 2011).

## PART 2 Eligibility for Ontario status assessment

### 2.1 Application of eligibility criteria

#### Taxonomic Distinctness

**Yes.** Large Whorled Pogonia is considered a valid species in all recent taxonomic works.

#### Designatable Units

No subspecies or varieties have been described for Large Whorled Pogonia. The species is known in Ontario only from a small area in the southwest with no range disjunctions. No genetic information is available on the Ontario populations.

#### Native Status

**Yes.** Large Whorled Pogonia has always been considered to be a native plant in mixed and deciduous woods in southwestern Ontario. It was first reported in the province at Komoka in 1879. It is not known to be in cultivation.

#### Presence/Absence

**Present.** Large Whorled Pogonia has not been seen in the province since 1996. However, it, like many orchids, may remain dormant for a number of years if conditions are unsuitable. The closely related *Isotria medeoloides* can remain dormant for up to 20 years. Even when not dormant, Large Whorled Pogonia is relatively small and easily overlooked if not in flower. Extensive, annual searches have not been carried out in all areas of suitable habitat within its Ontario range. It would be premature to consider it extirpated within the province (Jones et al., 2011).

### 2.2 Eligibility results

1. The putative taxon or DU is valid. **Yes**
2. The taxon or DU is native to Ontario. **Yes**
3. The taxon or DU is present in Ontario, extirpated from Ontario or extinct? **Present**

## PART 3 Ontario status based on COSSARO evaluation criteria

### 3.1 Application of primary criteria (rarity and declines)

#### 1. Global Rank

**Not in any category.** Large Whorled Pogonia is ranked as G5 (NatureServe, 2011).

#### 2. Global Decline

**Not in any category.** There is no evidence of a major global decline (NatureServe, 2011; Jones et al., 2011).

#### 3. Northeastern North America Ranks

**Special concern.** The species is ranked in 16 of 20 jurisdictions (80%). Large Whorled Pogonia is highly ranked (S1, S2, SH, or SX) in 7 of 16 jurisdictions (44%) (NatureServe, 2011).

#### 4. Northeastern North America Decline

**Not in any category.** The Northeastern North American range of the species is largely the same as its global range (Jones et al., 2011).

#### 5. Ontario Occurrences

**Endangered.** There are three Element Occurrences that are possibly extant, though no plants have been seen at any of these sites since 1996. A fourth record dates from 1879 from Komoka, but it has not been seen there since (Jones et al., 2011).

The site at Skunk's Misery was first found in 1984 when there were four plants, but only a single plant was seen in 1996. Despite some searches since then, no plants have been found (Jones et al., 2011; White, 1998).

The Backus Woods site was found in 1965 and had 30 plants. The colony has declined since then and the orchid was last seen there in 1990 when two plants were found.

Despite numerous searches since then, the species has not been seen at that location again (Jones et al., 2011).

The Fowler's Pond site was first discovered in 1985 and had 44 plants. Beavers flooded the site around 1990 and the species has not been seen there since, despite numerous searches (Jones et al., 2011).

#### 6. Ontario Decline

**Endangered.** The site at Skunk's Misery had four plants in 1984, a high of nine plants in 1987, but only a single plant was seen in 1996. The species has not been seen at that location since (Jones et al., 2011; White, 1998).

The Backus Woods site had 30 plants in 1965 and a high of 43 plants in 1966. The colony has declined since then and the orchid was last seen there in 1990 when two plants were found. Despite numerous searches since then, the species has not been seen at that location since (Jones et al., 2011).

The Fowler's Pond site was first discovered in 1985 with 30 plants and had a high of 106 plants in 1987. Beavers flooded the site in the early 1990's and the species has not been seen there since despite numerous searches (Jones et al., 2011).

## **7. Ontario's Conservation Responsibility**

**Not in any category.** Ontario makes up <1% of the species global range (Jones et al., 2011).

## **3.2 Application of secondary criteria (threats and vulnerability)**

### **8. Population Sustainability**

**Endangered.** There is definite evidence of reproductive or recruitment failure in Ontario because the species has gone from a known population of over 100 plants in 1987 to none found in 1997. No Population Viability Analyses have been conducted for the species.

### **9. Lack of Regulatory Protection for Exploited Wild Populations**

**Not in any category.** Protective legislation in Ontario includes the *Endangered Species Act, 2007* (MNR, 2011). The species is not known to be exploited in the province, however, orchids in general are sometimes the targets of would-be gardeners.

### **10. Direct Threats**

**Endangered.** All three of the possibly-extant sites have been affected by one or more of the following threats: habitat loss and degradation; the spread of invasive species, such as exotic earthworms and Garlic Mustard (*Alliaria petiolata*); trampling and soil compaction by hikers and photographers; beaver-flooding; and logging (COSEWIC, 2011a; Jones et al., 2011). Exotic earthworms reduce leaf litter and humus layers as well as fungal diversity (Jones et al., 2011) and exotic earthworms have been recorded at the Skunks Misery site (R. Brooks, pers. obs.).

### **11. Specialized Life History or Habitat-use Characteristics**

**Endangered.** Large Whorled Pogonia requires sites with thick leaf litter and a rich humus layer over acidic soil. Like most orchids, this species also depends on root associations with soil fungi. The widespread roots grow shallowly in the humus layer (Luer, 1975). Such conditions are easily degraded by beaver flooding, trampling, and exotic earthworms (COSEWIC, 2011a; Jones et al., 2011).

### **3.3 COSSARO evaluation results**

#### **1. Criteria satisfied in each status category**

Number of primary and secondary criteria met in each status category:

Endangered – 2/3

Threatened – 0/0

Special Concern – 1/0

Number of Ontario-specific criteria met in each status category:

Endangered – 2

Threatened – 0

Special Concern – 0

#### **2. Data Deficiency**

**No.** The number of criteria assessed as “insufficient information” is 1.

#### **3. Status based on COSSARO Evaluation Criteria**

The application of COSSARO evaluation criteria suggests that Large Whorled Pogonia is **Endangered** in Ontario.

## PART 4 Ontario status based on COSEWIC evaluation criteria

### 4.1 Application of COSEWIC criteria

#### Regional (Ontario) COSEWIC Criteria Assessment

##### **Criterion A – Decline in Total Number of Mature Individuals**

**Insufficient information.** Cannot assess decline. No plants observed since 1996, but dormant plants could be present.

##### **Criterion B – Small Distribution Range and Decline or Fluctuation**

**(B1ab(iii)) + B2ab(iii) Endangered.** Extent of Occurrence unknown since no plants seen in 15 years. If the three known sites are considered potentially extant, Area of Occupancy is 12 km<sup>2</sup>. Habitat quality has declined at all sites and one site has been flooded by beavers (COSEWIC, 2011a; Jones et al., 2011).

##### **Criterion C – Small and Declining Number of Mature Individuals**

**Not in any category.** Meets the initial step of <250 mature individuals but does not meet the subsequent steps of continuing decline since the population cannot decline further.

##### **Criterion D – Very Small or Restricted Total Population**

**(D1) Endangered.** Population may be none. Highest known population in Ontario (1987-1990) was 117 plants (COSEWIC, 2011a; Jones et al., 2011).

##### **Criterion E – Quantitative Analysis**

**Not in any category.** No Population Viability Analyses have been conducted for the species in Ontario.

##### **Rescue Effect**

**No.** Possible but unlikely. Rare in two of the four closest states (Michigan: S2 and New York: S3). Separated from US populations by Lake Erie (COSEWIC, 2011a; Jones et al., 2011).

## **4.2 COSEWIC evaluation results**

### 1. Criteria satisfied in each status category

Endangered – Yes

Threatened – No

Special Concern – No

### 2. Data Deficiency

**No.** No indication that data are insufficient to arrive at a status determination.

### 3. Status based on COSEWIC Evaluation Criteria

The application of COSEWIC evaluation criteria suggests that Large Whorled Pogonia is **Endangered** in Ontario.

## **Part 5 Ontario status determination**

### **5.1 Application of COSSARO and COSEWIC criteria**

COSSARO and COSEWIC criteria give the same result. **Yes**

### **5.2 Summary of status evaluation**

Large Whorled Pogonia is classified as **Endangered** in Ontario.

Large Whorled Pogonia (*Isotria verticillata*) is a moderately-tall orchid whose flower has greenish-yellow petals, a white and crimson-purple lip, and three long, dark purple sepals. In the United States, Large Whorled Pogonia occurs from New England and Michigan south to Texas and Georgia. In southwestern Ontario, this species grows in acidic soils in moist deciduous or mixed woods in the Carolinian Zone. This orchid has been found at four locations in Middlesex, Oxford, and Norfolk Counties: at one location, it has not been seen since 1879, at two others it hasn't been seen since 1990, and at the fourth site, it was last seen in 1996. Large Whorled Pogonia is known for its tendency to enter dormancy lasting several years during which time no plants appear above ground. Thus, the species may still occur at former sites even though it has not been seen for many years. Threats to the species in Ontario include habitat loss and degradation; spread of invasive species, such as exotic earthworms and Garlic Mustard; flooding by beavers; and logging. Due to the small number of locations and the very low population recorded in recent years, Large Whorled Pogonia is classed as Endangered in Ontario.

## **Information Sources**

### **1. Literature Cited**

COSEWIC. 2011a. COSEWIC Status Appraisal Summary on Large Whorled Pogonia *Isotria verticillata* in Canada. Prepared for Committee on the Status of Endangered Wildlife in Canada. 2-month Status Appraisal Summary. ii + 9 pp.

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White, D.J. 1998. Update COSEWIC status report on the Large Whorled Pogonia *Isotria verticillata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 6 pp.

### **2. Community and Aboriginal Traditional Knowledge Sources**

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

### **3. Acknowledgements**

No information obtained through personal communications or review of the evaluation.

## Appendix 1: Northeastern North America status rank and decline

| State/Province | Subnational Rank | Sources          | Decline | Sources |
|----------------|------------------|------------------|---------|---------|
| CT             | S3               | NatureServe 2011 |         |         |
| DE             | S2               | NatureServe 2011 |         |         |
| IL             | S1               | NatureServe 2011 |         |         |
| IN             | S3               | NatureServe 2011 |         |         |
| IA             | S3               | NatureServe 2011 |         |         |
| LB             | Not present      | NatureServe 2011 |         |         |
| KY             | S4               | NatureServe 2011 |         |         |
| MA             | SNR              | NatureServe 2011 |         |         |
| MB             | Not present      | NatureServe 2011 |         |         |
| MD             | SNR              | NatureServe 2011 |         |         |
| ME             | SX               | NatureServe 2011 |         |         |
| MI             | S2               | NatureServe 2011 |         |         |
| MN             | Not present      | NatureServe 2011 |         |         |
| NB             | Not present      | NatureServe 2011 |         |         |
| NF             | Not present      | NatureServe 2011 |         |         |
| NH             | S1               | NatureServe 2011 |         |         |
| NJ             | S4               | NatureServe 2011 |         |         |
| NS             | Not present      | NatureServe 2011 |         |         |
| NY             | S3               | NatureServe 2011 |         |         |
| OH             | SNR              | NatureServe 2011 |         |         |
| ON             | S1               | NatureServe 2011 |         |         |
| PA             | SNR              | NatureServe 2011 |         |         |
| PE             | Not present      | NatureServe 2011 |         |         |
| QC             | Not present      | NatureServe 2011 |         |         |
| RI             | S3               | NatureServe 2011 |         |         |
| VA             | S5               | NatureServe 2011 |         |         |
| VT             | S2               | NatureServe 2011 |         |         |
| WI             | Not present      | NatureServe 2011 |         |         |
| WV             | S5               | NatureServe 2011 |         |         |

Occurs as a native species in 20 of 29 northeastern jurisdictions.

S rank or equivalent information available for 16 of 20 jurisdictions = 80%

S1, S2, SH, or SX in 7 of 16 = 44%