Ontario Species at Risk Evaluation Report for Spring Blue-eyed Mary Collinsie printanière (*Collinsia verna*)

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

Assessed by COSSARO as Extirpated

April 2023

Final

Executive summary

Spring Blue-eyed Mary (*Collinsia verna*) belongs to the snapdragon family. It reaches 20-40 cm in height with opposite, simple leaves and a blossom that typically consists of whorls of four to six flowers. The flowers have five lobes with the upper lobes white to pale blue and the lower lobes bright blue. It is a winter annual that flowers by late May. This flowering plant is usually found in open woodland within floodplains and prefers moist rich soils. It is often associated with Sugar Maple and White Oak trees. This species is easy to identify in the wild.

In Canada, there are currently no known extant population of this species. Spring Blue-eyed Mary was historically recorded in three locations in southwestern Ontario. The first record was in Middlesex County in 1894; the second record was in Oxford County in 1896; and the third and last observation was in Elgin County in 1954.

This species is affected by several limiting factors including a short duration of seed viability, a short growing season (it is a winter annual that flowers by late May), being outcompeted by other vegetation and experiencing dramatic annual fecundity and population growth fluctuations.

The main threats that led to the extirpation of this plant from Ontario were habitat loss and degradation through forest clearing and agricultural development.

Spring Blue-eyed Mary is classified as extirpated in Ontario as there have been no verified Canadian records since 1954, despite survey efforts in the region of former occurrence.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Collinsia verna is the current accepted name and is a distinct species. There are no proposed subspecies.

1.1.2. Designatable units

Collinsia verna is one designatable unit within Ontario and Canada.

1.1.3. Native status

Collinsia verna is native to Ontario and was first observed in Middlesex County in 1894 (COSEWIC 2000).

1.1.4. Occurrence

Collinsia verna is designated Extirpated by COSEWIC and listed as extirpated on the Species at Risk in Ontario List (Ontario Regulation 230/08) under the Endangered Species Act, 2007.

1.2. Eligibility results

Spring Blue-eyed Mary (*Collinsia verna*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe 2023)
- IUCN: not assessed (2023)
- NRANK Canada: NX
- COSEWIC: Extirpated (December 2022)
- SARA: Extirpated (Schedule 1)
- ESA 2007: Extirpated (December 2022)
- SRANK: SX (ranked in 2015)

2.2. Distribution in Ontario

Spring Blue-eyed Mary has been designated Extirpated since April 1987 (Environment Canada 2010). The only three known occurrences of the Spring Blue-eyed Mary were in Elgin, Middlesex and Oxford counties. The last observation of the Spring Blue-eyed Mary in Ontario was reported in 1954 in Elgin County, and the other two observations were in Middlesex County in 1894 and Oxford County in 1896 (COSEWIC 2000).

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

The species' range is considered globally secure (G5) with a wide-spread distribution in the United States. The species ranges from New York, Pennsylvania and Virginia west to Wisconsin, Indiana and Kansas and south to Louisiana (NatureServe 2023).

It is presumed extirpated (SX) in Ontario and Wisconsin; possibly extirpated (SH) in New York; critically imperiled (S1) in Alabama, Arkansas, Iowa, Kansas, Oklahoma, Tennessee and Virginia; apparently secure (S4) in Kentucky, Pennsylvania and West Virginia; and unranked (SNR) in Illinois, Indiana, Michigan, Missouri and Ohio.

Table 1. Condition of the Species in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Quebec	n/a		NatureServe 2023
Manitoba	n/a		NatureServe 2023
Michigan	n/a	SNR	NatureServe 2023
Minnesota	n/a		NatureServe 2023
Nunavut	n/a		NatureServe 2023
New York	no	SH	NatureServe 2023
Ohio	n/a	SNR	NatureServe 2023
Pennsylvania	no	S4	NatureServe 2023
Wisconsin	no	SX	NatureServe 2023
Other Relevant Jurisdiction			

2.4. Ontario conservation responsibility

Based on the current understanding of the extirpated status of this species, Ontario includes 0% of the global range and population.

2.5. Direct threats

Threats for this species in Canada were assessed by COSEWIC in 2000. Threat types include logging, agriculture, invasive species and natural succession. Canadian Wildlife

Services (2006) states that the main threats that led to its extirpation from Ontario were habitat loss and degradation through forest clearing and agricultural development.

2.6. Specialized life history or habitat use characteristics

Spring Blue-eyed Mary seeds have a short viability, limiting the species' ability to develop a viable seed bank and repopulate an area after a catastrophic event (COSEWIC 2000; Kalisz 1991; Baskin and Baskin 1983). The species requires ample light conditions to grow and flower, limiting its growing season to the early part of the spring and the later autumn months of the year (COSEWIC 2000). Studies also show that this species is often outcompeted by other vegetation unless a disturbance is applied to the area and therefore is dependent on dynamic factors for its survival, possibly reducing available and suitable habitat. Finally, Spring Blue-eyed Mary experiences extreme annual fluctuations in fecundity and population growth rates (Kalisz, et al. 1999), which could affect the survival of the population if there are a number of consecutive poor growing years.

2.7. Existing Conservation and Recovery Actions

A recovery strategy has been prepared, and there have been targeted searches for the species where it was formerly observed (Environment Canada 2010). The strategy identified that recovery is not feasible at this time and the approach is to monitor research and recovery initiatives in the United States for new information on the species and its potential cultivation and reintroduction.

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 have been no verified Canadian records since 1954.

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

Does not apply. There have been no verified Canadian records since 1954.

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

Does not apply. There have been no verified Canadian records since 1954.

3.1.4. Criterion D – Very small or restricted total population

Does not apply. There have been no verified Canadian records since 1954.

3.1.5. Criterion E – Quantitative analysis

Does not apply. Analysis not conducted.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply.

3.3.2. Status modification based on level of risk in broader biologically relevant geographic range

Does not apply.

3.3.3. Rescue Effect

Does not apply.

3.4. Other status categories

3.4.1. Data deficient

Not applicable.

3.4.2. Extinct or extirpated

Extirpated. Plants only known from three old historic sites with no recent sightings despite regular field surveys within the region of former occurrence. No site records since 1954. Designated Extirpated in April 1987. Status re-examined and confirmed in May 2000 and December 2022.

3.4.3. Not at risk

Not applicable.

4. Summary of Ontario status

Spring Blue-eyed Mary (*Collinsia verna*) is classified as Extirpated in Ontario based on meeting none of the above criteria due to having no verified Canadian records since 1954, despite survey efforts in the region of former occurrence.

This status of this species is consistent with the definition of extirpated under the Endangered Species Act, 2007.

5. Information sources

Baskin, J.M. and C.C. Baskin. 1983. Germination ecology of *Collinsia verna*, a winter annual of rich deciduous woodlands. Bulletin of the Torrey Botanical Club 110: 311-315.

COSEWIC. 2000. COSEWIC assessment and status report on the spring blue-eyed Mary, Collinsia verna, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 17 pp.

COSEWIC. 2022. IN PRESS. COSEWIC Rapid Review of Classification on the Spring Blue-eyed Mary *Collinsia verna* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi pp. (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html).

Environment Canada. 2010. Recovery Strategy for the Spring Blue-eyed Mary (*Collinsia verna*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. iv+ 12 pp.

Kalisz, S. 1991. Experimental determination of seed bank age structure in the winter annual *Collinsia verna*. Ecology. 72: 575-585.

NatureServe. 2023. Website: https://explorer.natureserve.org/ [accessed April 2023].

Natural Heritage Information Centre. 2022. Website: https://www.ontario.ca/page/natural-heritage-information-centre [accessed April 2023].

[1] 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: Spring Blue-eyed Mary (*Collinsia verna*)

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	Not applicable
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Not applicable
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Not applicable
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Not applicable
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Not applicable
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.	Not applicable
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	a. Unknown b. Unknown c. Unknown
Are there extreme fluctuations in number of mature individuals?	Unknown

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO). *If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.*	0 km^2
Index of area of occupancy (IAO). *If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.*	0 km^2
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy is in habitat patches that are: (a) smaller than would be required to support a viable population, and	a. No b. No

Extent and occupancy attributes	Value
(b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	
Number of locations. *See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.*	0
Number of NHIC Element Occurrences *Request data from MNRF.*	0
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Not applicable
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Not applicable
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Not applicable
Is there an observed, inferred, or projected continuing decline in number of locations?	Not applicable
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Not applicable
Are there extreme fluctuations in number of populations?	Not applicable
Are there extreme fluctuations in number of locations?	Not applicable
Are there extreme fluctuations in extent of occurrence?	Not applicable
Are there extreme fluctuations in index of area of occupancy?	Not applicable

Number of mature individuals in each sub-population or total population (if known)

Sub-population (or total population)	Number of mature individuals
Not applicable	*Not applicable*

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is [unknown].

Threats

Threats calculator not applied.

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Possibly
Status of outside population(s) most likely to provide immigrants to Ontario	S4 (Pennsylvania)
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	No
Would immigrants be adapted to survive in Ontario?	Unknown
Is there sufficient suitable habitat for immigrants in Ontario?	Unknown
Are conditions deteriorating in Ontario?	Unknown
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	Not applicable
Is rescue from outside populations likely?	No

Sensitive species

Not data sensitive.

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
IUCN: International Union for Conservation of Nature and Natural Resources
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
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
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