

Ontario Species at Risk Evaluation Report for

Big-tooth Whitelip

Élicelle dentifère

(Neohelix dentifera)

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

Assessed by COSSARO as Endangered

January 2026

Final

Executive summary

Big-tooth Whitelip (*Neohelix dentifera*) is a large shell (2-2.5 cm diameter) land snail known to occur in at least five sites within mature mixed-wood forest from Perth to south of Algonquin Provincial Park in southern Ontario. It is extirpated from the rest of its historical Canadian range, which historically extended from the east near Quebec City, around Ottawa, and south to Hamilton. In Quebec City it was reported to be found in large numbers in the 1890s. Outside of Canada it has been found throughout much of the Northeast of the US, with apparently secure populations in New York State. It typically lives near boulders on slopes and ravines but is also found under logs in thick leaf litter.

The main threats are climate change (particularly droughts and changes in freeze-thaw cycles) and gross habitat alteration, but it is also susceptible to ecosystem modifications from invasive species (including exotic earthworms and slugs). The species' restricted distribution, limited dispersal, low abundance at known sites, continued habitat decline and continuing threats make it vulnerable to extirpation from Canada. Based on this evidence, Big-tooth Whitelip (*Neohelix dentifera*) is classified as Endangered in Ontario as it meets criteria B1ab(iii) and B2ab(iii). Big-tooth Whitelip was not previously assessed by COSSARO.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Big-tooth Whitelip (*Neohelix dentifera*) is a valid taxonomic species recognized in the scientific literature (A. Binney, 1837).

1.1.2. Designatable units

A single designatable unit is recognized for Big-tooth Whitelip, as there is no evidence of discrete, evolutionarily significant populations, subspecies, or designatable units within Ontario.

1.1.3. Native status

Big-tooth Whitelip is a native species in Ontario.

1.1.4. Occurrence

In Ontario, Big-tooth Whitelip occurs in south-central Ontario.

1.2. Eligibility results

Big-tooth Whitelip (*Neohelix dentifera*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 Secure (NatureServe 2025)
- IUCN: Not assessed
- NRANK Canada: N1 Critically imperiled (NatureServe 2025)
- COSEWIC: Endangered (May 2025)
- SARA: Not listed
- MBCA protection: No
- Aquatic species under SARA: No
- COSSARO: Not assessed
- ESA 2007: Not listed
- SRANK: S1 (ranked in 2025)

2.2. Distribution in Ontario

In Ontario, the Big-tooth Whitelip (*Neohelix dentifera*) is associated with moist, mature deciduous and mixed forests, particularly in areas with calcareous or limestone-derived soils (Nikola 2010). It typically occurs on well-shaded forest floors where deep leaf litter, decaying wood, and abundant ground cover help maintain cool, humid microclimates essential for moisture retention and protection from desiccation (Grimm et al 2010). The species is often found on slopes, ravines, and forested uplands rather than open or heavily disturbed habitats, and it relies on stable forest conditions with minimal soil compaction or canopy removal (COSEWIC 2025, IN PRESS). Access to calcium-rich substrates is especially important for shell development, making intact hardwood forests over limestone bedrock or glacial till particularly suitable habitat in southern Ontario (Pearce 2008).

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

Big-tooth Whitelip has a largely eastern North American distribution, with its range extending along the Appalachian region from southeastern Canada into the eastern United States (Pearce 2008). It is thought to occur inland from southeastern parts of Canada (including Ontario and into Quebec), through portions of the northeastern U.S. such as Maine, and southward along the Appalachian highlands to North Carolina. This pattern reflects an affinity for upland forested landscapes. Within this broader continental range, many occurrences are localized and patchy, and the species is considered uncommon in many areas, with relatively few well-documented populations outside its core Appalachian habitat. Although not assessed in many jurisdictions, Big-tooth Whitelip is considered extant in regions bordering Ontario including Quebec, New York, Ohio and Pennsylvania (NatureServe 2025).

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	Yes	SNR	NatureServe 2025,
Manitoba	No	n/a	n/a
Michigan	No	n/a	n/a
Minnesota	No	n/a	n/a
Nunavut	No	n/a	n/a
New York	Yes	SNR	NatureServe 2025
Ohio	Yes	SNR	NatureServe 2025
Pennsylvania	Yes	S4	NatureServe 2025
Wisconsin	No	n/a	n/a

2.4. Ontario conservation responsibility

Ontario’s conservation responsibility is considered low. The species is ranked as globally secure (G5), and Ontario supports a relatively small proportion of the global range and population, well below the $\geq 25\%$ threshold used to indicate significant provincial conservation responsibility.

2.5. Direct threats

In Ontario, the conservation of Big-tooth Whitelip is threatened mainly by the loss and degradation of its extant habitat in southern parts of the province, where land-use pressures are greatest. In the past, urban expansion, agricultural development, and associated infrastructure have likely substantially reduced and isolated suitable forested areas, particularly on limestone-influenced landscapes such as the Niagara Escarpment. Ongoing and persistent threats such as climate change may alter the forest floor microclimate for the species. Similarly, habitat alteration for the species is likely related to invasive species like earthworms that greatly affect the litter surface. Given the species’ limited dispersal ability and its reliance on stable forest conditions, these cumulative threats can have disproportionate impacts on small, localized populations in Ontario (COSEWIC 2025, IN PRESS).

2.6. Specialized life history or habitat use characteristics

Very little is known about the life history or habitat use (beyond general habitat associations) of Big-tooth Whitelip.

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 has been a significant decline in the estimated index of area of occupancy and extent of occurrence, but that has likely happened in a much longer period than 10 years or 3 generations. There is no evidence that the decline in AOO or EOO is continuing, although habitat quality may be declining due primarily to climate change and invasive species, both of which alter Big-tooth Whitelip's microclimate.

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

Applies. Estimated EOO (2.47 km²) and IAO (24 km²) are both below threshold for Endangered (B1,2), and meet 2 indicators as Endangered (a – less than 5 locations, and biii – habitat continuing to decline).

Meets criteria for Endangered under B1ab(iii) and B2ab(iii).

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

There is insufficient information to determine the number of mature individuals.

3.1.4. Criterion D – Very small or restricted total population

There is insufficient information to determine the number of mature individuals; AOO and EOO do not meet the criteria for Threatened.

3.1.5. Criterion E – Quantitative analysis

Does not apply. A quantitative analysis was not completed.

3.2. Application of Special Concern in Ontario

Does not apply as the species meets criteria for Endangered under B1ab(iii) and B2ab(iii)

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Big-tooth Whitelip does not meet the criteria for elevated conservation priority based on global risk and Ontario conservation responsibility. The species is ranked as globally secure (G5), and Ontario supports a relatively small proportion of the global range and population, well below the $\geq 25\%$ threshold used to indicate significant provincial conservation responsibility. Accordingly, Ontario's conservation responsibility for this

species is considered low.

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

Big-tooth Whitelip meets the criteria for Endangered in Ontario, and no status modifier is considered warranted. The condition of the species within its broader biologically relevant geographic range was partially evaluated using available status ranks and other relevant information, and this assessment does not support application of a lower classification for Ontario.

3.3.3. Rescue Effect

Overall, rescue effect is considered unlikely. Because of the biology of the species, cross-border immigration is likely limited or non-existent, bordering populations are not clearly secure source populations, and suitable habitat in Ontario is localized and sensitive to ongoing threats.

3.4. Other status categories

3.4.1. Data deficient

The species is not considered data deficient.

3.4.2. Extinct or extirpated

The species is not considered Extinct or Extirpated.

3.4.3. Not at risk

Based on available information, the species meets the criteria for being at risk and therefore does not qualify as Not at Risk.

4. Summary of Ontario status

Big-tooth Whitelip (*Neohelix dentifera*) is classified as Endangered in Ontario based on meeting criterion under B1ab(iii) and B2ab(iii). No status modifiers are applied. This is consistent with the recent assessment applied by the COSEWIC assessment in 2025 (2025, IN PRESS)

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

5. Information sources

COSEWIC. 2025. IN PRESS. COSEWIC assessment and status report on the Big-tooth Whitelip *Neohelix dentifera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 50 pp.

Grimm FW, Forsyth RG, Schueler FW, Karstad A. 2010. Molluscs of Canada. Ottawa, Ontario: Canadian Museum of Nature. 447 p.

Nekola JC. 2010. Acidophilic terrestrial gastropod communities of North America. *J Molluscan Stud.* 76(2):144–156.

Pearce TA. 2008. Land snails of the northeastern United States and adjacent Canada. Pittsburgh (PA): Carnegie Museum of Natural History. 194 p.

Appendix 1: Technical summary for Ontario

Species: Big-tooth Whitelip (*Neohelix dentifera*)

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.	Approximately 5-6 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Yes, inferred based on few detections (of live shells) found in extant populations in 2024.
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Unknown
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?	a. Unknown b. Unknown c. Unknown
Are there extreme fluctuations in number of mature individuals?	Unknown as population size is unknown

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO).	2,472.8 km ² (geocat.kew.org)
Index of area of occupancy (IAO).	24 km ² based on species detections 2024 (geocat.kew.org)
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy in habitat patches that are:	a. No b. Unknown

Extent and occupancy attributes	Value
(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?	
Number of locations.	5
Number of NHIC Element Occurrences	8 – observations from iNaturalist are considered candidate element occurrences for this species
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Yes – but likely well outside of the 10 year, 3 generations window.
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Unknown
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Unknown
Is there an observed, inferred, or projected continuing decline in number of locations?	Unlikely
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes – likely related to climate change and invasive species.
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)

Number of mature individuals is not known.

Quantitative analysis (population viability analysis conducted)

Unknown, analysis not conducted.

Threats

Threats to Big-tooth Whitelip in Ontario were assessed using the COSEWIC Threats Calculator (COSEWIC 2025, IN PRESS). The overall threat impact was assessed as High–Low. Primary threats were climate change (H-L), biological resource use (M-L), and natural system modification (L).

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Status of outside population(s) most likely to provide immigrants to Ontario	New York – Apparently Secure Quebec – Status not ranked
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Unlikely
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Possibly
Are conditions deteriorating in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions?	Unranked or no
Is the Ontario population considered to be a sink?	Unlikely
Is rescue from outside populations likely?	Unlikely

Sensitive species

Big-tooth Whitelip is not a data sensitive species.

Acronyms

BBRGR: Broader Biological Relevant Geographic Range
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
MNR: Ministry of Natural Resources
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