

Ontario Species at Risk Evaluation Report for
Lilliput
Toxolasme nain
(*Toxolasma parvum*)

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

Assessed by COSSARO as Special Concern

January 2026

Final

Executive summary

Lilliput (*Toxolasma parvum*) is a freshwater mussel found in rivers, wetlands, ponds, and sheltered nearshore areas with soft sediments. This species is a small mussel, typically measuring less than 35 mm in length. Its shell is oval or elliptical, thin yet moderately inflated, and displays a smooth surface with a glossy to silky texture. The exterior coloration ranges from yellowish-brown to greenish or dark brown, often with faint green rays, especially in younger individuals. The inside of the shell is bluish-white or pinkish, and the beak is low, rounded, and not prominent. It is native to Ontario, a distinct species, and eligible for assessment.

Globally, Lilliput is widespread and considered secure as it occurs in 26 states throughout central North America from the Gulf of Mexico to the Great Lakes. However, Ontario supports the entire Canadian population, making the province especially important for the species' survival in Canada. Specifically, Canada's Lilliput population is limited to southwestern Ontario, within the Lake St. Clair/Detroit River, Lake Erie, and western Lake Ontario drainages. Nearby populations outside Ontario are generally small or declining, and movement of individuals into Ontario is unlikely.

Lilliput was previously classified as Threatened in Ontario in 2013 and listed as such on the Species at Risk in Ontario List. Since that time, additional surveys and monitoring have significantly improved understanding of the species' distribution. These efforts have confirmed Lilliput in many more waterbodies than were previously known, increasing the number of recognized locations across southwestern Ontario. All Canadian occurrences of Lilliput are considered a single designatable unit, as no subspecies, varieties, or discrete evolutionary lineages have been identified within Ontario, and there is no population-level genetic data to support further subdivision. Therefore, while multiple locations have been documented, these do not represent distinct subpopulations in the formal taxonomic or conservation sense, but rather a collection of sites within one designatable unit.

These expanded findings directly influenced the reassessment of Lilliput's conservation status, as they indicate a wider distribution. Current information shows that, although Lilliput remains restricted to a relatively small area in Ontario, there is no evidence of an ongoing decline in the species' distribution or number of populations. The increase in known locations reflects improved survey effort rather than recent range expansion.

Despite these findings, the quality of habitat used by Lilliput continues to decline in Ontario. Ongoing pressures include poor water quality from urban and agricultural runoff, changes to waterways from dredging and water management, and the effects of climate change such as drought and altered water levels. Additionally, Lilliput's lifecycle includes an obligate larval parasitic phase where it must find suitable host fishes. The species' dependence on host fish communities, along with its other specific habitat requirements adds to its sensitivity to habitat degradation. While no single threat is currently causing a clear population decline, the combined effects of these pressures continue to reduce habitat quality.

Based on application of COSSARO criteria, the species does not meet quantitative or

distributional thresholds for Endangered or Threatened status. However, because it remains vulnerable to ongoing environmental pressures and could become Threatened or Endangered if these pressures are not managed, the species is classified as Special Concern in Ontario based on criteria b.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

Lilliput (*Toxolasma parvum* [Barnes, 1823]) is a valid and widely recognized species within the family Unionidae. No taxonomic uncertainty exists that would preclude assessment at the species level.

1.1.1. Designatable units

All Canadian occurrences of Lilliput are confined to the Great Lakes–Upper St. Lawrence National Freshwater Biogeographic Zone. No subspecies, varieties, or discrete evolutionary lineages have been identified within Ontario, and no population-level genetic data are available to support further subdivision. Consistent with COSEWIC, Lilliput is considered a single designatable unit in Ontario. (COSEWIC 2024, IN PRESS)

1.1.2. Native status

Lilliput is native to central North America and occurs naturally in Ontario without human introduction. Its presence in southwestern Ontario represents the northern extent of its natural range and satisfies the criteria for native status.

1.1.3. Occurrence

Lilliput is currently extant in Ontario. Live individuals and fresh shells have been documented in multiple waterbodies between 2013 and 2024, including several newly confirmed locations identified through targeted surveys. There is no evidence to suggest that the species is extirpated or extinct in Ontario (COSEWIC 2024, IN PRESS).

1.2. Eligibility results

Lilliput (*Toxolasma parvum*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe 2026)
- IUCN: Least concern (2026)
- NRANK Canada: N1 (NatureServe 2026)
- COSEWIC: Special Concern (November 2024)
- SARA: Endangered (Schedule 1 in 2019)
- MBCA protection: No
- Aquatic species under SARA: Yes
- COSSARO: Threatened (June 2013)
- ESA 2007 (Species at Risk in Ontario List): Threatened (June 2014)
- SRANK: S1 (ranked in 1997)

2.2. Distribution in Ontario

Lilliput is restricted to southwestern Ontario within the Carolinian Zone and occurs in the Lake St. Clair/Detroit River, Lake Erie (including Pelee Island), and western Lake Ontario drainages. Since the previous Ontario assessment, the number of confirmed waterbodies supporting Lilliput has increased substantially due to targeted sampling in preferred soft-substrate habitats. As of 2024, the species has been recorded in approximately 20 subwatersheds, corresponding to an estimated 20–32 COSEWIC-defined locations depending on how threats are spatially interpreted.

This increase in known occurrences reflects improved survey coverage rather than recent range expansion. The species remains absent from historically occupied areas such as the Detroit River. Ontario subpopulations are generally small and spatially isolated but occur across a broader distribution than previously documented (COSEWIC 2024, IN PRESS).

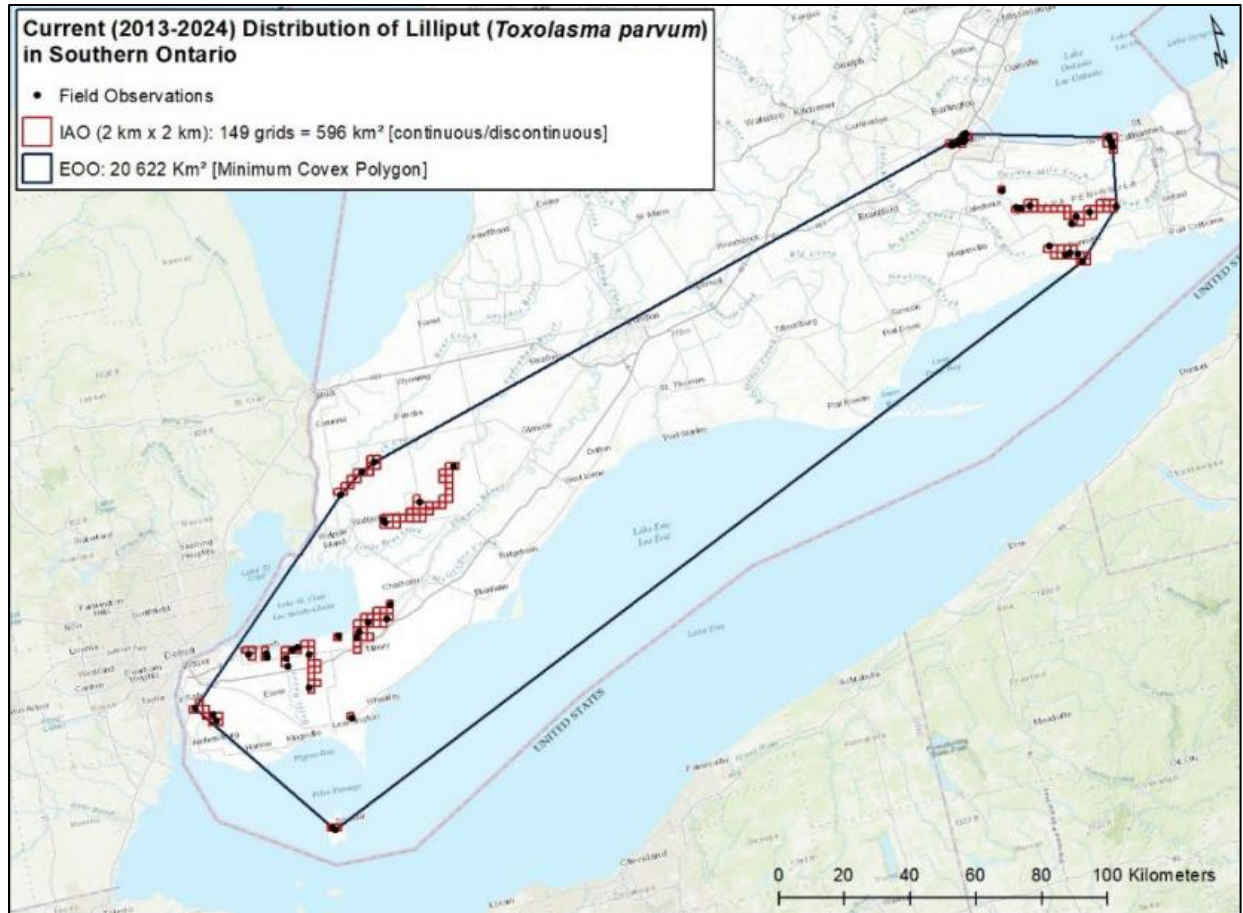


Figure 1. Current extent of occurrence and index of area of occupancy for Lilliput (*Toxolasma parvum*) within Ontario’s extent of jurisdiction. Map created by A. Saini (ECCC), COSEWIC 2024, IN PRESS.

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

Globally, Lilliput is distributed across central North America, occurring in approximately 26 U.S. states from the Gulf of Mexico north to the Great Lakes. The species is considered globally secure (G5) and nationally secure in the United States. However, within the Great Lakes basin, several adjacent U.S. jurisdictions (e.g., Michigan, Pennsylvania, New York) rank the species as imperiled or critically imperiled, reflecting similar stressors to those affecting Ontario populations.

The broader biologically relevant geographic range for Ontario includes Great Lakes basin jurisdictions where populations experience comparable climatic conditions, hydrology, and anthropogenic pressures. While some southern U.S. populations appear stable or expanding, rescue from outside Canada is considered unlikely due to habitat fragmentation, limited dispersal capacity, and declining conditions in adjacent Great Lakes jurisdictions (COSEWIC 2024, IN PRESS).

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	n/a	Species does not occur in Quebec.
Manitoba	n/a	n/a	Species does not occur in Manitoba. No confirmed records; prior listings considered erroneous.
Michigan	Yes	S1	Critically imperiled; declining in Great Lakes tributaries; NatureServe
Minnesota	Yes	SNR	Occurs primarily outside Great Lakes basin; limited relevance; NatureServe
Nunavut	n/a	n/a	Species does not occur in Nunavut
New York	Yes	S2	Imperiled; extirpated from portions of historic range; NatureServe
Ohio	Yes	S5	Secure; represents only stable adjacent jurisdiction; NatureServe
Pennsylvania	Yes	S1S2	Critically imperiled to imperiled; NatureServe
Wisconsin	Yes	S3	Vulnerable to imperiled; NatureServe

2.4. Ontario conservation responsibility

Ontario's conservation responsibility is low, as Ontario supports less than 5% of Lilliput's global range.

It should be noted that given the species' restricted Canadian occurrence and the degraded condition of many occupied watersheds, Ontario bears a high conservation responsibility for the persistence of Lilliput in Canada despite its broader global security.

2.5. Direct threats

Lilliput in Ontario is subject to multiple ongoing threats acting primarily at the watershed and subwatershed scale. Medium-low impact threats include pollution from urban and agricultural sources, natural system modifications such as dredging and water management activities, and climate change-related effects including drought and altered flow regimes. Lower-impact threats include invasive species and human disturbance. While no single threat is currently causing demonstrable population decline, the cumulative effect of these pressures continues to degrade habitat quality across much of the species' Ontario range (COSEWIC 2024, IN PRESS).

2.6. Specialized life history or habitat use characteristics

Lilliput demonstrates several biological characteristics that heighten its susceptibility, including an obligate parasitic larval stage dependent on suitable host fishes, restricted adult mobility, and elevated mortality during early development. While multiple host fish

species have been documented in the United States, host utilization remains unconfirmed for subpopulations in Ontario. Reliance on host fish assemblages and soft-substrate habitats within extensively modified watersheds further increases vulnerability to environmental changes and habitat degradation (COSEWIC 2024, IN PRESS).

The life history of Lilliput is consistent with that of small-bodied unionid mussels and is marked by probable hermaphroditism, early onset of maturity, a relatively brief lifespan, and dependence on an obligate parasitic larval stage. Glochidia (mussel larvae) are released as conglutinates (bundles of glochidia bound in mucus) requiring ingestion by appropriate host fishes; nevertheless, suitable hosts have not been identified for Canadian populations. As observed with other unionids, juvenile survival represents a critical demographic constraint, given limited dispersal capacity and pronounced sensitivity to shifts in water and sediment quality. Modeling of data-deficient unionid species indicates that populations exhibiting these traits are especially vulnerable to decreases in juvenile and adult survival rates, whereas they exhibit less responsiveness to variations in fecundity or glochidial survival. (DFO, 2022).

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 quantitative estimate of the total number of mature individuals for Lilliput in Ontario, and therefore population trends cannot be reliably estimated. While historical declines in extent of occurrence and index of area of occupancy have been inferred, these declines largely occurred prior to the most recent assessment window and do not meet thresholds for Threatened or Endangered under criterion A. Recent data indicate that the number of known subpopulations has increased due to improved survey effort, and there is no evidence of a continuing decline in abundance over the past three generations (approximately 10 years).

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

Does not apply. Although Lilliput has a relatively small Canadian distribution restricted to southwestern Ontario, the current index of area of occupancy (approximately 596 km²) is above the typical thresholds for Threatened under criterion B. While there is an observed and continuing decline in habitat quality across much of the species' Ontario range, the population is not severely fragmented, occurs at more than 10 locations, and does not experience extreme fluctuations in distribution or occupancy. As such, the necessary subcriteria under criterion B are not met.

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

Does not apply. The number of mature individuals in Ontario is unknown, and no quantitative population estimates are available. There is no evidence of a continuing decline in the number of mature individuals, nor evidence of extreme fluctuations. criterion C cannot be applied due to insufficient data.

3.1.4. Criterion D – Very small or restricted total population

Does not apply. Although the number of mature individuals remains unknown, the species does not meet the thresholds for criterion D based on distributional metrics. The index of area of occupancy and number of locations both exceed the values typically associated with Threatened status under this criterion.

3.1.5. Criterion E – Quantitative analysis

Does not apply. No quantitative population viability analysis has been conducted for Lilliput in Ontario.

3.2. Application of Special Concern in Ontario

Lilliput does not meet the criteria for Endangered or Threatened under any COSSARO

criterion at this time. However, the species remains highly sensitive to anthropogenic pressures, occurs in a limited geographic area within Ontario, and continues to experience a decline in habitat quality. These factors support consideration of Special Concern.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Ontario supports less than 5% of Lilliput's global range, and the Lilliput is not at risk globally (G5). Therefore, Ontario's conservation responsibility is low.

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

The broader biologically relevant geographic range for Lilliput includes Great Lakes basin jurisdictions where populations experience similar climatic conditions, hydrology, host fish communities, and watershed-scale stressors. While southern U.S. populations contribute to global security, they are not considered biologically relevant for Ontario due to substantially different ecological conditions and limited likelihood of demographic or genetic rescue.

3.3.3. Rescue Effect

Rescue effect evaluated and determined to be unlikely for this species.

3.4. Other status categories

3.4.1. Data deficient

Does not apply.

3.4.2. Extinct or extirpated

Does not apply.

3.4.3. Not at risk

Does not apply.

4. Summary of Ontario status

Lilliput (*Toxolasma parvum*) is classified as Special Concern in Ontario based on meeting criterion b; the species is likely to become Threatened if factors suspected of negatively influencing the persistence of the species are neither reversed nor managed with demonstrable effectiveness.

COSEWIC reassessed Lilliput as Special Concern in November 2024, down-listing the species from Endangered based on increased detections, improved understanding of distribution, and the absence of evidence for continuing population decline. The Ontario assessment aligns with this conclusion. While Ontario populations remain small and spatially constrained, available evidence does not support classification as Threatened under COSSARO criteria at this time.

The species' sensitivity to habitat degradation, reliance on host fishes, and exposure to ongoing watershed-scale threats indicate that Special Concern is the most appropriate Ontario status, recognizing the risk of future decline if current pressures are not effectively managed.

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

The change in status of this species from the 2013 assessment is considered a non-genuine¹ change based on increased number of known subpopulations since prior assessment.

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.

5. Information sources

COSEWIC. 2024. IN PRESS. COSEWIC assessment and status report on the Lilliput *Toxolasma parvum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiv + 81 pp. (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>).

Fisheries and Oceans Canada. 2022. Recovery Strategy and Action Plan for Lilliput (*Toxolasma parvum*) in Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. vi + 61 pp.

NatureServe. 2025. NatureServe Explorer: An online encyclopedia of life. Web site: http://www.natureserve.org/explorer/servlet/NatureServe?post_processes=PostReset&oadTemplate=nameSearchSpecies.wmt&Type=Reset [accessed November 2025]

COSSARO. 2013. Candidate Species at Risk Evaluation for Lilliput (*Toxolasma parvum*).

Appendix 1: Technical summary for Ontario

Species: Lilliput (*Toxolasma parvum*)

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.	~3 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	No, based on recent detections suggest stable or potentially increasing subpopulations.
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	No evidence of decline.
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	No evidence of decline
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	No quantitative population estimates exist for Ontario
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.	Insufficient data.
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	Does not apply
Are there extreme fluctuations in number of mature individuals?	No; do not typically exhibit extreme fluctuations.

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO).	20,622 km ²
Index of area of occupancy (IAO).	596 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 (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	a. No b. Yes

Extent and occupancy attributes	Value
Number of locations.	~20 (20-32)
Number of NHIC Element Occurrences	Not available
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?	No
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	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?	Yes – observed and continuing decline in quality.
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)

No quantitative analysis (i.e., population viability analysis) has been conducted for Lilliput (*Toxolasma parvum*) in Ontario. A quantitative analysis was not undertaken due to the absence of quantitative population estimates and insufficient demographic data.

Threats

Natural System Modifications (IUCN Threat 7) Impact: Medium–Low

Description: Alterations to flow regimes and habitats resulting from dredging, channelization, water level management, drainage maintenance, and other water management activities. These actions directly affect substrate stability, hydrology, and host fish availability.

Pollution (IUCN Threat 9) Impact: Medium–Low

Description: Degradation of water quality from agricultural runoff, urban stormwater, nutrient enrichment, sediment loading, and contaminants. Pollution acts at the watershed scale and contributes to declining habitat quality across much of the Ontario

range.

Climate Change and Severe Weather (IUCN Threat 11) Impact: Medium–Low

Description: Increased frequency and severity of droughts, altered hydrological regimes, and extreme weather events leading to reduced water levels, habitat contraction, and physiological stress.

Human Intrusions and Disturbance (IUCN Threat 6) Impact: Low

Description: Localized impacts from shoreline development, instream works, recreational activities, and infrastructure maintenance affecting occupied habitats.

Invasive and Other Problematic Species and Genes (IUCN Threat 8) Impact: Low

Description: Presence of invasive species that may indirectly affect Lilliput through food web alteration or impacts on host fishes. Currently considered a secondary threat in Ontario.

Overall Threat Impact: Medium

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	Adjacent to Great Lakes are imperiled; Ohio stable.
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	No; limited host fish movement.
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Yes
Are conditions deteriorating in Ontario?	Yes
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	No

Sensitive species

Lilliput 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
MBCA: Migratory Birds Convention Act
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