

Ontario Species at Risk Evaluation Report

for

Round Pigtoe (*Pleurobema sintoxia*)

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

Assessed by COSSARO as ENDANGERED

December 2014

Final

Pleurobème écarlate (*Pleurobema sintoxia*)

Le pleurobème écarlate est une moule d'eau douce qui peut atteindre une longueur de 13 cm. L'épaisse coquille des adultes est brun acajou parcourue de lignes foncées. Au Canada, le pleurobème écarlate est présent dans le sud-ouest de l'Ontario, dans le delta de la rivière Sainte-Claire et dans la rivière Sydenham River, et qu'en petites populations dans les rivières Grand et Thames. Il pourrait avoir disparu du lac Érié et de la rivière Niagara, mais il faudra réaliser d'autres relevés pour le confirmer. Le pleurobème écarlate utilise différents habitats, notamment les rivières et les lacs aux eaux profondes et aux fonds sablonneux, rocheux ou boueux. Comme toutes les moules d'eau douce, il se nourrit d'algues et de bactéries qu'il filtre hors de l'eau. Les larves de moules sont des parasites qui s'attachent à un poisson-hôte dont elles puisent les nutriments jusqu'à leur métamorphose en juvéniles, puis s'en détachent. Les hôtes du pleurobème écarlate sont, entre autres, le méné bleu, le ventre rouge du Nord, le ventre-pourri et le crapet arlequin. Le pleurobème écarlate est une espèce en voie de disparition en Ontario. Il est présent dans quelques endroits à peine, et le nombre de sites ne cesse de diminuer depuis 10 ans en raison de la présence des moules zébrées envahissantes (critères A2, B1 et B2 du CDSEPO). Les plus grandes menaces qui pèsent sur le pleurobème écarlate sont les espèces envahissantes et l'écoulement de surface des terres agricoles.

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EXECUTIVE SUMMARY

The Round Pigtoe is a freshwater mussel that reaches up to 13 cm in length. Adults have a thick, mahogany-coloured shell with dark bands.

In Canada, Round Pigtoe are found in southwestern Ontario in the St. Clair River delta and the Sydenham River with small populations in the Grand and Thames rivers. It may be extirpated from Lake Erie and the Niagara River, however, further surveys are required to confirm this.

The Round Pigtoe uses a variety of habitats including rivers and lakes with deep water and sandy, rocky, or mud bottoms. Like all freshwater mussels, it feeds on algae and bacteria that it filters out of the water. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the host until they transform into juvenile mussels and drop off. Hosts of the Round Pigtoe include: Spotfin Shiner, Northern Redbelly Dace, Bluntnose Minnow and Bluegill.

Round Pigtoe is Endangered in Ontario. It only occurs at a few locations and the number of sites has continued to decline over the past 10 years due to invasive Zebra Mussels (COSSARO criteria A2, B1 & B2). The greatest threats to the Round Pigtoe are invasive species and run-off from agricultural lands.



Round Pigtoe Adult

Photo from: <http://www.ontario.ca/environment-and-energy/round-pigtoe>

1. BACKGROUND INFORMATION

1.1 CURRENT DESIGNATIONS

GRANK: G4G5 (*NatureServe, accessed 10/11/2014*)
NRANK Canada: N1 *NatureServe, accessed 10/11/2014*)
COSEWIC: Endangered (November 2014)
SARA: Endangered (Schedule 1)
ESA 2007: Endangered (2007)
SRANK: S1 *NatureServe, accessed 10/11/2014*)

1.2 DISTRIBUTION IN ONTARIO

Round Pigtoe are only found in southwestern Ontario, mainly in the St. Clair River delta and the Sydenham River but small populations still exist in the Grand and Thames rivers. It appears to be extirpated from the nearshore waters of Lake Erie and the Niagara River due to Zebra Mussels (*Dreissena polymorpha*). Further surveys in Canadian waters are required to confirm this and to determine if any refugia exist.

1.3 DISTRIBUTION AND STATUS OUTSIDE ONTARIO

The Round Pigtoe was historically distributed from New York and Ontario in the east to South Dakota, Kansas and Oklahoma in the west and south to Arkansas and Alabama. Large river populations have declined in the upper Midwest, but many populations persist in tributaries of the Mississippi and Ohio rivers. Large river populations are exceedingly rare in the upper Midwest. Recent information suggests that the current distribution and abundance of the Round Pigtoe in the U.S. is generally the same as it was historically, although declines seem evident in a number of areas.

1.4 ONTARIO CONSERVATION RESPONSIBILITY

Less than 10% of the global range for Round Pigtoe occurs on Ontario (estimated based on watershed distribution map) (NatureServe 2014).

1.5 DIRECT THREATS

The greatest threats to the Round Pigtoe in Ontario are invasive species (Zebra Mussel (*Dreissena polymorpha*), Quagga Mussel (*Dreissena rostriformis bugensis*), Round Goby (*Neogobius melanostomus*)) and habitat loss/degradation due to agricultural pollution and siltation.

The current range of this species is approximately 30% of its historic extent of occurrence. Most of this loss in range has occurred due to its probable extirpation from Lake Erie and the Niagara River because of Zebra and Quagga Mussels (dreissenid mussels). This species does however seem to be able to compete with dreissenid mussels in the St. Clair delta, albeit likely at a lower population.

The threat of habitat degradation via agricultural effluent could be increased through more extreme storm events due to climate change. Other threats include: household sewages and urban wastewater and, industrial effluent (i.e. oil spills from pipelines).

1.6 SPECIALIZED LIFE HISTORY OR HABITAT USE CHARACTERISTICS

Like other freshwater mussels, the Round Pigtoe is parasitic on fish during its larval stage. The breeding season lasts from early May to July, and the larvae are released by the female before winter. Once released, the larvae must attach to the gills of a fish host. When the larvae transform into juveniles, they drop off the fish and fall to the substrate to begin life as free-living mussels.

The host fishes in Canada are the Spottfin Shiner (*Cyprinella spiloptera*), Northern Redbelly Dace (*Phoxinus eos*), Bluntnose Minnow (*Pimephales notatus*), Bluegill (*Lepomis macrochirus*) and Central Stoneroller (*Campostoma anomalum*). These are common fish species in the range of the Round Pigtoe.

2. ELIGIBILITY FOR ONTARIO STATUS ASSESSMENT

2.1 ELIGIBILITY CONDITIONS

Taxonomic Distinctness: Yes.

Designatable Units: No. The Canadian population remains as one designatable unit and there has been no change in the formal taxonomy.

Native Status: Yes. The earliest record of the species in Canada is a fresh whole shell collected in 1885 from the Grand River.

Occurrence: Extant. Identified from 33 sites between 2003-2012.

2.2 ELIGIBILITY RESULTS

Round Pigtoe (*Pleurobema sintoxia*) is eligible for status assessment in Ontario.

3. ONTARIO STATUS ASSESSMENT

3.1 APPLICATION OF ENDANGERED/THREATENED STATUS IN ONTARIO

Criterion A – Decline in Total Number of Mature Individuals

A1: Does not apply. Causes of reversal are not clearly reversible.

A2c: Endangered. Over the last three generations (approx. 30 years) the extent of occurrence has declined by approximately 70.5%. This has resulted in a suspected reduction in the number of mature individuals that exceeds 50%. The causes of this reduction have not ceased, and are not reversible (invasive species).

A3: Does not apply. Largest population in the St. Clair delta appears to be stable.

A4: Does not apply.

Criterion B – Small Distribution Range and Decline or Fluctuation

B1ab (i,ii,iii,iv,v): Endangered. Area of Occurrence estimated to be <5,000 km² (3,018 km²)

B2ab (i,ii,iii,iv,v):Endangered. Index of Area of Occupancy estimated to be <500 km² (140 km²)

For both B1 and B2: Estimates indicate that there are:

- a): <5 locations (likely 2-4 based on viability, see list of locations below), and
- b) A continuing decline in the (i) extent of occurrence and (ii) index of area of occupancy, (iii) area, extent and quality of habitat, (iv) number of locations and, (v) number of mature individuals.

Locations for Round Pigtoe:

1. St Clair Delta
2. Sydenham River
3. Thames River (very small population, may not be viable)
4. Grand River (very small population, may not be viable)
5. Bear Creek of North Sydenham River (recent, but likely no longer extant)
6. McGregor Creek of Thames River (recent, likely no longer extant)

Criterion C – Small and Declining Number of Mature Individuals

Does not apply. Population is unknown.

Criterion D – Very Small or Restricted Total Population

Does not apply. Total number of mature individuals is possibly more than 1000.

Criterion E – Quantitative Analysis

Does not apply. A quantitative population analysis has not been done (not enough data)

3.2 APPLICATION OF SPECIAL CONCERN IN ONTARIO

Does not apply. Meets criteria for Endangered.

3.3 STATUS CATEGORY MODIFIERS

Ontario's Conservation Responsibility

Does not apply. Global status of G4G5.

Rescue Effect

Rescue effect for populations in Lake Erie and Niagara River are possible but not probable. Round Pigtoe may be extirpated from the U.S. portion of these waterbodies (COSEWIC 2014; COSEWIC 2004).

Round Pigtoe has been identified as a candidate species for culture, and procedures to culture mussels have been developed by MNR (Heuvel 2013).

3.4 OTHER STATUS CATEGORIES

DATA DEFICIENT

Does not apply.

EXTINCT OR EXTIRPATED

Does not apply.

NOT AT RISK:

Does not apply.

4. SUMMARY OF ONTARIO STATUS

Round Pigtoe (*Pleurobema sintoxia*) is classified as **Endangered** in Ontario.

Provincial Decline in Total Numbers of Mature Individuals

A2c

Small Distribution Range and Decline or Fluctuation

B1ab (i,ii,iii,iv,v)

B2ab (i,ii,iii,iv,v)

5. INFORMATION SOURCES

COSEWIC. 2014. COSEWIC status appraisal summary on the Round Pigtoe *Pleurobema sintoxia* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxii pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

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APPENDIX 1: TECHNICAL SUMMARY FOR ONTARIO

Species: Round Pigtoe

Demographic Information	
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	>10 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Yes, Lake Erie and Niagara River populations appear to now be extirpated although further surveys are required in Canadian waters,
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?	Some causes potentially reversible (past and current habitat loss) and understood.
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information in Ontario	
Estimated extent of occurrence.	3,018 km ²
Index of area of occupancy (IAO).	140 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. No
Number of locations (<i>as defined by COSEWIC</i>).	4 (Grand and Thames River may not be viable)
Number of NHIC Element Occurrences	30 Total 9 EOs from 2000-present
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Yes
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Yes
Is there an observed, inferred, or projected continuing decline in	Yes

number of populations?	
Is there an observed, inferred, or projected continuing decline in number of locations?	Yes
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)	N of Mature Individuals
1. Grand River	>100
2. Lake St. Clair (Lake St. Clair Delta and Sydenham River)	1000s

Quantitative Analysis (population viability analysis conducted)
Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].

Rescue Effect	
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible, but not probable.
Would immigrants be adapted to survive in Ontario?	Yes.
Is there sufficient suitable habitat for immigrants in Ontario?	Possibly Habitat availability is restricted due to invasive species use of habitat.
Is the species of conservation concern in bordering jurisdictions?	Yes See Appendix 2
Is rescue from outside populations reliant upon continued intensive recovery efforts?	No

APPENDIX 2: ADJOINING JURISDICTION STATUS RANK AND DECLINE

Jurisdiction	Subnational Rank	Sources	Population Trend	Sources
Ontario	S1	NatureServe	70% reduction in Extent of Occurrence	COSEWIC 2014
Manitoba	Not Present			
Michigan	S2S3 Special Concern	NatureServe	Negative/ unquantified Though this species is fairly wide ranging in Michigan it was found infrequently and in relatively low abundance in recent surveys.	Badra 2007
Minnesota	S2 Threatened	NatureServe	Negative/ unquantified It has recently been found alive in only a small number of drainages, making it vulnerable to catastrophic events.	Minnesota Department of Natural Resources 2014
Nunavut	Not Present			
New York	S1	NatureServe	Negative/ unquantified It remains widespread in the Allegheny River basin, but populations in the Niagara River basin are likely gone	COSEWIC 2004
Ohio	S3 Species of Concern	NatureServe	Unknown	
Pennsylvania	S2 Special Concern	NatureServe	May have been downlisted. Listed as END in 2004 COSEWIC report. Now Special concern.	PA Natural Heritage Program 2014
Quebec	Not Present			
Wisconsin	S3 Special Concern/ Protected	NatureServe	Negative/ unquantified State watch list. Not tracked but known to by lost from several sites.	Wisconsin DNR 2014