COSSARO Candidate Species at Risk Evaluation Form

for

Northern Riffleshell (Epioblasma torulosa)

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

Assessed June 2010 by COSSARO as Endangered

June 2010

Final
Northern Riffleshell (*Epioblasma torulosa*)

**Current Designations:**
- GRANK – G2; last reviewed 18 Mar 2009
- NRANK Canada – N1; last reviewed 12 Jun 2000
- COSEWIC — Endangered; 1999; Reassessed as Endangered in April 2010.
- SARA – Schedule 1, 2005
- General Status Canada – At Risk
- SRANK – S1
- General Status Ontario – Endangered

**Distribution and Status Outside Ontario:**
Apparently the only populations in the US showing good evidence of recruitment occur in the Allegheny and Ohio River systems of Pennsylvania (COSEWIC 2010). The species also occurs in a few scattered watersheds in Michigan, West Virginia, Ohio and Kentucky. It is extirpated in Illinois and Indiana.

**ELIGIBILITY CRITERIA**

**Native Status**
- ✓ Yes The species occurs in the Midwestern United States and southwestern Ontario.

**Taxonomic Distinctness**
- ✓ Yes Three subspecies have been recognized for the Northern Riffleshell but two are already extinct (Williams *et al.* 2008).

**Designatable units**
*E. t. rangiana* is the only extant subspecies and there is no evidence to suggest that individuals in Ontario belong to more than one designatable unit.

**PRIORITY-SETTING CRITERIA**

**Recent Arrival**
- ✓ No

**Non-resident**
- ✓ No
PRIMARY CRITERIA (rarity and declines)

1. Global Rank
   ✔ Endangered – G2 Global Rank.

2. Global Decline
   ✔ Endangered – Historically, this mussel was found in Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, West Virginia and Ontario, and possibly New York. Over the past century there has been a long-term range reduction of more than 95% with only four known populations remaining today. The species has been extirpated from Illinois and Indiana (COSEWIC 2010; NatureServe 2010). Severe short-term declines of more than 70% have been occurring to populations in the United States (Nature Serve 2010).

3. Northeastern North America Ranks
   ✔ Endangered – Identified as S1, S2, SH or SX in 8 of 8 jurisdictions (100%).

4. Northeastern North America Decline
   ✔ Endangered – Similar to above, populations in northeastern North America have either been extirpated or are undergoing relative steep declines (95% long-term and >70% short-term), with only four reproducing populations remaining (COSEWIC 2010).

5. Ontario Occurrences
   ✔ Threatened – There are 9 extant element occurrences of northern Riffleshell in Ontario, and four historical EO’s, qualifying this species for threatened status under this criterion. However, this species currently only occurs in two rivers in southwestern Ontario: Sydenham and Ausable (COSEWIC 2010). This species was thought to be extirpated from Canada, but populations in Sydenham and Ausable Rivers were re-discovered in 1997 and 1998, respectively. Their densities are estimated to be considerably lower than extant populations in Pennsylvania; only two of the sites in the Sydenham River surpassed threshold of 0.13 m\(^2\) required for successful recruitment (Crabtree and Smith 2009). Only the Sydenham population is demonstrating any evidence of recruitment (COSEWIC 2010).

6. Ontario Decline
   ✔ Endangered – Decline of > 75% of its former range in Ontario, much of this decline has occurred in the last 20 years as it no longer occurs in Lake Erie, Lake St. Clair and Detroit River, and possibly the Thames River. While the re-discovery of populations in Ontario indicates some recovery, the populations are still very low (COSEWIC 2010).

7. Ontario’s Conservation Responsibility
**Endangered** – Believed that this species has relatively healthy reproducing populations at only three locations: one in Ontario and the other two in Pennsylvania (COSEWIC 2010). The Ausable River population also shows some evidence of recruitment while many of the other US populations do not (COSEWIC 2010). Historically Ontario contained less than 10% of the species range but now provincial populations may comprise a much higher proportion of the global population and be critical to survival of the species.

**SECONDARY CRITERIA (threats and vulnerability)**

1. **Population Sustainability**
   - **Not sufficient information** - Of the remaining two Ontario populations, Sydenham River is showing no signs of decline while empty shells along Ausable River and small number of live individuals indicate that significant population declines have occurred recently. Because there is little idea of population size and trends, no quantitative analyses re population sustainability have been undertaken.

2. **Lack of Regulatory Protection for Exploited Wild Populations**
   - **Not in any category**. The Northern Riffleshell is protected under the *Endangered Species Act, 2007* and the federal *Species at Risk Act*. *The Fish and Wildlife Conservation Act* regulates harvests of molluscs.

3. **Direct Threats**
   - **Endangered** – The primary cause of the disappearance of Northern Riffleshell populations on Lake Erie, Lake St. Clair and Detroit River is thought to be the spread of exotic mussels. Northern Riffleshell was abundant in Detroit River but declined rapidly from 1992 to 1994 as a result of invasion by Zebra and Quagga Mussels (Schloesser *et al.* 1998). It is also sensitive to sedimentation caused by heavily deforested and cultivated watersheds. Sedimentation and degraded water quality are the main concerns in the two watersheds where the species still occurs.

4. **Specialized Life History or Habitat-use Characteristics**
   - **Endangered** – The Northern Riffleshell primarily occurs at clear, well oxygenated riffles on small rivers and therefore is highly specialized. The larval stage is dependent on the presence of host fish species sculpins and darters.
Recommended Status: Endangered

SUMMARY

This species is currently confined to well-oxygenated riffle runs on two rivers in southwestern Ontario. These are two of four extant populations in North America. The population is currently stable on one river, but there is evidence of recent declines on the other. Sedimentation, declining water quality, and the rapid spread of invasive mussels are the main threats in the intensively cultivated watersheds. The species has already disappeared from several areas in its former range, largely because of the spread of invasive Zebra Mussel (*Dreissena polymorpha*) and Quagga Mussel (*Dreissena rostriformis bugensis*). Because of the small area of occupancy and continuing declines in population and quality of habitat, this species is **Endangered** in Ontario.

Information Sources


### Appendix 1
NORTHEASTERN NORTH AMERICA RANK, STATUS AND DECLINE

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Occurs as a native species in 8 of 29 northeastern jurisdictions
Srank or equivalent information available for 8 of 8 jurisdictions = (100%)
S1, S2, SH, or SX in 8 of 8 = (100%)
**PART 2**  
**Ontario Evaluation Using COSEWIC Criteria**

### Regional (Ontario) COSEWIC Criteria Assessment

**Criterion A – Declining Population**  
**No.** The number of mature individuals appears to be stable at present in Sydenham River. However, presence of empty shells indicates that Ausable River population was considerably larger formerly.

**Criterion B – Small Distribution and Decline or Fluctuation**  
**Yes.** Both the EO (983 km²) and IAO (296 km²) are within the thresholds for Endangered (< 5,000 km² and < 500 km², respectively). As the species is found at only 2 locations, sub-criterion “a” (no. of locations ≤ 5) is applicable. There is a continuing decline inferred in the quality of habitat so sub-criterion “b(iii)” also is applicable.

**Criterion C – Small Population Size and Decline**  
**No.** Does not meet criterion. The total number of mature individuals is estimated to be 146,400, above the thresholds for this criterion (< 10,000 for threatened), although one of the two populations contains 89% of the total estimated population.

**Criterion D – Very Small or Restricted**  
**Yes.** Meets the criteria for Threatened as the species is found at fewer than 5 locations and while it is prone to the effects of human activities (e.g., degraded water quality from agriculture, industrial, and urban activities), these activities are not occurring over a very short time frame in an uncertain future.

**Criterion E – Quantitative Analysis**  
**No.** None conducted.

**Rescue Effect**  
**No.** Immigrants would be adapted to survive in Ontario. Species has limited dispersal ability and no longer occurs in immediately adjacent waters in US. Rescue is unlikely.