

EXECUTIVE SUMMARY – Recovery Strategy for the Northern Riffleshell (*Epioblasma torulosa rangiana*), Snuffbox (*Epioblasma triquetra*), Round Pigtoe (*Pleurobema sintoxia*), Mudpuppy Mussel (*Simpsonaias ambigua*) and Rayed Bean (*Villosa fabalis*) in Ontario

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The preparation of the Recovery Strategy for the Northern Riffleshell (*Epioblasma torulosa rangiana*), Snuffbox (*Epioblasma triquetra*), Round Pigtoe (*Pleurobema sintoxia*), Mudpuppy Mussel (*Simpsonaias ambigua*) and Rayed Bean (*Villosa fabalis*) in Ontario was led by Fisheries and Oceans Canada to meet the requirements of the *Species at Risk Act*. This recovery strategy is being adopted under the *Endangered Species Act, 2007* (ESA 2007), which requires the Minister of Natural Resources to ensure recovery strategies are prepared for all species listed as endangered or threatened. With the additions summarized below, the Recovery Strategy for the Northern Riffleshell (*Epioblasma torulosa rangiana*), Snuffbox (*Epioblasma triquetra*), Round Pigtoe (*Pleurobema sintoxia*), Mudpuppy Mussel (*Simpsonaias ambigua*) and Rayed Bean (*Villosa fabalis*) in Canada meets all of the content requirements outlined in the ESA 2007.

The identification of critical habitat is not a component of a recovery strategy prepared under the ESA 2007. However, it is recommended that the areas of critical habitat identified in this recovery strategy be considered when developing a habitat regulation under the ESA 2007.

EXECUTIVE SUMMARY

Freshwater mussels are among the world's most imperiled taxa with declines reported on a global scale (Bogan 1993; Lydeard *et al.* 2004). The rich unionid fauna of North America has been hit particularly hard with over 70% of the approximately 300 species showing evidence of declines with many now considered rare, endangered, threatened or imperiled (Allan and Flecker 1993; Williams *et al.* 1993). Canada is home to 55 unionid species, 41 of which can be found in the province of Ontario with 18 species having Canadian distributions restricted to this province. The rivers of southwestern Ontario, primarily those draining into Lake St. Clair and Lake Erie, are home to the richest unionid assemblages in Canada. The Sydenham River has historically been considered to be the richest unionid river in all of Canada (Clarke 1992) with a total species count of 34 (Metcalf-Smith *et al.* 2003), however, recent evidence suggests that the Grand (Metcalf-Smith *et al.* 2000) and Thames rivers, also with historic species counts of 34, were equally diverse.

Despite the historic richness of these rivers, recent events have led to significant declines in the unionid communities of southwestern Ontario. Intensive agricultural activity, expanding urbanization and the introduction of the zebra mussel have all been implicated in large scale declines observed in freshwater

mussel populations over the last two to three decades (Nalepa 1994; Metcalfe-Smith et al. 2000; Metcalfe-Smith et al. 2003). During this time 4 species have been lost from the Sydenham River, 10 species have disappeared from the Thames River and the community of the Grand River has been reduced by 9 species. These declines, coupled with the near complete collapse of the Great Lakes populations (Nalepa *et al.* 1996), have led to the listing of 10 Ontario mussel species as endangered by the Committee on the Status of Endangered Wildlife In Canada (COSEWIC).

Threats to the Northern Riffleshell, Snuffbox, Round Pigtoe, Mudpuppy Mussel and Rayed Bean are many and varied. The main reason for the declines in lake populations, including the Lake St. Clair and Lake Erie populations, is the presence of the exotic zebra mussel (*Dreissena polymorpha*). Zebra mussels attach to the shells of native mussels and act to inhibit feeding, respiration, excretion and locomotion. Populations of Northern Riffleshell, Snuffbox, Round Pigtoe, Mudpuppy Mussel and Rayed Bean mussels from river habitats are subject to different threats than lake populations with the primary threats being declining water quality and the loss of habitat. The watersheds in southwestern Ontario, where the Northern Riffleshell, Snuffbox, Round Pigtoe, Mudpuppy Mussel and Rayed Bean are still found, are predominantly agricultural with high nutrient and sediment inputs to the watercourse from adjacent lands. The obligate parasitic nature of the reproductive cycle of these five species necessitates a consideration of threats to the host species as well as the direct threats to the mussel.

This Recovery Strategy was assembled by the Ontario Freshwater Mussel Recovery Team consisting of members from Fisheries and Oceans Canada, Environment Canada, Ontario Ministry of Natural Resources, University of Guelph, University of Toronto, Ausable-Bayfield Conservation Authority, Grand River Conservation Authority, Maitland Valley Conservation Authority, St. Clair Region Conservation Authority, Upper Thames River Conservation Authority and the Walpole Island Heritage Centre.

The long-term goals of the strategy are:

- i. to prevent the extirpation of the Northern Riffleshell, Snuffbox, Round Pigtoe, Mudpuppy Mussel and Rayed Bean in Canada;
- ii. to return healthy self-sustaining Northern Riffleshell populations to the Ausable, Grand, Sydenham and Thames rivers and the Lake St. Clair delta and;
- iii. to return healthy self-sustaining populations of Snuffbox to the Ausable, Grand, Sydenham and Thames rivers and the Lake St. Clair delta.
- iv. to return healthy self-sustaining populations of Round Pigtoe to the Sydenham, Thames and Grand rivers and the St. Clair delta and;

- v. to return/maintain healthy self-sustaining populations of Mudpuppy Mussel to the Sydenham and Thames rivers and Lake St. Clair delta and;
- vi. to return/maintain healthy self-sustaining populations of Rayed Bean to the Sydenham and Thames rivers and Lake St. Clair delta and;

The following specific short term objectives have been identified to assist with meeting the long term goal:

- i. Determine extent, abundance and population demographics of existing populations.
- ii. Determine/confirm host fishes, their distributions and abundances.
- iii. Define key habitat requirements to identify critical habitat.
- iv. Establish a long-term monitoring program for the Northern Riffleshell, Snuffbox, Round Pigtoe, Mudpuppy Mussel and Rayed Bean, their habitats and those of their hosts.
- v. Identify threats, evaluate their relative impacts and implement remedial actions to reduce their effects.
- vi. Examine the feasibility of relocations, reintroductions and artificial propagation.
- vii. Increase awareness of the significance of the Northern Riffleshell, Snuffbox, Round Pigtoe, Mudpuppy Mussel and Rayed Bean and their status as a Canadian Species at Risk.

The Recovery Team has identified a variety of approaches that are necessary to ensure that the objectives are met. These approaches have been organized into four categories: Research and Monitoring, Management, Stewardship and Awareness.

This Recovery Strategy represents one piece of a multi-faceted approach to ensure the preservation of these endangered mussels. The needs of Northern Riffleshell, Snuffbox, Round Pigtoe, Mudpuppy Mussel and Rayed Bean have been directly considered in the development of aquatic ecosystem recovery strategies for the Sydenham River, the Ausable River and the Thames River and the goals, objectives and approaches outlined in these ecosystem strategies will therefore benefit these five mussel species. Although not directly considered in the Grand River Fish Recovery Strategy or the Walpole Island Ecosystem Recovery Strategy, the Recovery Team feels that the actions proposed by these ecosystem oriented teams will likely benefit these five mussel species at risk through overall improvement of aquatic habitat. In addition to these recovery planning efforts, a number of ongoing research programs will assist with achieving the goals outlined in this strategy. A team at the University of Guelph has established a research facility to investigate potential host species for the Northern Riffleshell, Snuffbox, Rayed Bean and other mussel species at risk while a laboratory at the University of Toronto/Royal Ontario Museum has recently begun to examine the conservation genetics of mussel species at risk.

Researchers from the Department of Fisheries and Oceans and the National Water Research Institute of Environment Canada are conducting ongoing surveys for mussel species at risk in southwestern Ontario and examining the feasibility of establishing managed refuge sites in the St. Clair delta region.

The specification of Critical Habitat is crucial to the recovery of endangered species under the Species at Risk Act and requires a thorough knowledge of the species needs during all life stages as well as an understanding of the distribution, quantity, and quality of habitat across the range of the species. At present, this information is not available for the five species; therefore, the Recovery Team has identified a series of tasks that will assist with collecting the information required to characterize critical habitat for the species.