

EXECUTIVE SUMMARY – Recovery Strategy for the Round Hickorynut (*Obovaria subrotunda*) and Kidneyshell (*Ptychobranchnus fasciolaris*) in Ontario

Prepared by T. J. Morris

The preparation of the Recovery Strategy for the Round Hickorynut (*Obovaria subrotunda*) and Kidneyshell (*Ptychobranchnus fasciolaris*) 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 Round Hickorynut (*Obovaria subrotunda*) and Kidneyshell (*Ptychobranchnus fasciolaris*) 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 (Unionidae) are amongst the world's most imperiled taxa with declines reported at global, continental and national scales. Nearly 75% of North America's approximately 300 freshwater mussel species are facing varying degrees of extinction risk. Southern Ontario is home to the largest and most diverse mussel communities in Canada as three quarters of the nation's mussel species can be found in the lower Great Lakes drainage. Three of the largest mussel rivers in this region, the Thames, Grand and Sydenham rivers, have all shown significant declines during the latter half of the last century with species declines totaling 29%, 26% and 12% respectively. Eight species, all with distributions restricted to this region of southwestern Ontario and with current or historic distributions which include these three drainages, have been listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Two of these species, the Round Hickorynut (*Obovaria subrotunda*) and the Kidneyshell (*Ptychobranchnus fasciolaris*) share common current and historic distributions and are facing similar threats to their continued existence. These two species are considered here in a multispecies recovery strategy developed by the Ontario Freshwater Mussel Recovery Team to facilitate the protection and recovery of both species in Canada.

The Round Hickorynut is a small mussel reaching a maximum size of 60 - 65 mm in Canada. The mussel is readily recognized by its round shape and prominent centrally located, inward curving beaks that are elevated well above the hinge line. The Canadian distribution of this species has always been restricted to

southwestern Ontario where it was once found in the Welland, Grand, Sydenham, Thames, St. Clair and Detroit Rivers as well as the waters of Lake St. Clair and western Lake Erie. Declining water quality and the introduction of dreissenid mussels have resulted in a sharp decline in the Canadian distribution of the Round Hickorynut and it is now only found in the waters of the Lake St. Clair delta and a small portion of the East Sydenham River.

The Kidneyshell is a medium to large freshwater mussel that is readily distinguished by its elongate, elliptical shell and yellowish-brown periostracum with wide, interrupted green rays that look like squarish spots. The Kidneyshell has also always had a Canadian distribution limited to southwestern Ontario where it was once found in lakes St. Clair and Erie, as well as the Detroit, Sydenham, Thames, Ausable, Grand, Welland and Niagara rivers. Recent surveys have shown that this distribution has been severely reduced and the Kidneyshell is now limited to the Sydenham and Ausable rivers with a few specimens in the Lake St. Clair delta (COSEWIC 2003b).

Threats to the Round Hickorynut and Kidneyshell are many and varied although they can be separated into two major groups: those affecting lake populations (i.e. Great Lakes and connecting channels) and those affecting in-land riverine populations. The main reason for the declines in lake populations, and the major current threat to the Lake St. Clair populations of the Round Hickorynut and the Kidneyshell, is the presence of exotic dreissenid mussels. Dreissenid mussels (zebra and quagga mussels) attach to the shells of native mussels and act to inhibit feeding, respiration, excretion and locomotion. The near complete loss of freshwater mussels from the Great Lakes and their connecting channels can be attributed to the detrimental effects of these invasive mussels. As the largest remaining population of the Round Hickorynut is the St. Clair delta population, dreissenid mussels should be seen as the most significant threat to the continued existence of the Round Hickorynut in Canada.

Riverine populations of both mussel species are subject to different threats than the lake populations with the primary threats being declining water quality and a general disappearance of suitable habitat. The two watersheds where these species can still be found are predominantly agricultural with high nutrient and sediment inputs to the watercourse from the adjacent lands. Waters with high sediment loads, particularly when composed of fine sediments like those associated with agricultural run-off, have been shown to cause clogging of the gill structures which can interfere with feeding, respiration and reproduction.

The obligate parasitic nature of the reproductive cycle of these mussels necessitates a consideration of threats to the host fish 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, McMaster University, Ausable-Bayfield Conservation Authority, Grand River Conservation Authority, Maitland Valley Conservation Authority, St. Clair Region Conservation Authority, Upper Thames River Conservation Authority, Lower Thames Valley Conservation Authority and the Walpole Island Heritage Centre.

The long-term goals of this recovery strategy are:

- i. to prevent the extirpation of the Round Hickorynut and Kidneyshell in Canada;
- ii. to return healthy self-sustaining populations of Round Hickorynut to the Sydenham River and Lake St. Clair delta and;
- iii. to maintain healthy self-sustaining Kidneyshell populations in the Ausable and Sydenham rivers while returning the Lake St. Clair delta population to a self-sustaining level.
- iv. to re-establish populations in historically occupied habitats.

These populations can only be considered recovered when they have returned to historically estimated ranges and/or population densities and are showing signs of reproduction and recruitment.

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 fish hosts and their distributions and abundances.
- iii. Define key habitat requirements to identify critical habitat.
- iv. Establish a long-term monitoring program for Round Hickorynut and Kidneyshell populations, their hosts and the habitat of both.
- v. Identify threats, evaluate their relative importance and implement remedial actions to minimize their impacts.
- vi. Examine the feasibility of relocations, reintroductions and the establishment of managed refuge sites.
- vii. Increase awareness about the distribution, threats and recovery of these species.

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

This Recovery Strategy represents one component of a multi-faceted approach to preserve these endangered mussels. Because of the sedentary nature of mussels and their filter-feeding behaviour, they have a value beyond basic biodiversity in their role as indicators of ecosystem health. Threats that have been indicated as affecting riverine populations may, in most cases, be

considered as threats to the aquatic ecosystem in general. Correspondingly, activities directed at mitigating threats to mussels will benefit the aquatic ecosystem as a whole and general ecosystem recovery actions like those proposed in the Sydenham and Ausable river ecosystem recovery strategies (Dextrase et al. 2003; ARRT 2004) will assist with the recovery of the Round Hickorynut and Kidneyshell.

In addition to the ecosystem recovery planning efforts a number of ongoing research programs will assist with achieving the objectives outlined in this strategy. A team at the University of Guelph has established a research facility to investigate mussel-host relationships and juvenile rearing and has already succeeded in identifying hosts for the Kidneyshell in Canada. 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 National Water Research Institute of Environment Canada are conducting ongoing surveys for mussel species at risk in southwestern Ontario as well as examining the feasibility of establishing managed refuge sites in the St. Clair delta region. A permanent, long-term monitoring network to track changes in mussels and their habitat has been established in the Sydenham and Thames rivers and will be expanded to the Ausable River. Ongoing stewardship activities have been established through local conservation authorities throughout the ranges of both the Round Hickorynut and Kidneyshell.

The Round Hickorynut prefers sand and gravel substrates with steady, moderate flows at depths of up to 2 m. Currently occupied habitat for the Round Hickorynut consists of a 12 km² region of the Canadian waters of the St. Clair delta and a 60 km reach of the east Sydenham River from just upstream of Alvinston downstream to Dawn Mills. Historically occupied habitat would include the Thames River from London to Chatham and the Grand River near Dunville. If the impacts of dreissenid mussels can be mitigated then historically occupied areas in the Detroit, St. Clair and Welland rivers as well as the open waters of western Lake Erie and Lake St. Clair may also function as suitable habitat for recovery. The Kidneyshell prefers shallow areas with clear, swift-flowing water and substrates of firmly packed coarse gravel and sand. Currently occupied habitat for this species includes areas that fit this description in the coastal margin of the Lake St. Clair delta, 60 km of the East Sydenham River from Alvinston to Dawn Mills, and approximately 50 km of the Ausable River from Huron Park to Arkona Gorge. Historically occupied habitat for the Kidneyshell includes 50 km of the Lower Grand River from Caledonia to Port Maitland, a small portion of the Welland River, and locations within the Thames River between London and Chatham. Areas in Lake Erie, Lake St. Clair and the Niagara River may also function as future habitat if the influence of dreissenid mussels can be reduced.

The Recovery Team believes that the approaches outlined in this strategy to achieve recovery of the Round Hickorynut and Kidneyshell are best accomplished through cooperation with the existing ecosystem recovery teams.

In watersheds with existing ecosystem teams, implementation of recovery actions should be coordinated to confirm that activities are beneficial to all species at risk and to eliminate the possible duplication of efforts. Where ecosystem teams are absent, Recovery Implementation Groups may be struck to facilitate the carrying out of recovery actions. Evaluation of the success of recovery actions will be achieved primarily through the routine monitoring programs established to track changes in population demographics and habitat, however, RIGs will also incorporate specific milestones into Recovery Action Plans. The entire Recovery Strategy will be reassessed after 5 years to evaluate the progress towards achieving the goals and objectives and to incorporate new information.