

*Conservation Assessment  
for  
The Round Hickorynut (*Obovaria subrotunda*) Rafinesque, 1820*



*USDA Forest Service, Eastern Region*

2002

Kevin J. Roe  
Department of Biological Sciences  
Saint Louis University  
St. Louis, MO 63103-2010



*This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another provides information to serve as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject taxon, please contact the Eastern Region of the Forest Service – Threatened and Endangered Species Program at 310 Wisconsin Avenue, Suite 580 Milwaukee, Wisconsin 53203.*

**Table of Contents**

**EXECUTIVE SUMMARY ..... 4**  
**SYNONYMY ..... 4**  
**DISTRIBUTION ..... 5**  
**DESCRIPTION..... 5**  
**LIFE HISTORY AND ECOLOGY ..... 5**  
**STATUS ..... 5**  
**POPULATION BIOLOGY AND VIABILITY ..... 7**  
**SPECIAL SIGNIFICANCE OF THE SPECIES..... 7**  
**MANAGEMENT RECOMMENDATIONS ..... 7**  
**REFERENCES..... 8**

## EXECUTIVE SUMMARY

The Round Hickorynut, *Obovaria subrotunda* (Rafinesque, 1820) is a small ovate mussel that is found in small to medium sized rivers throughout the Ohio River System. *Obovaria subrotunda* can be distinguished from its congeners by its nearly round shape and its brown and usually rayless periostracum. The historical distribution of *O. subrotunda* consists of the Ohio River System, including the Tennessee and Cumberland rivers. Several museum records include localities outside these drainages which have not yet been confirmed by the author and may represent a separate species, possibly *O. unicolor*. *Obovaria subrotunda* is not listed by the U. S. Fish and Wildlife Service as threatened or endangered, although it is state listed in Indiana, Illinois and Michigan.

*Obovaria subrotunda* is dioecious, and its brooding habit is bradyctictic: spawning occurs in the summer, and the larvae are released the following spring. No fish hosts have been identified for this species. The absence of information on the life history and ecology of this species makes it difficult to evaluate current threats to its survival. Several factors are considered detrimental to the persistence of freshwater mussels in general: pollution, siltation and habitat perturbation such as gravel mining or the construction of new impoundments. Obtaining basic information regarding life history and genetic variation in *O. subrotunda* should be a priority for this species.

*Obovaria subrotunda* (Rafinesque, 1820) Round Hickorynut

## SYNONYMY

*Obliquaria (Rotundaria) subrotunda* Rafinesque, 1820; Rafinesque, 1820: 308, pl. 81, figs. 21-23

*Obovaria subrotunda* (Rafinesque, 1820); Vanatta, 1915: 552; Ortmann and Walker, 1922:45

*Obovaria (Obovaria) subrotunda* (Rafinesque, 1820); Ortmann, 1918: 567

*Unio (Aximedia) levigata* Rafinesque, 1820; Rafinesque, 1820:296, pl. 80, fig. 11

*Unio laevigatus* Rafinesque, 1820; Say, 1834: no pagination [misspelling]

*Obovaria levigata* (Rafinesque, 1820); Vanatta, 1915: 552

*Obovaria (Obovaria) levigata* (Rafinesque, 1820); Haas, 1969a:422

*Obovaria (Obovaria) subrotunda levigata* (Rafinesque, 1820); Ortmann, 1918: 568

*Obovaria subrotunda levigata* (Rafinesque, 1820); La Rocque, 1967:242

*Obovaria striata* Rafinesque, 1820; Rafinesque, 1820:311; Vanatta, 1915:522

*Mya rotunda* Wood, 1856; Wood, 1856:199, pl. 1 supp. fig. 1 [misspelling]

*Unio circulus* Lea, 1829; Lea 1829:433, pl. 9, fig 14

*Margarita (Unio) circulus* (Lea, 1829); Lea, 1836:33

*Margaron (Unio) circulus* (Lea, 1829); Lea, 1852c: 34

*Unio subrotundus* var. *circulus* Lea, 1829; Paetel, 1890:168

*Obovaria circulus* (Lea, 1829); Simpson, 1900a:600

*Obovaria circula* (Lea, 1829); Baker, 1920:383

*Unio lens* Lea, 1831; Lea, 1831:80, pl. 8, fig. 10

*Margarita (Unio) lens* (Lea, 1831); Lea, 1836:33

*Margaron (Unio) lens* (Lea, 1831); Lea, 1852c:34

*Obovaria lens* (Lea, 1831); Simpson, 1900a:600

*Obovaria subrotunda lens* (Lea, 1831); Goodrich and van der Schalie, 1944:318

*Unio leyii* Lea, 1862; Lea, 1862a: 168; Lea, 1866:44, pl. 15, fig. 42

*Margarona (Unio) leibii* (Lea, 1862); Lea, 1870:36  
*Obovaria leibii* (Lea, 1862); Simpson, 1900a:601  
*Obovaria circulus leibii* (Lea, 1862); Sterki, 1907:390  
*Obovaria subrotunda leibii* (Lea, 1862); Goodrich, 1932:103  
*Unio depygis* Conrad, 1866, 1866a:107, pl. 10, fig.1  
*Obovaria lens* var. *depygis* (Conrad, 1866); Simpson, 1900a:601  
*Obovaria subrotunda depygis* (Conrad, 1866); Frierson, 1927:90  
*Obovaria lens* var. *parva* Simpson, 1914; Simpson, 1914:294  
*Obovaria lens* var. *elongata* Simpson, 1914; Simpson, 1914:294-295  
*Obovaria subrotunda globula* Morrison, 1942; Morrison, 1942:360; Johnson, (1975:29, pl.1, fig.7  
*Quadrula subrotunda globula* Morrison, 1942; Johnson, 1980:96

**Type Locality:** "I' Ohio"

## **DISTRIBUTION**

The Ohio River system including the Tennessee and Cumberland River systems. It has also been reported from Lake Erie and Lake St. Clair and their tributaries in Ontario, Canada (Clarke, 1981). Alabama (S2), Illinois (S1), Indiana (S2), Kentucky (S4S5), Michigan (S1), Mississippi (S2), New York (SH), Ohio (S?), Pennsylvania (S1), Tennessee (S2), West Virginia (S3)

## **DESCRIPTION**

*Obovaria subrotunda* is a small mussel, ovate to elliptical in outline. The valves are moderately inflated and can be quite thick and heavy for their size. The beaks are nearly centrally placed and are high above the hinge and curl inward. The periostracum is smooth and dark brown in color, a paler almost yellow streak can be observed along the posterior edge. Some individuals exhibit obscure, dark green rays. Several weak ridges that run dorso-ventrally near the posterior portion of the shell. The ventral margin is curved in both sexes and the sexual dimorphism typical of most lamprosilines is not obvious in this species. Nacre color is iridescent white with some pink or purple wash. Glochidia are described by Hoggarth (1999) as subelliptical in shape. The average length and height are 177 and 204  $\mu\text{m}$  respectively. The ventral edge of the valves are covered with lanceolate micropoints (Hoggarth, 1999).

## **LIFE HISTORY AND ECOLOGY**

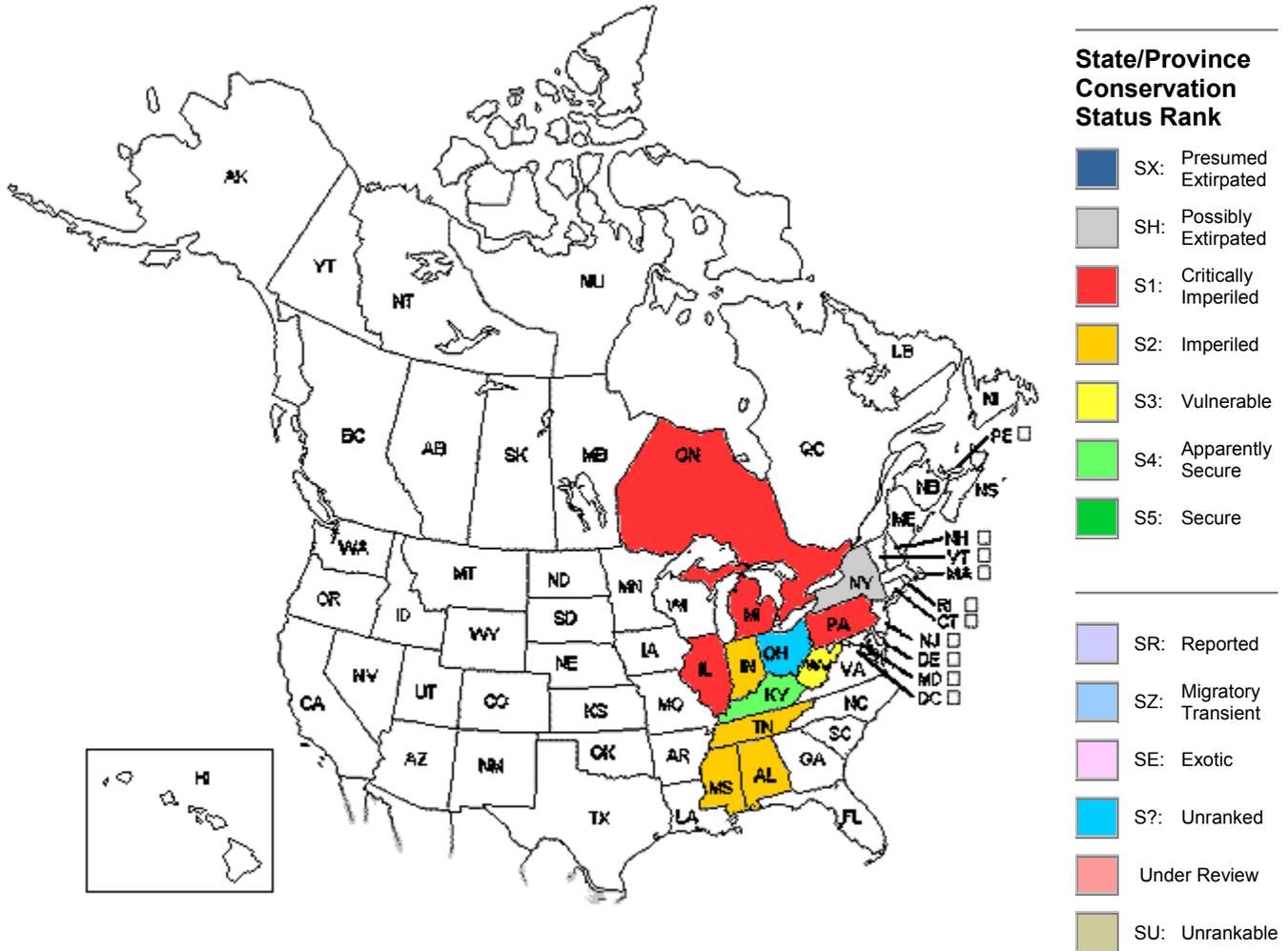
This species is typically found in medium to large sized rivers in gravel substrates of moderate current at depths of up to two meters (Gordon and Layzer, 1989). This species is bradyctictic, both Ortmann (1919) and Clarke (1981) report females are gravid from September to June. No host fishes have been determined for this species.

## **STATUS**

*Obovaria subrotunda* is listed as a species of special concern by Williams et al. (1993). Indiana lists it as a species of special concern, and the states of Illinois and Michigan lists it as state endangered. It is

difficult to accurately determine historical abundance of this species, Museum records indicate it has been collected within the last decade in Illinois, Indiana and Ohio. Parmalee and Bogan (1998) report that *O. subrotunda* has disappeared, from most of the rivers it inhabited in Tennessee. Museum records of collections from Tennessee indicate very few collections have been made in this state over the last decade.

**Figure 1.** Distribution of *Obovaria subrotunda* by county based on museum records.



### Limiting Factors:

Until more specific information is gathered concerning the life history and ecology of the Round Hickorynut, it is difficult to determine exactly how specific limiting factors will impact this species. It can be assumed that the same factors that have been determined to be limiting to other mussel species also hold for *O. subrotunda*. Factors implicated in the decline of freshwater bivalves include the destruction of habitat by the creation of impoundments, siltation, gravel mining, and channel

modification; pollution and the introduction of non-native species such as the Asiatic clam and the Zebra Mussel.

## **POPULATION BIOLOGY AND VIABILITY**

Museum records support the comments of Bogan and Parmalee (1998) that *O. subrotunda* has disappeared from most of the rivers in Tennessee. There are also few specimens in museums from the remaining states in the southern portion of this species' distribution. This could be due in part to differences collection efforts in northern and southern parts of the range of *O. subrotunda*. A significant amount of information is needed to complete our understanding of this species including host determination studies, as well as more thorough surveys.

## **SPECIAL SIGNIFICANCE OF THE SPECIES**

The genus *Obovaria* consists of six species. Three species of *Obovaria* are known from the Ohio River system, *O. olivaria*, *O. subrotunda*, and *O. retusa*.

## **MANAGEMENT RECOMMENDATIONS**

Plans for the conservation of North American freshwater mussels have generally taken one of two approaches:

- 1.) the preservation of existing populations and allow the mussels to re-invade historical ranges naturally and
- 2.) to actively expand the existing ranges by re-introducing mussels through translocation from "healthy" populations or from captive rearing programs (NNMCC, 1998). The second strategy is the more pro-active, and may ultimately prove to be effective, however several important factors should not be over-looked. Before translocations or re-introductions occur it should be established that conditions at the re-introduction site are suitable for the survival of mussels. Mussel translocation projects have had mixed success (Sheehan et al. 1989, Cope and Waller, 1995). Re-introducing mussels into still contaminated or otherwise un-inhabitable habitat is a waste of resources and can confound attempts to obtain unbiased estimates of the survival of species after re-introduction. Additionally, the genetic variation across and within populations should be assessed prior to the initiation of a reintroduction/translocation scheme (Lydeard and Roe, 1998). Evaluation of the genetic variation is crucial to establishing a captive breeding program that maintains the maximal amount of variation possible and avoid excessive inbreeding (Templeton and Read, 1984) or outbreeding depression (Avisé and Hamrick, 1996).

Additional information about the life-history of *O. subrotunda*, including determination of fish hosts is critical to formulating an intelligent management plan for this species. Midwestern populations should be monitored for detrimental affects from several factors including pollution, non-native species, and stream modifications such as impoundments.

## REFERENCES

- Awise, J.C. and J.L. Hamrick. 1996. Conservation genetics: case histories from nature. Chapman and Hall, New York.
- Clarke, A.H. 1981. The freshwater molluscs of Canada. The National Museum of Natural Sciences, National Museums of Canada, Ottawa, Canada.
- Cope, W.G. and D.L. Waller. 1995. Evaluation of freshwater mussel relocation as a conservation and management strategy. *Regulated Rivers: Research and Management*. 11: 147-155.
- Hoggarth, M.A. 1999. Descriptions of some of the glochidia of the Unionidae (Mollusca: Bivalvia). *Malacologia* 41: 1-118.
- Gordon, M.E. and J.B. Layzer. 1989. Mussels (Bivalvia: Unioniodes) of the Cumberland River. Review of life histories and ecological relationships. Biological Report 89(15) U. S. Fish and Wildlife Service.
- Lydeard, C. and K.J. Roe. 1998. Phylogenetic systematics: the missing ingredient in the conservation of freshwater unionid bivalves. 23: 16-17.
- National Native Mussel Conservation Committee. 1998. National Strategy for the conservation of native freshwater mussels. *J. Shellfish Res.* 17:1419-1428.
- NatureServe. 2003. NatureServe Explorer: An online encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: July 9, 2003 ).
- Ortmann, A.E. 1919. A monograph of the naiades of Pennsylvania. Part III: Systematic account of the genera and species. *Mem. Carnegie Mus.* 8: xvi-384, 21 pls.
- Parmalee, P.W. and A.E. Bogan. 1998. The freshwater mussels of Tennessee. The University of Tennessee Press, Knoxville.
- Sheehan, R.J. R.J. Neves, and H.E. Kitchel. 1989. Fate of freshwater mussels transplanted to formerly polluted reaches of the Clinch and North Fork Holston Rivers, Virginia. *Journal of Freshwater Ecology*. 5: 139-149.
- Templeton, A.R. and B. Read. 1984. Factors eliminating inbreeding depression in a captive heard of Speke's gazelle (*Gazella spekei*). *Zoo. Biol.* 3:177-199.
- Williams, J. D., Warren, M. L. Jr., Cummings, K. S., Harris, J. L., and Neves, R. J. 1993. Conservation status of the freshwater mussels of the United States and Canada. *Fisheries* 18: 6-22.