



**Status:** Federal and state endangered

**Global and State Rank:** G2T2/S1

**Family:** Unionidae (Pearly Mussels)

**Total Range:** The northern riffleshell was found historically in Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, West Virginia, and western Ontario. It was widespread in the Ohio and Maumee River basins, and in tributaries of western Lake Erie. Today, the northern riffleshell occurs in short reaches of the Green River in Kentucky; the Detroit and Black Rivers in Michigan; Big Darby Creek in Ohio; and French Creek, LeBoeuf Creek and the Allegheny River in Pennsylvania (Stansberry et al. 1982).

**State Distribution:** The range of the northern riffleshell in Michigan is restricted to the eastern border of the state. Historically, northern riffleshell mussels occurred in the Black River in Sanilac Co.; Lake St. Clair and the Detroit and Huron Rivers in Wayne Co.; and Macon Creek and the River Raisin in Monroe Co. Over the past 20 years, northern riffleshells have only been found in the Black, St. Clair and Detroit Rivers.

**Recognition:** The northern riffleshell is of moderate size with large adults reaching two inches. The shell is ovate to quadrate in shape, becoming thicker anteriorly. The shell is light green-yellow to olive green, with dark, narrow, closely-spaced rays. The hinge teeth are medium-sized and well developed. There is consider-

able sexual dimorphism in riffleshells. Male shells have a sulcus, or ridge, running postero-ventrally from just below the beak. Female shells have a low bulge along the postero-ventral edge of the shell that accommodates the enlarged marsupium containing eggs.

**Best Survey Time:** April through June.

**Habitat:** The northern riffleshell requires swiftly moving, well-oxygenated water. Riffle and run areas with fine to coarse gravel are the preferred habitats.

**Biology:** The northern riffleshell has been observed to be gravid from late summer to the following spring, at which time the glochidia are released (Ortmann 1912, Clarke 1987). The females use the posterior portion of the outer gill as a brood pouch, or marsupium, that is accommodated by the swelling of the female shell. Under laboratory conditions, glochidia developed with brown trout, bluebreast darter, banded darter and banded sculpin hosts (O'Dee and Watters 1998). However, these fish species do not occur in the Michigan range of the riffleshell, suggesting that there are additional hosts yet to be identified (Goforth 1999). Glochidia are semicircular in shape, with a straight hinge line and no hooks. It is unknown at what age riffleshells are reproductively mature. Because of their small size, it is difficult to determine whether juveniles are present in a population. This species may reach 15 years of age based on studies of annular growth rings. Like all mussels, the northern riffleshell is a filter feeder. Because the riffleshell filters the water for food



and oxygen, high levels of siltation can smother siphoning mussels. The exotic zebra mussel is a threat to the riffleshell, not only due to competition for food, but also because zebra mussels attach to the shells of native mussels making it difficult for the mussels to move and feed properly.

The riffleshell occurs at two sites in Michigan, the Black River in Sanilac Co. and the Detroit River in Wayne Co. Historically, the Black River has had a strong population of riffleshells. However, dredging of the river in 1948 and 1989 decimated this population. No live individuals were found at these sites in 1998, although recently spent shells found indicate that there may still be some individuals remaining. The Detroit River may still have a viable reproducing population, despite human impacts and zebra mussel infestations in the river. In 1992, a "Rescue the Riffleshell" program transplanted 110 mussels from the Detroit River to the St. Clair River. The current status of this translocation is unknown.

**Conservation/Management:** The future of the northern riffleshell depends on the protection and preservation of habitat and host fish. Siltation and run-off must be reduced to facilitate the recovery of this species. Damming and dredging of rivers have had a negative effect on the riffleshell, altering fast flowing, clear water habitats and making them unsuitable for sustaining riffleshell populations. The continued spread of exotic species such as the zebra mussel throughout Great Lakes tributary rivers is a continuing and increasing threat to all native species. Transplantation of viable populations into more protected and preserved habitats may be required to insure the long-term viability of this species.

**Research Needs:** To protect and preserve the reduced populations of northern riffleshells in Michigan, life history and ecological requirements for this species must be better understood. Perhaps of greatest importance is the identification of successful host species so that these fish can be protected as well.

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#### Abstract citation:

Carman, S. and R. R. Goforth. 2000. Special animal abstract for *Epioblasma torulosa rangiana* (northern riffleshell mussel). Michigan Natural Features Inventory, Lansing, MI. 2pp.

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Funding for abstract provided by Michigan Department of Natural Resources-Forest Management Division and Wildlife Division.

