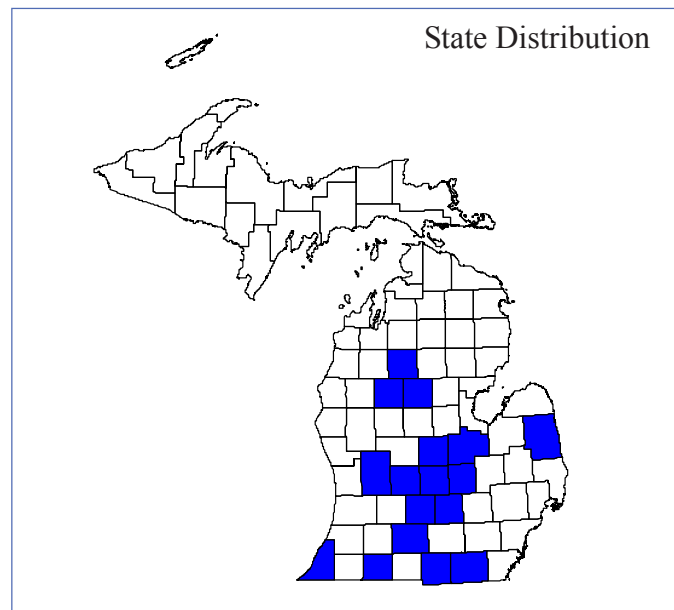
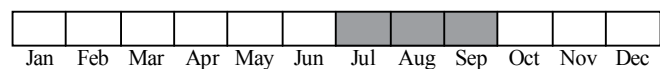




Photograph courtesy of Kevin Cummings,
Illinois Natural History Survey



Best Survey Period



Status: State special concern

Global and State Rank: G4/S2S3

Family: Unionidae (Freshwater Mussels)

Synonyms: The elktoe has also been called the Ridged Wedge-Mussel (Clarke 1981).

Total Range: The elktoe is widespread in North America although patchy in distribution. It occurs in the Great Lakes and St. Lawrence drainages south to the Tennessee drainage. It is most abundant in the center of its range (NatureServe).

While in Wisconsin, Illinois, Tennessee, Pennsylvania and New York the elktoe is considered apparently secure (S4), in other areas of its range it is less secure. The elktoe is considered possibly extirpated (SH) in Alabama and critically imperiled (S1) in Quebec, South Dakota, Kansas, Oklahoma and Vermont. In Minnesota, Missouri, Kentucky, West Virginia and Virginia, the elktoe is considered imperiled (S2) and in Ontario, Iowa and Indiana it is vulnerable (S3). In several states, the elktoe is unranked (S?) (North Dakota, Nebraska, Arkansas, Ohio and Washington D.C.) (NatureServe).

State Distribution: The elktoe has been found in several areas of Lower Michigan. Historically, it was present in the Grand River in Kent and Ionia Counties (Van der Shalie 1945). Recent surveys indicate that it still occurs in the Grand River, but in reduced numbers (Goforth et al. 2000). Live specimens have also been found in the St. Joseph River in Berrien and Calhoun Counties, St. Joseph (Maumee) River in Hillsdale County, and the Raisin River in Lenawee County (Badra and Goforth 2002, Goforth et al. 2001, Badra and Goforth 2001). During a survey of the Muskegon River watershed in the summer of 2002, live elktoe were found in Osceola County and spent shells were found in Clare and Missaukee Counties. Other recent surveys have found live elktoe in the Pine River in Montcalm County, the Maple River in Gratiot and Clinton Counties, the Looking Glass River in Clinton County and the Red Cedar River in Ingham County. Spent shells have been found recently in the Tittabawassee River in Saginaw County, the Thornapple River in Eaton County, the St. Joseph River in St. Joseph County, and the Black River in Sanilac County, but no live specimens have been recovered in these areas (Badra and Goforth 2002).

Recognition: The elktoe is a relatively small, thin-shelled mussel, that may reach up to four inches in length. The shell of the elktoe is elongate, with a rounded anterior end and an angled, square posterior



end. It has a prominent posterior ridge, and the posterior slope is ribbed. The umbo is large and centrally located above the hinge line. Beak sculpture is heavy and consists of three to four double-looped ridges. Lateral teeth are generally absent, and one, occasionally two, thin, elongate pseudocardinal teeth are present. The exterior color of the elktoe shell is yellowish green, with prominent broad dark green rays and dots. The nacre is white and may have some salmon coloring near the beak. The foot of the elktoe is bright orange (Cummings and Mayer 1992, Watters 1995, NatureServe).

In Michigan, the elktoe may be confused most often with the strange floater (*Strophitus undulatus*). The strange floater lacks the rays and flecks of the elktoe, as well as the heavy beak sculpture. The elktoe may also be confused with the snuffbox (*Epioblasma triquetra*), slippershell mussel (*Alasmidonta viridis*) and deertoed (*Truncilla truncata*). These species lack the ribs found on the posterior dorsal area of the elktoe.

Best Survey Time: While the elktoe is present in its habitat throughout the year, it is easiest to locate these mussels from July through September, when water levels are typically low and turbidity is generally reduced.

Habitat: The elktoe is found in small to large sized streams and small to medium rivers. It is a riffle species, preferring swifter currents over packed sand and gravel substrates. The elktoe is typically only found in clean, clear water (Cummings and Mayer 1992, Watters 1995, NatureServe).

Biology: Little is known with regard to elktoe biology. It is a hermaphroditic species, containing both male and female sex parts (Clarke 1981). Fertilization is internal. Sperm is released into the water and is then taken in through the siphon from the water column. The elktoe is bradytic, meaning that it is a long-term breeder. While fertilization generally occurs in July, the developing glochidia (larval mussels) are held in the gills until the following June, at which time the parasitic glochidia are released and adhere to a fish host (Oesch 1984). Known hosts include the white sucker (*Catostomus commersoni*), northern hog sucker (*Hypentelium nigricans*), shorthead redhorse (*Moxostoma macrolepidotum*), rockbass (*Ambloplites*

rupestris) and warmouth (*Lepomis gulosus*) (Oesch 1984, NatureServe).

After metamorphosis, the young mussels drop to the substrate, where they spend the remainder of their lives buried in the substrate. The elktoe is a filter feeder, obtaining nutrition from material suspended in the water column.

Conservation/Management: The elktoe needs clean, fast-flowing water to survive. Therefore, changes to its habitat, such as river impoundment, siltation and channel disturbances, including dredging, negatively affect this species. Pollution from point (industrial and residential discharge) and non-point (siltation, herbicide and surface run-off) sources is also a threat to mussels and should be limited and monitored to insure compliance with the Clean Water Act. It is essential to protect not only the habitat of the elktoe, but also the white sucker, northern hog sucker, shorthead redhorse, rockbass and warmouth, as they serve as hosts for the glochidia.

Research Needs: A thorough survey needs to be completed to determine the current distribution of the elktoe in Michigan. A thorough review of literature and museum records needs to be completed to detail the historical distribution of the elktoe in Michigan. Historical sites need to be revisited to determine the extent of populations present, and suitable habitat surveyed for the presence of additional populations.

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