Natural Heritage & Endangered Species Program

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Massachusetts Division of Fisheries & Wildlife

Eastern Pearlshell
Margaritifera margaritifera

State Status: **None**
Federal Status: **None**

SPECIES DESCRIPTION: The Eastern Pearlshell (*Margaritifera margaritifera*, Linnaeus 1758), is a medium- to large-bodied mussel in the family Margaritiferidae. It is the only representative of this family in Massachusetts and the Northeastern United States. In Massachusetts, specimens rarely exceed 5.5 inches in total length. The periostracum is thick and durable. Adult shells are rough and nearly black, whereas juveniles can have smooth, brown-golden shells. Shells are laterally compressed, and the beaks barely extend above the hinge line. A broadly arching dorsal margin and a slightly indented ventral margin add to a kidney-shaped appearance of the shell. The left valves have two well-developed pseudocardinal teeth that pair with one on the right valve, and both valves lack lateral (hinge) teeth. The nacre is white to bluish-white, and the center of the nacre contains distinctive pits with a faint tail toward the anterio-dorsal surface. The mantle tissue is typically dark reddish-brown to black, and there is no separation between exhalant and inhalant siphon apertures (Smith 1991, Nedeau 2008).

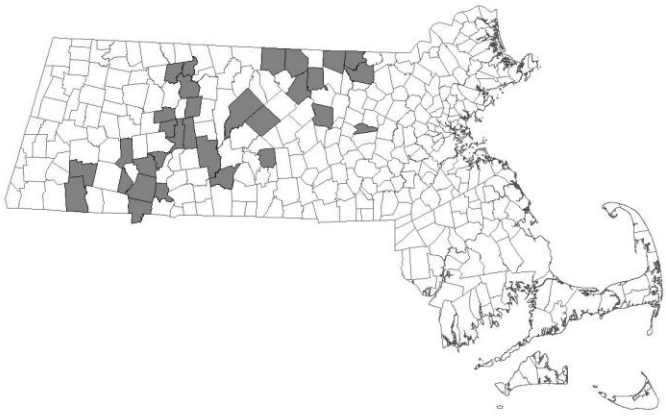

Figure 1: Massachusetts Towns with Recent or Historic Occurrences of Eastern Pearlshell

Photo by and courtesy of Ethan Gordon.

The Eastern Pearlshell has the greatest fecundity and smallest glochidia of all freshwater mussels in North America. Individuals may take 20 years to reach sexual maturity, and reported lifespans have surpassed 100 years. Host fish species in Massachusetts are likely native Brook Trout (*Salvelinus fontinalis*) and Atlantic Salmon (*Salmo salar*), as well as introduced Rainbow Trout (*Onchorynchus mykiss*) and Brown Trout (*Salmo trutta*) (NatureServe 2014). Female mussels are gravid from late summer through October and release of glochidia is dependent on water temperatures. Glochidia are triangular with hooks for attachment to hosts, approximately 0.6 mm in length and grow several times their size on fish hosts (Smith 1976). Metamorphosis is also dependent on water temperatures, but may last up to 10 months (Nedeau 2008).

DISTRIBUTION AND ABUNDANCE: Eastern Pearlshell is native to northern Europe, eastern North America, and Eurasia. European countries have witnessed extirpation or declines in distribution as high as 90%. Massachusetts appears to have a stable population of Eastern Pearlshell, though the state status (S rank) is also currently under review. Massachusetts,

Maine, Connecticut, and New Jersey, other northeastern states have listed the species as vulnerable (S3: New Hampshire), imperiled (S2: New York, Vermont) and critically imperiled (S1: Pennsylvania). In Canadian provinces, populations are currently unranked (SNR: Prince Edward Island, Labrador), vulnerable (S3: Quebec) or apparently secure (S4: New Brunswick, Newfoundland) (NatureServe 2014). Eastern Pearlshell is also currently listed as Special Concern in Connecticut, Threatened in Vermont, and Endangered in Rhode Island and New Jersey (Nedeau 2008).

Historic and current records of Eastern Pearlshell in the state are distributed from 31 towns and 8 major watersheds (Figure 1). Massachusetts NHESP databases have data on 104 extant records (i.e., record is less than 25 years old and contains living animals), and two records from shell only (Figure 2). Nedeau and Low (2008) studied Eastern Pearlshell from the Farmington River in Massachusetts and Connecticut, and reported length frequency distributions that suggest some populations are composed of primarily larger and older individuals. Given the long time to maturity in this species, lack of recruitment evidence is a concern for population persistence.

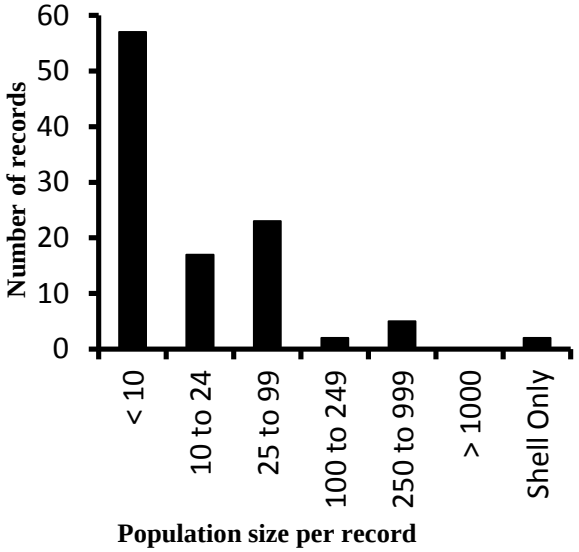

Figure 2: Distribution of Eastern Pearlshell Population Sizes in Massachusetts

HABITAT DESCRIPTION: Eastern Pearlshell inhabits cold water streams and rivers, but the best populations occur in small streams with intact riparian canopy, high dissolved oxygen and excellent water quality (Nedeau 2008). Eastern Pearlshell habitat is consistent with high-quality trout habitat in lotic systems, and could benefit from protection of cold-water fishery resources throughout Massachusetts.

THREATS: Eastern Pearlshell is sensitive to nutrient pollution and eutrophication; alterations in substrate type and stream channel morphology, increases in stream temperature, and increased acidity in streams (Nedeau 2008). Acid deposition, alterations of riparian and watershed landuse and forest cover, increased nutrient pollution in streams, changes in in-stream and environmental flows, and loss or reduction of host fish habitat are likely threats to Eastern Pearlshell. Because of the species preference for high-quality cold-water habitats, results of global climate change on weather patterns in Massachusetts could further restrict this species' range. In particular, increases in surface water temperature, and increased road salt use and metal contamination of streams from changes in winter weather patterns are concerning factors.

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Prepared by P.D. Hazelton, 2015

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

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