Natural Heritage
& Endangered Species
Program

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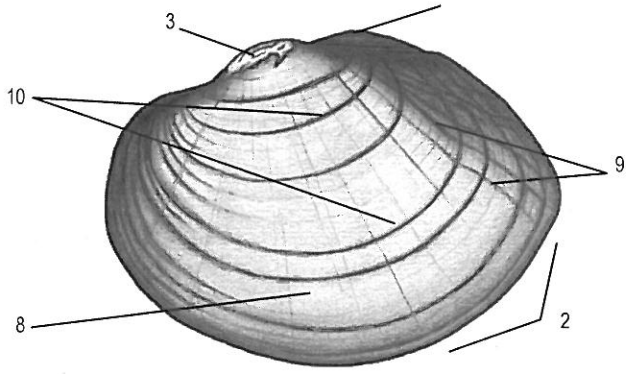
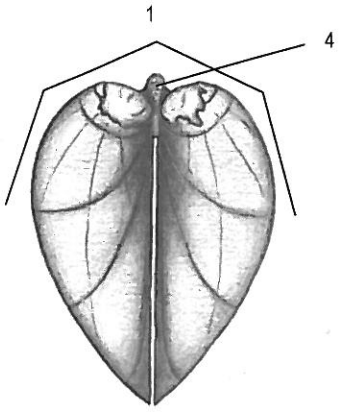
Tidewater Mucket
Leptodea ochracea

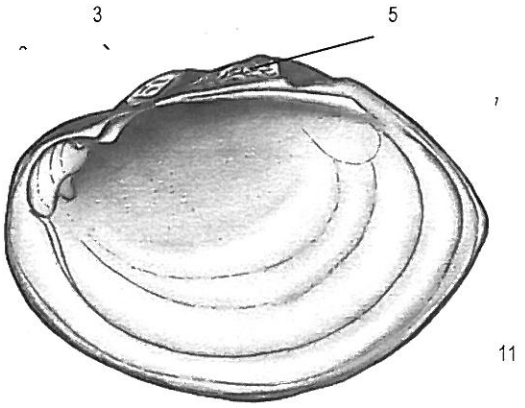
State Status: **Special Concern**
Federal Status: None

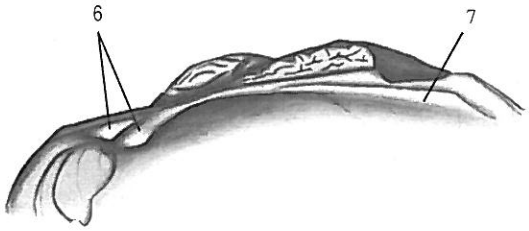
Description: The tidewater mucket is a medium-sized mussel that rarely exceeds four inches (100 mm) in length. The shape is ovate and the shells are laterally inflated (1). Shells of sexually mature females are usually more rounded toward the posterior ventral margin (2), and thus more oval-shaped than males or adolescent females. Shells are uniformly thin but quite strong. The beaks (3) are prominent and raised above the hinge line (4), and the hinge itself (5) is also quite prominent. Hinge teeth are thin and delicate. The left valve has two pseudocardinal teeth and two lateral teeth, and the right valve has two pseudocardinal teeth (6) and one lateral tooth (7). Pseudocardinal teeth are rather thin and elongate (compared to the stout triangular teeth of some other species), and are located anterior of the beak. The periostracum (8) is usually yellowish or greenish-brown, sometimes with a bronze or reddish hue. Juveniles tend to be more yellowish but their shells darken with age. Fine green rays (9) are usually evident on the shell, especially in younger specimens. Dark interannular lines (10) may also be evident on clean shells. The nacre (11) is usually pinkish or salmon-colored.

Similar Species in Massachusetts: It is often very difficult to distinguish this species from the yellow lampmussel, especially for the novice. Compared to the yellow lampmussel, the tidewater mucket is smaller, it has a thinner shell, and it has more delicate hinge teeth. Its shell is not nearly as shiny or yellow as the shell of the yellow lampmussel, and the tidewater mucket has dark interannular lines (10) on the periostracum. The nacre of the tidewater mucket is usually pinkish or salmon colored, whereas it is white or bluish-white in the yellow lampmussel. Other differences are described in Nedeau *et al.* 2000 and Nedeau 2008. The only places currently known in Massachusetts where these two species overlap is the Connecticut River. Live tidewater muckets can sometimes be confused with eastern lampmussels (a more common species), especially if they have dark or eroded shells, and an expert should be consulted for accurate identification.









Text contributed by Ethan Nedeau, December 2007, Tidewater Mucket Fact Sheet.

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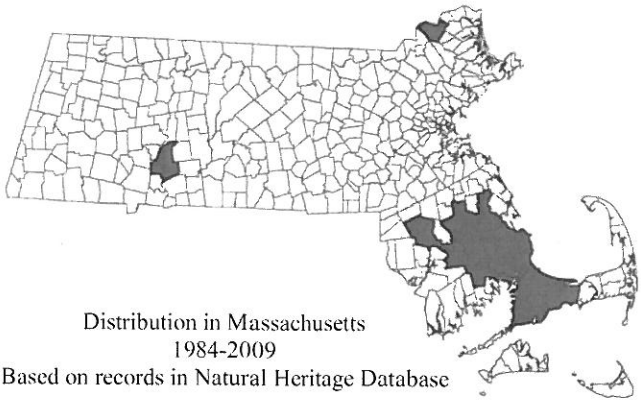
Range: The tidewater mucket is found in Atlantic coastal drainages from Georgia to Nova Scotia. Most of the Massachusetts records are from coastal plain ponds in southeastern Massachusetts and Cape Cod. Although this species occurs throughout the lower Connecticut River in Connecticut, it has only been found in a very limited area of the river in Massachusetts (Nedeau 2008).

Habitat: The tidewater mucket, as its name suggests, inhabits coastal freshwater environments despite that none of its confirmed fish hosts are anadromous. It occurs in small to large rivers, ponds, and lakes that have, or historically had, direct unimpeded connections with coastal waters. In the Connecticut River watershed, it inhabits muddy, sandy, and gravelly substrates. They have been found in water depths of one to more than 25 feet, and in a variety of flow conditions, but seem to prefer depositional areas with slow currents. Coastal plain ponds of southeastern Massachusetts with springtime alewife runs may provide the best habitat for this species; densities exceeding 10-15 animals per square meter have been found in the sandy bottoms of these ponds (Nedeau and Low 2008).

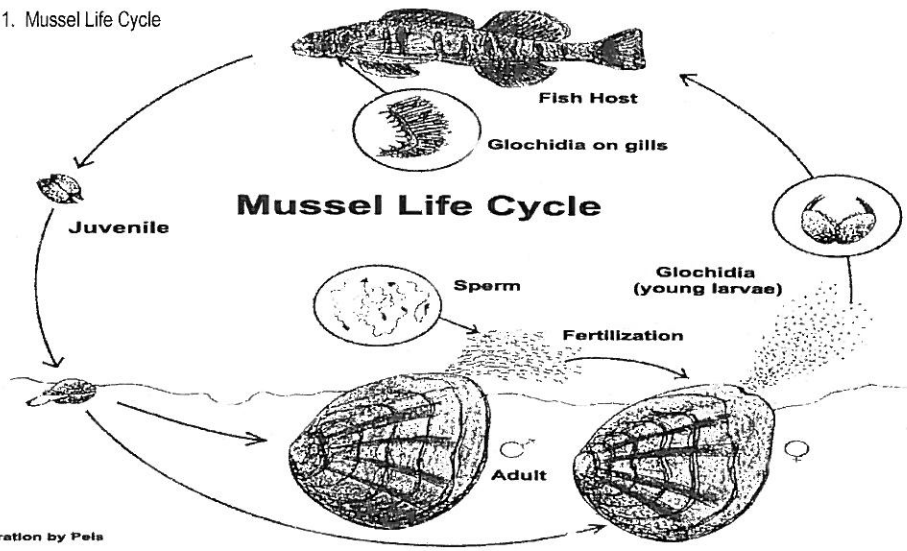
Biology: Tidewater muckets are essentially sedentary filter feeders that spend most of their lives partially burrowed into the bottoms of rivers, streams, lakes, and ponds. Like all freshwater mussels, larvae (called glochidia) of the tidewater mucket must attach to the gills or fins of a vertebrate host to develop into juveniles. Wick (2003) found that white perch was a suitable host for the tidewater mucket. The suitability of alewife as a host for tidewater muckets was also tested but all fish perished before results were apparent. Kneeland and Rhymer (2008) found that the banded killifish was a potential host for tidewater muckets in Maine, based on the observation of one fish that was heavily infested with 21 glochidia. The white perch and banded killifish are each tolerant of brackish conditions and prefer the same types of habitats as tidewater muckets. The potential role of alewife as a host fish for the tidewater mucket should be further investigated. Also, the striped bass is closely related to the white perch (in the genus *Morone*) and its recent resurgence in the lower Connecticut River might be related to a recent perceived recovery of tidewater muckets in this same area.



Distribution in Massachusetts
1984-2009
Based on records in Natural Heritage Database

Population Status in Massachusetts: The tidewater mucket is listed as a species of special concern in Massachusetts, as threatened in Connecticut, New Jersey, and Maine, and "at risk" in Nova Scotia. Some coastal plain ponds in Massachusetts support remarkably high densities of tidewater muckets with evidence of successful reproduction, whereas many others have smaller populations with animals in poor condition. The viability of the population in the Massachusetts portion of the Connecticut River watershed is uncertain and here the species is considerably more imperiled. This species is

Figure 1. Mussel Life Cycle



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currently known from 21 lakes/ponds and two rivers in Massachusetts, however, less than ten of these sites are known to support sizeable populations. There are an additional 5 historic occurrences that have not been documented in the last 25 years and therefore are not subject to MESA protection. Surveys and a careful status review are needed.

Threats: Because tidewater muckets are essentially sedentary filter feeders, they are unable to flee from degraded environments and are vulnerable to the alterations of water bodies. Tidewater muckets occur in lakes and rivers, and the threats in these two habitats are slightly different. Overlapping threats include nutrient enrichment, sedimentation, other forms of pollution, non-native and invasive species, and the many consequences of urbanization. River populations of tidewater muckets are threatened by alteration of natural flow regimes, encroachment of river corridors by development, habitat fragmentation caused by dams, and a legacy of land use that has greatly altered the natural dynamics of river corridors (Nedeau 2008). Lake populations are challenged by intense development, modification and recreational use of sensitive shoreline habitats, and increasing eutrophication. Dams and other stream barriers in the rivers that connect lakes to coastal waters may also affect lake populations of tidewater muckets. Invasive plants and animals, such as European milfoil and Asian clams, are having severe impacts on the fragile ecology of coastal plain ponds. The ultimate consequences on tidewater muckets and other native species are not completely known, but the prognosis is bleak. In addition, the long-term effects of regional or global problems such as acidic precipitation, mercury, and climate change are considered severe but little empirical data relates these stressors to mussel populations.

Conservation and Management Recommendations: Discovery and protection of viable mussel populations is critical for the long-term conservation of freshwater mussels. Currently, much of the available mussel occurrence data are the result of limited presence/absence surveys. In addition, regulatory protection under MESA only applies to rare species occurrences that are less than 25 years old. Surveys are critically needed to monitor known populations, evaluate habitat, locate new populations, and assess population viability so that conservation and restoration efforts, as well as regulatory protection, can be effectively targeted. Coastal plain ponds are critical to the long-term viability of the tidewater mucket in Massachusetts, and these habitats are also experiencing intense development pressure and recreational use. Understanding this threat and developing conservation and management strategies is a high priority for NHESP. The NHESP has produced *Freshwater Mussel Habitat Assessment* and *Survey Guidelines* and has been working with qualified experts to conduct surveys. Other conservation and management recommendations include:

- Understand the effects of shoreline development and recreational use of lakeshores
- Maintain naturally variable river flow and limit water withdrawals
- Identify, mitigate, or eliminate sources of pollution to waterbodies
- Addressing the problems of combined sewer overflows and the other effects of urban, industrial, and agricultural runoff is critical for protecting and restoring the tidewater mucket in the Connecticut River watershed
- Identify dispersal barriers for host fish, especially those that fragment the species range within a river or watershed, and seek options to improve fish passage or remove the barrier
- Maintain adequate vegetated riparian buffer along rivers and lakes
- Protect or acquire land at high priority sites

Further Reading

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Updated: 11/01/09

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