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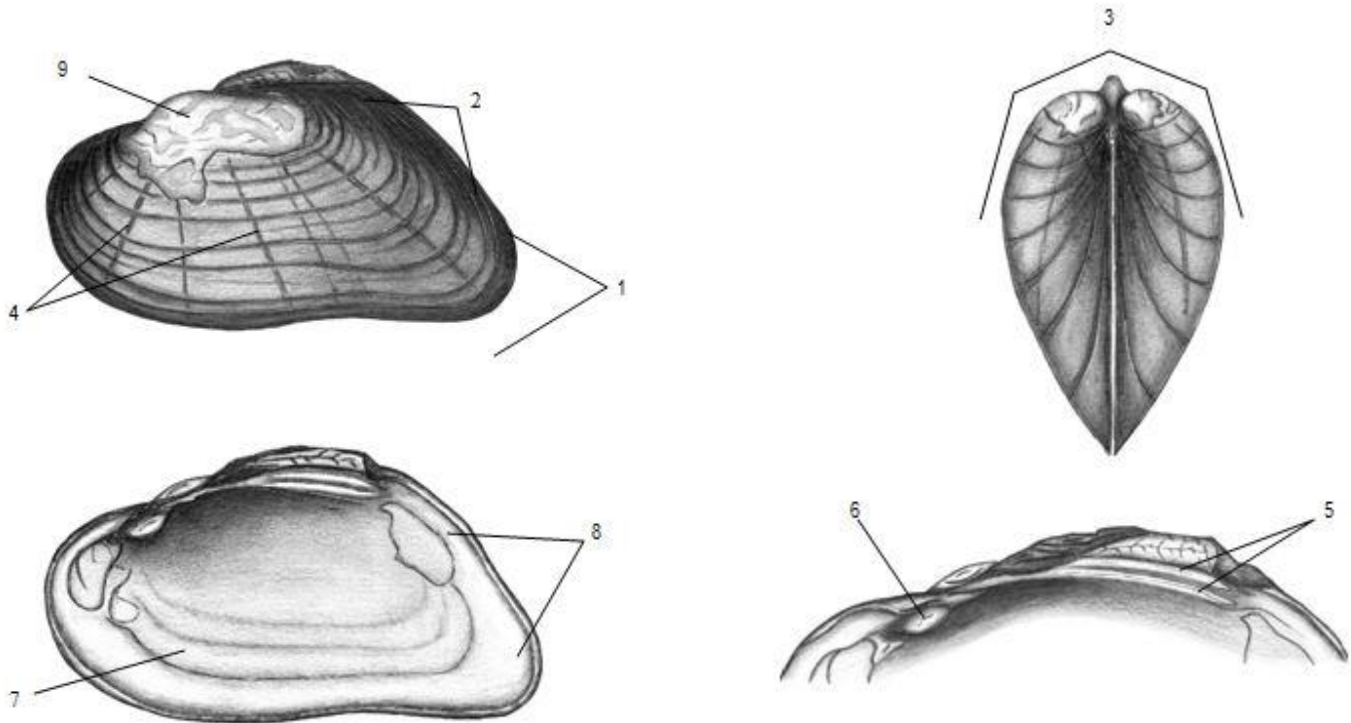
Massachusetts Division of Fisheries & Wildlife

**Dwarf Wedgemussel
*Alasmidonta heterodon***

State Status: **Endangered**
Federal Status: **Endangered**

DESCRIPTION: The Dwarf Wedgemussel is a small species that rarely exceeds 1.75 inches (45 mm) in length; the largest known specimens came from a New Hampshire river and were 2.2 inches (56 mm) long. The shell is triangular or trapezoidal. The posterior end of the shell tapers to a rounded point (1) and has been described as “wedge-shaped,” although this distinctive shape varies with the size and gender of an individual. There is a prominent rounded ridge along the dorso-posterior slope (2). The valves are usually laterally compressed to slightly inflated (3); mature females tend to be more inflated than males. The shell is smooth and

may be yellowish-brown, olive-brown, or brownish-black in color. Faint greenish rays (4) are evident on the shells of juveniles and light-colored adults. Hinge teeth are present but delicate. This is the only species in North America that has two lateral teeth (5) on the right valve and one lateral tooth on the left valve (all other species with lateral teeth have the opposite configuration). The Dwarf Wedgemussel also has pseudocardinal teeth—two on the left valve and one (6) on the right valve. The color of the nacre (7) is bluish-white and often iridescent along the posterior margin (8). The foot is often a pale beige or slightly orange color.



Illustrations by Ethan Nedean

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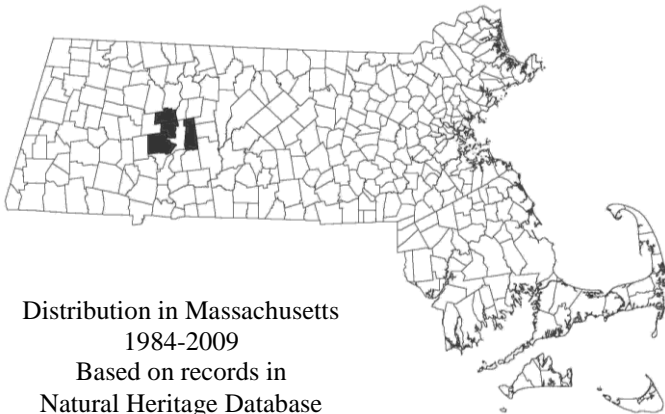
Massachusetts Division of Fisheries & Wildlife

1 Rabbit Hill Rd., Westborough, MA; tel: 508-389-6300; fax: 508-389-7890; www.mass.gov/dfw

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SIMILAR SPECIES IN MASSACHUSETTS: The small size, wedge shape, and hinge tooth morphology of this species make shells easily distinguishable from all other species in New England. None of the species it might be confused with (Brook Floater, Triangle Floater, and Creeper) has lateral teeth. However, live animals, which are often identified based on variable features such as shape or color, can sometimes be difficult to distinguish from a young Brook Floater, Triangle Floater, or Creeper. Unlike The Brook Floater, the Dwarf Wedgemussel lacks corrugations along the dorso-posterior slope and its feet are not cantaloupe colored. The Triangle Floater is more subovate and laterally inflated than the Dwarf Wedgemussel and has coarse uneven beak sculpturing (9). To the novice, it is most difficult to distinguish between Dwarf Wedgemussels and young Creepers because their shape and color are similar. The Dwarf Wedgemussel is a federally endangered species and it is imperative that animals are not harmed or removed from the water. Furthermore, commonly confused species are also protected in Massachusetts and an expert should always be consulted.



RANGE: The historic range of the Dwarf Wedgemussel included 70 locations in 15 major Atlantic coastal watersheds from North Carolina to eastern New Brunswick. By the early 1990s, its range was thought to have shrunk to approximately 20 locations in eight watersheds (USFWS 1993). In the last 15-18 years, biologists have rediscovered populations that were considered extirpated and discovered entirely new populations (Nedeau 2006). It is currently known from 70 locations in 15 major watersheds, with the largest populations in the Connecticut River watershed (Nedeau

2008). In Massachusetts, live animals have been found in only three water bodies in the Connecticut River watershed in the last 25 years.

HABITAT: The Dwarf Wedgemussel is a generalist in terms of its preference for stream size, substrate, and flow conditions (Nedeau 2008). It inhabits small streams less than five meters wide to large rivers more than 100 meters wide. It is found in a variety of substrate types including clay, sand, gravel, and pebble, and often in areas of rivers with large amounts of silt (e.g., depositional areas and near banks). The Dwarf Wedgemussel inhabits very shallow water along streambanks and can move laterally or horizontally in the substrate as water levels fluctuate, but they have also been found at depths of 25 feet in the Connecticut River. The Dwarf Wedgemussel does not inhabit lakes or reservoirs but may occur in small impoundments created by run-of-river lowhead dams, beaver dams, or by natural landforms that create deep and stable stream reaches. An increasing number of published studies and field observations suggest that stable flow and substrate are critical for this species (reviewed in Nedeau 2008). Dwarf Wedgemussels are often patchily distributed in rivers, especially those with highly variable physical habitat and fragmenting features such as dams and culverts. Identifying and protecting these patches are critical for conserving the species.

BIOLOGY: Dwarf Wedgemussels are essentially sedentary filter feeders that spend most of their lives partially burrowed into the bottoms of rivers and streams. Like all freshwater mussels, larvae (called glochidia) of the Dwarf Wedgemussel must attach to the gills or fins of a vertebrate host to develop into juveniles. The Tessellated Darter is considered the primary host in the Connecticut River watershed and its range is most congruent with that of the Dwarf Wedgemussel, but several other fish (e.g., Atlantic Salmon) have been identified as potential hosts (Nedeau 2008). Tessellated Darters do not move very far—usually less than 100 meters during their short lives—thus the dispersal ability of Dwarf Wedgemussels may be low and the rate at which they might recolonize former habitat is slow (McLain and Ross 2005). The life span of a Dwarf Wedgemussel is considered less than 12 years (Michaelson and Neves 1995), which is young compared with many other freshwater mussel species in the Northeast. Short life spans, low fecundity, high degree of host specificity, limited dispersal ability of its primary

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host, and low population densities likely all contribute to the endangered status of the Dwarf Wedgemussel.

POPULATION STATUS IN MASSACHUSETTS:

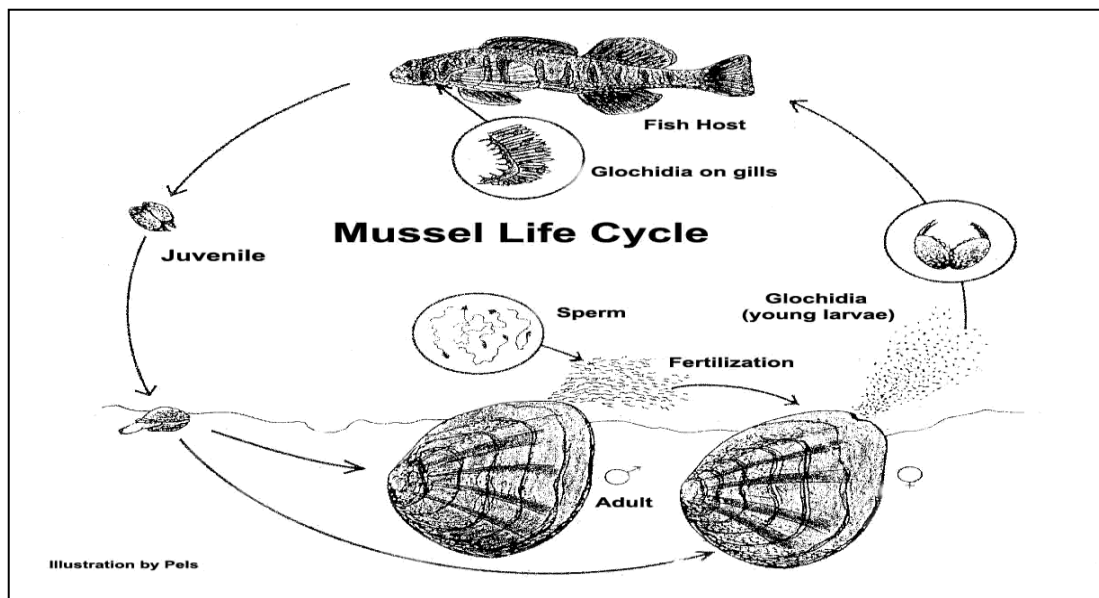
The Dwarf Wedgemussel is one of the most endangered mussels in all of northeastern North America. It is listed as Endangered in Massachusetts and protected under the Massachusetts Endangered Species Act (MG.L. c.131A) and its implementing regulations (321 CMR 10.00), and is the only federally endangered mussel in the state. In Massachusetts, it was historically known from the mainstem Connecticut River, several of its tributaries, and four other rivers in the southeastern and northeastern parts of the state. It is now believed extirpated from most of these sites (USFWS 1993) and recent (<25 years) records are confined to just four water bodies within the Connecticut River watershed. Dwarf Wedgemussels occur discontinuously within these river systems and usually at low population densities, raising concern about the viability of the populations.

THREATS: Because Dwarf Wedgemussels are essentially sedentary filter feeders, they are unable to flee from degraded environments and are vulnerable to the alterations of waterways. Some of the many threats to the Dwarf Wedgemussel and its habitat in Massachusetts include: nutrient enrichment, sedimentation, point-source pollution, alteration of natural flow regimes, water withdrawal, encroachment of river corridors by development, non-native and invasive species, habitat fragmentation caused by dams

and road-stream crossings, and a legacy of land use that has greatly altered the natural dynamics of river corridors (Nedeau 2008). Bacterial pathogens and nitrogenous wastes can cause problems downslope and downstream of agricultural lands; ammonia-nitrogen is considered particularly toxic to mussels. In 2001, runoff from a small farm killed more than 25 Dwarf Wedgemussels and hundreds of other mussels in a river in Massachusetts. Livestock allowed access to streams can severely damage mussel communities by trampling mussels, causing sedimentation, destabilizing streambanks, and defecating in the water. 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. As local populations of Dwarf Wedgemussels decline and/or become extirpated in response to these threats, dispersal distances between populations increase, weakening overall reproductive success, and ultimately genetic diversity.

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 at road crossings or other easily accessed points of entry. Regulatory protection under MESA only applies to rare species occurrences that are less than 25 years old. Surveys are critically



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needed to monitor known populations, evaluate habitat, locate new populations, and assess population viability at various spatial scales (e.g., river, watershed, state) so that conservation and restoration efforts, as well as regulatory protection, can be effectively targeted. 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:

- Maintain naturally variable river flow and limit water withdrawals;
- Identify, mitigate, or eliminate sources of pollution to rivers;
- Identify dispersal barriers (e.g., dams, impassable culverts) 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;
- Protect or acquire land at high priority sites.

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