Natural Heritage & Endangered Species Program

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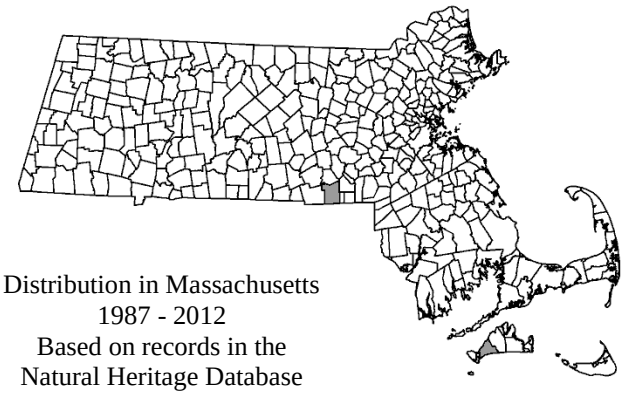
Massachusetts Division of Fisheries & Wildlife

Smooth Branched Sponge
Spongilla aspinosa

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

DESCRIPTION: The Smooth Branched Sponge can be found in freshwater ponds, encrusting surfaces or as a finger-like, branching structure growing on rock or wood. The sponge is typically bright green in color, but may be drab brown or grayish under low-light conditions. Close observation with a hand lens or the naked eye will reveal the spicules – hard, thin, supporting structures which form the "skeleton" of the sponge. The Smooth Branched Sponge contains both megascleres – large skeletal spicules – and smaller microscleres.

SIMILAR SPECIES: Identification of the Smooth Branched Sponge requires use of a microscope. The genus *Spongilla* is distinguished by its thin finger-like growth form, smooth megascleres, and pointed microscleres, which in *S. aspinosa* also appear smooth. The closely related *S. lacustris* generally displays microscleres which are minutely spined, though in acidic waters, the spines may be absent. The two species are best distinguished by the arrangement and appearance of the gemmules, spherical structures which allow for asexual reproduction. Mature specimens of *S. lacustris* contain large numbers of gemmules, which are concentrated at the base of the sponge in a single layer. These gemmules are reinforced with coarsely-spined gemmoscleres, a specialized class of spicule. Gemmules are rarely found in *S. aspinosa*. Where present, they are distributed in rough clusters throughout the tissue of the sponge, and are not supported by true gemmoscleres.



Distribution in Massachusetts
1987 - 2012
Based on records in the
Natural Heritage Database

HABITAT IN MASSACHUSETTS: Only two populations of Smooth Branched Sponge have been found in Massachusetts, in ponds in Dukes and Worcester counties. Both locations show little to no human disturbance and are naturally acidic sites, with a pH range around 5.0. Nationwide, Smooth Branched Sponge has only been reported from acidic waters, with a pH range of 4.0-5.5. However, naturally acidic waters in this range are common in eastern Massachusetts, suggesting that other as-yet-unknown factors contribute to its rarity (such as the lack of observers with the skills to identify this species).

RANGE: The true range of this species is unknown. The Smooth Branched Sponge has been collected in scattered localities, including ponds in Massachusetts, New Jersey, Virginia, Indiana, and eastern Canada.

LIFE CYCLE/BEHAVIOR: Sponges are filter-feeders, taking in water and directing it through feeding canals. Food particles are absorbed by cells lining the canal through phagocytosis, and transferred to other cells for digestion.

Sexual reproduction is carried out by specialized cells that develop from normal tissue during specific times of year. Sperm are released by male sponges into the open water, and ingested into female sponges during water uptake associated with feeding. Fertilized eggs develop into larvae, which undergo extensive development within the female sponge. They are then released and swim freely until they find a suitable substrate, where

they metamorphosize into stationary adults. Little research has been done on the Smooth Branched Sponge in particular, but individuals of the closely-related species *S. lacustris* have been shown to switch sexes between years.

Asexual reproduction can occur through simple fragmentation of the parent sponge, or through the formation of spherical gemmules, which are resistant to environmental stresses like low oxygen or cold temperatures. Many freshwater sponges undergo a dormancy period in the winter months, in which the mature sponge dies back and much of the tissue is converted into hardy gemmules. The Smooth Branched Sponge is unusual in that it rarely forms gemmules. This sponge may be more resistant to cold temperatures than related species. Potts (1887) noted the verdant growth of this sponge: "even after February has for weeks covered it with a thick sheet of ice, the sponge has been seen still green and in apparently as healthy growth as ever." The bright green color of this and other sponges is attributable to symbiotic relationships formed with photosynthetic algae.

POPULATION STATUS IN MASSACHUSETTS:
The Smooth Branched Sponge is listed under the Massachusetts Endangered Species Act as a Species of Special Concern. All listed species are protected from killing, collecting, possessing, or sale and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. In addition, listed animals are specifically protected from activities that disrupt nesting, breeding, feeding, or migration. The species has been reported from only two localities within Dukes and Worcester counties. Since it occupies undisturbed ponds, it is expected to be sensitive to changes in water chemistry from pollution, and disturbance along shore.

MANAGEMENT RECOMMENDATIONS:
Pollution of the naturally acidic ponds where Smooth Branched Sponges are found should be avoided, mitigated, or eliminated. Human disturbance of these habitats should be avoided. All active management of state-listed populations is subject to review under the Massachusetts Endangered Species Act, and should be planned in close consultation with the Massachusetts Natural Heritage & Endangered Species Program.

REFERENCES:
Potts, E. 1887. Fresh water sponges: A monograph. *Proc. Acad. Nat. Sci. Phila*.

Smith, D.G. 1991. Keys to the freshwater macroinvertebrates of Massachusetts. Douglas G. Smith, Department of Zoology, University of Massachusetts, Amherst, Massachusetts.

Thorp, J.H., and A.P. Covich, editors. 2001. *Ecology and Classification of North American Freshwater Invertebrates*, Second Edition. San Diego: Academic Press.

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