



Natural Heritage & Endangered Species Program

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Massachusetts Division of Fisheries & Wildlife

Mountain Firmoss *Huperzia selago* (L.) Bernh ex Schrank & Mart.

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

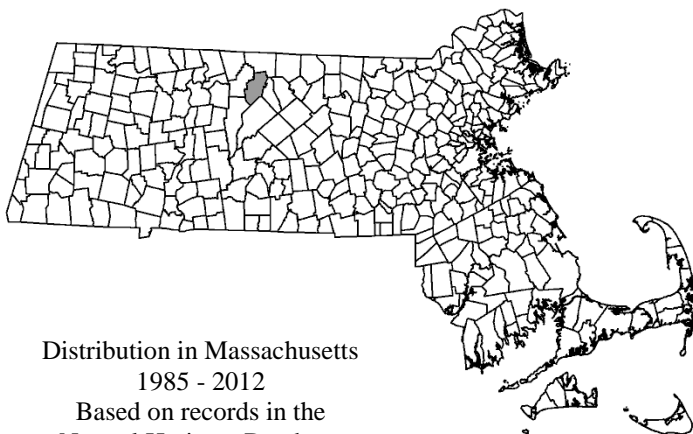
DESCRIPTION: Mountain Firmoss is a small, evergreen member of the Firmoss family (Huperziaceae) that is at the southern limit of its distribution in Massachusetts. Its dichotomously branching shoots are 8 to 12 cm (3–5 in.) tall and covered with small, pointed, simple leaves, 3.5 to 7.5 mm long.

AIDS TO IDENTIFICATION: Firmosses differ from clubmosses (Lycopodiaceae) in having their sporangia (spore-bearing structures) borne in leaf axils along the main stem, rather than in strobili (cones) at the tip. In addition to spores, they produce small, vegetative propagules (gemmae) on specialized branches called “gemmae”. Leaves (microphylls) have two forms: “sporophylls” are associated with sporangia, which are distributed in distinct areas along the stem; the leaves not associated with sporangia are called “trophophylls”. In Mountain Firmoss, the trophophylls are usually untoothed, widest below the middle, relatively uniform from the base of a shoot to the apex, and have numerous stomates on the upper leaf surface.



Mountain Firmoss is a small, evergreen species with sporangia in the leaf axils, and gemmiphores borne in a single whorl at the apex of a season's growth. Photo by Paul Somers.

SIMILAR SPECIES: Two other firmoss species occur in Massachusetts: Appalachian Firmoss (*H. appressa*), which is also listed as Endangered, and Shining Firmoss (*H. lucidula*), which is more common. The trophophylls of Mountain Firmoss and Shining Firmoss are similar from the base to the tip of a shoot, whereas in Appalachian Firmoss, the trophophylls near the apex are shorter and more ascending (appressed) than those near the base. Mountain Firmoss and Shining Firmoss also have gemmiphores borne in a single whorl at the apex of a season's growth, rather than throughout the apex. The lateral leaves of the gemmae are sharp-pointed and narrow (0.5–1.1 mm) in Appalachian Firmoss, and wider (1.3–2.5 mm) and blunt-tipped in the other species. Unlike Mountain Firmoss, Shining Firmoss has trophophylls that are widest beyond the middle, lack stomates on the upper surface, and have one to eight obvious teeth. A hybrid between Mountain Firmoss and Shining Firmoss, *H. x buttersii*, has been reported from



Distribution in Massachusetts
1985 - 2012
Based on records in the
Natural Heritage Database

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

Massachusetts Division of Fisheries & Wildlife

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Massachusetts. It is intermediate, with trophophylls with almost parallel margins, obscure teeth, and fewer stomates on the upper surface than Mountain Firmoss.

POPULATION STATUS IN MASSACHUSETTS:

Mountain Firmoss is listed under the Massachusetts Endangered Species Act as Endangered. 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. The only current site for Mountain Firmoss is in Worcester County; it was also collected historically from Franklin County, along with the hybrid *Huperzia x buttersii*.

RANGE: Mountain Firmoss occurs across Canada and in the northeastern United States, from Minnesota to Massachusetts. It is listed as Endangered in Massachusetts and New York, Threatened in Maine, Special Concern (and believed to be extirpated) in Connecticut, and Extirpated in Pennsylvania.

HABITAT: The only confirmed current site for Mountain Firmoss in Massachusetts is on a wet, north-facing roadcut. Elsewhere in its range, this species occurs in wet habitats such as ditches, low fields, and lakeshores, and occasionally in forests and mountain gullies.

THREATS AND MANAGEMENT

RECOMMENDATIONS: As for many rare species, exact needs for management of Mountain Firmoss are not known. The single known population in Massachusetts is on a roadcut, and activities associated with highway maintenance are potential threats. Management recommendations include avoiding wood-chipping, fertilizing, hydro-seeding, and other disturbances in the vicinity of the plants, and allowing nearby saplings to grow as long as possible before they become a road hazard, to provide the plants with shade. Like other plants with primarily northern distributions, Mountain Firmoss may also be threatened by global climate change. All active management of rare plant populations (including invasive species removal) 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:

Gleason, H. A., and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*, 2nd edition. The New York Botanical Garden, Bronx, NY.

Haines, A. 2011. *Flora Novae Angliae – a Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England*. New England Wildflower Society, Yale Univ. Press, New Haven, CT.

Updated 2020

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