

Species Listing PROPOSAL Form:

Listing Endangered, Threatened, and Special Concern Species in Massachusetts

Scientific name: *Malaxis unifolia*
 Common name: Green Adder's Mouth

Current Listed Status (if any): Watch List

Proposed Action:

Add the species, with the status of: T
 Remove the species
 Change the species' status to: _____

Change the scientific name to: _____
 Change the common name to: _____
 (Please justify proposed name change.)

Proponent's Name and Address: _____

Karro Frost, NHESP, 100 Hartwell St., West Boylston, MA 01583

Phone Number: 508-389-6390
 Fax: 508-389-7890

E-mail: karro.frost@state.ma.us

Association, Institution or Business represented by proponent: MA Natural Heritage and Endangered Species Program

Proponent's Signature:



Date Submitted:

5/30/2014

Please submit to: Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife, 1 Rabbit Hill Road, Westborough, MA 01581

Justification

Justify the proposed change in legal status of the species by addressing each of the criteria below, as listed in the Massachusetts Endangered Species Act (MGL c. 131A) and its implementing regulations (321 CMR 10.00), and provide literature citations or other documentation wherever possible. Expand onto additional pages as needed but make sure you address all of the questions below. The burden of proof is on the proponent for a listing, delisting, or status change.

(1) **Taxonomic status.** Is the species a valid taxonomic entity? Please cite scientific literature.

Yes, *Malaxis unifolia* Michx. Fl. Bor.-Amer. (Michaux) 2: 157. 1803 [19 Mar 1803]

This species appears as such in Flora of North America, Volume 26: Liliidae, 2002, and in Haines, 2011.

(2) **Recentness of records.** How recently has the species been conclusively documented within Massachusetts?

NHESP staff has observed it at another rare plant site as recently as 2011.

(3) **Native species status.** Is the species indigenous to Massachusetts?

Yes, this species has been determined to be native to Massachusetts (Cullina et al. 2011).

(4) **Habitat in Massachusetts.** Is a population of the species supported by habitat within the state of Massachusetts?

Yes, this species is currently supported by habitat in Massachusetts. Its habitat is described in FNA 2002 as "Swamps, bogs, sand barrens, heathlands, and dry woods."

(5) **Federal Endangered Species Act status.** Is the species listed under the federal Endangered Species Act? If so, what is its federal status (Endangered or Threatened)?

No, this species has no federal status.

(6) Rarity and geographic distribution.

(a) Does the species have a small number of occurrences (populations) and/or small size of populations in the state? Are there potentially undocumented occurrences in the state, and if so, is it possible to estimate the potential number of undocumented occurrences?

Number of populations MA has 4 current EOs in the database. One additional population is known. Recent floras completed in the state have not found additional EOs (Hamlin 2012, Bertin 2012, Searcy 2008, Hickler pers. com.) This plant is ranked G5. Among New England states, it is ranked as S1 in CT and RI; S2 in MA, VT and NH, and not ranked in ME. It is not included within Flora Conservanda 2012 as it is common in ME. It is also of conservation concern in DE, IL, IN, KS, OK (all S1), OH, FL, MO (S3), possibly extirpated in NJ and presumed extirpated from IA.

The population sizes of extant MA occurrences From the limited information in the NHESP database for this WL species, it appears that most populations consist of only a few individuals. More research is needed on this.

Likelihood of finding additional EOs It is likely that there are additional EOs; Weatherbee 1996 lists additional towns in which the species was observed that are not in the NHESP database. This is a small orchid; it does not have showy flowers or fruit; and is easily over-looked. There has been confusion in the past regarding the identification of this species and separation of a related species, *Malaxis bayardii* (listed as E in MA).

(b) What is the extent of the species' entire geographic range, and where within this range are Massachusetts populations (center or edge of range, or peripherally isolated)? Is the species a state or regional endemic?

The species' range includes most of eastern US and Canada, extending from Labrador to Saskatchewan in Canada south to Texas and Florida in the US. It is not a state or regional endemic.

(7) Trends.

(c) Is the species decreasing (or increasing) in state distribution, number of occurrences, and/or population size? What is the reproductive status of populations? Is reproductive capacity naturally low? Has any long-term trend in these factors been documented?

State distribution The known distribution of the species has not changed much. The most recent observation is from Leominster (Worcester County), but other current observations are from Adams (Berkshire) and Sandwich (Barnstable).

Number of populations The number of known populations has decreased. Many of the previously known populations have not been observed within the past 25 years.

The population sizes of extant MA occurrences The extant MA populations have not been observed frequently enough to determine any trend in the populations at any of the EOs.

Reproductive capacity Reproductive capacity may be limiting this orchid's populations in MA. A related species (*M. bayardii*) typically has substantially fewer capsules than flowers, and this may be true with this species too. In addition, the presence of, and species of soil fungi are required for germination of orchid seeds. If soil where seeds land does not have the appropriate fungi, the seeds may not germinate. Seeds for orchids are thought to have extended viability, with some germinating in the soil and existing underground long before leaves and/or flowers are observed as protocorms.

(8) Threats and vulnerability.

(d) What factors are driving a decreasing trend, or threatening reproductive status in the state? Please identify and describe any of the following threats, if present: habitat loss or degradation; predators,

parasites, or competitors; species-targeted taking of individual organisms or disruption of breeding activity.

The factors driving a decreasing trend in this species are unknown, but may include habitat loss, lack of appropriate fungal species in the soil, and re-forestation of the state leading to shading of extant populations. Earthworms mixing the soil within a population also may be a threat to the species (McCormick et al 2013). Deer browse may also be a threat, as deer have been known to browse on several orchids and appear to be a factor in their decline (Knapp and Wiegand 2014). Other factors currently unknown may also be causes of the species decline.

(e) Does the species have highly specialized habitat, resource needs, or other ecological requirements? Is dispersal ability poor?

It does not appear that this species has high habitat specificity. It is known from damp areas to dry woods, although most EOs are located in or on the edges of mapped wetland resources. Cause of decline is unknown and the habitat and resource needs for species to increase to sustainable population numbers are also unknown.

Conservation goals.

What specific conservation goals should be met in order to change the conservation status or to remove the species from the state list? Please address goals for any or all of the following:

Providing data do not indicate that the threat of invasive plants (or another currently unidentified threat) to populations ranked A through CD is dramatically increasing, this species may be down-listed to SC if:

(a) State distribution, number of occurrences (populations), population levels, and/or reproductive rates

The number of current, distinct occurrences (populations) increases to 20, and 50% or more of these have populations that exceed 50 individuals producing seed.

(b) Amount of protected habitat and/or number of protected occurrences

The number of EOs completely or mostly located on protected land with a minimum of 10 reproducing individuals should reach at least 33%.

(c) Management of protected habitat and/or occurrences

No criteria at this time.

Literature cited, additional documentation, and comments.

Bertin, RI, and TJ Rawinski. 2012. Vascular flora of Worcester County, Massachusetts. Special Publication of the New England Botanical Club.

Brumback, WE and J Gerke. 2013. Flora Conservanda: New England 2012. The New England Plant Conservation Program (NEPCoP) List of Plants in Need of Conservation. *Rhodora*, 115(964):313-408.

Cullina, MD, B Connolly, B Sorrie and P Somers. 2011. The Vascular Plants of Massachusetts: A County Checklist, First Revision. MA NHESP.

Flora of North America Editorial Committee (FNA). 2002.. Flora of North America: North of Mexico; Volume 26: Liliidae: Liliales and Orchidales..

Haines, A. 2011. Flora Novae Angliae. New England Wild Flower Society.

Hamlin, BT, WT Kittredge, DP Lubin, and EB Wright. 2012. Changes in the Vascular Flora of the Middlesex Fells Reservation, Middlesex County, Massachusetts, from 1895 To 2011. *Rhodora*, 114(959):229-308.

Hickler, MG. 2014. Personal communication regarding the Franklin County Flora Group database.

The International Plant Names Index [web application]. 2014. Plant Name Query. Published on the Internet <http://www.ipni.org> [accessed 21 March 2014].

Knapp, W.M. and R. Wiegand. 2014. Orchid (Orchidaceae) decline in the Catocin Mountains, Frederick County, Maryland as documented by a long-term dataset. *Biodiversity Conservation*. 2014. <http://link.springer.com/article/10.1007/s10531-014-0698-2> [Accessed: May 27, 2014].

Massachusetts Natural Heritage and Endangered Species Program (NHESP). 2014. Biotics Database.

McCormick MK, KL Parker, K Szlavecz and DF Whigham. 2013. Effects of Earthworms on Orchid Seeds. *Annals of Botany*, Oxford University Press, Open Access article. <http://aobpla.oxfordjournals.org/content/early/2013/03/11/aobpla.plt018.full.pdf+html> Accessed 3/21/2014.

NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Accessed: February 25, 2014).

Searcy, KB. 2008. Vascular Flora of the Greater Mount Holyoke Range, Hampshire County, Massachusetts. Special Publication of the New England Botanical Club.

Weatherbee, PB. 1996. Flora of Berkshire County Massachusetts. The Berkshire Museum.