

Species Listing PROPOSAL Form:
Listing Endangered, Threatened, and Special Concern Species in Massachusetts

Scientific name: *Galearis spectabilis* (L.) Raf.Current Listed Status (if any): Watch-listCommon name: Showy Orchid**Proposed Action:**☒ Add the species, with the status of:Threatened☐ 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:

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Association, Institution or Business represented by proponent:

Natural Heritage and Endangered Species Program

Proponent's Signature:



Date Submitted:

7-25-2023

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. The name *Galearis spectabilis* (L.) Raf. was first published in Herb. Raf.: 72 (1833). (Kew 2023.)
- (2) **Recentness of records.** How recently has the species been conclusively documented within Massachusetts?
***Galearis spectabilis* was most recently observed in 2022. Sixteen populations have been observed within the past 25 years.**
- (3) **Native species status.** Is the species indigenous to Massachusetts?
YES. *G. spectabilis* is considered a native species in MA according to Cullina et al, 2011, and Haines, 2011.
- (4) **Habitat in Massachusetts.** Is a population of the species supported by habitat within the state of Massachusetts?

YES. *G. spectabilis* in Massachusetts is typically found in areas of calcareous bedrock in rich, mesic forests.

(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. *G. spectabilis* is not listed under the Federal Endangered Species Act.

(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?

Massachusetts has sixteen (16) populations that have been observed in the past 25 years. The size of the populations varies from 4 or less (typically) to two populations of over 100 genets. There could be additional populations, but fewer than 10 total are expected. Franklin County surveys were recently completed (Bertin et al. 2020), with only 10 towns supporting populations compared to prior records of 15 towns. Berkshire County has had few new populations in the last 10 years. New populations might be found in Hampshire County, where there are areas of rich mesic forests that have not been adequately surveyed. No populations of *G. spectabilis* were found in Worcester County surveys by Bertin and Rawinski, 2012; herbarium records from Worcester County include 5 locations, none of which were relocated.

(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? Massachusetts is on the eastern edge of the center of the range. The population extends from Quebec province south to Georgia, west to Oklahoma and Nebraska and north to Ontario (NatureServe 2023.) In New England, the species is considered rare in Maine and New Hampshire, Extirpated from Rhode Island. It is not listed in Vermont (S4) or Connecticut (S3). NHESP botanists recently reassessed its state rank status and determined it is an S2.

(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?

Several previously known populations have not been seen for several years. Within the Natural Heritage database, there are 35 Element Occurrences. That does not include 11 new populations observed in the past 10 years. Overall, there has been a decline, from 35 previously known populations to 16 currently known populations. At a presentation at NEBC in 2017, Dr. Dennis Whigham mentioned that *Galearis spectabilis* populations at SERC had not been observed to set seed in over 30 years of monitoring. NHESP botanists started checking the populations in Massachusetts. Only 1 population was observed to have set seed out of nine observed during the past four years of monitoring. At that site, EO 30, which has over 30 plants, only 3 plants had formed mature seed capsules. No other monitored EOs had mature capsules. No or little seed production is very concerning. Dr. Whigham clarified his thoughts in additional personal communication, stating that he assumes that the species must be producing capsules and mature seed as he finds plants within their monitoring plots where plants were not previously observed. Dieringer 1982 found several thousand seeds per capsule and concluded that even with few pollinator visits and low capsule production, when a capsule is produced, there is more than enough seed produced to replace the population.

(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.

Factors driving decline of *G. spectabilis* in Massachusetts include loss of habitat, small populations, potentially loss of successful pollinators, and deer browse (personal observation). Go Orchids, a website of orchid information managed by the North American Orchid Center, lists queen bumblebees as the primary pollinators in the US with *Osmia proxima* as an important pollinator in Canada. (<https://goorchids.northamericanorchidcenter.org/species/galearis/spectabilis/> accessed 1/12/2023). In Ohio, Dieringer 1982 observed only *Bombus vagans* landing on and nectaring on *G. spectabilis* flowers though queens of other species of bumblebee were present in his study plots.

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

This species preferred habitat is rich, mesic forests, which are uncommon throughout the state and ranked as an S3 natural community. In addition, windblown orchid seeds rely on coming in contact with specific mycorrhizae to support their germination and growth. It is thought that many of the seeds produced fall close to the mother plant, but that strong wind will carry the dust sized seeds miles for dispersal.

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:

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

For *Galearis spectabilis* to be down-listed to Special Concern, there should be at least 50 separate populations in the state, of which at least 18 are considered excellent or good, with population numbers averaging at least 50 healthy, vigorous plants over 5 years, and several mature seed capsules observed each year.

For *G. spectabilis* to be removed from the MESA list, there should be at least 100 separate populations in the state, of which at least 30 are considered excellent or good, with population numbers averaging at least 50 healthy, vigorous plants over 5 years, and several mature seed capsules observed each year.

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

Approximately 75% of the known populations of *G. spectabilis* occur on protected lands, including the two largest populations. If other large populations are found off of permanently protected land, these populations should be protected as soon as possible.

(c) Management of protected habitat and/or occurrences

The management needs of *G. spectabilis* are not known.

Literature cited, additional documentation, and comments.

Bertin, Robert and Thomas Rawinski. 2012. Vascular Flora of Worcester County, Massachusetts. Special Publication of the New England Botanical Club.

Bertin, Robert L., Matthew G. Hickler, Karen B. Searcy, Glenn Motzkin, and Peter P. Grima. 2020. Vascular Flora of Franklin County, Massachusetts. Special Publication of the New England Botanical Club.

Cullina, Melissa Dow, Bryan Connolly, Bruce Sorrie, and Paul Somers. 2011. The Vascular Plants of Massachusetts: A County Checklist, First Revision. Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife.

Dietinger, Gregg. 1982. The Pollination Ecology of *Orchis spectabilis* L. (Orchidaceae). Ohio Journal of Science 82(5): 218-225.

Go Orchids web application. <https://goorchids.northamericanorchidcenter.org/species/galearis/spectabilis/> (Accessed: January 23, 2023)

Haines, Arthur. 2011. Flora Novae Angliae. The New England Wild Flower Society. Yale University Press.

Kew Royal Botanical Gardens <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:635315-1> accessed 1/12/2023.

NatureServe. 2023. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available <https://explorer.natureserve.org/>. (Accessed: January 11, 2023).

Whigham, Dennis. 2023 and 2017. Personal communication.