Species Listing PROPOSAL Form:

Listing Endangered, Threatened, and Special Concern Species in Massachusetts

Scientific name: ***Platanthera macrophylla*** **(Goldie) P.M. Br.**

Current Listed Status (if any): **Watch List**

Common name: **Large Round-leaved Orchid**

Proposed Action:

X 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 Revision 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 *Platanthera macrophylla* (Goldie) P.M. Brown is the accepted name. It was first published in Wild Flower Notes 3:23 (1988) (POWO 2023). This name is used in Flora Novae-Angliae (Haines 2011). This was originally recognized as a variety of *Platanthera orbiculata* as *P. orbiculata* var. *macrophylla* (Goldie) Luer in Native Orchids U.S. & Canada excluding Florida: 222 (1975).

(2) Recentness of records. How recently has the species been conclusively documented within Massachusetts?
This species was observed most recently in 2023.

(3) Native species status. Is the species indigenous to Massachusetts?
YES. It is considered indigenous to Massachusetts (Cullina et. al. 2011).

(4) <u>Habitat in Massachusetts.</u> Is a population of the species supported by habitat within the state of Massachusetts?

YES. This is a species of forests, often near small streams or in marginal wetlands. It prefers soils with a slightly higher pH or higher minerals, and is mostly found west of the Connecticut River.

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

NO. It 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?

In the last 25 years, only 11 populations of this species have been observed. Most populations are small, ranging from 1 to 4 plants, although four populations were observed with 10 to 20 plants. There are potentially undocumented occurrences in the state. Although this species seems to be highly visible with its large leaves and showy flowers, it is cryptic and blends into vegetation around it easily (pers. obs.) There could potentially be up to ten additional populations.

Cullina et al (2011) note populations from 8 counties in Massachusetts. It is currently known only from 3 counties, and thought to be extirpated from the other 5.

(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?

Platanthera macrophylla is known in all the New England states, west to Michigan, as well as Atlantic Canada and Ontario. It is known south to Pennsylvania.

According to the GoBotany website (2023), the species is known from Connecticut and Rhode Island, but is now listed as Possibly Extirpated (SH) in both states (NatureServe 2023).

(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?

Platanthera macrophylla was previously observed in eight of the 14 counties. In the last 25 years, it has been observed only in Berkshire, Franklin, and Hampshire counties, and is presumed extirpated from Worcester, Middlesex, Essex, Norfolk, and Bristol counties. In a 3000-hour fieldwork survey of all 26 towns in Franklin County, the species was found in four new towns that had likely been under surveyed prior to this study. It was not relocated from four towns where it had previously been found, and it was relocated in one town. Only one to three plants were seen at each site (Bertin et al 2020).

Deer have been known to both browse the flowering stems and browse the large green leaves, both of which damage the plants and decrease the populations and their ability to sustain themselves.

When observed, these plants are often found in flower, and if successfully pollinated, the species should spread to new locations easily. All orchids have dust-like seeds that are wind and animal dispersed, often at great distances. However, these tiny seeds carry no energy for germination, so a symbiosis with a mycorrhizal fungi must be formed for the seed to grow. Changes in the species composition as well as abundance and distribution of these fungi in the soil may be a strongly limiting factor in orchid recruitment.

Berry and Cleavitt (2021) followed 1000 plants of *Platanthera macrophylla* and *P. orbiculata* for 9 years at the Hubbard Brook Experimental Forest in New Hampshire. Their work determined that *P. macrophylla* was near (slightly above) its replacement rate in that N.H. forest. This was due to fruit set and seed gemination to protocorm. Their findings indicated that environmental disturbances impacting adult plant survival and seed production will limit populations and can cause decreases in populations.

It is likely that there are additional factors controlling species recruitment causing it to be reduced. This may include climate warming, increasing rainfall, especially episodically, or drought (such as in 2021 and 2022). Changes in climate may also cause a disassociation with its pollinators (Berry and Cleavitt, 2021).

(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.

Several recent papers have documented dramatic and significant declines in New England's native orchid species (Bertin et al. 2022, Bertin 2013, MacKenzie et al. 2019). Known or putative causes of decline include, but are not limited to, deer herbivory (Knapp and Wiegand 2014), earthworms (McCormick et al. 2023), lack of disturbance (Sheviak 1990), nitrogen deposition (Figura et al. 2020), and canopy closure (Brumback et al. 2011, Whigham et al. 2021), all of which affect orchids in Massachusetts. Other specific threats include changes in climate.

(e) Does the species have highly specialized habitat, resource needs, or other ecological requirements? Is dispersal ability poor?
UNKNOWN. *P. macrophylla* does not seem to have specialized habitat needs. It is often found in mixed conifer-hardwood forests, near streams. It has a preference for slightly mineral-enriched soil. It requires a fungal mycorrhizae to support it at least when the seed is first germinating and growing, and the plant may require the association throughout its life. The tiny seeds often fall near the mother plants but may also be easily carried by wind to new locations.

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
To downlist *P. macrophylla* to Special Concern, the species should have at least 25 current populations. Of these, at least 14 populations should be ranked as excellent or good with a minimum of 20 plants and at least 10 in bloom in a given year.
To delist the species, there should be a minimum of 50 populations, with at least 25 ranked as excellent or good. In these higher ranked populations, number of plants should exceed 50 plants, and at least 25 plants should bloom on average every year.

(b) Amount of protected habitat and/or number of protected occurrences
Many of the current populations are on permanently protected land, however, if any new populations are found on unprotected land, ways to protect the land should be found.

(c) Management of protected habitat and/or occurrences
UNKOWN. The management needs of the species are not known. As a woodland species some shade is probably needed, however, too much is thought to be a problem. As with many orchids, some disturbance is needed. Protection from deer and other animal browse may also be needed.

Literature cited, additional documentation, and comments.

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Sheviak CJ (1990) Biological considerations in the management of temperate terrestrial orchid habitats. New York State Museum Bulletin 471:194–196

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