

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

Scientific name: *Platanthera orbiculata* (Pursh)
Lindl.

Current Listed Status (if any): Watch List

Common name: Round-leaved 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:

Karro Frost

NHESP, MassWildlife

1 Rabbit Hill Rd.

Westborough, MA 01581

Phone Number: (cell) 413-531-5745

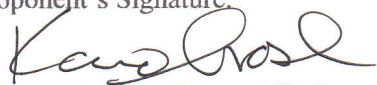
Fax:

E-mail: karro.frost@mass.gov

Association, Institution or Business represented by proponent:

Natural Heritage and Endangered Species Program

Proponent's Signature:



Date Submitted:

3/3/2023

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 orbiculata* (Pursh) Lindl. is the accepted name. It was first published in Gen. Sp. Orchid. Pl.: 286 (1835)

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

This species was observed most recently in 2021.

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

YES. It is considered indigenous to Massachusetts (Cullina et. al. 2011). It was previously observed across the state, including 4 eastern counties. In the last 25 years, it has only been observed only in Berkshire, Franklin, Hampshire, and Hampden counties; it is presumed extirpated from Middlesex, Essex, Plymouth, and Dukes counties now.

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

YES. This is a species of forests, often near headwaters, small streams or in wetland margins, though with a wider range of elevations and not usually as high mineral enrichment as its congener, *P. macrophylla*.

(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. 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 14 populations of *Platanthera orbiculata* have been observed. Most populations are small, ranging from 1 to 4 plants, although one population may have been observed with almost 40 plants (the observer is known to exaggerate). There could be undocumented occurrences in the state. Although this species seems to be highly visible with its large leaves and showy flowers, it is amazingly cryptic and blends into vegetation around it easily (pers. obs.) There could potentially be at least ten additional populations.

(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?

According to the GoBotany website (2023), the species was previously known from Connecticut and Rhode Island, but it is now listed as possibly extirpated in both states (SH). Massachusetts is in the middle of the eastern edge of the extent of this species. Populations of *P. orbiculata* extend south to North Carolina and Tennessee, west to Washington State, north to Alaska and across Canada.

(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 orbiculata has retreated from areas where it was formally known in Massachusetts, including all areas east of the Connecticut River. When found, plants are often found in flower, and with thousands of dust-like seeds per capsule, the species should be able to spread to new locations easily. Studies by Berry and Cleavitt (2021) in New Hampshire, indicate that this species is not maintaining its populations, due to a lack of successful pollination.

In a 3000-hour fieldwork survey of all 26 towns in Franklin County, the species was found in only one town, with a population of 4 plants (Bertin et al 2020, NHESP database).

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 found, these plants may be 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 abundance and distribution of these fungi in the soil may be a limiting factor in orchid recruitment.

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, Berry and Cleavitt 2021), earthworms (McCormick et al. 2023), lack of disturbance (Sheviak 1990), nitrogen deposition altering soil pH (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.

Habitat loss is also likely the cause for a decrease in the population in eastern Massachusetts. An increase in invasive plant species which shade plants is also a threat.

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

UNKNOWN. *P. orbiculata* does not seem to have specialized habitat needs. It is found in mixed conifer-hardwood forests, often near headwaters. It has a preference for slightly mineral enriched soil. It requires fungal mycorrhizae to support it for at least seed germination and formation and growth of the protocorm, and the plant may rely on this fungal association throughout its life for its carbon needs. 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. orbiculata* to Special Concern, the species should have at least 50 known populations. Of these, at least 18 populations should be ranked as excellent or good with a minimum of 50 plants and at least 30 in bloom averaged over 5 years.

To delist the species, 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.

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

Many of the current populations are on permanently protected land already, however, if any new large populations are found, ways to protect the land should be found as soon as possible.

(c) Management of protected habitat and/or occurrences

UNKNOWN. The management needs of the species are not known. As a woodland species some shade is needed, however, too much shade may be a problem. As with many orchids, some disturbance is also needed. Protection from deer and other animal browse may also be needed.

Literature cited, additional documentation, and comments.

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