

**Species Listing PROPOSAL Form:**

Listing Endangered, Threatened, and Special Concern Species in Massachusetts

Scientific name: Platanthera hookeri (Torr.)  
Lindl.Current Listed Status (if any): Watch ListCommon name: Hooker's Orchid**Proposed Action:**☒ Add the species, with the status of:Endangered☐ 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  
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**Association, Institution or Business represented by proponent:**

Natural Heritage and Endangered Species Program

**Proponent's Signature:**Revision  
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 *Platanthera hookeri* (Torr.) Lindl. is the accepted name. It was first published in Gen. Sp. Orchid. Pl.: 286 (1835). (POWO 2023)**(2) Recentness of records.** How recently has the species been conclusively documented within Massachusetts?

The most recent observation was in 2007 (Plants were not in flower but were in the exact same location, with same number of plants, as previously observed). A potential observation was made in 2013, but the plants were not in bloom so could not be confirmed.

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

YES. It is considered indigenous to Massachusetts (Cullina et. al. 2011, Haines 2011, POWO 2023). It was previously observed across the state, in all but Boston and the southeastern counties. In the last 25 years, it has only been observed only in Franklin (and possibly Berkshire) county.

**(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. Gleason and Cronquist (1999) describe its habitat as rich, mesic forests. Smith (2012) describes the habitat in Minnesota as variable, occurring in upland forests, mostly undisturbed, sometimes found in dry, sandy soil under pines, but also in moist soil under mixed forests, and sometimes under oaks on northern slopes. Reddoch and Reddoch (2007) describe its habitat in southwestern Quebec as dry to mesic forests of various compositions, including on the drier borders of some wetlands. Massachusetts has these habitats. In addition, some Massachusetts populations have been observed in areas where wildfires, set from passing trains would frequently burn their habitat. These populations have declined now that such fires are less likely to occur, and trees and shrubs shade the forest floor (Description of habitats in the NHESP database 2002, 2007).

**(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 2 populations of *Platanthera hookeri* have been observed. Leaves of a round-leaved orchid species were observed in 2013 near a previously known location, but the plants weren't in bloom so could not be confirmed as *Platanthera hookeri*. Throughout its range, most populations are smaller than 25 plants; in Massachusetts, the populations typically range from 1 to 4 plants, or were observed and recorded as "uncommon." There could be undocumented occurrences in the state, but no more than 5 to 10 are likely given the decline of this species across its entire range.

**(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 NatureServe Explorer (2023), Massachusetts is near the southeastern extent of this species range. Although this species occurred previously in both Rhode Island and Connecticut, both now list it as presumed extirpated (NatureServe 2023, RINHS 2023). In addition, Vermont, New York, and Pennsylvania now list this species as S1. This species range extends north to Newfoundland, west across Canada to Manitoba and south to Iowa. There are only 4 states which have no rank for this species. All others in its range rank it as either S1, S2 or as presumed extirpated (SH).

**(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 hookeri* has decreased substantially within Massachusetts as it was known across the state and has only been observed in two locations most recently, and none of the recent observations included flowering plants. In a 3000-hour fieldwork survey of all 26 towns in Franklin County, the species was not found; it was previously known from 9 towns in Franklin County (Bertin et al 2020). It was also not found in any of the towns in the extensive survey of Worcester County, where it previously was known from 7 towns (Bertin and Rawinski 2012). Searcy 2008 did not find any plants in her extensive survey of the Mount Holyoke Range. Finally, Jenkins et al. 2008 did not relocate any plants from Petersham MA.

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.

If this species flowers and is successfully pollinated, it 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 strongly 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).

**(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, which might cause a disassociation with their pollinators.

In addition, an increase in invasive plant species which shade plants is also a threat. In addition, nitrogen deposition could also impact the plants, including changing soil pH, which might impact its associated mycorrhizae. Other specific threats are not known.

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

UNKNOWN. *P. hookeri* does not seem to have specialized habitat needs, other than undisturbed forests with some openings. It requires fungal mycorrhizae to support it for at least seed germination and formation and growth of its 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. hookeri* to Threatened, the species should have at least 25 populations, with at least 12 occurrences with excellent to good viability, with at least 50 plants (immature and mature) in the population. To downlist *P. hookeri* to Special Concern, the species should have at least 80 populations. Of these, at least 20 populations should be ranked as excellent or good with a minimum of 50 plants and at least 30 in bloom averaged over 5 years, and immature plants observed within the population.

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**

The current populations are on permanently protected land already, however, if any new populations are found not on protected land, 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. Occasional fire may also be important in the habitat for this species.

**Literature cited, additional documentation, and comments.**

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