

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

Scientific name: *Utricularia subulata* L.

Syn. *Enetophyton cleistogamum* (A.Gray)
Nieuwl. in Amer. Midl. Naturalist 3: 190 (1914)

Current Listed Status (if any): uncommon (S-rank:
 S3), special concern (code: SC)
 _____S3_____

Common name: Slender or zigzag bladderwort _____

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:



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

Proponent's Signature:

Date Submitted:

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. This species is a valid taxonomic entity *Utricularia subulata* L. Lentibulariaceae Rich. Sp. pl. 1;18 (1753).

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

The latest herbarium record is from Myles Standish State Forest, Plymouth, MA dated in 2019 (NHESP).

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

YES (Taylor 1989).

The oldest herbarium record found in Massachusetts is from Nantucket dated on August 23, 1881 submitted by M. L. Owen to Harvard University Herbaria. Since then, most herbarium records were submitted in early 1900's from Nantucket. The most recent case is from 2019, described above.

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

YES (conditionally)

In Massachusetts, *U. subulata* occurs in wet sandy, peaty soil or in wetlands and bogs. However, the pan-tropic temperature range this species requires seems to occur rarely in MA.

(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)

S3

(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?

YES. A small size population was found in [REDACTED], MA (Nantucket island) in 2021 (iNaturalist), but has not been officially recorded. However, during the *U. subulata* survey I conducted for two historical sites (Windswept bog and Donut bog) in Nantucket island in Aug. 2018, I found no populations. There was none found in the Windswept bog. We found a small population of *U. geminiscapa* in bloom in the mote of Donut bog, but *U. subulata* was not found either in the mote or within the bog itself. The same year, I participated in a *U. subulata* survey led by Native Plant Trust (former New England Wild Flower Society). We surveyed two historical sites: near Whites Pond, Plymouth, and in Black Beach Bog in Falmouth, but found no pupulatoin of *U. subulata*.

There is one undocumented occurrences in the state, which is the aforementioned population in [REDACTED], on Nantucket Island (iNaturalist).

(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?

***U. subulata* is a pan-tropical species, and is not a state or regional endemic. In the USA, it occurs in MA, RI, NY, NJ, DE, MD, VA, DC, NC, SC, GA, FL, AL, TN, MS, LA, AR, and TX. MA is the northern limit of this species (Taylor 1989). *U. subulata* is locally rare, is at the edge of its global geographical range, has an established history of occurrence in the state, and its populations are not increasing.**

(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?

In MA, the species is decreasing in number of occurrences as ramets (Fig.1). If the trend in Fig. 1 is ture and continuous, *U. subulata* will likely to be extinguished by year 2037.

It is dispersed mainly by vegetative seeds from chleistogamous flowers which it produces profusely, and expansion by underground stolons (Taylor 1989). They occasionally bloom chasmogamous flowers, however, how much sexual reproduction is involved in this species is unknown. In cultivation, the reproductive capacity of this species is robust, or "weedy" (E.Kurosawa pers. obs.). Reproductive status of this species in MA is unknown.

For the Longtiern trend, please see Fig. 1.

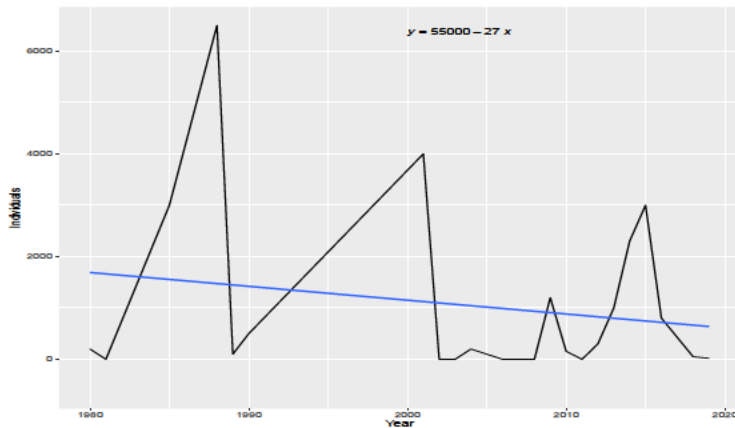


Fig.1. Population decline in *U. subulata* in Massachusetts. Individual counts between 1980 and 2019 were plotted. The shaded area depicts 95% confidence interval at $\alpha = 0.05$; The blue line represents the trendline. Individuals were counted as ramets. Data source: NHESP.

(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.

As for any wetland species, **Habitat loss or Degradation would be the primary threats to this species. However, this species is extremely rare in MA despite its rigorous reproductive capability, as this species is not present where other *Utricularia* species are commonly found. These facts together with this species being pan-tropical suggest that *U. subulata* struggle to survive under cold climate in MA except for the satellite population found on Nantucket island (iNaturalist, 2021). The photosynthetic leaves of this species are extremely small and inconspicuous. The plant produce cleistogamous flowers much more profusely than the yellow, bigger, and more conspicuous chasmogamous flowers. For these reasons, there is a good possibility that the plants might be often “unrecognized”, although they were there.**

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

NO. *U. subulata* should be able to grow around the perimeter of freshwater oligotrophic ponds and wetlands where other *Utricularia* species can be found as long as temperature range meets their requirements. The dispersal ability is extremely robust under the optimum condition (E.Kurosawa pers. obs.). The optimum condition for this species appear to occur extremely rarely in MA.

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

The current (2022) confirmed unofficial record for *U. subulata* population is a single very small population in Nantucket island (iNaturalist, 2021). The EO numbers from the record provided by NHESP shows we have currently 9 EOs (Fig.2). However, this is a very optimistic number largely due to the historical sites not being surveyed in recent years. *U. subulata* status was moved to S3 in 1982 when EO became 3, and the ramet counts for the previous year (1981) was 0. Unfortunately, we do not have the records prior to the status change, so I can only suggest the number of extant populations to

remove the species from the state list. I estimate it to be A-B ranking (500-3000 or greater than 3000 individuals), and preferably EO more than 100.

Reproductive rates are robust by vegetative reproduction (seeds and stolons) in cultivation (E. Kurosawa pers. obs.). However, reproductive rates in the wild population in MA is unknown.

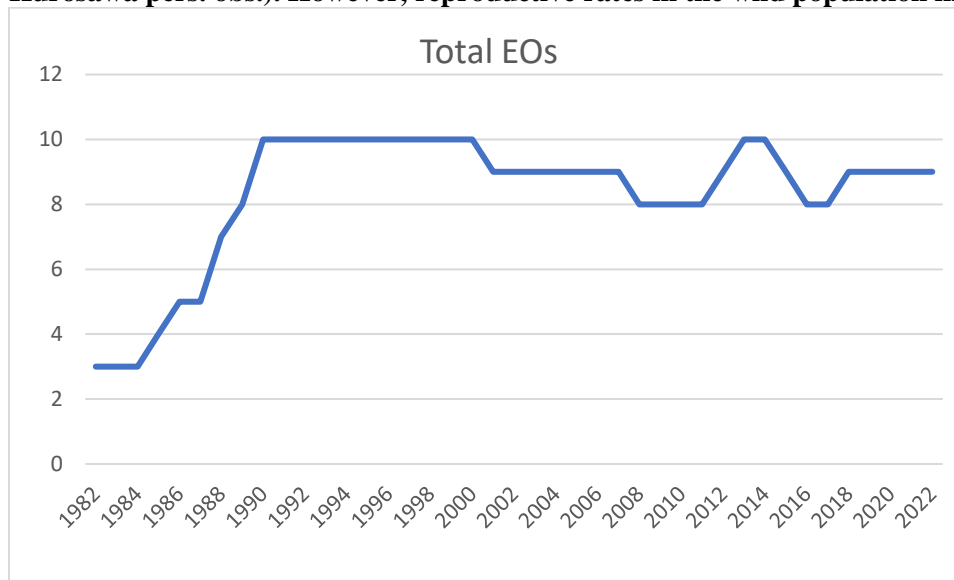


Fig. 2. Trend in total EO for *U. subulata*. EO between 1982 and 2022 were plotted. Data provided by NHESP.

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

The single confirmed location found in Nantucket (2022) was a floating *Sphagnum* mat on a kettle pond near wet scrape [REDACTED]. (Chase Mathey, pers. com. 2022). [REDACTED] is under the protection of Nantucket Conservation Foundation (MassMapper).

(c) Management of protected habitat and/or occurrences

Nantucket Conservation Foundation. It is unknown that 1. if this Foundation is aware of the existence of *U. subulata* in this property or 2. what level of protection the Foundation provides for this species.

The first conservation goal would be to conduct research on this particular confirmed Nantucket site for the population size, and record the species ecological niche requirements. With the ecological habitat information from this site in hand, we should repeat the survey to other historical EOs.

Acknowledgement

I thank Karro Frost, Plant Restoration Biologist, at Massachusetts Division of Fisheries and Wildlife
1 Rabbit Hill Road, Westborough, MA 01581, for her assistance in providing crucial data to create this proposal.

Literature cited, additional documentation, and comments.

Consortium of Northeastern Herbaria:

<https://portal.neherbaria.org/portal/#:~:text=About%3A,diatoms%2C%20algae%2C%20and%20lichens.>

iNaturalist: https://www.inaturalist.org/observations?locale=en-US&place_id=2&subview=map&taxon_id=79468

Linnaeus C. 1753. *Species Plantarum* Vol1. Pg 18.

MassMapper: http://maps.massgis.state.ma.us/map_ol/oliver.php

Native Plant Trust: <https://www.nativeplanttrust.org/>

Nantucket Conservation Foundation: <https://www.nantucketconservation.org/property-map/>

Taylor, P. 1989. *The Genus Utricularia*. Royal Botanic Garden Kew