

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

Scientific name: Carex willdenowii Willd.Current Listed Status (if any): HistoricalCommon name: Willdenow's Sedge**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:

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 NHESP/MassWildlife
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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 was first listed as *Carex willdenowii* Willd. in *Species Plantarum. Editio quarta* 4(1): 211. 1805. (Tropicos, 2023, POWO, 2023)
- (2) **Recentness of records.** How recently has the species been conclusively documented within Massachusetts?
This plant was recently re-discovered in Massachusetts in the western part of the state. One population was observed as recently as late June 2023. Three populations have been observed in the last 2 years. Prior to that, it hadn't been collected, or reported to NHESP, since the 1890s. It had not been previously observed and collected in western Massachusetts where it has been observed recently.
- (3) **Native species status.** Is the species indigenous to Massachusetts?
YES. It is indigenous to Massachusetts. It is known from herbarium records in a few locations from the 1800s.

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

YES. POWO (2023) describes this species as a perennial rhizomatous geophyte. Its habitat is described in GoBotany (2023) as woodlands and forests, usually on rocky or ledgy slopes or ridge lines. One observation submitted to MassWildlife Heritage Hub from 2022 describes the site as, “high quality hickory-hop hornbeam woodland with multiple rare species and extremely diverse herbaceous layer.” Associated species included *Carya glabra*, *Oxalis violacea*, *Trichophorum planifolium*, *Cornus racemosa*, *Carex digitalis*, *Crataegus* spp. A second observation also describes the site where the species was found as a hickory – hop hornbeam forest. The third observation describes the community as an oak – hickory forest. These habitats are present in Massachusetts. In all cases, it was observed growing on rock ledge or talus.

- (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. This species 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?

NHESP has received information on three observations over the past two years for this species in rich, rocky habitats. One recent observation consisted of an observation of only a single plant. The sizes of the existing populations is not fully known and additional surveys are needed. It is an early in the season maturing sedge, so it drops its perigynia early before the end of July, which are needed for identification, and it is a sedge, which may be ignored by otherwise excellent botanists. Thus, its presence may have been overlooked.

(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? Weakley (2020) gives the distribution as "from Massachusetts, Vermont (SH), New York (S4), southern Ontario (S1), and central Indiana (SNR/SNA), south to northcentral South Carolina (S1), northern Alabama (SNR/SNA), and southern Illinois (S1); disjunct in central Arkansas (S1)." Massachusetts currently represents the northeastern extent of the species.

Herbarium records provide a slightly different picture. Plants of this species have been collected from Connecticut, Maine, Massachusetts and Vermont. All the records are from the 1800s, except for three recent collections in Connecticut in 2003, 2006 and 2007 (Lombardi, personal communication, Moorhead species reviewer and Rawinski species reviewer). In addition, Moorhead in reviewing the listing document, states that there is a fourth known population in Connecticut, first observed in 2018.

Recent analysis of specimens indicates that this species is a complex of 3 species, with 2 species occurring only in the southeast United States, (*Carex basiantha* Steudel and *C. superata* Naczi, Reznicek, and B.A. Ford sp. nov.) *C. willdenowii* is known from northeastern U.S. and adjacent Canada. (Naczi et al. 1998). The above range description represents the range of the complex, not necessarily the range of the species. This paper describes *C. willdenowii* range as "southern Vermont, northern New York, and southern Ontario south and west to northernmost South Carolina and north Alabama."

(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?

There are no long-term assessments of this species as it was only re-discovered within the last two years. However, after 1 population was discovered in 2021, two additional populations were observed in 2022. In all cases, there was not a targeted survey for the species, as these were accidental observations in areas where botanists were completing surveys for other rare plants. It has also been recently rediscovered in Connecticut after not being observed there for approximately 100 years.

(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.

The threats to the species have not yet been well identified. The habitat of *Carex willdenowii* is described as dry, rocky, rich woods. It has been observed in Hickory – Hop Hornbeam woodland/forests, an S2 ranked natural community. Although Massachusetts does support these forests, these forest communities are threatened by a variety of non-native insects and changes resulting from climate change, as well as deer browse. Heavy deer browse may benefit the species as sedges are avoided by deer, who prefer green herbaceous leaves, thereby reducing competition and letting the sedges grow (Rawinski original proposal reviewer).

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

***Carex willdenowii* is a species that can grow on rocks, and in rocky areas. Its habitat is also described as “rich,” meaning that it also needs a level of mineral and nutrient enrichment (typically from the associated rocks) exceeding typical soil levels for the glacial soils in Massachusetts. The supporting geology could have higher levels of certain chemicals than the surrounding soil, for example.**

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 *Carex willdenowii* to be delisted it should have over 100 populations in the state, with at least a third ranked as excellent or good. For it to be considered as a Species of Special Concern, it should have at least 50 current populations, with at least a third ranked as excellent or good.

(b) Amount of protected habitat and/or number of protected occurrences
Currently all the extant populations occur on protected land, and the two populations observed in the 1800s, also occurred on what is now protected land. However, new populations may be observed on unprotected land. DFW and its conservation partners should work to protect any new populations.

(c) Management of protected habitat and/or occurrences
The management needs of this species have not yet been determined.

Literature cited, additional documentation, and comments.

Fernald, M.L. 1970. Gray’s Manual of Botany, Eight Edition. D. Van Nostrand Company.

Gleason, Henry A., and Arthur Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, Second Edition. The New York Botanical Garden.

GoBotany. 2023. <https://gobotany.nativeplanttrust.org/species/carex/willdenowii/> accessed 2/7/2023. Native Plant Trust.

Herbarium specimen data provided by: NEBC Herbarium, The Gray Herbarium (both at the Harvard University Herbaria), Pringle Herbarium, University of Vermont, and William and Lynda Steere Herbarium, New York Botanical Garden (Accessed through the Consortium of Northeastern Herbaria web site, www.neherbaria.org, 2023-02-10)

Lombardi, C.R. 2023. Personal communication.

MassWildlife NHESP Heritage Hub. 2023.

Moorhead, W. 2023 review of original listing proposal

Naczi, Robert F.C., Anton A. Reznicek, and Bruce a Ford. 1998. Morphological, Geographical, and Ecological Differentiation in the *Carex willdenowii* complex (Cyperaceae). American Journal of Botany 85(3): 434-447.

NatureServe. 2023. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available <https://explorer.natureserve.org/>. (Accessed: February 10, 2023).

POWO (2023). "Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.plantsoftheworldonline.org/> Retrieved 7 February 2023." <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:20008072-1#publications>

Rawinski, T. 2023 Review of original listing proposal.

Tropicos.org. Missouri Botanical Garden. 18 Apr 2023. <https://tropicos.org/name/9901770>

Weakley, Alan S. 2020. Flora of the Southeastern United States, Edition of 20 October 2020. University of North Carolina at Chapel Hill Herbarium, North Carolina Botanical Garden.