

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

Scientific name: Juncus biflorus ElliottCurrent Listed Status (if any): Watch ListCommon name: Two-flowered Rush**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:**

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Association, Institution or Business represented by proponent: Natural Heritage and Endangered Species ProgramProponent's Signature:Date Submitted:

3/27/2018

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.

This species was listed under the Massachusetts Endangered Species Act (MESA) as Endangered until 2003, when it was subsumed under the widespread and common species *Juncus marginatus* following Brooks and Clemants in Flora of North America. In 2008, Knapp and Naczi reassessed species characters separating *J. longii* from *J. marginatus* and *J. biflorus*. They determined that these three are separate species. *Juncus biflorus* is also recognized in Flora Novae Angliae, a flora that Natural Heritage botanists in New England typically follow. This species is currently proposed to be listed as Threatened.

Other scientific literature listing *J. biflorus* as a separate entity include:

Kartesz, J.T. 1994. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. 2nd edition. 2 vols. Timber Press, Portland, OR.

Gleason and Cronquist (1999) and Fernald (1950) also list this as a valid taxonomic entity.

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

*Juncus biflorus* was observed in 2016 on the shore of Raylene's Pondlet (Karberg 2016), a small coastal plain pond, located in the Middle Moors on Nantucket. It has also been recorded in 2001 in Brewster at Salls Pond and Blueberry Pond; and in 2000 in Brewster at Keeler Pond (Brumbach 2001, 2000). The species was also observed in a wetland northwest of Blueberry Pond in Brewster in 1994. A slightly older location is in Brewster (1989), in a wetland described as Cape Cod Sea Camps, Camp Wono, adjacent to "Berry's Pond." In Dennis, the most recent records are from 1985, when the species was observed at Aunt Patty's Pond. There are additional historic records from Nantucket from the early 1900s and Brewster from 1918. One occurrence hasn't been observed since 1990 on Nantucket, but had been found prior to that in 1986, 1988.

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

*J. biflorus* is indigenous to Massachusetts, which represents the species northeastern extent. It has been documented in Massachusetts by herbarium specimens since 1899 (Bicknell), but appears to have always been rare; and a gap of 50 years existed before Sorrie rediscovered the species in 1978, collecting a specimen in 1985, leading to the species prior listing as Endangered (NHESP database).

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

The habitat of *Juncus biflorus* is sandy, mucky or peaty shorelines of freshwater coastal plain ponds, as well as occasionally in their associated bordering wetlands. Massachusetts has only five known current locations, and eight historic locations. The plant has a record of not being found one year, and then reappearing again, depending on the weather, water levels and site conditions.

**(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)

*Juncus biflorus* is not, nor proposed to be, 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?

The species does have only a small number of occurrences, but it is likely that there are additional unknown populations. There are five current Element Occurrences in Massachusetts. Although this plant has been on the Watch List for the past 10 years, not everyone reports Watch List species when they are observed; in addition, one needs to feel comfortable identifying *Juncus* to species, which is a limited skill. The plant has always had limited population in the state. In Massachusetts, it thrives around Coastal Plain Pond habitats, of which there are over 500 documented in the state.

(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?

The entire range extends from Massachusetts west to Michigan, southwest into Texas, then east to Florida. Clearly many of these states do not have Coastal Plain Ponds, so the species is not restricted to that habitat in other states. The Massachusetts population represents the northeastern extent of the species range. The closest known populations in other states are located on Long Island in New York (NatureServe Explorer 2018). Massachusetts is the only state in New England with *J. biflorus*, which is listed as Division 2 in *Flora Conservanda: New England 2012* (Regionally Rare Taxa with 20 or fewer observations within the last 20 to 25 years).

**(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?

It appears the populations are decreasing, but the tracking of the species' population decreased over the past 10 years while the species was on the Watch List; detailed data regarding its current distribution are unknown.. When the species was described by Sorrie in 1987, only two extant populations were known; currently there are five known populations. When populations are observed, they mostly consist of a small number of plants.

**(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 a plant that thrives around Coastal Plain Pond habitats, the threats for it are similar for the habitat. Recent research indicates that the last two decades have been the wettest years in the Northeast in 500 years (Pederson et al. 2013, Newby et al. 2014, Weider and Boutt 2010). Pondshores not under the influence of water withdrawal do not regularly experience pondshore exposure, which can lead to the loss of rare plant populations from those shorelines. The shrubs at the pond edges shade the shorelines when water levels are high preventing the growth of herbaceous and graminoid species, such as *J. biflorus*. Due to sea-level rise, groundwater levels have risen 6 inches in southeastern Massachusetts since 1970, limiting the area of exposed shoreline around coastal plain ponds.

Residential and commercial development around coastal plain ponds threaten the plants through higher recreational levels, including trampling and ATV use, an increase in stormwater runoff, as well as an increase in a variety of contaminants found in stormwater runoff.

The use of coastal plain ponds as a source of irrigation water and recipients of runoff from cranberry bog operations change the natural fluctuations of water levels within the pond and can introduce nutrients and herbicides into the water. Unnatural water level fluctuations are also observed for ponds within the cone of depression of municipal wells, leading to the drying of ponds, which normally would retain shallow water. Gray willow (*Salix cinerea* and *S. atrocinerea*), and glossy buckthorn (*Frangula alnus*) are particularly problematic shrub species that may affect habitat quality. Purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*) can also be problematic invasive species in these habitats.

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

*Juncus biflorus* is a wetland species, and in Massachusetts, it is found primarily associated with Coastal Plain Pond shores. It is often found with other rare plants, such as *Rhexia mariana*, which also is at its northern extent in Massachusetts. It is not known why it has not spread more extensively in the state. Where it does occur, it typically occurs in small numbers.

**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

If this species expands the number of ponds where it occurs to at least 20 with at least half the populations ranked as A or B (exceeding 100 plants observed at one time in the past 10 years), it could be downlisted to Special Concern. If it is found in over 50 locations with at least half the populations exceeding 250 plants, it could be removed from the MESA list.

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

Two of the current occurrences are located on protected land: one population in Nickerson State Park and one in Middle Moors of Nantucket. Three other current occurrences are on unprotected land in Brewster.

(c) Management of protected habitat and/or occurrences

Management might consist of trimming tall shrubs and other vegetation in competition with *Juncus biflorus*, allowing as natural a fluctuation as possible of the water levels within the Coastal Plain Ponds, and protecting areas where it occurs from trampling.

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

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Gleason, H. A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and adjacent Canada*, 2<sup>nd</sup> ed. New York, New York Botanical Garden Press.

Haines, A. 2011. *New England Wild Flower Society's Flora Novae-Angliae*. Yale University Press. New Haven and London.

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Knapp, W.M., and R.F.C. Naczi. 2008. Taxonomy, Morphology, and Geographic Distribution of *Juncus longii* (Juncaceae). *Systematic Botany* 33:685-694.

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