Carex bushii

Bush's Sedge

Cyperaceae

Carex bushii by Eric Keith, 2017

Carex bushii Rare Plant Profile

New Jersey Department of Environmental Protection
State Parks, Forests & Historic Sites
Forests & Natural Lands
Office of Natural Lands Management
New Jersey Natural Heritage Program

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June, 2025

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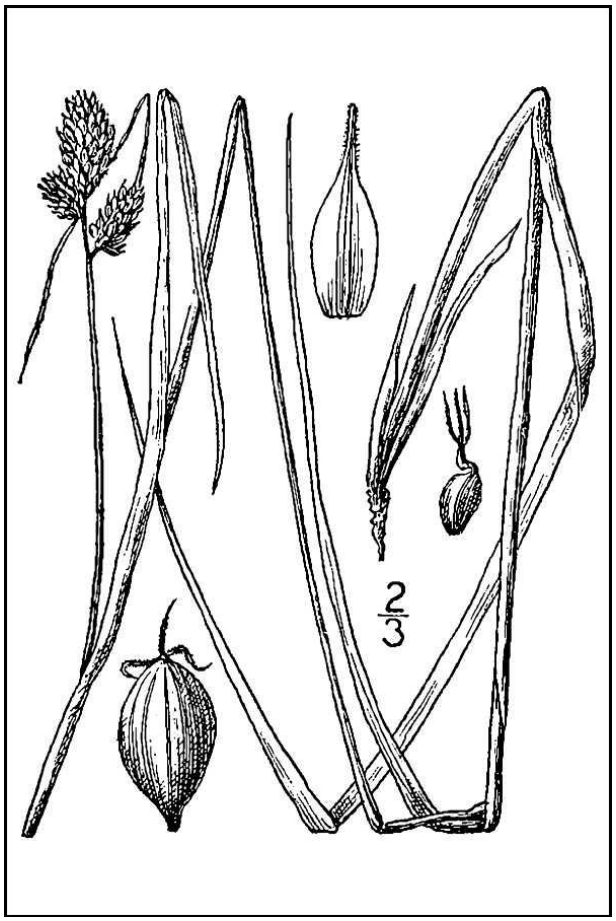
This report should be cited as follows: Dodds, Jill S. 2025. *Carex bushii* Rare Plant Profile. New Jersey Department of Environmental Protection, State Parks, Forests & Historic Sites, Forests & Natural Lands, Office of Natural Lands Management, New Jersey Natural Heritage Program, Trenton, NJ. 16 pp.

Life History

Carex bushii (Bush's Sedge) is a rhizomatous perennial sedge that forms moderate-sized clumps. The leaves are hairy and 1.5–4 mm wide and the culms are 3–9 dm tall, red-brown at the base, rough near the top, and sparsely hairy. The terminal spike of the inflorescence is gynecandrous, with staminate flowers at the base and pistillate flowers above, and the one or two additional spikes are pistillate. The densely-flowered spikes are cylindrical and 5–20 mm long by 5–10 mm wide. The scales of the pistillate florets are 2.5–3.5 mm long and lance-shaped with elongate tips or awns that are 0.5–2 mm in length. The perigynia of *C. bushii* are olive green, hairless, ribbed, and round in cross-section with three-parted stigmas. The achenes are distinctly three-sided and 2–2.6 mm long. (See Mackenzie 1910, Britton and Brown 1913, Fernald 1950, Gleason and Cronquist 1991, Standley 2011, Arsenault et al. 2013, Ball 2020). *Carex bushii* flowers in May and June and the fruits develop during June and July (Hough 1983, Weakley et al. 2024). Fruit dispersal is usually completed by mid-July (Butter 2020).



Left: Britton and Brown 1913, courtesy USDA NRCS 2025a. Right: Paul Marcum, 2021.

Carex bushii is one of seven species in *Carex* Section *Porocystis* that are known to occur in New Jersey. *Carex pallescens* can be distinguished from others in the group by its terminal spike, which is almost entirely staminate, while the densely hairy perigynia of *C. swanii* and *C. virescens* set them apart. *Carex bushii* is most likely to be confused with *C. caroliniana*, *C.*

complanata, or *C. hirsutella*, but those species differ in having shorter pistillate scales, laterally flattened perigynia, or both (Mackenzie 1910, Smith and Waterway 2008, Ball 2020).

Pollinator Dynamics

Most sedges are pollinated by wind but there are a few notable exceptions in scattered genera, including *Carex*. Typical adaptations to wind pollination in the family include large anthers, long filaments, and prominent stigmas. Some incidental cross-fertilization may occasionally result from the visits of pollen-collecting bees (Zomlefer 1994, Tucker 1987, Goetghebeur 1998, Yano et al. 2015).

In nearly all sedges, the female flowers develop before the male flowers (protogyny) and the lowest flowers on a spike are the first to mature (Goetghebeur 1998). Both strategies are generally viewed as means of promoting cross-pollination. However, experimentation to test that assumption showed that protogyny was not a particularly effective way of guaranteeing outcrossing in *Carex*, and the species in the study displayed a high degree of self-compatibility (Friedman and Barrett 2009). The authors concluded that protogyny gives wind-pollinated *Carex* species an opportunity to cross-fertilize while self-pollination assures reproductive success.

Seed Dispersal and Establishment

The fruit of a *Carex* plant is a single-seeded achene that forms in a sac-like perigynium in which it is eventually dispersed. A variety of distribution mechanisms have been reported in the genus, some of which were inferred from morphology (Leck and Schütz 2005, Newhouse et al. 1995). Gravity is the primary dispersal strategy for sedges (Zukowski et al. 2010) but animal-mediated dispersal may also occur. The fruits of various *Carex* species are consumed by game birds, songbirds, shorebirds and waterfowl as well as an assortment of mammals (Fassett 1957), and some sedge seeds retrieved from the droppings of birds or hoofed mammals have proven to be viable (Leck and Schütz 2005).

Seed banking has been documented in *Carex bushii* (Dutilly and DeBerry 2025). The sedge readily establishes in restored sites or abandoned fields (Karns et al. 2012, Boyce and Durtsche 2020, Schorn 2020) although it is not clear whether that is due to lengthy persistence in the seed bank or strong dispersion capabilities. Peak germination in the closely related *Carex complanata* takes place during the first spring following dispersal (Baskin and Baskin 1988). The propagules of most *Carex* species require a period of stratification at either low or high temperatures (Żukowski et al. 2010) as well as sufficient light (Leck and Schütz 2005) in order to germinate. *Carex* seeds typically sprout underground, producing their first leaf 4–5 days after germination (Alexeev 1988). It is not clear whether *C. bushii* forms any fungal associations but *Carex pallescens*, which is also in section *Porocystis*, appears to be facultatively mycorrhizal (Wang and Qiu 2006).

Habitat

Carex bushii occurs at elevations of 0–500 meters above sea level, where it can grow in a variety of conditions ranging from wet to dry and open to partly shaded Hough 1983, Rhoads and Block 2007, Ball 2020, Weakley et al. 2024). The sedge has often been associated with calcareous substrates, particularly in the eastern part of its range (Underwood 1945, Laughlin and Uhl 2003, Angelo and Boufford 2007, Bell et al. 2008, Standley 2011, MANHESP 2015). Typical natural habitats include grasslands, meadows, and open woodlands. *Carex bushii* has also been reported in communities with characteristics that tend to limit the establishment of other plant species such as sandstone glades, serpentine outcrops, and ephemerally wet clay barrens (Hermann 1936, Ebert and Holt 1994, Homoya 1994, Rolfsmeier and Wilson 1997, Witsell and Baker 2006, Tompkins et al. 2010). Typical canopy components in forested sites are *Acer*, *Carya*, and *Quercus* species (Bell et al. 2008, Hoagland and Buthod 2010). van Els et al. (2010) examined the colonization patterns of herbaceous plants in a *Quercus* forest relative to *Juniperus virginiana* using four categories: *Quercus* canopy only, adjacent to but not beneath *Juniperus*, beneath a *Juniperus* canopy, and adjacent to a *Juniperus* trunk. *Carex bushii* was found in all of the microsite types and showed little difference in abundance relative to position.

Carex bushii can tolerate, or even benefit from, anthropogenic disturbances. It has been reported growing along the edges of ditches and roadside ponds, in utility right-of-ways, and in old agricultural fields. *C. bushii* has even established in the vicinity of abandoned buildings, and in one case it was discovered at an active construction site (Butter 2020, Larson 2011, Bergman 2017, Schorn 2020). In the western part of its range, *C. bushii* is sometimes found in prairies that have been managed with periodic burns (Edgin and Ebinger 2000, Rosen 2007 & 2010).

Habitat descriptions recorded on the sheets of *Carex bushii* specimens that were collected in New Jersey during the early 1900s were brief, noting only that the sedge was found in a 'damp grassland' or a 'dry field' (NJNHP 2024). Davidson and Buell (1967) indicated that *C. bushii* was relatively well-adapted to mesic forested habitat in the northern part of the state. All of the more recent New Jersey occurrences of Bush's Sedge are associated with some type of disturbance. Some of the plants have become established on roadside banks and at the site of an abandoned mine. Most of the extant populations are subjected to periodic habitat disruptions from mowing, light vehicular traffic, or other maintenance activities along utility corridors (Arsenault 1992, NJNHP 2024).

Wetland Indicator Status

The U. S. Army Corps of Engineers divided the country into a number of regions for use with the National Wetlands Plant List and portions of New Jersey fall into three different regions (Figure 1). *Carex bushii* has more than one wetland indicator status within the state. In the Northcentral and Northeast region it a facultative species, meaning that it is equally likely to occur in wetlands or nonwetlands, but in the rest of the state it is a facultative wetland species, meaning that it usually occurs in wetlands but may occur in nonwetlands (U. S. Army Corps of Engineers 2022).

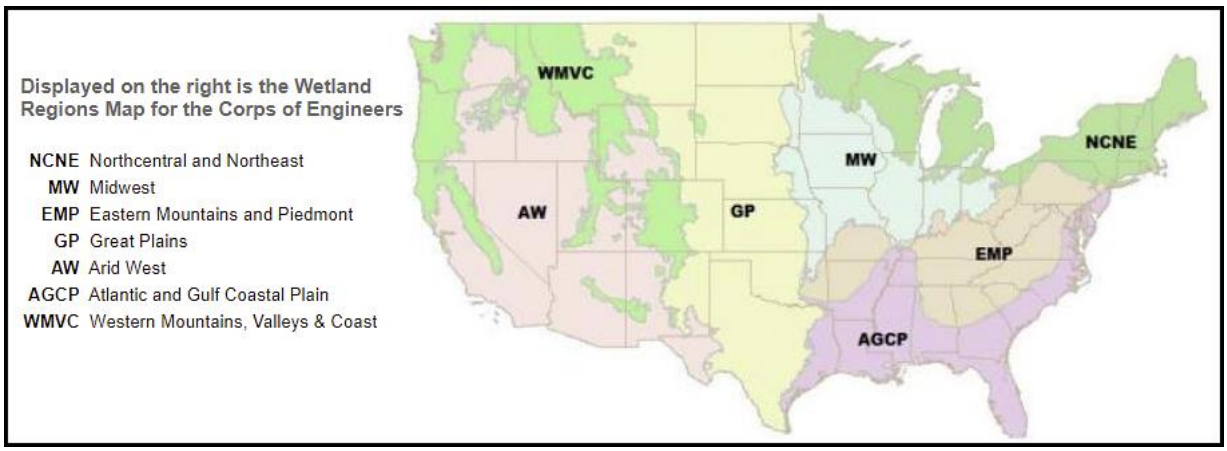


Figure 1. Mainland U. S. wetland regions, adapted from U. S. Army Corps of Engineers (2022).

USDA Plants Code (USDA, NRCS 2025b)

CABU5

Coefficient of Conservancy (Walz et al. 2020)

CoC = 5. Criteria for a value of 3 to 5: Native with an intermediate range of ecological tolerances and may typify a stable native community, but may also persist under some anthropogenic disturbance (Faber-Langendoen 2018).

Distribution and Range

The global range of *Carex bushii* is restricted to the central and eastern United States (POWO 2025). The map in Figure 2 depicts the extent of the species in North America.

The USDA PLANTS Database (2025b) shows records of *Carex bushii* in three New Jersey counties: Hunterdon, Somerset, and Sussex (Figure 3). The sedge has also been documented in Bergen, Camden, and Salem counties (Arsenault 1992, NJNHP 2024, Mid-Atlantic Herbaria 2025). The data include historic observations and do not reflect the current distribution of the species.

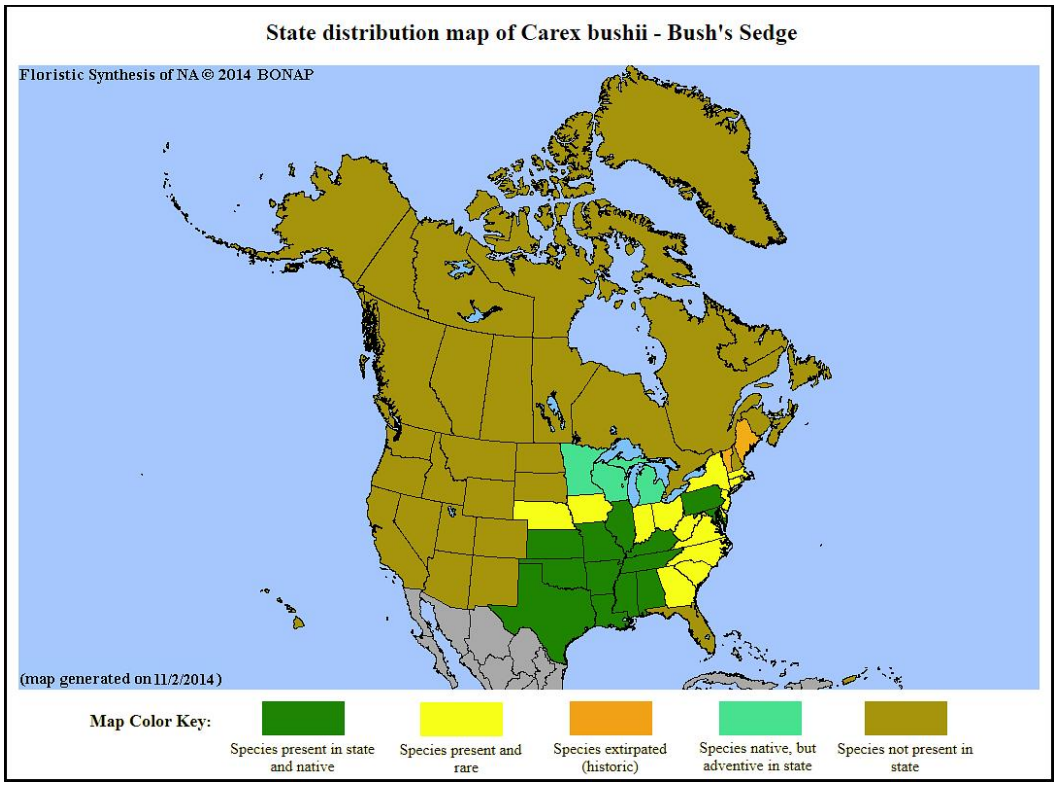


Figure 2. Distribution of C. bushii in North America, adapted from BONAP (Kartesz 2015).

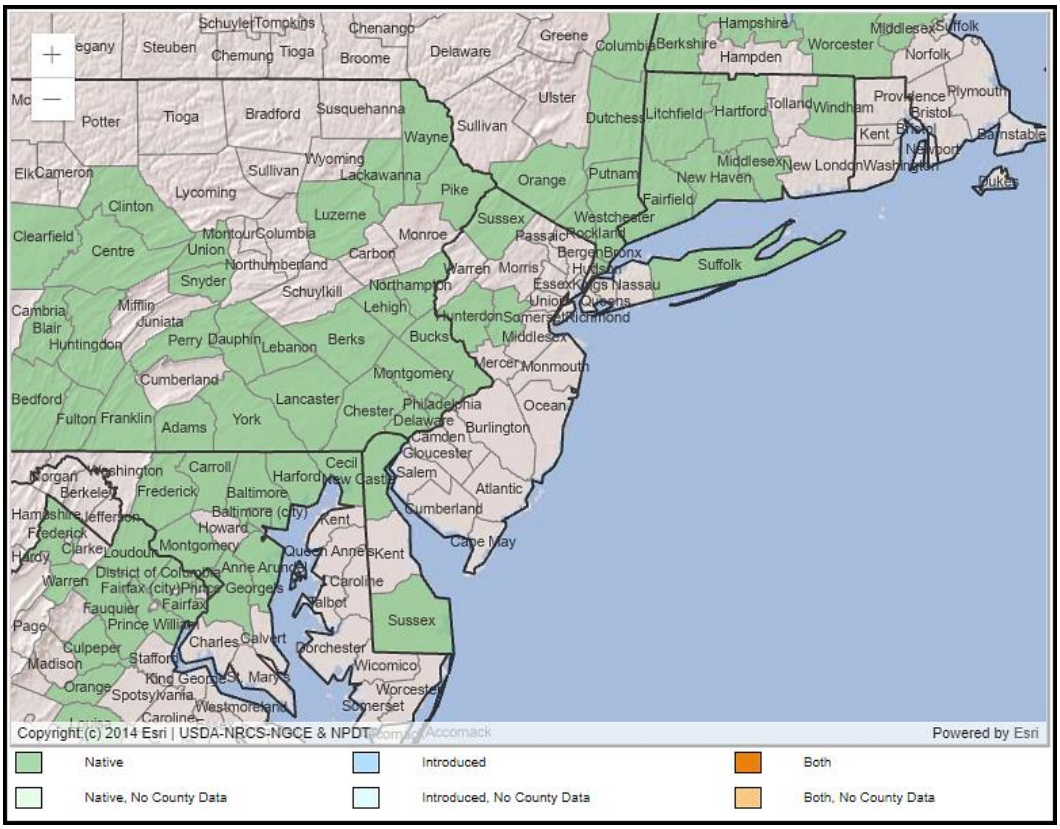


Figure 3. County records of C. bushii in New Jersey and vicinity (USDA NRCS 2025b).

Conservation Status

Carex bushii is considered globally secure. The G5 rank means the species has a very low risk of extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats (NatureServe 2025). The map below (Figure 4) illustrates the conservation status of *C. bushii* throughout its range. The sedge is secure, apparently secure, or unranked in about half of states where it has been found. However, it is vulnerable (moderate risk of extinction) in three states, imperiled (high risk of extinction) in four states, critically imperiled (very high risk of extinction) in six states, possibly extirpated in Rhode Island, and presumed extirpated in Maine. Occurrences in Michigan are not accepted as native, and the original reports of the species in that state may have been made in error (Hermann 1941, 1951).

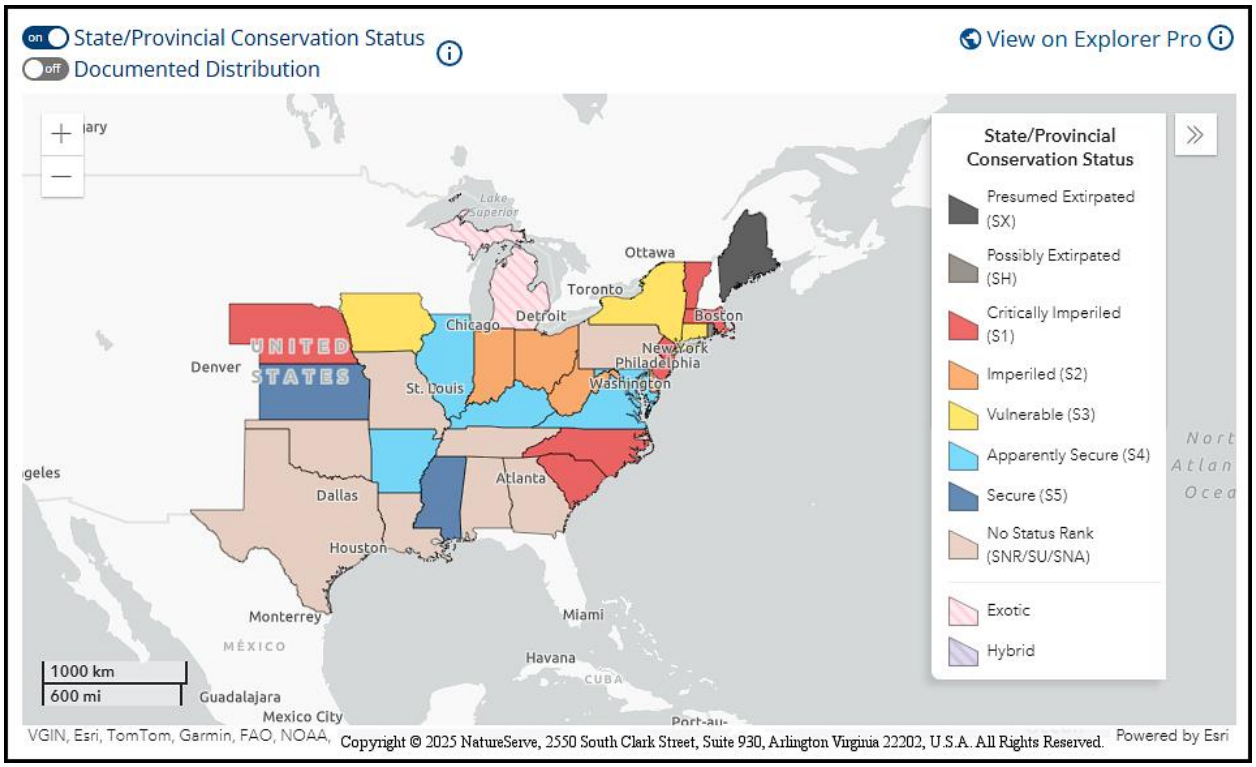


Figure 4. Conservation status of C. bushii in North America (NatureServe 2025).

Carex bushii is critically imperiled (S1) in New Jersey (NJNHP 2024). The rank signifies five or fewer occurrences in the state. A species with an S1 rank is typically either restricted to specialized habitats, geographically limited to a small area of the state, or significantly reduced in number from its previous status. *C. bushii* is also listed as an endangered species (E) in New Jersey, meaning that without intervention it has a high likelihood of extinction in the state. Although the presence of endangered flora may restrict development in certain communities such as wetlands or coastal habitats, being listed does not currently provide broad statewide protection for the plants. Additional regional status codes assigned to the sedge signify that the species is eligible for protection under the jurisdictions of the Highlands Preservation Area (HL) and the New Jersey Pinelands (LP) (NJNHP 2010).

Mackenzie (1910) had not yet seen *Carex bushii* in New Jersey when he named the species, but he later collected a specimen in Sussex County (Mid-Atlantic Herbaria 2025). The earliest state record was from Hunterdon County (Taylor 1915). Hunterdon was the only county of occurrence noted by Hough (1983) and it is where the majority of extant New Jersey populations can still be found (Breden et al. 2006, NHNHP 2024). *Carex bushii* was among the earliest plants in the state to be identified as species of concern and it has been ranked as endangered and critically imperiled since the lists were first established (NJONLM 1984, 1990, 1992).

Threats

No threats to New Jersey's populations of *Carex bushii* have been reported (NJNHP 2024). Although individual occurrences could potentially be threatened by any activity that results in habitat loss or degradation nothing in particular has been identified as widespread concern for the species (Soteropoulos 2024).

As discussed in the Habitat section, *Carex bushii* appears to thrive in places that are subject to periodic disturbances, which suggests that the sedge might be a poor competitor. Shading by woody species could be a threat in successional habitats, as could the proliferation of more competitive introduced plants. Some invasive species that have been noted as possible threats to *C. bushii* are *Alliaria petiolata*, *Berberis thunbergii*, *Elaeagnus umbellata*, *Rhamnus cathartica*, and *Rosa multiflora* (Bell et al. 2008, Larson 2011, MANHESP 2015, Schorn 2020).

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Carex bushii* populations to climate change. The species was assigned a rank from NatureServe's Climate Change Vulnerability Index using the associated tool (Version 3.02) to estimate its exposure, sensitivity, and adaptive capacity to changing climactic conditions in accordance with the guidelines described by Young et al. (2016) and the state climactic computations by Ring et al. (2013). Based on available data *C. bushii* was assessed as Less Vulnerable, meaning that climate change is not expected to have a notable detrimental impact on its extent in New Jersey by 2050.

The effects of changing climactic conditions in New Jersey include higher temperatures, a longer growing season, and shifting precipitation patterns that have increased the frequency and intensity of both droughts and floods (Hill et al. 2020). Since *Carex bushii* has a strong presence in the southeastern and south central United States, the species can be expected to withstand warmer conditions and a longer growing season. Other features of the sedge that may be advantageous are its ability to tolerate a wide range of moisture levels and to establish in disturbed habitats. The most direct impact of climate change on *C. bushii* will probably be an increase in competition. Invasive plant species are likely to become an even greater threat in New Jersey as the climate continues to warm. Some of the introduced species that have already gained a foothold in the northeast are expected to become more abundant (Dukes et al. 2009, Coville et al. 2021, O'Uhuru 2022), and both the northeastern and mid-Atlantic regions are

predicted to become hotspots for the establishment of additional nonnative plants (Bellard et al. 2013, Salva and Bradley 2023).

Management Summary and Recommendations

Periodic disturbances appear to be effective in sustaining established populations of *Carex bushii*. Mowing in particular has been noted as beneficial to a number of eastern occurrences and the sedge seems to thrive under light disturbance regimes such as those employed to maintain utility corridors (Larson 2011, MANHESP 2015, Schorn 2020, NJNHP 2024). The use of fire may be appropriate at some sites, although studies are needed to ascertain the optimal timing, intervals, and intensity of planned burns. Other avenues of research on *Carex bushii* might help to determine why such a disturbance-tolerant species is relatively rare in so many places.

Regular monitoring of extant *Carex bushii* occurrences is recommended in order to evaluate the status of populations and identify emerging concerns. One Hunterdon County occurrence can serve as a cautionary tale: Thousands of fruiting plants were observed at the site in 1986 but very few could be found when the site was revisited in 2009. Three of New Jersey's populations have never been formally assessed and another has not been visited since it was first discovered during the 1980s (NJNHP 2024). Additional colonies of *Carex bushii* may yet be found in the state. There is a limited likelihood of relocating historic collection sites due to a paucity of details regarding their locations, but Schorn (2020) pointed out that searches of old fields or other disturbed sites could result in some new discoveries.

Synonyms

The accepted botanical name of the species is *Carex bushii* Mack. Orthographic variants, synonyms, and common names are listed below (ITIS 2025, POWO 2025, USDA NRCS 2025b).

Botanical Synonyms	Common Names
Carex caroliniana Schwein. var. *cuspidata* (Dewey) Shinners	Bush's Sedge
Carex hirsuta var. *cuspidata* Dewey	

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