Rhynchospora nitens

Short-beaked Bald-rush

Cyperaceae

Rhynchospora nitens by Keith Bradley, 2015

***Rhynchospora nitens* 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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Life History

Rhynchospora nitens (Short-beaked Bald-rush) is a tufted annual sedge. *R. nitens* is one of three species in the eastern United States in the *Psilocarya* group: The others are *R. scirpoides*, which also occurs in New Jersey, and *R. eximia*, which has not been documented north of Florida. Torrey (1836) established *Psilocarya* as a separate genus and despite the fact that it was redefined as a section of *Rhynchospora* a short time later by Gray (1867) many botanists retained *Psilocarya* at the genus level well into the 20th century. Two key features separate the *Psilocarya* group from other *Rhynchospora* species: They are many-flowered, having a perfect floret behind each spikelet scale whereas other members of the genus have many empty scales and only a few flowers, and their achenes lack bristles—the name *Psilocarya* roughly translates into 'bald nut' (Torrey 1836, Gray 1867, Britton and Brown 1913). Species in section *Psilocarya* typically have dark-colored, stalked spikelets and their inflorescences and leaves are generally long relative to the stature of the plants (Kral 2020, Weakley et al. 2024).


Left: Britton and Brown 1913, courtesy USDA NRCS 2024a. Center: Janet Wright, 2020. Right: Claire Ciafré, 2024.

Strong (2006) noted that *Rhynchospora nitens* plants can be extremely variable in size. According to Fernald (1950) the typical height is 50–70 cm but Kral (2020) indicated that it could range from (10–)20–100 cm and the plants in a Delaware population discovered by Naczi (1984) were all under 5 cm tall. The linear leaves arising from the mid-stem of *R. nitens* plants often surpass the inflorescences, which can be both terminal and axillary. The spikelets are ovoid with pointed tips, dark brown, and 4–6 mm long. *Rhynchospora scirpoides* is similar in appearance and has the same habitat preferences as *R. nitens*—they are commonly found growing together (Reznicek 1999, Clark 2003, NJNHP 2024) so mature fruits are needed to distinguish the two species. Clark (2003) noted that the achenes of *R. nitens* are initially light-colored but darken as they become ripe. *R. nitens* achenes are strongly cross-wrinkled and have low (0.1–0.3 mm) tubercles that are wider than tall, while those of *R. scirpoides* have less distinct transverse markings and are topped with triangular tubercles over 0.5 mm which are

notably taller than wide. (See Britton 1888, Britton and Brown 1913, Fernald 1950, Fassett 1957, Gleason and Cronquist 1991, Reznicek 1999, Strong 2006, Kral 2020).

Rhynchospora nitens plants do not emerge every year and when they do the population sizes can fluctuate considerably (Fairbrothers and Hough 1973, Clark 2003, NJNHP 2024). In the northeast, germination is likely to occur in May (Clark 2003). Flowering and fruiting times vary with latitude: Fruit can be found as early as June in Florida (Anderson et al. 1985) but September or October is typical in New Jersey and Massachusetts (Hough 1983, Clark 2003). In some parts of the species' range fruit may be present at any time of the year (Kral 2020). Vegetative parts of the plant generally deteriorate once the achenes have matured (Clark 2003).

Pollinator Dynamics

Most species in the Cyperaceae are wind-pollinated but insect pollination has also been documented in several sedge genera, including *Rhynchospora*. Nearly all of the insect-pollinated sedges are also pollinated by wind (Goetghebeur 1998). Wind is the prevailing pollination mechanism for the majority of *Rhynchospora* species outside of section *Dichromena*: The flowers of plants in that group have pale, leafy involucral bracts, white glumes, and sticky pollen and use insects as their primary means of cross-fertilization (Lucero et al. 2014). Some New Jersey *Rhynchospora* species, including *R. alba* and *R. pallida*, utilize a combination of insect and wind pollination. The floral morphology of *Rhynchospora nitens* is indicative of wind pollination because the spikelets lack features that would be attractive to insects (da Costa et al. 2021).

Seed Dispersal and Establishment

Rhynchospora seeds can be locally dispersed by gravity, wind, or water (Leck and Schütz 1994). *R. nitens* probably releases its achenes as the plants senesce so many of them are likely to end up very close to the source plants, particularly if there is no standing water at the end of the growing season (Clark 2003). Some seeds may be transported to new locations by animals, particularly birds. Howard and Allain (2012) ranked *R. nitens* as having moderate value as a food source for wildlife. The achenes are sometimes consumed by waterfowl and have been found in the gizzards of Mallards (*Anas platyrhynchos*) and Mottled Ducks (*A. fulvigula*) (McAtee 1918, Fassett 1957, Stieglitz 1972). The dispersal of viable propagules following consumption by avian species has been documented in a variety of sedges (Leck and Schütz 1994).

Rhynchospora nitens typically maintains large seed banks in the communities where it occurs (Clark 2003, Toth and van der Valk 2012). Kirkman and Sharitz (1994) studied seed banks of Carolina Bays with different dominant species including *Andropogon virginicus, Iva microcephala, Leersia hexandra, Panicum acuminatum, P. hemitomon,* and *P. wrightianum*. *R. nitens* seeds germinated from samples taken in all vegetation types. Short-beaked Bald-rush was also noted as one of the most abundant species in the seed bank at a site studied by Sutter and Kral (1994). Clark (2003) indicated that *R. nitens* seeds can remain dormant for a number of years until conditions become favorable for growth.

Rhynchospora nitens grows in places that experience significant hydrological fluctuations seasonally or between years (see next section) and the seeds germinate during drier periods but remain dormant when standing water is present. Germination may not take place immediately following substrate exposure—studies in both natural and artificial wetlands found that *R. nitens* emerged during the second year of an extended drawdown period (Zaremba and Lamont 1993, Howard and Allain 2012).

Habitat

Rhynchospora nitens is a habitat specialist, growing at elevations of 0–100 meters above sea level in sites that are alternately wet and dry but generally remain moist. It is usually found on sandy or peaty substrates along shorelines or at the bottom of intermittent ponds (Ferguson 1926, Field and Coddington 1980, Hough 1983, Naczi 1984, Sorrie and Leonard 1999, Young 2012, Kral 2020). *R. nitens* requires open habitats with abundant light (Weakley et al. 2024). The sites are often acidic (Kral 1966, Angelo and Boufford 2007) but the sedge has sometimes been found in calcareous settings (Orzell and Bridges 2006) and in Texas it was described as a characteristic species of neutral or moderately alkaline wetlands (Singhurst et al. 2011).

When *Rhynchospora nitens* was first found in New Jersey the plants were growing on the muddy bottom of a dried-up pond (Long 1909) and the majority of subsequently documented occurrences in the state were also situated in intermittent ponds on the coastal plain. The small, isolated wetlands are typical of the habitat utilized by the species in the northeast. They are usually full during the winter months but the water levels drop as the growing season progresses: Sometimes the substrate is completely exposed but other times standing water is still present at the end of the summer. The amount, frequency, and duration of drawdown varies considerably from one year to the next. During extended periods of drawdown *Rhynchospora nitens* and a suite of other specialist graminoids and forbs emerge from the seed bank in profusion (Zaremba and Lamont 1993, McAvoy and Bowman 2002, Clark 2003, NJNHP 2024).

All throughout its range *Rhynchospora nitens* occurs in habitats with similar hydrologic characteristics. In the southeast typical communities include Carolina Bays, Slough/Depression Marshes and Pond Cypress Savannas; the latter are maintained by both hydroperiod and episodic fires (Anderson and Alexander 1985, Sutter and Kral 1994, Mulhouse et al. 2005). *R. nitens* has been found in interdunal swales in Texas and on North Carolina's barrier islands (Singhurst et al. 2011, Sorrie 2021). In the Great Lakes region, *R. nitens* occurs in sandy-bottomed, shallow wetlands that experience periodic drawdowns, and a number of other disjunct coastal plain species grow there as well (Reznicek 1999, Hedge and Stork 2013). On the Gulf Coast the sedge is frequently associated with wet prairie communities (Toth and van der Valk 2012). One Louisiana prairie studied by Grace et al. (2000) featured a high density of mima mounds, which are raised areas of disputed geologic origin that are about 0.5–1 meter high and 5–10 meters wide. *R. nitens* was found between but not upon the mounds. Habitats utilized by Short-beaked Bald-rush in other parts of the world are similar to those in North America. In Belize and Nicaragua *Rhynchospora nitens* grows in low, wet, sandy or peaty sites that are dominated by graminoids and influenced by fire (Thomas 1992, Goodwin et al. 2013). In Guyana it was found on a sand bank at the edge of a river (Strong 2006).

Rhynchospora nitens has also been documented in some anthropogenic habitats that have comparable hydrologic characteristics including dammed streamheads, ditches, and other disturbed areas (Sorrie and Leonard 1999, Taggart 2010). The species has been found growing in a utility right-of-way maintained by mowing (Shelingoski et al. 2005) and in vehicle ruts in a wet meadow (Weakley et al. 2022).

Wetland Indicator Status

Rhynchospora nitens is an obligate wetland species, meaning that it almost always occurs in wetlands (U. S. Army Corps of Engineers 2020).

USDA Plants Code (USDA, NRCS 2024b)

RHNI

Coefficient of Conservancy (Walz et al. 2020)

CoC = 8. Criteria for a value of 6 to 8: Native with a narrow range of ecological tolerances and typically associated with a stable community (Faber-Langendoen 2018).

Distribution and Range

The native range of *Rhynchospora nitens* extends from the United States south to Guyana in South America. The sedge has a sporadic distribution in Central America and the Caribbean (POWO 2024). In Guyana it is only known from a single site (Strong 2006). The map in Figure 1 depicts the extent of *R. nitens* in the United States and Canada. In the U. S. *Rhynchospora nitens* is mainly restricted to the Atlantic and Gulf coastal plain (Weakley et al. 2024) with disjunct occurrences in the vicinity of Lake Michigan (Reznicek 1999, Hedge and Stork 2013).

The USDA PLANTS Database (2024b) shows records of *Rhynchospora nitens* in five New Jersey counties: Atlantic, Cape May, Cumberland, Ocean, and Salem (Figure 2). *R. nitens* has also been found in Burlington and Gloucester counties (NJNHP 2024). The data include historic observations and do not reflect the current distribution of the species.

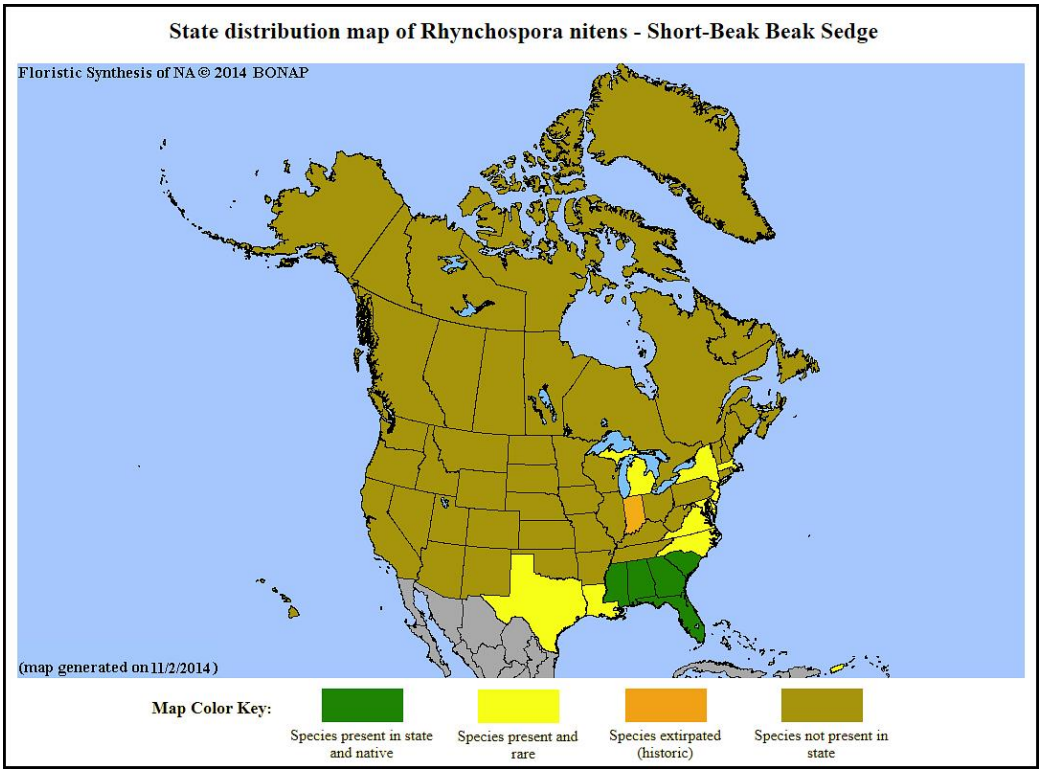

Figure 1. Distribution of R. nitens in the United States and Canada, adapted from BONAP (Kartesz 2015).

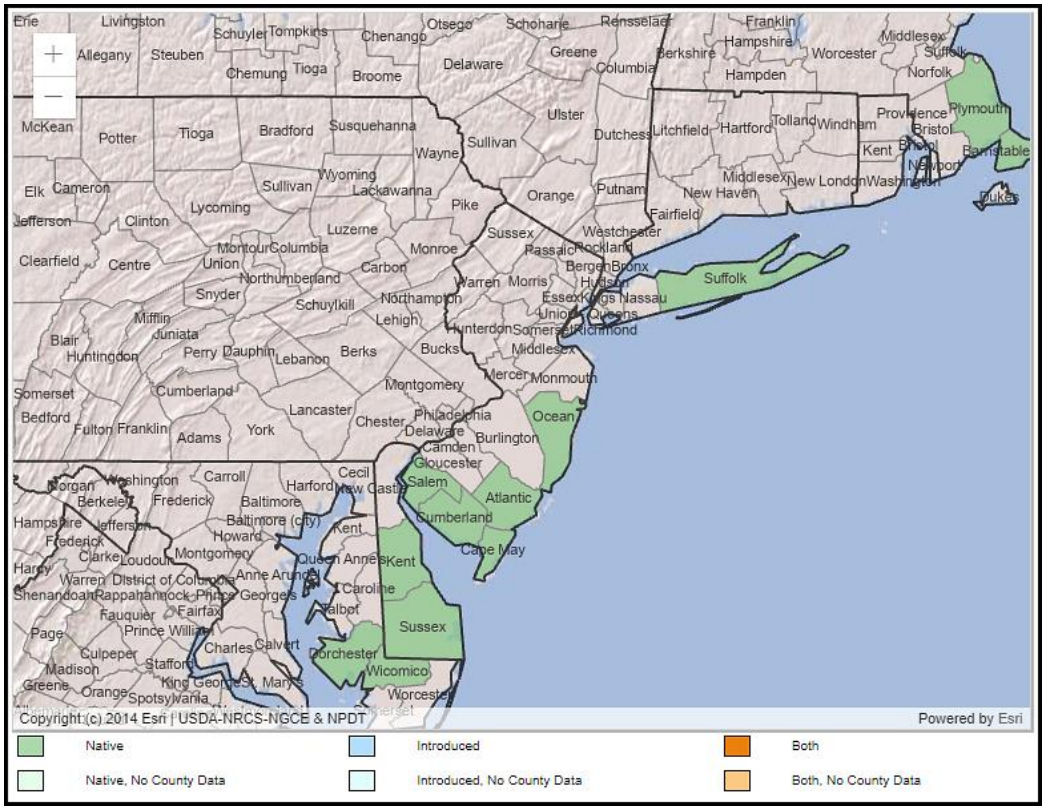

Figure 2. County records of R. nitens in New Jersey and vicinity (USDA NRCS 2024b).

Conservation Status

Rhynchospora nitens is apparently secure at a global scale. The G4? rank means the species is at fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, although there is some cause for concern as a result of recent local declines, threats, or other factors. The question mark indicates that the status is in need of a review—The status of *R. nitens* has not been re-evaluated since February 2001 (NatureServe 2024).

The map below (Figure 3) illustrates the conservation status of *Rhynchospora nitens* in the United States and Canada. The species is vulnerable (moderate risk of extinction) in three states, imperiled (high risk of extinction) in three states, critically imperiled (very high risk of extinction) in five states, and possibly extirpated in Virginia. Reznicek (1994) noted that it had not been collected in the Great Lakes region since 1899 but some mislabeled specimens from the 1950s turned up in Indiana and single occurrences of the sedge were subsequently documented in Michigan and relocated in Indiana (Reznicek 1999, Hedge and Stork 2013). Short-beaked Bald-rush is apparently secure in Florida and Louisiana and it has not been ranked in Alabama or South Carolina. *Rhynchospora nitens* has been identified as a plant species of highest conservation priority for the North Atlantic region, which includes four Canadian provinces and twelve U. S. states. The species has a rank of R2 (imperiled), signifying a high risk of regional extinction (Frances 2017).

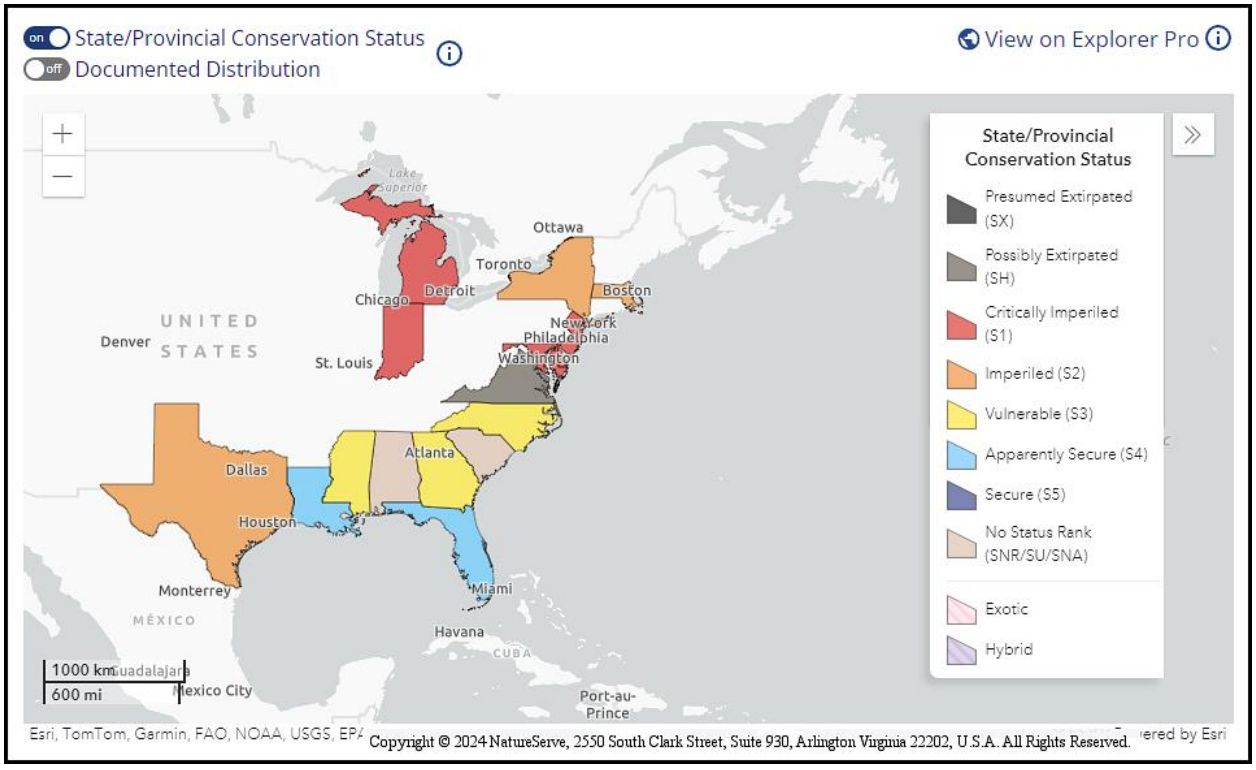

Figure 3. Conservation status of R. nitens in the United States and Canada (NatureServe 2024).

Rhynchospora nitens 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. *R. nitens* has also been assigned a regional status code of HL, signifying that the species is eligible for protection under the jurisdiction of the Highlands Preservation Area (NJNHP 2010).

Otway H. Brown discovered a population of *Rhynchospora nitens* in Cape May County during October of 1908 (Long 1909). That was the first documentation of the species in the state, and it remained the only known New Jersey occurrence for several decades (Stone 1911, Taylor 1915, Fairbrothers and Hough 1973, NJNHP 2024). Fairbrothers and Hough (1973) initially labeled the status of *R. nitens* as undetermined but amended it to endangered in a 1975 update of their publication. New occurrences were discovered around the same time and by the early 1980s the species was known from four counties (Hough 1983). Short-beaked Bald-rush was state-listed as imperiled during the 1990s (NJONLM 1992) and its status was modified to critically imperiled within the past decade (NJNHP 2015). Seven populations of *R. nitens* are currently tracked as extant and six other are ranked as historical (NJNHP 2024). Many of the 'extant' occurrences have not been seen for decades, but it is difficult to assess the status of a species that undergoes such large fluctuations in population size. Some other reported records of the sedge might be indicative of either persistent historical occurrences or undocumented populations (eg. Schuyler and Gordon 2002, Sundue 2006, Moore et al. 2016).

Threats

Rhynchospora nitens belongs to a relatively small group of species that flourish in sites with variable water levels. The fluctuations make the sites unsuitable for many other plants, so changes to natural hydrologic regimes can significantly alter community composition to the detriment of the specialists. Alteration of its vulnerable wetland habitats has been identified as the primary threat to the species throughout North America (Morse and MacBryde 2001). In New Jersey, historic impacts to intermittent coastal plain ponds resulted from ditching and draining of the wetlands, resource extraction, and conversion to cranberry bogs (Johnson and Walz 2013), and two of the state's populations of *R. nitens* were lost to damming and dredging (NJNHP 2024). In addition to disruption of hydrology extensive regional development can result in fire suppression or the introduction of nutrients from agricultural and lawn runoff, which in turn can cause changes in community composition. Local development may also lead to additional foot traffic and inadvertent trampling of the plants (Clark 2003, Young 2012, Johnson and Walz 2013, MANHESP 2019).

In recent years the most frequently noted threat to *Rhynchospora nitens* populations in New Jersey is damage resulting from off-road vehicle (ORV) activities (NJNHP 2024). ORV traffic has been identified as a significant threat to intermittent coastal plain ponds throughout the northeast (Clark 2003, Young 2012, Johnson and Walz 2013, MANHESP 2019) and as a potential concern for *R. nitens* habitats in the Great Lakes region (MINFI 2024). At one New Jersey location an observer noted that ORVs were destroying sensitive species but also helping to keep the habitat open, and it was suspected that *R. nitens* had initially been brought to the site by the vehicles (NJNHP 2024). While it is entirely possible that seeds of rare plants are occasionally dispersed to new locations on the wheels of ORVs, it is much more common to find that the traffic has introduced invasive plant species into natural communities (pers. obs.).

In the absence of disturbance, invasive species are rarely noted as threats to *Rhynchospora nitens* because their establishment is deterred by the characteristic hydrologic fluctuations that favor the sedge. Farnsworth (2004) noted that none of the 13 New England populations were affected by invasive species and to date no invasive plants have been reported in the vicinity of New Jersey occurrences (NJNHP 2024). *Phragmites australis* ssp. *australis* has been identified as a concern for some *R. nitens* populations in New York (Young 2012).

Rhynchospora nitens is susceptible to some smut fungi that could have a significant detrimental effect on populations of the sedge. Both *Ustanciosporium montagnei* and *U. psilocaryae* have been recorded on *R. nitens* (Vánky 2010). *U. psilocaryae* was first described from infected *Rhynchospora nitens* plants by Tracy and Earle (1899), who found that the fungus transformed the sedges's seeds into black, powdery masses. *U. montagnei* has the same effect and may also result in stunted vegetative growth (Vánky 2010). Clark (2003) observed a smut fungus in several places where *R. nitens* co-occurred with *R. scirpoides* but the infected plants could not be identified because no achenes had been produced. Torrey (1836) reported that a smut infection in a *R. scirpoides* population had become so extensive that no healthy plants could be found. For a species like *Rhynchospora nitens* that only emerges periodically, a failure to replenish the seed bank is likely to result in population decline.

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Rhynchospora nitens* 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 *R. nitens* 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. However, some populations may be more vulnerable than others.

The effects of changing climactic conditions in New Jersey include higher temperatures, shifting precipitation patterns that increase the frequency and intensity of both droughts and floods, and rising sea levels along the coast (Hill et al. 2020). *Rhynchospora nitens* is well-adapted to withstand hydrological fluctuations. Coastal plain intermittent ponds are expected to remain relatively stable as the climate continues to change (Johnson and Walz 2013) and *R. nitens* is drought-tolerant: In fact, an increase in the abundance of the sedge was documented following a four-year drought in South Carolina (Mulhouse et al. 2005). However, New Jersey's longest known population is located in an area that could be susceptible to storm surge during Category 3 or higher intensity hurricanes (NJ Adapt 2024). In some places climate change could exacerbate other threats to natural hydrologic patterns or water quality, making the habitats accessible to more competitive plant species. If extant sites become unsuitable for *R. nitens* the likelihood of it colonizing new locations is diminished by a reliance on random events for long-distance dispersal and a scarcity of favorable habitat in the state.

Management Summary and Recommendations

Habitat conservation is the management priority for *Rhynchospora nitens* in New Jersey and in other parts of its range. Preservation of the natural water regime is essential, so land acquisition initiatives should include large enough buffers to keep water quantity and quality within normal limits. Because intermittent coastal plain ponds are particularly vulnerable to lowered water tables as a result of offsite activities, protection of the sites may require the formation of partnerships with local government agencies or nearby landowners. Planned burns might be an appropriate tool for maintaining an open canopy but research is needed to evaluate impact of fire on *R. nitens*. Deterrence of ORV traffic should be prioritized for sites where that has been identified as an existing or developing threat.

Monitoring of extant and historic occurrences should focus on habitat characteristics and conditions. It is difficult to assess the viability of occurrences for a species like *Rhynchospora nitens* that only appears sporadically and exhibits wild fluctuations in population size. The reappearance of an Indiana population at a site where it had not been seen for more than half a century (Hedge and Stork 2013) indicates that *R. nitens* is able to persist in the seed bank for quite a long time while awaiting suitable conditions for germination.

Synonyms

The accepted botanical name of the species is *Rhynchospora nitens* (Vahl) A. Gray. Some orthographic variants, synonyms, and common names are listed below (ITIS 2024, POWO 2024, USDA NRCS 2024b). *Rhynchospora nitens* plants in Belize are known as var. *hispanolica* (Goodwin et al. 2013). *Psilocarya portoricensis* was described by Britton (1915) when he encountered the sedge in Puerto Rico—He noted its close resemblance to the continental *P. nitens* but thought that the achenes were slightly different.

Botanical Synonyms	**Common Names**
Dichromena nitens (Vahl) Kunth	Short-beaked Bald-rush
Isolepis nitens (Vahl) Roem. & Schult.	Shortbeak Beaksedge
Psilocarya nitens (Vahl) Alph. Wood	Black-fruited Beaksedge
Psilocarya portoricensis Britton	
Psilocarya rhynchosporoides Torr.	
Psilocarya texensis Torr.	
Rhynchospora nitens var. *hispaniolica* Kük.	
Rhynchospora texensis (Torr.) Boeckeler	
Scirpus carolinianus Panz. ex Kunth	
Scirpus nitens Vahl	

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