Glyceria laxa

Northern Manna Grass

Poaceae

Glyceria laxa by Colin Chapman-Lam, 2019

Glyceria laxa 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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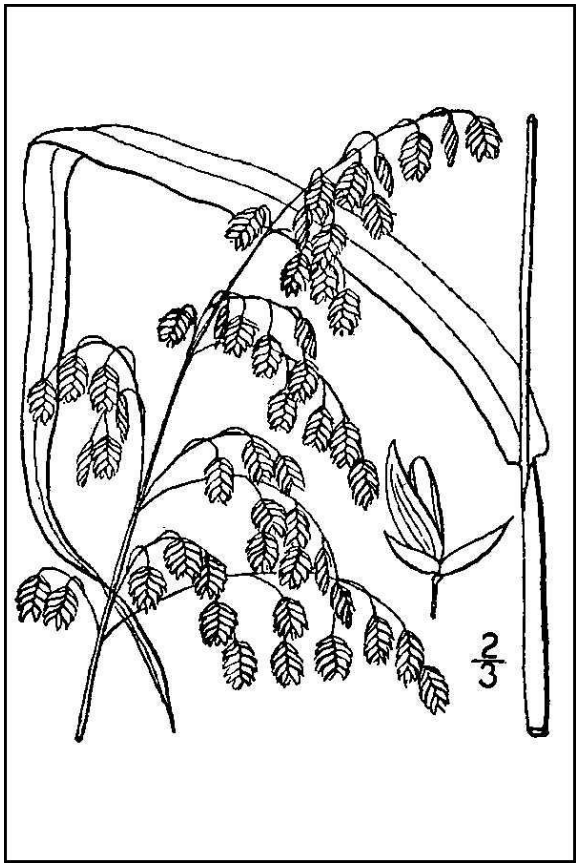
Life History

Glyceria laxa (Northern Manna Grass) is a tall perennial grass. When it grows in colonies the culms are somewhat uniform in height (Munro et al. 2014). The stems may be 0.6–1.6 meters tall and the sheaths are fused for most of their length, rough to the touch, and not strongly compressed. The 5–8 stem leaves are 1–4 dm long, 3–8 mm wide, and rough on the upper surface. Ligules of the uppermost leaves are 2–6 mm long and membranous. The inflorescence of *G. laxa* is a pyramidal panicle with drooping branches that is typically 2–4 dm in length. The spikelets are laterally compressed and 3–5 mm wide. The florets have 2 stamens and conspicuously veined lemmas with boat-shaped tips and no awns. (See Lamson-Scribner 1894, Rand and Redfield 1894, Britton and Brown 1913, Fernald 1950, Hitchcock 1950, Gleason and Cronquist 1991, Ibrahim and Peterson 2014, Mittelhauser et al. 2019, Barkworth and Anderton 2021).



Left: Britton and Brown 1913, courtesy USDA NRCS 2025a. Right: Colin Chapman-Lam, 2024.

Glyceria laxa is very similar to *G. canadensis* and the two species utilize the same habitats (Westerfield 1961). The culms of *G. laxa* can be slightly taller but the spikelets have fewer and smaller florets (Lamson-Scribner 1894, Gilman 1957). On average, the spikelet clusters of *G. laxa* have five or fewer florets while those of *G. canadensis* have five or more. Fernald and Wiegand (1910) found the number of florets was an unreliable means of distinguishing the species but observed that the panicles of *G. laxa* tended to have more branches. In *G. laxa* the spikelets are 3–5 mm long, the lemmas are 1.8–2.5 mm long (roughly equal to the paleas), and

the lower glumes are 0.6–1.3 mm long with tips that are usually rounded. In *G. canadensis* the spikelets are 5–8 mm long, the lemmas are 2.4–4.0 mm long (projecting beyond the paleas), and the lower glumes are 1.6–2.4 mm long with acute tips (Barkworth and Anderton 2021, Weakley et al. 2024).

As with many grasses, identification of *Glyceria laxa* is most reliable when mature fruits are present. In New Jersey *G. laxa* flowers and develops fruit from early July through September (Hough 1983). In Canada the grass flowers and fruits during July and August (Munro et al. 2014), while some populations at the southern end of the species' range may begin to flower as early as June (Weakley et al. 2024).

Pollinator Dynamics

Glyceria species, like most plants the Poaceae, are pollinated by wind (Grant 1949). Some characteristics that facilitate wind pollination in the family include smooth, round pollen grains, a reduced perianth, and a limited number of ovules (Geisler 1945, Friedman and Barrett 2009). In species like *Glyceria laxa* that have diffuse inflorescences, culm movements stimulated by wind may play a role in both dispersal and receipt of pollen (Friedman and Harder 2004). Some floral visitation by syrphid flies has been recorded in the genus (Stelleman 1984), but even when grasses also utilize insects as pollinators wind remains the most important mechanism for cross-fertilization (Schulze-Albuquerque et al. 2019).

Self-incompatibility is frequent in the grass family (Friedman and Barrett 2009) but research on several *Glyceria* species revealed that some were highly self-fertile (Borrill 1955, 1958). The least self-compatible species in Borrill's studies still produced seeds but they were fewer and smaller than those resulting from cross-pollination. Due to the variability within the genus, no inferences can be drawn regarding self-compatibility in *G. laxa*.

Seed Dispersal and Establishment

The fruit of a grass, known as a grain or caryopsis, is dry, indehiscent, and single-seeded. *Glyceria laxa* does not release all of its seeds as soon as they mature and some may remain on the stalks well into the winter. For example, Tessa Wissink's 2020 images from New Brunswick, Canada show *G. laxa* culms that are still retaining some fruit during late January while the ground is covered with snow (iNaturalist 2025).

Most grass seeds fall fairly close to the parent plants but both wind and post-ingestion dispersal by animals are also common (Collins and Uno 1985, Cheplick 1998). Manna grass caryopses are frequently consumed by waterfowl, and in one instance 10,000 *Glyceria* seeds were found in the stomach of a single wood duck (Mabbott 1920, McAtee 1918 & 1939). *Glyceria* species are also heavily grazed by White-tailed Deer during the spring and summer months (Hamerstom and Blake 1939a). Consumption by both birds and deer can play a significant role in the distribution of viable grass seeds (Orlowski et al. 2016, Flaherty et al. 2017). The culms of *Glyceria* spp. are a favored food for muskrats during the spring, summer, and fall (Hamerstom and Blake 1939b),

and muskrat activity is likely to facilitate local dispersal because the animals tend to cut the stems of their food plants and move them around the wetlands to feeding stations (Enders 1932, Bellrose 1950). Flotation and adherence to muddy feet were noted as additional distribution mechanisms for *Glyceria maxima* seeds (Lambert 1947).

No information was found regarding the germination and establishment requirements of *Glyceria laxa,* and—with the exception of *G. maxima*, a European species that has been introduced into some parts of North America—studies of those stages in related species appear to be limited. The seeds of *Glyceria canadensis* do not require any pretreatment in order to germinate. They do need light, and they sprout in response to warm temperatures. Sowing on the soil surface is recommended (Prairie Moon Nursery 2025). In natural settings, *Glyceria* seeds may germinate on saturated soils or in shallow water (Crocker 1938, Lambert 1947, van der Valk and Davis 1978). *G. maxima* seedlings produce their first leaf about two weeks after germination but the plants may take two years to reach reproductive maturity. Lambert (1947) did not observe any mycorrhizae in that species but some other members of the genus are known to be mycorrhizal (Wang and Qiu 2006).

Habitat

Glyceria laxa usually inhabits open wetlands. Weakley et al. (2024) assigned the grass a heliophily ranking of 8, which signifies a strong affinity for sunny locations but some ability to tolerate shade. Typical habitats throughout the species' range include bogs, fens, marshes, seeps, pond margins, and wet meadows or glades (Porter 1899, Ferguson 1924, Fogg 1930, Palmer 1930, Blomquist 1939, Bean et al. 1946, Westerfield 1961, Wieder et al. 1981, Dalton and Novelo Retana 1983, Bonner 2005, Carter and McIntosh 2012, NJNHP 2024, Weakley et al. 2024). *G. laxa* has also been recorded in shrubby wetlands and wooded swamps (Hough 1983, Byers et al. 2007, Munro et al. 2014, Barkworth and Anderton 2021). One of the sites where the grass was collected had been managed with controlled burns (Carter and McIntosh 2012).

Glyceria laxa generally grows with a diverse mixture of sedges and other grasses as well as an assortment of wetland herbs. Associated woody species may include Red Maple (*Acer rubrum*), Sweet Birch (*Betula lenta*), White Pine (*Pinus strobus*), hemlocks (*Tsuga* spp.), alders (*Alnus* spp.), willows (*Salix* spp.), chokecherries (*Aronia* spp.) or Swamp Rose (*Rosa palustris*) (Crockett 2001, Gaddy 2002, Poindexter 2013). No reports of *Glyceria laxa* establishing in anthropogenic habitats or disturbed sites were found.

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). *Glyceria laxa* has more than one wetland indicator status within the state. In the Eastern Mountains and Piedmont region it is a facultative wetland species, meaning that it usually occurs in wetlands but may occur in nonwetlands. In the rest of the state it is an obligate wetland

species, meaning that it almost always occurs in wetlands (U. S. Army Corps of Engineers 2022).

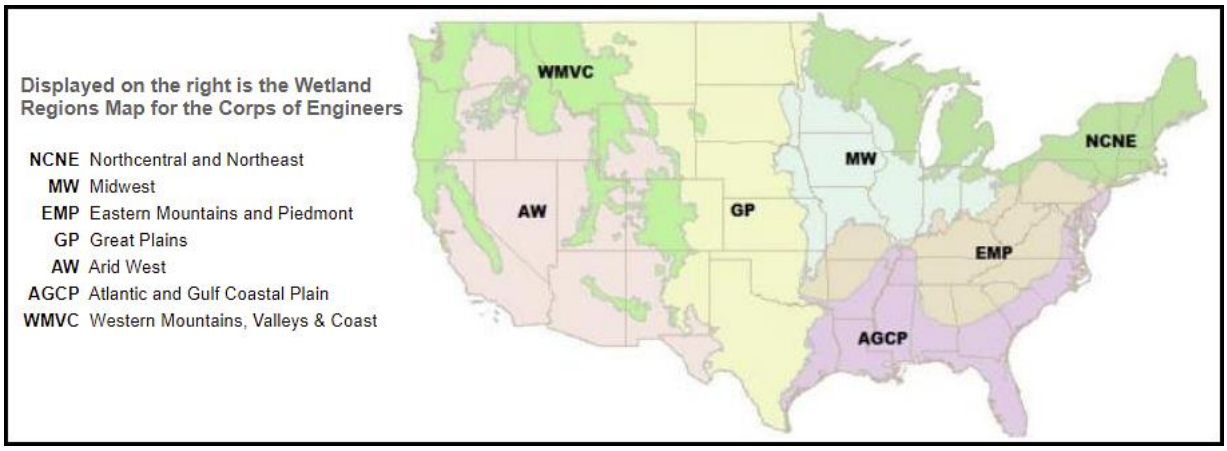


Figure 1. Mainland U. S. wetland regions, adapted from U. S. Army Corps of Engineers (2022).

USDA Plants Code (USDA, NRCS 2025b)

GLLA

Coefficient of Conservancy (Walz et al. 2020)

CoC = 9. Criteria for a value of 9 to 10: Native with a narrow range of ecological tolerances, high fidelity to particular habitat conditions, and sensitive to anthropogenic disturbance (Faber-Langendoen 2018).

Distribution and Range

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

The USDA PLANTS Database (2025b) shows records of *Glyceria laxa* in seven New Jersey counties: Burlington, Cumberland, Gloucester, Mercer, Middlesex, Ocean, and Sussex (Figure 3). The grass has also been collected in Morris and Somerset counties (Mid-Atlantic Herbaria 2025). The data include historic observations and do not reflect the current distribution of the species.

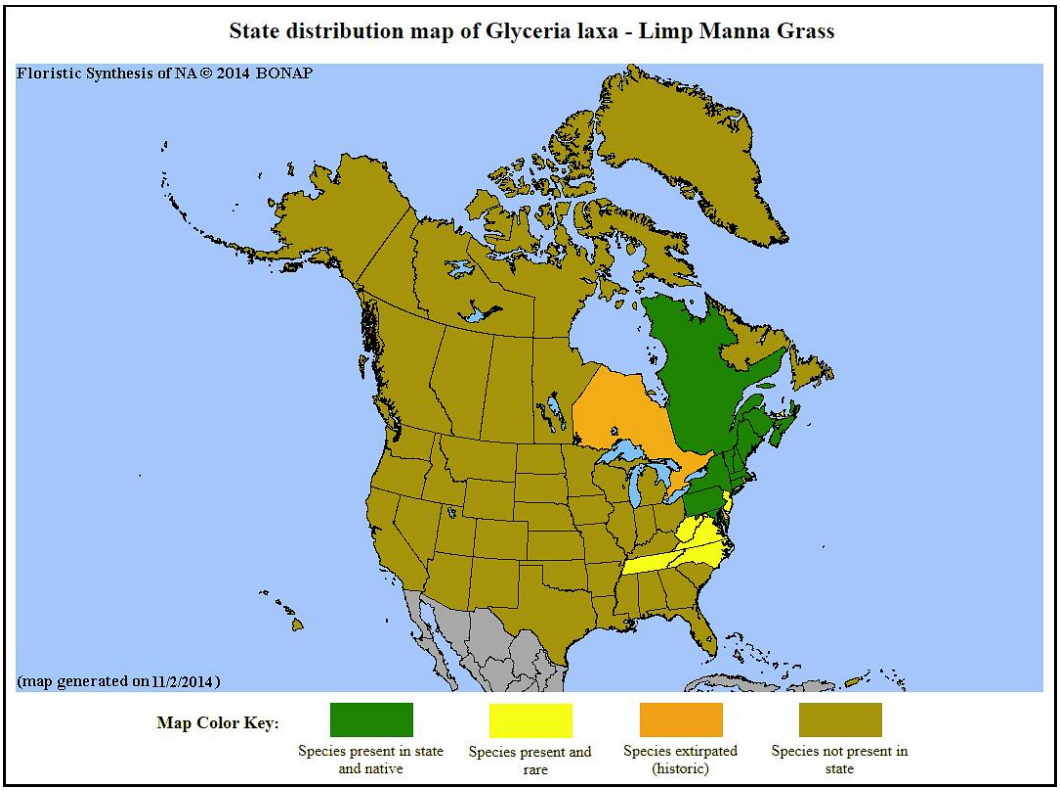


Figure 2. Distribution of G. laxa in North America, adapted from BONAP (Kartesz 2015).

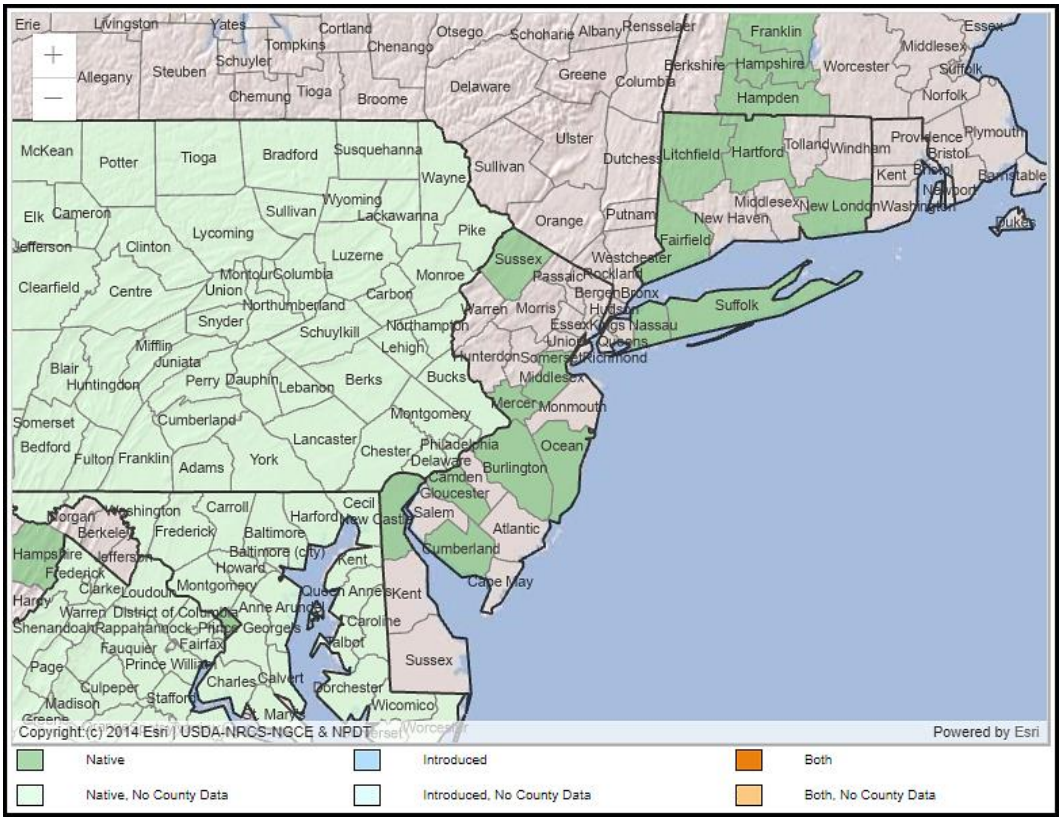


Figure 3. County records of G. laxa in New Jersey and vicinity (USDA NRCS 2025b).

Conservation Status

Glyceria laxa 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 (NatureServe 2025). The map below (Figure 4) illustrates the conservation status of *G. laxa* throughout its range. The grass is imperiled (high risk of extinction) in two states, critically imperiled (very high risk of extinction) in three states, and presumed extirpated in the District of Columbia.

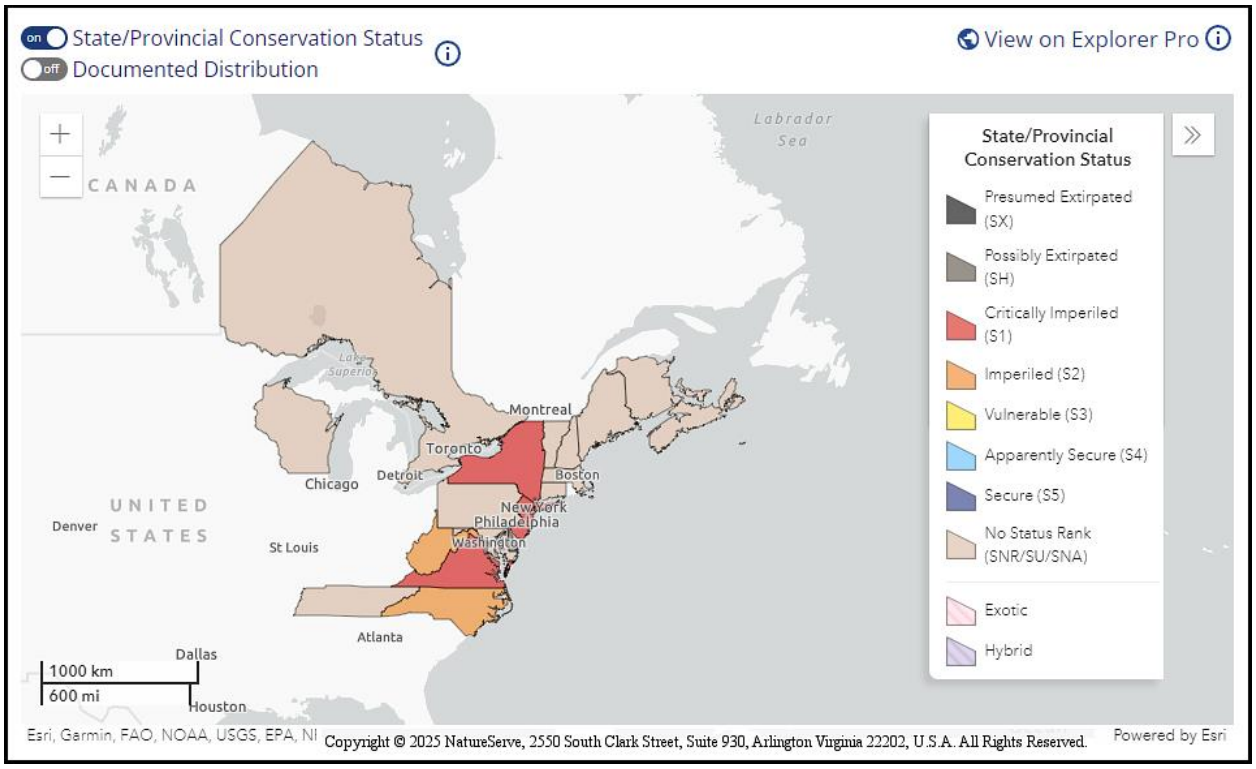


Figure 4. Conservation status of G. laxa in North America (NatureServe 2025).

New Jersey is one of the states where *Glyceria laxa* is critically imperiled. The S1 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. *G. laxa* 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).

The earliest New Jersey collections of *Glyceria laxa* were reportedly made in Gloucester County (Keller and Brown 1905). In addition to the Gloucester records, Taylor (1915) noted the species' presence in Middlesex and Sussex counties and Hough (1983) subsequently indicated that there had also been records from Burlington, Cumberland, and Mercer counties and that extant populations were known in Ocean and Sussex counties. Northern Manna Grass was initially listed as an S2 species in the state but its status was revised to S1 shortly thereafter (NJONLM 1997, NJNHP 2001). Only two New Jersey occurrences are currently tracked by the Natural

Heritage Program and in both cases *G. laxa* has been documented in the area for almost 100 years. One population from which a collection was made in 1894 was relocated by David Snyder in 1985, and in 2012 Snyder discovered a new population just a short distance from another site where the species had been found in 1915 (NJNHP 2024).

Some historical populations in New Jersey may have been morphologically intermediate between *Glyceria laxa* and *G. canadensis.* Stone (1911) found the southern New Jersey material he examined to be ambiguous. In the original description of the grass, Lamson-Scribner (1894) remarked that what appeared to be an unusual form of the species had been collected by H. H. Rusby in New Jersey and that the same form was also known from Maine. A 1879 specimen collected by Rusby in Essex County is now labeled as immature *G. canadensis* but that may or may not have been the one examined by Lamson-Scribner. There are also some 1930s-era specimens from Cumberland County that have alternately been identified as *G. laxa* and *G. canadensis* (Mid-Atlantic Herbaria 2025).

Threats

More information about *Glyceria laxa* is needed in order to identify global population trends or range-wide threats. Potential concerns for individual populations include land-use conversion, habitat fragmentation, forest and utility right-of-way management practices, invasive plants, and succession (Ventrella 2025). No specific threats to the extant New Jersey populations have been reported, although the habitat at one location was noted to be degraded (NJNHP 2024). The habitat conditions preferred by *Glyceria laxa* are also favored by beavers so some populations of the grass could be eliminated by flooding. Conversely, once beaver ponds have become well-established they may provide new sites that are suitable for the grass (Bonner 2005).

Northern Manna Grass is susceptible to some common fungal infections that affect many other grasses and have been known to cause extensive losses in cereal crops. *Glyceria laxa* is a documented host for a smut fungus, *Ustilago longissima* var. *macrospora* (Clinton 1902), and for the floral pathogen *Claviceps purpurea* var. *purpurea*, commonly known as Ergot (Alderman et al. 2004). Smut fungi colonize the vascular systems of their hosts but they may remain unnoticed until they reach the floral parts, where they replace the plant's reproductive organs with masses of their own spores (Zuo et al. 2019). *Claviceps purpurea* is similar in that it exclusively attacks the ovaries of grasses but it only develops in some of the flowers, forming dark-colored overwintering structures called sclerotia. Alkaloids in the sclerotia are extremely toxic to mammals, including humans (Tudzynski and Scheffer 2004). Both types of infection can severely reduce the reproductive capacity of the host plants. However, Lev-Yadum and Halpern (2007) suggested that mild ergot infections that have a limited impact on the host's reproduction might benefit the plants by deterring herbivores.

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Glyceria laxa* 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 Northern Manna Grass was assessed as Moderately Vulnerable, meaning that it is likely to show some decrease in abundance or range extent in New Jersey by 2050. However, the conclusion was reached with a low level of confidence because some of the factors were ranked based on inferences rather than data and others were left unranked due to gaps in information about *G. laxa*.

Glyceria laxa is often characterized as a northern species, and although its distribution extends into some of the mid-Atlantic states the grass is generally rare and restricted to cooler mountainous sites in the southern part of its range (Porter 1899, Taylor 1915, Gilman 1957, Clarkson 1966, Wieder et al. 1981). Shifting climactic conditions are causing temperatures to rise faster in New Jersey than in other parts of the northeast, and one of the consequences of the changing regional precipitation patterns is more frequent and prolonged droughts (Hill et al. 2020). While the effects of temperature and drought on *G. laxa* plants do not appear to have been studied, the species' natural distribution and habitat preferences suggest that hotter conditions or lengthy droughts could be detrimental. Information regarding the grass's sensitivity to competition is lacking, and it is not clear whether the vulnerability of *G. laxa* to fungal pathogens will be altered by the effects of climate change.

Management Summary and Recommendations

Ventrella (2025) noted that closer monitoring of *Glyceria laxa* populations throughout the species' range will improve our understanding of its global status. An updated state status assessment is needed for New Jersey. Both of the known populations were small when they were last seen: One in 2012 and the other 40 years ago. Monitoring visits are recommended to determine the current extent of the occurrences, make note of habitat conditions, and identify site-specific threats and management needs. It might also be worthwhile to review the herbarium specimens labeled as *G. laxa* in order to identify other historical collection sites, particularly in light of the fact that the species was still able to be found at some locations after nearly a century had passed.

Meaningful conservation planning for *Glyceria laxa* will require additional knowledge about the species' life history and ecological relationships. Suggested topics for investigation include self-compatibility, seed persistence and plant longevity, germination and establishment requirements, temperature effects, mycorrhizal associations, drought tolerance, competitive abilities, and the pros and cons of fire as a management tool.

Synonyms and Taxonomy

The accepted botanical name of the species is *Glyceria laxa* (Scribn.) Scribn. Orthographic variants, synonyms, and common names are listed below (POWO 2025, USDA NRCS 2025b).

Lamson-Scribner (1894) first published the species as *Panicularia laxa* but at his request it was republished as *Glyceria laxa* later that year (Rand and Redfield 1894). Hitchcock (1934) redefined it as a variety of *G. canadensis* and that viewpoint has been maintained by some current sources (e.g. Barkworth and Anderton 2021, ITIS 2025).

Botanical Synonyms	**Common Names**
Glyceria canadensis var. *laxa* (Scribn.) Hitchc.	Northern Manna Grass
Panicularia laxa Scribn.	Limp Mannagrass
	Flaccid Mannagrass
	Lax Mannagrass

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