Torreyochloa pallida var. *fernaldii*

Fernald's False Manna Grass

Poaceae

Torreyochloa pallida var. *fernaldii* by Nate Martineau, 2022

***Torreyochloa pallida* var. *fernaldii* 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

Torreyochloa pallida var. *fernaldii* (Fernald's False Manna Grass) is a perennial rhizomatous grass. There are three varieties of *Torreyochloa pallida* but only two occur in New Jersey and var. *pallida* is considerably more common than var. *fernaldii* in the state. In northern New England and Canada var. *fernaldii* is generally the most abundant variety (Nichols and Nichols 2008, Munro et al. 2014). The two eastern varieties are morphologically similar: The primary difference is that var. *fernaldii* is smaller—having shorter culms, narrower leaves and shorter anthers, lemmas, and ligules (Fassett 1957, Gleason and Cronquist 1991, Davis 2021, Weakley et al. 2024). *Torreyochloa* species may be confused with various types of *Glyceria* or *Puccinellia* (see Synonyms and Taxonomy section). *T. pallida* is most likely to co-occur with *Glyceria* species, which differ in having closed leaf sheaths while those of *Torreyochloa* and *Puccinellia* are open at the top. *Puccinellia* species are more likely to be found in saline or alkaline soils (Tucker 1996).

Left: Hitchcock 1950, courtesy USDA NRCS 2025a. Center and Right: Nate Martineau, 2022.

The culms of *Torreyochloa pallida* var. *pallida* may be a meter or more in height but those of var. *fernaldii* are usually less than 0.5 meter. The stems often recline at the base and root at the lower nodes. The largest leaves of var. *fernaldii* are 1.5–3.0 mm wide and the associated ligules are 2–4 mm long, while the leaves of var. *pallida* are 2.8–10.0 mm wide and the ligules are 5–8 mm in length. The inflorescence of *Torreyochloa pallida* is a panicle with branches that are stiff to flexuous in flower but may be reflexed or erect in fruit. The panicles of *T. pallida* var. *fernaldii* are typically 5–8 cm long and up to 3 cm wide while those of var. *pallida* are 11–19 cm long and 3–16 cm wide. *Torreyochloa* spikelets have multiple florets and unequal glumes. The anthers of *T. pallida* var. *fernaldii* are less than 0.5 mm long and the largest lemmas are under 3.5 mm, in contrast with the florets of var. *pallida* which have anthers over 1 mm long and larger lemmas that range from 2.7–3.5 mm in length. (See Hitchcock 1906 & 1950, Fernald 1950, Munro et al. 2014, Mittelhauser et al. 2019, Davis 2021, Weakley et al. 2024). *T. pallida* var. *fernaldii* starts to flower in May or June and fruits may be present through August or September

(Hough 1983, Rhoads and Block 2007, Munro et al. 2014, Weakley et al. 2024). In New Jersey, mature fruits have been found during late June and early July (Bright 1926, NJNHP 2024).

Pollinator Dynamics

Wind is the primary means of pollination for plants in the Poaceae, including *Torreyochloa* species (Tucker 1996, Culley et al. 2002, García-Mozo 2017). 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). Even in grasses that also utilize insects as pollinators, wind remains the most important mechanism for cross-pollination (Stelleman 1984, Schulze-Albuquerque et al. 2019).

It is not clear whether *Torreyochloa pallida* is capable of self-fertilization. Self-incompatibility is frequent in the grass family, particularly in perennial species (Baumann et al. 2000, Friedman and Barrett 2009), although it can be partial—reducing but not eliminating the production of viable seeds. The related genus *Glyceria* contains both self-compatible and self-incompatible species (Connor 1979).

Seed Dispersal and Establishment

The fruit of *Torreyochloa pallida* var. *fernaldii* is a single-seeded grain that is oblong, dorsally flattened, and 0.8 mm long (Fernald 1950, Davis 2021). The propagules have no special adaptations for dispersal but they are likely to be distributed in multiple ways. The majority of grass seeds fall near their parent plants but both wind and post-ingestion dispersal by animals are also common (Collins and Uno 1985, Cheplick 1998). Wetland grasses that are structurally similar to *Torreyochloa* species can be important food sources for waterfowl, muskrats, and deer (Fassett 1957). Although muskrats mainly eat the basal stems of grasses, local dispersal may be enhanced by their activities because they often move the upper portions of the plants to different parts of the wetlands (Enders 1932, Bellrose 1950). Consumption by both birds and deer can play a significant part in the distribution of viable grass seeds (Orlowski et al. 2016, Flaherty et al. 2017). Barber (2015) characterized *Torreyochloa pallida* var. *pauciflora* as a weak disperser, indicating a limited capacity for the movement of seeds over long distances. However, *T. pallida* var. *fernaldii* has been documented on islands in the Atlantic Ocean and the Gulf of Maine (Stalter and Lamont 2006, Nichols and Nichols 2008), and its establishment in those places was probably facilitated by birds.

Darris (2005) noted that the seeds of *Torreyochloa pallida* (var. *pauciflora*) do not require stratification. It is not clear how long propagules of the species can persist. *T. pallida* was present in a wetland studied by Leck and Leck (2005) although it was not noted in the seed bank. *T. pallida* var. *fernaldii* was one of the earliest species to recolonize a Quebec peatland that was exposed following the collapse of a beaver dam, but the source seeds could have been either already present in the soil or newly dispersed from a nearby population (Reddoch and Reddoch 2005). Upon germination, *Torreyochloa* seedlings follow the Festucoid pattern of development described by Hoshikawa (1969).

Habitat

Torreyochloa pallida var. *fernaldii* occurs in a variety of freshwater wetlands, where it can be found growing in wet soil or in shallow water (Angelo and Boufford 1998, White 2010, McDonald 2015). Reported habitats include bogs, marshes, wet meadows, swamps, lake and pond shores, stream beds, ditches, beaver ponds, and vernal pools (Dore 1959, Argus 1968, Mitchell and Tucker 1994, Rhoads and Block 2007, Calhoun and deMaynadier 2008, Bradley and Crow 2010, Munro et al. 2014, Davis 2021, Weakley et al. 2024). The habitat of one historic New Jersey occurrence was described as a small pond, and the state's only extant population is situated in a brushy thicket on the shore of a flooded wetland (Bright 1926, NJNHP 2024).

Weakley et al. (2024) assigned *Torreyochloa pallida* var. *fernaldii* a heliophily rank of 7, signifying that the plants have some tolerance for shade but are more likely to thrive in open locations. The grass has been recorded in shrublands dominated by Speckled Alder (*Alnus incana*) or Buttonbush (*Cephalanthus occidentalis*) (Marks 2000, Rhoads and Block 2006). On peaty lake shores where it occurs, pH values ranging from 4.06 to 7.1 have been recorded (Reddoch and Reddoch 2005, Nazaire and Crow 2008).

Wetland Indicator Status

Torreyochloa pallida 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 2025b)

TOPAF

Coefficient of Conservancy (Walz et al. 2020)

CoC = 10. 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 distribution of *Torreyochloa pallida* var. *fernaldii* is restricted to the central and eastern parts of Canada and the United States (POWO 2025). The map in Figure 1 depicts the extent of Fernald's False Manna Grass in North America. Wyoming occurrences are only known from the northwestern corner of that state and are notably disjunct from the primary range of the variety (Shaw 1968, Marks 2000).

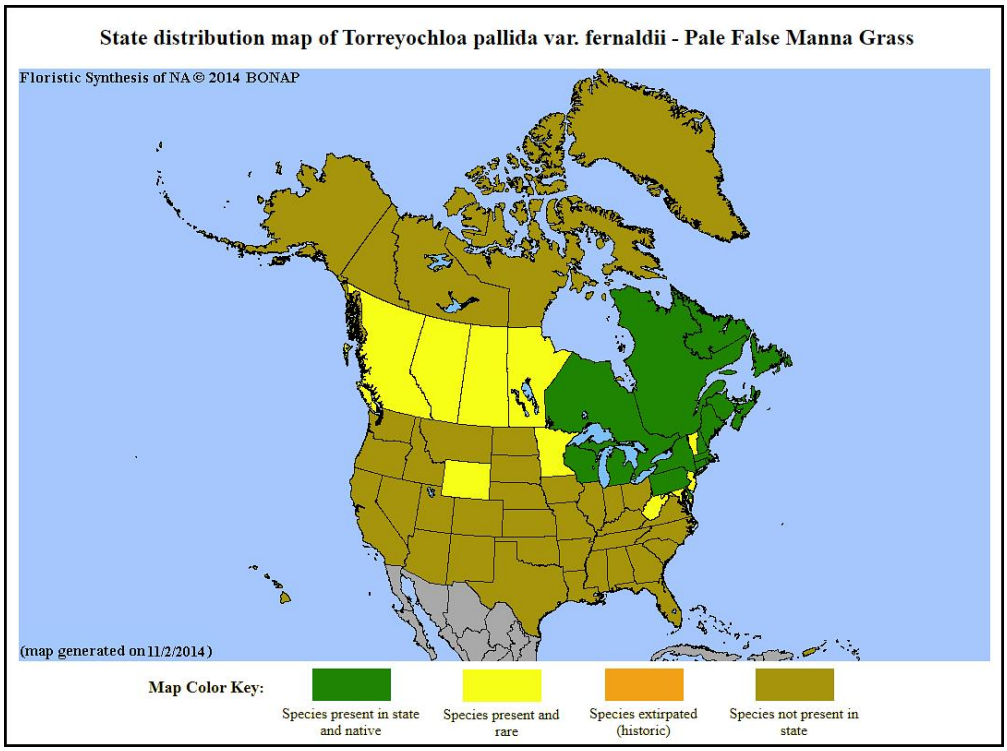

Figure 1. Distribution of T. pallida var. fernaldii in North America, adapted from BONAP (Kartesz 2015).

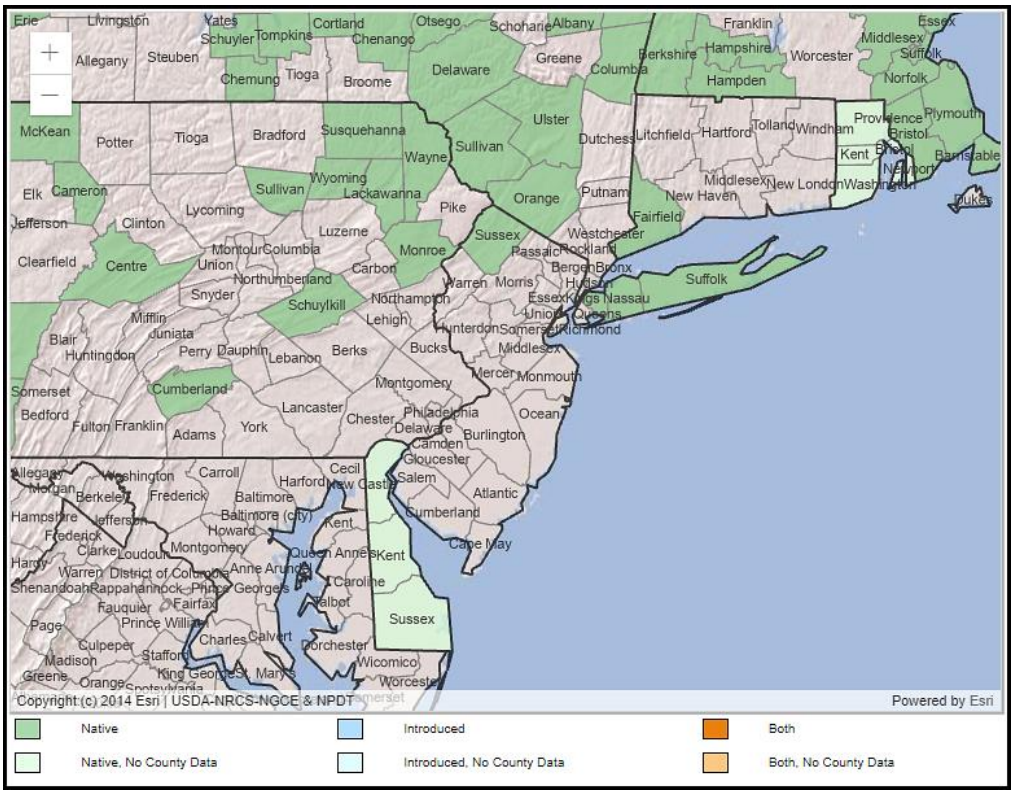

Figure 2. County records of T. pallida var. fernaldii in New Jersey and vicinity (USDA NRCS 2025b).

The USDA PLANTS Database (2025b) only shows records of *Torreyochloa pallida* var. *fernaldii* in one New Jersey county: Sussex County (Figure 2 above). The grass has also been reported in Cumberland County (Mid-Atlantic Herbaria 2025). The data include historic observations and do not reflect the current distribution of the species.

Conservation Status

Torreyochloa pallida var. *fernaldii* is considered globally secure. The G5T5? rank means the variety 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, although the question mark indicates that it may be in need of review (NatureServe 2025). The map below (Figure 3) illustrates the conservation status of *T. pallida* var. *fernaldii* throughout its range. The variety is vulnerable (moderate risk of extinction) in two states and one province, imperiled (high risk of extinction) in one state and two provinces, and critically imperiled (very high risk of extinction) in three states and one province. In many of the places where it occurs the grass is secure, apparently secure, or unranked.

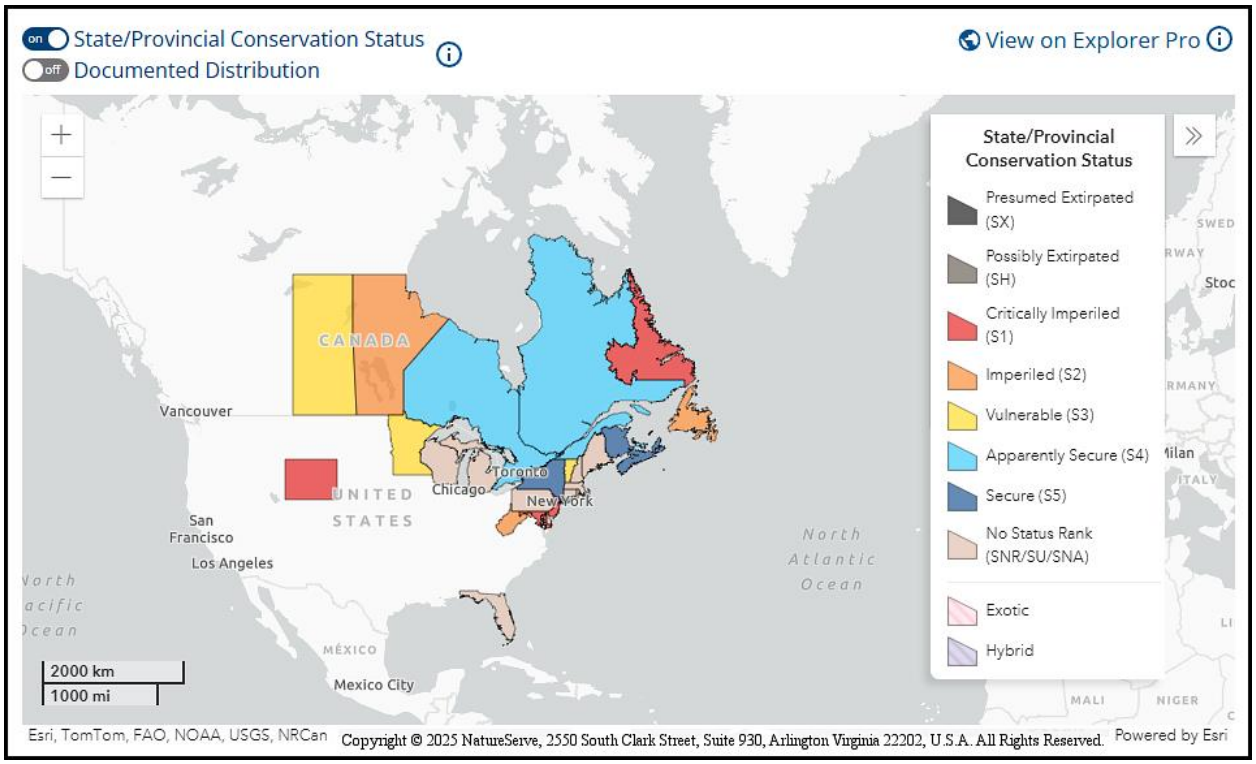

Figure 3. Conservation status of T. pallida var. fernaldii in North America (NatureServe 2025).

New Jersey is one of the states where *Torreyochloa pallida* var. *fernaldii* is critically imperiled (NJNHP 2024). 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. *T. pallida* var. *fernaldii* has also been assigned a regional status code of HL, signifying that the variety is eligible for protection under the jurisdiction of the Highlands Preservation Area (NJNHP 2010).

A grass specimen collected in Cumberland County by John Bright (1926) was just determined to be *Torreyochloa pallida* var. *fernaldii* in 2014. Hough (1983) noted that the variety was only known from Sussex and Warren but no records were found for the latter county. The only other documented population in the state was discovered by Tom Halliwell in 1979, and that occurrence is still thought to be extant (NJNHP 2024).

Threats

No concerns were noted for New Jersey's occurrence of *Torreyochloa pallida* var. *fernaldii* (NJNHP 2024), and few threats to *T. pallida* have been reported throughout the species' range. Like many grasses, *Torreyochloa pallida* is susceptible to a fungal disease known as ergot (*Claviceps purpurea*). The pathogen has been documented in *T. pallida* var. *pauciflora* (Alderman et al. 2004) and it is likely to occur in the other varieties as well. *Claviceps purpurea* destroys the ovaries of grass florets, replacing them with dense clumps of fungal tissue known as sclerotia that serve as resting structures for its spores, and thus inhibits the development of viable seeds (Smith et al. 2014).

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Torreyochloa pallida* var. *fernaldii* population 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 Fernald's False 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.

Some of 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). Of the two eastern varieties of *Torreyochloa pallida*, var. *fernaldii* has a more northern distribution and may be better adapted to cooler conditions. The variety is near the southern end of its range in the state so it could be detrimentally affected by rising temperatures, although the impacts of environmental conditions on the species do not appear to have been studied. Because *T. pallida* is an obligate wetland plant, populations in some locations might be expected to decline following extended periods of drought but again data is lacking. Climate change could increase the threat from *Claviceps purpurea*: Ergot thrives in warm conditions and its sclerotia are very resistant to high temperatures (Patterson and Lima 2011).

Management Summary and Recommendations

Although no management needs have been identified for New Jersey's extant population of *Torreyochloa pallida* var. *fernaldii* an updated assessment of the occurrence would be advisable. The last site visit took place more than a decade ago (NJNHP 2024). It is possible that additional undetected occurrences of *T. pallida* var. *fernaldii* are present in the state. There are a number of reasons why populations could be overlooked. Close examination is required to separate Fernald's False Manna Grass from the more abundant *T. pallida* var. *pallida*. The grass can also be difficult to distinguish from a number of *Glyceria* species and it frequently grows among taller, more robust plants that could conceal it (Munro et al. 2014, McDonald 2015).

In planning for the long-term conservation of *Torreyochloa pallida* it would be particularly useful to understand the impacts of differing environmental conditions on its reproduction and survival, and to ascertain whether climactic factors have had any bearing on the distribution of var. *fernaldii* and var. *pallida*. Some additional topics suggested for research include self-compatibility, seed banking, and the effects of competition.

Synonyms and Taxonomy

The accepted botanical name of the species is *Torreyochloa pallida* var. *fernaldii* (Hitchc.) Dore ex Koyama & Kawano. Orthographic variants, synonyms, and common names are listed below (ITIS 2025, POWO 2025, USDA NRCS 2025b). The genus *Torreyochloa* was first established during the mid-1900s (Church 1949) but prior to that *T. pallida* was usually treated as a species of *Glyceria*. Initially a number of botanists agreed with Church that *Torreyochloa* was distinct from *Glyceria* but rather than accept the new genus they placed the relevant species in *Puccinellia* (e.g. Clausen 1952, Voss 1966, Hodgdon and Crow 1979, Gleason and Cronquist 1991). Eventually the use of *Torreyochloa* was widely adopted.

Torreyochloa pallida var. *fernaldii* was first described as a variety of *Glyceria pallida* by Hitchcock (1906) but shortly thereafter St. John (1917) argued for its recognition as a distinct species. Others felt that the plants represented a morphological variation of *G. pallida* which did not merit specific rank (e.g. Fassett 1946, Dore 1959), and despite the fact that Church had maintained *T. fernaldii* as a species when he published the new genus name he subsequently concurred that it should be treated as a variety (Church 1952). Koyama and Kawano (1964) identified the taxon as *Torreyochloa pallida* ssp. *pallida* var. *fernaldii* based on similarities between *T. pallida* and two Japanese grasses (*T. natans* and *T. viridis*). Most current authors follow Davis (1991, 2021) in recognizing three North American varieties of *T. pallida*. One exception is Weakley et al. (2024), who agreed with St. John and identified it as *Torreyochloa fernaldii*.

Botanical Synonyms

Glyceria fernaldii (Hitchc.) H. St. John
Glyceria pallida var. *fernaldii* Hitchc.
Panicularia fernaldii (Hitchc.) Hitchc.
Puccinellia fernaldii (Hitchc.) E. G. Voss
Torreyochloa fernaldii (Hitchc.) Church

Common Names

Fernald's False Manna Grass
Pale Meadowgrass

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