

# *Cirsium virginianum*

Virginia Thistle

Asteraceae



*Cirsium virginianum* by Leeann McClure, 2020

## ***Cirsium virginianum* Rare Plant Profile**

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

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## Life History

*Cirsium virginianum* (Virginia Thistle) is a biennial or short-lived perennial herb in the aster family. During the first year, the plants form a basal rosette of spiny leaves and a cluster of thickened fibrous roots. The narrow, deeply-cut basal leaves are bright green above and woolly-white below, and they usually disappear before the plants bloom. Second-year Virginia Thistles typically produce tall, erect stems 0.3–1.5 meters high with numerous (30–70) spiny, thick leaves that become gradually smaller as they approach the top. The stem leaves are also bright green with a dense cover of white hairs on the underside. Flowering may occur from August to October. The stems sometimes branch near the top, producing 1–10 floral heads. The floral stalks (peduncles) are 10–15 cm long. The heads are composed of many pinkish-purple disc flowers and a 1.7–2.4 cm long whorl of greenish floral bracts that are tipped with short (1–2 mm), dark spines. (See Britton and Brown 1913, Fernald 1950, Gleason and Cronquist 1991, Krings et al. 2002, Sellers et al. 2019, Keil 2020). During the winter months, the short-spined bracts and numerous narrow leaves that become reduced toward the upper end of the stem can help to identify the remains of floral stalks from the preceding season (Levine 1995).



Left: Britton and Brown 1913, courtesy USDA NRCS 2023a. Center and Right: Alan Weakley, 2020.

Following a chromosomal study of *Cirsium* species in southeastern states, Ownbey and Olson (1969) reported that *C. virginianum* was not closely allied to other local thistles and its relationships to other North American species were obscure. Recent genetic studies have suggested that—of all the *Cirsium* species known to occur in New Jersey (see Kartesz 2015)—*C. virginianum* is most closely related to the Field Thistle, *C. discolor* (Ackerfield et al. 2020). While both *C. virginianum* and *C. discolor* have leaves that are woolly on the undersides, the whorl of bracts in the flower heads of *C. discolor* is larger (2.5–4.5 cm long) and that species is more likely to be found in upland sites (Weakley et al. 2022).

## **Pollinator Dynamics**

*Cirsium* species are pollinated by a diverse array of insects (Eckberg 2017, Les 2017). In the northeastern and mid-Atlantic regions, several bees are known to be pollen specialists on *Cirsium* including *Melissodes desponsus*, *Osmia chalybea*, and *O. texana* (Fowler 2016a, 2016b). A number of other Asteraceae specialists regularly visit *Cirsium* species: Among them are *Melissodes agilis*, *M. boltoniae*, *M. subillatus*, *Svastra obliqua*, *Megachile intimica*, *M. pugnata*, and *Osmia coloradensis* (Fowler and Droege 2020). Many generalist bees also routinely forage on *Cirsium* flowers (Stubbs et al. 1992). In addition to bees, various kinds of flies, butterflies, moths, and beetles were observed on *Cirsium* blooms by Robertson (1929). An assortment of insects in other orders as well as several types of hummingbird have also been documented visiting thistles (Eckberg et al. 2017).

Despite the fact that *Cirsium* species appear to share a suite of common pollinators, their relative appeal to insects may vary. Theis et al. (2007) reported that some thistles produce a floral scent, although the importance of odor in drawing pollinators differed between species. Visual appearance seems to play a notable role, and *Cirsium* species with large display sizes or numerous flower heads are the most attractive to bees and other insects (Ohashi and Yahara 1998, Powell et al. 2011). That could be a drawback for *C. virginianum* in terms of attracting specialists because the plants are few-flowered and populations are typically small (Sorrie 1999), but any disadvantage is likely to be offset by the broad selection of potential pollinators.

## **Seed Dispersal**

The dry, single-seeded fruits of *Cirsium virginianum* are 4–5 mm long and have several plumose bristles 17–20 mm in length (Keil 2020). The feathery appendages make the propagules well-suited for dispersal by wind (Howe and Smallwood 1982), which is generally reported as the primary means of seed dissemination in *Cirsium* (Les 2017). A study of a thistle with comparable fruits (*Cirsium vulgare*) found that 90% of the seeds remained in the local population and the majority ended up within several meters of the parent plants (Klinkhamer et al. 1988).

Thistle seeds are an important food source for the American Goldfinch (*Spinus tristis*), and they are frequently consumed by other small birds including finches, sparrows, and buntings (Eckberg et al. 2017). Although such consumption is often framed as seed predation many finches examined by Guerro and Tye (2009) defecated viable seeds, leading the authors to conclude that the importance of dispersal by the birds had been underestimated. Heleno et al. (2011) proposed that avian seed predators and dispersers exist on a continuum so that all types of consumption should at least occasionally result in the dispersal of viable propagules. *Cirsium* seeds are also eaten by small mammals (Klinkhamer et al. 1988, Ackerfeld et al. 2020) and waterfowl (Green et al. 2016), which could sometimes facilitate the establishment of plants at new locations.

No information was found regarding germination and development in *Cirsium virginianum*. Klinkhamer et al. (1988) found that only 1% of *Cirsium vulgare* seeds remained viable after a year, although other species in the genus can remain dormant for longer periods of time. The

majority of native *Cirsium* species germinate best following a period of cool, moist stratification, and seeds dispersed during the fall generally do not begin sprouting until the following season (Eckberg et al. 2017). A number of thistles are known to form mycorrhizal associations (Wang and Qiu 2006), although it is unclear whether they are needed for seedling establishment.

### **Habitat**

*Cirsium virginianum* is a coastal plain species that occurs at elevations between 0 and 150 meters above sea level (Keil 2020). Commonly reported habitats include savannas, bogs, flatwoods, and pinelands (Sorrie 1999, Krings et al. 2002, Keil 2020, Weakley et al. 2022). The substrate can range from moist to fairly dry (Weakley et al. 2022). Fernald (1945) noted that one Virginia population of *C. virginianum* was located in a springy sphagnum bog but the plants were also found growing in dry pine woods nearby. Another Virginia site was described by Fernald (1942) as 'open, argillaceous low woods', and Beard (1959) found the species occupying the drier microsites along a riverside terrace in North Carolina.

*Cirsium virginianum* can establish in mesic ecotones between wetter and drier communities (Sorrie 1999). One New Jersey population is situated in an ecotone between a salt marsh and a wet woodland—described as a sea level fen—that is fed by fresh water seepage from the adjacent *Chamaecyparis-Acer-Nyssa* woods. Two other New Jersey occurrences are situated along an old roadway that passes through a brackish marsh (NJNHP 2022). Virginia Thistle has also been recorded in anthropogenic habitats: It was collected along powerline easements in Virginia (Sheridan et al. 1997) and observed in mowed utility right-of-ways in North Carolina (Shelingski et al. 2005).

A representative community type for *Cirsium virginianum* in the northern part of its range has been described as North Atlantic Coastal Plain Pitch Pine Lowland (Largay and Sneddon 2009). Typical cover is wetland Pine Barren vegetation, often mixed in with upland Pine Barren vegetation: The sites generally have variable hydrologic regimes and are likely to experience periodic fires. In the southeast, *C. virginianum* is characteristic of wetter, richer sites and it is often present in Wet Loamy Pine Savannas but not in Sandy Pine Savannas (Thornhill 2013).

### **Wetland Indicator Status**

*Cirsium virginianum* is a facultative wetland species, meaning that it usually occurs in wetlands but may occur in nonwetlands (U. S. Army Corps of Engineers 2020).

### **USDA Plants Code (USDA, NRCS 2023b)**

CIVI

## Coefficient of Conservatism (Walz et al. 2018)

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 range of *Cirsium virginianum* is restricted to the east coast of the United States (POWO 2023). The map in Figure 1 depicts the known extent of Virginia Thistle. Sorrie (1999) noted that populations are not well-distributed throughout the range of the species.

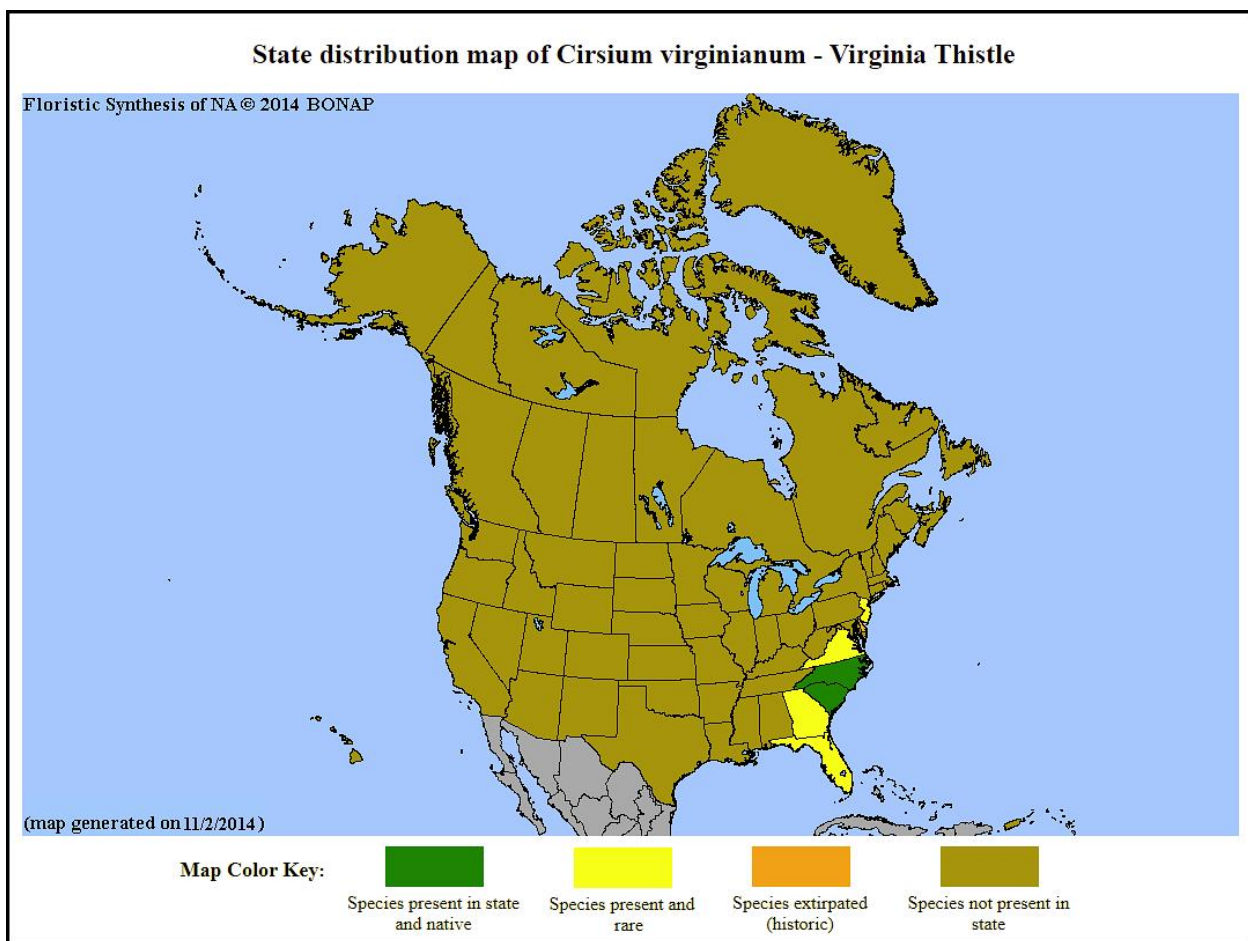


Figure 1. Distribution of *C. virginianum* in North America, adapted from BONAP (Kartesz 2015).

*Cirsium* has been identified as one of the more taxonomically challenging genera in North America. The genus appears to be an evolutionary work in progress, with particularly rapid diversification in the western United States, and separation of the species is complicated by overlapping morphological characteristics and a remarkable capacity for hybridization (Ackerfield et al. 2020, Keil 2020). As a result, *Cirsium virginianum* has often been reported

from locations well outside of its accepted range such as Missouri (Bush 1931, Steyermark 1934), Kentucky (Braun 1939) or Ohio (Jones 1943). Herbarium specimens labeled as *C. virginianum* have also originated from Alabama, Arkansas, California, Indiana, Louisiana, Maryland, Massachusetts, Mississippi, Nevada, Pennsylvania, South Dakota, Tennessee, Texas, Utah, and Wyoming (Mid-Atlantic Herbaria 2023).

The USDA PLANTS Database (2022b) shows records of *Cirsium virginianum* in four New Jersey counties: Atlantic, Burlington, Cape May, and Ocean (Figure 2). The data include historic observations and do not reflect the current distribution of the species.

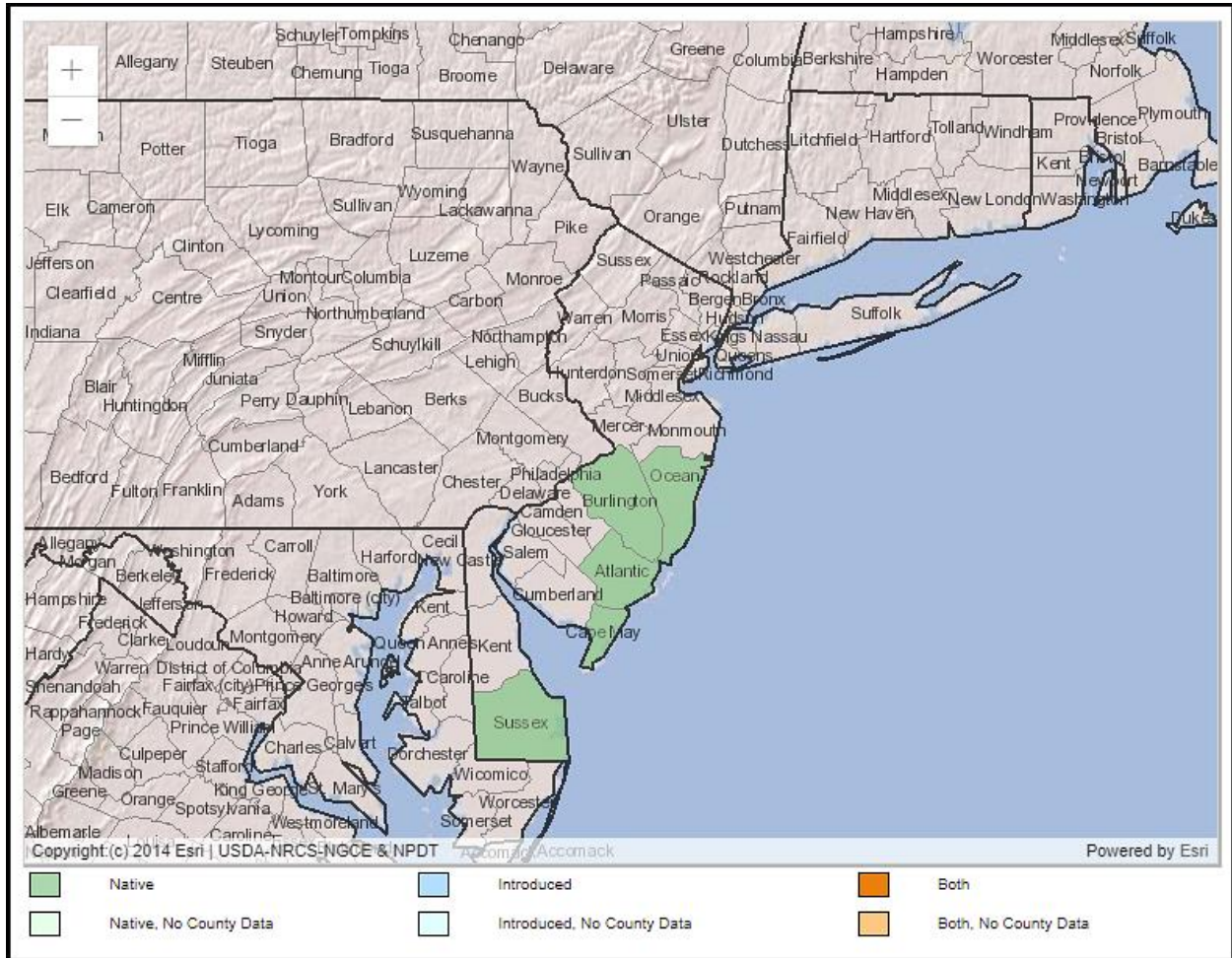


Figure 2. County records of *C. virginianum* in New Jersey and vicinity (USDA NRCS 2023b).

**Conservation Status**

*Cirsium virginianum* is globally vulnerable. The G3 rank means the species has a moderate risk of extinction or collapse due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors (NatureServe 2023).

The map below (Figure 3) illustrates the conservation status of *C. virginianum* throughout its range. The thistle is vulnerable (moderate risk of extinction) in one state, imperiled (high risk of

extinction) in two states, critically imperiled (very high risk of extinction) in one state, and possibly extirpated in Delaware. *C. virginianum* is unranked in South Carolina and Florida, although Sellers et al. (2019) indicated that it is rare in the latter state.

In North America, *Cirsium virginianum* has also 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 regional rank of R1 (critically imperiled), signifying a very high risk of extinction (Frances 2017).

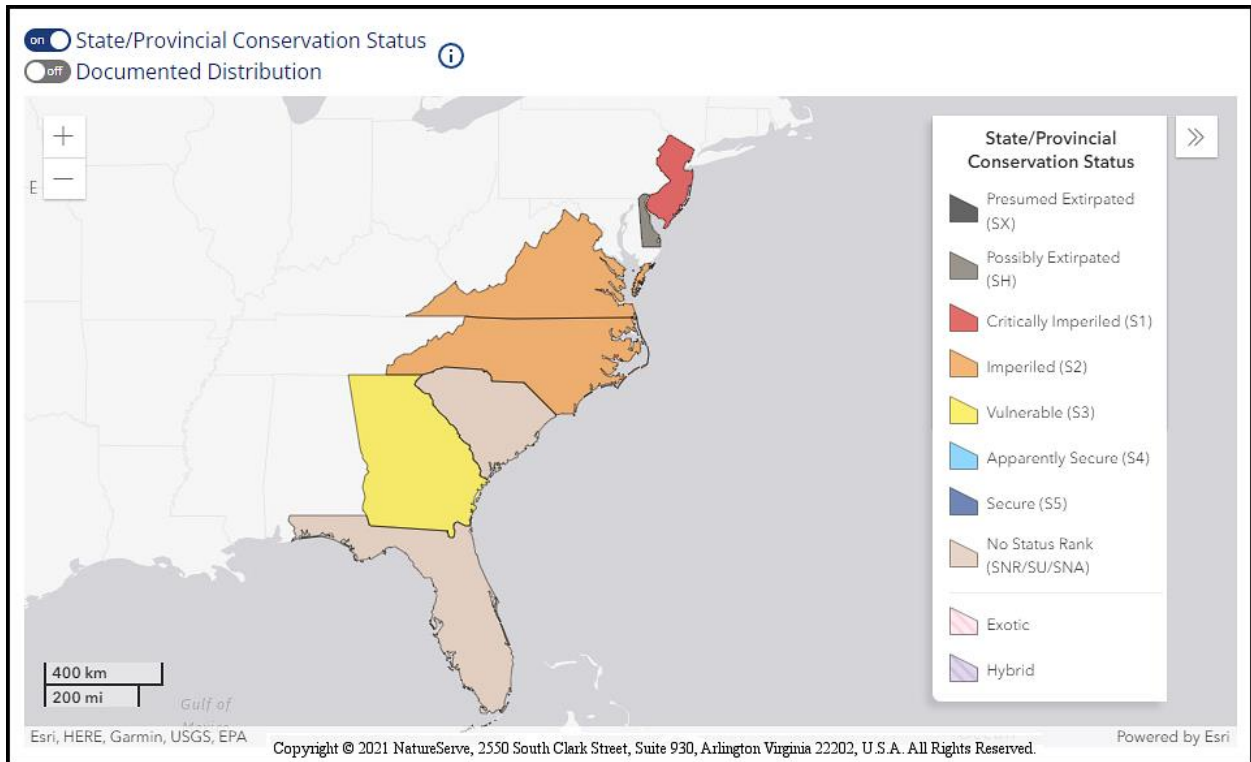


Figure 3. Conservation status of *C. virginianum* in North America (NatureServe 2023).

*Cirsium virginianum* is critically imperiled (S1) in New Jersey (NJNHP 2022). 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. virginianum* 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 Virginia Thistle 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).

*Cirsium virginianum* was not listed in New Jersey's early floras, including the one completed by Witmer Stone (1911), although Stone had apparently collected a specimen of the thistle in Ocean County during 1903. Several additional collections were made in southern New Jersey during the early 1900s (NJNHP 2022); nevertheless, the species did not appear in the updated



compendium by Hough (1983). Snyder (1985) cited *C. virginianum* as a historical species that had recently been rediscovered in the state. Seven occurrences are presently included in the Natural Heritage Database—three extant and four historical (NJNHP 2022). When last surveyed two of the extant occurrences were above average in size, as typical populations of the species include ten or fewer plants (Sorrie 1999).

## **Threats**

Native thistles are an under-appreciated group, and the tendency to treat all members of the genus *Cirsium* as noxious weeds can compound the vulnerability of the rarer species (Eckberg et al. 2017). That viewpoint was exemplified by Sellers et al. (2019), who described ways to eradicate both native and alien thistles in order to improve forage quality in pastures. Many native *Cirsium* species are presently threatened by exotic insects that were deliberately introduced to keep weedy nonindigenous thistles in check. The Thistle Head Weevil (*Rhinocyllus conicus*), Thistle Crown Weevil (*Trichosiocalus horridus*), and Canada Thistle Bud Weevil (*Larinus planus*) are all examples of introductions intended for the control of invasive plants that have become problematic for non-target *Cirsium* species. Reported consequences for some of the native thistles have included reduced seed production, declines in population growth, and—for one species—the possibility of extinction. (See Turner et al. 1987, Louda et al. 1997, Rose et al. 2005, Takahashi et al. 2009, Havens et al. 2012).

Throughout its range, the primary threats reported for *Cirsium virginianum* are habitat loss and fire suppression (Sorrie 1999, Chafin 2019). Strategies touted by Sellers et al. (2019) as means of 'weed' control can also be construed as threats: Those include the application of herbicides or mowing after plants have formed stalks but prior to seed set. Site-specific threats to *C. virginianum* in New Jersey include the spread of Common Reed (*Phragmites australis* ssp. *australis*), habitat degradation from all-terrain vehicle use or dumping, and mosquito control programs (NJNHP 2022).

Because all of New Jersey's extant populations of Virginia Thistle are located in close proximity to the coast they are also particularly vulnerable to rising sea levels as the climate continues to warm. The sites are likely to become increasingly saline and experience more frequent flooding. Other local changes resulting from shifting climactic conditions, such as rising temperatures and altered precipitation patterns (Hill et al. 2020), may also affect *Cirsium virginianum* although the outcome is harder to project due to gaps in information regarding the thistle's environmental tolerances.

## **Management Summary and Recommendations**

New Jersey's populations of *Cirsium virginianum* are particularly important because they are at the northern boundary of the species' range and two of them are apparently markedly larger than typical occurrences. At one site, controlling the spread of *Phragmites* was noted as a critical need in order to maintain habitat quality. Established stands of *Phragmites australis* are notoriously difficult to eradicate, and management of the invasive species may require the

application of more than one technique over a period of several years. However, some level of intervention could help to limit the spread of the tenacious grass. The pros and cons of potential management techniques for *P. australis* have been reviewed by OMNR (2011) and Hazelton et al. (2014). Additional conservation efforts should be focused on protecting extant populations of *C. virginianum* from damage due to off-road vehicles, trash deposition, or other direct disturbances.

Research on *Cirsium virginianum* should be a priority because of the species' global vulnerability. Basic information is needed regarding certain aspects of the thistle's life history such as seed longevity, germination conditions, and prerequisites for establishment. While *C. virginianum* is reported to have a spotty distribution and small populations, the factors that inhibit its proliferation are unknown. Studies of the species' competitive ability and the limits of its environmental and climatic tolerances would be valuable. Fire is considered an important mechanism for maintaining *C. virginianum* habitat (Sorrie 1999, Chafin 2019), and vigorous regrowth was noted at one New Jersey site shortly after a fire (NJNHP 2022). Therefore, more specific data regarding the optimal fire frequency and intensity for Virginia Thistle would also be beneficial to land managers.

### **Synonyms**

The accepted botanical name of the species is *Cirsium virginianum* (L.) Michx. Orthographic variants, synonyms, and common names are listed below (ITIS 2021, POWO 2023, USDA NRCS 2023b).

#### **Botanical Synonyms**

*Carduus revolutus* Small  
*Carduus virginianus* L.  
*Cirsium revolutum* (Small) Petr.  
*Cirsium virginianum* f. *revolutum* (Small) Fernald  
*Cnicus virginianus* Pursh

#### **Common Names**

Virginia Thistle

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