# Native Wild Plant Species Accounts

**Department of Conservation and Natural Resources**

**Conservation of Native Wild Plants (Chapter 45 Subchapter B)**
**Rulemaking Change Data**

2022

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DEPARTMENT OF CONSERVATION
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# Conservation of Pennsylvania Native Wild Plants

Plant Species Accounts 2022

The Department of Conservation and Natural Resources presents the following information on plant species with status changes within the regulation, Conservation of Pennsylvania Native Wild Plants, Title 17, Chapter 45, including species being added, deleted, or receiving status changes within the list of classified plants. These species accounts provide detailed explanations for the changes to the regulation. The Table of Contents below provides the current status of each plant as well as the proposed change. Species are organized in this document according to the proposed classification change, alphabetized by scientific name. Species whose status changes are related are presented together.

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Key:
PX: Pennsylvania Extirpated; PE: Pennsylvania Endangered; PT: Pennsylvania Threatened; PR: Pennsylvania Rare; TU: Tentatively Undetermined; DL: Delist; N: Unlisted/not listed

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Key:
PX: Pennsylvania Extirpated; PE: Pennsylvania Endangered; PT: Pennsylvania Threatened; PR: Pennsylvania Rare; TU: Tentatively Undetermined; DL: Delist; N: Unlisted/not listed

# Plant Species Being Added or Moved to the Pennsylvania Extirpated Classification

## Two-Seeded Copperleaf (*Acalypha deamii* (Weath.) Ahles)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Extirpated**

Two-seeded copperleaf, Photo: John Hilty (Illinois Wildflowers)

The Department of Conservation and Natural Resources proposes adding two-seeded copperleaf to the list of Pennsylvania Extirpated plants within the regulation, Conservation of Pennsylvania Native Wild Plants. The reason for this decision is that this plant has not been observed in the commonwealth since 1900.

Two-seeded copperleaf is a member of the Spurge Family (Euphorbiaceae), plants that, among other characteristics, often have milky sap and small flowers with reduced or no petals. Two-seeded copperleaf grows up to 1.5 feet tall, with oval, toothed leaves and two-seeded fruits. It flowers and fruits late summer to fall; habitat includes moist areas, bottomland or riparian woods, but rarely in moist upland forest (Levin, FNA).

In North America, this species ranges from Pennsylvania south to Virginia, west to Kansas and Arkansas, and is considered rare or presumed extirpated in each state in its range (Kartesz 2015, NatureServe 2020). In Pennsylvania, there is only one recorded population, located in Allegheny County, which has not been observed since 1900 (PNHP 2020). The record, based on an herbarium specimen, has been verified as two-seeded copperleaf (*Acalypha deamii*) by botanist, G.A. Levin. The specimen was collected in a wooded hollow, in a Pittsburgh park natural area. The record of this occurrence is near the rest of the geographic range of the species, and the occurrence appears to have been a natural one. However, it has not been relocated despite surveys.

Habitat loss is a threat to two-seeded copperleaf. In other states, two-seeded copperleaf is found in well-defined natural riparian habitat with less human disturbance (Truman 2003). The only known population of this species in Pennsylvania was in Fern Hollow in Frick Park, located in the suburbs of Pittsburgh. This area has experienced considerable development since 1900 (Rhoads and Klein 1993). Another threat to two-seeded copperleaf is Invasive plant species that typically colonize the preferred habitat, riparian areas with periodic scour (Truman 2003). Even if a seed bank of three-seeded mercury persisted in suitable habitat it may have been out-competed by invasive plant species such as garlic mustard. However, as a Pennsylvania Extirpated species, three-seeded mercury would be elevated to a Pennsylvania Endangered species if it is ever re-located in Pennsylvania.

This species has received a state rank of SX (Presumed Extirpated) from the Pennsylvania Natural Heritage Program using national NatureServe methodology with available data and the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), because it has not been located despite intensive searches. It is ranked as G4 (Globally Apparently Secure) because worldwide, it is uncommon though widespread and there are some causes for long-term concern due to decline (NatureServe 2020). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as extirpated.

The Department has reviewed all information and made the determination that two-seeded copperleaf should be added to the list of extirpated plants within the regulation, Conservation of Pennsylvania Native Wild Plants, due to documentation of confirmed historical presence in the commonwealth in combination with the lack of any extant populations.

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## Hazel Dodder (*Cuscuta coryli* Engelm.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Extirpated**

Hazel dodder, Photo: Samuel Brinker (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes reclassifying hazel dodder from Tentatively Undetermined to Pennsylvania Extirpated within the regulation, Conservation of Pennsylvania Native Wild Plants. Hazel dodder has not been observed in the commonwealth since 1956 and is believed by the department to be extinct within the commonwealth.

Hazel dodder is a member of the Morning-glory Family (Convolvulaceae) which consists of plants with twining stems or vines. Hazel dodder lacks chlorophyll and has tiny, non-photosynthetic leaves. It has twining yellowish or orange stems that attach to a host plant. Hazel dodder flowers from June to September, and fruits from July to October. Its habitat includes dry open areas where it is parasitic on host plants (Rhoads & Block 2007).

In North America, this species' range includes Canada and the eastern United States to South Carolina and west to Montana and Arizona. It is considered rare or extirpated from many states in which it has been reviewed (Kartesz 2015, NatureServe 2020).

In Pennsylvania, herbarium records show that hazel dodder was typically found on open, dry, often rocky wooded slopes growing on shrubs or herbaceous plants. There are nine recorded populations, all of which are historical and not observed since 1956 despite resurveying. No new populations have been observed (Rhoads & Klein 1993, PNHP 2020). The records are from the northeast counties of Luzerne (two populations, one last observed in 1956 and another in 1946), Lackawanna (1933), Wyoming (1946), Northampton (1908), Monroe (1947); southeast from Delaware County (last observed in 1910; the site is now urbanized), central Pennsylvania from Centre County (1913); and from the west in Allegheny County (1897) (PNHP 2020).

Research was commissioned in 2013 through the Wild Resource Conservation Fund to analyze existing herbarium specimens and conduct additional field surveys. Through review, botanists determined it was unlikely to be present in the commonwealth due to the successional nature of this species (PNHP 2017). Succession is the progression of a more open habitat, such as a field often after a

disturbance event, to a mature forest. While it is a natural process, this can result in unsuitable habitat for species that depend on more open, early successional habitat types.

Botanical surveys were conducted to re-locate the known populations of hazel dodder, but none could be re-located. Other areas of suitable habitat have been surveyed as well and hazel dodder has not been identified. Although identification of dodder species is challenging and relies on flower and fruit characteristics, hazel dodder's preference of upland, dry habitats helps to distinguish it from other dodder species. This indicates that its presence at a site would be an identifiable and notable occurrence. The Department believes enough field surveys have been conducted to conclude this species is extirpated. As a Pennsylvania Extirpated species, hazel dodder would be elevated to Pennsylvania Endangered species if it is ever re-located in Pennsylvania.

When hazel dodder was originally listed as Tentatively Undetermined, there was evidence of decline, but the Department did not have enough information to more accurately classify this species. Recent research has determined that hazel dodder is no longer present in the recorded locations, surveys have not discovered the species in the known locations or suitable habitat elsewhere, and it is unlikely to be present in the commonwealth. The Department now has enough information to correctly list this species as extirpated.

This species has received a state rank of SH (possibly extirpated) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012) and because it has not been located despite intensive searches. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as extirpated.

The Department has reviewed all information and made the determination that hazel dodder should be added to the list of Pennsylvania Extirpated plants within the regulation, Conservation of Pennsylvania Native Wild Plants, due to the lack of any current populations.

Literature Cited:

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## Retrorse Flatsedge (*Cyperus retrorsus* Chapm.)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Pennsylvania Extirpated**

Retrorse flatsedge, Photo: Charles T. Bryson (CC BY 3.0 US, USDA Agricultural Research Service, Bugwood.org)

The Department of Conservation and Natural Resources proposes to reclassify retrorse flatsedge from Pennsylvania Endangered to the list of Pennsylvania Extirpated plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Retrorse flatsedge has not been observed in the commonwealth in several decades and the Department believes it to be extirpated.

Retrorse flatsedge is a perennial member of the Sedge Family (Cyperaceae) with flower spikes in a simple, rounded arrangement. It grows on dry, open and sandy areas, such as ballast (Rhoads & Block 2007).

In North America, retrorse flatsedge is found in the southern and eastern states, from Florida and New Mexico north to Missouri and New York (Kartesz 2015, NatureServe 2020). It is ranked critically imperiled (S1, at very high risk of extirpation) in New York, Massachusetts and Kentucky; and possibly extirpated (SX, possibly extinct) in Pennsylvania and Missouri (NatureServe 2020).

In Pennsylvania, it was historically known from four sites in the southeastern counties of Bucks, Berks, Lehigh (PNHP 2020; Rhoads and Klein 1993). None of these populations have been relocated through botanical surveys. Most of the populations have not been observed since the 1800s; the most recent observation was in 1958. Retrorse flatsedge's populations were observed in an area that has undergone extreme urbanization and land use conversion; therefore, these locations are no longer viable today. Enough potential habitat has been examined to conclude that, if retrorse flatsedge was still present at or near the previously known locations, it would have been discovered during surveys. If this species is rediscovered during any future surveys, it would be considered a Pennsylvania Endangered plant species.

Retrorse flatsedge has received a state rank of SH (possibly extinct or historical) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The species was known to be present historically and may be discovered in the future but has not been

rediscovered within 20 years. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that retrorse flatsedge be reclassified as extirpated.

The Department has reviewed all information and made the determination that retrorse flatsedge should be removed from the list of Pennsylvania Endangered plants and added to the list of Pennsylvania Extirpated plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Broad-Leaved Beardgrass (*Gymnopogon ambiguus* (Michx.) Britton, Stearns & Poggenb.)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Pennsylvania Extirpated**

Broad-leaved beardgrass, Photo: J. Richard Abbott (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to reclassify broad-leaved beardgrass from Pennsylvania Endangered to Pennsylvania Extirpated within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is believed by the Department to be extirpated from the commonwealth, but if it is re-discovered in the commonwealth, it will be considered a Pennsylvania Endangered species.

Broad-leaved beardgrass is a perennial member of the Grass Family (Poaceae) that can grow to about two feet tall. It has many stiffly spreading leaves about a quarter of an inch wide by two inches long, and flowers arranged in an open arrangement. In Pennsylvania, the species was known to flower from July through early October. Broad-leaved beardgrass is adapted for hot, dry environments and is also known as a "warm season" grass and grows on serpentine barrens (Rhoads and Block 2007).

In North America, the range of broad-leaved beardgrass includes the southern half of the United States, from the mid-Atlantic states through the southeast and west to New Mexico (Kartesz 2015). However, it is extirpated or presumed extirpated from Pennsylvania, Ohio, Indiana and Illinois, the four states at northern edge of its range; it is ranked as critically imperiled (S1, at very high risk of extirpation) in West Virginia and Delaware; imperiled (S2, at high risk of extirpation) in Kentucky and Kansas; and vulnerable (S3, at moderate risk) in New Jersey. (NatureServe 2020).

In Pennsylvania, one historic location of broad-leaved beardgrass is known from near a serpentine quarry in Lancaster County. The record comes from an herbarium specimen from 1937 with vague location information. Weakley (2020) lists habitat for this species across the southeastern United States as "prairies, glades, barrens, dry pinelands and woodlands, dry fields," which suggests the species was found in a dry, early successional habitat, such as a barren. Portions of the quarry site have been resurveyed in more recent years, but the species has not been re-found. Given the age of the record and lack of more recent reports despite efforts at locating, the site is considered unlikely to still support the species (PNHP 2020). Other suitable habitat within its range has also been surveyed for this species, however it has not been observed.

The main threats to this species across its range include habitat loss and succession (transition from an open habitat type to a more wooded and closed canopy habitat) due to fire suppression or other periodic disturbance. Serpentine barrens are a rare and fire-dependent habitat type. Some serpentine barrens exist along the Pennsylvania – Maryland border, and these occur as disconnected islands of habitat, which makes species that rely on them more at risk of random negative impacts and extirpation. Some of these serpentine sites have been lost to mining or development, and others have not been managed to maintain their rare plant communities. Fire suppression and habitat loss have contributed to broad-leaved beardgrass becoming rare across its range, but active management including using fire and preservation of habitat has allowed broad-leaved beardgrass populations to flourish in some areas (NatureServe 2020). If broad-leaved beardgrass is re-found in the commonwealth, active fire management and site protection would benefit this species.

Broad-leaved beardgrass has received a state rank of SX (presumed extirpated) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data using the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as extirpated.

The Department has reviewed all information and made the determination that broad-leaved beardgrass should be reclassified as Pennsylvania Extirpated within the regulation, Conservation of Pennsylvania Native Wild Plants. This is a species which was once present in the commonwealth but has been extirpated, however, if it is relocated it will be treated as an endangered species.

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## Slender Bladderwort (*Utricularia subulata* L.)

**Current Status: Not listed**
**Proposed Status: Pennsylvania Extirpated**


Slender bladderwort, Photo: Lauren (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes adding slender bladderwort to the classification of Pennsylvania Extirpated within the regulation, Conservation of Pennsylvania Native Wild Plants. Current data suggest that slender bladderwort no longer occurs within the commonwealth.

Slender bladderwort is a low-growing, inconspicuous, terrestrial member of the Bladderwort Family (Lentibulariaceae) that grows in open, wet, mucky or sandy soil. In June through August, slender bladderwort has yellow flowers on a stem that has a zig-zag appearance. The species is carnivorous, trapping and digesting tiny organisms to supplement its growth (Rhoads and Block 2007).

In North America, slender bladderwort is found along the coast from Nova Scotia south to Florida and west to Texas, and then much less frequently northward in the Mississippi Valley to the Great Lakes states (Kartesz 2015). It is considered critically imperiled (S1, at very high risk of extirpation) in seven states in the U.S.; imperiled (S2, at high risk of extirpation) in four states; vulnerable (S3, at moderate risk) in three states; and extirpated (SX) from two states including the commonwealth (NatureServe 2020).

In Pennsylvania, the only record for slender bladderwort in Pennsylvania is based on one herbarium specimen collected in 1909 from a swamp in Chester County (PNHP 2020). This specimen had been misfiled and was recently reidentified by experts as slender bladderwort. This reidentification represented a new species for Pennsylvania's flora. Field surveys in potential sites near this historical location have yielded no new populations of slender bladderwort, and it seems unlikely that this plant presently occurs in Pennsylvania, due to the considerable habitat changes that have occurred in the southeastern part of the commonwealth where it would most likely be present. Gray notes habitat as "sandy swamps and pine barrens" near the coast from New England to Florida (1908). This indicates that at the time this herbarium specimen was collected, suitable habitat was likely present in Pennsylvania, however, habitat conversion in the Philadelphia region has made it unlikely that it still persists.

Slender bladderwort has received a state rank of SX (Presumed Extirpated) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). This is because it has not been located despite searches in appropriate habitat and it has little chance of being rediscovered. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as extirpated.

The Department has reviewed all information and made the determination that slender bladderwort should be added to the list of extirpated plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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# Plant Species Being Added or Moved to the Pennsylvania Endangered Classification

## Colic-Root (*Aletris farinosa* L.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Endangered**

Colic-root, Photo: Scott Martin via the Pennsylvania Natural Heritage Program

The Department of Conservation and Natural Resources proposes to reclassify colic-root from the list of Tentatively Undetermined plant species to Pennsylvania Endangered, within the regulation, Conservation of Pennsylvania Native Wild Plants. Colic-root is extremely rare in Pennsylvania and is in danger of extirpation if critical habitat is not maintained.

Colic-root is an herbaceous member of the Death Camas Family (Melanthiaceae), a family of plants that grow from basal rosettes and often contain toxic substances. Colic-root grows from a rhizome to about three feet tall, with a smooth stem and almost entirely basal, lance-shaped leaves. The spike of white flowers appears from May to July. Habitat includes moist clearings mostly in southeastern Pennsylvania (Rhoads & Block 2007).

Colic-root can be found from Ontario south through most of the eastern half of the United States (Kartesz 2015). It is considered extirpated or rare in about half of the states in which it has been reviewed (NatureServe 2020). In Pennsylvania, 29 populations in 11 counties were known historically, centered in the southeastern counties with a few scattered in the northeastern and northwestern counties (Rhoads & Klein 1993).

It is presently known to occur only in three locations in Delaware, Chester, and Venango counties (PNHP 2020). Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Of the three locations known, only the Delaware County population has been rated with a fair estimated viability where fencing prevents impacts. The number of individuals at this site has declined in recent years. In 1988, approximately 100 plants were observed; in 2010, only approximately 40 plants were observed. This site was previously a gravel quarry, and reverted to an old field with some open or mossy soil. Colic-root seeds need open, bare or mossy soil to become established and was observed growing in areas with less woody vegetation present. Other threats at this site include the invasive plant species, common reed. The Chester County population was found in a serpentine thicket. It has not been observed since 1995 and had a poor estimated viability ranking. The Venango population was found on damp, sandy soil; ten plants were

observed in 1979. This population was only verified as extant, and a viability ranking was not assigned (PNHP 2020). With three populations commonwealth-wide and only one of them estimated with a fair chance of viability, this species meets the criteria for an "endangered" status in Pennsylvania.

Reasons for the decline of this species in Pennsylvania include degradation and loss of its habitat due to natural succession to forest, which is the natural progression of an open habitat toward a more wooded habitat. Open habitat is necessary for colic-root and requires periodic disturbance which probably included naturally-occurring fires in the past. Other threats include development, competition from invasive plant species, deer herbivory, and possibly poaching to make use of this species' supposed medicinal properties. Active management such as prescribed fire or removal of woody plants can create and maintain the open habitat needed by this species.

Colic-root has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered due to its extreme rarity.

The Department has reviewed all information and made the determination that colic-root should be classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. This is because few populations remain in the Commonwealth as well as the necessity of maintaining its habitat in the face of multiple threats.

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## Great Indian Plantain (*Arnoglossum reniforme* (Hook.) H.E.Robins.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**

Great Indian plantain, Photo: Peter M. Dziuk, 2013 (CC by-NC-ND 3.0 US, MinnesotaWildflowers.org)

The Department of Conservation and Natural Resources proposes to add great Indian plantain to the list of plants classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. Great Indian plantain has experienced population declines and is in danger of becoming extinct from the commonwealth if habitat is not protected.

Great Indian plantain is a member of the Aster family (Asteraceae), which are predominantly herbaceous plants with compound flower heads. It can grow up to 10 feet tall and has a grooved and angled stem. The leaves are large, alternately arranged, and palmately-veined. Great Indian plantain blooms from June through September with clusters of white flowers in a loose, flat-topped arrangement. Habitat includes wet woods, floodplains, and seepage wetlands (Rhoads & Block 2007, PNHP 2020). Two synonyms for this plant are *Arnoglossum muehlenbergii* (Schultz-Bip.) H.E. Robins. and *Cacalia muehlenbergii* (Schultz-Bip.) Fernald.

Great Indian plantain is found in most of the eastern half of the United States, from Pennsylvania to Minnesota and south to Oklahoma and Georgia. It is considered rare in many of the states in its range (Kartesz 2015, NatureServe 2020). In Pennsylvania, there is presently only one population known, located in Greene county (PNHP 2020). Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. This population has a fair estimated viability. It was last observed in 2012 and consisted of only one plant. Ten years prior, this site consisted of two subpopulations and total of 11 plants. The habitat at this site is a wet meadow or floodplain/seepage wetland with mucky soil, fed in part by a calcareous spring.

Threats at this site include ATV traffic and anthropogenic changes to the wetland hydrology. Invasive plants, particularly poison-hemlock (*Conium maculatum*), and Japanese knotweed (*Polygonum cuspidatum*) are also threats (PNHP 2020).

Historically, this species was known from approximately 20 populations from nine counties scattered across the southern half of the commonwealth (Rhoads & Klein 1993, PNHP 2020). Field surveys have been conducted to re-locate the historical locations, however many of these efforts have failed to find the species: most of the previously known populations are no longer in existence. The

single population that has been observed recently is small, and has a low estimated viability. This population is in sub-optimal habitat, in a modified wetland that has been subjected to additional disturbance since its discovery in 2002. Small populations are at greater risk of extirpation from a site. The less secure each population is within a species, the greater the risk of extirpation of the species from a region or state. Great Indian plantain is threatened by habitat loss and degradation. With only one small, at-risk population in Pennsylvania, great Indian plantain is at high risk of being extirpated from the commonwealth.

Great Indian plantain has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), such as the species' extreme rarity. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that great Indian plantain should be classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. There are very few populations of this species remaining in Pennsylvania and is threatened by habitat degradation and loss, making this species at risk of extirpation from the commonwealth.

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## Bradley's Spleenwort (*Asplenium bradleyi* D.C. Eaton)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**

Bradley's spleenwort, Photo: Pennsylvania Natural Heritage Program

The Department of Conservation and Natural Resources proposes to reclassify Bradley's spleenwort from the list of Pennsylvania Threatened to Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Bradley's spleenwort may be in danger of becoming extirpated from Pennsylvania if critical habitat is not maintained.

Bradley's spleenwort is a member of the spleenwort family (Aspleniaceae), a which is a type of fern. Bradley's spleenwort has short-creeping rhizomes that may be branched, and evergreen fronds that are divided into smaller segments. It is found in crevices of dry, shaded acidic rock outcrops (Rhoads & Block 2007).

Bradley's spleenwort's range is limited to the Mid-Atlantic and southern states in the Ozark region, from New York south to Georgia and west to Oklahoma, and is primarily associated with the Appalachians. It is very rare in or extirpated from many states in its range (Kartesz 2015, NatureServe 2020). It is ranked by NatureServe, an international network of natural heritage programs, as G4 (Globally Apparently Secure) because it is uncommon but not rare worldwide; however, there are causes for long-term concern due to decline (NatureServe 2020). Pennsylvania has a role to play in the conservation of this species, worldwide.

It is unlikely that Bradley's spleenwort was ever a common species in Pennsylvania, but it has experienced population declines recently. There are about 10 historic records for this species from Carbon, Lehigh, Lancaster and Chester counties (Rhoads and Klein 1993), but some of these sites no longer support populations. Bradley's spleenwort is presently only found in six populations in Chester and Lancaster counties. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Two of these populations have good-to-fair estimated viability, two have fair estimated viability. One population's viability is estimated at fair-to-poor, another is estimated at poor. None of the six known extant populations have good or excellent estimated survivability (PNHP 2020). Threats to this species include degradation and loss of forested

habitat, invasive species introduction, and drought. Actions that open the forested cover and allow more sunlight to reach the ground may change the microhabitat used by the species, making the shaded rock crevices it grows in too dry or warm. Some recreation activities, such as rock climbing, may impact Bradley's spleenwort at some locations. Quarrying and mining of the rock outcrops inhabited by this fern are significant threats to this species. The habitat of Bradley's spleenwort may be improved by maintaining forested buffers in areas where its location is known. Curtailing rock climbing in areas of known populations would also benefit this species.

Bradley's spleenwort has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), due to its extreme rarity and small population sizes. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

Therefore, because only a few small populations of this species remain in the Commonwealth and it is at risk of habitat degradation and loss, the Department has made the determination that Bradley's spleenwort should be classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Canadian Milk-Vetch (*Astragalus canadensis* L.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**

Canadian milk-vetch, Photo: Joe F. Duft (USDA-NRCS PLANTS Database)

The Department of Conservation and Natural Resources proposes to add Canadian milk-vetch to the classification of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Canadian milk-vetch has experienced a decrease in populations and is in danger of extirpation if critical habitat is not maintained.

Canadian milk-vetch is an herbaceous perennial member of the Legume Family (Fabaceae). It is rhizomatous and can grow up to five feet tall, with as many as thirty-five leaflets on alternate leaves. Its creamy or whitish flowers appear late in June through early August. Canadian milk-vetch can be found growing on limestone soils and open rocky or shale-rich areas, including along roadsides (Rhoads & Block 2007). In addition, this species has been observed on steep shale or siltstone cliffs, shale slopes, steep road banks, and shale outcrops (PNHP 2020).

In North America, Canadian milk-vetch is known throughout most of the United States and Canada, excluding Arizona and Florida. It is more prevalent in the western and Midwest sections of the United States, with fewer locations in the east (Kartesz 2015). Historically, 20 populations were documented in 14 counties in Pennsylvania, in the southwest and Erie and Wayne Counties (Rhoads & Klein 1993). In 1998, five extant populations were known, four of which are from Bedford County.

In order to find more information about the status of Canadian milk-vetch in Pennsylvania, the Department commissioned research in 2013 through the Wild Resource Conservation Fund, to analyze existing herbarium specimens and conduct additional field surveys. Botanists reviewed preserved specimens and conducted surveys where it was likely that habitat still existed. Currently, seven populations of Canadian milk-vetch are known in Pennsylvania (PNHP 2017).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Of the extant populations, only one is estimated with an excellent viability, a robust number of individuals found in Susquehanna County on a steep south-facing slope and abandoned old railroad grade. One population has a fair viability estimate, a smaller size population found in Bedford County on a shale slope with scattered woods and shrubs. There are three populations

estimated to have poor viability: small populations with weak individuals or little reproduction, found in Westmoreland and Bedford counties on shale roadside banks or steep limey slopes. One population was not relocated despite searching, and another has not been evaluated for viability. These populations are threatened by overuse, improper roadside management, ATV use, invasive plants and shading (PNHP 2020). The small size of the extant populations puts them more at risk of disturbance, and local extirpation.

Threats to Canadian milk-vetch include succession, habitat conversion and invasive plants. Since Canadian milk-vetch uses early successional habitats, the growth of a mature canopy creates unsuitable habitat for this species. Therefore, the historical locations often no longer support this plant. Canadian milk-vetch can tolerate some disturbance and prefers open or filtered light, where less shading is present, such as a cliff or forest canopy gap. In order to maintain the existence of open habitat areas, frequent disturbance is required, often in the form of fire. In the absence of periodic disturbance, succession occurs, making the habitat unsuitable for species that utilize open areas. Habitat conversion (e.g. development) or degradation (e.g. overuse of trails) is another reason why this species is rare. In addition, this species prefers limestone habitats, which have been converted at higher rates than other geology types in Pennsylvania, making this species more at risk to habitat conversion (PNHP 2017, McPherson 2013). Canadian milk-vetch could benefit from active management, such as selective removal of woody species nearby, prescribed burning, and removal of invasive species.

Canadian milk-vetch has received a state rank of S1, or critically imperiled, from the Pennsylvania Natural Heritage Program using the national NatureServe methodology, specifically the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), because of steep declines and a restricted range. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that Canadian milk-vetch should be added to the list of Pennsylvania Endangered plant species because of population declines and threats to habitat. It is in danger of becoming extirpated from the commonwealth if critical habitat is not maintained.

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## Swamp Beggar-Ticks (*Bidens bidentoides* (Nutt.) Britton)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**

Swamp beggar-ticks, Photo: Pennsylvania Natural Heritage Program (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes to reclassify swamp beggar-ticks from Pennsylvania Threatened to Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is considered at risk of becoming endangered in the commonwealth.

Swamp beggar-ticks is a member of the Aster family (Asteraceae), which are herbaceous plants that feature compound flower heads. This annual species produces small yellow flower heads from September to October. It is found on muddy, tidal areas (Rhoads & Block 2007).

Swamp beggar-ticks is uncommon in North America and the world. NatureServe has ranked it G3G4, or globally apparently secure to vulnerable (NatureServe 2020). A globally vulnerable (G3) species is at moderate risk of extinction due to a restricted range with relatively few populations (often 80 or fewer), recent and widespread declines, or other factors; a species that is apparently secure globally (G4) is uncommon but not rare with some cause for long-term concern due to declines or other factors (NatureServe 2020). Because swamp beggar-ticks is vulnerable to extinction throughout its range, it is significant that this species is present in Pennsylvania, and its conservation here is important worldwide.

In North America, swamp beggar-ticks has a very limited range in the coastal portions of New York, Pennsylvania, Maryland, Delaware and New Jersey (Kartesz 2015). Worldwide, only about 70 populations are known, in freshwater intertidal marshes and mudflats. It is considered rare or extirpated in all those states (NatureServe 2020). In Pennsylvania, this species is only found in Delaware, Bucks and Philadelphia Counties along the lower Delaware River (PNHP 2020).

Swamp beggar-ticks was never a common species throughout Pennsylvania, as it is limited to areas influenced by intertidal flow. Historically, this species had approximately 10 populations within the commonwealth, all along the lower Delaware River (Rhoads and Klein 1993). Currently, the Department has records on nine extant populations. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Of these nine populations, only one is considered to have excellent viability, located in Bucks County with several meta-populations

showing high vigor and consistently relocated during surveys. Three populations also found on mudflats and islands in Bucks County are estimated excellent-to-good viability. Two populations have fair estimated viability, and two more have poor viability. One additional population was not estimated for viability (PNHP 2020). Very few are considered robust, having large numbers of individuals making up the populations. In addition, the habitat requirements limit the distribution of this species.

The primary threats to this species are habitat loss and degradation. Much of its freshwater tidal marsh habitat has been lost due to development, and the areas that remain are often degraded by invasive plants and shoreline erosion from boating activity (PNHP 2020). Conservation efforts to protect the intertidal mudflat areas could help conserve the populations of this species in Pennsylvania.

Swamp beggar-ticks has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), because of its extreme rarity, due to very few populations, and very restricted habitat. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that swamp beggar-ticks should be reclassified from Pennsylvania Threatened to the classification of Pennsylvania Endangered within the Conservation of Pennsylvania Native Wild Plants.

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## Wild Hyacinth (*Camassia scilloides* (Raf.) Cory)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**

Wild hyacinth, Photo Courtesy Alan Cressler, Lady Bird Johnson Wildflower Center (unrestricted use)

The Department of Conservation and Natural Resources proposes to reclassify wild hyacinth from the list of Pennsylvania Threatened to Pennsylvania Endangered, within the regulation, Conservation of Pennsylvania Native Wild Plants. Wild hyacinth is extremely rare in the commonwealth and is in danger of extirpation if critical habitat is not maintained.

Wild hyacinth is a perennial herbaceous member of the Hyacinth Family (Hyacinthaceae), plants with long, linear leaves that grow from bulbs. Wild hyacinth grows to about 2 feet tall and has a spike of pale blue to white flowers that bloom from April to May in moist woods (Rhoads & Block 2007). Other habitat includes floodplains, and swamps or riparian areas (PNHP 2020).

In North America, wild hyacinth can be found from Ontario south through most of the eastern half of the United States, and from Texas northeast to Pennsylvania. With the exception of Kentucky, wild hyacinth is considered vulnerable to critically imperiled in the states that have reviewed its status (Kartesz 2015, NatureServe 2020).

In Pennsylvania, wild hyacinth is found in the southwestern region. About nine populations were historically known in three counties: Lawrence, Allegheny and Washington (Rhoads & Klein 1993); currently there are four extant populations in those counties (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Of the four extant populations, only the Washington County population has good estimated viability, found in a mature beech-sugar maple forested slope along a creek. Threats to this location include residential and other development pressures. Two other populations were estimated to have fair viability, both with some threats due to invasive plants and development pressure nearby. This includes a population in Allegheny County in second-growth shrubby woods, and a large colony in a black ash swamp along a creek in Lawrence County. Another population in an old railroad grade in Lawrence County has not had its viability estimated (PNHP 2020).

Threats to wild hyacinth across its range include habitat loss due to land-use conversion, fragmentation and some forestry practices (NatureServe 2020). Primary threats to this species in

Pennsylvania are habitat loss and conversion, and the encroachment of invasive plants (PNHP 2020). Conservation efforts to protect wetland habitats and conduct active management, such as removal of invasive plants, can help to preserve the remaining populations of this species in Pennsylvania.

Wild hyacinth has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), due to its extreme rarity. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that wild hyacinth should be reclassified as endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. This species has experienced declines and there are few populations remaining in the Commonwealth; the remaining habitat for this species is at risk of degradation.

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## False Hop Sedge (*Carex lupuliformis* Sartwell)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Endangered**

False hop sedge, Photo Courtesy: Peggy Romfh, Lady Bird Johnson Wildflower Center (unrestricted use)

The Department of Conservation and Natural Resources proposes to reclassify false hop sedge from Tentatively Undetermined to the list of Pennsylvania Endangered plant species within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is in danger of becoming extirpated within this commonwealth if critical habitat is not maintained.

False hop sedge is a member of the Sedge Family (Cyperaceae) which is comprised of herbaceous plants usually with three-angled stems and linear leaves. It forms rhizomes and has stems that are about one and a half to three feet tall. It is closely related to and looks very similar to hop sedge (*Carex lupulina*), thus the common name "false hop sedge." Hop sedge gets its name from the prominent fruiting clusters which look somewhat like hops. False hop sedge grows in wetlands, especially those that experience fluctuating water levels such as vernal pools and other wet areas on calcareous substrates (Rhoads & Block 2007, PNHP 2020).

In North America, false hop sedge is found in the eastern half of the United States, from Vermont to Florida, west to Minnesota and Texas, as well as Ontario and Quebec. It is considered rare in nearly every state or province in which it has been evaluated (Kartesz 2015, NatureServe 2020). In Pennsylvania, false hop sedge is relatively widespread and not limited to a specific region, yet is uncommon due to its habitat requirements (PNHP 2020).

False hop sedge was added to the Tentatively Undetermined list of plant species in 1993 in order to identify it as a species that was potentially in need of conservation but for which the Department needed more information to properly classify it. Since then, numerous field surveys have been conducted, and preserved plant specimens have been re-examined to confirm their identity, because false hop sedge closely resembles another species of sedge (*Carex lupulina*) that is common and widespread. Field surveys have documented 11 populations of false hop sedge presently in Pennsylvania (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Three populations of false hop sedge have an estimated good-to-

fair viability, found in vernal ponds in mixed hardwood forests in Northumberland, Mifflin and Chester Counties. Three populations have a fair estimated viability, found in vernal pools in red maple-black gum palustrine forest, oak mixed woods or other deciduous woods Chester and Juniata Counties. The populations with fair estimated viability tend to have fewer individuals per population and/or be more threatened by invasive plants. Five populations have only been identified as extant, and viability was not estimated. This includes vernal pools in Snyder, Mifflin, and Berks counties, a hummock-hollow in Erie County and a shrub swamp in Crawford County (PNHP 2020).

Threats to false hop sedge include invasive plant encroachment in vernal pools or other wetland habitats. Some factors which may contribute to false hop sedge being rare are its affinity for wetlands with fluctuating in water levels, often vernal pools which can be overlooked as wetlands. False hop sedge is often found on calcareous substrates, which are more prone to invasive plant encroachment. The overall loss of wetland habitat and alterations of hydrology also are threats. In addition, forest canopy closure, herbivory and a propensity for vegetative reproduction instead of flower and fruit production at some populations contribute to rarity. Vegetative reproduction yields individuals that are genetically identical to each other (clones). Over time, the population becomes less genetically diverse, making the population vulnerable to diseases and other impacts. Protection of wetland habitats, particularly vernal pools, should benefit false hop sedge.

This species has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012) because of extreme rarity and steep declines. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that false hop sedge be listed as endangered.

The Department has reviewed all information and made the determination that false hop sedge should be added to the classification of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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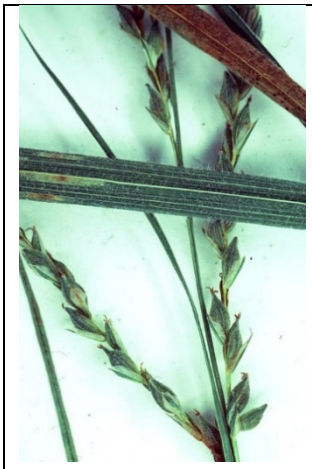
## Roan Mountain Sedge (*Carex roanensis* F.J. Herman, Source: Weakley 2020)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**



Roan mountain sedge, Photo: Charles T. Bryson (CC BY-3.0 US, USDA Agricultural Research Service, Bugwood.org)

The Department of Conservation and Natural Resources proposes to add Roan Mountain sedge to the list of plants classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. This plant was recently identified in Pennsylvania and has a very small number of populations and individuals known within the commonwealth.

Roan Mountain sedge is a member of the Sedge Family (Cyperaceae) with a dark maroon base and fuzzy seed coverings. It grows in cove forests, moderate to high elevation oak forests, northern hardwood forests in southwest Pennsylvania and flowers May through June (Weakley 2020).

Roan Mountain sedge has a been ranked globally by NatureServe as imperiled (G2) because it is a species that has a high risk of global extinction (NatureServe 2020). It has a restricted range worldwide, only being found in the Appalachian region, with populations in eight states: Pennsylvania, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, and Georgia. It is ranked as critically imperiled (at very high risk of extirpation) in Tennessee, Kentucky and Georgia; and imperiled (at high risk of extirpation) in Virginia, West Virginia, Tennessee and North Carolina. It is estimated that about 45 populations are known globally, but they tend to be small (Kartesz 2015, NatureServe 2020). It is significant that this species is present in Pennsylvania, as its conservation in the commonwealth is important worldwide.

Roan Mountain sedge is newly identified in Pennsylvania. In 2007, preserved specimens of a sedge species from the Ohiopyle area were reviewed and re-identified as Roan Mountain sedge. They had been labelled as a different and common species, ribbed sedge (*Carex virescens)*. The specimens indicated that Roan Mountain sedge had been collected in Pennsylvania in the past and warranted conducting field surveys to determine the current presence of the Roan Mountain sedge in Pennsylvania. Since that time, botanical surveys have revealed four extant populations in the commonwealth (PNHP 2020).

All extant populations of Roan Mountain sedge are found in one area of Fayette County. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Of the four known populations in Pennsylvania, two are considered to have good estimated viability, one is verified only as extant with no viability estimate given, and one was not re-found during the most recent survey. All four sites are located on protected state land. One of the populations with a good estimated viability is made up of approximately 40 clumps of plants along a walking path and nearby deer trail. The site is on a rocky wooded slope in a maple-beech-tulip tree forest. No threats are evident at this location, and the population appears healthy and reproducing. The second site with good estimated viability had approximately 50 clumps of plants and is in a very rich forest dominated with paw paw, basswood, and sugar maple on a steep slope. Some threats at this site include disturbance from recreation (rappelling), invasive plants, and potentially timber activities. Another site is considered extant only, with no viability estimate, found along a trail in rocky woods made up of red maple and hemlock. One population failed to be relocated in the most recent survey, in 2018. It was last observed in 2006 with one clump of plants. It is possible that seed bank is still present in the soil at this location and the population is not yet considered extirpated or historic. This population is in a mesic forest along a trail and threats include potential logging, and invasive plant encroachment especially by Japanese stiltgrass, since it also favors edge habitat (PNHP 2020).

Local populations can be at risk of extirpation when their populations have few individuals, making them susceptible to alterations to the habitat. Species that have fewer populations across the commonwealth are at risk of extirpation because they have less “back up” if one population fails. The fact that all known populations of Roan Mountain sedge are found in one county makes this species at very high risk of extirpation in the commonwealth. It is also important worldwide that Pennsylvania conserve this species. Threats to Roan Mountain sedge include conversion of land, habitat fragmentation, and invasive species, particularly Japanese stiltgrass. Removal of invasive plants and continued good land management practices should benefit this species.

Roan Mountain sedge has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey’s Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that Roan Mountain sedge should be added to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Schweinitz's Sedge (*Carex schweinitzii* Schwein.)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**


Schweinitz's sedge, Photo: Emmet J. Judziewicz (Flora of Wisconsin)

The Department of Conservation and Natural Resources proposes to reclassify Schweinitz's sedge from Pennsylvania Threatened to Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. Schweinitz's sedge has declined in Pennsylvania and is in danger of becoming extirpated if critical habitat is not maintained.

Schweinitz's sedge is a member of the Sedge Family (Cyperaceae) which is comprised of herbaceous grass-like plants usually with three-angled stems. This species grows from long, slender rhizomes below ground, and produces fertile shoots that can grow to about a half-foot to two feet tall and are sharply triangular below the inflorescence. It is found in fens and on streambanks in calcareous soil (Rhoads & Block, 2007).

In North America, Schweinitz's sedge is found from primarily in Ontario and Michigan, with scattered populations in the northeastern United States and around the Great Lakes, south to Virginia. It is considered critically imperiled, imperiled or vulnerable in every state in which it has been analyzed, except for Missouri, Wisconsin and Rhode Island where it is historic. In addition, it is somewhat globally rare, ranked as G3G4 (globally secure to vulnerable) with only about 70 known populations worldwide (Kartesz 2015, NatureServe 2020).

In Pennsylvania, there are currently six populations known to be present in Bedford and Blair Counties in spring-fed wetlands (PNHP 2020). Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the species has. A species that has few populations, with low estimates of viability, has a lower chance at persistence in the commonwealth and a higher chance of extirpation from the commonwealth. Of the six known extant populations, only one of them has good estimated viability, with excellent habitat quality, limited threats and a large population. This population is found in Bedford County in a spring-fed wetland in a meadow bordered by shrubs and small trees, surrounded by agricultural and grazed land. Two Schweinitz's sedge populations have fair estimated viability, also found in spring-fed wetlands: one in excellent habitat quality in a Bedford County fen with high species diversity, but a small

population size; and another in Blair County in a partially-spring-fed cattail-sedge wetland that has been degraded due to encroachment of invasive and woody plant species, particularly reed canary-grass and tag alder. There are two sites with poor viability: a Blair County wetland with mediocre habitat nearby road, invaded with non-native plants, and a marginal population size; and a sedge meadow in Bedford County that has poor viability due to small population size and poor habitat quality (disturbance from utility corridors and agriculture). There is one site in Bedford County that has no estimate of viability; there are a few historic sites that no longer support the species (PNHP 2020).

Schweinitz's sedge is limited to fens and calcareous stream habitats, which is not a very common habitat in Pennsylvania, and one reason why this species is uncommon. Other threats to this species include invasive plant species (fens and floodplains are particularly vulnerable to invasion, and several sites already have severe problems that may have reduced or eliminated the species), and habitat conversion to other uses. Protection of wetlands and springs which feed marshes and wetlands through stream buffers or management plans can help benefit this species.

Schweinitz's sedge has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that Schweinitz's sedge should be reclassified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Sterile Sedge (*Carex sterilis* Willd.)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**

Sterile sedge, Photo: Peter M. Dziuk (CC BY-NC-ND 3.0 US, Minnesota Wildflowers)

The Department of Conservation and Natural Resources proposes to reclassify sterile sedge from Pennsylvania Threatened to Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. Sterile sedge populations have declined and is in danger of extirpation from the commonwealth if critical habitat is not maintained. The Department will also change the common name from "Atlantic" sedge to "sterile" sedge, which is another accepted name for this species and is more descriptive.

Sterile sedge is a member of the Sedge Family (Cyperaceae). Sterile sedge plants typically produce 2-8 flower clusters, the terminal one being either all male, all female or nearly so. It is found in in calcareous swamps and fens (Rhoads & Block 2007).

In North America, sterile sedge has a northern distribution and is found in southern Canada, south through the Mid-Atlantic states west to northern Midwestern states (Kartesz 2015). It is considered critically imperiled (S1, at very high risk of extirpation) in five states including Pennsylvania; imperiled (S2, at high risk of extirpation) in four states; and vulnerable (S3, at moderate risk) in three states in the U.S. It is considered possibly extirpated in three states (NatureServe 2020).

In Pennsylvania, this species has been found in the northwest, northeast, and south-central (PNHP 2020). Sterile sedge populations have declined in Pennsylvania since it was originally listed as Pennsylvania Threatened, primarily due to habitat loss. Historically, about 20 populations were known, scattered in nine counties (Rhoads and Klein 1993). More recent botanical surveys have confirmed eight populations, in four counties (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats, and other criteria. Of the eight known populations in Pennsylvania, none have been estimated to have excellent viability. Two populations have good estimated viability. One of these is a small population in Lawrence County in excellent habitat consisting of a graminoid-seepage shrubland. The other population with good viability is found in Bedford County in a partially wooded riparian/wetland corridor with a high level of plant diversity. A Northampton County population has a

fair estimated viability, made up of a complex of many fens and wetlands with varying degrees of quality habitat. Invasive plant encroachment and habitat manipulation or development are the chief threats. The remaining five populations are only considered extant, with no viability estimate (PNHP 2020).

Many of the historical sites known in eastern Pennsylvania are no longer extant, because the habitat has been converted to other uses. Sterile sedge grows in calcareous swamps and fen habitats which are not very common in Pennsylvania, and one reason why this species is rare. A limited amount of suitable habitat limits the potential for a species' expansion. Other threats to sterile sedge include invasive plant species. Protection of wetlands and stream buffers can help benefit this species. Pennsylvania is near its southern extent, with only scattered populations in states further south. Most of sterile sedge's range lies to the north and populations in Pennsylvania may be vulnerable to climate change. Corridors for species migration may become important to its survival. It is restricted to colder climates, and calcareous fens, which limits habitat availability in Pennsylvania.

Sterile sedge has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered. The Department has reviewed all information and made the determination that Sterile sedge should be reclassified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Spring Coral-Root (*Corallorhiza wisteriana* Conrad)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Endangered**

Spring coral-root, Photo: Eric Hunt (CC BY-SA 4.0, Wikimedia Commons)

The Department of Conservation and Natural Resources proposes to reclassify spring coral-root from Tentatively Undetermined to Pennsylvania Endangered, within the regulation, Conservation of Pennsylvania Native Wild Plants. This plant is in danger of extirpation throughout its Pennsylvania range due to the limited number of populations in the commonwealth and population declines.

Spring coral-root is a member of the Orchid Family (Orchidaceae). It has a reddish-brown stem with ten to fifteen purple to reddish flowers (Rhoads & Block 2007). Like other orchids in this genus, spring coral-root does not photosynthesize and acquires all necessary nutrients through mycorrhizal fungi that tap into the roots of surrounding plant species (Rhoads & Block 2007, North American Orchid Conservation Center 2016). The habitat for spring coral-root includes rocky, wooded slopes on limestone and diabase (Rhoads and Block 2007).

In North America, spring coral-root's range includes most of the United States, from Pennsylvania and New Jersey, west to Montana and Oregon, and south through the Gulf and mid-Atlantic states to Arizona, northern Mexico, Utah, and Florida (Kartesz 2015, NatureServe 2020). This species is ranked as critically imperiled (S1, very high risk of extirpation) in six states, imperiled (S2, high risk of extirpation) in four states; vulnerable (S3, at moderate risk of extirpation) in four states; and considered extirpated or possibly extirpated in three (NatureServe 2020).. Pennsylvania is at the northern limit of this species' range.

In Pennsylvania, spring coral-root is found in a disjunct pattern, with disconnected populations in the east, west, and central parts of the commonwealth. There are currently five sites that support spring coral-root and four additional sites that have not been relocated in recent surveys. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. Of the five populations that have been observed in recent surveys, one population has a good estimated viability in Franklin County, one population has a good-to-fair estimated viability in Chester County, and three populations have fair estimated viabilities in Berks, Bucks and Montgomery counties. The Franklin County population was estimated to have a good

viability because it is a healthy population situated in a moist, shaly ravine under a southeast-facing calcareous woods but threatened by trampling. The Chester County population is on an shaded, moist, upper slope and was estimated at good-to-fair viability because of fewer and smaller plants and some evidence of herbivory. The three fair viable populations are found in an oak-tulip tree woods on a southerly slope in a state park in Bucks County and threatened by trampling, picking, deer browse and invasive species; a cemetery in Berks County at risk of mowing and exotic invasive species; and a heavily browsed tulip tree-beech-maple forest in Montgomery County (PNHP 2020). The numbers of plants documented per site range from 1-30; these are extremely low population sizes that increase vulnerability to extirpation from any threats and decline from genetic effects such as inbreeding. Four additional sites that have not been relocated in recent surveys (PNHP 2020).

All other data on the occurrence on spring coral-root in Pennsylvania are historical sites known from past museum collections, and due to the age of these records and the highly developed region of the commonwealth where they occur, it is believed that few, if any, support the plant at this time. A recent study analyzed several orchid species in the Catoctin Mountains (Frederick County, Maryland, just south of Pennsylvania), in an area much less urbanized than most of spring coral-root's historic sites in Pennsylvania. The researchers found orchids have declined precipitously, with losses mostly above 50% and in many cases, including two species of *Corallorhiza*, above 90%. Deer herbivory was demonstrated to be a significant factor in the decline (Knapp and Wiegand, 2014). While spring coral-root (*C. wisteriana*) was not known from the study area it shows that deer herbivory can have serious impacts on this genus. The records for the known extant populations in Pennsylvania note deer herbivory as observed threats. This species is also found on moist calcareous shale, limestone or other calcareous soil, which is disproportionately at risk to exotic plant species (McPherson 2013). Removal of invasive species, reduction in deer browse intensity, and protection of moist calcareous soils near the existing populations could benefit this species.

Some aspects of an orchid's life cycle can increase its likelihood of rarity. For instance, orchid seeds are well-suited to long-distance dispersal by wind, as they are extremely small and are produced in large numbers. However, the seeds have no developed embryo and carry no food with them and must encounter very specific environmental conditions, including the presence of a suitable fungus, in order to germinate and grow. Orchids that are removed from their habitat by poachers often do not survive, due to the loss of these fungal associations. Orchid species often require ten years or more to grow from seed to maturity before flowering and producing more seed, so recovery from disturbance or

poaching may take decades (Dressler 1981). For these reasons, as well as other factors like environmental or pollinator specificity, orchids, as a group, tend to be uncommon in Pennsylvania.

Spring coral-root has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program, which uses the national NatureServe methodology to analyze available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The very small number of individuals known in the commonwealth and at individual sites, the level of threat the species faces from deer browse and invasive species, and an apparent trend of decline over the last century contribute to this decision. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that spring coral-root be reclassified from the list of Tentatively Undetermined to that of Pennsylvania Endangered plants. This species is in danger of becoming extirpated from the commonwealth if critical habitat is not maintained.

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## Showy Lady's-Slipper (*Cypripedium reginae* Walter)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**

Showy lady's-slipper, Photo: Chris Tracey, Western Pennsylvania Conservancy/Pennsylvania Natural Heritage Program (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes to reclassify showy lady's-slipper from Pennsylvania Threatened to Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. Showy lady's-slipper is in danger of extirpation if the critical habitat is not maintained.

Showy lady's-slipper is a member of the Orchid family (Orchidaceae) bearing a distinctive white flower with a pouch-shaped, inflated lower petal that is streaked with pink or purple. It has a leafy stem and grows in wetlands such as fens and swamps (Rhoads & Block 2007).

In North America, showy lady's-slipper can be found from eastern Canada south to Arkansas. It is rare in most states in which it has been evaluated (Kartesz 2015, NatureServe 2020). Historically, populations of showy lady's-slipper were scattered across northwest, central and eastern Pennsylvania, about 25 populations in 13 counties (Rhoads and Klein 1993). However, numbers of showy lady's-slipper populations have declined, to about seven existing populations are now limited to the northwestern corner of the commonwealth, all in Erie, Lawrence and Crawford counties (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the plant has. A species that has few populations, with low estimates of viability, the lower chance at persistence in the commonwealth and the higher the chances of extirpation. Of the seven populations known to be extant, two are considered excellent or good, two have a fair estimated viability, and one is estimated at poor viability. There are two more populations that are only considered extant, no estimate of their viability has been made. The two best populations are from shrub swamps or fens in Erie County, one in somewhat limited but good quality habitat on protected state lands, and another in good quality habitat but threatened by deer browse. The fair estimated populations in Erie and Lawrence counties, are very small populations. The extant populations that have not been estimated for viability are found in Erie and Crawford counties. In

addition to the seven known extant populations, there are 25 historical populations (despite searching, it has not been rediscovered within 20 years) and four populations that have not been re-found despite recent surveys, yet it is too soon to deem them historical (PNHP 2020).

Showy lady's-slipper prefers swamps or wetlands with calcareous and alkaline conditions, which are not common habitats in Pennsylvania. Threats to showy lady's-slipper include threats to wetlands, such as habitat destruction or conversion, hydrological modification, declining water quality, invasive plant species competition, and canopy closure. The species is also threatened by herbivory from deer and excess collection by the horticultural industry (NatureServe 2020). This species could benefit from protecting known population areas, implementing forested buffers in those areas, preventing deer browse, and halting collection and poaching activities.

Orchids' life cycles can increase their likelihood of rarity. It can be difficult for orchid species to colonize new locations. Orchid seeds are well-suited to long-distance dispersal by wind, as they are extremely small and are produced in large numbers. However, the seeds have no developed embryo and carry no food with them and must encounter very specific environmental conditions, including the presence of a suitable fungus, in order to germinate and grow. When orchids are picked or taken, they often do not survive due to the loss of these fungal associations. Orchid species often require ten years or more to grow from seed to maturity before flowering and producing more seed, so recovery from disturbance or poaching may take decades (Dressler 1981). Because of these reasons, orchids, as a group, tend to be uncommon in Pennsylvania.

The showy lady's-slipper orchid has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data, notably steep population declines, with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and determined that the appropriate classification for showy lady's-slipper is the classification of endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Blue Ash (*Fraxinus quadrangulata* Michx., Source: Weakley 2020)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**

Blue ash, Photo: Jeff Krentny (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to add blue ash to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Blue ash is extremely rare and in danger of extinction from the commonwealth due to a pest insect species.

Blue ash is a member of the Olive family (Oleaceae) and is similar in appearance to other native ash trees, including having opposite, compound leaves. Blue ash can grow up to 80 feet tall with a spread of 40 feet. The undersides of the leaflet often have hairy midribs. The most notable feature of blue ash is the square shape of young twigs, which disappears as the twigs mature into branches. The seeds are housed within samaras that are noticeably flat compared with other ash species. The name "blue ash" arises from a blue dye that was extracted from the species by early pioneers. Habitat includes mesic to dry calcareous woodlands and forests (Weakley 2020).

In North America, the geographic range for blue ash extends from central Canada, south through the Midwest to Florida. It occurs as far west as Kansas, to Pennsylvania and Virginia on the east. The majority of blue ash occurs from western Ohio to central Missouri, with neighboring states exhibiting extant populations (Kartesz 2015). This species is ranked as critically imperiled, or at very high risk of extirpation, in Wisconsin, Iowa, Oklahoma, Mississippi, West Virginia, and Pennsylvania; imperiled, at high risk of extirpation, in Georgia, Kansas and Ontario, Can.; and vulnerable, at moderate risk of extirpation, in Virginia (NatureServe 2020).

In Pennsylvania, blue ash is known from one herbarium specimen, collected in 1985 from Fayette County in Forbes State Forest along Chestnut Ridge (PNHP 2020). A significant threat to this and all ash species in Pennsylvania is the emerald ash borer, a non-native, invasive wood-boring beetle that was first identified in North America in 2002 (USDA 2015) and has been documented infesting other ash species of North America (Anulewicz & McCullogh 2011). Larvae of this beetle feed exclusively on the cambium of ash trees, which disrupts the nutrient flow, eventually girdling and killing the tree. The emerald ash borer is considered a forest pest by the United States Department of Agriculture Forest Service, as well as the Pennsylvania Department of Conservation and Natural Resources, Bureau of

Forestry. This pest usually kills ash trees within three to four years of infestation. It is estimated that between 20 and 55 million ash trees from all species have been lost across the United States and Canada. Without active management, it is predicted that emerald ash borer will severely reduce populations of ash trees in the commonwealth. As of 2014, ash forests in Pennsylvania have been reduced by 12 percent. If no measures are taken to protect the live blue ash trees, the species is extremely likely to become extinct in Pennsylvania (Liu & Miller 2014). The Department has been chemically treating other ash trees in prioritized areas in order to combat the emerald ash borer.

Blue ash may become considered rare throughout its range in North America. The national conservation status is currently G5, secure, but it is being reevaluated by NatureServe, identifying emerald ash borer as the primary threat. The tree may survive by producing stump sprouts for one to two more years after the main stem dies back, however the plant eventually dies completely. Without mature seed-producing adults, no new plants will replenish the seed bank. NatureServe reports that some studies have observed blue ash being able to regenerate after infestation, while others disagree. It appears that blue ash may be less susceptible to emerald ash borer than some other ash species due to the thickness of the bark (NatureServe 2020). However, the extreme rarity of the plant coupled with the pest threat makes blue ash a species that is likely to become extirpated from the commonwealth.

This species has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that the appropriate listing for blue ash is the classification of endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Box Huckleberry (*Gaylussacia brachycera* (Michx.) A. Gray)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**


Box huckleberry, Photo: E (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove box huckleberry from the list of Pennsylvania Threatened plants and add it to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Box huckleberry is a plant which, if critical habitat is not maintained, will become extirpated from Pennsylvania.

Box huckleberry is a long-lived, slow-growing, colonial, evergreen shrub belonging to the Heath Family (Ericaceae). It is low growing, only reaching two feet or less in height, and may form dense patches. Box huckleberry produces white flowers in May and blue fruits in August. This species grows in well-drained, open woods (Rhoads and Block 2007).

In North America, box huckleberry is found mainly in the central Appalachian Mountains with a few locations on the coastal plain and piedmont (Kartesz 2015, NatureServe 2020). Box huckleberry has a state rank of critically imperiled (S1) in Pennsylvania, Maryland, Delaware, Virginia and North Carolina (at very high risk of extirpation due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors). It is ranked as imperiled (S2) in West Virginia, Kentucky and Tennessee (at high risk of extirpation). Box huckleberry is globally vulnerable (G3) with a moderate risk of extinction worldwide due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors (NatureServe 2020). The Pennsylvania populations are critical to the survival of box huckleberry worldwide.

In Pennsylvania, there are three known sites of box huckleberry; two populations are found in Perry and one in Bedford counties (PNHP 2020). One Perry County population is large and healthy with an excellent estimated viability. This site is protected within the Box Huckleberry State Forest Natural Area and has been estimated to be over 1,300 years old (Coville 1919, who estimated then that it was 1,200 years old). This is likely the best population in Pennsylvania, with minimal disturbance and no sign of invasive plant threats. The second Perry County population consists of four sub-populations which may have been connected at one time, but are now separated by road construction, agriculture, and spoil material (PNHP 2020). It is hypothesized that the plats at this site may be approximately 13,000

years old (Willaman 1965, Moldenke 1957). Regardless, they are some of the oldest plants in the eastern United States (Pooler et al. 2008). The Bedford county population, like the other two, was found in mixed oak woods with a hemlock or pine component on acidic shale bedrock. One historic site from a state gamelands in Lebanon/Dauphin County has not been observed since 1930 (PNHP 2020).

Box huckleberry grows extremely slowly, at a rate of up to six inches per year, replacing the older stems with new vegetation sprouted from underground rhizomes. Germination rates from seeds are very low, and the seedlings often appear weak (Wilbur et al. 2004). Pooler et al. (2008) suggest that all plants are clonal in the largest Pennsylvania colony. Pooler et al. (2006) note that box huckleberry is found in isolated colonies with limited opportunity to outcross and requires other individuals with which to reproduce sexually, circumstances which favor clonal reproduction. This situation makes it difficult or unlikely for box huckleberry to establish new colonies in areas away from the existing ones.

Recent work has shown that, while genetic diversity is limited, the populations may be made up of more than one clone. The different populations in Pennsylvania appear to have different genotypes, making them all critical to conserve for genetic diversity of the species (Pooler et al. 2006). Threats to box huckleberry in Pennsylvania include picking/poaching, fragmentation and conversion or development of habitat, succession and increasing shade, and invasive exotic plants in addition to isolated, small populations (PNHP 2020).

Box huckleberry has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012) because of its extreme rarity and heavy reliance on vegetative reproduction. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that box huckleberry should be reclassified from the list of Pennsylvania Threatened to Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Golden Hedge-Hyssop (*Gratiola aurea* Muhl. ex Pursh)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Endangered**

Golden hedge-hyssop, Photo: Laura Costello (CC BY 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to reclassify golden hedge-hyssop from the list of Tentatively Undetermined plants to the list of Pennsylvania Endangered plants, within the regulation, Conservation of Pennsylvania Native Wild Plants. Golden hedge-hyssop is a species that may become extirpated from the commonwealth if critical habitat is not maintained.

Golden hedge-hyssop is an herbaceous, perennial member of the Plantain Family (Scrophulariaceae). It is a low-growing plant that can reach up to one foot in height with bright yellow flowers that bloom from July to August. This wetland plant typically grows in moist or wet soils along streams or ponds (Rhoads and Block 2007). The seeds can remain dormant in the soil during wetter years.

In North America, golden hedge-hyssop is limited to the east and is found from southern Canada, south through New England along the Atlantic coast to Florida and west into Alabama. Scattered populations also exist in a few Midwestern states (Kartesz 2015). It is considered critically imperiled in Michigan, Pennsylvania, North Carolina, and New Brunswick, Canada (NatureServe 2020). In Pennsylvania, golden hedge-hyssop is found in the Delaware River watershed, mostly on the banks of the Delaware River.

Golden hedge-hyssop was originally listed as Tentatively Undetermined in 1988 because it was identified as a species in need of conservation, but the Department needed more information to properly classify it at the time. The Pennsylvania Biological Survey's Vascular Plant Technical Committee recommended field surveys be done to more adequately determine the extent of the populations. In 1993, the *Vascular Flora of Pennsylvania Annotated Checklist and Atlas* reported approximately 15 sites, including historical ones. The range included four counties along the Delaware River and extended as far north as Pike County (Rhoads and Klein 1993). Through field observations, golden hedge-hyssop is known to be extant at only three sites now.

The three known populations of golden hedge-hyssop are limited to two counties: Bucks and Wayne. Many historical populations have not been relocated despite repeated survey attempts. Botanists estimate the viability of plant populations based on size, number of reproducing members,

threats and other criteria. A plant species that has many populations with high estimates of viability, has a greater chance of continued survival. Of the three known sites of golden hedge-hyssop, one is considered excellent-to-good estimated viability, and the other two have no estimation of their viability. The population with excellent viability is found in a coastal plain forest remnant in Bucks County, in a local preserve. This is the largest population found in the commonwealth with thousands of plants growing in and around pond margins. Despite its protected location, threats include invasive plant species, motorized recreation, vandalism, and deer browse. The other two populations are in Wayne and Bucks Counties. The Wayne County population is located on a very wet sandstone cliff face, above the Delaware River and appears secure due to its difficult-to-access location. The other Bucks County site is in a protected area growing in tidal mud and exposed rubble along the Delaware shoreline (PNHP 2020). All three of these sites are either inaccessible or in a protected area, which has likely allowed them to persist. Populations with small numbers of individuals, like in golden hedge-hyssop, are at more risk to disturbance and extirpation. Continued protection of the known golden hedge-hyssop populations, including reducing deer browse, invasive species and recreation threats, should benefit this species.

This species has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that golden hedge-hyssop should be classified as endangered within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Northern Sweet Grass (*Hierochloe hirta* (Schrank) Borbás, Source: Weakley 2020)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**

Northern sweet grass, Photo: Rob Routledge, Sault College (CC BY 3.0 US, Bugwood.org, Forestry Images)

The Department of Conservation and Natural Resources proposes to add northern sweet grass to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This is a species which is in danger of becoming extinct from its natural range within the commonwealth if critical habitat is not maintained.

Northern sweet grass is a perennial member of the Grass Family (Poaceae) that can grow to 30 inches tall. This species has a reddish-purple base and grows from thin creeping underground horizontal stems called rhizomes. It grows in fens, wet calcareous meadows, high elevation pastures and openings, saltmarsh edges, and blooms April through August (Weakley 2020). A synonym for this species is *Anthoxanthum hirtum* (Schrank) Y.Schouten & Veldkamp (NatureServe 2020).

In North America, northern sweet grass is found in Canada south through most of the United States, extending as far south as North Carolina in the east and New Mexico and California in the west (Kartesz 2015). It is critically imperiled in many of the mid-Atlantic states (NatureServe 2020).

In Pennsylvania, northern sweet grass was historically found in the northeastern and northwestern counties. There are currently four extant populations in fens and wet meadows from Erie and Lawrence Counties. There are two historical sites where the species no longer exists due to habitat loss or degradation, one that has not been re-found despite searching (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats, and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the plant has. Of the four extant populations, one is estimated as having a good viability, two have a fair or poor estimated viability and the fourth population's viability has not been estimated. The best population in Pennsylvania is found in Erie County, with hundreds of plants growing in a culvert along a roadside. While this population appears to be healthy now, proximity to the road, potential for invasive plants, roadside salt, and other impacts are threats to northern sweet grass. Another population in Erie County has good viability and is also found along a roadside, forming dense clones growing on dry gravel. This population is threatened

by reed canary-grass, an invasive plant that is displacing the northern sweetgrass. One population in Lawrence County has a good-to-fair estimated viability, with a few, widely scattered plants. It is a small population with declining habitat quality due to agricultural runoff (PNHP 2020).

The two historical records are based on herbarium specimens from 1924 in open sedge bogs and swamps in Lawrence County in, and 1899 from an alluvial island in the Ohio River now completely developed in Allegheny County. Another record from Wayne and Susquehanna Counties found in a sedge meadow in 1937 was searched for multiple times unsuccessfully (PNHP 2020).

The presence of the species in edge habitats along roads has some impacts on viability, as anthropogenic openings can mimic natural disturbance processes that provide adequate light, while at the same time the roads present significant threats such as increased vulnerability to invasive species and exposure to adverse road maintenance activities such as de-icing and herbicide treatments. Factors contributing to broad-scale degradation of wetland habitats in North America also contribute to the overall decline of the species (Reis et al 2017). Protection and stewardship of fens in the commonwealth, including control of invasive plants, limiting water runoff from the surrounding landscape, and otherwise protecting the quality and quantity of the water entering the wetlands will improve habitat quality and availability for northern sweet grass.

This species has been assigned a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program based on analysis of available data using the NatureServe Rank Calculator (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended it be listed as Pennsylvania Endangered.

The Department has reviewed all information and made the determination that northern sweet grass should be classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is at risk of extirpation from the Commonwealth if critical habitat is not maintained.

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## Clasping-Leaved St. John's-Wort (*Hypericum gymnanthum* Engelm. & A. Gray)

**Current Status: Pennsylvania Extirpated**
**Proposed Status: Pennsylvania Endangered**

Clasping-leaved St. John's-wort, Photo: Eric Keith (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to reclassify clasping-leaved St. John's-wort from Pennsylvania Extirpated to Pennsylvania Endangered within the regulation Pennsylvania Native Wild Plants. Clasping-leaved St. John's-wort was rediscovered in Pennsylvania after it was presumed to be extirpated.

Clasping-leaved St. John's-wort is an annual member of the St. John's-wort family (Hyperiaceae). It can grow up to 2 feet tall and has leaves that wrap around the stem and an open arrangement of yellow flowers. Clasping-leaved St. John's-wort blooms from July to September and is found in muddy wet areas (Rhoads and Block 2007).

In North America, clasping-leaved St. John's-wort is found in the eastern half of the United States, west to the Mississippi region, with most populations found around the Gulf states and the southern Mid-Atlantic (Kartesz 2015). While clasping-leaved St. John's-wort may have a wide range, it is limited because of restricted habitat requirements. It is ranked as critically imperiled (S1, at very high risk of extirpation) in Pennsylvania, New Jersey, Indiana and Kentucky; imperiled (S2, at high risk of extirpation) in Ohio; vulnerable (S3, moderate risk) in Maryland, Delaware and North Carolina and apparently secure in Virginia (NatureServe 2020).

In Pennsylvania, Rhoads and Klein reported that it had been found in a few locations in muddy shores and intermittent ponds, but no records were collected since 1920 (1993). Since then, it has been discovered in Huntingdon County (PNHP 2020). According to the regulation, Conservation of Native Wild Plants, when a plant listed as Pennsylvania Extirpated is found to exist within the Commonwealth, the species automatically becomes classified as Pennsylvania Endangered (17 Pa. Code § 45.2. Definitions).

The population in Huntingdon County was discovered in 2000 in a natural seasonal pond located in a dry oak-heath forest. Only one plant was found and the population has a poor estimated viability due to the small population in unstable habitat. Threats to this population include succession and shading by taller trees, herbivory by deer, and trampling (PNHP 2020). Botanists estimate the viability of

each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. A species that has few populations, with low estimates of viability, the lower chance at persistence in the Commonwealth and the higher the chances of extirpation from the Commonwealth.

Clasping-leaved St. John's-wort was originally listed as Pennsylvania Extirpated because at the time of its listing, there were only historical populations known (Rhoads and Klein 1993). These were found in: Lehigh County, in an open cut-over woodlot in 1920, surrounded by a field pasture and scattered homes; Centre County in an edge of a dried pool in an oak barren last observed in 1938; an island in Delaware County, collected in 1866, and is impacted by dredge spoils and pollution; and a site in Bucks County last observed in 1865 (PNHP 2020). All historical populations have been searched for but not found. Some of these sites are now developed or impacted so that no longer provide suitable habitat for the species.

Clasping-leaved St. John's-wort is an obligate wetland plant and its dependence on wetlands is one reason why this species is rare in Pennsylvania. Range-wide, threats to this species include changes in hydrology of wetlands, development of habitat, and invasive species (NatureServe 2020). Site protection of critical habitat in Pennsylvania is important to prevent this plant from being extirpated from the Commonwealth.

Clasping-leaved St. John's-wort has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). Globally, NatureServe has assigned it a rank of G4, or apparently secure because worldwide it is uncommon but not rare; and there are some long-term concerns due to declines or other factors (NatureServe 2020). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be reclassified as Pennsylvania Endangered.

The Department has reviewed all information and made the determination that clasping-leaved St. John's-wort should be reclassified from Pennsylvania Extirpated to Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants since it was rediscovered in this commonwealth.

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## Lance-Leaved Loosestrife (*Lysimachia hybrida* Michx.)

**Current Status: Not listed**
**Proposed Status: Pennsylvania Endangered**


Lance-leaved loosestrife, Photo: Kelly Sitch, PA DCNR

The Department of Conservation and Natural Resources proposes adding lance-leaved loosestrife to the classification of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This is a species at risk of extirpation from the commonwealth if critical habitat is not maintained.

Lance-leaved loosestrife is a member of the Myrsine Family (Myrsinaceae). It is an upright perennial plant that can grow to approximately 5 feet tall with opposite, narrow, lance-shaped leaves. Bright yellow flowers grow from the top of the plant as well as at the top-most intersections of leaves and stem. This species typically flowers from June to August, growing in wetlands including swamps, fens, wet meadows and pond margins (Rhoads & Block 2007).

In North America, the range of this species includes most of the eastern United States and Canada, with the majority of populations in the upper Mississippi Valley in Midwestern states. Scattered populations are found along the Appalachian Mountains and the Mid-Atlantic coast (Kartesz 2015). In the United States, lance-leaved loosestrife is considered critically imperiled (S1, at very high risk of extirpation) in six states including Pennsylvania; imperiled (S2, at high risk of extirpation) in six states; vulnerable (S3, moderate risk) in three states; and apparently secure in four (S4, fairly low risk) (NatureServe 2020).

In Pennsylvania, lance-leaved loosestrife has been found in the southeastern and south-central portions of the commonwealth. Historically, approximately 30 populations of this species were known in 12 counties, many dating back to the early 1900s (Rhoads and Klein 1993). Botanical surveys of historic locations in the southeast are challenging, as records are often imprecise and the landscape heavily developed; those that have been conducted have been largely unsuccessful. Currently, there are only five populations known to exist in four counties: Fulton, Franklin, Cumberland and Bucks. The existing populations are small, with numbers of individuals ranging from 10 to 65 (PNHP 2020). Populations consisting of smaller numbers of individuals are more vulnerable to environmental changes or unexpected disturbances than populations with more individuals. Three of the five locations are found on protected lands, in state forest or other park land.

Lance-leaved loosestrife grows in wetland habitat, often in temporary ponds. Three of the populations were found at the edge of vernal ponds in mucky soil. The Bucks County population was found in an acidic, wet meadow with sandy soils. Historically, this species was also found in fens and floodplain forests. Habitat loss and degradation, particularly of wetland and seasonal pond habitat, deer browse, and encroachment of invasive plant species such as glossy buckthorn and Japanese stiltgrass are threats to lance-leaved loosestrife (PNHP 2020). Protection and restoration of wetlands, especially vernal ponds, can benefit this species. Vernal ponds may not be immediately identified as wetlands because they only have water in their depressions for part of the year and are dry during summer and fall. Control of invasive plant species and deer could also benefit this species.

Lance-leaved loosestrife has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that lance-leaved loosestrife should be added to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This decision is due to extremely few populations in the commonwealth making it a species that is in danger of extirpation from the Commonwealth.

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## Winged Loosestrife (*Lythrum alatum* Pursh)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Endangered**

Winged loosestrife, Photo: David Sarkozi (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes adding winged loosestrife to the classification of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is at risk of extirpation from the commonwealth.

Winged loosestrife is a member of Lythraceae (Loosestrife) Family which consists of perennial herbaceous plants that usually grow in wet or swampy habitat. It can grow up to 30 inches tall and has a four-angled stem with alternate leaves. The purple flowers are solitary and occur in the upper axils of the plant, from early July through September (Rhoads & Block 2007).

In North America, this species is found from New England south to Florida and Texas, and west to Montana (Kartesz 2015). It is considered critically imperiled (S1, at very high risk of extirpation) in three New England states, Maryland, and Wyoming; imperiled (S2, at high risk of extirpation) in Virginia and West Virginia (NatureServe 2020).

In Pennsylvania, this species was historically found in scattered locations from swamps, wet meadows, shorelines and ditches, mostly from the southeast (Rhoads and Klein 1993). The number of currently extant sites in the commonwealth has declined; from about 20 historic localities, we know of only one that remains extant. The single extant population is found in a Lehigh County wetland (PNHP 2020). Historical sites included low, open meadows, fields or low ground in Lehigh, Bucks, Chester, Allegheny, Delaware, and Montgomery counties; swamps or swampy soils in Allegheny and Bucks counties; a collection from Pine Grove Furnace in Cumberland County in the 1920s; Philadelphia City (PNHP 2020).

The most recent observation of the Lehigh County site consisted of two flowering stems of normal vigor over 1 square yard in 2005. Plants were growing on a flat slope with open light and inundated moisture. This population has declined since 1993, when approximately 80 stems were observed. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. This population has a fair estimated viability due to

the good to marginal habitat quality and presence of some threats such as invasive plants, particularly invasive cattails and reed canary grass, and human disturbances (PNHP 2020). When a plant species has so few populations, such as winged loosestrife, it is very vulnerable to disturbances and stochastic events such as flooding or habitat degradation.

This species has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that winged loosestrife should be added to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants, because of an extremely low number of populations in the commonwealth and decline in the number of populations in the last 50 years.

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## Large-Flowered Marshallia (*Marshallia grandiflora* Beadle & F.E. Boynton)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**

## Beautiful Barbara's-Buttons (*Marshallia pulchra* W.M.Knapp, D.B.Poind. & Weakley, Source: Weakley 2020)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**

Beautiful Barbara's-buttons, Photo: Jason Ryndock (CC BY-NC-SA 2.0, PA Natural Heritage Program Flickr)

The Department of Conservation and Natural Resources proposes to remove large-flowered marshallia (*Marshallia grandiflora*) from the list of Pennsylvania Endangered plants and add beautiful Barbara's-buttons (*Marshallia pulchra*) as Pennsylvania Endangered, within the regulation, Conservation of Pennsylvania Native Wild Plants. This does not represent a change in the status of the Barbara's-buttons/marshallia plants in Pennsylvania, but rather reflects that the name *Marshallia grandiflora* (large-flowered marshallia) has been determined to apply only to a narrow endemic and probably extinct species of North Carolina. A new name, *Marshallia pulchra* (beautiful Barbara's-buttons), has been published to encompass the remainder of the plants formerly treated as *M. grandiflora* (Knapp et al 2020). To avoid confusion, scientific names are included where necessary. This species account summarizes both decisions.

Beautiful Barbara's-Buttons Discussion (*Marshallia pulchra*, Not Listed, Proposed Pennsylvania Endangered)

Beautiful Barbara's-buttons (*Marshallia pulchra*) is a perennial member of the Aster Family (Asteraceae) with tufted stems and large pink flowering heads. It blooms from mid-June through mid-July and grows in high-energy river scour habitats (NatureServe 2020, Weakley 2020).

In Pennsylvania, beautiful Barbara's- buttons (*Marshallia pulchra*) is restricted to isolated small patches of habitat in the Youghiogheny River gorge. There are 16 populations of beautiful Barbara's buttons known currently. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. Of the 16 known extant populations of beautiful Barbara's-buttons, six have estimated viability of excellent, excellent-to-good, or good. These were all sites with larger populations and good quality habitat that is relatively

protected. Seven sites are considered to have good-to-fair or fair viabilities due to smaller populations, some visitor use or trampling, invasive plants or development disturbance in otherwise good habitat. Three sites have poor estimated viabilities because of small populations sizes, little room for expansion, recreation disturbance and invasive plants (PNHP 2020). It is also important to note that all populations are found in Fayette County along the Youghiogheny River. This concentration of populations makes the species as a whole more vulnerable in Pennsylvania. The Pennsylvania Natural Heritage Program is currently studying the habitat and population trends of the species, and preliminary data suggests that it has been undergoing severe decline.

Large-Flowered Marshallia Discussion (*Marshallia grandiflora*, Pennsylvania Endangered, Proposed Delist)

Large flowered marshallia (*Marshallia grandiflora*), as currently understood (excluding *M. pulchra*) has never been documented in Pennsylvania and almost certainly never will be. This species is found only in North Carolina, and is likely extirpated. True habitat for large-flowered marshallia is uncertain because the name was incorrectly attributed to populations of the other species, but it is thought that the habitat for large-flowered marshallia is possibly the border of swamps. Because the plants formerly treated under that name are proposed to be listed as Pennsylvania Endangered under the name beautiful Barbara's-buttons (*Marshallia pulchra*), the Department proposes removing the name large-flowering marshallia (*Marshallia grandiflora*) from the list of regulated plant species in Pennsylvania.

Summary

Beautiful Barbara's buttons (*Marshallia pulchra*) has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). This species is also a globally vulnerable plant (G3, at moderate risk of extirpation), which makes its populations in Pennsylvania significant to the conservation of the species worldwide. Large-flowering marshallia (*Marshallia grandiflora*) has no state rank in Pennsylvania since it is not found here. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that beautiful Barbara's buttons (*Marshallia pulchra*) be listed as endangered and large-flowering marshallia (*Marshallia grandiflora*) be removed since it does not exist in Pennsylvania.

The Department has reviewed all information and made the determination that large-flowered marshallia should be delisted and that beautiful Barbara's buttons should be added to the list of Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Hoary Willow (*Salix candida* Flüggé ex Willd.)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**


Hoary willow, Photo: Gwyneth Govers (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes reclassifying hoary willow from Pennsylvania Threatened to Pennsylvania Endangered, within the regulation Conservation of Pennsylvania Native Wild Plants. With very few populations of this plant known in Pennsylvania, this species is in danger of extinction throughout the commonwealth if critical habitat is not maintained.

Hoary willow is a shrub in the Willow Family (Salicaceae) that grows in wet meadows and fens on calcareous soils. This plant can grow to about one meter tall and has distinctive, lance-shaped leaves with whitish hairy undersides, giving rise to its name (Rhoads and Block 2007).

In North America, hoary willow is found in the northern part of the United States, including New England, the Great Lake States, and several states west of the Rocky Mountains. Its range extends south to Pennsylvania, Illinois, and Colorado, and north to parts of Alaska and southern Canada (Kartesz 2015, NatureServe 2020). It is ranked as critically imperiled (S1, at very high risk of extirpation) in four states including Pennsylvania; imperiled (S2, at high risk of extirpation) in six states; vulnerable (S3, at moderate risk of extirpation) in five states in its U.S. range (NatureServe 2020). Pennsylvania is at the southern limit of the species' range.

In Pennsylvania, hoary willow is found in the northeastern and northwestern parts of the commonwealth. Currently there are two populations found in Monroe and Northampton counties. Recent botanical surveys have documented fewer populations of hoary willow in Pennsylvania than were once known. Seven populations were historically known from Erie, Lehigh, Northampton, Huntingdon, and Monroe counties, some dating back to 1916 (PNHP 2020). Targeted field work attempted to re-locate these historically documented populations. Of these seven records, only two populations have been documented as still existing; no new populations have been identified despite searching in appropriate habitat.

Botanists estimate the viability of each population based on size, number of reproducing members, threats, and other criteria, ranging from "excellent" to "poor." The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. The most

viable hoary willow population in Pennsylvania is in Northampton County and is estimated to have a good or fair viability, growing in a degraded but recovering calcareous wetland that is dominated by native and exotic plants with patches of shrubs or small trees. This population is small with few individuals but located on protected habitat. The other known occurrence of hoary willow has a fair estimated viability and grows in a poorly drained calcareous wetland in Monroe County. Threats to these two sites include flooding by beavers, invasive plants, and earth disturbing activities (PNHP 2020).

The other populations are either extirpated (no longer existing) or may be extirpated. The populations that were searched for but not found for at least 20 years, include a site from Lehigh County described as a being surrounded by suburbs and agricultural fields, and a site in Monroe County in marshy ground along a streamlet. Historical populations, represented from herbarium specimens, are also known from the following: Huntingdon County; an Erie County park dated 1916; a shrub fen from Northampton County last seen in 1957 and is now likely extirpated (PNHP 2020). Hoary willow is distinctive with its silvery-hairy leaves and would be observed by botanists visiting these or other potential habitats. The fen or wet calcareous meadow habitat that hoary willow utilizes is rare in Pennsylvania, which contributes to the rarity of this species. Invasive species and hydrological modification are primary threats to this habitat, and to populations of hoary willow. Protection of wetlands from these and other threats, particularly fens and calcareous wet meadows in Northampton and Monroe counties, could benefit this species in Pennsylvania and contribute to its recovery.

Hoary willow has received a state rank of S1 (critically imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that hoary willow should be reclassified from Pennsylvania Threatened to Pennsylvania Endangered, due to very few populations and rare habitat making it vulnerable to extirpation from Pennsylvania.

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## Dwarf Spiraea (*Spiraea betulifolia* Pallas var. *corymbosa* (Raf.) Maxim.; name change to: *Spiraea corymbosa* Rafinesque, Source: Weakley 2020)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Endangered**


Dwarf spiraea, Photo: PNHP (CC BY-NC-SA 2.0)

The Department of Conservation and Natural Resources proposes reclassifying dwarf spiraea from Pennsylvania Threatened to Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. Dwarf spiraea has declined in the commonwealth and is in danger of extirpation. The Department is also updating the scientific name of dwarf spiraea.

Dwarf spiraea is a perennial shrub member of the Rose Family (Rosaceae) with few branches that grows to about three feet tall. It grows in dry upland and woodland slopes, and steep shale hillsides. This plant has coarse, toothed, oval leaves with whitish to pink flowers that form dense clumps that occur in June (Rhoads and Block 2007).

In North America, dwarf spiraea is found in the Mid-Atlantic states from Pennsylvania through Virginia and Ontario, Canada. It is considered critically imperiled (S1, at high risk of extirpation) in Pennsylvania and North Carolina, and vulnerable (S3, at moderate risk) in Maryland and West Virginia (NatureServe 2020). It is considered a southern and central Appalachian endemic by Weakley (2020). In Pennsylvania, this species occurs in the Ridge and Valley region of Pennsylvania, in lightly wooded areas, dry upland or steep sites (Lis, FNA).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria, from “excellent” to “poor.” The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the plant has. A species that has few populations, with low estimates of viability, has a lower chance at persistence in the Commonwealth and a higher chance of extirpation from the Commonwealth. There are four populations of dwarf spiraea found in Pennsylvania Bedford and Fulton counties; two are estimated to have a fair viability, and two are only documented as extant with no estimation of viability. One of the populations with an estimated fair viability is found in Fulton County in a somewhat dry ravine between two steep shale barren slopes. This rank was assigned because of the small size and stature of the plants; however, the landscape setting is intact and protected. The other population with fair estimated

viability is found in Bedford County in open herbaceous, bank with some shrubs. This site is less secure with a smaller number of individuals making up the population and is being invaded by Japanese stiltgrass. The two unranked sites are found in Fulton County, in a tulip tree-beech-maple forest and a steep shale cliff where erosion, logging, and invasive species are threats (PNHP 2020).

Dwarf spiraea prefers somewhat open woods and does not thrive in a closed-canopy forest setting. Maintaining existing habitat is critical for this species' survival. Forestry practices such as selective thinning and prescribe fire to keep a somewhat open canopy and help prevent competition could benefit this species. Protecting the existing populations to allow them to reproduce is also important to maintaining the genetic diversity of species.

The Department also proposes changing the scientific name from "*Spiraea betulifolia* Pallas var. *corymbosa* (Raf.) Maxim." to "*Spiraea corymbosa* Rafinesque" in line with current taxonomic treatments (Lis in FNA, Weakley 2020). Scientific names are changed by taxonomists periodically, and the Department strives to use the most accurate information available. Since the standard reference, *Plants of Pennsylvania vol. 2* (Rhoads and Block 2007) does not include this scientific name, the Department refers to the alternate reference manual, *Flora of the Southeastern United States*. Technically, the scientific name *Spiraea betulifolia* Pallas var. *corymbosa* (Raf.) Maxim. will be delisted from the Pennsylvania Threatened species list, and *Spiraea corymbosa* Rafinesque will be added to the Pennsylvania Endangered species list, however they both refer to the same taxon, dwarf spiraea.

This species has received a state rank of S1 (Critically Imperiled) from Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as endangered.

The Department has reviewed all information and made the determination that dwarf spiraea should be added to the list of endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants, due to the few populations in a limited geographical range in south central Pennsylvania.

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## Running Buffalo Clover (*Trifolium stoloniferum* Eaton, Source: Weakley 2020)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**

Running buffalo clover, Photo by U.S. FWS, Sarena Selbo (public domain)

The Department of Conservation and Natural Resources proposes to add running buffalo clover to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Running buffalo clover has very few populations and may become extirpated in Pennsylvania if critical habitat is not maintained.

Running buffalo clover is a member of the Pea or Legume Family (Fabaceae). This clover species features white flowers on distinct stems and horizontal stems along the ground called stolons or runners. Flowers appear at the tip of upright branches with short-stalked leaves on opposite sides. Running buffalo clover grows in dry upland woodlands and prairies and blooms from May through August (Weakley 2020).

In North America, running buffalo clover is found in eight states in the southern portion of the Midwest from Kansas east to Ohio, West Virginia and Pennsylvania, and south to Arkansas (Kartesz 2015; NatureServe 2020). Running buffalo clover is of conservation concern in all states in which it occurs. It has received state rankings as critically imperiled (S1, at very high risk of extirpation) in Pennsylvania, Indiana and Missouri; imperiled (S2, at high risk of extirpation) in Kentucky; vulnerable (S3, at moderate risk) in West Virginia and Ohio; and possibly extirpated in Arkansas and Kansas (NatureServe 2020).

In Pennsylvania, running buffalo clover is a recent discovery. Although it has been known for decades from Ohio and West Virginia, including the northern panhandle adjacent to Pennsylvania, it was first discovered in Pennsylvania in 2017, and there are five populations known in the state. It has been found in the extreme southwest portion of Pennsylvania, in Fayette, Greene and Washington counties (PNHP 2020).

Pennsylvania's conservation of this species is important nation-wide. Running buffalo clover is a globally rare species that is currently classified as Endangered under the federal Endangered Species Act. The U.S. Fish and Wildlife Service is evaluating available data to determine whether it meets the criteria for downgrading to Threatened or removal from the list of Threatened and Endangered plants.

Pennsylvania Natural Heritage Program has provided information to the U.S. Fish and Wildlife Service regarding this species' status review. However, even if it is federally downgraded or delisted, it will still remain of global conservation concern due to a limited global geographic range (six states in the southern Midwest to Pennsylvania), a limited number of known global populations (about 160), and ongoing threats to the future viability of populations. Small population sizes, affinity for early successional habitat, and invasive species are threats to running buffalo clover throughout its range.

Running buffalo clover requires filtered sunlight, tolerant of neither full sun nor full shade, and moderate disturbance, as described in USFWS 2017 five-year review: "For sites near streams that are exposed to periodic flooding and high flows, this disturbance may occur naturally. For other sites, grazing or other human-induced disturbance may be appropriate." The five-year review also mentions the benefits of low to moderate levels of grazing.

The primary threats to running buffalo clover throughout its range are habitat destruction, habitat alteration through succession/lack of appropriate disturbance, and displacement by invasive plant species. As a low-growing, light-loving species, it is particularly vulnerable to being out-competed by invasive shrubs and Japanese stiltgrass, both of which are pervasive in its habitats. In general, monitoring has shown that where sites are actively managed to create appropriate disturbance and successional stage for running buffalo clover and control invasive species, the populations can remain steady and even increase. However, when sites do not receive active management, populations generally decline over time. Concern is also heightened because most efforts at transplantation have failed to persist more than a year or so. USFWS notes that inadequate seed dispersal and poor seed quality are also threats to viability, and that "climate change is a new and serious threat to this species" (USFWS 2017).

Pennsylvania's populations are experiencing the same threats as those elsewhere range wide including small population sizes, succession and invasive species. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. Of the five known Pennsylvania populations, one has good estimated viability, one has fair estimated viability and three have not had viability estimated. One population in Fayette County has been assigned a "good" rank of viability and currently has low invasive species presence. It consists of 50-100 plants located along a park trail situated in an abandoned agricultural area which is now an early successional woodland. Invasive species including Japanese stiltgrass is a threat to this population. The population in Greene County ranked as "fair" viability has 50-120 individuals and is growing in a partially

shaded floodplain near a limestone gravel road where the plants get mowed regularly. This sort of disturbance seems to mimic historic disturbance regimes that provided habitat for this species, however direct threats of road maintenance and changes in mowing regimen exist. Also, Japanese stiltgrass was so dense when the population was first discovered, it was very difficult to locate the clover plants. Hand pulling of Japanese stiltgrass twice per year has kept this invasive species in check, but if that management is not continued, the future of the clover will likely not survive for very many years, as Japanese stiltgrass is abundant in the vicinity. Viability ranks have not yet been assigned at the remaining three populations in Washington County; one is a small population with 1-10 individuals, one has incomplete population data, and one is part of a population that extends into West Virginia that may number in total 100-200 individuals. They are in areas with histories of anthropogenic disturbances including logging and other threats such as deer browse and invasive plant species. One site is a mature hardwood forest which may be overshading the running buffalo clover (PNHP 2020). Studies have not been done to assess genetic diversity across the range of the species, but some work has shown that even small populations can have fairly high genetic diversity, so these small populations should not be discounted due to an assumption that severe inbreeding effects would be present (USFWS 2017).

Running buffalo clover has received a state rank of critically imperiled (S1) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended this plant be listed as endangered.

The Department has reviewed all available information and made the determination that running buffalo clover should be added to the list of Pennsylvania Endangered plants due to the very limited number of populations known in Pennsylvania, their fairly small sizes, the global conservation concern for this species, and the ongoing threats to its future viability.

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## Wedge-Leaved Violet (*Viola glaberrima* (Gingins) H. House, Source: Weakley 2020)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Endangered**

Wedge-leaved violet, Photo: Bonnie Isaac (Carnegie Museum of Natural History, used with permission)

Three-parted violet, Photo: Susan Harper (CC BY-NC 4.0, iNaturalist)

## Three-Parted Violet (*Viola tripartita* Elliott)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**

This species account addresses two violets with related recent taxonomic updates and the corresponding changes in their conservation status ranks. The Department of Conservation and Natural Resources proposes adding wedge-leaved violet to the classification of Pennsylvania Endangered, and removing three-parted violet from the classification of Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants. Wedge-leaved violet is a plant that is likely to become extirpated from the commonwealth because of extremely few populations. The Department also proposes to update the name to the correct taxonomic treatment. The name previously attributed to this taxon, three-parted violet, is not found in Pennsylvania.

Wedge-leaved violet is a member of the Violet Family (Violaceae) that arises from one long stem growing from a thick rhizome. The leaves are simple with wedge shaped bases; the leaves and stems have sparse, easily-visible hairs. The flowers bloom in March through May and are yellow with a purple tinge on the back side and bearded lateral petals. This violet produces two types of flowers: flowers that open and get pollinated to produce fruits in April through June, and flowers which never open but self-pollinate and produce fruits in July through September. Habitat includes rich, moist forests on lower slopes and bottomlands, often over calcareous substrate (Weakley 2020). This species blooms for a short period of time and is very distinct, being the only violet with single stems, wedge-shaped leaves and yellow petals with purple on the back. The habitat is similar to other common violets, which may be co-located with wedge-leaved violet.

In North America, wedge-leaved violet ranges from southwest Pennsylvania to southeast Ohio, south to western and central North Carolina and eastern Kentucky, with a disconnected population in

northern Georgia (Ballard 2020). Pennsylvania is wedge-leaved violet's northernmost extent, confined to the western Appalachian Plateau in Fayette, Somerset, Indiana and Westmorland counties (Ballard 2020). A historic specimen was also confirmed by Ballard from Franklin County.

Wedge-leaved violet was formerly treated as a variety of three-parted violet, as *Viola tripartita* var. *glaberrima* (Rhoads and Block 2007). It was originally listed as three-parted violet (*Viola tripartita*) and classified as Tentatively Undetermined because it was deemed a species that may be a species in decline but it could not be combined in any other classification. One reason for listing as Tentatively Undetermined was because there were taxonomic uncertainties regarding this species, which has only recently been clarified. A group of three violets, referred to as the *Viola tripartita* species complex, share a number of characteristics and can be confused with each other. Historically, they had been considered "intermodal," existing along a spectrum of morphological characteristics from one species to another. Until more accurate mapping and empirical studies of this group was conducted, they continued to be misinterpreted. However, Ballard states that based on new research and unpublished data (at the time of writing), the *Viola tripartita* complex was not intermodal and that there are three distinct species with separate populations but overlapping ranges (2020). The range of *Viola glaberrima* reaches from the southern states just north into Pennsylvania's southwestern counties of Fayette, Somerset, Indiana and Westmoreland. *Viola tripartita* is found mostly in the western Carolinas and Georgia, with an outlier in southern Ohio, growing on moist slopes and bottomlands, especially over mafic or calcareous rocks and is not in Pennsylvania. In its range, *Viola tripartita* blooms in late March through May. The third species in the complex, *Viola tenuipes,* is found in the Carolinas, Georgia and Louisiana and not in Pennsylvania. According to this information, the taxon previously referred to as *Viola tripartita* in Pennsylvania (the species originally listed by the Department as Tentatively Undetermined) is more accurately identified as *Viola glaberrima* (wedge-leaved violet).

In addition to taxonomic uncertainties, the Department was unsure if this species was present in the Commonwealth, or if it had been extirpated. At the time of original listing, wedge-leaved violet (then referred to as three-parted violet, *Viola tripartita*) was represented by six historic herbarium specimen collections from Westmoreland, Fayette, and Franklin counties, and was presumed to be extirpated. This plant had not been seen since the 1920s. Special surveys were undertaken by botanists from Carnegie Museum to search for this species where it was collected previously and search in other, likely habitats. The botanists were also studying phenological changes in flowering and fruiting time, compared to historically documented times, as a potential consequence of climate change, as commissioned by the Department through the Wild Resource Conservation Program. Plants may flower

or fruit earlier than previously documented because of changes in environmental cues, such as temperature, sunlight intensity, or periods without snowpack. The botanists were out early that spring and identified wedge-leaved violet at a state park in Indiana County, a new record for the plant. This identification was verified by *Viola* expert, Dr. Harvey Ballard (Isaac 2020, Ballard 2020). This identification has confirmed two things: verified that this plant is extant in Pennsylvania and clarified that it is most correctly termed wedge-leaved violet (*Viola glaberrima*).

Wedge-leaved violet has received a state rank of S1 (Critically Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this species be listed as Pennsylvania Endangered.

The Department has reviewed all information and made the determination that wedge-leaved violet should be added to the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants, due to the extreme rarity in Pennsylvania.

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# Plant Species Being Added or Moved to the Pennsylvania Threatened Classification

## Small-Leaved White-Snakeroot (*Ageratina aromatica* (L.) Spach (Synonym: *Eupatorium aromaticum*))

**Current Status: Not listed**
**Proposed Status: Pennsylvania Threatened**

Small-leaved white-snakeroot, Photo: H. Zell (CC BY-SA 3.0, Wikimedia Commons)

The Department of Conservation and Natural Resources proposes to add small-leaved white-snakeroot to the classification of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. A synonym for this species is *Eupatorium aromaticum*. This species has experienced declines in populations due to habitat loss and may become endangered within the commonwealth if habitat is not maintained.

Small-leaved white-snakeroot is a member of the Aster Family (Asteraceae) which are herbaceous plants with compound flowering heads. This species has fuzzy stems about three feet tall and thick leaves. The compound flowering head is made up of numerous small white florets that bloom from August to October (Rhoads and Block 2007). This plant is found on dry, often sandy, low-nutrient soils and open sites, whereas the more common white snakeroot, *Ageratina altissima*, is found on moist wooded sites (Block and McPherson 2017).

Small-leaved white-snakeroot is distributed in the eastern United States, ranging from New York and Massachusetts in New England, south through the mid-Atlantic to Florida, and as far west as Ohio and Louisiana. It appears to be most abundant in the Carolinas and Virginia (Kartesz 2015). It is considered a conservation concern in the northern edge of its range in New England to West Virginia and Ohio (NatureServe 2020).

In Pennsylvania, all extant populations of small-leaved white-snakeroot are found on serpentine barrens in the southeastern portion of the commonwealth. In the past, approximately 23 populations altogether ranged across Pennsylvania, most concentrated in the southeast. Currently, there are seven known extant sites in Pennsylvania. Three of these known sites are small with population sizes of 50 individuals or fewer. Having fewer individuals in a population increases vulnerability to disease or stochastic events that destroy local habitat. Three other populations are fairly secure with several hundred to thousands of individuals (Block and McPherson 2017).

Many historic locations have been resurveyed for small-leaved white-snakeroot but without success. Some historic locations were excluded from re-surveying because they no longer have suitable habitat. This was due to habitat conversion to other uses such as development and natural progression from an open to a more wooded habitat. Small-leaved white-snakeroot is a species that specializes in early successional habitat, or open areas without much woody competition or shade. While this species historically may have been found more broadly, it is now limited to serpentine habitats (Block and McPherson 2017).

The primary threat to small-leaved white-snakeroot is the loss in open habitat, due to woody plant succession. Closely related to succession is competition with other vegetation, including invasive plants. There is also a limited amount of serpentine barrens habitat in Pennsylvania. Most serpentine sites are protected in Pennsylvania and many of them receive active management by conservation groups or organizations to maintain open habitat. This should encourage survival of small-leaved white-snakeroot at these sites (Block and McPherson 2017).

Small-leaved white-snakeroot has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this species be listed as Pennsylvania Threatened. These findings are supported by research commissioned in 2013 through the Wild Resource Conservation Program. Researchers reviewed and analyzed known historical records for this plant (Block and McPherson 2017).

The Department has reviewed all information and made the determination that small-leaved white-snakeroot should be added to the classification of threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants due to its scarcity of populations in the Commonwealth.

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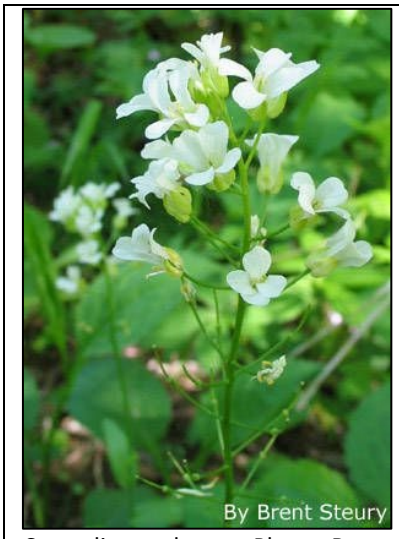
## Spreading Rockcress (*Arabis patens* Sull.)

**Current Status: Not listed**
**Proposed Status: Pennsylvania Threatened**



Spreading rockcress, Photo: Brent Steury. (Orrell T (2020). NMNH, Smithsonian Institution)

The Department of Conservation and Natural Resources proposes to add spreading rockcress to the classification of Pennsylvania Threatened plants in the regulation, Conservation of Pennsylvania Native Wild Plants. Spreading rockcress may become endangered in Pennsylvania if critical habitat is not maintained.

Spreading rockcress is a member of the Cabbage Family (Brassicaceae) whose flowers are characterized by a cross-like arrangement. Spreading rockcress takes two years to mature and produce white flowers from April to July in moist, rocky woods (Rhoads & Block 2007).

This plant can be found from southwestern Mississippi, north to Ohio and eastward to Pennsylvania and North Carolina (Kartesz 2015). It has a limited range, primarily in the Appalachian Mountains; and there are less than 100 populations worldwide. It is considered rare in each state in which it has been analyzed. Spreading rockcress has been evaluated by NatureServe, an international network of natural heritage programs, and has been ranked as globally vulnerable (G3), meaning it is at moderate risk of extinction worldwide. This is due to its fairly restricted global range, relatively few populations, and threats to its long-term viability (NatureServe 2020). Pennsylvania's populations are important to this species' viability, worldwide.

In Pennsylvania, historically, approximately 23 populations of spreading rockcress were known (Rhoads and Klein 1993). There are currently 10 populations found south-central Pennsylvania. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Of the currently known extant populations, two are estimated to have excellent-to-good viability. These populations are in Bedford County on a steeply sloping bluff threatened with invasive plants; and another in Franklin County, also on a bluff formation. Two spreading rockcress populations have good estimated viability, found in Blair and Franklin, also on limestone outcrops. One population has good-to-fair viability, in Bedford. Two populations have fair viability estimates in Huntingdon and Bedford counties. Two populations have fair-to-poor viability in

Chester and Franklin counties (PNHP 2020). The populations were found on steep, rocky outcrops or bluffs.

While some of this rocky outcrop habitat is fairly inaccessible, and may keep the species somewhat protected, some are threatened by recreational activities (e.g., rock climbing) as well as natural disturbances such as riverbank scouring (NatureServe 2020). These populations are generally small (1-100 individuals) and are susceptible to disturbance and at risk to impacts from invasive species (PNHP 2020). Invasive plants area a common threat. They can be more detrimental in limestone communities because the native plants that grow in calcareous limestone habitats often grow nowhere else (WPC 2019). When invasive plants invade critical habitat, native rare plants are displaced and cannot relocate to other habitat types. The fact that Pennsylvania harbors this globally vulnerable plant is significant. Pennsylvania's populations represent the northernmost limit of spreading rockcress. Protection and conservation of its habitat, in the form of preventing disturbance to rocky limestone outcrops and invasive plant removal would improve the viability of this spreading rockcress worldwide.

Spreading rockcress has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), due to steep declines. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as threatened.

The Department has reviewed all information and made the determination that spreading rockcress should be added to the list of threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Whorled Milkweed (*Asclepias verticillata* L.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Threatened**

Whorled milkweed, Photo: George F Mayfield (CC BY-SA 2.0, Wikimedia Commons)

The Department of Conservation and Natural Resources proposes to add whorled milkweed to the list of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This plant is in danger of becoming endangered in Pennsylvania due to loss of habitat.

Whorled milkweed is a member of the Dogbane Family (Apocynaceae), comprised of herbaceous plants with milky sap. This species is characterized by clusters of white or greenish flowers and narrow leaves arranged in a whorl around a slender stem. The seeds have tufts of silky filaments to aid in dispersal on the wind. Habitat includes dry rocky, sandy soils or barrens; it flowers July through August (Rhoads and Block 2007).

Whorled milkweed ranges from southcentral Canada south through most of United States, east of the Rockies. It is most common in the Midwest (Kartesz 2015). It is of conservation concern in many Mid-Atlantic and New England states (NatureServe 2020).

In Pennsylvania, whorled milkweed is found in the eastern and central/southcentral regions. There are currently 10 known extant populations in Pennsylvania, most which are found on serpentine barrens (PNHP 2020). Historically, there were 50 - 100 locations known, based on preserved herbarium specimens from the 1800s and 1900s. Most of these collections were from Chester, Delaware and Lancaster counties, in locations that have experienced succession and development over the last 100 years. It is unlikely that these historical locations support habitat that is suitable for the species now (Kunsman 2017). A small number of additional populations were known from calcareous grasslands and shale barrens in the central part of the commonwealth, which have also changed greatly due to succession. The loss of suitable habitat is a threat to this species.

Whorled milkweed occurs in well-drained, sunny locations, on mineral-rich substrates, particularly serpentine grasslands. In non-serpentine habitats, the species is found on limestone and diabase glades, shale barrens, open woodlands, prairies and rock outcroppings. Occasionally, whorled milkweed will occur in human-influenced habitats including pastures on calcareous substrates. It is not found on acidic soils. The largest populations of whorled milkweed are found in actively managed

serpentine barrens or grasslands; these populations are robust and viable. There are smaller populations in areas with less active management (Kunsman 2017). These smaller populations can be at risk of local extirpation due to changes in the environment and lack of connectivity between the smaller populations.

A major threat to this species is encroachment of woody vegetation into the open habitat it requires due to succession. Succession is the progression of an open habitat, such as a grassy field, toward a mature forest. While succession is a natural process, it can reduce or eliminate suitable habitat for species like whorled milkweed. Invasive plants can also reduce available habitat for this species. Another threat is loss of habitat due to development. Active management of extant populations including removal of woody vegetation and invasive plants, and protection of extant locations, would benefit whorled milkweed (Kunsman 2017).

Whorled milkweed has received a state rank of S2 (Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as threatened.

The Department has reviewed all information and made the determination that whorled milkweed should be added to the list of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is likely to become endangered from the Commonwealth if critical habitat is not maintained.

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## Kalm's Brome (*Bromus kalmii* A.Gray)

**Current Status: Not listed**
**Proposed Status: Pennsylvania Threatened**

Kalm's brome, Photo: Jessica McPherson, Western Pennsylvania Conservancy/PNHP (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes to add Kalm's brome to the classification of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is also called by the common name prairie brome grass. This species has experienced declines in populations due to habitat loss and may become endangered within the commonwealth if habitat is not maintained.

Kalm's brome is a member of the Grass Family (Poaceae) which consists of herbaceous plants usually with hollow stems and flat-bladed leaves. This perennial grass has slender unbranched stems with three to five alternate leaves; it flowers from June through July. General habitat of Kalm's brome includes rocky wooded slopes and dry to moist, wooded areas (Rhoads & Block, 2007). More specifically, survey records indicate this species is frequently found in open, dry barrens and prairie, and is often associated with limestone bedrock (PNHP 2020).

In North America, Kalm's brome range includes much of southern Canada and the northeastern half of the United States, and stretches as far south as Virginia (Kartesz 2015). It is considered historic in Maryland, New Hampshire and the District of Columbia. It is considered rare in Maine, New Jersey, Ohio, Vermont and Virginia and appears to be secure in New York and West Virginia (NatureServe 2020).

Historically, approximately 27 populations of Kalm's brome were known in 14 counties spread throughout Pennsylvania, including central, western, northeastern and southeastern portions of the commonwealth. This distribution roughly followed the Ridge and Valley ecoregional province, where limestone rock and thin soils are frequent in the landscape. Currently, there are approximately 12 existing populations in nine counties, in habitats such as limestone outcrops, open grasslands, and scrub oak barrens where there is some calcareous influence (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Only one of these populations, in Centre County, has been estimated to have a good-to-fair viability. This population benefits from the control of woody

vegetation that occurs on a nearby right-of-way. However, management can be a threat to Kalm's brome as well, if mowing or herbicide takes place before the plant sets seed. Two populations have a poor estimated viability, in Adams and Huntingdon counties, threatened by succession (encroachment of woody vegetation) and invasive plants. The remaining populations also face threats of succession, invasive plants, and habitat loss (PNHP 2020).

The range of this species in Pennsylvania has decreased and is now limited to the southcentral and eastern portion of the commonwealth (PNHP 2020). Kalm's brome is a prairie remnant species, meaning it utilizes a type of prairie habitat that developed over a very long timescale and was more extensive in Pennsylvania prior to European settlement than today. Although never common, this habitat type has declined greatly in availability and quality across Pennsylvania over the last 100 years; there may be less than one hectare of dry limestone prairie remaining in the Pennsylvania (Laughlin & Uhl 2003). Prairies and grasslands require frequent disturbance, often in the form of fire, to maintain their existence. In the absence of periodic disturbance, succession occurs. This natural progression towards a forested state makes the habitat unsuitable for prairie species. This is one reason why Kalm's brome is declining in Pennsylvania. Habitat conversion often from development is another reason why this species is rare.

This species has received a state rank of S2 (Imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this species be listed as Pennsylvania Threatened.

The Department has reviewed all information and made the determination that Kalm's brome should be added to the classification of threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants due to its scarcity of populations in the Commonwealth.

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## Collins' Sedge (*Carex collinsii* Nutt.)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Pennsylvania Threatened**

Collins' sedge, Photo: Rocky Gleason, Western Pennsylvania Conservancy/Pennsylvania Natural Heritage Program (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes reclassifying Collins' sedge from Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants, to Pennsylvania Threatened. Recent botanical surveys have discovered additional populations of Collins' sedge within the Commonwealth, so this species now appears to be at lower risk of becoming extirpated from Pennsylvania.

Collins' sedge is a member of the Sedge Family (Cyperaceae), which are herbaceous plants usually with three-angled stems and linear leaves. This plant is best identified in the summer, when the distinctively long, slender fruits are mature (Rhoads and Block 2007, PNHP 2020).

In North America, Collins' sedge is found along the eastern United States coastal plain, from Georgia north to New York, Rhode Island and Connecticut (Kartesz 2015). Collins' sedge has received a global status of G4 (Apparently Secure), indicating the species is uncommon but not rare worldwide, and that there is some cause for concern due to declines (NatureServe 2020). In Pennsylvania, it is found in the northeastern counties, especially in the Poconos region, and grows in acidic swamps and boggy woods and openings, where conifers are often a prominent part of the canopy cover (PNHP 2020).

Botanical field surveys have allowed the Department to better understand the distribution of Collins' sedge in Pennsylvania. While this species cannot be considered common, more populations of Collins' sedge have been discovered in northeastern Pennsylvania in the last 30 years. There are currently 18 known extant populations (PNHP 2020). Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Two of the 18 extant populations are considered to have excellent viability and suffer from minimal threats. These populations are located in a boreal conifer/red maple swamp in Monroe County and a sphagnum swamp woods Schuylkill County. Four populations are estimated to have excellent-to-good viability, with few identified threats, including a protected bog on a state park in Carbon County, green space in a Carbon County development, and a property managed for watershed protection in Schuylkill County. The

remaining 12 known populations' viability estimates range from excellent-to-good, to fair. Some threats at these locations include activities that may impact the watershed hydrology, such as development within the watersheds, beaver activity, and invasive plants (PNHP 2020). Additional protections for wetland areas and invasive plant management will benefit populations of Collins' sedge.

Collins' sedge has received a state rank of S2 (imperiled in Pennsylvania) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). This is because it is a species that is vulnerable to extirpation from the commonwealth because of a rarity due to very few populations (often 20 or fewer) or a restricted range. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as threatened.

The Department has reviewed all information and made the determination that Collins' sedge should be reclassified as threatened (removed from the list of endangered plants and added to the list of threatened) within the regulation, Conservation of Pennsylvania Native Wild Plants, due to the few populations in northeastern Pennsylvania.

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## Long's Sedge (*Carex longii* Mack.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Threatened**

Long's sedge, Photo: Forest & Kim Starr (Flickr, CC BY-2.0)

The Department of Conservation and Natural Resources proposes to reclassify this species from the list of Tentatively Undetermined plants to Pennsylvania Threatened within the regulation, Conservation of Pennsylvania Native Wild Plants. The small and infrequent populations of this species make it at risk of becoming endangered in the commonwealth.

Long's sedge is a member of the large and widespread Sedge Family (Cyperaceae) which is comprised of herbaceous plants usually with three-angled stems and linear leaves. Long's sedge has oblong fruits with triangular beaks and must be identified carefully because it closely resembles several other sedge species. The habitat of this species can be variable in terms of dryness, but generally is characterized by open situations with sandy substrates (Rhoads & Block 2007, PNHP 2020).

In North America, the range of Long's sedge extends along the eastern half of the United States, from Maine to Florida west to Texas and Wisconsin. It is rare or extirpated in many states in which it is reported (Kartesz 2015, NatureServe 2020). In Pennsylvania, it is found in the eastern half of the commonwealth (PNHP 2020). Historically, Long's sedge was known from 10 counties, the largest concentration being along the Delaware River in Bucks County. There are total of 20 historical populations. Currently, Long's sedge occurs in eight counties, in 15 populations in Pennsylvania, located in the eastern counties of Berks, Bucks, Chester, Lehigh, Luzerne, Monroe, Northumberland, and Schuylkill (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Taken altogether, this helps to describe the quality or persistence of the species statewide. Nine of the 15 extant populations have good-to-fair estimated viability or better. However, Long's sedge is a species that utilizes open, disturbed areas and will not persist in more wooded, closed canopy sites. The majority of populations are found on utility rights-of-way with varying degrees of moisture, where disturbance regimes, such as mowing, limit competing vegetation that keeps the habitat open and more suitable for Long's sedge persistence. Other healthy populations receive intentional management, such as prescribed burning. The most robust site is found on a protected property in Bucks County, in an open utility right-of-way through a coastal plain forest

remnant with estimated viability of excellent-to-good. One population in Monroe County with excellent-to-fair viability is found on mesic till barrens managed by prescribed burns, adjacent to suburban development. Only one population has been observed in Chester County, in a wet slough area at the edge of a raised railroad bed, is considered to have good-to-fair estimated viability (PNHP 2020).

Two populations have fair estimated viability: one in Luzerne County in a dry scrub oak-heath barren with periodic prescribed burning; and another in Schuylkill County in a scrubby hardwood forest and pitch pine-scrub oak barren in dry sandy soil. Two populations have a poor estimated viability in Northumberland and Lehigh County, both found in wooded areas near more open rights-of-way. Two populations, also found on powerline rights-of-way in Bucks and Lehigh Counties, have only been ranked as extant, with no viability estimate given (PNHP 2020).

Threats to Long's sedge in Pennsylvania include competition for resources by invasive plant species, over-browsing by deer, habitat succession, and development pressure (PNHP 2020). The current population trends indicate that Long's sedge may be declining and at risk of becoming endangered in the commonwealth without maintenance of its habitat. Habitat management to limit encroachment of woody vegetation is recommended through the use of prescribed burning, forestry practices including overstory thinning, invasive plant management, and protection of habitat through easements or other conservation tools will benefit Long's sedge.

Long's sedge has received a state rank of S2S3 (imperiled-to-vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as threatened.

The Department has reviewed all information and made the determination that Long's sedge should be reclassified as Pennsylvania Threatened from Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants, because relatively few small populations of this species are documented in the Commonwealth.

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## Eastern Paintbrush (*Castilleja coccinea* (L.) Spreng.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Threatened**

Eastern paintbrush, Photo: Jen Hamel (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to reclassify eastern paintbrush from the list of Tentatively Undetermined plants to Pennsylvania Threatened within the regulation, Conservation of Pennsylvania Native Wild Plants. Eastern paintbrush may become endangered in Pennsylvania if critical habitat is not maintained because of the limited number of extant sites and observed decline of some populations. The Department is also updating the common name to eastern paintbrush from "Indian" paintbrush.

Eastern paintbrush is an annual, and like all members of the Broom-rape Family (Orobachaceae), it is hemiparasitic; it derives nutrients from the roots of other plants. It is an upright plant that can grow up to 2 feet tall. The yellowish-green flowers are surrounded by a showy crimson-tipped bract, and bloom in April-June (Rhoads & Block 2007). Eastern paintbrush grows on moist to wet meadows, generally on limestone or diabase, or other acidic substrates (Block 2017).

In North America, eastern paintbrush's range includes much of the eastern portion of the United States and southern Canada, however its distribution is primarily in the Midwest plus the Appalachian Mountains (Kartesz 2015, Block 2017). It is considered a conservation concern in most states in which it has been analyzed. It is critically imperiled (S1, at very high risk of extirpation) in nine states in the northeast and Midwest; imperiled (S2, at high risk of extirpation) in Pennsylvania and South Carolina; vulnerable (S3, at moderate risk) in five states; and extirpated or presumed extirpated in six states in the eastern United States (NatureServe 2020).

In Pennsylvania historically, eastern paintbrush was found in the southern half of the commonwealth into Pike County in eastern Pennsylvania, although restricted to calcareous and diabase soil types and habitats. In 1993, there were over 80 populations known in over 20 counties (Rhoads and Klein 1993). Current distribution of the species is concentrated in southeastern Pennsylvania, with most known extant populations in Bucks and Montgomery counties. This is likely due to the intensity of recent botanical field work (Block 2017).

There are currently 15 verified extant populations of this species, and six populations that have not been found in recent surveys; there are also 21 historical and two extirpated or presumed extirpated populations. The population sizes range from very few individuals to several hundred per site and can fluctuate over years, owing to eastern paintbrush's hemiparasitic natural history. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. Of the 15 known extant populations, none have excellent estimated viability. Four have been estimated with a good viability; two with good-or-fair viability; six with fair viability; and one with poor viability, and two populations do not have estimates of viability.

The four eastern paintbrush populations with good estimated viability are found in Montgomery, Northampton, and Bucks counties. These sites all have large populations of hundreds of plants on relatively protected sites with periodic maintenance, management or mowing such as utility rights-of-way, other intentionally managed lands. They consist of moist meadows or seepages, with open light on diabase or calcareous substrates. The maintenance of these sites maintains the open situation eastern paintbrush requires, however too much, too little or ill-timed mowing may be a threat to these populations. Invasive exotic plant species (especially Japanese stiltgrass and common reed) are also threats. Two sites have good-or-fair estimated viability. One is found along a forested road in Fayette County that is overly shaded and the other is in an open wet meadow in Montgomery County that is subjected to deer pressure and lack of host plants. These sites may also be impacted by ill-timed management and/or too much disturbance. The six fairly viable populations are found in Bucks, Chester and Fayette counties in marginal to disturbed habitat some with very small numbers of individuals, also threatened by invasive plants. One site in Northampton County is estimated at poor viability, found in an open disturbed, swampy area with fill substrate that is threatened by cultivation and invasive plants. Two populations in Bucks and Lebanon counties are simply considered extant, and no estimate of the population viability has been made. Six sites in Northampton, Bucks and Montgomery counties have been unable to relocate during the last surveys despite searching, however they are not yet considered historic or extirpated. There are 21 historical populations, with a lack of information from the last 20-40 years or more to verify the continued existence of the site. Two populations are extirpated or possibly extirpated, where there is documented destruction of the habitat (PNHP 2020).

Not all populations are stable; some are in decline. There are active measures to manage habitat in some locations, such as mowing regimes in the "good" populations, and potentially prescribed fire on managed lands. Most locations in southeastern Pennsylvania have been well-documented over

time and re-visited within the last 10 years. Some have been destroyed while others have been placed under protection through purchase or easement (Block 2017). The factors that contribute to eastern paintbrush's rarity include the fact that it has an unusual life cycle as a hemiparasite, requires disturbance, is limited to acidic substrate soils, and has declined in population sizes over the years. These are reasons why this species may become endangered within the commonwealth if critical habitat is not maintained. Mowing during winter or after seeds have been set will be critical management for this species.

Threats to this species across its range include land-use changes, habitat fragmentation, invasive plant competition and succession. The absence of fire has also been identified as limiting reproduction in this species in the Southern Appalachian Region (NatureServe 2020). Eastern paintbrush is a plant of moist to wet meadows, generally on limestone or diabase, or other high pH substrates. Also, as a low-growing, shade-intolerant plant species, competition from taller vegetation is a primary threat.

Eastern paintbrush's life history may also contribute to its being rare. Annual hemiparasites, like some orchid species, are sometimes irregular in their cyclic appearance at some sites for reasons not well understood. As a hemiparasite, it obtains some of its nutrient and carbon requirements from host species. However, parasitic and hemiparasitic plant species are reported to play complex roles in some ecological systems (Bardgett, et al, 2006; Press and Phoenix, 2005), but the relationships between eastern paintbrush specifically and its host plants has not been examined (Block 2017). Improved habitat management, including prescribed fire, invasive and competition removal may benefit Eastern paintbrush.

This species has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as threatened.

The Department has reviewed all information and made the determination that eastern paintbrush should be reclassified from Tentatively Undetermined to the list of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Purple Bedstraw (*Galium latifolium* Michx.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Threatened**

Purple bedstraw, Photo: CDance (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes adding purple bedstraw to the list of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Purple bedstraw is a plant that may become endangered within the Commonwealth if critical habitat is not maintained.

Purple bedstraw is a perennial member of the Madder Family (Rubiaceae). Like all members of its genus (*Galium*), this species has leaves arranged in whorls around an angled stem. Purple bedstraw has lance-shaped leaves, purple flowers and unlike some of the more common bedstraws, does not have prickly hairs on the leaves. It flowers from June to July in woods, rocky slopes and along roadsides (Rhoads & Block 2007).

In North America, purple bedstraw is found in the southern Atlantic states from Pennsylvania south to Georgia and Alabama, Kentucky and Tennessee. It follows the Appalachian mountain range but also extends into some lower lands in South Carolina (Kartesz 2015). This species is considered vulnerable (S3, at moderate risk of extirpation) in Maryland (NatureServe 2020).

In Pennsylvania, purple bedstraw is found in the south-central portion of the commonwealth, often on shale-derived soils. There are 24 extant sites known, most within the Ridge and Valley physiographic province. Most of these populations consist of a small number of individuals. There are 23 historical records of this plant in locations where it is no longer present. Site descriptions of this species' habitat includes dry, rocky woods and roadsides; moist to dry forests in the mountains or piedmont; open forests in dry to slightly moist areas (PNHP 2020). Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Smaller populations are more at risk from random environmental changes that occur at the site. Purple bedstraw has a limited number of populations and individuals known in Pennsylvania. Five populations of purple bedstraw have good estimated viability, found in Bedford, Perry and Franklin counties. They are located in open mixed-hardwood forests, made up of healthy plants in good habitat often on public land that is unlikely to be disturbed. Six populations have good-to-fair estimated viability, located in Franklin, Fulton, Juniata and Bedford counties. There are additional threats at these sites such as

invasive plants, gypsy moth defoliation, deer browse or logging pressure; several of the sites are also on protected public land. One site in Bedford County has a fair estimated viability because of very small number of individuals (only one plant was observed) and the presence of invasive plants. Three sites in Fulton and Franklin counties have poor estimated viability, because of small numbers of plants occupying limited habitat. Nine sties have only been confirmed as extant and no estimate of viability has been made. Extant sites in (PNHP 2020).

In summary, this species occupies a moderately specialized habitat type within a limited range, the Appalachian Mountain section of the Ridge and Valley province. Threats to this species include invasive plant encroachment and displacement, possibly succession (progression of a young forest towards a more mature forest), deer browse and development pressure (PNHP 2020). Purple bedstraw is expected to be relatively stable under changing climate pressures. While the range of this species is not expected to change, smaller-scale changes at micro-sites may occur (PNHP 2018). Protecting this species from damaging levels of deer browse and controlling invasive plant species in its habitat should benefit purple bedstraw. This species has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using national NatureServe methodology because it has relatively few populations (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that purple bedstraw be listed as Pennsylvania Threatened.

The Department has reviewed all information and made the determination that purple bedstraw should be added to the list of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This is because of the low numbers of populations and the risk of this species becoming endangered from the commonwealth if critical habitat is not maintained.

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## Passion-Flower (*Passiflora lutea* L.)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Pennsylvania Threatened**


Passion-flower, Photo: Clayton Bownds (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to reclassify passion-flower from the list of Pennsylvania Endangered plants to the classification of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Passion-flower is more common than previously thought in the commonwealth, but could become endangered if critical habitat is not maintained.

Passion-flower is a member of the Passion-Flower Family (Passifloraceae), which is comprised of herbaceous perennial climbing vines with showy flowers. Passion-flower produces greenish-yellow flowers in July, which ripen into purple fruits, and is found in moist stream bank thickets (Rhoads & Block 2007).

In North America, passion-flower is found in the southeastern quarter of the United States, from Pennsylvania south through Florida and east to Kansas and Texas (Kartesz 2015). It is considered imperiled (S2, high risk of extirpation) in Kansas and Pennsylvania (NatureServe 2020). Pennsylvania is the northernmost state in its range. Passion-flower is found primarily in the southwestern counties of Greene, Washington, Allegheny, Westmoreland, and Fayette.

Targeted surveys in the region where passion-flower is known, particularly in southwestern Pennsylvania, have discovered more populations than were previously known. Conversely, the historical populations from eastern Pennsylvania, in Lancaster and York Counties along the Susquehanna River, have not been relocated in botanical surveys. This species has also been found in disturbed areas such as roadsides, mine spoil areas, and hedgerows along farm fields or pastures. However, most of the populations tend to be small (1-100 individuals) and this species is not common throughout the state and limited to the west (PNHP 2020).

There are 20 extant populations of passion-flower in Pennsylvania. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the plant has. Of the 20 known sites, none have excellent or good viability. Only one population is estimated at fair viability, two have fair-or-poor viability estimates and the rest are only

considered to be extant, with no estimate of their viability. The best population in Pennsylvania, with a fair viability, is found in Allegheny County on disturbed slopes overgrown with multiflora rose, overlooking the Monongahela River. Two less viable sites include one located in Westmoreland County that is threatened by trampling, cattle grazing and ATV usage and another in Washington County that consists of fewer than 10 plants that showed evidence of deer-browsing. There are 13 populations that have no estimated viability but are only considered extant (PNHP 2020). The Department has taken into account the fairly large number of populations of passion-flower coupled with the knowledge that those populations are small and often threatened. While the species can handle some disturbance, this is a plant that could become endangered in the commonwealth. This information has led the Department to decide to reclassify passion-flower as threatened.

This species has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as threatened.

The Department has reviewed all information and made the determination that passion-flower should be removed from the list of endangered plants and added to the list of threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Water-Plantain Spearwort (*Ranunculus ambigens* S. Wats.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Threatened**

Water-plantain spearwort, Photo: Scott Schuette, WPC PNHP (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to add water-plantain spearwort to the list of Pennsylvania Threatened plant species within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is in danger of becoming endangered in the commonwealth if critical habitat is not maintained.

Water-plantain spearwort is a member of the Buttercup Family (Ranunculaceae) and is an herbaceous perennial characterized by its lance-shaped, marginally-toothed leaves with elongate leaf stalks, solitary flowers with five yellow petals, tiny seed-like fruits, and wetland habitat. The shape, and often the length, of its leaves are distinctive and look quite unlike most of its buttercup relatives in which the leaves are divided into leaflets or lobed/incised segments (Schuette and Kunsman 2017). This obligate wetland plant grows in low wet ground, swamps and muddy ditches, flowering in May through August (Rhoads and Block 2006).

In North America, water-plantain spearwort's range includes most of the eastern United States and some Canadian provinces, centered in the Mid-Atlantic states west to the Mississippi and the Great Lakes states (Kartesz 2015). It has a conservation concern in nearly every state in which it has been analyzed. It has been ranked as critically imperiled (S1, at very high risk of extirpation) in New York, Connecticut, Ohio, Maryland, Delaware and Virginia; imperiled (S2, at high risk of extirpation) in Pennsylvania and New Jersey and vulnerable (S3, moderate risk of extirpation) in Kentucky. It is possibly or presumed extirpated from five states (NatureServe 2020).

In Pennsylvania, water-plantain spearwort is scattered throughout the commonwealth but is restricted to wetland habitats. Descriptions of habitat from herbarium records include: streambanks and margins, swamps, wet places, ditches, bogs, marshes, wet thickets, intermittent streamlets, wet woods, pools and ponds, woodland ponds, muddy shores and depressions, swales, low fields, wet pastures, sloughs, ditches, and bottomlands. Based on these descriptions, the species does not appear to be limited to certain types of wetlands. However, observations of the few extant populations suggest that this plant prefers to be in mucky soils in or near slow-moving water where there is some periodic fluctuation in water levels.

The Department commissioned research on this species through the Wild Resource Conservation Fund to review and analyze known historical records for this plant and survey extant locations. Based on the resulting information summarized in this document, the Department has determined the appropriate status for water-plantain spearwort is Pennsylvania Threatened.

Currently there are 10 extant locations in Pennsylvania, and all but one population have relatively small numbers (25 or fewer plants) of individuals. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. Of the 10 populations of water plantain-spearwort, one has been estimated at excellent-to-good viability, two at good estimated viability, one fair, one poor, and five extant populations with no estimate of viability (PNHP 2020).

One population on state lands in Cambria County consists of between 250 and 500 individuals and represents the majority of plants known in the state. This site has an excellent to good viability due to the size of the population, relative protection on state lands but did have some evidence of deer browse. Two populations in Northumberland and Pike counties received good viability estimates. They are small populations but relatively protected on conservancy and state lands. A small population with a fair viability in Bedford County is located close to cultivation and threatened by the invasive plant, Japanese stiltgrass. A site in Butler County near a utility right-of-way has a poor viability. This small population size coupled with the frequent and intense disturbances greatly reduce long term viability at this site. Four extant populations with no estimate of viability are found in poor or disturbed conditions in Butler, Bedford, Northumberland, and Warren counties (PNHP 2020).

The wide range of the species seems to suggest that it is not restricted to selected watersheds or physiographic provinces, and this may increase the possibility of finding more populations. However, this is a large and recognizable species and the lack of documentation suggests that it is very uncommon throughout the state. There are approximately 60-66 historical locations in about 30-35 counties, which are well distributed throughout the state. As a group, 40% were documented prior to 1900 and nearly 84% were documented prior to 1950. Subsequent surveys of suitable wetland habitats at some of the historical locations failed to find the species, suggesting that water-plantain spearwort is either extirpated from those sites or is seed-banking and may show up another year. While not all historical locations have not been surveyed, their age and accessibility argue against the likelihood of confirming very many of them. In addition, throughout its range this plant is declining and is threatened with extirpation from many locations including neighboring states.

Threats that are impacting this species include deer browsing and the encroachment of native and exotic invasive species. At all sites where the plant was confirmed extant, there was clear evidence of severe deer browsing, especially of the flowering stems that are elevated above the ground. The effects of this browsing were compounded by the fact that other, un-browsed, native invasive species were able to out-compete the spearwort for available habitat (Schuette and Kunsman 2017). Actions that may benefit this species include floodplain protection, conservation and restoration through riparian buffers, reduction of invasive plant species and control of deer herd.

Water-plantain spearwort has received a state rank of (S2), or imperiled from the Pennsylvania Natural Heritage Program, based on analysis of the available data on the species with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be classified as Pennsylvania Threatened.

The Department has reviewed all information made the determination that water-plantain spearwort should be added to the list of Pennsylvania Threatened plants. In summary, water-plantain spearwort is found in few locations, most with small populations, and threatened by increased threats.

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## Mountain Goldenrod (*Solidago roanensis* Porter)

**Current Status: Pennsylvania Rare**
**Proposed Status: Pennsylvania Threatened**


Mountain goldenrod, Photo: Andrew Rohrbaugh (PA DCNR)

The Department of Conservation and Natural Resources proposes to reclassify mountain goldenrod from Pennsylvania Rare to Pennsylvania Threatened within the regulation, Conservation of Pennsylvania Native Wild Plants. This species occurs in very few locations in Pennsylvania and it may become endangered within the commonwealth if habitat is not maintained. The Department is also updating the common name to mountain goldenrod, from Tennessee goldenrod.

Mountain goldenrod is a member of the Aster family (Asteraceae), a group of herbaceous plants with compound flowering heads. This goldenrod has smooth leaves and stem below the yellow, wand-shaped collection of flowering heads. It blooms from August through September and is generally found in somewhat open habitat on rocky banks, roadsides, woods and woods edges (Rhoads & Block, 2007).

In North America, mountain goldenrod occurs from southern Pennsylvania, southward to Georgia and South Carolina and west to Kentucky and Tennessee (Kartesz 2015). It is considered critically imperiled (S1, at very high risk of extirpation) in Kentucky, imperiled (S2, at high risk of extirpation) in Pennsylvania and vulnerable (S3, moderate risk) in Maryland. Globally, mountain goldenrod has a fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, but there is some cause for some concern because of local recent declines, threats, or other factors (NatureServe 2020). This makes Pennsylvania's populations important to the conservation of this species worldwide.

In Pennsylvania, approximately 13 populations of mountain goldenrod were historically known from the southwest and southcentral region of the state, roughly following the Allegheny Mountains (Rhoads & Klein 1993). Historic specimens suggest that the species may have been more broadly distributed. Documented populations in Pennsylvania are now restricted to 10 occurrences from Somerset and Bedford counties. This species requires early successional conditions and many of the extant populations occur in disturbed habitat (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria, ranging from “excellent” to “poor.” A species that has more populations with higher estimates of viability has a greater chance of continued survival. Of the 10 extant populations of mountain goldenrod, none have an excellent estimated viability, one is considered to have good viability, three are estimated at good or fair viability, and three estimated at fair viability. Three more populations are only documented as extant; no estimation of their viability has been made (PNHP 2020).

The population with good estimated viability is found in Somerset County in a state forest, growing in shady roadside openings along the edge of a mixed oak forest. In 2017, 390 flowering individuals were observed, which is consistent with observances since the mid-1980s. This population has been benefitted by continued active management, including canopy clearing, correctly timed mowing, and burning to keep the site in an early successional habitat. The populations with good-to-fair estimated viability were found in Somerset and Bedford counties on exposed, rocky soils in mixed oak woods. These populations were made up of smaller number of individuals, faced more threats from invasive exotic plants, deer grazing, forest succession, and road maintenance. The three populations that have a fair estimated viability are all located in Somerset County, and face threats of roadway improvements, right-of-way maintenance, and competition with invasive plants. The three populations documented as extant with no estimate of viability are also located in Somerset County. (PNHP 2020). Mountain goldenrod seems to thrive in forest edges with some disturbance and exposed rocky soils with few to no plant competition, however too much disturbance that removes or eliminates habitat is not beneficial. Periodic mowing at the right time of year will likely keep woody competition down and provide continued habitat for this species.

In summary, mountain goldenrod is known from very few locations in Pennsylvania, and while a few large populations are known, many of the known populations have limited viability. The species has experienced declines in recent years. It requires early successional conditions and persists in some disturbed habitats. There are populations on protected land that are being stewarded. Therefore, the classification of Pennsylvania Threatened was determined to be more appropriate than that of Pennsylvania Rare.

Mountain goldenrod has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological

Survey's Vascular Plant Technical Committee has recommended that mountain goldenrod be listed as threatened.

The Department has reviewed all information and made the determination that mountain goldenrod should be reclassified as Pennsylvania Threatened within the regulation, Conservation of Pennsylvania Native Wild Plants due to its decline of populations in the commonwealth.

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## Northern Stitchwort (*Stellaria borealis* Bigelow)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Threatened**


Northern stitchwort Photo: Andrew Rohrbaugh (PA DCNR)

The Department of Conservation and Natural Resources proposes to add northern stitchwort to the classification of Pennsylvania Threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species may become endangered within the commonwealth if habitat is not maintained.

Northern stitchwort is a member of the Pink Family (Caryophyllaceae). It is a small plant that grows perennially from a rhizome and has many weak and somewhat trailing branches. The tiny flowers bloom from May through August, with very short or absent white petals. Northern stitchwort is found on slopes with springs, wet banks and in swamps with sphagnum (Rhoads & Block 2007).

In North America, northern stitchwort's range includes Alaska and Canada, much of the western United States, and into the northcentral states, New England and the Mid-Atlantic states (Kartesz 2015). It is considered critically imperiled (S1, at very high risk of extirpation) in West Virginia; imperiled (S2, at high risk of extirpation) in Pennsylvania; and vulnerable (S3, at moderate risk of extirpation) in Wyoming (NatureServe 2020).

In Pennsylvania, there are currently 20 known extant populations in 12 counties, and 31 additional historic collections in 18 counties. At least five of the historical locations no longer appear to have viable habitat present. The 20 extant populations are found mostly along wooded wetlands, springs, and streams (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria, ranging from "excellent" to "poor." The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. Out of the 20 extant populations of northern stitchwort, only one has an excellent estimated viability, in a spring seepage on state game lands in Potter County. The next best site, with an excellent-or-good estimated viability, is a robust population in Pike County growing on a bryophyte mat on a vertical rock outcrop kept moist by dripping seeps. There are three populations with good estimated viabilities, two that are good or fair, and one estimated at fair viability. The rest of the known populations in Pennsylvania have only been determined to be extant, without viability estimated (PNHP 2020). Several populations are

found on protected lands, either state forest, state game lands or other municipal areas. Protection or inaccessibility help to keep these population viable.

The range of this species in Pennsylvania appears to have become more limited, as it is no longer known from several counties in the central and northeastern regions of the commonwealth. Significant field work since 1998 attempted to relocate historic populations and survey suitable habitat but only a few new populations of northern stitchwort have been found. This species may be sensitive to temperature or habitat changes in extant populations, and at least one extant population is under severe pressure from invasive species (PNHP 2020). Other threats include logging, actions that alter hydrology, and establishment of the exotic Norway spruce in its habitat. The species is at the southern edge of its range in Pennsylvania, and is dependent on a specific hydrological regime, which may make it vulnerable to negative impacts of climate change. Efforts to preserve suitable habitat and its hydrology may benefit this species. These findings are supported by research commissioned in 2013 through the Wild Resource Conservation Fund. Researchers reviewed and analyzed known historical records for this plant. (PNHP 2017).

Northern stitchwort has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using national NatureServe methodology because it has relatively few populations (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that northern stitchwort be listed as threatened.

The Department has reviewed all information and made the determination that northern stitchwort should be added to the classification of threatened plants within the regulation, Conservation of Pennsylvania Native Wild Plants due to its scarcity of populations in the commonwealth.

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## Thick-Leaved Meadow-Rue (*Thalictrum coriaceum* (Britton) Small)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Pennsylvania Threatened**


Thick-leaved meadow-rue, Photo: Jason Ryndock (PA Natural Heritage Program)

The Department of Conservation and Natural Resources proposes to reclassify thick-leaved meadow-rue from the list of Pennsylvania Endangered plant species to Pennsylvania Threatened within the regulation, Conservation of Pennsylvania Native Wild Plants. This species more closely fits the definition of a Pennsylvania Threatened species, because more populations have been discovered.

Thick-leaved meadow-rue is a member of the Buttercup Family (Ranunculaceae) that grows from two to six feet in height. Each plant has either male or female flowers that are white to purplish, a bright yellow root and compound leaves. It is found in rich, rocky woods, thickets and moist alluvium, and blooms from late May through June (Rhoads & Block 2007).

In North America, thick-leaved meadow-rue's range is centered along the Appalachian Mountains, from southern Pennsylvania to northern Georgia and eastern Kentucky (Kartesz 2015). It is critically imperiled (S1, at very high risk of extirpation) in Tennessee and Georgia, imperiled; (S2, high risk of extirpation) in Pennsylvania and North Carolina; and apparently secure (S4, fairly low risk of extirpation) in Maryland, Virginia, West Virginia and Kentucky (NatureServe 2020).

In Pennsylvania, 12 populations of thick-leaved meadow-rue were documented historically in six counties in the southwest and southcentral (Rhoads & Klein 1993). This distribution roughly follows the Ridge and Valley and Central Appalachians ecoregional provinces. Since the time of original listing as Pennsylvania Endangered, additional populations have been discovered. Even though populations of this plant have become more numerous in Pennsylvania, it is still fairly rare, and in need of conservation. Currently, at least 21 populations are known to be extant in eight counties, still centered in southwest to southcentral Pennsylvania. While this plant is most often found in calcareous habitat, at least one site is found on acidic soils, which indicates that thick-leaved meadow-rue may not be as restricted to calcareous habitat as was previously thought.

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the plant has. Thick-leaved meadow rue has at

least 21 populations. Of these, more than half are considered excellent, good, or good-to-fair. These populations have better chances of persisting because they are larger, in habitats with good herbaceous diversity, and often located on protected state forest or state gamelands. Eight populations have fair or poor viability estimates. These are characterized by small population sizes, threats of deer browse, invasive plant or pests such as hemlock wooly adelgid, or altered habitat due to development (PNHP 2020). Managing invasive species, forest pests and deer should benefit thick-leaved meadow-rue.

This species has received a state rank of S2 (imperiled) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that thick-leaved meadow-rue be listed as Pennsylvania Threatened.

The Department has reviewed all information and made the determination that thick-leaved meadow-rue should be reclassified as Pennsylvania Threatened within the regulation, Conservation of Pennsylvania Native Wild Plants, because it is not in danger of extirpation within the commonwealth.

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# Plant Species Being Added or Moved to the Pennsylvania Rare Classification

## American Bugbane (*Actaea podocarpa DC*)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Rare**

American bugbane, Photo: Steve Grund, Western Pennsylvania Conservancy/Pennsylvania Natural Heritage Program

The Department of Conservation and Natural Resources proposes reclassifying American bugbane from Pennsylvania Threatened to the list of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is not in danger of becoming endangered within its range within the Commonwealth, however it is geographically limited.

American bugbane is a member of the Buttercup Family (Ranunculaceae). Like all species in the genus, *Actaea*, this plant contains glycosides or essential oils that are poisonous (Rhoads and Block 2007). It is found on rich, wet wooded slopes and in mountain coves and grows up to 2.5 feet tall. American bugbane features compound leaves and stalks of white flowers that bloom in August (Rhoads & Block 2007). This species was once known as *Cimicifuga americana*.

American bugbane is found in the eastern United States primarily along the Appalachian Mountain chain, extending from Pennsylvania south to Georgia. Plants occur sparsely west to Illinois and Iowa (Kartesz 2015, NatureServe 2020). In Pennsylvania, American bugbane has been found in eight counties in the southwest and northcentral portions of the commonwealth. There are approximately 50 populations, in the counties of Bedford, Blair, Cambria, Fayette, Indiana, Lycoming, Somerset, and Westmoreland (PNHP 2020).

Pennsylvania is the northern range limit for American bugbane. While it is still uncommon, this species is somewhat more common than previously thought. Within the geographically limited distribution, American bugbane can be locally abundant where suitable habitat is present. Recent botanical surveys have identified new populations, some of which have hundreds of individuals.

Threats to American bugbane include habitat loss of the wooded slopes this species utilizes and misidentification. Several species in this genus have similar appearances and can be mistaken for each other. Black cohosh (*Actaea racemosa*), doll's eyes (*A. pachypoda*), and red baneberry (*A. rubra*), common species in this genus, all share habitat requirements and can be found growing together with American bugbane. Black cohosh is often collected by people for anecdotal medicinal qualities, and

accidental collection of American bugbane contributes to its rarity. American bugbane mainly grows on lower slopes and stream terraces of moderate-sized streams, a habitat that is increasingly vulnerable to extreme flooding. Therefore, while the it appears to be more secure than previously thought, it is not overly common. The results of more recent surveys, coupled with the geographical limitation of American bugbane, have contributed to the decision by the Department to reclassify this species as Pennsylvania Rare.

This species has received a state rank of S3 (vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012) due to its restricted range and relatively few populations. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

The Department has reviewed all information and made the determination that American bugbane should be reclassified from Pennsylvania Threatened to Pennsylvania Rare. This classification is more appropriate and describes the status of the species in Pennsylvania more accurately.

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## Elliott's Beardgrass (*Andropogon gyrans* Ashe)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Rare**

Elliott's beardgrass, Photo: James H. Miller (USDA-NRCS PLANTS Database)

The Department of Conservation and Natural Resources proposes to add Elliott's beardgrass to the list of plants classified as Pennsylvania Rare, within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is found in relatively low numbers within the Commonwealth and has a geographically limited distribution.

Elliott's beardgrass is a member of the Grass Family (Poaceae). It is a perennial plant that grows to about three feet tall, often tufted and branching at the top. Its upper blades are usually crowded, wide, and brownish or copper colored. Elliot's beadgrass grows in dry or moist fields, grasslands, open areas with few trees or shrubs, and on open banks (Rhoads & Block 2007).

This species is found across the southeastern United States, reaching the northern edge of its natural range in Pennsylvania and New Jersey (NatureServe 2020). In Pennsylvania, it is limited to the southeastern portion of the commonwealth. It is considered rare in New Jersey (Kartesz 2015). Historically, Elliott's beardgrass was known from approximately 30 populations in six counties: Lancaster, Chester, Delaware, Montgomery, Bucks, and Philadelphia (Rhoads and Klein 1993).

Current population distribution is similar, found in southwestern and southeastern counties of Chester, Delaware, Montgomery, Greene and Westmoreland. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Of the known populations (historical and current), only one has been ranked as a good or excellent viability; seven are considered good viability; four good to fair viability; nine considered fair viability; one with poor viability; 10 viability has not been assessed; 11 are considered historic; and one is considered extirpated. This viability estimate describes how likely the population will persist. The population with the best viability was found in Chester County in a dry meadow on Wissahickon Formation, being managed as a hayfield. Threats to the populations include mowing/haying late in summer or fall (when seed heads would be removed) as well as a lack of mowing or other management to retard succession (allowing the habitat to become overgrown) (PNHP 2020). It is likely that the periodic disturbance of haying prevents woody vegetation to encroach the field and allows Elliot's beardgrass to persist.

The populations considered to be good estimated viability are found mainly in Chester and a few in Delaware County. These were found in hayfields; old, dry meadows or pastures; serpentine meadows; grassy powerline cuts; and pipeline rights-of-way. These habitats all have a history of management or mowing in common. Elliot's beardgrass requires an open area, and threats include succession (encroachment of woody vegetation), invasive plants and mowing during the wrong time of year (PNHP 2020). Recent field surveys have not been able to relocate the Lancaster population. Some of these populations are large and vigorous (PNHP 2020), and with proper management of grasslands, such as mowing in the winter season, the species may persist and thrive. While Elliott's beardgrass may appear frequent in the southeast, this species is not common throughout the entire commonwealth; it has a geographically limited distribution.

Elliott's beardgrass has received a state rank of S3 (Vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012) due to the limited geographical distribution and low number of populations. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

The Department has reviewed all information and made the determination that Elliott's beardgrass should be classified as Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Lobed Spleenwort (*Asplenium pinnatifidum* Nutt.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Rare**


Lobed spleenwort, Photo: Chris Hoess (used with permission)

The Department of Conservation and Natural Resources proposes to add lobed spleenwort to the list of plants classified as Pennsylvania Rare, within the regulation, Conservation of Pennsylvania Native Wild Plants. This plant is geographically limited and is found in low numbers in Pennsylvania.

Lobed spleenwort is a member of the spleenwort family (Aspleniaceae), a which is a type of fern. This fern can be identified by its evergreen leaves that have an elongate, sharply pointed, triangular tip and lobed margins. It is found in crevices of dry, lightly shaded cliffs of non-calcareous rocks (Rhoads & Block 2007).

Lobed spleenwort ranges from Minnesota to Massachusetts in the north, to Oklahoma, Mississippi, and Georgia in the south. It is considered rare in most states in its range (Kartesz 2015, NatureServe 2020).

In Pennsylvania, the distribution of this species is somewhat geographically limited (southwestern and southeastern counties) and limited by habitat (steep slopes and outcrops with crevices). Lobed spleenwort is currently known in four counties in western Pennsylvania (Armstrong, Westmoreland, Greene, and Fayette[1]), and in five counties in the east (Franklin, Adams, York, and Lancaster and Chester), with about 27 populations extant currently (PNHP 2020). Botanists estimate the viability of each population based on size, number of reproducing members, threats, and other criteria. Over half of the known extant populations have been estimated at good to fair viability. Four populations have been estimated at a good viability on outcrops and steep slopes in York, Chester, and Lancaster counties. Six populations are considered to have good-to-fair viability; five populations with fair viability; three with fair-to-poor viability; and four with poor viability. There are 22 historic records (not observed within 50 years or more). Many of these records are from herbarium specimens that

[1] Fayette County appeared in earlier drafts of this document but was inadvertently deleted during editing and published online with the omission. DCNR acknowledges the error in this species account, which has been corrected on 9/15/2022, but notes that it does not affect the proposed status. Additionally, the number of western counties has been updated from three to four to reflect this change. DCNR's status assessment and determination of lobed spleenwort included the Fayette County populations. (Note: the online publication of the updated document may be after 9/15/2022, depending on IT availability.)

indicate a location of collection. Three populations have not had their viability assessed, and two populations were searched for but not found (PNHP 2020).

Threats to lobed spleenwort include the loss of suitable habitat due to fragmentation, quarrying, and forest management activities which result in a change in the light and moisture regime. Some sites may be at risk of trampling or habitat degradation through recreation caused by hikers or rock climbers who may impact the plant growing in crevices on cliffs. There is at least one site where people may be collecting lobed spleenwort, or purposefully removing it from its habitat to plant elsewhere, which could be negatively impacting populations (PNHP 2020). Drought can influence the populations, causing them to fluctuate year to year. Lobed spleenwort is limited by habitat requirements of dry non-calcareous rocks.

This species has received a state rank of S3 (Vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

The Department has reviewed all information and made the determination that lobed spleenwort should be classified as Pennsylvania Rare are within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Screw-Stem (*Bartonia paniculata* ssp. *paniculata* (Michx.) Muhl.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Rare**

Screw-stem, Photo: Rachel Goad, Western Pennsylvania Conservancy/ Pennsylvania Natural Heritage Program.

The Department of Conservation and Natural Resources proposes adding screw-stem to the classification of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is found in low numbers and is uncommon in the commonwealth.

Screw-stem is a member of the Gentian Family (Gentianaceae) with leaves reduced to tiny scales. It is a slender, delicate annual plant with small, sometimes purple-tinged whitish flowers that bloom in August through October. It can grow up to over one foot in height but is usually smaller, only a few inches tall. Its habitat includes swamps, bogs, sphagnous seepages and along edges of peaty lakes (Rhoads & Block 2007; Weakley 2020).

In North America, screw-stem has a scattered eastern distribution, from southern Canada through New England and west to the Great Lakes, south to Texas and Florida. It follows the Atlantic and Gulf Coasts to the Mississippi lowlands, though it also occurs in the Appalachians (Kartesz 2015). This species is considered a conservation concern in several states including those neighboring Pennsylvania (NatureServe 2020).

In Pennsylvania, screw-stem is scattered throughout most of the commonwealth. It is found in damp to wet places including margins of forests, swamps, thickets and seepages (PNHP 2020). Prior to the late 1990s, screw-stem was generally considered a Coastal Plain species, mostly found in forested wetlands of the southeastern counties (Rhoads and Klein 1993). More recently, surveys have found screw-stem in northern and western counties, primarily in mossy or boggy acidic wetlands. In addition, the species has been observed in disturbed habitats such as boggy utility line rights-of-way, beaver-impacted wetlands, wet forested roads, tree plantations and ditches (Kunsman 2017). These observations indicate the species is not limited to Coastal Plain forested wetlands and is able to utilize sites with some level of disturbance, in areas where disturbance has allowed wetland habitat to stay open. The recent expansion of the known range may be due to more accurate surveys since the tiny plants may have been previously overlooked during botanical surveys. Alternatively, actual expansion in

range and colonizing of new habitat types (e.g. anthropogenically-influenced open wet areas) may be taking place, or some combination of both.

Currently, screw-stem is known from 63 extant locations, in 24 counties. The number of plants that occur at each site vary from very few (one plant) to very many (500 or more plants), but nearly half of the locations have 50 or fewer plants. As a species with an annual life cycle, numbers of individual plants can fluctuate year to year depending on site conditions. Many historical locations, primarily in the southeast, are known from herbarium specimens (preserved, pressed plants) from the 1890s to the 1950s. Many of these historical populations are no longer viable due to development of wet Coastal Plain forests in that region. Many of the extant populations (83%) of screw-stem are found on protected lands, such as state or municipal land, or land with another kind of protection (Kunsman 2017).

While this implies that populations of screw-stem are relatively secure, this species has been estimated to be moderately vulnerable to climate-driven changes. If micro-habitats become unsuitable (too dry, for example) for screw-stem, plants will need to disperse their seeds to another suitable place in order to persist. However, due to fragmentation, there may be long distances between suitable places for this species (PNHP 2018).

Other threats to screw-stem include those experienced by most native wetlands plants: loss or degradation of habitat due to development and invasive plant encroachment. The populations in the northern areas are found on protected lands in remote locations. Therefore, the threats are fewer in the northern locations compared to the southeastern populations (Kunsman 2017).

This species has received a state rank of S3 (Vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). Previously, the Vascular Plant Technical Committee recommended that this plant be listed as threatened. However, this status was adjusted to rare because of the new locations documented since the late 1990s. These findings are supported by research commissioned in 2013 through the Wild Resource Conservation Program (Kunsman 2017). Researchers conducted field work, reviewed state status recommendations, and known historical records for this plant (Schuette 2018).

The Department has reviewed all information and made the determination that screw-stem should be added to the list of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is uncommon and has limited available habitat in the Commonwealth in bogs and peaty wetlands.

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## Brown Sedge (*Carex buxbaumii* Wahlenb.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Rare**

Brown sedge, Photo: Pennsylvania Natural Heritage Program (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes to reclassify brown sedge from Tentatively Undetermined to Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants. Brown sedge is found in a restricted geographic region and in relatively low numbers in the commonwealth.

Brown sedge is a member of the Sedge Family (Cyperaceae). that can grow to three feet tall, has prominent dark-margined bracts at the base of each fruit and a red-tinged stem base. It is usually found in calcareous wet areas including grasslands, meadows, swales, and wet woods (Rhoads & Block 2007, PNHP 2020).

In North America, brown sedge can be found scattered throughout most of Canada and the United States, except for the southern states along the Gulf of Mexico (Kartesz 2015). It is considered critically imperiled, at very high risk of extirpation, in nine states and one Canadian province; imperiled, at high risk of extirpation, in 10 states; and vulnerable, at moderate risk, in six states including Pennsylvania and four Canadian provinces (NatureServe 2020).

In Pennsylvania, there are 22 extant populations of brown sedge scattered across the commonwealth, mainly in the southern counties (PNHP 2020). Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Over half of brown sedge populations that are extant in Pennsylvania are estimated with viability ranging from excellent-to-good to fair. One population in a floodplain meadow in Bucks County has an excellent-to-good estimated viability. Mowing or other management is necessary to keep site open and cessation of mowing is a threat. Seven populations have an estimated good viability, including a small but healthy population in Butler County; a large population in Montgomery County; two damp, former pastures in Adams County; a mixed graminoid-robust emergent marsh in Bedford County; an open, creekside meadow pasture in Bucks; and a vernal pond in Huntingdon County. Common threats include succession or lack of active management such as fire, mowing, and removal of woody vegetation and competition with invasive plants. There are four populations that have a good-to-fair estimated survivability; two populations are estimated at fair viability, and two more populations were considered

poor chance at viability. An additional six populations have not had their viability estimated (PNHP 2020). This information demonstrates a plant that is in low numbers in the commonwealth and restricted geographically.

Brown sedge was listed in 1993 as Tentatively Undetermined because it was suspected that the species had experienced declines, but additional information was required to assign the species a more definitive status. Since then, field surveys have shown that this species is found mostly in the southeastern counties, but also scattered in the western and central counties. Surveys have also shown that there were more populations than previously thought and the species is adaptable to a variety of habitats, including some human disturbance (PNHP 2020). Threats to brown sedge include hydrological changes, succession, habitat fragmentation and invasive species (NatureServe 2020).

This species has received a state rank of S3 (vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

The Department has reviewed all information and made the determination that brown sedge should no longer be classified as Tentatively Undetermined and should instead be classified is Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Bog Sedge (*Carex paupercula* Michx.)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Pennsylvania Rare**

Bog sedge, Photo: Pennsylvania Natural Heritage Program (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes to reclassify bog sedge from Pennsylvania Threatened to Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants. Bog sedge is a species that has a northern geographical distribution and is found in low numbers within the state.

Bog sedge is a member of the Sedge Family (Cyperaceae) that is loosely to densely tufted, with roots covered by a brownish felt. Its sheaths and leaf blades are smooth and hairless, with fertile shoots that are four inches to almost three feet tall. It is found in sphagnum bogs and boggy woods (Rhoads & Block 2007).

In North America, bog sedge can be found across most of Canada and the north-central and north-eastern United States. It is found across New England, portions of the upper Midwest, and in scattered locations west of the Rocky Mountains (Kartesz 2015, NatureServe 2020). In Pennsylvania, bog sedge is found in the northern half of the state. There are approximately 45 populations known from 11 counties, with the most concentrated occurrences in Monroe County (PNHP 2020).

Bog sedge was originally listed as Pennsylvania Threatened because, at the time of listing, there were approximately 20 populations known from five counties (Rhoads and Klein 1993). Pennsylvania is the southern limit of bog sedge's range, making the species vulnerable to climatic changes (PNHP 2011). However, since the original listing decision, field surveys have led to the discovery of additional populations in northern Pennsylvania.

Despite its potential vulnerability to climatic change, the Department proposes to reclassify this species as Pennsylvania Rare. There are now 45 occurrences known for this species; some are small, but many are robust. The limited geographic range and specialized habitat of this species prevent it from becoming a common species, but it appears to be secure enough in its limited habitat that it is not at immediate risk of extinction within the state. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. Thirty of the 45 known populations have a viability estimate of good-to-fair or better. Three populations have an excellent-to-good estimated viability in large, undisturbed, swamps and bog mats in Tioga/Lycoming, Wayne and Pike

counties. Higher viability sites tend to be located in remote areas, often on state land or other protected areas in the northern tier counties. These sites include sphagnum-beaked rush peatlands, white pine-hemlock-balsam fir wetlands and floating bog mats (PNHP 2020). Threats to this species include impacts to wetlands such as draining or degrading water quality, competition with invasive plants and potential changes to habitat as a result of changing climate (e.g. too dry or warm).

Bog sedge has received a state rank of S3 (vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012) due to its restricted range and relatively few populations. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

The Department has reviewed all information and made the determination that bog sedge should be reclassified as Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants.

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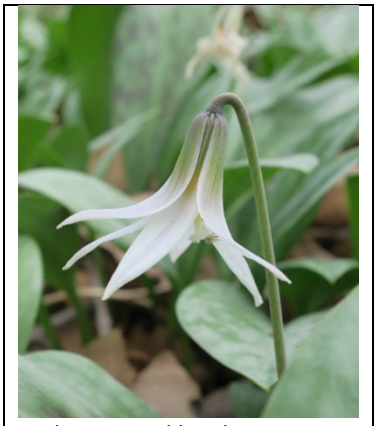
## White Trout-Lily (*Erythronium albidum* Nutt.)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Rare**



White trout-lily, Photo: Jason Ryndock DCNR/Pennsylvania Natural Heritage Program

The Department of Conservation and Natural Resources proposes adding white trout-lily to the classification of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species has declined significantly and is uncommon in the commonwealth.

White trout-lily is a member of the Lily Family (Liliaceae), perennial plants arising from rhizomes or bulbs with simple leaves and showy flowers. White trout lily grows in large patches on the forest floor and may form extensive colonies. White trout-lily often co-occurs with its more common cousin, yellow trout-lily (*E. americanum*). Both produce egg- or spade-shaped mottled leaves but are distinguishable for a short period in late April when mature plants produce nodding white blooms (Rhoads & Block 2007).

In North America, white trout-lily is found in most of the eastern half of the United States, from the Midwest east to New York, and south to Virginia and Alabama. White trout-lily becomes less common in the Mid-Atlantic, where yellow trout-lily becomes more common. It is of conservation concern in many states on the periphery of its range (Kartesz 2015, NatureServe 2020).

In Pennsylvania, white trout-lily is found in rich wooded slopes and floodplains on calcareous soils (Rhoads & Block 2007). This species is most often encountered in southwestern Pennsylvania and along the lower Susquehanna River, with scattered stations elsewhere. It is apparently absent from the north-central portion of the commonwealth (Kunsman 2017).

White trout-lily's habitat includes floodplains and on the lower slopes of stream and river valleys. It appears to be restricted to alkaline soils (high pH). This species tends to be more frequent in forests that have little history of agricultural development; it does not readily move from one location to another. Threats to this species are habitat loss or impacts such as a floodplain development, modification such as dams, industry, and agriculture, and competition with invasive species which grow rapidly in rich flood-prone soils (PNHP 2020). Although floodplains are more protected from development than in the past, many threats remain (Kunsman 2017).

The most significant threat to white trout-lily is that of non-native invasive plant species. The floodplain habitat favored by this species is particularly prone to invasion by several species, including

but not limited to Japanese knotweed (*Fallopia japonica*) and Japanese stiltgrass (*Microstegium vimineum*). Other threats, which are minor on their own but additive in effect, include logging, grazing, construction and maintenance of roads, railroads, sewer lines, and pipelines, habitat degradation by all-terrain-vehicles, and others. None of these threats are unique to floodplains, but all cause more severe impacts to floodplains (Kunsman 2017).

The number of populations of white trout-lily has declined in recent years. While censusing this early-spring ephemeral can be difficult, surveys have identified 48 populations known to be extant (Kunsman 2017). In 1993, approximately 60 populations were known (Rhoads and Klein 1993). Each population has a small number of individuals at each site. These data support the decision for this species to be listed as Pennsylvania Rare, including that there are a declining number of extant populations with low number of individuals, and these are found in sites that are likely to be threatened (Kunsman 2017).

This species has received a state rank of S3 (Vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), combining the rarity with trend data and a threat analysis. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

The Department has reviewed all information and made the determination that white trout-lily should be added to the list of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species has a restricted geographic range and limited available habitat in the commonwealth and is vulnerable to future declines as calcareous floodplains are lost to development, flood regime alterations, and invasive species.

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## Grass-Leaved Rush (*Juncus biflorus* Elliott)

**Current Status: Tentatively Undetermined**
**Proposed Status: Pennsylvania Rare**

## Long's Rush (*Juncus longii* Fern.)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**

Grass-leaved rush, Photo: Wayne Longbottom (CC BY-NC 4.0, iNaturalist)

Long's rush, Photo: Howard Horne (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to reclassify grass-leaved rush from Tentatively Undetermined to Pennsylvania Rare, within the regulation, Conservation of Pennsylvania Native Wild Plants because it is has a restricted range and found in low numbers in the commonwealth. The Department also proposes to delist Long's rush from the list of Pennsylvania Endangered plants because this species has never existed in Pennsylvania. The only records of this plant in Pennsylvania were based on misidentified specimens that are actually grass-leaved rush. Because the Department's decisions on these species are connected, they are being presented together in this species account.

Grass-leaved rush and Long's rush are both herbaceous member of the Rush Family (Juncaceae), made up of plants with cylindrical stalks and hollow stem-like leaves. Grass-leaved rush and Long's rush are upright plants that grow from underground horizontal stems called rhizomes and produces up to 100 flowering heads comprised of numerous tiny flowers, which become dark brown capsules (fruits), each containing numerous tiny seeds when mature. Grass-leaved rush has a loose assemblage of fruits (Knapp and Naczi 2008) and grows in moist, open woods, boggy fields, gravel pits, and ditches (Rhoads & Block 2007) on calcareous or diabase substrate (Block and McPherson 2017). Long's rush has a denser arrangement of fruits and is found in very wet, often inundated sites, bogs, ditches, rooting in clay or peat (Weakley 2020).

Long's rush and grass-leaved rush are part of the same group of rush species that share many similar characteristics, Graminifolii. They are similar in appearance and have been mistaken for each other. Historically, different taxonomy references disagree about whether grass-leaved rush and Long's rush are separate species, varieties or subspecies. A recent publication has clarified the morphological characteristics and habitat requirements of these rushes (Knapp and Naczi 2008). Specimens from

Pennsylvania were examined by Knapp and Naczi and, using 12 morphological characteristics as well as habitat information, determined that the Pennsylvania plants were grass-leaved rush and not Long's rush.

Grass-leaved rush is found from New England to the Midwest and disjunct locations in Arizona and further south. Long's rush has a more restricted range and is only found in water seepages of the southeastern United States including the southeastern Coastal Plain in Virginia south to the Carolinas and Tennessee (Knapp and Naczi 2008). Long's rush is not found in Pennsylvania. The populations previously identified as Long's rush located in Pennsylvania have been re-determined as grass-leaved rush (Knapp and Naczi 2008).

Grass-leaved Rush Discussion (Tentatively Undetermined, Proposed PA Rare)

In Pennsylvania, grass-leaved rush is geographically limited and has few populations in Pennsylvania that tend to be found on calcareous substrates. The populations are concentrated in the southeast, with some from central Pennsylvania, and three sites from the west. There are 39 extant populations containing an estimated 7,000 plants across the commonwealth, on calcareous soil (Block and McPherson 2017).

Most populations have small numbers of individuals, but that can fluctuate over time. This fluctuation is partly due to the species' dependence on early-successional habitats; it can colonize an area after a disturbance but may disappear as that habitat continues to change during succession and become more shaded. Most historical sites no longer support this species because the early successional habitats have been altered, either because of habitat maturity or anthropogenic development. Further, population occurrences are limited by the availability of calcareous habitats, many of which have been developed or are otherwise unsuitable (Block and McPherson 2017, McPherson 2013). As such, the primary threat to grass-leaved rush is loss of habitat. Active management to maintain open habitat by removing woody vegetation in calcareous wet meadows and fields, and removing encroaching invasive plant species, could benefit many of these small populations.

These findings are supported by research commissioned in 2013 through the Wild Resource Conservation Fund. Researchers analyzed known and historical populations, conducted additional field surveys, performed an updated rank status calculator and provided a status summary for this plant. Although the rarity of the grass-leaved rush and the level of threat the species faces might suggest the definition of Pennsylvania Threatened, researchers recommended the Pennsylvania Rare status based on the number of extant populations, the ability to establish new populations and use disturbed,

anthropogenic habitat. Active management to maintain early-successional conditions will likely be critical to its long-term success in the commonwealth (Block and McPherson 2017).

Grass-leaved rush has received a state rank of S3 (vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

Long's Rush Discussion (PA Endangered, Proposed to Delist)

Long's rush was originally listed in 1988 as a Pennsylvania Endangered species, based on a few historical specimen collections from locations in southeastern Pennsylvania. But more recently, taxonomic experts reviewed the herbarium specimens that were considered to represent Long's rush and determined they were grass-leaved rush. Knapp and Naczi's systematic analysis of morphological characteristics and habitat requirements clarify that Long's rush is a habitat specialist that is restricted to the southeast United States (2008). This new research also demonstrates that Long's rush is not present in Pennsylvania.

Long's rush is a globally uncommon species. It is rare in much of its range and NatureServe has assigned it a Global Rank of G3Q (Vulnerable) because it is at a moderate risk of extinction due to relatively few populations. Long's rush does not have a current state rank assigned to it from the Pennsylvania Natural Heritage Program using the NatureServe rank status calculator because it is not found here (Faber-Langendoen et al. 2012). The NatureServe Explorer website has not yet updated the state rank for Pennsylvania for this species and still displays the old rank of S1 (Critically Imperiled) from when it was previously listed as Pennsylvania Endangered (NatureServe 2020). The Department and the Pennsylvania Heritage Program are working to correct this information. The Pennsylvania Vascular Plant Committee recommend that this species be delisted.

Summary

The Department has reviewed all information and made the determination that grass-leaved rush should be moved from the list of Tentatively Undetermined plants to the classification of Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants. It has a limited number of small populations tempered with disturbance tolerance. The Department has also

reviewed all information and made the determination that Long's rush should be removed from the list of Pennsylvania Endangered plants because this plant is not found in Pennsylvania.

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## Netted Chain Fern (*Lorinseria areolata* (Linnaeus) C. Presl., Source: Weakley 2020)

**Current Status: Not Listed**
**Proposed Status: Pennsylvania Rare**

Netted chain fern, Photo: Andrew Strassman, PA Natural Heritage Program (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes adding netted chain fern to the list of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This plant has a limited distribution and low numbers within the state.

Netted chain fern is a member of the Fern Family (Blechnaceae), a group of herbaceous, nonflowering, spore-bearing plants. This species spreads by branching and creeping rhizomes, forming dense clonal patches. The bright green, deeply lobed vegetative and fertile fronds are distinctly different from each other. The vegetative fronds are often confused with the more common sensitive fern (*Onoclea sensibilis*) (Rhoads & Block 2007) but can be distinguished as netted chain fern by having generally alternate, more pointed pinnae, and with the pinna edges finely serrated (Weakley 2020). This species favors moist, sandy, and acidic soils of woods and bogs (PNHP 2020, Weakley 2020) never occurring on limestone or other high pH substrates (Block 2017). An older nomenclatural treatment for this species was *Woodwardia areolata*, under which name the Department commissioned research (Block 2017).

In North America, netted chain fern has a chiefly southeastern distribution. It is primarily on the Atlantic Coastal Plain, from East Texas to Florida and north to Maine, but extending inland particularly in states south of Pennsylvania (Kartesz 2015). Netted chain fern is critically imperiled in New Hampshire (S1, at very high risk of extirpation); imperiled in Rhode Island, West Virginia, Illinois, and Missouri (S2, at high risk of extirpation); and vulnerable in Pennsylvania, New York and Indiana(S3, at moderate risk) (NatureServe 2020).

In Pennsylvania, netted chain fern is scattered throughout the southern half of the commonwealth. Historically, this species was presumed to be limited to the Coastal Plain (PNHP 2020). There are 37 extant populations, and slightly more than half are outside of the Coastal Plain, many of which have been only recently found. The largest known netted chain fern populations are in Bucks County in a protected wetland within a park. In recent years, it has been found in the southwestern counties of Greene and Fayette. Several smaller populations exist in Coastal Plain remnant forest sites of

about five acres or less in size. Many of the more recently discovered populations outside of the Coastal Plain are small and may have established recently, often only consisting of a single genetic clone. The Delaware Valley, including the Philadelphia metropolitan area in Bucks, Delaware, Montgomery, and Philadelphia counties, once contained most of Pennsylvania's netted chain fern population. However, historic populations in located in the heavily developed metropolitan areas are presumed to be extirpated due to development expansion (Block 2017).

The rate of development on the Coastal Plain remains high, potentially threatening populations located in that region of the commonwealth. The remaining areas of natural habitat in the Coastal Plain are also small and fragmented, with questionable long-term viability due to threats from edge effects, invasive species, and disturbance from human traffic and recreational activities. Outside of the Coastal Plain, populations face a lower level of threat, mainly from invasive species and various sources of development. The genetic structure of populations in Pennsylvania may also create long-term vulnerability for the species. Although a few large populations exist, it is likely that these occurrences represent only a few genetically distinct individuals. The upright leaves arising from a branching, below-ground stem system are clones of one individual and genetically identical. This lack of genetic diversity and the physical connectivity of clones can leave a site vulnerable to rapid decline or extirpation when faced with disease or environmental changes, despite its robust above-ground appearance (Block 2017). These findings are supported by research commissioned in 2013 through the Wild Resource Conservation Fund. Researchers analyzed known populations, conducted additional field surveys, calculated an updated rank status and provided a status summary for this plant.

Netted chain fern has received a state rank of S3 (vulnerable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be listed as rare.

The Department has reviewed all information and made the determination that netted chain fern should be added to the list of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. The ongoing threats and limited number of known populations tempered with the apparent expansion into slightly less-threatened regions of the commonwealth contribute to this plant being classified as Pennsylvania Rare.

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# Plant Species Being Removed from Classification (Delisted)

## Northern Maidenhair Fern (*Adiantum pedatum* L. ssp. *caulderi* Cody (Synonym: *Adiantum aleuticum*))

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**

Northern maidenhair fern, Photo: homeredwardprice (CC BY 2.0, Wikimedia Commons)

The Department of Conservation and Natural Resources proposes to delist northern maidenhair fern from the classification of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants. A synonym for this species is *Adiantum aleuticum*. New research has shown that northern maidenhair fern is not found in Pennsylvania.

Northern maidenhair fern is a member of the Maidenhair Fern Family (Pteridaceae), and is an herbaceous, nonflowering, spore-bearing plant. The plant forms spreading fronds in a palm-shaped pattern and grows about 1.5 feet tall (Rhoads & Block 2007). The habitat attributed to this species was serpentine barrens, however genetic studies show this species does not exist in Pennsylvania.

As its name suggests, northern maidenhair fern is found in the north: in Alaska, eastern and western portions of Canada, the western half of the United Sates and northern New England (Kartesz 2015, NatureServe 2020). This fern was originally listed as Tentatively Undetermined in Pennsylvania because of taxonomic uncertainties. Botanists have historically confused populations of northern maidenhair fern (*A. aleuticum*) and another common maidenhair fern species (*Adiantum pedatum*) for each other. Several morphological characteristics were used as diagnostic, but often were inconsistent. The *Plants of Pennsylvania, second edition* indicates that northern maidenhair fern (*A. aleuticum*) is shorter in stature than the common species (*A. pedatum*) and found only on serpentine barrens in Pennsylvania. *Adiantum pedatum* is a frequent species throughout Pennsylvania (Rhoads & Block 2007). The common names of these species are often interchanged, furthering the confusion.

In 2016, a DNA barcoding study investigated the genetic relationship of two species of maidenhair fern (*Adiantum aleuticum* and *A*. *pedatum*) in Pennsylvania and Maryland (Williams et al. 2016). This study revealed that the populations previously referred to as *Adiantum aleuticum* (also known as *Adiantum pedatum* ssp*. caulderia*) are correctly identified as the more common taxon *Adiantum pedatum* (not the subspecies). Further, they determined that the differences observed in Pennsylvania, such as the short stature, were a result of environmental conditions. The researchers found no *A. aleuticum* genetic markers within the maidenhair fern samples taken from Pennsylvania. All

known populations of potential *A. aleuticum* have been re-identified as *Adiantum pedatum*, and it is believed to be extremely unlikely that any populations of *Adiantum aleuticum* exist in Pennsylvania because serpentine habitats are limited within the commonwealth and have been very well surveyed.

Northern maidenhair fern (*Adiantum aleuticum*) has received a state rank of SNA (state conservation rank not applicable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that northern maidenhair fern (*Adiantum aleuticum,* synonym *A. pdedatum* ssp*. caulderia*) should be removed from the classification of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Taxonomic revisions and ecological information supported by genetic research indicate it does not occur in Pennsylvania and therefore does not require protection.

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## Naked-Spiked Ambrosia (*Ambrosia psilostachya* DC.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**

Naked-spiked ambrosia, Photo: Krzysztof Ziarnek Kenraiz (CC BY-SA 4.0, Wikimedia Commons)

The Department of Conservation and Natural Resources proposes to delist naked-spiked ambrosia from the list of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Evidence has shown that this species is not native to Pennsylvania.

Naked-spiked ambrosia is a perennial herbaceous member of the Aster family (Asteraceae), characterized by opposite, lobed leaves and compound flower heads. It grows to about three feet tall from creeping roots with leaves that are rough on the upper side. It is found in sandy shores or meadows, and blooms from August through October (Rhoads & Block 2007).

Naked-spiked ambrosia is found across the United States. It is native to the southwestern and Midwestern United States, introduced in the east, and considered noxious in Oregon and Idaho (Kartesz 2015), and exotic in Pennsylvania and other eastern states (NatureServe 2020).

Most observations in Pennsylvania were made in the 1930s and were limited to the sandy shores in Presque Isle. However, more recent field work revealed several more populations in a variety of habitats including disturbed areas such as roadsides, spoil areas and fill, and other human-influenced areas. Pennsylvania now considers this species to be adventive, native to the United States but not native in this region. As a non-native species, and a species able to utilize abundant, highly disturbed habitats, the Department does not consider it a conservation concern in Pennsylvania.

Naked-spiked ambrosia has received a state rank of Exotic from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on all available information (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that naked-spiked ambrosia should be delisted from the classification of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Puttyroot (*Aplectrum hyemale* (Muhl. ex Willd.) Nutt.)

**Current Status: Pennsylvania Rare**
**Proposed Status: Delist**

Puttyroot, Photo: Jason Ryndock, Pennsylvania Natural Heritage Program

The Department of Conservation and Natural Resources proposes to remove puttyroot from the Pennsylvania Rare classification, within the regulation, Conservation of Pennsylvania Native Wild Plants. Field surveys have shown that this species does not fit the definition of a Pennsylvania Rare plant.

Puttyroot, a member of the Orchid family (Orchidaceae), is an herbaceous perennial with parallel-veined leaves and irregular flowers. In fall and winter, puttyroot produces a single leaf from the base of the stem below ground. The leaf is longitudinally pleated and grayish green with white veins. A stalk of purplish flowers is produced in the summer, which then dies back. It is found in moist, rich wooded slopes and bottomlands in Pennsylvania (Rhoads & Block 2007). Plants may not flower every year and the flower stalks are easily missed, making it likely that it is even more common but overlooked.

Puttyroot is found in the central and eastern United States, ranging from Ontario and Quebec in the north to Oklahoma and Minnesota west, and south to Georgia (Kartesz 2015, NatureServe 2020). In Pennsylvania, it is known to occur mostly in the southern half of the commonwealth, with a few populations further north. There has been an increase in known populations based on recent botanical surveys. The number of populations presently known in Pennsylvania is approximately 64 in 16 counties, compared to 18 populations known in the past (PNHP 2020). In addition, puttyroot is sometimes found in habitats recovering from disturbance (for example, timber harvesting or grazing). This indicates that puttyroot may not be as limited by habitat quality as previously thought. It also could indicate that the species was overlooked in previous surveys. While some populations of this species may have potential threats like habitat degradation or conversion, loss of associate mycorrhizal fungi, or deer herbivory, overall, puttyroot appears to be increasing in the southern half of the commonwealth with suitable substrates (PNHP 2020). It will likely never be a common species throughout the entire Commonwealth, but its robust population numbers and increasing trends indicate that it is secure and not in need of protection.

This species has received a state rank of S4 (Apparently Secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data

with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). This rank means the species is uncommon but not rare with some cause for long-term concern due to declines or other factors. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that puttyroot should be delisted from the classification of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. While not extremely common, puttyroot has shown an increased number of populations and does not require commonwealth-wide protection.

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## Eastern Baccharis (*Baccharis halimifolia* L.)

**Current Status: Pennsylvania Rare**
**Proposed Status: Delist**

Eastern baccharis, Photo: Pennsylvania Natural Heritage Program (CC BY-NC-SA 2.0, PNHP flickr)

The Department of Conservation and Natural Resources proposes to remove eastern baccharis from the regulation, Conservation of Pennsylvania Native Wild Plants. This species is increasing in number and uses disturbed habitat in the commonwealth and is not a conservation concern.

Eastern baccharis, also called groundsel tree and salt-bush, is a member of the Aster Family (Asteraceae). Its compound flowering head is made up of fluffy, white florets, which bloom from August to October. This shrub is found in open sandy places, wet areas including fields and marshes, beaches, disturbed areas, and along roadsides (Rhoads & Block 2007).

Eastern baccharis is abundant in the eastern United States along the Atlantic and Gulf Coasts. It is found from Nova Scotia, New York and Massachusetts south through Florida and west to Texas, being more abundant further south (Kartesz 2015). It is considered rare in Nova Scotia and Rhode Island (NatureServe 2020). This species tolerates salt, and its habitat includes coastal plains and areas influenced by sea salt or spray. In Pennsylvania, eastern baccharis occurs in the Atlantic Coastal Plain province, in the saltmarshes and tidal marshes of Delaware, Philadelphia and Bucks counties (PNHP 2020). There is some question as to whether this species is historically native to Pennsylvania, or was an early adventive species in disturbed, salt-influenced waste areas. Although herbarium specimens from the 1860s exist, the species is notably absent from early floral descriptions of the area though botanical collecting was popular in the Philadelphia area at that time.

While eastern baccharis' natural habitat may be limited in Pennsylvania, this species is adaptable and can withstand disturbances (PNHP 2020). It utilizes roadside habitat that has been influenced by salt treatment and is expanding its range along roadways. It is no longer possible to distinguish between naturally occurring populations and populations that have established more recently due to salt treatments. The species is highly mobile and can easily colonize new areas through seed dispersal. The observation of this species' ability to use disturbed areas, salt-influenced roadways

and expansion of its range, coupled with an uncertainty of its nativity has caused the Department to determine this species is thriving and not in need of protection.

This species has received a state rank of S5 (Secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that eastern baccharis should be deleted from the list of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Foxtail Sedge (*Carex alopecoidea* Tuckerman)

**Current Status: Pennsylvania Extirpated**
**Proposed Status: Delist**

Foxtail sedge, Photo Courtesy: Sally and Andy Wasowski, Lady Bird Johnson Wildflower Center (unrestricted use)

The Department of Conservation and Natural Resources proposes to remove foxtail sedge from the list of Pennsylvania Extirpated plant species within the regulation, Conservation of Pennsylvania Native Wild Plants. Reports of this species from Pennsylvania were based on misidentified specimens, and there is no known credible evidence that the species is or ever was part of the Pennsylvania flora.

Foxtail sedge is a member of the Sedge Family (Cyperaceae). It grows in wet soils and meadows, streambanks and openings in streamside woods, particularly on calcareous soils. It has smooth leaf blades with red spots and fruits in July (Standley, FNA).

In North America, foxtail sedge's range includes southern Canada and the northeastern half of the United States with some disjunct populations in Wyoming. It is considered a conservation concern in several New England and Great Lakes states (NatureServe 2020). Foxtail sedge is not known from Pennsylvania. The specimens previously thought to be foxtail sedge were re-determined by J.K. Bissell of the Cleveland Museum of Natural History as three different species: *Carex conjuncta* (NatureServe State Rank S4, apparently secure in Pennsylvania, PNHP 2020), *C. stipata* (no state rank assigned, occurring in every county in Pennsylvania, Kartesz 2015), and *C. annectens* (no state rank assigned, but occurring throughout Pennsylvania, Kartesz 2015). There are currently no known specimens from Pennsylvania identified as *Carex alopecoidea* (PNHP 2020).

This species has not received a state rank from the Pennsylvania Natural Heritage Program using national NatureServe methodology, the NatureServe Rank Calculator tool, because there is no available data (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that foxtail sedge should be removed from the regulation, Conservation of Pennsylvania Native Wild Plants because it is not present in Pennsylvania.

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## Heavy Sedge (*Carex gravida* Bailey)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**

Heavy sedge, Photo: Tom Potterfield, Mt. Cuba Center (Flickr; CC BY-NC-SA 2.0)

The Department of Conservation and Natural Resources proposes to remove heavy sedge from the list of Pennsylvania Endangered plant species within the regulation, Conservation of Pennsylvania Native Wild Plants. Reports of this species from Pennsylvania were based on misidentified specimens, and it is no longer considered to be present or native in Pennsylvania.

Heavy sedge is a perennial member of the Sedge Family (Cyperaceae) without conspicuous rhizomes that grows up to about three feet tall. It fruits in late spring and habitat includes prairies, ditches, swales, and other open areas usually on calcareous soils (Ball, FNA).

In North America, heavy sedge is found in south-central Canada and the Midwest United States south through Texas and Georgia. It is a conservation in some provinces in Canada and several states in the United States along the Mississippi River. It is not found in New England and it is considered non-native along the southeastern seaboard states (Kartesz 2015, NatureServe 2020).

In Pennsylvania, heavy sedge was originally listed based on two herbarium specimens, collected from Lancaster and Berks counties. These specimens were reviewed by botanist A.A. Reznicek from the University of Michigan, who determined that the specimens were glomerate sedge (*Carex aggregata*) and Leavenworth's sedge (*Carex leavenworthii*) (PNHP 2020). Both glomerate and Leavenworth's sedges are common throughout Pennsylvania and are not of conservation concern (Kartesz 2015, NatureServe 2020).

Heavy sedge has not received a state rank from the Pennsylvania Natural Heritage Program using the national NatureServe methodology, because it is not found in Pennsylvania. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that heavy sedge should be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Midland Sedge (*Carex mesochorea* Mackenzie)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**

Midland sedge, Photo: Dwayne Estes (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove midland sedge from the list of Tentatively Undetermined plant species from within the regulation, Conservation of Pennsylvania Native Wild Plants. Midland sedge appears to be fairly common within the commonwealth and is not a conservation concern.

Midland sedge is a member of the Sedge Family (Cyperaceae) which is comprised of herbaceous plants usually with three-angled stems and linear leaves. It can grow to between 10 inches to three feet tall with short flower heads, one half to three-quarters inch long, and must be carefully identified because of its similarity to several other species of sedge. The habitat for midland sedge includes fields, grasslands, road banks, and open woods with varying levels of dryness (Rhoads & Block 2007, PNHP 2020).

In North America, midland sedge ranges from Quebec and Ontario where it is either extirpated or very rare, south in a spotty distribution through the Mid-Atlantic States west to Texas and Nebraska. It is considered rare in many states in which it has been ranked (Kartesz 2015, NatureServe 2020). In Pennsylvania, most populations are in the southeastern counties, but include other regions of the commonwealth as well.

Midland sedge was added to the Tentatively Undetermined list of plant species in 1993 in order to identify it as a species that was potentially in need of conservation, but for which the Department needed more information in order to properly classify it. Since then, field surveys have been conducted, and have shown that the species is more frequent and widespread in Pennsylvania than was previously suspected. Midland sedge has been identified in about 20 counties. Many observations are from highly disturbed areas, which indicate this species is not limited by habitat availability or quality and is adaptable enough to compete and establish new populations. This has contributed to the Department's decision that midland sedge is secure and not in need of conservation in Pennsylvania.

Midland sedge has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The

Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that midland sedge should be removed from the classification of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Spring Blue-Eyed Mary (*Collinsia verna* Nutt.)

**Current Status: Pennsylvania Rare**
**Proposed Status: Delist**

Spring blue-eyed Mary, Photo Courtesy George Wallace, Lady Bird Johnson Wildflower Center (unrestricted use)

The Department of Conservation and Natural Resources proposes to remove spring blue-eyed Mary from the list of plants classified as Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants. Spring blue-eyed Mary is found in great enough numbers in the commonwealth that it is not in need of conservation.

Spring blue-eyed Mary is a member of the Plantain Family (Plantaginaceae), a group of plants often characterized by petals with a fused base. Spring blue-eyed Mary flowers have bright blue petals on the bottom and white above, with prominent notches. It blooms from late April to May and is found in woods and scrubby areas near streams (Rhoads & Block 2007).

In North America, spring blue-eyed Mary is found in the eastern United States, toward the Midwest. It appears more common to the south of the Great Lakes. Its range includes south central Canada where it is assumed to be extirpated, south to New York where it may be extirpated through Virginia and Alabama, west to Wisconsin, Kansas and Oklahoma (NatureServe 2020). In Pennsylvania, this species is native and common in the western part of the commonwealth (Kartesz 2015).

Spring blue-eyed Mary was originally added to the list of Pennsylvania Rare plant species due to a geographically limited distribution, being found only in the west and a small number of known populations or individuals. While this plant's geographic distribution has not changed, enough populations, many of which are very large, have been discovered such that it is no longer considered to be of conservation concern. There are approximately 33 populations known in eight counties in Pennsylvania and some experts believe there may be 50 or more populations. In addition, many of the populations are large and vigorous with a commonwealth-wide estimated total of up to a million plants. Spring blue-eyed Mary will likely never become a widespread, common species in Pennsylvania because of the geographically limited distribution, however, the number of populations and individuals indicate that this plant no longer fits the definition of Pennsylvania Rare.

Spring blue-eyed Mary has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). This is a species that is uncommon but not rare in Pennsylvania. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that spring blue-eyed Mary should be removed from the list of Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants.

Literature Cited:

Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

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## Short-Pointed Flatsedge (*Cyperus acuminatus* Torr. & Hook.)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**


Short-pointed flatsedge, Photo: Ryan Donnelly (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove short-pointed flatsedge from the list of plants classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. Short-pointed flatsedge is not native to Pennsylvania.

Short-pointed flatsedge is a member of the Sedge Family (Cyperaceae) which is a family of plants usually with three-angled stems and linear leaves. It is an annual with flower spikes clustered in dense heads and short-pointed flower parts. It grows in wet, sandy disturbed areas, where it flowers and fruits mid-summer through early fall (Rhoads & Block 2007).

In North America, the range of short-pointed flatsedge is concentrated in the central portion of the continent, from southern Canada south through Texas, ranging eastwards sparsely as far as western Ohio (Kartesz 2015). It is considered imperiled in Ohio and extirpated from Michigan, but exotic in Pennsylvania and New York. In Virginia, only a few disconnected locations are known, but at least one is considered native (NatureServe 2020).

In Pennsylvania, short-pointed flatsedge was originally listed as Pennsylvania Endangered because very few populations were known. This species was first collected in Pennsylvania at the American Dyewood Company in Chester, Pennsylvania in the early 1930s. It is likely a case of accidental transportation. At the time of listing, there were only two records known, from Philadelphia and Delaware counties. However, additional botanical surveys have shown that this species favors disturbed open ground such as railroad beds, wharves and drainage ditches. Rhoads and Klein state that even though this species is known to be native as far east as Virginia, the only known sites in Pennsylvania were from very disturbed sites (1993). Rhoads and Block state the species is not native to Pennsylvania (2007).

Since short-pointed flatsedge uses predominately disturbed habitat, it does not need conservation. The native habitat for short-pointed flatsedge is described as wetlands, particularly those over limestone, which does not match the habitat in which it has been observed in Pennsylvania. Its

affinity for human-influenced habitats in Pennsylvania, such as ditches, and lack of presence in less disturbed habitats, supports the concept that this species is not native.

Short-pointed sedge has not received a state rank from the Pennsylvania Natural Heritage Program with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012), because it is not found in Pennsylvania. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information made the determination that short-pointed sedge should be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

Literature Cited:

Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

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Rhoads, A.F. & T.A. Block. 2007. *The Plants of Pennsylvania, second edition*. University of Pennsylvania Press. Philadelphia, PA.

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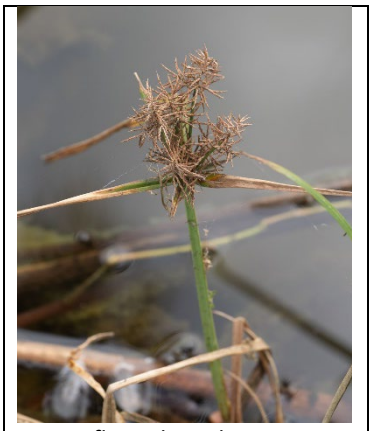
## Rusty Flatsedge (*Cyperus odoratus* L.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**



Rusty flatsedge, Photo: Jesse Rorabaugh (CC0 1.0 Public Domain, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove rusty flatsedge from the list of plants classified as Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is no longer considered a conservation concern in Pennsylvania.

Rusty flatsedge is a member of the Sedge Family (Cyperaceae). This species is an annual plant with flattened flower spikes in an obvious axis. Rusty flatsedge is found in moist meadows, wet sandy or gravelly flats and riverbanks in the southeast and northwest. It flowers and fruits mid-summer through early fall (Rhoads & Block 2007).

In North America, rusty flatsedge is found in southern Canada throughout most of the United States (Kartesz 2015). It is ranked as critically imperiled, at very high risk of extirpation, in Idaho; imperiled, at high risk of extirpation, in Quebec, Can.; and ranked as vulnerable, at moderate risk, in New York and North Carolina. It is not ranked, under review or considered unrankable in the majority of states within the United States (NatureServe 2020).

In Pennsylvania, rusty flatsedge has been found in scattered locations, from the northeast, southeast, southwest and northwest (Kartesz 2015). Most populations are known in the southeast area in Philadelphia, Montgomery and Berks counties in wet sand, gravel flats, ballast, wharves and railroad sidings (Rhoads and Klein 1993). More recently, it has been found to be widespread (PNHP 2020).

Rusty flatsedge was originally listed as Tentatively Undetermined because the Department felt that the species may be experiencing declines but did not have enough information to place the species in another classification. Since then, additional field surveys showed this species was plentiful and did not seem to need conservation or protection. It was found to be fairly widespread with at least twenty large populations, especially around reservoirs and artificial lakes near the Schuylkill, and common near the Susquehanna. In addition, rusty flatsedge was found more often in disturbed habitats such as ditches and reservoirs than in highly pristine natural habitat (PNHP 2020).

Rusty flatsedge has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The

Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that rusty flatsedge be delisted.

The Department has reviewed all information and made the determination that rusty flatsedge should be removed from the list of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

Literature Cited:

Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

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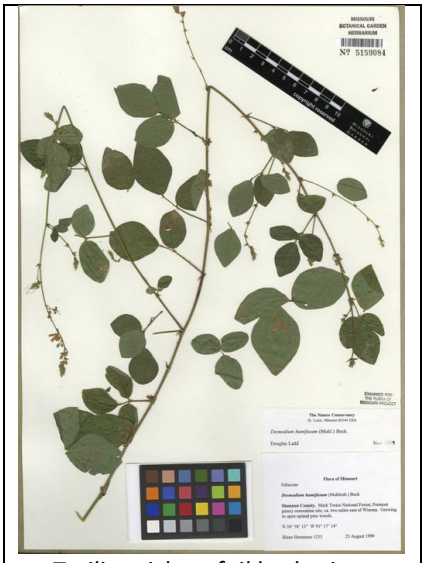
## Trailing Tick-Trefoil (*Desmodium humifusum* (Muhl.) Beck)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**



Trailing tick-trefoil herbarium specimen, Image: Missouri Botanical Garden (CC BY-NC-SA 3.0, Tropicos)

The Department of Conservation and Natural Resources proposes to delist trailing tick-trefoil from the list of Pennsylvania Endangered plant species within the regulation, Conservation of Pennsylvania Native Wild Plants. Trailing tick-trefoil is not in danger of decline and not in need of classification.

Trailing tick-trefoil is a member of the Pea family (Fabaceae), which can be woody or herbaceous plants with alternate, compound leaves. This is a perennial plant with a stem that lays on the ground and produces purple flowers in August through September. It is found in dry habitats such as sandy woods (Rhoads & Block 2007).

In North America, trailing tick-trefoil is found in ten states from the Mid-Atlantic to Missouri. It is considered rare in some states and exotic or a hybrid in others (Kartesz 2015, NatureServe 2020). In Pennsylvania, it can be found scattered throughout the commonwealth (PNHP 2020).

Recent genetic and taxonomic work has determined that this plant is not a true species, but a hybrid derived from two common species with which it co-occurs: round-leaved tick-trefoil (*Desmodium rotundifolium*) and panicled-leaf tick-trefoil (*D. paniculatum*). This genetic work also found little evidence that trailing tick-trefoil produces viable offspring (Raveill 2002). Hybrids can be of conservation value, but trailing tick-trefoil is not in danger of decline because both parent plants are abundant and secure (VPTC 1992).

Trailing tick-trefoil has received a state rank of SNA (conservation status not applicable) from the Pennsylvania Natural Heritage Program, using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012) because the species is not a suitable target for conservation activities. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and determined it is appropriate for trailing tick-trefoil to be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

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Vascular Plant Technical Committee, *Guidelines for the Inclusion of Hybrids*. 1992

# American Beakgrain (*Diarrhena obovata* (Gleason) Bradenburg)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**

American beakgrain, Photo: Vanessa Voelker (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to delist American beakgrain (*Diarrhena obovata)* from the list of plants classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. The common name American beakgrain is used for more than one species, *Diarrhena obovata* and *D. americana.* Therefore, to avoid confusion, the scientific name is used in this document. Botanical surveys have indicated that populations of *Diarrhena obovata* are robust and it is not in need of conservation in Pennsylvania.

*Diarrhena obovata* is a perennial member of the Grass family (Poaceae) with thick, scaly rhizomes and large grains. It is a native cool season grass, meaning it grows during the cooler period of the year. It is found in rich woods (Rhoads & Block 2007).

In North America, this species is found mostly in the central United States and Canada, ranging from Ontario south through Minnesota and New York to Texas and Virginia. It is considered rare in the north and south edges of its range (Kartesz 2015, NatureServe 2020). In Pennsylvania, it is known to occur mostly in the southcentral and southeast part of the commonwealth (PNHP 2020). There are currently five counties in which it is found, from the southwest to the northeast (Kartesz 2015).

The number of known extant populations of this species has increased in recent years. This may be due to increased survey efforts and better understanding of the species' habitat, or because the species is expanding its range in Pennsylvania. A recent publication suggests *Diarrhena obovata* was introduced into Virginia from the Midwest, potentially as an invasion (Lea 2012). While this paper referred to Virginia specifically, similar situations are present in Pennsylvania. In 1993, the *Vascular Flora of Pennsylvania, Annotated Checklist and Atlas* identified four known populations in two counties in the southwestern part of the Pennsylvania (Rhoads & Klein 1993). By 2000, it was estimated that there were approximately 200,000 plants in Pennsylvania. By 2003, more surveys had been done and 32 populations were identified as extant, with close to a million plants in some populations.

Field surveys have shown that *Diarrhena obovata* grows in floodplain habitat ranging from shrubby to old-growth forest, indicating that the species is not restricted by habitat type, and able to

utilize a range of habitats. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the plant has. A species that has few populations, with low estimates of viability, the lower chance at persistence in the Commonwealth and the higher the chances of extirpation from the Commonwealth. There are approximately 32 known extant populations in Pennsylvania and likely more. Twelve of the known populations have an estimated viability of excellent, good or fair. The best sites were found on moist, floodplain woods, bottomland terrace or seasonally flooded woods (PNHP 2020). The majority of highly viable populations indicates the plant is stable and not in danger of extirpation from Pennsylvania.

*Diarrhena obovata* has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and determined it is appropriate for *Diarrhena obovata* to be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Fall Witch-Grass (*Digitaria cognatum* (Schultes) Pilger)

**Current Status: Pennsylvania Threatened**
**Proposed Status: Delist**

Fall witch-grass; Photo: Curtis Eckerman (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove fall witch-grass from the list of plants classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. Although it is uncommon in the commonwealth, it grows abundantly in its natural range and has not experienced population declines from historical records.

Fall witch-grass is a member of the Grass Family (Poaceae), with stems growing from a tufted, knotted base. It is a native perennial warm season grass, growing in the spring as soil temperature warms and continues through the summer and fall. It has a very open, spreading flower head that blooms in July through early October in sandy moist soil (Rhoads & Block 2007).

In North America, fall witch-grass is found in the eastern half of the United States and in some parts of central Canada. It appears to be common in most states (Kartesz 2015), but is considered critically imperiled in Virginia and Ontario (NatureServe 2020). In Pennsylvania, it primarily grows in Erie County and on the Coastal Plain in the southeast (Rhoads & Block 2007).

While fall witch-grass is not found throughout the commonwealth, it is common in sandy, open, coastal ground. Fall witch-grass also has not experienced any significant population declines from historical records (Rhoads & Klein 1993). The lack of a significant population decline and its current abundance indicates that this species is not at risk of becoming endangered in Pennsylvania. Records show this species being locally common on sandy embankments in Erie, old sand dunes in Northumberland County or wet, sandy soil in Bucks County (PNHP 2020). Fall witch-grass is a species that depends on disturbance such as fire, shifting sands, or periodic mowing to keep habitats open. It has been found to occur in disturbed areas as well as its native habitat, suggesting that habitat quality is not a limiting factor.

Fall witch-grass has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The

Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and determined it is appropriate for fall witch-grass to be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

Literature Cited:

Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

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## Seashore Saltgrass (*Distichlis spicata* (L.) Greene)

**Current Status: Pennsylvania Extirpated**
**Proposed Status: Delist**

Seashore saltgrass, Photo: Remington Jackson (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove seashore saltgrass from Pennsylvania Extirpated within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is no longer considered native to Pennsylvania's flora and so is not in need of conservation and should be removed from the list of classified plants in Pennsylvania.

Seashore saltgrass is a small perennial grass in the Grass Family (Poaceae) growing about a half-foot to one and one-half feet tall with rigid leaf blades. It blooms from August to October (Rhoads & Block 2007).

In North America, seashore saltgrass ranges through most of southern Canada and the United States. It is mainly found in the western half of the United States, as well as along the Atlantic coast (Kartesz 2015).

In Pennsylvania, there are no current extant populations of seashore saltgrass. It is known from Pennsylvania from herbarium specimens collected from sites in Philadelphia and Delaware Counties. The last time it was observed or collected was in 1943 in ballast and waste ground in Delaware County (Rhoads and Klein 1993). It was assumed to be extirpated because of the urbanization in the Philadelphia area. However, under additional scrutiny, it has been determined that this record of seashore saltgrass is non-native. Pennsylvania does not have the necessary habitat for seashore saltgrass to thrive, and the 1943 Delaware County occurrence is believed to be introduced accidentally by ship traffic.

Along the eastern and Gulf Coast of the United States, seashore saltgrass is found mainly coastal salt marsh communities. It is regionally abundant in the nearby Delaware Bay area. The area in which the historical records were found are not coastal salt-marsh communities, but tidal-influenced mudflats. The record of seashore saltgrass in Pennsylvania is likely a waif, or a species that is alien and cannot persist without human intervention.

Seashore saltgrass has not received a state rank of SNA (not applicable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). It is also

considered exotic. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and determined it is appropriate for seashore saltgrass to be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

Literature Cited:

Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA.

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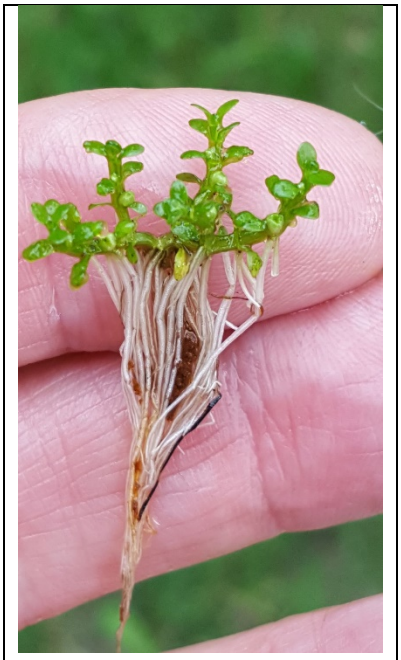
## Small Waterwort (*Elatine minima* (Nutt.) Fisch. & Mey)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**



Small waterwort, Photo: Norma Malinowski (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove small waterwort from the list of plants classified as Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants. Field surveys showed that small waterwort is more frequent and widespread than previously thought and does not require a conservation status.

Small waterwort is a member of the Waterwort Family (Elatinaceae), which consists of small, aquatic plants. Small waterwort grows submerged in shallow water along the shorelines of ponds, lakes, and artificial impoundments. Individual plants are usually less than two inches in height, and bloom from July through August (Rhoads & Block 2007).

In North America, small waterwort can be found throughout the northeast, south along the Atlantic coast to South Carolina, and through eastern Canada and into the northern Midwest (Kartesz 2015). It is critically imperiled (S1, at very high risk of extirpation) in Vermont, Maryland, Virginia and South Carolina; imperiled (S2, at high risk of extirpation) in Delaware; vulnerable (S3, at moderate risk of extirpation) in New Jersey; and apparently secure (S4, uncommon but not rare) in Pennsylvania and New York (NatureServe 2020).

In Pennsylvania, it is found in the northeastern and southeastern counties of the state (Rhoads & Klein 1993). Small waterwort was originally listed as Tentatively Undetermined because it was identified as plant species that was believed to be in danger of population decline, but which the Department could not include within another classification at that time. Uncertainties due to limited evidence within historical records or insufficient data contributed to the decision to list this species as Tentatively Undetermined. There were approximately 19 sites known in 1993 and it was believed to be geologically restricted to relatively pristine glaciated lakes and ponds of northeastern Pennsylvania. There was also concern about herbicides in the species' habitat. Since then, more field surveys have found small waterwort is more common and found in artificial impoundments such as reservoirs. In addition, small waterwort can disperse and colonize new locations.

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. There are at least 36 known populations of small waterwort in Pennsylvania. All but one have received an estimate of fair viability or better, with the majority having an estimated good or excellent viability. This means this species has fairly secure and viable populations, that are not very likely to become locally extirpated.

Small waterwort has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and determined it is appropriate for small waterwort to be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Capitate Spike-Rush (*Eleocharis olivacea* Torr.)

**Current Status: Pennsylvania Rare**
**Proposed Status: Delist**

Capitate spike-rush, Photo: Mark Kluge (CC BY-NC-ND, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove capitate spike-rush from the list of plants classified as Pennsylvania Rare within the regulation, Conservation of Pennsylvania Native Wild Plants. Although not common in the commonwealth, this species is more frequent than previously believed and does not appear to be experiencing population declines.

Capitate spike-rush is a perennial plant of the Sedge Family (Cyperaceae) which are herbaceous plants usually with three-angled stems and linear leaves. Capitate spike-rush stems grow out of clusters from thin rhizomes, with the aerial stem often less than three inches tall and producing a single flower head. It grows in bogs and various types of open wetlands, especially those with peaty-sandy substrate (Rhoads & Block 2007).

In North America, the range of capitate spike-rush encompasses most of the eastern half of North America, excluding West Virginia, Missouri and Tennessee. Capitate spike-rush's range extends southwest into Texas and is rare in many of the states where it has been analyzed (Kartesz 2015, NatureServe 2020). In Pennsylvania, this species is found mostly in the northeastern and northwestern counties.

Capitate spike-rush was originally listed as Tentatively Undetermined in 1988; the Department updated the classification in 1993 to Pennsylvania Rare based on information collected by the Pennsylvania Biological Survey's Vascular Plant Technical Committee. More recently, targeted field surveys have shown that this species is more common than previously thought; its small size and life history makes it easily overlooked. Capitate spike-rush produces seeds which remain viable in the soil for many years, growing when conditions are favorable but remaining dormant when conditions are unfavorable. Consequently, some years the plants are visible and others they are not. Many of the recently observed populations were found in peaty soils during a dam drawdown or in de-watered beaver ponds, often on protected public land. Since this species often grows in habitats that are not easily accessible (such as thin bog mats and exposed peat islands) and can persist buried in peat for extended periods it can be overlooked (PNHP 2020).

Based on field work of the past twenty years, capitate spike-rush populations have now been documented in at least 40 locations in Pennsylvania, particularly in the glaciated portions. Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival the plant has. The majority of the known sites for this plant are in excellent to fair estimated viability, meaning the populations do not appear to be in danger of local extirpation. The populations of this species may consist of hundreds of plants (PNHP 2020).

Capitate spike-rush has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that capitate spike-rush be delisted.

The Department has reviewed all information and made the determination that capitate spike-rush should be removed from the list of Pennsylvania Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Wild Rye (or Awnless Wild Rye) (*Elymus virginicus* L. var. *submuticus* Hook., Synonym: *Elymus curvatus* Piper)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**

Awnless wild rye, Photo: New York Botanical Garden (CC BY 4.0)

The Department of Conservation and Natural Resources proposes to remove wild rye from the list of plants classified as Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants. This taxon is no longer considered native to Pennsylvania's flora and so is not in need of conservation, and should be removed from the list of classified plants in Pennsylvania.

Wild rye (*Elymus virginicus*) is a perennial member of the Grass Family (Poaceae) with densely tufted stems culms about one and one-half foot tall to five feet tall. The variety *submuticus* (known as awnless or beardless wild rye) is distinguished from the typical variety by much shorter awns and rolled-in upper leaves. It blooms June through August and grows in moist soils of open forests, thickets, grasslands, ditches, disturbed ground and bottomlands (Barkworth et al 2007, Weakley 2020).

The awnless (or nearly awnless) variety of wild rye (*Elymus virginicus* var. *submuticus*, treated in Flora of North America and Flora of Southeastern United States as a separate species, *Elymus curvatus*) is native to the Midwest prairie region and westward of North America (Barkworth et al. 2007, Weakley 2020). It is occasionally found as an introduced species, especially along railroad tracks, further east according to coauthor of the *Elymus* treatment in Flora of North America (Campbell 2017, pers. comm.). It is not considered native in Pennsylvania (NatureServe 2020).

Wild rye (variety *submuticus*) was originally listed as Tentatively Undetermined in 1988 because it was identified as a species in need of conservation but the Department needed more information to properly classify it. There were taxonomic uncertainties and data was limited. Since then, new information has made it clear that this species is not native in Pennsylvania, the taxon is not of conservation concern in Pennsylvania. Herbarium specimens were analyzed and a 1937 collection from along a railroad in Schuylkill County has been determined by Campbell to be this taxon; a 1952 specimen from Bucks County is of dubious identity and might be a second historical record (2017 pers. comm.). The nearest record representing a native occurrence seems to be in Illinois (Kartesz 2015). This indicates

that the known historical occurrences of this variety of wild rye were waifs, alien species found in the wild that only persists a few generations and disappears.

This variety of wild rye has received a state rank of SNA (not applicable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data because the variety is not recognized and the species is widespread and common. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that wild rye be delisted.

The Department has reviewed all information and made the determination that wild rye should be removed from the list of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Small Floating Mannagrass (*Glyceria borealis* (Nash) Batch.)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**


Small floating mannagrass, Photo: Tyler Miller, (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to delist small floating mannagrass from the list of Pennsylvania Endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is not in danger of extirpation from the commonwealth and does not need classification.

Small floating mannagrass is a perennial member of the Grass Family (Poaceae) that grow to 1.2 meters tall and will root from the lower nodes. This cool-season grass grows in shallow lakes and streams and blooms in July (Rhoads and Block 2007).

In North America, small floating mannagrass is found in southern Canada and in the eastern United States as far south as Pennsylvania and Indiana. It is found in many states west of the Rocky Mountains (Kartesz 2015). It is considered rare or extirpated in several states in which it has been evaluated (NatureServe 2020). In Pennsylvania, it mostly grows in the northeast, but populations have been found scattered elsewhere through the commonwealth (Barkworth et al. 2007, Rhoads and Block 2007). Pennsylvania is at the southern edge of the species' range in the east.

This species is not limited by habitat quality or availability. It can be found in disturbed areas such as eutrophic lakes, beaver ponds and highly managed ponds. In the southern portion of its range, small floating mannagrass has been noted to be found primarily in subalpine and alpine areas (Barkworth et al. 2007). Accordingly, it was once thought that this species was restricted to the glacial lake region of northeastern Pennsylvania. However, the species has since been found outside that region inhabiting disturbed areas, including impoundments. Currently, there are at least 25 known populations with about 5,000—16,000 individuals, and more likely undiscovered (PNHP 2020).

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation of viability, the greater chance at continued survival. The majority of populations have been estimated at an excellent to good viability. This includes populations found in natural settings such as glacial lakes with floating bog mats, artificial lakes, and other dammed waterways (PNHP 2020). The fact that most

populations are considered to have a high viability, and the sizes of these populations are large, indicates that the populations are not in danger of local extirpations. This supports the conclusion that this species is not in danger of extirpation from the commonwealth.

This species has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that small floating mannagrass should be removed from the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Carolina Milkvine (*Matelea carolinensis* (Jacq.) Woods.)

**Current Status: Pennsylvania Extirpated**
**Proposed Status: Delist**

Carolina milkvine, Photo: Lauren Long (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to delist Carolina milkvine from the classification of Pennsylvania Extirpated within the regulation, Conservation of Pennsylvania Native Wild Plants. The records for Carolina milkvine in Pennsylvania are not considered to represent natural occurrences of this species.

Carolina milkvine is a perennial member of the Milkweed Family (Asclepiadaceae). It has a twining vine with milky sap and short hairs. The leaves are arranged opposite each other on the stem and have a heart-shaped base. Each stalk contains five to ten maroon flowers with five petals. Habitat includes moist woods, thickets, river banks, ditches and fence rows (NatureServe 2020), and it flowers in June and July (Gleason and Cronquist 1991).

In North America, Carolina milkvine is found in the southeastern portion of the United States, from the Chesapeake states south through Alabama and west to Texas (Kartesz 2015). In Pennsylvania, it was originally listed as Pennsylvania Extirpated in 1988 because this species was known from two historical herbarium records. When the records were reviewed by botanists, one was re-annotated as a different species. The second is considered a garden escape and not a native plant. In addition, this species has not been observed during any more recent surveys in appropriate habitat. Therefore, no known native records for Carolina milkvine exist in Pennsylvania.

This species has received a state rank of SNA (state rank not applicable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that Carolina milkvine should be removed from the classification of endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Evergreen Bayberry (*Myrica heterophylla* Raf.)

**Current Status: Pennsylvania Extirpated**
**Proposed Status: Delist**


Evergreen bayberry, Photo: Nate Hartley (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to delist evergreen bayberry from the classification of Pennsylvania Extirpated within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is not found in Pennsylvania.

Evergreen bayberry is an evergreen shrub of the Bayberry Family (Myricaceae). Like many species in this family, evergreen bayberry leaves are leathery and aromatic when crushed. Reported habitat includes dry to moist woods or thickets (Rhoads and Klein 1993), or swamps and moist, low ground on the coastal plain It flowers in April or May (Gleason and Cronquist 1991). Although Rhoads and Klein (1993) reported records of this species, by 2007 it was determined this species was not present in Pennsylvania (Rhoads and Block 2007).

In Pennsylvania, evergreen bayberry was originally listed as extirpated because it was thought that the plant was last collected in 1947 (Rhoads and Klein 1993). The Pennsylvania record of evergreen bayberry was based on two sterile specimens that were later reidentified as northern bayberry (*Morella pensylvanica*). Northern bayberry is found throughout most of Pennsylvania and is considered apparently secure in Pennsylvania (Kartesz 2015, NatureServe 2020). Evergreen bayberry is not known from any other location or herbarium record in Pennsylvania. Therefore, there is no evidence that evergreen bayberry is a part of the current or historic flora of Pennsylvania.

Evergreen bayberry has received a state rank of SNA (state rank not applicable) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that evergreen bayberry should be removed from the classification of endangered plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Sourwood (*Oxydendrum arboreum* (L.) DC.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**

Sourwood, Photo: Steve Grund, Western Pennsylvania Conservancy/Pennsylvania Natural Heritage Program

The Department of Conservation and Natural Resources proposes to delist sourwood from the list of plants classified as Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants. Sourwood is found in great enough numbers in the commonwealth that it does not require classification.

Sourwood is a member of the Heath Family (Ericaceae), which includes shrubs or small trees that commonly grow in acidic soils. Sourwood is a small native tree found within forests and at edges in sunny locations, where there are fewer competitors. It grows to 65 feet in height and can easily be identified by the unique bell-shaped white flowers in a long, drooping spray. It blooms in August and is found in dry woods and along slopes (Rhoads & Block 2007).

In North America, sourwood's native range extends from Pennsylvania east to states bordering the Mississippi and south to Texas and Florida (Kartesz 2015, NatureServe 2020). Sourwood is considered exotic in New York, Rhode Island, and Illinois. It is ranked as critically imperiled (S1, at very high risk of extirpation) in Maryland; vulnerable (S3, at moderate risk) in Indiana; and apparently secure or secure (S4 or S4, not at risk of extirpation) in four other states including Pennsylvania (NatureServe 2020). It is often used as an ornamental planting, due to its bright crimson leaves in the fall and showy flowers which has led to garden escapes. In Pennsylvania, this species is native and primarily found in the southwestern counties (Kartesz 2015), which is the northern edge of its range.

Sourwood was originally listed as Tentatively Undetermined because there was concern that this species may be declining in the commonwealth, but enough information was lacking to place it in another classification. Its geographically limited distribution in Pennsylvania was one reason this species' status was reviewed. It was considered for reclassification as Pennsylvania Rare. however, over the past twenty years, the Department has observed that while sourwood is not common throughout the entire commonwealth, it is abundant in the southwest. Approximately 30 populations are currently extant in Pennsylvania, with additional populations likely. Most populations have large numbers of individuals. Combined, they are estimated to contain between 25,000 to 30,000 individuals. Sourwood can grow in both natural and disturbed conditions, such as formerly mined land, rights-of-way and old

agricultural fields. Suitable habitat of this nature is abundant within its geographic range, which may be expanding northwards (Speedy 2017).

These findings are supported by research commissioned in 2013 through the Wild Resource Conservation Fund. Researchers analyzed existing herbarium specimens and conducted additional field surveys of historical locations and suitable habitat, concluding that the number of individuals across populations, ability to use a variety of disturbed habitats, and indications of possible population expansion warrant delisting of this species (Speedy 2017). The Department has concluded that, while this species may be limited geographically, it is not found in low numbers and is not in need of conservation within the commonwealth.

Sourwood has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that sourwood should be removed from the list of Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants.

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Program Grants #013486 and #14513. Prepared by Western Pennsylvania Conservancy/Pennsylvania Natural Heritage Program, in Partnership with Cleveland Museum of Natural History, Carnegie Museum of Natural History, and Morris Arboretum of the University of Pennsylvania. Entry for *Oxydendrum arboreum*.

## Yellow Watercress (*Rorippa palustris* (L.) Besser var. *palustris* (synonym: *Rorippa palustris* ssp. *palustris*))

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**


Yellow watercress, Photo: sgraue (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to delist yellow watercress from the classification of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants. Recent research has shown that this plant is common in Pennsylvania and does not require classification.

Yellow watercress is a member of the Mustard Family (Brassicaceae), comprised of herbs with pungent watery juice and four flower petals. Yellow watercress has a taproot and is an annual or biennial. It has four yellow flower petals, and usually grows erect from one to three feet high. It is found on wet shores and low open ground and blooms May through September (Rhoads & Block 2007). Weakley (2020) describes its habitat as bogs and seeps. Al-Shebaz (2020) states that *Rorippa palustris* subspecies *palustris* ranges throughout North America except some portions of Canada.

Yellow watercress was originally listed as Tentatively Undetermined because of concern the then variety, now subspecies, *palustris* had limited populations but the Department did not have enough information to place it within another classification. At the time of listing, it was thought that yellow watercress was experiencing decline and there were also questions about taxonomy, thus it was listed as Tentatively Undetermined. Weakley (2020) follows Al Shebaz (2020), recognizing a broad concept of *Rorippa palustris* ssp. *palustris* that includes ssp. *fernaldiana*, which is common and widespread in Pennsylvania.

Yellow watercress (*Rorippa palustris* ssp. *palustris*) has received a state rank of S5 from the Pennsylvania Natural Heritage Program using the national NatureServe methodology. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that yellow watercress should be removed from the classification of Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants due to taxonomic revisions and ecological information which indicates it is not a conservation concern in Pennsylvania.

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## Meadow Willow (*Salix petiolaris* Sm.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**


Meadow willow, Photo: J. L. Mason (CC BY-NC 4.0, iNaturalist).

The Department of Conservation and Natural Resources proposes to remove meadow willow from the classification of the Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants. This species is more common than previously thought and is not in need of conservation in the commonwealth.

Meadow willow is a shrub in the Willow Family (Salicaceae) that grows in meadows and swales. It can grow to about 20 feet and has yellowish, hairy twigs and lance-shaped leaves. It flowers just before the leaves emerge (Rhoads and Block 2007).

In North America, meadow willow is found in Canada and the northeastern quarter of the United States, including New England and the Great Lakes States west to the Mid-West. Pennsylvania is at the southern edge of its range (Kartesz 2015, NatureServe 2020). Meadow willow is scattered throughout Pennsylvania, but populations are concentrated in the northwest portion of the commonwealth (PNHP 2020).

Meadow willow was originally listed as Tentatively Undetermined because the species seemed to be experiencing decline, but the Department did not have more information to place the species in another classification. Botanical field surveys have found that meadow willow is more common than previously thought. Targeted field work was very successful in relocating historic populations in Pennsylvania, many of which were found to be quite large. There are 49 recorded populations scattered across Pennsylvania, from Erie to Bucks counties in wet meadows, fens, along streams and lakeshores, and in forest clearings in moist conditions with direct sunlight. Fifteen records are considered historical, many dating back to the early 1900s; these are sites where the species has not been recently documented. One record was revisited but not re-located, and may be extirpated. Thirty-two populations have been re-located during surveys and verified as currently extant. Willow are notoriously difficult to identify, and this species is almost certainly under-documented because it can closely resemble silky willow (*Salix sericea*), a more common species. Because meadow willow has a robust number of populations scattered throughout the state, this species does not warrant additional protection measures.

This species has received a state rank of S4 (apparently secure) from the Pennsylvania Natural Heritage Program, using national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that meadow willow should be removed from to the list of plants within the regulation, Conservation of Pennsylvania Native Wild Plants, because it is not at risk of extirpation or decline in the commonwealth.

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## Lance-Leaved Sage (*Salvia reflexa* Hornem.)

**Current Status: Tentatively Undetermined**
**Proposed Status: Delist**


Lance-leaved sage, Photo: bennyep (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove lance-leaved sage from the list of plants classified as Tentatively Undetermined within the regulation, Conservation of Pennsylvania Native Wild Plants. Recent information indicates this species is not native to Pennsylvania and therefore, not in need of classification.

Lance-leaved sage is a member of the Mint Family (Lamiaceae), which is a family of plants with square stems and opposite leaves that are usually fragrant. Lance-leaved sage is an annual plant that grows between one to two feet in height, is slightly fuzzy, and has lance-shaped or linear leaves. It is found in stream banks, old fields, roadsides, cinders, and quarry waste, and it flowers from June-September (Rhoads & Block 2007).

In North America, lance-leaved sage is found from Arizona and Nevada east to Louisiana, and north to Saskatchewan and Quebec (Kartesz 2015). It is considered imperiled in Utah and Wyoming and may be extirpated from Arkansas and Tennessee. It is considered nonnative in many states east of the Mississippi River, including Pennsylvania, West Virginia, New Jersey, Michigan, and Illinois (NatureServe 2020). Biota of North America considers it as present but a non-native (Kartesz 2015).

In Pennsylvania, lance-leaved sage is found mostly in the south, often in disturbed habitat such as roadsides and quarry spoil (Rhoads and Block 2007). Lance-leaved sage was originally added to the list of Tentatively Undetermined plants because it was a species that was potentially in need of conservation, but for which the Department needed more information to appropriately classify it. In 1993, eight populations in six counties in the southern half of the state were reported in the *Vascular Flora of Pennsylvania* (Rhoads and Klein). Historical specimens collected in 1918 and 1942 from Bedford and Allegheny counties were reviewed by botanists. No collections of this species from Pennsylvania exist prior to 1918 and lance-leaved sage is not mentioned in earlier botanical sources for the area (Gray 1889). Kartesz considers it a species that is alien and cannot persist without human intervention in Pennsylvania (2015). Lance-leaved sage is found along roadsides and in gravelly areas where it would be readily observed by botanists if it were present earlier in the twentieth century, when botanists were active across Pennsylvania. Since it tends to be only found in areas associated with human disturbance

or travel, it is likely to have been spread by human activities. The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted because it is not native to Pennsylvania.

The Department has reviewed all information and made the determination that lance-leaved sage should be removed from the list of Pennsylvania Tentatively Undetermined plants within the regulation, Conservation of Pennsylvania Native Wild Plants.

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## Cranefly Orchid (*Tipularia discolor* (Pursh) Nutt.)

**Current Status: Pennsylvania Rare**
**Proposed Status: Delist**

Cranefly orchid leaf top and bottom, Photo: Rebecca Bowen, PA DCNR

The Department of Conservation and Natural Resources proposes to delist cranefly orchid from the list of plants classified as Pennsylvania Rare, within the regulation, Conservation of Pennsylvania Native Wild Plants. Field surveys have shown that this species is more common than previously thought and is not in need of listing.

Cranefly orchid is a member of the Orchid family (Orchidaceae), herbaceous perennials with parallel-veined leaves and irregular flowers. In fall and winter, cranefly orchid produces a single stem and leaf from the underground corm. The leaf is parallel veined, green on top and purple on the underside. From late June to August this species produces a flower stalk of green-purple flowers that are three-lobed with a spur at the base of the flower (Rhoads & Block 2007). The leaf is not present when the plant blooms, making fall and winter the best times to observe the species.

In North America, cranefly orchid occurs across the eastern United States from New York and Michigan south through Florida and west to Texas (Kartesz 2015). It is ranked critically imperiled (at very high risk of extirpation) at the northern edge of its range in New York, Massachusetts, Michigan, and Illinois; imperiled (at high risk of extirpation) in Oklahoma; and vulnerable (moderate risk of extirpation) in Missouri. It is considered apparently secure in Pennsylvania, New Jersey, West Virginia, Virginia and Florida (NatureServe 2020).

In Pennsylvania, cranefly orchid is found 13 counties in the southeast portion of the commonwealth. As of 2020, there are 83 known populations in Pennsylvania. A population estimate across these sites is approximately 7,000 total plants (PNHP 2020). This is a marked increase from 1993, when only 15 populations were known in three counties in southeast Pennsylvania (Rhoads & Klein, 1993). Typically, this species is found in growing in mature forests in rich soils or near streambanks. In the last decade, additional botanical surveys conducted during the winter months have found this plant growing at the edge of trails on disturbed soils and near the edges of woodlots and agricultural fields.

Botanists estimate the viability of each population based on size, number of reproducing members, threats and other criteria. The more populations a plant species has, with a higher estimation

of viability, the greater chance at continued survival. Of the 83 populations of cranefly orchid known in Pennsylvania, five have been estimated to have good viability, nine have good-to-fair estimated viability, and 16 have fair viability. An additional eight have fair-to-poor viability, and 13 have poor viability. There are 30 populations that have no estimates of viability but considered extant. Two cranefly orchid sites have been surveyed for but not relocated in recent surveys, however they have not yet been declared historic or extirpated. There are 12 sites that have either historic populations or are extirpated (PNHP 2020). The populations with good and good-to-fair estimated viability were found in hardwood forests, often dominated by beech and tulip trees, usually on a slope, and often in protected locations like parks. Threats to cranefly orchid include habitat conversion, invasive species competition and deer browse. Despite the threats and the fact that some sites have poor viability estimates, the number of populations and plants indicates cranefly orchid is not in need of conservation. The leaves and flowers are not present at the same time. The best time to survey for cranefly orchid is fall and winter when the leaf is visible because the brownish-purple flowers are not obvious and may not bloom every year. Most surveys occur in the growing season which would not observe the leaf and could overlook the camouflaged flower. For these reasons, it is likely that cranefly orchid has been under-surveyed historically. Targeted surveys have shown that it is more common than previously thought. Although it is not widespread across all of Pennsylvania, it is locally common and not in danger of extirpation from the commonwealth.

This species has received a state rank of S4S5 (Apparently Secure/Secure), from the Pennsylvania Natural Heritage Program using the national NatureServe methodology based on analysis of the available data with the NatureServe Rank Calculator tool (Faber-Langendoen et al. 2012). The Pennsylvania Biological Survey's Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that cranefly orchid should be delisted from the classification of Rare plants within the regulation, Conservation of Pennsylvania Native Wild Plants. It is uncommon but not rare in most counties and is widespread in a few southeastern counties. Therefore, the Department has determined it does not require statewide protection.

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## New England Grape (*Vitis novae-angliae* Fernald)

**Current Status: Pennsylvania Endangered**
**Proposed Status: Delist**

New England grape, Photo: Zihao Wang (CC BY-NC 4.0, iNaturalist)

The Department of Conservation and Natural Resources proposes to remove New England grape from the list of plants classified as Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants. New England grape has been found to be a sterile hybrid and is not in danger of decline.

New England grape is a member of the Grape Family (Vitaceae), with woody vines, peeling bark, and stems and leaves that are hairy when young, but turn smooth when mature. It blooms in May and produces clusters of small dark fruit in August through November. It is found in moist mountain woods, ravines, and roadside thickets (Rhoads & Block 2007).

In North America, New England grape is found in the mid-Atlantic states to New England and north into Ontario (NatureServe 2020). In Pennsylvania, it is scattered throughout the state, from the southwest through the northeastern corner of the state (Kartesz 2015).

New England grape was originally listed as Pennsylvania Endangered because only four populations were known at that time (Rhoads & Klein 1993). However, subsequent research has determined that this taxon is a sterile hybrid of two common species, fox grape (*Vitis labrusca*) and frost grape (*Vitis riparia*) (Moore 1991). Hybrids can be of conservation value, but New England grape is not in danger of decline because both parent plants are abundant and secure (VPTC 1992): fox grape and frost grape are both common and widespread throughout Pennsylvania (Kartesz 2015). Although the offspring are sterile, the parents will continue to produce them.

Due to this, New England grape has received a state rank of “hybrid without conservation value” from the Pennsylvania Natural Heritage Program using the national NatureServe methodology (NatureServe 2020). The Pennsylvania Biological Survey’s Vascular Plant Technical Committee has recommended that this plant be delisted.

The Department has reviewed all information and made the determination that New England grape should be removed from the list of Pennsylvania Endangered within the regulation, Conservation of Pennsylvania Native Wild Plants.

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