Wool-grass – Mannagrass Mixed Shrub Marsh

System: Palustrine
Subsystem: Herbaceous
PA Ecological Group(s): Vernal Pool

Global Rank: GNR
State Rank: S4

General Description

The Wool-grass – mannagrass mixed shrub marsh pool occurs in seasonally to somewhat permanently inundated depressions throughout Pennsylvania. The type can be described as a seasonally flooded, herbaceous swamp with well defined boundaries; some pools of this type exhibit somewhat poorly defined boundaries. The surrounding plant community varies with region, soils, and geology. The pools are generally deeper than those of the Rice cutgrass – bulrush marsh pool and may not dry completely over the summer months.

This community is characterized as an open, seasonally to permanently flooded depression, dominated by herbaceous and shrubby species; wool-grass (*Scirpus cyperinus*) is usually dominant. Common co-dominant and associate species include floating mannagrass (*Glyceria septentrionalis*), rattlesnake mannagrass (*Glyceria canadensis*), rice cutgrass (*Leersia oryzoides*), pale meadowgrass (*Torreyochloa pallida*), sedges (e.g. *Carex crinita, C. lurida*, *C. lupulina*, *C. vesicaria*, *C. folliculata*), three-way sedge (*Dulichium arundinaceum*), mild water-pepper (*Persicaria hydropiperoides*), marsh-purslane (*Ludwigia palustris*), marsh St. Johns-wort (*Triadenum fraseri*). The federally endangered species, northeastern bulrush (*Scirpus ancistrochaetus*), is also found in this type. Shrubs include hardhack (*Spiraea tomentosa*), meadow-sweet (*S. alba*), northern arrow-wood (*Viburnum recognitum*), highbush blueberry (*Vaccinium corymbosum*), and buttonbush (*Cephalanthus occidentalis*). Canopy trees, which are limited to the pool margins, most often include white oak (*Quercus alba*), sourgum (*Nyssa sylvatica*), and red maple (*Acer rubrum*).

Rank Justification

Uncommon but not rare; some cause for long-term concern due to declines or other factors.

Identification

- Open, seasonally flooded depression, dominated by herbaceous plants, usually graminoids.
- Moderately deep water for vernal pools, 1-3 feet in the spring and composed of herbaceous and shrubby plant species
- “Marsh-like” – pool boundaries are sometimes poorly defined and may not dry completely over the summer months
- Wetlands may be influenced by groundwater

Characteristic Species

Trees

- White oak (*Quercus alba*)
- Blackgum (*Nyssa sylvatica*)
- Red maple (*Acer rubrum*)

Shrubs

- Steeple-bush (*Spiraea tomentosa*)
- Meadow-sweet (*Spiraea alba*)
- Northern arrow-wood (*Viburnum recognitum*)
- Highbush blueberry (*Vaccinium corymbosum*)
- Buttonbush (*Cephalanthus occidentalis*)
- Winterberry (*Ilex verticillata*)

Herbs

- Wool-grass (*Scirpus cyperinus*)
- Floating mannagrass (*Glyceria septentrionalis*)
- Rattlesnake mannagrass (*Glyceria canadensis*)
- Rice cutgrass (*Leersia oryzoides*)
- Pale meadowgrass (*Torreyochloa pallida*)
- Sedge (*Carex crinita*)
- Sedge (*Carex lurida*)
- Sedge (*Carex lupulina*)
- Sedge (*Carex vesicaria*)
- Sedge (*Carex folliculata*)
- Three-way sedge (*Dulichium arundinaceum*)
- Mild water-pepper (*Persicaria hydropiperoides*)

- Marsh-purslane (*Ludwigia palustris*)
- Marsh st. johns-wort (*Triadenum fraseri*)
- Northeastern bulrush (*Scirpus ancistrochaetus*)

International Vegetation Classification Associations:

Scirpus cyperinus Seasonally Flooded Herbaceous Vegetation (CEGL006349)
Seasonally Flooded Mixed Graminoid Meadow (CEGL006519)

NatureServe Ecological Systems:

None

Origin of Concept

Leppo, B., Zimmerman, E., Ray, S., Podniesinski, G., and Furedi, M. 2009. Pennsylvania Statewide Seasonal Pool Ecosystem Classification: Description, mapping, and classification of seasonal pools, their associated plant and animal communities, and the surrounding landscape. Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, Pittsburgh, PA.

Pennsylvania Community Code

Similar Ecological Communities

Rice cutgrass – bulrush marsh pools are generally shallow, composed of several herbaceous species, and usually dry completely over the summer months, allowing herbaceous species to establish throughout the pool and is restricted to saddles between ridges and high plateaus within the Central Appalachian Forest Ecoregion in Pennsylvania.

Fike Crosswalk

Related to Herbaceous Vernal Pool. This type is new to the Pennsylvania Plant Community Classification developed fromstudies of vernal pool ecosystems of Pennsylvania.

Conservation Value

Vernal pools are primarily found in forested areas and are characterized by absence of fish, lack of flowing water, small size, shallow depth, and presence of plants and animals that can withstand a period of drought (Brown and Jung 2005). Their seasonal nature is important because it excludes fish that would otherwise prey upon the eggs and larvae of amphibians breeding in them.

In the mid-Atlantic states, 26 percent of all state-listed threatened and endangered amphibians are dependent on vernal pools.

Vernal pools provide critical breeding habitat for several species of amphibians and a type of crustacean that use vernal pools almost exclusively during some stage of their life cycle. The amphibian species are:

- Marbled Salamander (*Ambystoma opacum*)
- Spotted Salamander (*Ambystoma maculatum*)
- Jefferson Salamander (*Ambystoma jeffersonianum*)
- Wood Frog (*Rana sylvatica*)
- Eastern Spadefoot (*Scaphiopus holbrookii holbrookii*)
- Springtime Fairy Shrimp (*Eubranchipus vernalis*).

A plant species found only in vernal pools in Pennsylvania is the northeastern bulrush (*Scirpus ancistrochaetus*).

Threats

Threats include habitat fragmentation, alteration of hydrology and water chemistry, alteration of substrate, loss of vegetation, and global climate change.

Filling vernal pools, and disturbances to the vegetation and soil around pools from building and road construction, quarries, and logging operations lead to direct mortality of animals and habitat destruction or degradation. Vernal pools are often not identified as wetlands due to their temporary nature.

Clearing and development of adjacent land can lead to accumulation of agricultural run-off and pollution, sedimentation, and pollution in the pools. Removal or change in composition of vegetation in and around a pool affects which species can use the pool. For species that lay their eggs in plant material, loss of vegetation eliminates egg-laying sites. For species that lay their eggs in the water, removal of vegetation reduces shade.

Roads near vernal pools present a physical obstacle to animals moving from their upland feeding habitats to their vernal pool breeding habitats. Many animals are killed as they attempt these crossings. The presence of roads also provides opportunities for undesirable elements to get into the pools. Roads bring invasive plant species, sediments, and contaminants to pools through runoff. During the winter the application of road salt poses a problem for pools located near roads. As the snow melts, salt-laden water flows into these pools and increases the salinity of the water, making the water less hospitable to wildlife.

All aspects of life in a vernal pool, from amphibian migration to egg and larval development to adult feeding, thermoregulation, and reproductive success, depend on certain environmental cues and conditions. Climate change is of increasing concern for species of special concern, especially in regard to species that are geographically restricted.

Management

A natural buffer around the wetland should be maintained in order to minimize nutrient runoff, pollution, and sedimentation. Protecting vernal pools and the surrounding 1000 feet of upland habitat is

critical for protection of water quality, amphibian breeding, and terrestrial habitat for adult and juvenile amphibians. Soil erodibility in terms of the soil texture, condition of the adjacent vegetation (mature forests vs. clearcuts) and the topography of the surrounding area (i.e. degree of slope) should be considered when establishing buffers. Impervious surfaces surrounding the wetland should be minimized to prevent thermal pollution. Direct impacts and habitat alteration should be avoided (i.e. roads, trails, filling of wetland) and low impact alternatives (i.e. elevated footpaths, boardwalks, bridges) should be utilized in situations where accessing the wetland can not be avoided. Care should also be taken to control and prevent the spread of invasive species within the wetland.

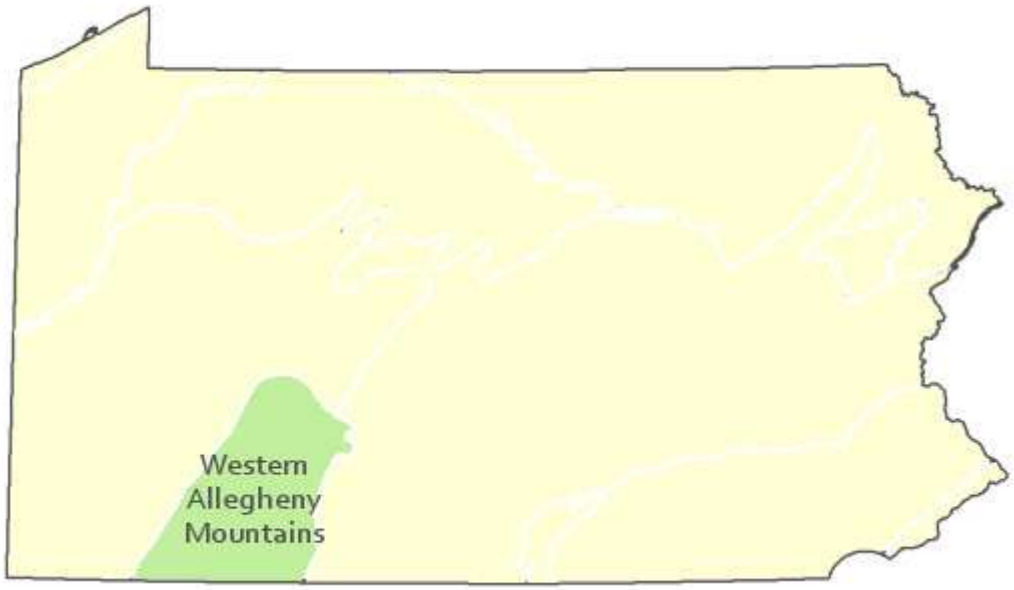
Research Needs

There is a need to collect community plot data to characterize variations of this community to assist further classification of this community.

Trends

These wetlands were probably more common but declined due to wetland draining/filling and clearing of the adjacent lands leading to increased evaporation of the standing water and sedimentation.

Range Map



Pennsylvania Range

Central Appalachian Forest Ecoregion in Pennsylvania

Global Distribution

References

Brown, L. J. and R.E. Jung. 2005. “An introduction to Mid-Atlantic Seasonal Pools,” EPA-903-B-05-001. U.S. Environmental Protection Agency, Mid-Atlantic Integrated Assessment, Ft. Meade, Maryland. epa.gov/bioiweb1/pdf/EPA-903-B-05-001AnIntroductiontoMid-AtlanticSeasonalPools.pdf

Fike, J. 1999. Terrestrial and Palustrine Plant Communities of Pennsylvania. Pennsylvania Natural Diversity Inventory. Harrisburg, PA. 87pp.

Hulse, A.C., C. J. McCoy and E. J. Censky. 2001. Amphibians and Reptiles of Pennsylvania and the Northeast. Cornell University Press, New York. 419 pp.

Leppo, B., Zimmerman, E., Ray, S., Podniesinski, G., and Furedi, M. 2009. Pennsylvania Statewide Seasonal Pool Ecosystem Classification: Description, mapping, and classification of seasonal pools, their associated plant and animal communities, and the surrounding landscape. Pennsylvania Natural Heritage Program, Western Pennsylvania Conservancy, Pittsburgh, PA.

Pennsylvania Seasonal Pool Registry: WaterLandLife.org/54

Pennsylvania Herp Identification: Online Guide to Reptiles and Amphibians of Pennsylvania: paherps.com/herps

Pennsylvania Herpetological Atlas: paherpatlas.org

The Nature Conservancy’s Vernal Pools Web site: nature.org/pavernalpools

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available: http://www.natureserve.org/explorer. (Accessed: March 10, 2010).