

**COMMON NAME (PARK-SPECIFIC): SILKY DOGWOOD SUCCESSIONAL
PALUSTRINE SHRUBLAND**

SYNONYMS

NVC English Name: Steeplebush - Blackberry species / Reed Canarygrass Shrubland
NVC Scientific Name: *Spiraea tomentosa* - *Rubus* spp. / *Phalaris arundinacea* Shrubland
NVC Identifier: C EGL006571

LOCAL INFORMATION

Environmental Description: This shrub-dominated type is associated with floodplains of small creeks, drainages, and upland edges of marshes. Many of these sites were formerly used as pasture or mowed during dry conditions. These sites are typically intermittently flooded, with portions of the shrubland saturated by groundwater seepage. Soils are typically poorly drained, such as those found in the Fredon-Halsey complex. These areas are similar to sites of Wet Meadow that have been colonized by shrubs. This association may succeed to a palustrine or floodplain forest if disturbance or management does not remove the woody species.

Vegetation Description: This association is characterized by tall and short shrubs that cover 50-90 % of the area, within a matrix of graminoids similar to those in Wet Meadow or Reed Canarygrass Riverine Grassland. The tall-shrub layer (30-60% cover) is dominated by silky dogwood (*Cornus amomum*), crack willow (*Salix fragilis*), common buttonbush (*Cephalanthus occidentalis*), and the invasive species Morrow's honeysuckle (*Lonicera morrowii*) and multiflora rose (*Rosa multiflora*). Scattered individuals of red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), and American hornbeam (*Carpinus caroliniana*) may be present in a sparse tree canopy that covers <10% of the wetland. The short-shrub layer (20-50% cover) contains silky dogwood, multiflora rose, Allegheny blackberry (*Rubus allegheniensis*), and white meadowsweet (*Spiraea alba* var. *latifolia*). The herbaceous layer typically covers 40-70% of the wetland and varies depending on the hydrology of the site. Sites with less groundwater seepage and less frequent flooding may contain some species typical of terrestrial old-field vegetation. Common species include reed canarygrass (*Phalaris arundinacea*), arrowleaf tearthumb (*Polygonum sagittatum*), hairyfruit sedge (*Carex trichocarpa*), fowl bluegrass (*Poa palustris*), climbing false buckwheat (*Polygonum scandens*), sensitive fern (*Onoclea sensibilis*), tussock sedge (*Carex stricta*), eastern marsh fern (*Thelypteris palustris*), Canadian clearweed (*Pilea pumila*), wrinkleleaf goldenrod (*Solidago rugosa*), giant goldenrod (*Solidago gigantea*), smallspike false nettle (*Boehmeria cylindrica*), jewelweed (*Impatiens capensis*), and greater bladder sedge (*Carex intumescens*). Vines such as devil's darning needles (*Clematis virginiana*), eastern poison ivy (*Toxicodendron radicans*), and fox grape (*Vitis labrusca*) can be absent or abundant. These wetlands are susceptible to invasion by purple loosestrife (*Lythrum salicaria*) and Japanese stiltgrass (*Microstegium vimineum*).

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Cornus amomum</i> , <i>Salix fragilis</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Cornus amomum</i> , <i>Lonicera morrowii</i> , <i>Rosa multiflora</i>

Herb (field)	Vine/Liana	<i>Clematis virginiana</i> , <i>Toxicodendron radicans</i> , <i>Vitis labrusca</i>
Herb (field)	Forb	<i>Polygonum sagittatum</i> , <i>Polygonum scandens</i>
Herb (field)	Graminoid	<i>Carex trichocarpa</i> , <i>Phalaris arundinacea</i> , <i>Poa palustris</i>
Herb (field)	Fern or fern ally	<i>Onoclea sensibilis</i>

Characteristic Species: *Cornus amomum*, *Lonicera morrowii*, *Salix fragilis*, *Carex trichocarpa*, *Phalaris arundinacea*, *Poa palustris*, *Polygonum sagittatum*, *Polygonum scandens*.

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	SNA	1	Successional Palustrine Shrubland	Walz et al 2006
PA	SNA	1	no crosswalk	Fike 1999

Local Range: This shrub wetland is found in a variety of palustrine settings throughout the park; however, it is most common in the broad floodplain surrounding Flat Brook.

Classification Comments: Silky Dogwood Successional Palustrine Shrubland is distinguished from other palustrine shrublands by the dominance of *Cornus amomum* with frequent *Salix fragilis*, *Lonicera morrowii*, and *Rosa multiflora* in the tall- and short-shrub layers that collectively cover 50-90% of the wetland.

Other Comments: None.

Local Description Authors: S. J. Perles (PNHP).

Plots and Data Sources: DEWA.48, DEWA.52, DEWA.58, DEWA.232.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Seasonally flooded cold-deciduous shrubland (III.B.2.N.e.)
Alliance	<i>Spiraea tomentosa</i> - <i>Rubus</i> spp. Seasonally Flooded Shrubland Alliance (A.3022)
Alliance (English name)	Steeplebush - Blackberry species Seasonally Flooded Shrubland Alliance
Association	<i>Spiraea tomentosa</i> - <i>Rubus</i> spp. / <i>Phalaris arundinacea</i> Shrubland
Association (English name)	Steeplebush - Blackberry species / Reed Canarygrass Shrubland
Ecological System(s):	Information not available

GLOBAL DESCRIPTION

Concept Summary: This wet meadow vegetation of the northeastern states occurs in a variety of settings, most frequently in low-lying areas of old fields or pastures, or beaver-impacted wetlands. The physiognomy is complex and variable, ranging from shrub thicket to herbaceous

meadow with scattered shrubs. Shrub species usually include *Spiraea tomentosa*, *Spiraea alba* var. *alba*, *Cornus amomum*, *Rubus allegheniensis*, *Rubus hispidus*, *Salix* spp., and others. *Hypericum densiflorum* often occurs in the Central Appalachians. The invasive exotic shrubs *Lonicera morrowii* and *Rosa multiflora* may be locally abundant. Associated herbaceous species are also variable in composition, depending on land-use history. Commonly seen are *Phalaris arundinacea*, *Solidago rugosa*, *Solidago gigantea*, *Solidago canadensis*, *Juncus effusus*, *Scirpus cyperinus*, *Scirpus expansus*, *Leersia oryzoides*, *Carex scoparia*, *Carex folliculata*, *Carex lurida*, *Carex lupulina*, *Carex vulpinoidea*, *Carex trichocarpa*, *Vernonia noveboracensis*, *Triadenum virginicum*, *Lycopus uniflorus*, *Impatiens capensis*, *Eupatorium maculatum*, *Polygonum sagittatum*, *Thelypteris palustris*, *Onoclea sensibilis*, *Eleocharis* spp., and others. The invasive species *Microstegium vimineum*, *Lythrum salicaria*, and *Phragmites australis* can be abundant or form monocultures in these wetlands.

Environmental Description: This wet meadow vegetation of the northeastern states occurs in a variety of settings, most frequently in low-lying areas of old fields or pastures, or beaver-impacted wetlands. These wetlands typically flood early in the growing season and may be saturated to near the surface for some of the growing season, but they are generally dry for much of the year. The substrate is typically mineral soil with a layer of muck at the surface.

Vegetation Description: The physiognomy is complex and variable, ranging from shrub thicket to herbaceous meadow with scattered shrubs. Within each wetland, species may be locally abundant and often have patchy distribution. Shrub species usually include *Spiraea tomentosa*, *Spiraea alba* var. *alba*, *Cornus amomum*, *Rubus allegheniensis*, *Rubus hispidus*, *Salix* spp., and others. *Hypericum densiflorum* often occurs in the Central Appalachians. The invasive exotic shrubs *Lonicera morrowii* and *Rosa multiflora* may be locally abundant. Associated herbaceous species are also variable in composition, depending on land-use history. Commonly seen are *Phalaris arundinacea*, *Solidago rugosa*, *Solidago gigantea*, *Solidago canadensis*, *Juncus effusus*, *Scirpus cyperinus*, *Scirpus expansus*, *Leersia oryzoides*, *Carex scoparia*, *Carex folliculata*, *Carex lurida*, *Carex lupulina*, *Carex vulpinoidea*, *Carex trichocarpa*, *Vernonia noveboracensis*, *Triadenum virginicum*, *Lycopus uniflorus*, *Impatiens capensis*, *Eupatorium maculatum*, *Polygonum sagittatum*, *Thelypteris palustris*, *Onoclea sensibilis*, *Eleocharis* spp., and others. The invasive species *Microstegium vimineum*, *Lythrum salicaria*, and *Phragmites australis* can be abundant or form monocultures in these wetlands.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Rubus allegheniensis</i> , <i>Spiraea alba</i> var. <i>alba</i> , <i>Spiraea tomentosa</i>
Herb (field)	Forb	<i>Solidago canadensis</i> , <i>Solidago rugosa</i>
Herb (field)	Graminoid	<i>Leersia oryzoides</i> , <i>Phalaris arundinacea</i>

Characteristic Species: *Polygonum sagittatum*, *Rubus allegheniensis*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Palustrine.

DISTRIBUTION

Range: Although this vegetation is widespread, its range has not been evaluated. It is known from the Central Appalachian ecoregion and the Lower New England / Northern Piedmont ecoregions, and is likely in others.

States/Provinces: NJ, PA.

Federal Lands: NPS (Allegheny Portage Railroad, Delaware Water Gap, Johnstown Flood); USFWS (Assabet River?, Great Meadows?, Great Swamp, Parker River?).

CONSERVATION STATUS

Rank: GNR (8-Jul-1999).

Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 2 – Moderate.

Comments: Information not available.

Similar Associations: Information not available.

Related Concepts: Information not available.

SOURCES

Description Authors: L. A. Sneddon, mod. S. C. Gawler.

References: Decker 1955, Eastern Ecology Working Group n.d., Fike 1999, NatureServe and Russell 2003.



Figure 76. Silky Dogwood Successional Palustrine Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.58). July 2003.



Figure 77. Silky Dogwood Successional Palustrine Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.232). August 2004.

**COMMON NAME (PARK-SPECIFIC): Highbush Blueberry - Steeplebush
Wetland**

SYNONYMS

NVC English Name: Highbush Blueberry - Swamp Azalea - Coastal Sweet-pepperbush Shrubland

NVC Scientific Name: *Vaccinium corymbosum* - *Rhododendron viscosum* - *Clethra alnifolia* Shrubland

NVC Identifier: CEG006371

LOCAL INFORMATION

Environmental Description: This palustrine shrubland occurs in small upland depressions and basins surrounding small streams and drainages. The substrate is typically very poorly drained, however, a thick organic layer is typically absent. These wetlands are seasonally to permanently flooded, often influenced by beaver or other impoundments.

Vegetation Description: This association is characterized by a substantial layer of tall shrubs that cover 30-95% of the wetland. Highbush blueberry (*Vaccinium corymbosum*) may be dominant or codominant, with swamp azalea (*Rhododendron viscosum*), maleberry (*Lyonia ligustrina*), and/or common buttonbush (*Cephalanthus occidentalis*) as codominant or as associates. Smooth alder (*Alnus serrulata*), black chokeberry (*Photinia melanocarpa*), and common elderberry (*Sambucus nigra* ssp. *canadensis*) are additional associates in the tall-shrub layer. Scattered individuals of red maple (*Acer rubrum*) and blackgum (*Nyssa sylvatica*) may occur in a sparse tree canopy, covering less than 10% of the wetland. The composition of the short-shrub layer (10-60% cover) is variable. Steeplebush (*Spiraea tomentosa*) can be prominent, along with highbush blueberry, swamp azalea, and/or bristly dewberry (*Rubus hispidus*) as associates. Other common short shrubs include sheep laurel (*Kalmia angustifolia*), red maple, black chokeberry, white meadowsweet (*Spiraea alba* var. *latifolia*), and common elderberry. The herbaceous layer can be highly variable both in percent cover (5-80%) and species composition. Common species include bur-reeds (*Sparganium* spp.), eastern marsh fern (*Thelypteris palustris*), tussock sedge (*Carex stricta*), common marsh bedstraw (*Galium palustre*), sensitive fern (*Onoclea sensibilis*), arrowleaf tearthumb (*Polygonum sagittatum*), fowl mannagrass (*Glyceria striata*), smallspike false nettle (*Boehmeria cylindrica*), prickly bog sedge (*Carex atlantica* ssp. *capillacea*), rice cutgrass (*Leersia oryzoides*), common rush (*Juncus effusus*), northern bugleweed (*Lycopus uniflorus*), earth loosestrife (*Lysimachia terrestris*), threeway sedge (*Dulichium arundinaceum*), American marshpennywort (*Hydrocotyle americana*), and Virginia marsh St. Johnswort (*Triadenum virginicum*). A layer of sphagnum (*Sphagnum* spp.) is common and varies in percent cover from 5-70%.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium corymbosum</i> , <i>Lyonia ligustrina</i> , <i>Rhododendron viscosum</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium corymbosum</i> , <i>Spiraea tomentosa</i>
Herb (field)	Forb	<i>Galium palustre</i> , <i>Polygonum sagittatum</i>

Herb (field) Graminoid *Carex stricta, Glyceria striata, Sparganium* spp.
 Herb (field) Fern or fern ally *Onoclea sensibilis, Thelypteris palustris*

Characteristic Species: *Vaccinium corymbosum, Lyonia ligustrina, Spiraea tomentosa, Dulichium arundinaceum, Sparganium* spp.

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	S3?	1	Blueberry Wetland Thicket	Walz et al. 2006
PA	S5	2	Highbush blueberry - meadow-sweet wetland	Fike 1999

Local Range: These wetlands are found occasionally throughout the park; however, they are most common in small upland depressions and basins surrounding small drainages on high elevations of the Kittatinny Ridge.

Classification Comments: Highbush Blueberry - Steeplebush Wetland is distinguished from other palustrine shrublands by the dominance or codominance of *Vaccinium corymbosum* or *Spiraea tomentosa*, often with *Rhododendron viscosum, Lyonia ligustrina,* and/or *Spiraea tomentosa* as codominant.

Other Comments: None.

Local Description Authors: S. J. Perles (PNHP).

Plots and Data Sources: DEWA.63, DEWA.94, DEWA.137, DEWA.211, DEWA.212; Fike 1999.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Seasonally flooded cold-deciduous shrubland (III.B.2.N.e.)
Alliance	<i>Vaccinium formosum</i> - <i>Vaccinium fuscatum</i> - <i>Vaccinium corymbosum</i> Seasonally Flooded Shrubland Alliance (A.992)
Alliance (English name)	Southern Highbush Blueberry - Black Highbush Blueberry - Highbush Blueberry Seasonally Flooded Shrubland Alliance
Association	<i>Vaccinium corymbosum</i> - <i>Rhododendron viscosum</i> - <i>Clethra alnifolia</i> Shrubland
Association (English name)	Highbush Blueberry - Swamp Azalea - Coastal Sweet-pepperbush Shrubland
Ecological System(s):	Atlantic Coastal Plain Northern Basin Peat Swamp (CES203.522) Atlantic Coastal Plain Northern Pondshore (CES203.518) Atlantic Coastal Plain Northern Dune and Maritime Grassland (CES203.264)

GLOBAL DESCRIPTION

Concept Summary: This is a tall-shrub swamp of seasonally flooded basins in the eastern United States. It occurs in small open basins, closed sandplain basins, and seasonally flooded zones within larger wetlands. This vegetation can occur on the margins of Coastal Plain ponds. This community is influenced by a strongly fluctuating water table with flooded conditions in spring and early summer followed by a drop in the water table below soil surface usually by late summer. There is usually a shallow organic layer often over sand. Dominant shrubs include *Vaccinium corymbosum*, *Ilex verticillata*, and *Rhododendron viscosum*. Scattered *Acer rubrum* are not uncommon. *Lyonia ligustrina* and *Cephalanthus occidentalis* are characteristic although not necessarily dominant. Associated shrub species may include *Clethra alnifolia*, *Spiraea tomentosa*, *Chamaedaphne calyculata*, *Ilex glabra*, *Leucothoe racemosa*, *Decodon verticillatus*, *Kalmia angustifolia*, *Alnus serrulata*, *Myrica gale*, and *Photinia* spp. (= *Aronia* spp.). Herbaceous composition is variable; some of the more typical species include *Osmunda cinnamomea*, *Osmunda regalis*, *Thelypteris palustris*, *Onoclea sensibilis*, *Calla palustris*, *Lycopus uniflorus*, *Triadenum virginicum*, *Glyceria striata*, *Leersia oryzoides*, *Dulichium arundinaceum*, *Juncus effusus*, and *Woodwardia virginica*. A layer of peatmoss is common and varies in cover; species include *Sphagnum fimbriatum*, *Sphagnum rubellum*, *Sphagnum magellanicum*, *Sphagnum fallax*, and *Sphagnum viridum*.

Environmental Description: This community is influenced by a strongly fluctuating water table with flooded conditions in spring and early summer, often followed by a drop in the water table below soil surface usually by late summer. There is usually a shallow organic layer often over mineral soil.

Vegetation Description: This association is a tall-shrub swamp where the dominant shrubs include *Vaccinium corymbosum*, *Ilex verticillata*, and *Rhododendron viscosum*. Scattered *Acer rubrum* are not uncommon. *Lyonia ligustrina* and *Cephalanthus occidentalis* are characteristic although not necessarily dominant. Associated shrub species may include *Clethra alnifolia*, *Spiraea tomentosa*, *Chamaedaphne calyculata*, *Ilex glabra*, *Leucothoe racemosa*, *Decodon verticillatus*, *Kalmia angustifolia*, *Alnus serrulata*, *Myrica gale*, and *Photinia* spp. (= *Aronia* spp.). Herbaceous composition is variable; some of the more typical species include *Osmunda cinnamomea*, *Osmunda regalis*, *Thelypteris palustris*, *Onoclea sensibilis*, *Calla palustris*, *Lycopus uniflorus*, *Triadenum virginicum*, *Glyceria striata*, *Leersia oryzoides*, *Dulichium arundinaceum*, *Juncus effusus*, and *Woodwardia virginica*. A layer of peatmoss is common and varies in cover; species include *Sphagnum fimbriatum*, *Sphagnum rubellum*, *Sphagnum magellanicum*, *Sphagnum fallax*, and *Sphagnum viridum*.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Ilex verticillata</i> , <i>Rhododendron viscosum</i> , <i>Vaccinium corymbosum</i>
Herb (field)	Forb	<i>Lycopus uniflorus</i>
Herb (field)	Graminoid	<i>Glyceria striata</i>
Herb (field)	Fern or fern ally	<i>Osmunda cinnamomea</i> , <i>Osmunda regalis</i> , <i>Woodwardia virginica</i>

Characteristic Species: *Calla palustris*, *Lyonia ligustrina*, *Rhododendron viscosum*, *Sphagnum fallax*, *Sphagnum fimbriatum*, *Sphagnum magellanicum*, *Sphagnum rubellum*, *Sphagnum viridum*, *Thelypteris palustris*, *Vaccinium corymbosum*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Palustrine.

DISTRIBUTION

Range: This type occurs from New Hampshire south to New Jersey and possibly Delaware.

States/Provinces: CT, DE, MA, ME, NH:S4, NJ:S1S3, NY, PA, RI.

Federal Lands: NPS (Cape Cod, Delaware Water Gap, Fire Island, Weir Farm); USFWS (Assabet River, Great Meadows, Great Swamp, Oxbow, Parker River).

CONSERVATION STATUS

Rank: GNR (14-Apr-1998).

Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 2 – Moderate.

Comments: More inland examples of this association may lack some characteristically Coastal Plain species such as *Clethra alnifolia* and *Ilex glabra*.

Similar Associations:

- *Vaccinium corymbosum* / *Sphagnum* spp. Shrubland (CEGL006190).

Related Concepts: Information not available.

SOURCES

Description Authors: L. A. Sneddon and S. L. Neid, mod. S. C. Gawler.

References: Breden et al. 2001, Conard 1935, Dowhan and Rozsa 1989, Eastern Ecology Working Group n.d., Edinger et al. 2002, Enser 1999, Fike 1999, Gawler 2002, Golet 1973, Johnson 1981, Lynn and Karlin 1985, Metzler and Barrett 2001, Niering and Egler 1966, Reschke 1990, Schall and Murley 1984, Sperduto 2000a, Sperduto and Nichols 2004.



Figure 78. Highbush Blueberry - Steeplebush Wetland in Delaware Water Gap National Recreation Area (plot DEWA.63). July 2003.



Figure 79. Highbush Blueberry - Steeplebush Wetland in Delaware Water Gap National Recreation Area (plot DEWA.212). June 2004.

COMMON NAME (PARK-SPECIFIC): BUTTONBUSH WETLAND

SYNONYMS

NVC English Name: Common Buttonbush - Swamp-loosestrife Shrubland
NVC Scientific Name: *Cephalanthus occidentalis* - *Decodon verticillatus* Shrubland
NVC Identifier: CEGLO06069

LOCAL INFORMATION

Environmental Description: This palustrine shrubland occurs in a variety of settings that experience prolonged or semipermanent flooding. The substrate may be organic or mineral soil. This wetland type is found in shallow water along lake- or pondshores, in river or stream oxbows, in wet swales, on floodplains, or in upland depressions.

Vegetation Description: Common buttonbush (*Cephalanthus occidentalis*) is dominant in these wetlands, covering >50% of the area as a tall or short shrub. Other common shrubs may include highbush blueberry (*Vaccinium corymbosum*), swamp azalea (*Rhododendron viscosum*), silky dogwood (*Cornus amomum*), silky willow (*Salix sericea*), or common elderberry (*Sambucus nigra* ssp. *canadensis*). Scattered red maple (*Acer rubrum*) trees may be present in the wetland. The herbaceous layer is typically sparse to moderately dense and contains purplestem beggarticks (*Bidens connata*), threeway sedge (*Dulichium arundinaceum*), threepetal bedstraw (*Galium trifidum*), hemlock waterparsnip (*Sium suave*), smallspike false nettle (*Boehmeria cylindrica*), longhair sedge (*Carex comosa*), royal fern (*Osmunda regalis*), blue skullcap (*Scutellaria lateriflora*), and American bur-reed (*Sparganium americanum*).

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Cephalanthus occidentalis</i>
Herb (field)	Forb	<i>Bidens connata</i> , <i>Galium trifidum</i> , <i>Sium suave</i>
Herb (field)	Graminoid	<i>Dulichium arundinaceum</i>

Characteristic Species: *Cephalanthus occidentalis*, *Bidens connata*, *Carex comosa*, *Dulichium arundinaceum*, *Galium trifidum*, *Osmunda regalis*, *Scutellaria lateriflora*, *Sparganium americanum*.

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	SNR	1	Northeastern Buttonbush Shrub Swamp	Walz et al. 2006
PA	S4	1	Buttonbush wetland	Fike 1999

Local Range: This shrubland type occurs occasionally throughout the park in a variety of palustrine settings.

Classification Comments: Buttonbush Wetland is distinguished from other palustrine shrublands by the dominance of *Cephalanthus occidentalis*, covering >50% of the wetland.

Other Comments: None.

Local Description Authors: S. J. Perles (PNHP).

Plots and Data Sources: DEWA.228; Fike 1999.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Semipermanently flooded cold-deciduous shrubland (III.B.2.N.f.)
Alliance	Cephalanthus occidentalis Semipermanently Flooded Shrubland Alliance (A.1011)
Alliance (English name)	Common Buttonbush Semipermanently Flooded Shrubland Alliance
Association	<i>Cephalanthus occidentalis</i> - <i>Decodon verticillatus</i> Shrubland
Association (English name)	Common Buttonbush - Swamp-loosestrife Shrubland
Ecological System(s):	Laurentian-Acadian Floodplain Forest (CES201.587) Central Appalachian Floodplain (CES202.608)

GLOBAL DESCRIPTION

Concept Summary: This buttonbush swamp occurs in the northeastern United States. These swamps experience prolonged or semipermanent flooding for much of the growing season, with water tables receding below the soil surface only during drought or very late in the growing season. They occur in a variety of environmental settings, including backwater sloughs or oxbow ponds, wet swales in floodplains, pond and lake borders, and small, isolated depressions where water levels recede very slowly, such as those with perched water tables. The substrate is typically loose muck. *Cephalanthus occidentalis* is dominant and often monotypic. Occasional associates depend on the environmental setting and most often occur in drier areas. They include *Vaccinium corymbosum*, *Rhododendron viscosum*, *Acer rubrum*, *Cornus* spp. closer to upland borders, or *Acer saccharinum*, *Fraxinus pennsylvanica*, and *Viburnum dentatum* where adjacent to floodplains, or *Decodon verticillatus*, *Chamaedaphne calyculata*, and *Spiraea alba* var. *latifolia* in more stagnant basins. Herbaceous species tend to be sparse but can include *Glyceria canadensis*, *Dulichium arundinaceum*, *Carex stricta*, *Scirpus cyperinus*, *Thelypteris palustris*, *Leersia oryzoides*, *Acorus calamus*, *Alisma plantago-aquatica*, *Polygonum* spp., *Sparganium* spp., and floating or submerged aquatic species such as *Lemna minor*, *Potamogeton natans*, and *Nuphar lutea* ssp. *variegata* (= *Nuphar variegata*). Bryophytes, if present, cling to shrub bases and include *Warnstorfia fluitans* (= *Drepanocladus fluitans*), *Drepanocladus aduncus*, or *Sphagnum fallax*. In disturbed areas, these wetland may be invaded by *Lythrum salicaria*.

Environmental Description: This association includes buttonbush swamps that experience prolonged or semipermanent flooding for much of the growing season with water tables receding below the soil surface only during drought or very late in the growing season. They occur in a variety of environmental settings including backwater sloughs or oxbow ponds, wet swales in floodplains, pond and lake borders, and small, isolated depressions where water levels recede very slowly, such as those with perched water tables. Soils are often organic mucks or silt loams.

Vegetation Description: This association includes buttonbush swamps of the eastern and northeastern United States. These swamps experience prolonged or semipermanent flooding for much of the growing season with water tables receding below the soil surface only during drought or very late in the growing season. They occur in a variety of environmental settings

including backwater sloughs or oxbow ponds, wet swales in floodplains, pond and lake borders, and small isolated depressions where water levels recede very slowly, such as those with perched water tables. *Cephalanthus occidentalis* is dominant and often monotypic. Scattered *Acer rubrum* trees may be present in the wetland. Occasional associates depend on the environmental setting, and some only occur in drier areas. They include *Vaccinium corymbosum*, *Rhododendron viscosum*, *Acer rubrum*, *Salix* spp., *Cornus amomum* or *Cornus sericea* closer to upland borders, or *Acer saccharinum*, *Fraxinus pennsylvanica*, or *Viburnum dentatum* where adjacent to floodplains, or *Decodon verticillatus*, *Chamaedaphne calyculata*, and *Spiraea alba* var. *latifolia* in more stagnant basins. Herbaceous species tend to be sparse but can include *Glyceria canadensis*, *Dulichium arundinaceum*, *Carex stricta*, *Scirpus cyperinus*, *Osmunda regalis*, *Thelypteris palustris*, *Bidens* spp., *Sium suave*, *Scutellaria lateriflora*, *Alisma plantago-aquatica*, *Polygonum* spp., *Sparganium* spp., and floating or submerged aquatic species such as *Lemna minor*, *Potamogeton natans*, and *Nuphar lutea* ssp. *variegata* (= *Nuphar variegata*). Bryophytes, if present, cling to shrub bases and include *Warnstorfia fluitans* (= *Drepanocladus fluitans*), *Drepanocladus aduncus*, or *Sphagnum fallax*.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Cephalanthus occidentalis</i>
Herb (field)	Graminoid	<i>Dulichium arundinaceum</i>

Characteristic Species: *Cephalanthus occidentalis*, *Dulichium arundinaceum*, *Osmunda regalis*, *Sparganium americanum*, *Vaccinium corymbosum*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Palustrine.

DISTRIBUTION

Range: This association is found throughout the northeastern United States.

States/Provinces: CT, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV?

Federal Lands: NPS (Cape Cod, Delaware Water Gap, Minute Man, Weir Farm); USFWS (Assabet River?, Chesapeake Marshlands, Great Meadows, Great Swamp, Oxbow).

CONSERVATION STATUS

Rank: G4G5 (8-Dec-2005).

Reasons: This association is widely distributed in the northeastern U.S. and relatively common in its small-patch setting.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 2 – Moderate.

Comments: This type may be synonymous with *Cephalanthus occidentalis* / *Carex* spp. Northern Shrubland (CEGL002190), although it also ranges south of the glaciation boundary in the east. CEGL002190 is distributed from the Western Allegheny Plateau (TNC Ecoregion 49) and Great Lakes (TNC Ecoregion 48) west to the Central Tallgrass Prairie (TNC Ecoregion 36), while this type occurs from the Central Appalachian Forest (TNC Ecoregion 59) and High Allegheny Plateau (TNC Ecoregion 60) east.

Similar Associations:

- *Cephalanthus occidentalis* - (*Leucothoe racemosa*) / *Carex jorii* Shrubland (CEGL004075).
- *Cephalanthus occidentalis* / *Carex* spp. - *Lemna* spp. Southern Shrubland (CEGL002191).
- *Cephalanthus occidentalis* / *Carex* spp. Northern Shrubland (CEGL002190).

Related Concepts:

- Buttonbush Swamp (Kettle Basin Shrub Swamp) (Thompson 1996) ?
- Buttonbush semipermanently flooded shrub swamp (CAP pers. comm. 1998) ?
- Palustrine Broad-leaved Deciduous Scrub-Shrub Wetland, Seasonally Flooded (PSS1C) (Cowardin et al. 1979) ?

SOURCES

Description Authors: S. L. Neid, mod. E. Southgate, L. A. Sneddon, S. C. Gawler, E. Largay.

References: Bowman 2000, Breden et al. 2001, CAP pers. comm. 1998, Cowardin et al. 1979, Eastern Ecology Working Group n.d., Edinger et al. 2002, Enser 1999, Fike 1999, Fleming et al. 2001, Gawler 2002, Harrison 2004, Metzler and Barrett 2001, Nichols et al. 2001, Sperduto 2000b, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000.



Figure 80. Buttonbush Wetland in Delaware Water Gap National Recreation Area (plot DEWA.228). August 2004.

COMMON NAME (PARK-SPECIFIC): Highbush Blueberry - Leatherleaf Wetland

SYNONYMS

NVC English Name: Highbush Blueberry / Peatmoss species Shrubland
NVC Scientific Name: *Vaccinium corymbosum* / *Sphagnum* spp. Shrubland
NVC Identifier: C EGL006190

LOCAL INFORMATION

Environmental Description: These interesting wetlands occur in glacial upland depressions on the Kittatinny Ridge. In these bog-like areas, vegetation grows on organic soil, often on a floating mat. These wetlands may be ombrotrophic (receiving nutrients from rainfall only) or influenced by groundwater.

Vegetation Description: This association is characterized by a dense tall-shrub layer (50-90% cover) of highbush blueberry (*Vaccinium corymbosum*), swamp azalea (*Rhododendron viscosum*), maleberry (*Lyonia ligustrina*), black spruce (*Picea mariana*), and red maple (*Acer rubrum*). Scattered trees may be present (<10% cover) such as black spruce, red maple, blackgum (*Nyssa sylvatica*), or pitch pine (*Pinus rigida*). Typical short shrubs include leatherleaf (*Chamaedaphne calyculata*), black huckleberry (*Gaylussacia baccata*), swamp azalea, highbush blueberry, sheep laurel (*Kalmia angustifolia*), and cranberry (*Vaccinium macrocarpon*). Sphagnum (*Sphagnum* spp.) blankets well-developed hummocks and hollows. The herbaceous and graminoid species are scattered sparsely over the peatmoss. Common ferns include cinnamon fern (*Osmunda cinnamomea*), eastern marsh fern (*Thelypteris palustris*), and Virginia chainfern (*Woodwardia virginica*).

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium corymbosum</i> , <i>Lyonia ligustrina</i> , <i>Rhododendron viscosum</i>
Short shrub/sapling	Broad-leaved evergreen shrub	<i>Chamaedaphne calyculata</i>

Characteristic Species: *Vaccinium corymbosum*, *Chamaedaphne calyculata*, *Lyonia ligustrina*, *Rhododendron viscosum*, *Woodwardia virginica*, *Sphagnum* spp.

Other Noteworthy Species: *Cornus canadensis*, *Picea rubens*, *Vaccinium oxycoccos*.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	S1S3	1	Highbush Blueberry Bog Thicket	Walz et al. 2006
PA	S4	1	Highbush blueberry - sphagnum wetland	Fike 1999

Local Range: These rare wetlands occur only on the Kittatinny Ridge in New Jersey within the park.

Classification Comments: Highbush Blueberry - Leatherleaf Wetland is distinguished from Leatherleaf Peatland by the thick tall-shrub layer (>50% cover) of typically *Vaccinium corymbosum*, with *Rhododendron viscosum* and *Lyonia ligustrina*.

Other Comments: None.

Local Description Authors: S. J. Perles (PNHP).

Plots and Data Sources: DEWA.210; Accuracy Assessment Observation Point DEWA.998; Fike 1999, Breden et al 2001, Radis 1986.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Saturated cold-deciduous shrubland (III.B.2.N.g.)
Alliance	<i>Vaccinium corymbosum</i> Saturated Shrubland Alliance (A.1018)
Alliance (English name)	Highbush Blueberry Saturated Shrubland Alliance
Association	<i>Vaccinium corymbosum</i> / <i>Sphagnum</i> spp. Shrubland
Association (English name)	Highbush Blueberry / Peatmoss species Shrubland
Ecological System(s):	Boreal-Laurentian-Acadian Acidic Basin Fen (CES201.583) North-Central Interior and Appalachian Acid Peatland (CES202.606) Atlantic Coastal Plain Northern Pitch Pine Lowland (CES203.374)

GLOBAL DESCRIPTION

Concept Summary: Highbush blueberry peat bog of glaciated regions in the eastern and northeastern United States. This tall-shrub bog thicket occurs on oligotrophic to weakly minerotrophic peat soils, commonly as a border thicket around more open dwarf heath shrub peatlands or within small, isolated basins. Significant seasonal water level fluctuation can occur, especially in isolated basins without inlet or outlet streams. A tall-shrub layer is characterized by abundant *Vaccinium corymbosum* plus *Gaylussacia baccata*, *Chamaedaphne calyculata*, *Kalmia angustifolia*, *Rhododendron canadense*, *Lyonia ligustrina*, and *Nemopanthus mucronatus* in more northern or cooler microclimates, and *Ilex verticillata* and *Rhododendron viscosum* in the south. In locally wetter areas, *Cephalanthus occidentalis* or *Decodon verticillatus* can occur. Coastal occurrences may have additional shrub species such as *Leucothoe racemosa*, *Clethra alnifolia*, and *Gaylussacia dumosa*. Sparse, scattered trees may occur, including *Acer rubrum*, *Picea mariana*, *Larix laricina*, *Pinus strobus*, *Pinus rigida*, *Betula populifolia*, or *Nyssa sylvatica*, with species dependent on environmental setting. The herbaceous layer tends to be sparse, although can be locally abundant. Common herbs include *Osmunda cinnamomea*, *Woodwardia virginica*, *Carex trisperma*, *Sarracenia purpurea*, *Thelypteris palustris*, *Triadenum virginicum*, and *Maianthemum trifolium*. *Sphagnum* mosses blanket well-developed hummocks and hollows, including *Sphagnum magellanicum*, *Sphagnum centrale*, *Sphagnum rubellum*, *Sphagnum capillifolium*, *Sphagnum fimbriatum*, and *Sphagnum fuscum*.

Environmental Description: This tall-shrub bog thicket occurs on oligotrophic to weakly minerotrophic peat soils, commonly as a border thicket around more open dwarf heath shrub peatlands or within small, isolated basins. Significant seasonal water level fluctuation can occur, especially in isolated basins without inlet or outlet streams.

Vegetation Description: A tall-shrub layer is characterized by abundant *Vaccinium corymbosum* plus *Gaylussacia baccata*, *Chamaedaphne calyculata*, *Kalmia angustifolia*,

Rhododendron canadense, *Lyonia ligustrina*, and *Nemopanthus mucronatus* in more northern or cooler microclimates, and *Ilex verticillata* and *Rhododendron viscosum* in the south. In locally wetter areas, *Cephalanthus occidentalis* or *Decodon verticillatus* can occur. Sparse, scattered trees may occur, including *Acer rubrum*, *Picea mariana*, *Larix laricina*, *Pinus strobus*, *Pinus rigida*, *Betula populifolia*, or *Nyssa sylvatica*, with species dependent on environmental setting. The herbaceous layer tends to be sparse, although can be locally abundant. Common herbs include *Osmunda cinnamomea*, *Woodwardia virginica*, *Carex trisperma*, *Sarracenia purpurea*, *Thelypteris palustris*, *Triadenum virginicum*, and *Maianthemum trifolium*. *Sphagnum* mosses blanket well-developed hummocks and hollows, including *Sphagnum magellanicum*, *Sphagnum centrale*, *Sphagnum rubellum*, *Sphagnum capillifolium*, *Sphagnum fimbriatum*, and *Sphagnum fuscum*.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Lyonia ligustrina</i> , <i>Vaccinium corymbosum</i>
Tall shrub/sapling	Broad-leaved evergreen shrub	<i>Chamaedaphne calyculata</i>

Characteristic Species: *Chamaedaphne calyculata*, *Gaylussacia baccata*, *Lyonia ligustrina*, *Osmunda cinnamomea*, *Rhododendron viscosum*, *Vaccinium corymbosum*, *Woodwardia virginica*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Palustrine.

DISTRIBUTION

Range: Occurs from Pennsylvania and New Jersey north to New Hampshire and Maine and possibly Vermont.

States/Provinces: CT, MA:S4, ME?, NH, NJ:S1S3, NY, PA, RI, VT.

Federal Lands: NPS (Cape Cod, Delaware Water Gap); USFWS (Assabet River?, Great Meadows?).

CONSERVATION STATUS

Rank: G3G5 (31-Dec-1997).

Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 2 – Moderate.

Comments: These tall heath shrub bog thickets tend to occur in wetter, more minerotrophic settings relative to dwarf heath shrub bogs.

Similar Associations:

- *Vaccinium corymbosum* - *Gaylussacia baccata* - *Photinia melanocarpa* / *Calla palustris* Shrubland (CEGL005085).
- *Vaccinium corymbosum* - *Rhododendron viscosum* - *Clethra alnifolia* Shrubland (CEGL006371).

Related Concepts:

- *Vaccinium corymbosum*-*Rhododendron viscosum* tall shrub bog and bog border association [Type A] (Kearsley 1999a) ?
- Highbush blueberry shrub swamp (CAP pers. comm. 1998) ?
- New England coastal plain pondshore (Rawinski 1984) ?

- Northern New Jersey Shrub Swamp (Breden 1989) ?
- Shrub Swamp (Lundgren et al. 2000) ?

SOURCES

Description Authors: S. L. Neid, mod. S. C. Gawler.

References: Breden 1989, Breden et al. 2001, CAP pers. comm. 1998, Conard 1935, Damman and French 1987, Eastern Ecology Working Group n.d., Edinger et al. 2002, Enser 1999, Fike 1999, Gawler 2002, Johnson 1981b, Karlin and Lynn 1988, Kearsley 1999a, Lundgren et al. 2000, Lynn and Karlin 1985, Metzler and Barrett 1982, Metzler and Barrett 2001, Radis 1986, Rawinski 1984, Rozsa and Metzler n.d., Sperduto 2000a, Sperduto and Nichols 2004, Swain and Kearsley 2000, Swain and Kearsley 2001.



Figure 81. Highbush Blueberry - Leatherleaf Wetland in Delaware Water Gap National Recreation Area (plot DEWA.210). June 2004.

COMMON NAME (PARK-SPECIFIC): LEATHERLEAF PEATLAND

SYNONYMS

NVC English Name: Leatherleaf - (Dwarf Huckleberry) - Swamp-loosestrife / Virginia Chainfern Dwarf-shrubland
NVC Scientific Name: *Chamaedaphne calyculata* - (*Gaylussacia dumosa*) - *Decodon verticillatus* / *Woodwardia virginica* Dwarf-shrubland
NVC Identifier: C EGL006008

LOCAL INFORMATION

Environmental Description: These interesting wetlands occur in glacial upland depressions on the Kittatinny Ridge. In these bog-like areas, vegetation grows on organic soil, often on a floating mat. These wetlands may be ombrotrophic (receiving nutrients from rainfall only) or influenced by groundwater.

Vegetation Description: This association is characterized by a thick layer of leatherleaf (*Chamaedaphne calyculata*) in the short-shrub layer, over a near continuous mat of sphagnum (*Sphagnum* spp.). Scattered trees may be present (<10% cover) such as black spruce (*Picea mariana*), red maple (*Acer rubrum*), blackgum (*Nyssa sylvatica*), and pitch pine (*Pinus rigida*). The moderately dense tall-shrub layer (25-50% cover) contains highbush blueberry (*Vaccinium corymbosum*), swamp azalea (*Rhododendron viscosum*), maleberry (*Lyonia ligustrina*), black spruce, and red maple. The characteristically dense short-shrub layer (70-80% cover) is dominated by leatherleaf, with associates black huckleberry (*Gaylussacia baccata*), swamp azalea, highbush blueberry, sheep laurel (*Kalmia angustifolia*), and cranberry (*Vaccinium macrocarpon*). The herbaceous and graminoid species are scattered sparsely over the peatmoss. Characteristic species include purple pitcherplant (*Sarracenia purpurea*), roundleaf sundew (*Drosera rotundifolia*), swamploosestrife (*Decodon verticillatus*), white beaksedge (*Rhynchospora alba*), tawny cotton-grass (*Eriophorum virginicum*), Virginia chainfern (*Woodwardia virginica*), northern long sedge (*Carex folliculata*), and prickly bog sedge (*Carex atlantica* ssp. *atlantica*). These species are more abundant in areas with less tall-shrub cover.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Short shrub/sapling	Broad-leaved evergreen shrub	<i>Chamaedaphne calyculata</i>
Herb (field)	Forb	<i>Decodon verticillatus</i> , <i>Drosera rotundifolia</i> , <i>Sarracenia purpurea</i>
Herb (field)	Graminoid	<i>Eriophorum virginicum</i> , <i>Rhynchospora alba</i>

Characteristic Species: *Chamaedaphne calyculata*, *Decodon verticillatus*, *Drosera rotundifolia*, *Eriophorum virginicum*, *Rhynchospora alba*, *Sarracenia purpurea*, *Vaccinium macrocarpon*, *Sphagnum* spp.

Other Noteworthy Species: *Cornus canadensis*, *Picea rubens*, *Vaccinium oxycoccos*

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	S1	1	Southern New England Bog	Walz et al. 2006
PA	S2	1	Leatherleaf - bog rosemary peatland	Fike 1999
PA	S2S3	1	Leatherleaf - cranberry peatland	Fike 1999

Local Range: These rare wetlands occur only on the Kittatinny Ridge in New Jersey within the park.

Classification Comments: Leatherleaf Peatland is distinguished from Highbush Blueberry - Leatherleaf Wetland by <50% cover of tall shrubs, the thick layers of *Chamaedaphne calyculata* and *Sphagnum* spp., and prominence of the characteristic "bog" plants, *Sarracenia purpurea*, *Drosera rotundifolia*, *Decodon verticillatus*, *Rhynchospora alba*, and *Eriophorum virginicum*.

Other Comments: None.

Local Description Authors: S. J. Perles (PNHP).

Plots and Data Sources: DEWA.209; Fike 1999, Breden et al 2001, Radis 1986.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Dwarf-shrubland (IV)
Physiognomic Subclass	Evergreen dwarf-shrubland (IV.A.)
Physiognomic Group	Needle-leaved or microphyllous evergreen dwarf-shrubland (IV.A.1.)
Physiognomic Subgroup	Natural/Semi-natural needle-leaved or microphyllous evergreen dwarf-shrubland (IV.A.1.N.)
Formation	Saturated needle-leaved or microphyllous evergreen dwarf-shrubland (IV.A.1.N.g.)
Alliance	<i>Chamaedaphne calyculata</i> Saturated Dwarf-shrubland Alliance (A.1092)
Alliance (English name)	Leatherleaf Saturated Dwarf-shrubland Alliance
Association	<i>Chamaedaphne calyculata</i> - (<i>Gaylussacia dumosa</i>) - <i>Decodon verticillatus</i> / <i>Woodwardia virginica</i> Dwarf-shrubland
Association (English name)	Leatherleaf - (Dwarf Huckleberry) - Swamp-loosestrife / Virginia Chainfern Dwarf-shrubland
Ecological System(s):	Atlantic Coastal Plain Northern Bog (CES203.893) North-Central Interior and Appalachian Acid Peatland (CES202.606)

GLOBAL DESCRIPTION

Concept Summary: This dwarf-shrub quaking or floating bog occurs in the southern portion of the glaciated Northeast, extending west to the Western Allegheny Plateau. It occupies oligotrophic, peat-accumulating basins. *Chamaedaphne calyculata* is strongly dominant, with associate species including *Kalmia angustifolia*, *Kalmia polifolia*, *Vaccinium oxycoccos*, *Vaccinium macrocarpon*, *Gaylussacia dumosa* (on the coast), and *Gaylussacia baccata*. Associate shrubs generally occur with low cover, although they may be locally common. Scattered tall shrubs, such as *Vaccinium corymbosum*, *Rhododendron viscosum*, *Larix laricina*, *Picea mariana*, and *Acer rubrum*, may occur but always with low cover. Herbaceous cover is quite low but can include *Carex trisperma*, *Pogonia ophioglossoides*, *Calopogon tuberosus* (= *Calopogon pulchellus*), *Eriophorum virginicum*, *Drosera rotundifolia*, *Drosera intermedia*, *Sarracenia purpurea*, and *Woodwardia virginica* scattered throughout and with *Carex canescens*, *Carex limosa*, *Glyceria canadensis*, *Triadenum virginicum*, *Utricularia cornuta*, *Rhynchospora alba*, and sometimes *Scheuchzeria palustris* occurring in wetter fen windows.

Edges of floating mats tend to receive more nutrient enrichment and support such species as *Peltandra virginica*, *Decodon verticillatus*, and *Dulichium arundinaceum*. The bryophyte layer is well-developed, dominated by *Sphagnum capillifolium*, *Sphagnum magellanicum*, *Sphagnum rubellum*, and *Sphagnum fuscum* with *Sphagnum bartlettianum*, *Sphagnum cuspidatum*, *Sphagnum fallax*, and *Sphagnum recurvum* also occurring in some examples.

Environmental Description: This dwarf-shrub quaking or floating bog occupies oligotrophic, peat-accumulating basins.

Vegetation Description: *Chamaedaphne calyculata* is strongly dominant, with associate species including *Kalmia angustifolia*, *Kalmia polifolia*, *Vaccinium oxycoccos*, *Vaccinium macrocarpon*, *Gaylussacia dumosa* (near the coast), and *Gaylussacia baccata*. Associate shrubs generally occur with low cover, although they may be locally common. Scattered tall shrubs, such as *Vaccinium corymbosum*, *Rhododendron viscosum*, *Lyonia ligustrina*, *Larix laricina*, *Picea mariana*, and *Acer rubrum*, may occur but always with low cover. Herbaceous cover is quite low but can include *Carex trisperma*, *Pogonia ophioglossoides*, *Calopogon tuberosus* (= *Calopogon pulchellus*), *Eriophorum virginicum*, *Decodon verticillatus*, *Drosera rotundifolia*, *Drosera intermedia*, *Sarracenia purpurea*, and *Woodwardia virginica* scattered throughout and with *Carex canescens*, *Carex limosa*, *Carex folliculata*, *Carex atlantica*, *Glyceria canadensis*, *Triadenum virginicum*, *Utricularia cornuta*, *Rhynchospora alba*, and sometimes *Scheuchzeria palustris* occurring in wetter fen windows. Edges of floating mats tend to receive more nutrient enrichment and support such species as *Peltandra virginica*, *Decodon verticillatus*, and *Dulichium arundinaceum*. The bryophyte layer is well-developed, dominated by *Sphagnum capillifolium*, *Sphagnum magellanicum*, *Sphagnum rubellum*, and *Sphagnum fuscum* with *Sphagnum bartlettianum*, *Sphagnum cuspidatum*, *Sphagnum fallax*, and *Sphagnum recurvum* also occurring in some examples.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Short shrub/sapling	Dwarf-shrub	<i>Chamaedaphne calyculata</i>
Herb (field)	Forb	<i>Drosera rotundifolia</i>

Characteristic Species: *Chamaedaphne calyculata*, *Drosera rotundifolia*, *Eriophorum virginicum*, *Rhynchospora alba*, *Sarracenia purpurea*, *Vaccinium macrocarpon*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Palustrine.

DISTRIBUTION

Range: Information not available.

States/Provinces: CT, MA, ME, NH, NJ:S1, NY, OH, ON:S3, PA, RI.

Federal Lands: NPS (Cape Cod, Delaware Water Gap?, Minute Man); USFWS (Assabet River, Nomans Land Island?).

CONSERVATION STATUS

Rank: G5 (1-Dec-1997).

Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 1 – Strong.

Comments: Information not available.

Similar Associations:

- *Chamaedaphne calyculata* / *Eriophorum virginicum* / *Sphagnum rubellum* Dwarf-shrubland (CEGL006513).

Related Concepts:

- Glacial Bog (Breden 1989) ?

SOURCES

Description Authors: S. L. Neid and L. A. Sneddon, mod. S. C. Gawler.

References: Anderson 1982, Breden 1989, Breden et al. 2001, Damman and French 1987, Eastern Ecology Working Group n.d., Edinger et al. 2002, Enser 1999, Fike 1999, Gawler 2002, Lynn and Karlin 1985, Metzler and Barrett 2001, Radis 1986, Sperduto 2000b, Sperduto and Nichols 2004, Swain and Kearsley 2000.



Figure 82. Leatherleaf Peatland in Delaware Water Gap National Recreation Area (plot DEWA.209). June 2004.



Figure 83. Leatherleaf Peatland in Delaware Water Gap National Recreation Area (Accuracy Assessment Observation Point DEWA.999). June 2006.

COMMON NAME (PARK-SPECIFIC): SUCCESSIONAL BEAR OAK - HEATH SHRUBLAND

SYNONYMS

NVC English Name: (Northern Lowbush Blueberry, Velvetleaf Blueberry, Hillside Blueberry) Central Appalachian Dwarf-shrubland

NVC Scientific Name: *Vaccinium (angustifolium, myrtilloides, pallidum)* Central Appalachian Dwarf-shrubland

NVC Identifier: CEGL003958

LOCAL INFORMATION

Environmental Description: This association occurs on dry, high-elevation portions of Kittatinny Ridge where the fire frequency and intensity is high. This particular vegetation type is best expressed where fire has recently occurred. The soil is typically thin sandy soils over bedrock. Soils are typically acidic with low moisture content. Droughty soils conditions limit tree development, and most trees (when present) are stunted. Bedrock is primarily acidic sandstones of the Shawangunk Formation.

Vegetation Description: Due to periodic fire events on Kittatinny Ridge, this vegetation is variable in its spatial distribution and occurs in a mosaic with related dry oak and scrub oak vegetation types. This type is characterized by a dense short-shrub layer (<2 m in height) with very high cover that may exceed 90%. The short-shrub layer is very diverse and dominated by ericaceous species. Typical species include lowbush blueberry (*Vaccinium angustifolium*), Blue Ridge blueberry (*Vaccinium pallidum*), deerberry (*Vaccinium stamineum*), black huckleberry (*Gaylussacia baccata*), sheep laurel (*Kalmia angustifolia*), mountain laurel (*Kalmia latifolia*), sweet fern (*Comptonia peregrina*), and tree saplings. Bear oak (*Quercus ilicifolia*) often forms an open to occasionally dense tall-shrub overstory with low heath species below. Immediately after fire, the dense short-shrub layer regenerates. However, in the years following the fire, early-successional tall shrubs and trees establish in the low heath. Common species include quaking aspen (*Populus tremuloides*), bigtooth aspen (*Populus grandidentata*), gray birch (*Betula populifolia*), and sweet birch (*Betula lenta*). Scattered individuals of pitch pine (*Pinus rigida*), scarlet oak (*Quercus coccinea*), and chestnut oak (*Quercus prinus*) may be also present. Tall-shrub and tree cover can vary from 0-75%, depending on the length of time since the fire. The herbaceous layer is usually sparse with low diversity (0-5% cover). Typical herb species include whorled yellow loosestrife (*Lysimachia quadrifolia*), narrowleaf cowwheat (*Melampyrum lineare*), eastern hayscented fern (*Dennstaedtia punctilobula*), white snakeroot (*Ageratina altissima* var. *altissima*), wavy hairgrass (*Deschampsia flexuosa*), poverty oatgrass (*Danthonia spicata*), hay sedge (*Carex argyrantha*), Swan's sedge (*Carex swanii*), and ribbed sedge (*Carex virescens*). Polytrichum mosses (*Polytrichum* spp.) are present and occasionally abundant below the shrub layer.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Betula populifolia</i> , <i>Populus grandidentata</i> , <i>Populus tremuloides</i> , <i>Quercus ilicifolia</i>

Short shrub/sapling	Broad-leaved deciduous shrub	<i>Comptonia peregrina</i> , <i>Gaylussacia baccata</i> , <i>Vaccinium angustifolium</i> , <i>Vaccinium pallidum</i>
Short shrub/sapling	Broad-leaved evergreen shrub	<i>Kalmia angustifolia</i> , <i>Kalmia latifolia</i>

Characteristic Species: *Gaylussacia baccata*, *Kalmia latifolia*, *Quercus ilicifolia*, *Vaccinium angustifolium*, *Vaccinium pallidum*, *Comptonia peregrina*, *Lysimachia quadrifolia*, *Melampyrum lineare*, *Dennstaedtia punctilobula*, *Populus grandidentata*, *Populus tremuloides*.

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	S2?	2	Central Appalachian Blueberry Shrubland	Walz et al. 2006
PA	S2	1	Low heath shrubland	Fike 1999

Local Range: This vegetation type is known from the Sunfish Pond area of Kittatinny Ridge but may occur elsewhere where Dry Oak Heath Forests have burned with sufficient intensity to kill the oak canopy.

Classification Comments: This shrubland type appears to be successional to Dry Oak - Heath Forest and is the result of severe burns of these forest types. Successional Bear Oak - Heath Shrubland is similar to Bear Oak - Wavy Hairgrass Shrubland. However, for the Successional Bear Oak - Heath Shrubland, fire is probably the primary factor influencing the association structure, such that these shrublands are likely to succeed to Dry Oak - Heath Forest in between fire events. By contrast, Bear Oak - Wavy Hairgrass Shrubland is primarily influenced by extremely thin soils over acidic bedrock, which limits tree growth.

Other Comments: None.

Local Description Authors: G. S. Podniesinski (PNHP).

Plots and Data Sources: DEWA.205, DEWA.206, DEWA.215, DEWA.217; Fike 1999.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Dwarf-shrubland (IV)
Physiognomic Subclass	Deciduous dwarf-shrubland (IV.B.)
Physiognomic Group	Cold-deciduous dwarf-shrubland (IV.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous dwarf-shrubland (IV.B.2.N.)
Formation	Cespitose cold-deciduous dwarf-shrubland (IV.B.2.N.a.)
Alliance	<i>Vaccinium</i> (<i>angustifolium</i> , <i>myrtilloides</i> , <i>pallidum</i>) Dwarf-shrubland Alliance (A.1113)
Alliance (English name)	(Northern Lowbush Blueberry, Velvetleaf Blueberry, Hillside Blueberry) Dwarf-shrubland Alliance
Association	<i>Vaccinium</i> (<i>angustifolium</i> , <i>myrtilloides</i> , <i>pallidum</i>) Central Appalachian Dwarf-shrubland
Association (English name)	(Northern Lowbush Blueberry, Velvetleaf Blueberry, Hillside Blueberry) Central Appalachian Dwarf-shrubland

Ecological System(s): Central Appalachian Pine-Oak Rocky Woodland (CES202.600)

GLOBAL DESCRIPTION

Concept Summary: This association occurs on mid- to high-elevation acidic rock outcrops or summits and is characterized by abundant dwarf *Vaccinium* spp. in areas with frequent fire and/or droughty soils. This community is dominated by heaths or heath-like shrubs (typically blueberries, *Vaccinium angustifolium*, *Vaccinium myrtilloides*, *Vaccinium stamineum*, *Vaccinium pallidum* (= *Vaccinium vacillans*)) and is commonly referred to as "heath barrens." Soils are shallow accumulations of organic material on bedrock habitats, or rapidly drained and nutrient-poor sands on outwash plains. Small trees may be present but are very sparse. The herbaceous layer is usually sparse with low diversity. In addition to *Vaccinium*, the shrub layer typically contains other low shrubs such as *Gaylussacia baccata*, *Kalmia angustifolia*, and *Comptonia peregrina*, with *Kalmia latifolia* present in some areas. *Quercus ilicifolia* is frequently present, with variable cover, above the low heaths. Herbaceous plants scattered among the shrubs include *Deschampsia flexuosa*, *Schizachyrium scoparium*, *Carex pensylvanica*, *Carex argyrantha*, *Danthonia spicata*, *Piptatherum pungens* (= *Oryzopsis pungens*), *Lysimachia quadrifolia*, *Rubus hispidus*, *Melampyrum lineare*, *Solidago canadensis*, *Lycopodium dendroideum*, and *Lycopodium digitatum*. Mosses (including *Polytrichum* spp.) and lichens usually are present.

Environmental Description: These patchy communities are typically found on higher-elevation acidic rock outcrops or summits. Along with bedrock outcrops, ledges, summits of igneous or metamorphic rock, this association is sometimes found in depressions on level outwash plains or valley floor frost pockets. Soils are shallow accumulations of organic material on bedrock habitats, or rapidly drained and nutrient-poor sands on outwash plains.

Vegetation Description: This dwarf-shrubland is dominated by locally dense *Vaccinium* (*Vaccinium angustifolium*, *Vaccinium stamineum*, and/or *Vaccinium pallidum* (= *Vaccinium vacillans*)). Scattered small individuals of *Pinus strobus*, *Pinus rigida*, *Prunus serotina*, *Betula papyrifera*, and/or *Betula populifolia* may occur where soil has accumulated. The herbaceous layer is usually sparse with low diversity. In addition to *Vaccinium*, the shrub layer typically contains other shrubs such as *Gaylussacia baccata*, *Kalmia angustifolia*, and *Comptonia peregrina*, with *Kalmia latifolia* present in some areas. *Quercus ilicifolia* is frequently present, with variable cover, above the low heaths. Herbaceous plants scattered among the shrubs include *Deschampsia flexuosa*, *Schizachyrium scoparium*, *Carex pensylvanica*, *Carex argyrantha*, *Danthonia spicata*, *Piptatherum pungens* (= *Oryzopsis pungens*), *Lysimachia quadrifolia*, *Rubus hispidus*, *Melampyrum lineare*, *Solidago canadensis*, *Lycopodium dendroideum*, and *Lycopodium digitatum*. Mosses (including *Polytrichum* spp.) and lichens usually are present.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Quercus ilicifolia</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Comptonia peregrina</i> , <i>Gaylussacia baccata</i> , <i>Vaccinium angustifolium</i> , <i>Vaccinium pallidum</i>
Short shrub/sapling	Broad-leaved evergreen shrub	<i>Kalmia angustifolia</i>

Characteristic Species: *Comptonia peregrina*, *Deschampsia flexuosa*, *Gaylussacia baccata*, *Kalmia latifolia*, *Lysimachia quadrifolia*, *Melampyrum lineare*, *Quercus ilicifolia*, *Vaccinium angustifolium*, *Vaccinium pallidum*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Not applicable.

DISTRIBUTION

Range: This association is known from the mid-Atlantic states of Maryland, New Jersey, Pennsylvania and West Virginia.

States/Provinces: MD, NJ, PA, WV.

Federal Lands: NPS (Delaware Water Gap).

CONSERVATION STATUS

Rank: G4G5 (21-Jun-2006).

Reasons: This association is distributed over a fairly large portion of glaciated northeastern North America. In some states where it occurs, it has a state conservation rank of S4.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 2 – Moderate.

Comments: This type shares many species and the general environmental setting with *Vaccinium angustifolium* - *Sorbus americana* / *Sibbaldiopsis tridentata* Dwarf-shrubland (CEGL005094), but it lacks species of more northern affinity such as *Picea* spp., *Abies* spp., and *Sorbus* spp., and is not characterized by *Sibbaldiopsis tridentata*. It results from frequent fires and droughty soils, with cold climate having less effect than in CEGL005094.

Similar Associations:

- *Vaccinium angustifolium* - *Sorbus americana* / *Sibbaldiopsis tridentata* Dwarf-shrubland (CEGL005094).

Related Concepts:

- *Vaccinium myrtilloides* Dwarf-shrubland (Walton et al. 1997) ?

SOURCES

Description Authors: E. Largay, mod. S. C. Gawler.

References: Eastern Ecology Working Group n.d., Fike 1999, Harrison 2004, Walton et al. 1997.



Figure 84. Successional Bear Oak - Heath Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.205). June 2004.

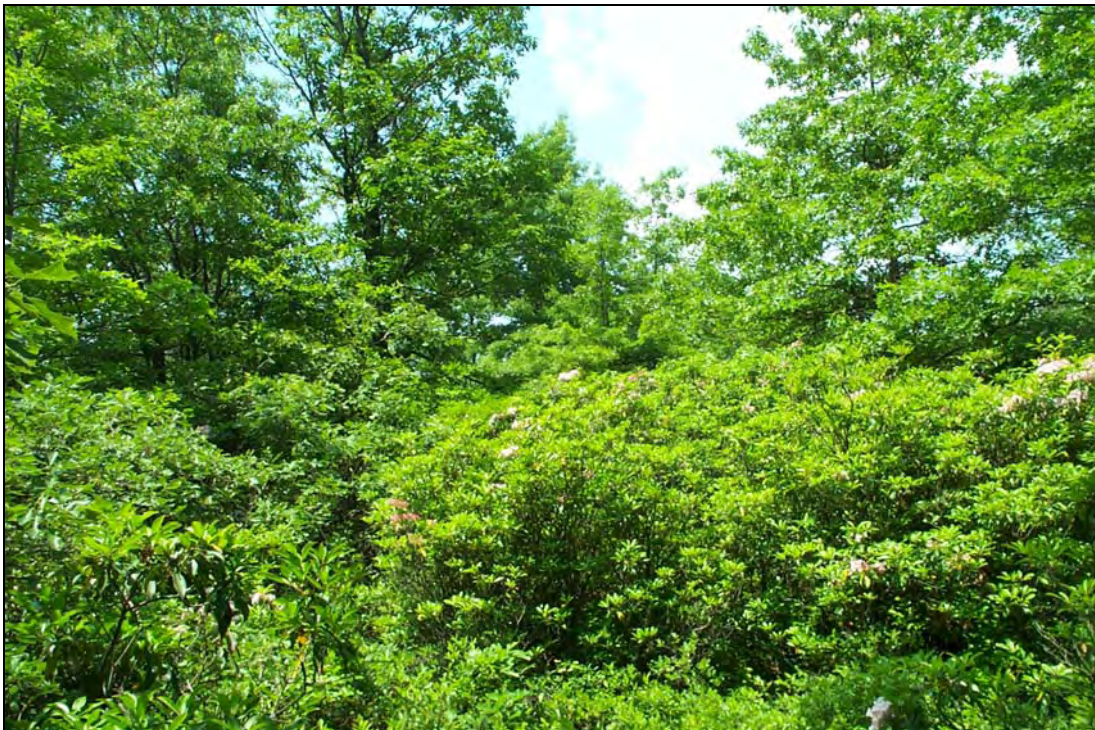


Figure 85. Successional Bear Oak - Heath Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.206). June 2004.

COMMON NAME (PARK-SPECIFIC): LITTLE BLUESTEM GRASSLAND

SYNONYMS

NVC English Name: Little Bluestem - Goldenrod species Herbaceous Vegetation
NVC Scientific Name: *Schizachyrium scoparium* - *Solidago* spp. Herbaceous Vegetation
NVC Identifier: C EGL006333

LOCAL INFORMATION

Environmental Description: This association occurs in various settings throughout the park, often in association with disturbed or managed openings and fields (including utility rights-of-way). Typical soils series is Wyoming, which contains excessively well-drained cobbly, gravelly or channery sandy and silt loams. These soils are often moderately to strongly acidic (pH 5.1 to 6.0).

Vegetation Description: This vegetation type is characterized by thick herbaceous and graminoid vegetation in which little bluestem (*Schizachyrium scoparium*) is at least codominant and usually dominant (absolute cover >50%). The associate species can vary but are typically restricted to drought-tolerant species or include species characteristic of Old Fields. Trees and tall shrubs are typically absent. Occasional short shrubs (<2 m in height) may include pitch pine (*Pinus rigida*), eastern red-cedar (*Juniperus virginiana*), sheep laurel (*Kalmia angustifolia*), and sweet fern (*Comptonia peregrina*). Northern dewberry (*Rubus flagellaris*) is often present as a short shrub/creeping vine. The herbaceous layer (other than little bluestem) is characterized by early goldenrod (*Solidago juncea*), common sheep sorrel (*Rumex acetosella*), wrinkleleaf goldenrod (*Solidago rugosa*), dwarf cinquefoil (*Potentilla canadensis*), and hawkweeds (*Hieracium* spp.). Drought-tolerant mosses are usually present, particularly polytrichum mosses (*Polytrichum* spp.).

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Short shrub/sapling	Needle-leaved shrub	<i>Juniperus virginiana</i> , <i>Pinus rigida</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Rubus flagellaris</i>
Herb (field)	Vine/Liana	<i>Vitis labrusca</i>
Herb (field)	Forb	<i>Rumex acetosella</i> , <i>Solidago juncea</i> , <i>Solidago rugosa</i>
Herb (field)	Graminoid	<i>Schizachyrium scoparium</i>

Characteristic Species: *Schizachyrium scoparium*, *Solidago juncea*, *Rubus flagellaris*, *Rumex acetosella*.

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	SNR	2	Little Bluestem Grassland	Walz et al. 2006
PA	S4	2	no crosswalk	Fike 1999

Local Range: Throughout the park on well-drained to excessively drained upland soils, most examples appear to be associated with human disturbance.

Classification Comments: Key feature of this type is the relatively high cover of *Schizachyrium scoparium* (>50% cover). Other grass species, while present, are rarely abundant. *Deschampsia flexuosa* and *Danthonia* spp. are often absent.

Other Comments: None.

Local Description Authors: G. S. Podniesinski (PNHP).

Plots and Data Sources: DEWA.113, DEWA.114, DEWA.172.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Medium-tall sod temperate or subpolar grassland (V.A.5.N.c.)
Alliance	<i>Andropogon virginicus</i> Herbaceous Alliance (A.1208)
Alliance (English name)	Broomsedge Bluestem Herbaceous Alliance
Association	<i>Schizachyrium scoparium</i> - <i>Solidago</i> spp. Herbaceous Vegetation
Association (English name)	Little Bluestem - Goldenrod species Herbaceous Vegetation
Ecological System(s):	Information not available

GLOBAL DESCRIPTION

Concept Summary: This broadly defined vegetation type includes old fields of well-drained soils, either sandy or shallow to bedrock. They are characterized by dominance of warm-season grasses. *Schizachyrium scoparium* is characteristic and nearly always present. Species composition is variable, depending on land-use history, but in general this vegetation is quite wide-ranging in northeastern and midwestern states. In addition to the nominal species, other associates may include *Andropogon virginicus*, *Eragrostis spectabilis*, *Festuca rubra*, *Deschampsia flexuosa*, *Danthonia spicata*, *Nuttallanthus canadensis* (= *Linaria canadensis*), *Rubus flagellaris*, *Panicum virgatum*, *Dichanthelium depauperatum* (= *Panicum depauperatum*), *Potentilla simplex*, *Dichanthelium meridionale* (= *Panicum meridionale*), *Dichanthelium dichotomum* (= *Panicum dichotomum*), *Solidago rugosa*, and *Carex pensylvanica*. Scattered shrubs are often present, including *Comptonia peregrina*, *Morella pensylvanica*, *Gaylussacia baccata*, and scattered tree saplings, such as *Prunus serotina*, *Sassafras albidum*, and *Juniperus virginiana*. *Polytrichum juniperinum* and other *Polytrichum* spp. are common bryophytes.

Environmental Description: This vegetation occurs on well-drained soils, either on sandy flats or on dry knolls with shallow soils. The vegetation arises spontaneously after soil disturbance.

Vegetation Description: *Schizachyrium scoparium* is characteristic and nearly always present. Species composition is variable, depending on land-use history, but in general, this vegetation is quite wide-ranging in northeastern and midwestern states. In addition to the nominal species, other associates may include *Andropogon virginicus*, *Eragrostis spectabilis*, *Festuca rubra*, *Deschampsia flexuosa*, *Centaurea biebersteinii* (= *Centaurea maculosa*), *Danthonia spicata*, *Hypericum perforatum*, *Nuttallanthus canadensis* (= *Linaria canadensis*), *Rubus flagellaris*, *Panicum virgatum*, *Dichanthelium depauperatum* (= *Panicum depauperatum*), *Potentilla simplex*, *Dichanthelium meridionale* (= *Panicum meridionale*), *Dichanthelium dichotomum* (= *Panicum dichotomum*), *Solidago juncea*, *Solidago nemoralis*, *Solidago rugosa*, *Hieracium* spp., and *Carex pensylvanica*. Scattered shrubs are often present, including *Comptonia peregrina*, *Morella pensylvanica*, *Gaylussacia baccata*, and scattered tree saplings, such as *Prunus serotina*, *Sassafras albidum*, and *Juniperus virginiana*.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Short shrub/sapling	Dwarf-shrub	<i>Rubus flagellaris</i>
Herb (field)	Forb	<i>Solidago juncea</i> , <i>Solidago nemoralis</i> , <i>Solidago rugosa</i>
Herb (field)	Graminoid	<i>Schizachyrium scoparium</i>

Characteristic Species: *Andropogon virginicus*, *Schizachyrium scoparium*, *Solidago juncea*, *Solidago nemoralis*, *Solidago rugosa*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Not applicable.

DISTRIBUTION

Range: This vegetation is quite wide-ranging in northeastern and midwestern states, and possibly occurs at higher elevations in the southeastern states.

States/Provinces: CT, MA, ME, NH, NJ, NY, PA, RI, VT.

Federal Lands: NPS (Cape Cod, Delaware Water Gap, Fire Island, Saratoga, Weir Farm); USFWS (Great Swamp).

CONSERVATION STATUS

Rank: GNA (invasive) (19-Jan-2006).

Reasons: This vegetation type includes pasture and post-agricultural fields.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 3 – Weak.

Comments: This type is distinguished, in theory, from the very similar *Dactylis glomerata* - *Phleum pratense* - *Festuca* spp. - *Solidago* spp. Herbaceous Vegetation (CEGL006107) by the dominance of warm-season grasses as opposed to cool-season grasses (*Phleum*, *Festuca*) dominating CEGL006017. Additional data will be required to see how this distinction holds up and what geographic differences might accompany such a distinction.

Similar Associations:

- *Dactylis glomerata* - *Phleum pratense* - *Festuca* spp. - *Solidago* spp. Herbaceous Vegetation (CEGL006107).
- *Lolium (arundinaceum, pratense)* Herbaceous Vegetation (CEGL004048).
- *Phleum pratense* - *Bromus pubescens* - *Helenium autumnale* Herbaceous Vegetation (CEGL004018).

Related Concepts: Information not available.

SOURCES

Description Authors: L. A. Sneddon, mod. S. C. Gawler.

References: Eastern Ecology Working Group n.d., Edinger et al. 2002, House 1917, Newbold et al. 1988, Niering et al. 1970.



Figure 86. Little Bluestem Grassland in Delaware Water Gap National Recreation Area (plot DEWA.113). September 2003.



Figure 87. Little Bluestem Grassland in Delaware Water Gap National Recreation Area (plot DEWA.172). September 2003.

COMMON NAME (PARK-SPECIFIC): OLD FIELD

SYNONYMS

NVC English Name: Orchard Grass - Timothy - Fescue species - Goldenrod species
Herbaceous Vegetation

NVC Scientific Name: *Dactylis glomerata* - *Phleum pratense* - *Festuca* spp. - *Solidago* spp.
Herbaceous Vegetation

NVC Identifier: C EGL006107

LOCAL INFORMATION

Environmental Description: This association occurs in fields that are not plowed or planted in crops or hay grasses. These fields are mowed at least biannually if not more frequently. Without mowing, these sites will succeed to Successional Shrubland as woody species colonize the field. The shrublands are flat to gently sloping, often bounded by stonewalls or fencerows. Some of these sites are old homesteads from which the houses have been removed. These sites contain moderately well-drained to well-drained soils, typical of the Manlius, Chenango, Pope, and Venango series, among others. These fields may contain drainage swales in which the vegetation is similar to that of Wet Meadow.

Vegetation Description: Characteristic vegetation for this association is a diverse mixture of goldenrods, cool-season grasses, and agricultural weeds. The herbaceous layer is typically dense (80-100% cover). Species dominance in this layer shifts through the growing season, with cool-season grasses dominant early in the summer and goldenrods dominant later in the summer. Within each field, species may be locally abundant and often have patchy distribution. The two characteristically dominant species are wrinkleleaf goldenrod (*Solidago rugosa*) and sweet vernalgrass (*Anthoxanthum odoratum*). Other abundant species include flat-top goldentop (*Euthamia graminifolia*), meadow hawkweed (*Hieracium caespitosum*), red fescue (*Festuca rubra*), common cinquefoil (*Potentilla simplex*), wild bergamot (*Monarda fistulosa*), white bergamot (*Monarda clinopodia*), deertongue (*Dichanthelium clandestinum*), broomsedge bluestem (*Andropogon virginicus*), purple foxglove (*Digitalis purpurea*), lanceleaf wild licorice (*Galium lanceolatum*), Kentucky bluegrass (*Poa pratensis*), and common yarrow (*Achillea millefolium*). Other common associates are false baby's breath (*Galium mollugo*), common St. Johnswort (*Hypericum perforatum*), white clover (*Trifolium repens*), Queen Anne's lace (*Daucus carota*), common dandelion (*Taraxacum officinale*), meadow ryegrass (*Lolium pratense*), Virginia mountainmint (*Pycnanthemum virginianum*), little bluestem (*Schizachyrium scoparium*), and common gypsyweed (*Veronica officinalis*). Little bluestem can be common, however, it does not cover >50% of the field. Scattered trees, tall, or short shrubs may be present, covering <25% of the field. These typically occur near the field edges or in scattered clumps. Typical tree and tall-shrub species include eastern red-cedar (*Juniperus virginiana*), gray birch (*Betula populifolia*), choke cherry (*Prunus virginiana*), black walnut (*Juglans nigra*), white ash (*Fraxinus americana*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), and the invasive species autumn-olive (*Elaeagnus umbellata*) and tree of heaven (*Ailanthus altissima*). Common short shrubs are gray dogwood (*Cornus racemosa*), northern dewberry (*Rubus flagellaris*), Allegheny blackberry (*Rubus allegheniensis*), wine raspberry (*Rubus phoenicolasius*), black raspberry (*Rubus occidentalis*), and the invasive species multiflora rose (*Rosa multiflora*), Morrow's honeysuckle (*Lonicera morrowii*), and Japanese barberry (*Berberis thunbergii*).

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Forb	<i>Solidago rugosa</i> , <i>Euthamia graminifolia</i> , <i>Monarda fistulosa</i>
Herb (field)	Graminoid	<i>Anthoxanthum odoratum</i> , <i>Festuca rubra</i>

Characteristic Species: *Solidago rugosa*, *Anthoxanthum odoratum*, *Monarda fistulosa*, *Euthamia graminifolia*, *Achillea millefolium*, *Daucus carota*, *Dichanthelium clandestinum*, *Lolium pratense*, *Pycnanthemum virginianum*, *Taraxacum officinale*, *Trifolium* spp.

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	SNA	1	Old Field	Walz et al. 2006
PA	SNA	1	no crosswalk	Fike 1999

Local Range: This common vegetation type occurs throughout the park.

Classification Comments: Old Field is identified by a thick layer of herbaceous-graminoid vegetation dominated by a diverse mixture of goldenrods, cool-season grasses, and agricultural weeds. *Solidago rugosa* and *Anthoxanthum odoratum* are characteristic dominants.

Schizachyrium scoparium covers <50% of the field. Trees and shrubs cover <25% of the field.

Other Comments: None.

Local Description Authors: S. J. Perles (PNHP).

Plots and Data Sources: DEWA.26, DEWA.65, DEWA.82, DEWA.138, DEWA.151, DEWA.152, DEWA.161; Perles et al. 2006a, Perles et al. 2006b, Perles et al. 2006c.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION**NVC CLASSIFICATION**

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Medium-tall sod temperate or subpolar grassland (V.A.5.N.c.)
Alliance	<i>Dactylis glomerata</i> - <i>Rumex acetosella</i> Herbaceous Alliance (A.1190)
Alliance (English name)	Orchard Grass - Common Sheep Sorrel Herbaceous Alliance
Association	<i>Dactylis glomerata</i> - <i>Phleum pratense</i> - <i>Festuca</i> spp. - <i>Solidago</i> spp. Herbaceous Vegetation
Association (English name)	Orchard Grass - Timothy - Fescue species - Goldenrod species Herbaceous Vegetation
Ecological System(s):	Information not available

GLOBAL DESCRIPTION

Concept Summary: This broadly defined vegetation type includes pastures and post-agricultural fields and is largely composed of non-native cool-season grasses and herbs (generally of European origin) in the early stages of succession. The fields are typically mowed

at least annually. Physiognomically, these grasslands are generally comprised of mid-height (1-3 feet tall) grasses and forbs, with occasional scattered shrubs. Species composition varies from site to site, depending on land-use history and perhaps soil type, but in general this vegetation is quite wide-ranging in northeastern and midwestern states and at higher elevations (610-1220 m [2000-4000 feet]) in the southeastern states. Dominant grasses vary from site to site but generally feature the nominal species. Other graminoid associates may include *Agrostis stolonifera*, *Agrostis hyemalis*, *Elymus repens*, *Bromus inermis*, *Bromus tectorum*, *Lolium perenne*, *Poa pratensis*, *Poa compressa*, *Schizachyrium scoparium* (not in abundance), and *Anthoxanthum odoratum*. Forbs scattered among the grasses are varied but include *Hieracium* spp., *Oxalis stricta*, *Achillea millefolium*, *Asclepias syriaca*, *Solidago rugosa*, *Solidago nemoralis*, *Solidago juncea*, *Solidago canadensis*, *Solidago canadensis* var. *scabra*, *Euthamia graminifolia*, *Cerastium arvense*, *Oenothera biennis*, *Potentilla simplex*, *Symphyotrichum lateriflorum* (= *Aster lateriflorus*), *Symphyotrichum novae-angliae* (= *Aster novae-angliae*), *Symphyotrichum lanceolatum* (= *Aster simplex*), *Daucus carota*, *Ambrosia artemisiifolia*, *Vicia cracca*, *Trifolium* spp., and many others.

Environmental Description: This association occurs on pastures and land that has been tilled. Generally the fields are mowed at least annually.

Vegetation Description: In addition to *Dactylis glomerata* and *Phleum pratense*, these grassy fields are characterized by graminoids including *Agrostis stolonifera*, *Agrostis hyemalis*, *Elymus repens*, *Bromus inermis*, *Bromus tectorum*, *Lolium perenne*, *Poa pratensis*, *Poa compressa*, *Schizachyrium scoparium* (not in abundance), and *Anthoxanthum odoratum*. Forbs scattered among the grasses are varied but include *Hieracium* spp., *Oxalis stricta*, *Achillea millefolium*, *Asclepias syriaca*, *Solidago rugosa*, *Solidago nemoralis*, *Solidago juncea*, *Solidago canadensis*, *Solidago canadensis* var. *scabra*, *Euthamia graminifolia*, *Cerastium arvense*, *Oenothera biennis*, *Potentilla simplex*, *Symphyotrichum lateriflorum* (= *Aster lateriflorus*), *Symphyotrichum novae-angliae* (= *Aster novae-angliae*), *Symphyotrichum lanceolatum* (= *Aster simplex*), *Daucus carota*, *Ambrosia artemisiifolia*, *Vicia cracca*, *Trifolium* spp., and many others.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Forb	<i>Rumex acetosella</i>
Herb (field)	Graminoid	<i>Dactylis glomerata</i> , <i>Festuca rubra</i> , <i>Phleum pratense</i>

Characteristic Species: *Achillea millefolium*, *Anthoxanthum odoratum*, *Dactylis glomerata*, *Euthamia graminifolia*, *Phleum pratense*, *Rumex acetosella*, *Solidago canadensis* var. *scabra*, *Solidago canadensis*, *Solidago rugosa*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Not applicable.

DISTRIBUTION

Range: This vegetation is quite wide-ranging in northeastern and midwestern states and possibly occurs at higher elevations in the southeastern states.

States/Provinces: CT, DE, KY, MA, MD, ME, NH, NJ, NY, PA, RI, TN, VA, VT, WV.

Federal Lands: NPS (Allegheny Portage Railroad, Cape Cod, Delaware Water Gap, Fire Island, Fort Necessity, Friendship Hill, Gettysburg, Johnstown Flood, Marsh-Billings-Rockefeller, Minute Man, Morristown, Saint-Gaudens, Valley Forge, Weir Farm); USFWS (Aroostook, Assabet River, Carlton Pond, Great Meadows, Moosehorn, Nulhegan Basin, Oxbow, Parker River).

CONSERVATION STATUS

Rank: GNA (modified/managed) (8-Dec-2005).

Reasons: This vegetation type includes pasture and post-agricultural fields and is largely composed of non-native grasses and herbs (generally of European origin).

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 3 – Weak.

Comments: *Schizachyrium scoparium* - *Solidago* spp. Herbaceous Vegetation (CEGL006333) is similar to this type but is dominated by warm-season grasses.

Similar Associations:

- *Lolium (arundinaceum, pratense)* Herbaceous Vegetation (CEGL004048).
- *Phleum pratense* - *Bromus pubescens* - *Helenium autumnale* Herbaceous Vegetation (CEGL004018).
- *Schizachyrium scoparium* - *Solidago* spp. Herbaceous Vegetation (CEGL006333).

Related Concepts: Information not available.

SOURCES

Description Authors: S. C. Gawler.

References: Clark 1986, Dowhan and Rozsa 1989, Eastern Ecology Working Group n.d., Edinger et al. 2002, Ehrenfeld 1977, Keever 1979, Newbold et al. 1988, Perles et al. 2006a, Perles et al. 2006b, Perles et al. 2006c, Sneddon et al. 1995, TDNH unpubl. data.



Figure 88. Old Field in Delaware Water Gap National Recreation Area (plot DEWA.138). June 2003.



Figure 89. Old Field in Delaware Water Gap National Recreation Area (plot DEWA.161). August 2003.

**COMMON NAME (PARK-SPECIFIC): WAVY HAIRGRASS - COMMON SHEEP
SORREL ROCK OUTCROP**

SYNONYMS

NVC English Name: Little Bluestem - Poverty Oatgrass - Pennsylvania Sedge / Cup
Lichen species Herbaceous Vegetation
NVC Scientific Name: *Schizachyrium scoparium* - *Danthonia spicata* - *Carex pensylvanica*
/ *Cladonia* spp. Herbaceous Vegetation
NVC Identifier: C EGL006544

LOCAL INFORMATION

Environmental Description: This association occurs on level to occasionally sloping ground on high elevations of the Kittatinny Ridge where the substrate is massive rock outcrops and/or thin soils over bedrock. Bedrock is composed of erosion-resistant sandstones of the Silurian Shawangunk Formation. This association commonly occurs in association with former home and cottage sites at high elevation along the ridge.

Vegetation Description: The vegetation in this type is typically sparse, with total vascular plant cover below 50%. Trees and shrubs are uncommon and often stunted (maximum height under 10 m). Typical tree species include red hickory (*Carya ovalis*), pignut hickory (*Carya glabra*), white ash (*Fraxinus americana*), and eastern red-cedar (*Juniperus virginiana*). Occasional short shrubs and saplings (<2 m in height) include sweet birch (*Betula lenta*) and black huckleberry (*Gaylussacia baccata*). The herbaceous layer (<1 m tall) is characterized by a mix of drought-tolerant species, including wavy hairgrass (*Deschampsia flexuosa*), common sheep sorrel (*Rumex acetosella*), eastern hayscented fern (*Dennstaedtia punctilobula*), poverty oatgrass (*Danthonia spicata*), little bluestem (*Schizachyrium scoparium*), and tapered rosette grass (*Dichanthelium acuminatum* var. *acuminatum*). The invasive species Japanese stiltgrass (*Microstegium vimineum*) is locally abundant, reflecting past disturbance. Lichens and mosses may be locally abundant on exposed rock outcrops and soils.

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Forb	<i>Rumex acetosella</i>
Herb (field)	Graminoid	<i>Deschampsia flexuosa</i>

Characteristic Species: *Deschampsia flexuosa*, *Rumex acetosella*, *Fraxinus americana*, *Carya ovalis*, *Gaylussacia baccata*.

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

<u>State</u>	<u>State Rank</u>	<u>Confidence</u>	<u>State Name</u>	<u>Reference</u>
NJ	S1S2?	1	Little Bluestem - Poverty Grass Low- to Mid-Elevation Outcrop Opening	Walz et al. 2006
PA	S2	2	Little bluestem - Pennsylvania sedge opening	Fike 1999

Local Range: This vegetation type is restricted to high-elevation areas of Kittatinny Ridge in the New Jersey portion of the park.

Classification Comments: This association differs from the little bluestem grassland in that *Schizachyrium scoparium* is a minor component and usually less abundant than *Deschampsia*

flexuosa. This type often occurs within a matrix of Dry Oak - Heath Forest or Dry Oak - Mixed Hardwood Forest.

Other Comments: None.

Local Description Authors: G. S. Podniesinski (PNHP).

Plots and Data Sources: DEWA.208; Fike 1999.

Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Medium-tall sod temperate or subpolar grassland (V.A.5.N.c.)
Alliance	Schizachyrium scoparium - (Sporobolus cryptandrus) Herbaceous Alliance (A.1224)
Alliance (English name)	Little Bluestem - (Sand Dropseed) Herbaceous Alliance
Association	<i>Schizachyrium scoparium</i> - <i>Danthonia spicata</i> - <i>Carex pensylvanica</i> / <i>Cladonia</i> spp. Herbaceous Vegetation
Association (English name)	Little Bluestem - Poverty Oatgrass - Pennsylvania Sedge / Cup Lichen species Herbaceous Vegetation
Ecological System(s):	Central Appalachian Pine-Oak Rocky Woodland (CES202.600)

GLOBAL DESCRIPTION

Concept Summary: These grassy openings are found on rock outcrops and summits at 365-1220 m (1200-4000 feet) elevation in the Central Appalachians and adjacent regions. Settings include flat summits, outcrops, plateaus and southwest-facing upper slopes. Bare rock (acidic sandstone and conglomerates) typically makes up a large part of the cover. *Danthonia spicata*, *Schizachyrium scoparium*, and *Deschampsia flexuosa* are all typical. Total herbaceous cover is usually 25-50%. Other associates include *Carex pensylvanica*, *Piptatherum pungens* (= *Oryzopsis pungens*), *Piptatherum racemosum* (= *Oryzopsis racemosa*), *Prunus pumila*, *Rumex acetosella*, *Rubus* spp., *Sibbaldiopsis tridentata*, *Cladonia* sp., and *Umbilicaria* sp. There may be small patches of shrubs within the graminoid matrix, including *Vaccinium* spp., *Gaylussacia baccata*, and *Photinia melanocarpa* (= *Aronia melanocarpa*).

Environmental Description: This association occurs on rock outcrops and summits at 365-1220 m (1200-4000 feet) elevation in the Central Appalachians and adjacent regions. Settings include flat summits, outcrops, plateaus and southwest-facing upper slopes. Bare rock (acidic sandstone and conglomerates) typically makes up a large part of the cover.

Vegetation Description: *Danthonia spicata*, *Schizachyrium scoparium*, and *Deschampsia flexuosa* are all typical. Total herbaceous cover is usually 25-50%. Other associates include *Carex pensylvanica*, *Piptatherum pungens* (= *Oryzopsis pungens*), *Piptatherum racemosum* (= *Oryzopsis racemosa*), *Prunus pumila*, *Rumex acetosella*, *Rubus* spp., *Sibbaldiopsis tridentata*, *Cladonia* sp., and *Umbilicaria* sp. There may be small patches of shrubs within the graminoid matrix, including *Vaccinium* spp., *Gaylussacia baccata*, and *Photinia melanocarpa* (= *Aronia melanocarpa*).

Most Abundant Species:

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Forb	<i>Rumex acetosella</i>
Herb (field)	Graminoid	<i>Danthonia spicata</i> , <i>Deschampsia flexuosa</i>

Characteristic Species: *Carex pensylvanica*, *Danthonia spicata*, *Deschampsia flexuosa*, *Gaylussacia baccata*, *Schizachyrium scoparium*.

Other Noteworthy Species: Information not available.

USFWS Wetland System: Not applicable.

DISTRIBUTION

Range: Information not available.

States/Provinces: CT, NJ, NY, PA.

Federal Lands: NPS (Delaware Water Gap).

CONSERVATION STATUS

Rank: GNR (8-Jul-1999).

Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 3 – Weak.

Comments: Information not available.

Similar Associations: Information not available.

Related Concepts: Information not available.

SOURCES

Description Authors: S. C. Gawler.

References: Eastern Ecology Working Group n.d., Fike 1999.



Figure 90. Wavy Hairgrass - Common Sheep Sorrel Rock Outcrop in Delaware Water Gap National Recreation Area (plot DEWA.208). June 2004.



Figure 91. Wavy Hairgrass - Common Sheep Sorrel Rock Outcrop in Delaware Water Gap National Recreation Area (near the Appalachian Trail on the Kittatinny Ridge in New Jersey). April 2006.