COMMON NAME (PARK-SPECIFIC): HICKORY - EASTERN RED-CEDAR ROCKY WOODLAND

SYNONYMS

NVC English Name:	**Eastern Red-cedar - White Ash / Poverty Oatgrass / Canada Bluegrass Woodland**
NVC Scientific Name:	***Juniperus virginiana - Fraxinus americana / Danthonia spicata - Poa compressa* Woodland**
NVC Identifier:	**CEGL006002**

LOCAL INFORMATION

Environmental Description: This association occurs on very steep, typically south- to southeast-facing slopes of Kittatinny Ridge and at the top of shale and siltstone bedrock outcrops and along narrow shelves on cliffs along the east side of the Glaciated Low Plateau. This vegetation type often occurs immediately downslope of Dry Hickory Ridgetop Forest, Dry Oak - Heath Forest or Dry Oak - Mixed Hardwood Forest that has somewhat deeper soils. This community often occurs as a mosaic with Sparsely Vegetated Cliffs (sandstone, shale or siltstone) or Shale Scree Slopes. On Kittatinny Ridge, the substrate is coarse sandstone boulders and bedrock outcrops of the Silurian Shawangunk Formation. Soils are Laidig extremely stony silt loam with slopes of 25-65 %. Along the edge of the Glaciated Low Plateau, outcrops of Devonian shales and siltstones of the Mahantango Formation occur as very steep southeast-facing slopes and shale cliffs. Soils are typically very thin, acidic and rocky, when present (e.g., Arnot very channery loam). Soils are excessively well-drained and subject to drought during the growing season. Although excessively well-drained and droughty, this association may not burn often due to a low fuel load and abundance of bare rocky substrate.

Vegetation Description: This association is open woodland on a steep rocky slope. The tree canopy is often sparse, 5 to 10 m in height, and is dominated by stunted pignut hickory (*Carya glabra*) and eastern red-cedar (*Juniperus virginiana*). Other tree species include stunted white ash (*Fraxinus americana*), pignut hickory (*Carya glabra*), pitch pine (*Pinus rigida*), and chestnut oak (*Quercus prinus*). Due to the short height of the sparse canopy, there is no subcanopy. The tall-shrub layer is 2 to 5 m in height with up to 40 % total cover. Characteristic tall shrubs include tree saplings, bear oak (*Quercus ilicifolia*), and blackhaw (*Viburnum prunifolium*). The short-shrub layer (<2 m in height) is dominated by bear oak, Blue Ridge blueberry (*Vaccinium pallidum*), lowbush blueberry (*Vaccinium angustifolium*), black huckleberry (*Gaylussacia baccata*), northern dewberry (*Rubus flagellaris*), and tree seedlings. Downy arrowwood (*Viburnum rafinesquianum*) may also be locally abundant in the short-shrub layer. Dwarf sumac (*Rhus copallina*) and Carolina rose (*Rosa carolina*) are often present as short shrubs but at low total cover. The herbaceous layer is <1 m in height with total cover generally 40% or less. Wavy hairgrass (*Deschampsia flexuosa*) is the most abundant herbaceous species. Other typical species include little bluestem (*Schizachyrium scoparium*), red columbine (*Aquilegia canadensis*), garlic mustard (*Alliaria petiolata*), big bluestem (*Andropogon gerardii*), common sheep sorrel (*Rumex acetosella*), rock harlequin (*Corydalis sempervirens*), climbing false buckwheat (*Polygonum scandens*), orangegrass (*Hypericum gentianoides*), and dwarf cinquefoil (*Potentilla canadensis*). Sweet vernalgrass (*Anthoxanthum odoratum*) may be locally abundant when present. Creeping vines, especially Virginia creeper (*Parthenocissus quinquefolia*), are often present but with low total cover (<5%).

Most Abundant Species:

Stratum	Lifeform	Species
Tree canopy	Needle-leaved tree	*Juniperus virginiana, Pinus rigida*
Tree canopy	Broad-leaved deciduous tree	*Carya glabra*
Tall shrub/sapling	Broad-leaved deciduous shrub	*Viburnum prunifolium, Quercus ilicifolia*
Short shrub/sapling	Broad-leaved deciduous shrub	*Vaccinium pallidum, Quercus ilicifolia, Rubus flagellaris*
Herb (field)	Vine/Liana	*Parthenocissus quinquefolia*
Herb (field)	Forb	*Aquilegia canadensis, Corydalis sempervirens, Hypericum gentianoides, Rumex acetosella*
Herb (field)	Graminoid	*Anthoxanthum odoratum, Danthonia spicata, Deschampsia flexuosa, Schizachyrium scoparium*

Characteristic Species: *Carya glabra, Juniperus virginiana, Quercus ilicifolia, Aquilegia canadensis, Corydalis sempervirens, Deschampsia flexuosa, Hypericum gentianoides, Schizachyrium scoparium, Solidago bicolor.*

Other Noteworthy Species: *Opuntia humifusa, Woodsia ilvensis.*

Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	S1S2	1	Eastern Red-cedar Rocky Woodland	Walz et al. 2006
PA	S2	1	Red-cedar - pickly pear shale shrubland	Fike 1999

Local Range: This woodland type is common within the park in Pennsylvania and New Jersey on south- to southeast-facing steep upper slopes of Kittatinny Ridge, where the substrate is large sandstone boulders and sandstone bedrock outcrops with small pockets of thin soil. In Pennsylvania, this vegetation type is restricted to shale cliffs and outcrops along the eastern rim of the Glaciated Low Plateau.

Classification Comments: This community differs from Dry Hickory Ridgetop Forest in being more open, with thinner soils, more exposed bedrock, and a more open canopy.

Other Comments: In New Jersey, the inclusion of pitch pine (*Pinus rigida*) in this association is unique to the Kittatinny Ridge (Shawangunk sandstone bedrock). The examples of this association that occur on the Watchung Mountains (Preakness basalt bedrock) outside the park do not contain pitch pine. Also, this association can be found on southwest-facing basalt (traprock) outcrops and steep slopes in the Piedmont in New Jersey.

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

Plots and Data Sources: DEWA.60, DEWA.119**,** DEWA.121, DEWA.146, DEWA.149, DEWA.246, DEWA.248; Fike 1999, Podniesinski 1999, Podniesinski and Kunsman 1999.

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

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Evergreen woodland (II.A.)
Physiognomic Group	Temperate or subpolar needle-leaved evergreen woodland (II.A.4.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.)
Formation	Conical-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.b.)
Alliance	Juniperus virginiana Woodland Alliance (A.545)
Alliance (English name)	Eastern Red-cedar Woodland Alliance
Association	*Juniperus virginiana - Fraxinus americana / Danthonia spicata - Poa compressa* Woodland
Association (English name)	Eastern Red-cedar - White Ash / Poverty Oatgrass / Canada Bluegrass Woodland
Ecological System(s):	Central Appalachian Pine-Oak Rocky Woodland (CES202.600)

GLOBAL DESCRIPTION

Concept Summary: This traprock ridge open woodland is known from mountainous sites in New England, New Jersey, and Pennsylvania, and may occur in southeastern New York. The vegetation occurs primarily on exposed outcrops of basaltic rock in the Connecticut Valley of New England and the Piedmont physiographic province in New Jersey. Sites supporting this community are upper slopes of basalt or diorite ridges from 365-1050 m elevation, characteristically south- or west-facing and range in slope from 5-30 degrees. Most sites have minimal soil development. Tree cover is sparse, ranging from 5-30% cover (average 20%) with *Juniperus virginiana* being the most constant canopy tree. Other woody species sometimes present include *Fraxinus americana, Quercus rubra, Quercus prinus, Ostrya virginiana*, and *Carya glabra*. The actual canopy composition reflects, to some extent, the surrounding forest. The scattered shrub layer often includes *Rosa carolina, Quercus prinus, Quercus ilicifolia, Rhus hirta, Vaccinium pallidum, Vaccinium angustifolium, Viburnum rafinesquianum*, and *Prunus virginiana*. The herbaceous layer usually covers 12-50% of the ground and is dominated by *Schizachyrium scoparium, Deschampsia flexuosa*, and *Danthonia spicata*, with their relative abundance varying from site to site. Numerous other herbaceous species occur in this community type, including *Carex pensylvanica, Anthoxanthum odoratum, Hypericum gentianoides, Antennaria plantaginifolia, Corydalis sempervirens, Solidago nemoralis, Poa compressa, Maianthemum racemosum, Uvularia perfoliata, Aquilegia canadensis, Asclepias verticillata, Polygonum scandens, Krigia virginica*, and *Houstonia longifolia*. No species is restricted to this community, but the assemblage listed above is very characteristic.

Environmental Description: This sparse woodland occurs primarily on exposed outcrops of basaltic rock in the Connecticut Valley of New England and the Piedmont physiographic province in New Jersey and adjacent Pennsylvania. Sites supporting this community are upper slopes of basalt or diorite ridges from 365-1050 m elevation. The ridges are characteristically south- or west-facing and range in slope from 5-30 degrees. Most sites have minimal soil development.

Vegetation Description: This community occurs as exposed, mainly herbaceous openings on ridgetops of resistant mafic rock. Occurrences are generally less than 0.1 ha in size. Tree cover is sparse, ranging from 5-30% cover (average 20%) with *Juniperus virginiana* being the most constant canopy tree. Other woody species sometimes present include *Fraxinus americana, Quercus rubra, Quercus prinus, Ostrya virginiana*, and *Carya glabra*. The actual canopy composition reflects, to some extent, the surrounding forest. The scattered shrub layer often includes *Rosa carolina, Quercus prinus, Quercus ilicifolia, Rhus hirta, Vaccinium pallidum, Vaccinium angustifolium, Viburnum rafinesquianum*, and *Prunus virginiana*. The herbaceous layer usually covers 12-50% of the ground and is dominated by *Schizachyrium scoparium, Deschampsia flexuosa*, and *Danthonia spicata*, with their relative abundance varying from site to site. Numerous other herbaceous species occur in this community type, including *Carex pensylvanica, Anthoxanthum odoratum, Hypericum gentianoides, Antennaria plantaginifolia, Corydalis sempervirens, Solidago nemoralis, Poa compressa, Maianthemum racemosum, Uvularia perfoliata, Aquilegia canadensis, Asclepias verticillata, Polygonum scandens, Krigia virginica*, and *Houstonia longifolia*. No species is restricted to this community, but the assemblage listed above is very characteristic.

Most Abundant Species:

Stratum	Lifeform	Species
Tree canopy	Needle-leaved tree	*Juniperus virginiana*
Herb (field)	Graminoid	*Carex pensylvanica*, *Danthonia spicata*, *Deschampsia flexuosa*, *Schizachyrium scoparium*

Characteristic Species: *Danthonia spicata, Deschampsia flexuosa, Helianthemum bicknellii, Poa compressa, Rosa carolina, Solidago nemoralis, Isanthus brachiatus.*

Other Noteworthy Species: *Arabis missouriensis, Houstonia longifolia, Muhlenbergia capillaris, Polygonum tenue, Pycnanthemum clinopodioides, Pycnanthemum torrei, Scutellaria parvula* var. *missouriensis, Selaginella rupestris.*

USFWS Wetland System: Not applicable.

DISTRIBUTION

Range: This community has been described from mountainous sites in four New England states: Fall Mountain in New Hampshire; Bare Mountain, East Mountain, Mount Tom and Mount Norwottuck in Massachusetts; and Onion Mountain, Sugarloaf, Sleeping Giant and West Mountain in Connecticut. It has also been documented at sites in the Watchung Mountains in New Jersey, Kittatinny Ridge in New Jersey and Pennsylvania, and may occur in southeastern New York.

States/Provinces: CT, MA, ME?, NH, NJ:S1S2, NY, ON, PA, VT.

Federal Lands: NPS (Delaware Water Gap).

CONSERVATION STATUS

Rank: G2G3 (16-Nov-1997).

Reasons: There are probably 30-60 occurrences of this community rangewide. At least 19 occurrences have been documented from Connecticut, Massachusetts, Pennsylvania, and New Jersey, with outliers in New Hampshire and southeastern New York. This community is restricted to exposed outcrops of basaltic rock in the Connecticut River valley of New England, and the High Allegheny Plateau and Piedmont physiographic provinces of New Jersey and

adjacent Pennsylvania. Most occurrences are small; total acreage is probably less than 500 acres rangewide.

CLASSIFICATION INFORMATION

Status: Standard.
Confidence: 2 – Moderate.
Comments: In general, this community is similar to a number of other sparse woodland ridgetop communities. New Jersey occurrences are floristically related to ridgetop sparse woodlands in Virginia (e.g., greenstone glades) but appear to share more species with the northern occurrences with which they have been grouped here. However, further research may indicate that the New Jersey occurrences represent a unique vegetation assemblage. In Massachusetts, this community typically occurs as herbaceous (and probably successional) patches within a hickory-hop hornbeam forest. New York may contain some examples of this community which they classify under the name "red cedar rocky summit community."
Similar Associations:

- *Juniperus virginiana - Ostrya virginiana / Carex eburnea* Woodland (CEGL006180).

Related Concepts:

- Eastern Redcedar: 46 (Eyre 1980) B
- Red Cedar Woodland (Thompson 1996) ?
- SNE circumneutral rocky summit/rock outcrop community (Rawinski 1984) ?

SOURCES

Description Authors: M. Anderson, mod. S. C. Gawler.
References: Breden 1989, Breden et al. 2001, Eastern Ecology Working Group n.d., Eyre 1980, Fike 1999, Grossman et al. 1994, Lee 1985, Livingston and Lund 1982, Metzler and Barrett 1992, Metzler and Barrett 2001, Motzkin 1993, Nichols 1914, Rawinski 1984, Roberts 1914, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000, Walz 1996.

Figure 61. Hickory - Eastern Red-cedar Rocky Woodland in Delaware Water Gap National Recreation Area (plot DEWA.121). September 2003.

Figure 62. Hickory - Eastern Red-cedar Rocky Woodland in Delaware Water Gap National Recreation Area (plot DEWA.146). July 2003.

COMMON NAME (PARK-SPECIFIC): OAK - BIRCH TALUS FOREST

SYNONYMS

NVC English Name: **Chestnut Oak - Sweet Birch / Virginia Creeper Talus Woodland**

NVC Scientific Name: ***Quercus prinus - Betula lenta / Parthenocissus quinquefolia* Talus Woodland**

NVC Identifier: **CEGL006565**

LOCAL INFORMATION

Environmental Description: This forest association occurs on the rocky steep southeast-facing slope of the Kittatinny Ridge and on occasional boulderfields in other sections of the park. The characteristic substrate for this forest is coarse, bouldery sandstone talus. The parent material is sandstone and sandstone conglomerate of the Silurian Shawangunk Formation. There is little available soil except for small amounts that accumulate in crevices and in between rocks.

Vegetation Description: This forest type is characterized by open forest canopy (50-80% cover) dominated by chestnut oak (*Quercus prinus*) and sweet birch (*Betula lenta*). Other canopy associates include pignut hickory (*Carya glabra*), mockernut hickory (*Carya alba*), blackgum (*Nyssa sylvatica*), black oak (*Quercus velutina*), white oak (*Quercus alba*), red maple (*Acer rubrum*), eastern white pine (*Pinus strobus*), and pitch pine (*Pinus rigida*). Canopy trees range in height from 15-30 m, while subcanopy trees extend 10-15 m in height. The sparse subcanopy (10-30% cover) is typically dominated by sweet birch and blackgum, with other canopy trees as associates. The tall-shrub layer (15-40% cover) commonly includes American witch-hazel (*Hamamelis virginiana*), mountain laurel (*Kalmia latifolia*), common serviceberry (*Amelanchier arborea*), striped maple (*Acer pensylvanicum*), smooth sumac (*Rhus glabra*), and sprouts of American chestnut (*Castanea dentata*). The variable short-shrub layer (0-30%cover) can contain black huckleberry (*Gaylussacia baccata*), Blue Ridge blueberry (*Vaccinium pallidum*), lowbush blueberry (*Vaccinium angustifolium*), northern dewberry (*Rubus flagellaris*), Allegheny blackberry (*Rubus allegheniensis*), as well as seedlings of canopy trees. The herbaceous layer is typically extremely sparse, due to the bouldery substrate. Common species include wavy hairgrass (*Deschampsia flexuosa*), marginal woodfern (*Dryopteris marginalis*), white wood aster (*Eurybia divaricata*), Swan's sedge (*Carex swanii*), and poverty oatgrass (*Danthonia spicata*). Vines may be common, including eastern poison ivy (*Toxicodendron radicans*) and Virginia creeper (*Parthenocissus quinquefolia*).

Most Abundant Species:

Stratum	Lifeform	Species
Tree canopy	Broad-leaved deciduous tree	*Quercus prinus, Betula lenta*
Tree subcanopy	Broad-leaved deciduous tree	*Nyssa sylvatica, Betula lenta*
Tall shrub/sapling	Broad-leaved deciduous shrub	*Hamamelis virginiana*

Characteristic Species: *Quercus prinus, Betula lenta, Hamamelis virginiana.*

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	S3?	2	Chestnut Oak - Sweet Birch / Virginia Creeper Talus Woodland	Walz et al. 2006
PA	S3	2	Birch (black-gum) rocky slope woodland	Fike 1999

Local Range: This common forest type occurs along the rocky, steep, southeast-facing slope of the Kittatinny Ridge.
Classification Comments: This forest is identified by the steep, coarse, bouldery talus and open canopy dominated by *Quercus prinus* and *Betula lenta*.
Other Comments: None.
Local Description Authors: S. J. Perles (PNHP).
Plots and Data Sources: DEWA.59, DEWA.181; Fike 1999.
Delaware Water Gap National Recreation Area Inventory Notes: Information not available.

GLOBAL INFORMATION

NVC CLASSIFICATION

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Deciduous woodland (II.B.)
Physiognomic Group	Cold-deciduous woodland (II.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous woodland (II.B.2.N.)
Formation	Cold-deciduous woodland (II.B.2.N.a.)
Alliance	Quercus rubra - Quercus prinus Woodland Alliance (A.624)
Alliance (English name)	Northern Red Oak - Chestnut Oak Woodland Alliance
Association	*Quercus prinus - Betula lenta / Parthenocissus quinquefolia* Talus Woodland
Association (English name)	Chestnut Oak - Sweet Birch / Virginia Creeper Talus Woodland
Ecological System(s):	North-Central Appalachian Acidic Cliff and Talus (CES202.601)

GLOBAL DESCRIPTION

Concept Summary: This talus or rocky slope woodland community occurs in the central Appalachian Mountains and extends west to the Western Allegheny Plateau in Pennsylvania. The substrate is generally quartzite or sandstone talus and usually sloping, but the type also occurs on benches, ridges, and boulderfields. Soils, where present, are shallow, organic, acidic and infertile. The canopy is of variable cover but generally open with gnarled, widely spaced trees. Characteristic trees are birches, primarily *Betula lenta* but less frequently including *Betula papyrifera, Betula populifolia*, or *Betula alleghaniensis*, as well as *Nyssa sylvatica*. Other tree associates may include *Tsuga canadensis, Acer rubrum, Carya glabra, Quercus prinus, Quercus alba, Quercus rubra, Quercus velutina*, or *Quercus coccinea*. Typical shrubs include *Acer spicatum, Acer pensylvanicum, Amelanchier arborea, Castanea dentata, Kalmia latifolia, Hamamelis virginiana, Menziesia pilosa, Ribes rotundifolium, Vaccinium angustifolium, Vitis* spp., *Toxicodendron radicans, Smilax rotundifolia*, and *Parthenocissus quinquefolia*. Ferns characterize the herb layer and may include *Dryopteris marginalis, Polypodium virginianum, Woodsia obtusa*, or *Asplenium platyneuron*. The forbs *Aralia nudicaulis, Heuchera* spp., and *Scutellaria saxatilis* are also well-adapted to the bouldery habitats. Lichens, especially the rock-tripes *Lasallia papulosa* and *Umbilicaria mammulata*, characterize the nonvascular layer.
Environmental Description: Sites include the edges of very large, unvegetated (except for lichens), scarcely weathered block fields, as well as a variety of more weathered boulderfields and slopes covered by coarse to fine, bouldery colluvium. Much of the bouldery rubble is weathered from resistant quartzite or sandstone caprock. The elevation range of plot-sampled stands ranges from about 300 m in New Jersey to 1025 m in Virginia (975-3360 feet). Slope position and aspect are variable, while associated landforms include landslide scarps, slide

masses, concave hollow heads, and incised hollow bottoms. Mean cover of exposed boulders at Virginia sampling sites is 72%. In this very rocky environment, soil is limited to local, interstitial, root-rich duff deposits, or to "pads" of moss and underlying, thin, organic / sandy material that have developed on wide, flat boulder surfaces. Interstitial air spaces between boulders may be prevalent for 1.0 m or more below the surface. Soils are largely organic and usually extremely acidic and infertile. There is often some heterogeneity of boulder depth and weathering, as well as of microclimate and soil moisture, within boulderfields. In general, sites are somewhat xeric and show little evidence of subsurface drainage. However, this regime is ameliorated by higher elevations and north aspects, which probably slow evaporation and increase the moisture-holding capacity of the bouldery substrate.

Vegetation Description: Physiognomy varies from nearly closed forest to open woodland with widely spaced trees. The canopy is dominated by more-or-less gnarled specimens of *Betula lenta* and *Quercus prinus* generally <20 m tall. *Betula lenta* is usually the sole dominant of less weathered, steeper, more unstable boulderfield habitats, while a greater variety of trees is often codominant with *Betula lenta* on more weathered and stable habitats. Other overstory associates that may be important on some sites are *Quercus rubra, Quercus velutina, Quercus alba, Acer rubrum, Nyssa sylvatica, Betula populifolia, Betula papyrifera* var. *cordifolia* (high elevation sites), *Carya glabra, Carya alba, Tsuga canadensis*, and *Betula alleghaniensis*. The presence of well-preserved, fallen boles indicates that *Castanea dentata* was important on some boulderfields prior to the arrival of chestnut blight (Fleming and Moorhead 2000). The typically open shrub layer contains *Acer pensylvanicum, Acer spicatum, Amelanchier arborea, Castanea dentata* sprouts, *Hamamelis virginiana, Ilex montana, Kalmia latifolia, Rhus glabra, Menziesia pilosa* (at the southern end of the range), and *Ribes rotundifolium*. Herbs are very sparse and restricted to mossy pockets or flat boulders; typical species are *Dryopteris marginalis, Polypodium appalachianum, Deschampsia flexuosa*, and *Danthonia spicata*. In the southern portion of the range, *Heuchera* spp. and *Scutellaria saxatilis* are characteristic herbs. Vines are scattered to abundant and include *Parthenocissus quinquefolia, Vitis* spp., *Toxicodendron radicans*, and *Smilax rotundifolia*. Bryophyte cover ranges up to 65% in some microhabitats. The rocktripes *Lasallia papulosa* and *Umbilicaria mammulata* are generally the most conspicuous lichens.

Most Abundant Species: Information not available.

Characteristic Species: *Acer spicatum, Aralia nudicaulis, Betula lenta, Betula papyrifera* var. *cordifolia, Dryopteris marginalis, Menziesia pilosa, Parthenocissus quinquefolia, Polypodium appalachianum, Quercus prinus, Ribes rotundifolium, Scutellaria saxatilis, Vaccinium angustifolium.*

Other Noteworthy Species: *Betula papyrifera* var. *cordifolia, Gymnocarpium appalachianum, Heuchera americana* var. *hispida.*

USFWS Wetland System: Not applicable.

DISTRIBUTION

Range: This community occurs locally throughout the Blue Ridge and Ridge and Valley sections of Pennsylvania, Virginia, West Virginia, and Maryland, extending northeast to the Pennsylvania-New Jersey border.

States/Provinces: MD, NJ, PA, VA:S3S4, WV.

Federal Lands: NPS (Blue Ridge Parkway, Catoctin Mountain, Delaware Water Gap, Harpers Ferry, Shenandoah, Valley Forge); USFS (George Washington, Jefferson).

CONSERVATION STATUS

Rank: G3G4 (9-Aug-2004).

Reasons: Although this community type occurs in small patches over a limited geographic range, there are probably >200 sites (if not many hundreds of sites) in Virginia and West Virginia alone. Moreover, stands occupy rugged habitats that are not prone to anthropogenic disturbances.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 2 – Moderate.

Comments: This vegetation type is poorly represented by plot data and additional sampling is needed, particularly of lower elevation and south-slope stands. Even with limited data, potential variants of the type in Virginia were proposed by Fleming and Moorhead (2000). A variant of sheltered north slopes in which *Tsuga canadensis* is codominant with *Betula lenta* and/or *Quercus* spp. has been reported from Virginia by Hupp (1983) and from Pennsylvania by Fike (1999). The combination of surficial boulder cover and nutrient-poor substrate results in a notably low mean species richness (n = 22 taxa per 400 square meters) in Virginia plot samples of this type.

Similar Associations:

- *Betula alleghaniensis - Quercus rubra / Polypodium virginianum* Woodland (CEGL006320)--is known from ME, NH, VT, NY, PA and perhaps NJ, is similar but more northern in character; it lacks *Betula lenta*, *Nyssa sylvatica*, and *Kalmia latifolia*.
- *Quercus prinus - Quercus rubra / Hamamelis virginiana* Forest (CEGL006057)--of somewhat sheltered, often very rocky slopes.

Related Concepts:

- *Betula lenta / Parthenocissus quinquefolia* Association (Rawinski et al. 1996) ?
- *Betula lenta / Ribes rotundifolium - Menziesia pilosa / Parthenocissus quinquefolia - Polypodium appalachianum* Woodland (Fleming and Coulling 2001) ?
- *Quercus rubra - Quercus montana - Betula lenta / Ilex montana / Menziesia pilosa* Forest (Fleming and Moorhead 2000) ?
- *Quercus rubra - Quercus montana - Betula lenta / Parthenocissus quinquefolia* Forest (Fleming and Moorhead 2000) ?

SOURCES

Description Authors: G. Fleming and P. Coulling, mod. S. C. Gawler.

References: Anderson et al. 1998, Eastern Ecology Working Group n.d., Fike 1999, Fleming and Coulling 2001, Fleming and Moorhead 2000, Fleming et al. 2001, Hack and Goodlett 1960, Harrison 2004, Hupp 1983, Lea 2003, Rawinski et al. 1996, Russell and Schuyler 1988, VDNH 2003.

Figure 63. Oak - Birch Talus Forest in Delaware Water Gap National Recreation Area (Accuracy Assessment Point DEWA.128). April 2006.

Figure 64. Oak - Birch Talus Forest in Delaware Water Gap National Recreation Area (Accuracy Assessment Point DEWA.1096). April 2006.

COMMON NAME (PARK-SPECIFIC): SUCCESSIONAL SHRUBLAND

SYNONYMS

NVC English Name:	**Autumn-olive - Gray Dogwood - Multiflora Rose - Eastern Red-cedar Shrubland**
NVC Scientific Name:	***Elaeagnus umbellata - Cornus racemosa - Rosa multiflora - Juniperus virginiana* Shrubland**
NVC Identifier:	**CEGL006451**

LOCAL INFORMATION

Environmental Description: Successional Shrubland occurs on former agricultural lands and old fields that are no longer intensively mowed, plowed or managed. This association develops as woody species colonize the open fields, typically from the outer edges of the field into the center or as scattered clumps throughout the field. Over time, these sites will likely succeed to Northeastern Modified Successional Forest if left unmanaged. Some of these fields are mowed or brushcut only in strips or paths that crisscross the field. These sites contain moderately well-drained to well-drained soils, typical of the following series: Wallpack, Lordstown, Nassau, Manlius, Hoosic, Otisville, and Hazen. The shrublands are flat to gently sloping, often bounded by stonewalls or fencerows.

Vegetation Description: The vegetation structure of Successional Shrubland varies from open fields with scattered tall and short shrubs covering 25% of the field to dense "closed-canopy" tall shrublands with sparse ground layer vegetation. Another common vegetation structure for this type contains small, scattered open patches of herbaceous and graminoid old-field vegetation in a matrix of large, dense clumps of tall and short shrubs. Scattered trees may be present, covering <25% of the field. Typical 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 black locust (*Robinia pseudoacacia*). Tall shrubs can be scattered or dense (25-90% cover). Characteristic tall shrubs include autumn-olive (*Elaeagnus umbellata*), gray dogwood (*Cornus racemosa*), multiflora rose (*Rosa multiflora*), eastern red-cedar, flowering dogwood (*Cornus florida*), Morrow's honeysuckle (*Lonicera morrowii*), smooth sumac (*Rhus glabra*), blackhaw (*Viburnum prunifolium*), and species listed above in the tree layer. The short-shrub layer (5-40% cover) is less dense than the tall-shrub layer and can contain the same species, as well as Japanese barberry (*Berberis thunbergii*), Allegheny blackberry (*Rubus allegheniensis*), wine raspberry (*Rubus phoenicolasius*), and black raspberry (*Rubus occidentalis*). In fields at higher elevations, ericaceous shrubs such as black huckleberry (*Gaylussacia baccata*), Blue Ridge blueberry (*Vaccinium pallidum*), deerberry (*Vaccinium stamineum*), and/or lowbush blueberry (*Vaccinium angustifolium*) can be a prominent part of the shrub layer. The herbaceous layer is variable depending on the density of shrub cover. Typical species are those associated with old fields, grasslands, and agricultural sites. Common species include garlic mustard (*Alliaria petiolata*), wrinkleleaf goldenrod (*Solidago rugosa*), wild bergamot (*Monarda fistulosa*), sweet vernalgrass (*Anthoxanthum odoratum*), eastern poison ivy (*Toxicodendron radicans*), Kentucky bluegrass (*Poa pratensis*), common yellow oxalis (*Oxalis stricta*), flat-top goldentop (*Euthamia graminifolia*), giant goldenrod (*Solidago gigantea*), red fescue (*Festuca rubra*), little bluestem (*Schizachyrium scoparium*), Virginia mountainmint (*Pycnanthemum virginianum*), false baby's breath (*Galium mollugo*), common dandelion (*Taraxacum officinale*), common cinquefoil

(*Potentilla simplex*), common yarrow (*Achillea millefolium*), Queen Anne's-lace (*Daucus carota*), white clover (*Trifolium repens*), smooth brome (*Bromus inermis*), redtop (*Agrostis gigantea*), and quackgrass (*Elymus repens*), among many others. Vines can be absent or dominant (0-90% cover), often covering the tall and short shrubs. Common vines are summer grape (*Vitis aestivalis*), fox grape (*Vitis labrusca*), oriental bittersweet (*Celastrus orbiculatus*), Virginia creeper (*Parthenocissus quinquefolia*), and Japanese honeysuckle (*Lonicera japonica*).

Most Abundant Species:

Stratum	Lifeform	Species
Tall shrub/sapling	Needle-leaved tree	*Juniperus virginiana*
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	*Cornus racemosa, Elaeagnus umbellata, Rosa multiflora*
Herb (field)	Vine/Liana	*Celastrus orbiculatus, Vitis aestivalis, Vitis labrusca*
Herb (field)	Forb	*Alliaria petiolata, Monarda fistulosa, Solidago rugosa*
Herb (field)	Graminoid	*Anthoxanthum odoratum, Schizachyrium scoparium*

Characteristic Species: *Cornus racemosa, Elaeagnus umbellata, Juniperus virginiana, Alliaria petiolata, Anthoxanthum odoratum, Monarda fistulosa, Rosa multiflora, Solidago rugosa, Celastrus orbiculatus, Vitis aestivalis.*

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	SNA	1	Successional Shrubland	Walz et al. 2006
PA	SNA	1	no crosswalk	Fike 1999

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

Classification Comments: Information not available.

Other Comments: None.

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

Plots and Data Sources: DEWA.1, DEWA.4, DEWA.5, DEWA.15, DEWA.21, DEWA.31, DEWA.44, DEWA.47, DEWA.162, DEWA.194.

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	Temperate cold-deciduous shrubland (III.B.2.N.a.)
Alliance	Cornus drummondii Shrubland Alliance (A.3558)
Alliance (English name)	Roughleaf Dogwood Shrubland Alliance
Association	*Elaeagnus umbellata - Cornus racemosa - Rosa multiflora - Juniperus virginiana* Shrubland
Association (English name)	Autumn-olive - Gray Dogwood - Multiflora Rose - Eastern Red-cedar Shrubland

Ecological System(s): Information not available

GLOBAL DESCRIPTION

Concept Summary: This association comprises shrubby old fields dominated by thickets of *Elaeagnus angustifolia, Cornus racemosa, Viburnum prunifolium, Lonicera japonica, Lonicera morrowii, Ligustrum vulgare, Euonymus alatus, Rosa multiflora, Rhus glabra*, and *Rhus hirta*, with patches of herbaceous vegetation among the shrubs. Shorter shrubs include *Berberis thunbergii* and *Rubus* spp., and in some fields *Gaylussacia baccata, Vaccinium pallidum, Vaccinium stamineum*, and/or *Vaccinium angustifolium*. Small trees are often present but form <25% cover; they include *Juniperus virginiana, Betula populifolia, Prunus virginiana, Cornus florida, Acer rubrum, Juglans nigra, Prunus serotina, Robinia pseudoacacia*, and *Fraxinus americana*. The herbaceous layer is variable depending on the density of shrub cover. Typical species are those associated with old fields, grasslands, and agricultural sites. Common species include *Solidago rugosa, Solidago gigantea, Solidago nemoralis, Monarda fistulosa, Anthoxanthum odoratum, Poa pratensis, Oxalis stricta, Viola sororia, Euthamia graminifolia, Festuca rubra, Schizachyrium scoparium, Pycnanthemum virginianum, Alliaria petiolata, Galium mollugo, Potentilla simplex, Achillea millefolium, Daucus carota, Trifolium repens, Bromus inermis, Agrostis gigantea*, and *Elymus repens (= Elytrigia repens)*, among many others. Vines can be absent or dominant, sometimes covering the tall and short shrubs. Common vines are *Vitis aestivalis, Vitis labrusca, Toxicodendron radicans, Celastrus orbiculatus, Parthenocissus quinquefolia*, and *Lonicera japonica*.

Environmental Description: This association occurs on former agricultural lands and old fields that are no longer intensively mowed, plowed or managed. These sites contain moderately well-drained to well-drained soils. The shrublands are flat to gently sloping, often bounded by stonewalls or fencerows.

Vegetation Description: The structure of this association varies from open fields with scattered tall and short shrubs covering 25% of the field, with herbaceous vegetation in the interstices, to dense "closed-canopy" tall shrublands with sparse ground layer vegetation. Common shrubs include *Elaeagnus angustifolia, Cornus racemosa, Viburnum prunifolium, Lonicera japonica, Lonicera morrowii, Ligustrum vulgare, Euonymus alatus, Rosa multiflora, Rhus glabra*, and *Rhus hirta*, with patches of herbaceous vegetation among the shrubs. Shorter shrubs include *Berberis thunbergii* and *Rubus* spp., and in some fields *Gaylussacia baccata, Vaccinium pallidum, Vaccinium stamineum*, and/or *Vaccinium angustifolium*. Small trees are often present but form <25% cover; they include *Juniperus virginiana, Betula populifolia, Prunus virginiana, Cornus florida, Acer rubrum, Juglans nigra, Prunus serotina, Robinia pseudoacacia*, and *Fraxinus americana*. The herbaceous layer is variable depending on the density of shrub cover. Typical species are those associated with old fields, grasslands, and agricultural sites. Common species include *Solidago rugosa, Solidago gigantea, Solidago nemoralis, Monarda fistulosa, Anthoxanthum odoratum, Poa pratensis, Oxalis stricta, Viola sororia, Euthamia graminifolia, Festuca rubra, Schizachyrium scoparium, Pycnanthemum virginianum, Alliaria petiolata, Galium mollugo, Potentilla simplex, Achillea millefolium, Daucus carota, Trifolium repens, Bromus inermis, Agrostis gigantea*, and *Elymus repens (= Elytrigia repens)*, among many others. Vines can be absent or dominant, sometimes covering the tall and short shrubs. Common vines are *Vitis aestivalis, Vitis labrusca, Toxicodendron radicans, Celastrus orbiculatus, Parthenocissus quinquefolia*, and *Lonicera japonica*.

Most Abundant Species:

Stratum	Lifeform	Species
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	*Cornus racemosa*, *Elaeagnus umbellata*, *Rhus glabra*, *Rosa multiflora*
Tall shrub/sapling	Needle-leaved shrub	*Juniperus virginiana*
Herb (field)	Vine/Liana	*Celastrus orbiculatus*, *Vitis aestivalis*, *Vitis labrusca*
Herb (field)	Forb	*Monarda fistulosa*, *Solidago canadensis* var. *scabra*, *Solidago rugosa*
Herb (field)	Graminoid	*Anthoxanthum odoratum*, *Schizachyrium scoparium*

Characteristic Species: *Anthoxanthum odoratum*, *Celastrus orbiculatus*, *Cornus racemosa*, *Elaeagnus umbellata*, *Juniperus virginiana*, *Monarda fistulosa*, *Rhus glabra*, *Rhus hirta*, *Rosa multiflora*, *Solidago canadensis* var. *scabra*, *Solidago rugosa*, *Vitis aestivalis*.
Other Noteworthy Species: Information not available.
USFWS Wetland System: Not applicable.

DISTRIBUTION

Range: This community is common in former agricultural areas in the northeastern U.S.
States/Provinces: CT, DE, MA, NJ, NY, PA.
Federal Lands: NPS (Delaware Water Gap, Valley Forge).

CONSERVATION STATUS

Rank: GNA (ruderal) (23-Jun-2006).
Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.
Confidence: 2 – Moderate.
Comments: This is a broadly defined type intended for shrubby vegetation on abandoned cropland or pasture.
Similar Associations: Information not available.
Related Concepts: Information not available.

SOURCES

Description Authors: S. C. Gawler.
References: Eastern Ecology Working Group n.d., Keever 1979, Newbold et al. 1988, Overlease 1987.

Figure 65. Successional Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.15). May 2003.

Figure 66. Successional Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.31). June 2003.

COMMON NAME (PARK-SPECIFIC): BEAR OAK - WAVY HAIRGRASS SHRUBLAND

SYNONYMS
NVC English Name: **Bear Oak - Sand Cherry Shrubland**
NVC Scientific Name: ***Quercus ilicifolia - Prunus pumila* Shrubland**
NVC Identifier: **CEGL006121**

LOCAL INFORMATION

Environmental Description: This vegetation type occurs on high-elevation ridges with excessively well-drained and shallow soils over sandstone and shale bedrock of the Silurian Shawangunk and Devonian Mahantango formations, respectively. This association is influenced by the extremely thin soils over acidic bedrock, with fire as a secondary influence.
Vegetation Description: This association is characterized a moderately dense to dense growth of bear oak (*Quercus ilicifolia*). The tree layer, when present, is limited to drought-tolerant species such as chestnut oak (*Quercus prinus*), pitch pine (*Pinus rigida*), and pignut hickory (*Carya glabra*). Trees are usually stunted and less than 10 m in height. The tall-shrub layer (2-5 m in height) is usually sparse and limited to occasional tree saplings, common serviceberry (*Amelanchier arborea*), and tall bear oak. The short-shrub layer (<2 m in height) is most diagnostic for this association with bear oak typically a dominant to codominant species (relative cover in short-shrub layer greater than 25%). Other common and occasionally codominant short-shrub species include lowbush blueberry (*Vaccinium angustifolium*), Blue Ridge blueberry (*Vaccinium pallidum*), black huckleberry (*Gaylussacia baccata*), and common serviceberry. The herbaceous layer cover varies from 40 to 70% and is dominated by wavy hairgrass (*Deschampsia flexuosa*) with relative cover in the herbaceous layer well over 50%. Other typical herb species include Pennsylvania sedge (*Carex pensylvanica*), little bluestem (*Schizachyrium scoparium*), and smooth Solomon's seal (*Polygonatum biflorum*). Mosses may be present with low total cover, especially polytrichum mosses (*Polytrichum* spp.).
Most Abundant Species:

Stratum	Lifeform	Species
Tall shrub/sapling	Broad-leaved deciduous shrub	*Quercus ilicifolia, Amelanchier arborea*
Short shrub/sapling	Broad-leaved deciduous shrub	*Quercus ilicifolia, Vaccinium angustifolium, Vaccinium pallidum*
Herb (field)	Forb	*Polygonatum biflorum*
Herb (field)	Graminoid	*Carex pensylvanica, Deschampsia flexuosa, Schizachyrium scoparium*

Characteristic Species: *Quercus ilicifolia, Vaccinium angustifolium, Vaccinium pallidum, Deschampsia flexuosa.*
Other Noteworthy Species: *Prunus pumila* var. *susquehanae.*
Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	S2?	1	Ridgetop Scrub Oak Barrens	Walz et al. 2006
PA	S3	1	Scrub oak shrubland	Fike 1999

Local Range: This shrubland occurs on excessively well-drained, thin soils over shale or sandstone bedrock associated with ridgetops. It may occur anywhere on the Pennsylvania side of the park on the Glaciated Low Plateau and on the New Jersey side along the top of Kittatinny Ridge.
Classification Comments: This community is similar to Successional Bear Oak - Heath Shrubland but with much greater bear oak cover. Also, the herbaceous layer is better expressed in this type (with moderate to high wavy hairgrass cover), while the herb layer is sparse to absent in Successional Bear Oak - Heath Shrubland. In addition, for 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.221, DEWA.222, DEWA.247; 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	Temperate cold-deciduous shrubland (III.B.2.N.a.)
Alliance	Quercus ilicifolia Shrubland Alliance (A.906)
Alliance (English name)	Bear Oak Shrubland Alliance
Association	*Quercus ilicifolia - Prunus pumila* Shrubland
Association (English name)	Bear Oak - Sand Cherry Shrubland
Ecological System(s):	Central Appalachian Pine-Oak Rocky Woodland (CES202.600) Central Appalachian Dry Oak-Pine Forest (CES202.591)

GLOBAL DESCRIPTION

Concept Summary: This *Quercus ilicifolia* shrubland occurs on ridgetops, summits and rock outcrops in the northeastern United States. It occurs on extremely shallow, stable acidic soils over bedrock. Open bedrock is common. This shrubland is dominated by *Quercus ilicifolia*, which occurs with variable cover depending on site conditions. Associated shrubs include *Vaccinium angustifolium, Vaccinium pallidum, Comptonia peregrina, Kalmia angustifolia, Gaylussacia baccata, Photinia melanocarpa (= Aronia melanocarpa), Quercus prinoides*, and *Prunus pumila*. The herbaceous layer varies from sparse to well-developed depending on the density of shrub cover. Typical herbs include *Deschampsia flexuosa, Carex pensylvanica, Danthonia spicata, Schizachyrium scoparium, Pteridium aquilinum, Gaultheria procumbens, Comandra umbellata, Melampyrum lineare, Hypericum gentianoides, Corydalis sempervirens, Sibbaldiopsis tridentata (= Potentilla tridentata)*, plus *Andropogon gerardii* or *Polygonatum biflorum* at some sites. Scattered and stunted trees are common and include species from the surrounding ridgetop forests, such as *Quercus prinus, Quercus rubra, Quercus alba, Pinus rigida, Populus tremuloides, Betula populifolia*, and *Carya glabra*.

Environmental Description: This shrubland occurs on extremely shallow, stable acidic soils over bedrock, typically on ridges. Open bedrock is common. Fire is a secondary influence.
Vegetation Description: This shrubland is dominated by *Quercus ilicifolia*, which occurs with variable cover depending on site conditions. Associated shrubs include *Vaccinium angustifolium, Vaccinium pallidum, Comptonia peregrina, Kalmia angustifolia, Gaylussacia baccata, Photinia melanocarpa (= Aronia melanocarpa), Quercus prinoides*, and *Prunus pumila*. The herbaceous layer varies from sparse to well-developed depending on the density of shrub cover. Typical herbs include *Deschampsia flexuosa, Carex pensylvanica, Danthonia spicata, Schizachyrium scoparium, Pteridium aquilinum, Gaultheria procumbens, Comandra umbellata, Melampyrum lineare, Hypericum gentianoides, Corydalis sempervirens, Sibbaldiopsis tridentata (= Potentilla tridentata)*, plus *Andropogon gerardii* or *Polygonatum biflorum* at some sites. Scattered and stunted trees are common and include species from the surrounding ridgetop forests, such as *Quercus prinus, Quercus rubra, Quercus alba, Pinus rigida, Populus tremuloides, Betula populifolia*, and *Carya glabra*.
Most Abundant Species:

Stratum	Lifeform	Species
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	*Quercus ilicifolia*
Short shrub/sapling	Broad-leaved deciduous shrub	*Vaccinium angustifolium, Vaccinium pallidum*
Herb (field)	Graminoid	*Carex pensylvanica, Deschampsia flexuosa, Schizachyrium scoparium*

Characteristic Species: *Amelanchier arborea, Comandra umbellata, Danthonia spicata, Deschampsia flexuosa, Melampyrum lineare, Prunus pumila, Pteridium aquilinum, Quercus ilicifolia, Quercus prinus, Vaccinium angustifolium, Vaccinium pallidum.*
Other Noteworthy Species: Information not available.
USFWS Wetland System: Not applicable.

DISTRIBUTION
Range: This association is known from ridgelines from southern New England south to interior New Jersey and Pennsylvania.
States/Provinces: CT, MA, NJ, NY?, PA.
Federal Lands: NPS (Delaware Water Gap).

CONSERVATION STATUS
Rank: GNR (10-May-2002).
Reasons: Information not available.

CLASSIFICATION INFORMATION
Status: Standard
Confidence: 2 – Moderate.
Comments: Information not available.
Similar Associations:
- *Quercus ilicifolia - Quercus prinoides* Shrubland (CEGL006111).

Related Concepts: Information not available.

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

References: Eastern Ecology Working Group n.d., Fike 1999, Metzler and Barrett 2001, Swain and Kearsley 2000.

Figure 67. Bear Oak - Wavy Hairgrass Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.221). June 2004.

Figure 68. Bear Oak - Wavy Hairgrass Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.247). June 2004.

COMMON NAME (PARK-SPECIFIC): SYCAMORE - MIXED HARDWOOD RIVERINE SHRUBLAND

SYNONYMS

NVC English Name:	**River Birch - Sycamore - (Sandbar Willow, Carolina Willow) Shrubland**
NVC Scientific Name:	***Betula nigra - Platanus occidentalis - Salix (interior, caroliniana)* Shrubland**
NVC Identifier:	**CEGL003896**

LOCAL INFORMATION

Environmental Description: This sycamore-dominated riverine shrubland typically occurs on cobble bars and sand/gravel bars that are adjacent to or contiguous with the shoreline of the Delaware River. This type can also occur on the upstream ends of islands. They are subject to frequent floods, high stream velocity and ice-scour, though these disturbances are often less intense than those experienced by Sycamore (Willow) - Mixed Hardwood Riverine Dwarf-shrubland.

Vegetation Description: This community is characterized by a substantial layer of tall shrubs (2-5 m in height) dominated by sycamore (*Platanus occidentalis*) that covers at least 25% of the area. River birch (*Betula nigra*) or silver maple (*Acer saccharinum*) can also be codominant in the tall-shrub layer. Individual sycamores may also be scattered in a sparse tree canopy that is 5-10 m in height. Black willow (*Salix nigra*), sycamore and river birch are dominant in the sparse short-shrub layer, with silver maple and black ash (*Fraxinus nigra*). The herbaceous layer ranges from sparse to moderately dense and can contain a wide variety of typical wetland and prairie species. Common species include marshpepper knotweed (*Polygonum hydropiper*), reed canarygrass (*Phalaris arundinacea*), switchgrass (*Panicum virgatum*), whitegrass (*Leersia virginica*), Pennsylvania smartweed (*Polygonum pensylvanicum*), deertongue (*Dichanthelium clandestinum*), upland bentgrass (*Agrostis perennans*), swamp milkweed (*Asclepias incarnata*), smallspike false nettle (*Boehmeria cylindrica*), sensitive fern (*Onoclea sensibilis*), Canadian clearweed (*Pilea pumila*), and swamp smartweed (*Polygonum hydropiperoides*). This association is highly susceptible to colonization by purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*), multiflora rose (*Rosa multiflora*), purple crownvetch (*Coronilla varia*), and other invasive plants. Vines such as riverbank grape (*Vitis riparia*) and eastern poison ivy (*Toxicodendron radicans*) are often found throughout this tall sycamore-dominated shrubland.

Most Abundant Species:

Stratum	Lifeform	Species
Tall shrub/sapling	Broad-leaved deciduous shrub	*Platanus occidentalis, Betula nigra*
Short shrub/sapling	Broad-leaved deciduous shrub	*Salix nigra, Platanus occidentalis, Betula nigra*
Herb (field)	Vine/Liana	*Vitis riparia*
Herb (field)	Forb	*Lythrum salicaria, Polygonum hydropiper, Polygonum pensylvanicum*

Herb (field)	Graminoid	*Leersia virginica, Panicum virgatum, Phalaris arundinacea*

Characteristic Species: *Platanus occidentalis, Betula nigra, Salix nigra, Leersia virginica, Panicum virgatum, Phalaris arundinacea, Polygonum hydropiper.*
Other Noteworthy Species: Information not available.
Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	SNR	1	Birch - Willow Riverbank Shrubland	Walz et al. 2006
PA	S4	1	River birch - sycamore floodplain scrub	Fike 1999

Local Range: This vegetation type is common in the Delaware River within the park.
Classification Comments: This association is distinguished from other riparian types by the substantial tall-shrub layer of *Platanus occidentalis*, often with *Betula nigra*. The height of the shrubs (2-5 m) differentiates this type from Sycamore (Willow) - Mixed Hardwood Riverine Dwarf-shrubland in which shrubs are less than 2 m in height. Also, the shrubs in Sycamore (Willow) - Mixed Hardwood Riverine Dwarf-shrubland remain stunted because they typically receive more frequent or more intense scour than Sycamore - Mixed Hardwood Riverine Shrubland.
Other Comments: None.
Local Description Authors: S. J. Perles (PNHP).
Plots and Data Sources: DEWA.103, DEWA.106, DEWA.110; Fike 1999, Perles et al 2004.
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	Temporarily flooded cold-deciduous shrubland (III.B.2.N.d.)
Alliance	Betula nigra Temporarily Flooded Shrubland Alliance (A.951)
Alliance (English name)	River Birch Temporarily Flooded Shrubland Alliance
Association	*Betula nigra - Platanus occidentalis - Salix (interior, caroliniana)* Shrubland
Association (English name)	River Birch - Sycamore - (Sandbar Willow, Carolina Willow) Shrubland
Ecological System(s):	Central Appalachian Riparian (CES202.609) South-Central Interior Small Stream and Riparian (CES202.706)

GLOBAL DESCRIPTION

Concept Summary: This early-successional shrub community of riverbank floodplains and river gravel bars and islands occurs in the High Allegheny Plateau, Central Appalachians, and Lower New England ecoregions. It is subject to relatively frequent and powerful flooding and ice-scour and occurs on sand, gravel or cobble deposits. It is dominated by stunted and often battered trees (less than 5 m tall), primarily *Platanus occidentalis, Betula nigra*, and/or *Acer saccharinum*, but also including *Acer negundo, Fraxinus* spp., *Populus deltoides*, and *Ulmus*

americana. *Betula nigra* is characteristic and often dominant. Associates include *Cornus amomum, Salix nigra, Salix interior (= Salix exigua), Salix caroliniana, Salix sericea, Alnus serrulata*, and sometimes *Cephalanthus occidentalis* or *Physocarpus opulifolius*. The herbaceous layer ranges from sparse to moderately dense and can contain a wide variety of typical wetland and prairie species. Characteristic herbs include *Apocynum cannabinum, Polygonum virginianum, Polygonum hydropiper, Polygonum pensylvanicum, Polygonum hydropiperoides, Eupatorium* spp., *Asclepias incarnata, Pilea pumila, Hypericum* spp., *Bidens* spp., *Sorghastrum nutans, Andropogon gerardii, Phalaris arundinacea, Dichanthelium clandestinum, Leersia virginica, Panicum virgatum*, and *Justicia americana*. Vines such as *Vitis riparia* and *Toxicodendron radicans* are often found throughout this association. Exotics such as *Lythrum salicaria, Polygonum cuspidatum, Coronilla varia*, and *Rosa multiflora* are a frequent problem.
Environmental Description: This early-successional community occurs on riverbank floodplains and river gravel bars and islands subject to frequent flooding and ice-scour. It occurs on sand, gravel or cobble deposits.
Vegetation Description: This shrubby floodplain community is dominated by stunted and often battered trees (less than 5 m tall), primarily *Platanus occidentalis, Betula nigra*, and/or *Acer saccharinum*, but also including *Acer negundo, Fraxinus* spp., *Populus deltoides*, and *Ulmus americana*. *Betula nigra* is characteristic and often dominant. Associates include *Cornus amomum, Salix nigra, Salix interior (= Salix exigua), Salix caroliniana, Salix sericea, Alnus serrulata*, and sometimes *Cephalanthus occidentalis* or *Physocarpus opulifolius*. The herbaceous layer ranges from sparse to moderately dense and can contain a wide variety of typical wetland and prairie species. Characteristic herbs include *Apocynum cannabinum, Polygonum virginianum, Polygonum hydropiper, Polygonum pensylvanicum, Polygonum hydropiperoides, Eupatorium* spp., *Asclepias incarnata, Pilea pumila, Hypericum* spp., *Bidens* spp., *Sorghastrum nutans, Andropogon gerardii, Phalaris arundinacea, Dichanthelium clandestinum, Leersia virginica, Panicum virgatum*, and *Justicia americana*. Vines such as *Vitis riparia* and *Toxicodendron radicans* are often found throughout this association. Exotics such as *Lythrum salicaria, Polygonum cuspidatum, Coronilla varia*, and *Rosa multiflora* are a frequent problem.
Most Abundant Species:

Stratum	Lifeform	Species
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	*Betula nigra, Platanus occidentalis*
Herb (field)	Vine/Liana	*Vitis riparia*
Herb (field)	Forb	*Lythrum salicaria, Polygonum hydropiper, Polygonum pensylvanicum*
Herb (field)	Graminoid	*Leersia virginica, Panicum virgatum, Phalaris arundinacea*

Characteristic Species: *Acer saccharinum, Betula nigra, Leersia virginica, Panicum virgatum, Phalaris arundinacea, Platanus occidentalis, Polygonum hydropiper, Salix nigra.*
Other Noteworthy Species: Information not available.
USFWS Wetland System: Palustrine.

DISTRIBUTION

Range: This association is found in the High Allegheny Plateau and Central Appalachian ecoregions, and peripherally in the Lower New England ecoregion, from West Virginia, Maryland (and possibly Virginia) north to New York. It is also attributed to the Western Allegheny Plateau.
States/Provinces: MD, NJ, NY, PA, VA, WV.
Federal Lands: NPS (Delaware Water Gap).

CONSERVATION STATUS

Rank: G4G5 (1-Dec-1997).
Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.
Confidence: 2 – Moderate.
Comments: *Salix interior* is listed as "rare" in Maryland and Virginia (Kartesz 1999).
Similar Associations:

- *Betula nigra - Platanus occidentalis / Impatiens capensis* Forest (CEGL006184).
- *Platanus occidentalis - (Betula nigra, Salix* spp.) Temporarily Flooded Woodland [Provisional] (CEGL003725).

Related Concepts:

- Black willow - mixed hardwood riverine shrubland (Perles et al. 2004) ?
- Mixed hardwood riverine shrubland (Perles et al. 2004) ?
- River birch (sycamore) - mixed hardwood riverine shrubland (Perles et al. 2004) ?
- River birch-willow thickets (CAP pers. comm. 1998) ?
- Silver maple (river birch) - mixed hardwood riverine shrubland (Perles et al. 2004) ?
- Sycamore - mixed hardwood riverine shrubland (Perles et al. 2004) ?

SOURCES

Description Authors: S. L. Neid, mod. S. C. Gawler.
References: CAP pers. comm. 1998, Eastern Ecology Working Group n.d., Edinger et al. 2002, Fike 1999, Harrison 2004, Kartesz 1999, Perles et al. 2004.

Figure 69. Sycamore - Mixed Hardwood Riverine Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.106). August 2003.

Figure 70. Sycamore - Mixed Hardwood Riverine Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.110). August 2003.

COMMON NAME (PARK-SPECIFIC): SYCAMORE (WILLOW) - MIXED HARDWOOD RIVERINE DWARF SHRUBLAND

SYNONYMS

NVC English Name: **Black Willow / Reed Canarygrass - Indian-hemp Temporarily Flooded Shrubland**

NVC Scientific Name: ***Salix nigra / Phalaris arundinacea - Apocynum cannabinum* Temporarily Flooded Shrubland**

NVC Identifier: **CEGL006065**

LOCAL INFORMATION

Environmental Description: Most occurrences of this association are located on low terraces and bars attached to riverbanks of the Delaware River; however, the type can occur on islands as well. The substrate is predominantly cobbles along with sand and gravel. Due to flooding, high stream velocity and ice-scour to which these areas are frequently exposed, the majority of the shrubs remain short-statured (<2 m in height). This community occurs between Riverine Scour Vegetation and the floodplain forest along low terraces and toward island heads.

Vegetation Description: This association is characterized by a moderately dense to dense short-shrub layer less than 2 m in height. The species composition of the short-shrub layer is mixed and varied, with no one species consistently dominating. Stunted individuals of black willow (*Salix nigra*) may be codominant, along with one or more other species of willow (*Salix eriocephala, Salix sericea*) or sycamore (*Platanus occidentalis*). Other typical woody species are silver maple (*Acer saccharinum*), eastern cottonwood (*Populus deltoides*), river birch (*Betula nigra*), and red maple (*Acer rubrum*). Individual tall shrubs (2-5 m in height) of the same species may be scattered throughout the shrubland. The herbaceous layer can be sparse to dense and contains a wide diversity of herbaceous and graminoid species. Some common species are reed canarygrass (*Phalaris arundinacea*), Indian-hemp (*Apocynum cannabinum*), American water-willow (*Justicia americana*), deertongue (*Dichanthelium clandestinum*), marshpepper knotweed (*Polygonum hydropiper*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), wingstem (*Verbesina alternifolia*), upland bentgrass (*Agrostis perennans*), and Virginia wildrye (*Elymus virginicus*). This community is also frequently colonized by purple loosestrife (*Lythrum salicaria*).

Most Abundant Species:

Stratum	Lifeform	Species
Short shrub/sapling	Broad-leaved deciduous shrub	*Salix* spp., *Platanus occidentalis*
Herb (field)	Forb	*Apocynum cannabinum*, *Lythrum salicaria*, *Polygonum hydropiper*
Herb (field)	Graminoid	*Phalaris arundinacea*

Characteristic Species: *Salix* spp., *Platanus occidentalis, Phalaris arundinacea.*

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	SNR	2	Willow River-Bar Shrubland	Walz et al. 2006
PA	S4	1	Black willow shrub/scrub wetland	Fike 1999

Local Range: This vegetation type occurs throughout the Delaware River.
Classification Comments: This association is identified by the presence of a substantial short-shrub layer of *Salix* spp. and/or *Platanus occidentalis*. The height of the shrubs (<2 m in height) differentiates this type from Sycamore - Mixed Hardwood Riverine Shrubland in which shrubs are 2-5 m in height. Also, the shrubs in Sycamore (Willow) - Mixed Hardwood Riverine Dwarf-shrubland remain stunted because they typically receive more frequent or more intense scour than the tall-shrub community.
Other Comments: None.
Local Description Authors: S. J. Perles (PNHP).
Plots and Data Sources: DEWA.105; Fike 1999, Perles et al 2004.
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	Temporarily flooded cold-deciduous shrubland (III.B.2.N.d.)
Alliance	Salix nigra Temporarily Flooded Shrubland Alliance (A.948)
Alliance (English name)	Black Willow Temporarily Flooded Shrubland Alliance
Association	*Salix nigra / Phalaris arundinacea - Apocynum cannabinum* Temporarily Flooded Shrubland
Association (English name)	Black Willow / Reed Canarygrass - Indian-hemp Temporarily Flooded Shrubland
Ecological System(s):	Laurentian-Acadian Wet Meadow-Shrub Swamp (CES201.582) Central Appalachian Riparian (CES202.609)

GLOBAL DESCRIPTION

Concept Summary: This community is a willow shrubland of low riverbanks along moderate- to high-energy rivers in the northeastern U.S. and High Allegheny Plateau. It occurs on cobble substrates with sand and gravel in areas that are flooded only during high-water events, but receive winter ice-scour. It occupies an intermediate position along a disturbance gradient between open, herbaceous cobble shores and higher floodplain forests. *Salix nigra* is often dominant or codominant with other willows or dogwoods forming a dense shrub layer. Less frequent shrubs and tree saplings include *Salix eriocephala, Salix lucida, Salix sericea, Alnus incana, Alnus serrulata, Cornus amomum, Cornus sericea (= Cornus stolonifera), Spiraea alba* var. *latifolia, Platanus occidentalis, Acer rubrum, Acer saccharinum*, and *Populus deltoides*. The herbaceous layer is typically sparse with variable composition, including *Carex torta, Panicum dichotomiflorum, Panicum virgatum, Dichanthelium clandestinum (= Panicum clandestinum), Echinochloa crus-galli, Elymus virginicus, Phalaris arundinacea, Calamagrostis canadensis, Apocynum cannabinum (= Apocynum sibiricum), Agrostis* spp., *Solidago gigantea, Solidago rugosa, Eupatorium maculatum, Lysimachia terrestris, Polygonum* spp., and *Bidens* spp. Invasive, exotic species can be problematic in this community, including *Polygonum cuspidatum, Lythrum salicaria, Tussilago farfara*, and *Cynanchum louiseae*.

Environmental Description: This community occurs on low riverbanks along moderate- to high-energy rivers on cobble substrates within a sand or gravel matrix.
Vegetation Description: *Salix nigra* is often dominant or codominant with other willows or dogwoods forming a dense shrub layer. Less frequent shrubs and tree saplings include *Salix eriocephala, Salix lucida, Salix sericea, Alnus incana, Alnus serrulata, Cornus amomum, Cornus sericea (= Cornus stolonifera), Spiraea alba* var. *latifolia, Platanus occidentalis, Acer rubrum, Acer saccharinum*, and *Populus deltoides*. The herbaceous layer is typically sparse with variable composition, including *Carex torta, Panicum dichotomiflorum, Panicum virgatum, Dichanthelium clandestinum (= Panicum clandestinum), Echinochloa crus-galli, Elymus virginicus, Phalaris arundinacea, Calamagrostis canadensis, Apocynum cannabinum (= Apocynum sibiricum), Agrostis* spp., *Solidago gigantea, Solidago rugosa, Eupatorium maculatum, Lysimachia terrestris, Polygonum* spp., and *Bidens* spp. Invasive, exotic species can be problematic in this community, including *Polygonum cuspidatum, Lythrum salicaria, Tussilago farfara*, and *Cynanchum louiseae*.
Most Abundant Species:

Stratum	Lifeform	Species
Short shrub/sapling	Broad-leaved deciduous shrub	*Salix nigra*
Herb (field)	Forb	*Apocynum cannabinum, Polygonum hydropiper*
Herb (field)	Graminoid	*Phalaris arundinacea*

Characteristic Species: *Cornus amomum, Dichanthelium clandestinum, Phalaris arundinacea, Platanus occidentalis.*
Other Noteworthy Species: Information not available.
USFWS Wetland System: Palustrine.

DISTRIBUTION
Range: This association occurs in the eastern United States from New Hampshire and Vermont south to Pennsylvania and New Jersey.
States/Provinces: CT, MA, MD?, ME, NH:S3, NJ, NY?, PA, VT.
Federal Lands: NPS (Delaware Water Gap); USFWS (Great Meadows).

CONSERVATION STATUS
Rank: G4? (20-Jun-2006).
Reasons: This community is not well-documented but occurs over a large range and is a frequent component of floodplain systems.

CLASSIFICATION INFORMATION
Status: Standard.
Confidence: 3 – Weak.
Comments: Information not available.
Similar Associations:
- *Salix caroliniana* Temporarily Flooded Shrubland (CEGL003899).
- *Salix interior - Salix eriocephala* Sandbar Shrubland (CEGL005078).

Related Concepts: Information not available.

SOURCES
Description Authors: S. L. Neid, mod. S. C. Gawler.
References: Eastern Ecology Working Group n.d., Fike 1999, Gawler 2002, Metzler and Barrett 2001, Nichols et al. 2001, Perles et al 2004.

Figure 71. Sycamore (Willow) - Mixed Hardwood Riverine Dwarf Shrubland in Delaware Water Gap National Recreation Area (plot DEWA.105). August 2003.

COMMON NAME (PARK-SPECIFIC): ALDER WETLAND

SYNONYMS
NVC English Name: **Smooth Alder Swamp Shrubland**
NVC Scientific Name: ***Alnus serrulata* Swamp Shrubland**
NVC Identifier: **CEGL005082**

LOCAL INFORMATION

Environmental Description: This shrub wetland occurs in a variety of palustrine settings, including depressions in floodplains, ponded drainages, upland edges of marshes, small upland depressions, and the base of slopes. The substrate is generally very poorly drained shallow peat or mineral soil with a thin organic layer, such as in Alden mucky silt loam or the Fredon-Halsey complex. These wetlands often contain standing water for most of the year. The pH of these wetlands is broadly circumneutral. Beaver dams or other impoundments may have influenced many of these wetlands.

Vegetation Description: This palustrine association is characterized by a substantial tall-shrub layer, dominated by smooth alder (*Alnus serrulata*) or gray alder (*Alnus incana*), covering 30-75% of the area. Other associated tall shrubs include silky dogwood (*Cornus amomum*), common buttonbush (*Cephalanthus occidentalis*), red maple (*Acer rubrum*), and willows (*Salix* spp.). These species also occur in the sparse short-shrub layer, along with white meadowsweet (*Spiraea alba* var. *latifolia*) and northern spicebush (*Lindera benzoin*). The herbaceous layer can be dense and contain a variety of species, including tussock sedge (*Carex stricta*), fowl mannagrass (*Glyceria striata*), eastern marsh fern (*Thelypteris palustris*), marshpepper knotweed (*Polygonum hydropiper*), arrowleaf tearthumb (*Polygonum sagittatum*), nodding beggartick (*Bidens cernua*), hairy sedge (*Carex lacustris*), true forget-me-not (*Myosotis scorpioides*), smallspike false nettle (*Boehmeria cylindrica*), Canadian clearweed (*Pilea pumila*), stiff marsh bedstraw (*Galium tinctorium*), woolgrass (*Scirpus cyperinus*), spotted water hemlock (*Cicuta maculata*), and jewelweed (*Impatiens capensis*).

Most Abundant Species:

Stratum	Lifeform	Species
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	*Alnus incana, Alnus serrulata*
Herb (field)	Forb	*Bidens cernua, Polygonum* spp.
Herb (field)	Graminoid	*Carex lacustris, Carex stricta, Glyceria striata*
Herb (field)	Fern or fern ally	*Thelypteris palustris*

Characteristic Species: *Alnus incana, Alnus serrulata, Carex lacustris, Carex stricta, Cicuta maculata, Glyceria striata, Polygonum* spp., *Sium suave, Thelypteris palustris.*

Other Noteworthy Species: Information not available.

Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	SNR	2	Smooth Alder Swamp	Walz et al. 2006
PA	S3S4	2	Alder - ninebark wetland	Fike 1999

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

Classification Comments: Alder Wetland is distinguished from other palustrine shrublands by the dominance of *Alnus* spp., covering 30-75% of the wetland.
Other Comments: None.
Local Description Authors: S. J. Perles (PNHP).
Plots and Data Sources: DEWA.51, DEWA.163; 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	Alnus serrulata Seasonally Flooded Shrubland Alliance (A.994)
Alliance (English name)	Smooth Alder Seasonally Flooded Shrubland Alliance
Association	*Alnus serrulata* Swamp Shrubland
Association (English name)	Smooth Alder Swamp Shrubland
Ecological System(s):	Central Appalachian Floodplain (CES202.608)
	Laurentian-Acadian Wet Meadow-Shrub Swamp (CES201.582)

GLOBAL DESCRIPTION

Concept Summary: This alder swamp is found widely throughout the northeastern United States south of near-boreal regions. These shrublands are found on muck overlying mineral soils (peat deposits are not typical) of upland marsh borders, at the edges of red maple swamps, or in acidic colluvium at bases of slopes. The pH of these systems is broadly circumneutral to somewhat calcareous. The vegetation is dominated by tall shrubs, characterized and usually dominated by *Alnus serrulata*, sometimes in a mixture with (or rarely replaced by) *Alnus incana*. Associate shrubs vary somewhat with geography and include *Cornus sericea, Rosa palustris, Physocarpus opulifolius, Viburnum dentatum* var. *lucidum*, and *Salix* spp. Saplings of *Acer rubrum* are typical. Short shrubs include *Spiraea alba* var. *latifolia* and *Lindera benzoin*. Less frequent shrubs include *Cephalanthus occidentalis, Decodon verticillatus, Ilex verticillata, Rhododendron viscosum*, and *Sambucus nigra* spp. *canadensis*. Herbaceous associates include *Calamagrostis canadensis, Osmunda regalis, Glyceria striata, Thelypteris palustris, Galium* spp., *Typha latifolia, Polygonum hydropiper, Bidens cernua, Galium tinctorium, Cicuta maculata, Peltandra virginica*, and *Carex stricta*.
Environmental Description: These shrublands are found on muck overlying mineral soils (peat deposits are not typical) of upland marsh borders, small upland depressions, at the edges of red maple swamps or other ponded drainages, or in colluvium at bases of slopes. The pH of these systems is broadly circumneutral to somewhat calcareous (Fike 1999).
Vegetation Description: The vegetation is dominated by tall shrubs and characterized by *Alnus serrulata, Alnus incana, Physocarpus opulifolius, Viburnum dentatum* var. *lucidum, Cornus amomum*, and *Salix* spp. Saplings of *Acer rubrum* are typical. Short shrubs include *Spiraea alba* var. *latifolia* and *Lindera benzoin*. Other shrubs present include *Cephalanthus occidentalis, Decodon verticillatus, Ilex verticillata, Rhododendron viscosum*, and *Sambucus nigra* spp. *canadensis* (Anderson 1996, Fike 1999). Herbaceous associates include *Calamagrostis*

canadensis, Osmunda regalis, Glyceria striata, Thelypteris palustris, Galium spp., *Typha latifolia, Polygonum hydropiper, Bidens cernua, Galium tinctorium, Cicuta maculata, Peltandra virginica,* and *Carex stricta*.

Most Abundant Species:

Stratum	Lifeform	Species
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	*Alnus incana*
Tall shrub/sapling	Broad-leaved deciduous shrub	*Alnus serrulata, Physocarpus opulifolius, Viburnum dentatum* var. *lucidum*
Herb (field)	Forb	*Peltandra virginica*
Herb (field)	Graminoid	*Calamagrostis canadensis*
Herb (field)	Fern or fern ally	*Osmunda regalis*

Characteristic Species: *Alnus serrulata, Cornus amomum, Physocarpus opulifolius, Viburnum dentatum* var. *lucidum.*

Other Noteworthy Species: Information not available.

USFWS Wetland System: Palustrine.

DISTRIBUTION

Range: This alder swamp is found widely throughout the northeastern United States, ranging from central New England south to New Jersey, and west to Ohio and Pennsylvania.

States/Provinces: CT, DE?, MA, MD?, ME, NH, NJ, NY, OH, PA, QC?, RI, VT.

Federal Lands: NPS (Delaware Water Gap, Minute Man).

CONSERVATION STATUS

Rank: G4G5 (22-Mar-1999).

Reasons: Information not available.

CLASSIFICATION INFORMATION

Status: Standard.

Confidence: 3 – Weak.

Comments: This type overlaps with *Alnus incana* Swamp Shrubland (CEGL002381) where the ranges abut in Ohio, Pennsylvania, southern New England, and southern New York. Where both alder species are present, this type is distinguished from the *Alnus incana* nominal type by the presence of species with a somewhat more Central Appalachian / Alleghenian affinity such as *Physocarpus opulifolius, Rhododendron viscosum, Peltandra virginica,* compared to CEGL002381 which is characterized by somewhat more northern species such as *Nemopanthus mucronatus* and *Myrica gale*. Where they overlap, the relative dominance of the two alder species should be expected to vary. If *Alnus serrulata* is present in more than token amounts, consider this type as opposed to CEGL002381.

Similar Associations:

- *Alnus incana* Swamp Shrubland (CEGL002381).
- *Alnus serrulata* Southeastern Seasonally Flooded Shrubland (CEGL008474).

Related Concepts:

- Smooth alder shrub thicket (CAP pers. comm. 1998) ?

SOURCES

Description Authors: L. A. Sneddon, mod. D. Faber-Langendoen and S. C. Gawler.

References: Anderson 1996, CAP pers. comm. 1998, Eastern Ecology Working Group n.d., Fike 1999, Swain and Kearsley 2001.

Figure 72. Alder Wetland in Delaware Water Gap National Recreation Area (plot DEWA.51). July 2003.

Figure 73. Alder Wetland in Delaware Water Gap National Recreation Area (Accuracy Assessment Observation Point DEWA.547). June 2006.

COMMON NAME (PARK-SPECIFIC): WET MEADOW

SYNONYMS
NVC English Name: **Steeplebush - Blackberry species / Reed Canarygrass Shrubland**
NVC Scientific Name: ***Spiraea tomentosa* - *Rubus* spp. / *Phalaris arundinacea* Shrubland**
NVC Identifier: **CEGL006571**

LOCAL INFORMATION

Environmental Description: This variable wetland type occurs along streams and drainages on a variety of somewhat to very poorly drained soils. These wetlands typically flood early in the growing season and may be saturated at or 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, often with a layer of muck at the surface. Wet Meadow is often found in former lakebeds that have been drained. Rivulets of water flow through these lakebeds, with relatively little area covered by standing water. The substrate in these lakebeds often contains cobbles, compacted soil, and occasionally bedrock. Some lakebeds contain patches of unvegetated bare soil.
Vegetation Description: The species composition of these wetlands is variable among sites. Within each wetland, species may be locally abundant and often have patchy distribution. A mixture of predominantly graminoid species, with numerous herbaceous associates, covers 70-95% of the wetland. Common dominants include woodland bulrush (*Scirpus expansus*), arrowleaf tearthumb (*Polygonum sagittatum*), common rush (*Juncus effusus*), eastern marsh fern (*Thelypteris palustris*), giant goldenrod (*Solidago gigantea*), rice cutgrass (*Leersia oryzoides*), hairyfruit sedge (*Carex trichocarpa*), broom sedge (*Carex scoparia*), Bailey's sedge (*Carex baileyi*), shallow sedge (*Carex lurida*), tussock sedge (*Carex stricta*), owlfruit sedge (*Carex stipata*), woolgrass (*Scirpus cyperinus*), and rough bentgrass (*Agrostis scabra*). Other associated species are northern bugleweed (*Lycopus uniflorus*), sensitive fern (*Onoclea sensibilis*), jewelweed (*Impatiens capensis*), smallspike false nettle (*Boehmeria cylindrica*), nodding sedge (*Carex gynandra*), hop sedge (*Carex lupulina*), stiff marsh bedstraw (*Galium tinctorium*), bluntleaf bedstraw (*Galium obtusum*), common marsh bedstraw (*Galium palustre*), dwarf St. Johnswort (*Hypericum mutilum*), Virginia marsh St. Johnswort (*Triadenum virginicum*), and woodland rush (*Juncus subcaudatus*). Reed canarygrass (*Phalaris arundinacea*) can occur in this type, but it is not a dominant species. The invasive species Japanese stiltgrass (*Microstegium vimineum*), purple loosestrife (*Lythrum salicaria*), and common reed (*Phragmites australis*) can be abundant or form monocultures in these wetlands. Shrubs may cover up to 30% of the area; common species include steeplebush (*Spiraea tomentosa*), silky dogwood (*Cornus amomum*), and the invasive species multiflora rose (*Rosa multiflora*).
Most Abundant Species:

Stratum	Lifeform	Species
Short shrub/sapling	Broad-leaved deciduous shrub	*Cornus amomum*, *Rosa multiflora*, *Spiraea tomentosa*
Herb (field)	Forb	*Polygonum sagittatum*
Herb (field)	Graminoid	*Carex* spp., *Scirpus* spp., *Juncus* spp., *Leersia oryzoides*, *Microstegium vimineum*

Characteristic Species: *Carex* spp., *Scirpus* spp., *Juncus* spp., *Agrostis scabra, Leersia oryzoides, Polygonum sagittatum, Thelypteris palustris*
Other Noteworthy Species: Information not available.
Subnational Distribution with Crosswalk data:

State	State Rank	Confidence	State Name	Reference
NJ	SNR	2	Steeplebush / Reed Canarygrass Successional Wet Meadow	Walz et al. 2006
PA	S5	2	Wet meadow	Fike 1999

Local Range: This wetland type is found along streams and drainages throughout the park; however, this type is most common in drained lakebeds on the Kittatinny Ridge.
Classification Comments: Wet Meadow has a highly variable species composition; however, it is distinguished from other palustrine types by the diverse mix of graminoid species and its hydrology (flooded in early growing season and dry or saturated the rest of the year). Mixed Forb Marsh typically has year-round ponded water and associated hydrophilic species that are tolerant of standing water, without shrubs and other woody species. Tussock Sedge Marsh is dominated by *Carex stricta* (30-70% cover).
Other Comments: None.
Local Description Authors: S. J. Perles (PNHP).
Plots and Data Sources: DEWA.67, DEWA.96, DEWA.132, DEWA.199, DEWA.226; 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	Spiraea tomentosa - Rubus spp. Seasonally Flooded Shrubland Alliance (A.3022)
Alliance (English name)	Steeplebush - Blackberry species Seasonally Flooded Shrubland Alliance
Association	*Spiraea tomentosa* - *Rubus* spp. / *Phalaris arundinacea* 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:

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

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 74. Wet Meadow in Delaware Water Gap National Recreation Area (plot DEWA.67). July 2003.

Figure 75. Wet Meadow in Delaware Water Gap National Recreation Area (plot DEWA.96). August 2003.