

---

## **ECOLOGICAL SYSTEM: CENTRAL APPALACHIAN PINE-OAK ROCKY WOODLAND**

---

**Summary:** This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes, mostly at lower elevations, but occasionally up to 1220 m (4000 feet) in West Virginia. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. *Pinus* (pine) spp. are diagnostic and often are mixed with xerophytic *Quercus* (oak) spp. Some areas have a fairly well-developed heath shrub layer, others a graminoid layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire.

**High-ranked Species:** *Arabis serotina* (G2, shale barren rockcress), *Canis rufus* (G1Q, red wolf), *Catocala herodias gerhardi* (G3T3, herodias or pine barrens underwing), *Gaylussacia brachycera* (G3, box huckleberry), *Malaxis bayardii* (G1G2, bayard's malaxis), *Packera millefolia* (G2, piedmont groundsel), *Pyrgus wyandot* (G1G2Q, Appalachian grizzled skipper), *Taenidia montana* (G3, mountain-pimpernel), *Vaccinium hirsutum* (G3, hairy blueberry), *Virginia valeriae pulchra* (G5T3T4, mountain earth snake)

**Range:** This system occurs from central New England south to Virginia and West Virginia. United States: CT, MA, MD?, ME, NH, NJ, NY, PA, VA, VT, WV

### **Delaware Estuary Associations:**

- Central Appalachian Blueberry Shrubland
- Little Bluestem - Poverty Grass Low- to Mid-Elevation Outcrop Opening
- Pitch Pine Rocky Summit
- Ridgetop Scrub Oak Barrens

### **CLASSIFIERS FOR CENTRAL APPALACHIAN PINE-OAK ROCKY WOODLAND**

**Primary Division:** 202

**Land Cover Class:** Forest and Woodland

**Spatial Scale & Pattern:** Large patch

**Required Classifiers:** Natural/Semi-natural; Vegetated (>10% vasc.); Upland

**Diagnostic Classifiers:** Forest and Woodland (Treed); Shrubland (Shrub-dominated); Woody-Herbaceous;

Ridge/Summit/Upper Slope; Acidic Soil; *Pinus* (*strobus*, *rigida*, *echinata*, *virginiana*) - *Quercus prinus*

**Non-diagnostic Classifiers:** Lowland; Temperate; Oligotrophic Soil; Shallow Soil; Ustic; Consolidated; F-Patch/Medium Intensity; Needle-Leaved Tree; Broad-Leaved Deciduous Tree; Moderate (100-500 yrs) Persistence

---

## **CENTRAL APPALACHIAN BLUEBERRY SHRUBLAND**

*Vaccinium* (*angustifolium*, *myrtilloides*, *pallidum*) High Allegheny Plateau / Central Appalachian Dwarf-shrubland

---

**Range:** Within the Delaware Estuary, this community occurs within high-elevation portions of the Blue, First, and Second mountains in Schuylkill County in Pennsylvania.

**Environmental Description:** This association occurs on dry, high-elevation portions of the Blue, First, and Second mountains where the fire frequency and intensity is high. This particular vegetation type is best expressed where fire has recently occurred. The soil is typically sandy or thin soils over bedrock. Soils are



Photo by Pennsylvania Natural Heritage Program

typically acidic with low moisture content. Droughty soil conditions limit tree development and most trees (when present) are stunted.

**Vegetation Description:** This community is dominated by heaths or heath-like shrubs, including *Gaylussacia baccata* (black huckleberry), *Vaccinium angustifolium* (northern lowbush blueberry), *Vaccinium pallidum* (hillside blueberry), and *Vaccinium stamineum* (deerberry). Other common shrubs can include *Kalmia angustifolia* (sheep laurel), *Kalmia latifolia* (mountain laurel), *Gaylussacia frondosa* (dangleberry), *Comptonia peregrina* (sweet-fern), and *Quercus ilicifolia* (bear oak). Associated herbaceous plants are *Deschampsia flexuosa* (wavy hairgrass), *Schizachyrium scoparium* (little bluestem), *Danthonia spicata* (poverty oatgrass), *Carex pensylvanica* (Pennsylvania sedge), *Carex swanii* (swan's sedge), *Piptatherum pungens* (slender mountain ricegrass), *Euthamia graminifolia* (flat-top goldentop), *Solidago canadensis* (Canada goldenrod), *Lycopodium dendroideum* (tree clubmoss), and *Lycopodium digitatum* (fan clubmoss). Mosses and lichens usually are present.

**Characteristic Species:** *Gaylussacia baccata* (black huckleberry), *Vaccinium angustifolium* (northern lowbush blueberry), *Vaccinium pallidum* (hillside blueberry), *Vaccinium stamineum* (deerberry)

**Dynamics/Successional Trajectory:** This association is maintained as a shrubland by periodic fire, shallow rocky soils, and harsh edaphic conditions.

**Management Concerns:** The applicability of utilizing prescribed fire as a restoration technique for this association should be evaluated on a site-specific basis.

**Reference Sites:** Weiser State Forest and Locust Lake State Park, Schuylkill County, PA

**Global and State Conservation Ranks and Reasons:** GNR (1-Dec-1997). PA: SNR.

**VegBank Link for Plot Data:** [http://vegbank.org/natureserve/element\\_global.2.686894](http://vegbank.org/natureserve/element_global.2.686894)

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

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Gaylussacia baccata</i> (black huckleberry)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium angustifolium</i> (northern lowbush blueberry)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium pallidum</i> (hillside blueberry)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium stamineum</i> (deerberry)
Herb (field)	Graminoid	<i>Deschampsia flexuosa</i> (wavy hairgrass)

### LITTLE BLUESTEM - POVERTY GRASS LOW- TO MID-ELEVATION OUTCROP OPENING

*Schizachyrium scoparium* - *Danthonia spicata* - *Carex pensylvanica* / *Cladonia* spp. Herbaceous Vegetation

**Range:** This community occurs in the Pennsylvania portion of the Delaware Estuary.

**Environmental Description:** This Central Appalachian community occurs on rock outcrops, flat summits, plateaus, and southwest-facing upper slopes with grassy openings. It occurs between 365 and 425 m (1200-1400 feet) in elevation. The bedrock consists of acidic sandstone and conglomerates.



Photo by Pennsylvania Natural Heritage Program

**Vegetation Description:** *Danthonia spicata* (poverty

oatgrass), *Schizachyrium scoparium* (little bluestem), and *Deschampsia flexuosa* (wavy hairgrass) dominate this community. Other associates include *Carex pensylvanica* (Pennsylvania sedge), *Piptatherum pungens* (slender mountain ricegrass), *Piptatherum racemosum* (black-seed mountain ricegrass), *Hypericum gentianoides* (pineweed), *Rubus* (blackberry) spp., *Sibbaldiopsis tridentata* (mountain-cinquefoil), *Cladonia* (cup lichen) sp., *Umbilicaria* (rocktripe) sp. Scattered shrubs include *Vaccinium* (blueberry) spp., *Gaylussacia baccata* (black huckleberry), and *Photinia melanocarpa* (black chokeberry).

**Characteristic Species:** *Danthonia spicata* (poverty oatgrass), *Deschampsia flexuosa* (wavy hairgrass), *Schizachyrium scoparium* (little bluestem)

**Dynamics/Successional Trajectory:** This community is typically associated with Pitch Pine Rocky Summit (CEGL006116) and similar dry ridgetop woodlands and shrublands. It is relatively stable where controlled by edaphic conditions (thin, poor soils over bedrock), or successional where fire has removed or reduced woody plant cover.

**Management Concerns:** This community requires maintenance of a natural disturbance regime, including fire where necessary for reducing woody plant cover.

**Reference Sites:** Delaware Water Gap National Recreation Area, Pike County, PA; Sussex County, NJ; Pike County, PA

**Global and State Conservation Ranks and Reasons:** GNR (8-Jul-1999). PA: SNR.

**VegBank Link for Plot Data:** [http://vegbank.org/natureserve/element\\_global.2.685616](http://vegbank.org/natureserve/element_global.2.685616)

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

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Herb (field)	Graminoid	<i>Danthonia spicata</i> (poverty oatgrass)
Herb (field)	Graminoid	<i>Schizachyrium scoparium</i> (little bluestem)

## PITCH PINE ROCKY SUMMIT

*Pinus rigida* / (*Quercus ilicifolia*) / *Photinia melanocarpa* / *Deschampsia flexuosa* Woodland

**Range:** Within the Delaware Estuary, this association likely occurs only in high-elevation portions of the Blue, First, and Second mountains in Schuylkill County in Pennsylvania.

**Environmental Description:** This northeastern pitch pine community occurs on dry rocky ridges and summits of low to moderate elevations. Soils are derived from acidic bedrock and are typically shallow, well- to excessively drained, coarse sands or gravels that develop in pockets of the exposed bedrock expanses.



Photo by Pennsylvania Natural Heritage Program

**Vegetation Description:** The canopy is open and trees are often stunted. Tall shrubs are scattered and not abundant. The dwarf-shrub layer is typically well-developed. Herb distribution is patchy. The bryoid layer is of variable cover, with lichens prominent. The ground cover is bare rock,

deciduous and coniferous litter. The canopy is dominated by *Pinus rigida* (pitch pine) with a variable mixture of associates, such as *Betula populifolia* (gray birch), *Quercus rubra* (northern red oak), *Pinus strobus* (eastern white pine), *Pinus resinosa* (red pine), *Betula lenta* (sweet birch), *Acer rubrum* (red maple), and *Prunus serotina* (black cherry). The tall-shrub layer is comprised of scattered *Nemopanthus mucronatus* (catberry), *Quercus ilicifolia* (bear oak), or *Quercus prinoides* (dwarf chinquapin oak). The shrub layer is dominated by heaths, such as *Vaccinium angustifolium* (northern lowbush blueberry), *Vaccinium pallidum* (hillside blueberry), *Kalmia angustifolia* (sheep laurel), and *Gaylussacia baccata* (black huckleberry), as well as other shrubs, such as *Comptonia peregrina* (sweet-fern) and *Photinia melanocarpa* (black chokeberry). The herbaceous layer typically includes *Pteridium aquilinum* (bracken fern), *Schizachyrium scoparium* (little bluestem), *Deschampsia flexuosa* (wavy hairgrass), *Danthonia spicata* (poverty oatgrass), *Carex pensylvanica* (Pennsylvania sedge) and/or *Carex lucorum* (Blue Ridge sedge), *Maianthemum canadense* (Canada mayflower), *Aralia nudicaulis* (wild sarsaparilla), *Melampyrum lineare* (narrowleaf cow-wheat), *Fragaria virginiana* (Virginia strawberry), *Trientalis borealis* (starflower), *Rumex acetosella* (common sheep sorrel), *Erechtites hieraciifolia* (American burnweed), *Corydalis sempervirens* (rock harlequin), *Polypodium virginianum* (rock polypody), and *Cypripedium acaule* (pink lady's-slipper). In the central Appalachians, this community occurs at elevations of 305 to 520 m (1000-1700 feet), with occasional associates including *Pinus pungens* (Table Mountain pine), *Pinus virginiana* (Virginia pine), and *Ilex montana* (mountain holly).

**Noteworthy Associated Plant and/or Animal Species:** *Dendroica discolor* (prairie warbler)

**Characteristic Species:** *Deschampsia flexuosa* (wavy hairgrass), *Photinia melanocarpa* (black chokeberry), *Pinus rigida* (pitch pine), *Quercus ilicifolia* (bear oak)

**Dynamics/Successional Trajectory:** Periodic fires are probably necessary for persistence of this type, except at the most extreme sites. The prominent areas of exposed bedrock also maintain this association in an open woodland state.

**Management Concerns:** The applicability of utilizing prescribed fire as a restoration technique for this association should be evaluated on a site-specific basis.

**Reference Sites:** near Crater Lake, Delaware Water Gap National Recreation Area, NJ

**Global and State Conservation Ranks and Reasons:** GNR (1-Dec-1997). NJ: S1, PA: SNR.

**VegBank Link for Plot Data:** [http://vegbank.org/natureserve/element\\_global.2.686132](http://vegbank.org/natureserve/element_global.2.686132)

**References:** Breden 1989, Breden et al. 2001, CAP pers. comm. 1998, Eastern Ecology Working Group n.d., Edinger et al. 2002, Eyre 1980, Fike 1999, Fleming 1985, Gawler 2002, Harrison 2004, Hunt 1999, Kuchler 1956, Lundgren 1999a, Metzler and Barrett 2001, Moore and Taylor 1927, Rawinski 1984, Sperduto 1997a, Swain and Kearsley 2001, Thompson 1996, Thompson and Sorenson 2000

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Needle-leaved tree	<i>Pinus rigida</i> (pitch pine)
Tree canopy	Broad-leaved deciduous tree	<i>Betula populifolia</i> (gray birch)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Quercus ilicifolia</i> (bear oak)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium angustifolium</i> (northern lowbush blueberry)
Herb (field)	Fern or fern ally	<i>Pteridium aquilinum</i> (bracken fern)

---

## RIDGETOP SCRUB OAK BARRENS

*Quercus ilicifolia* - *Prunus pumila* Shrubland

---

**Range:** Within the Delaware Estuary, this association likely occurs only in high-elevation portions of the Blue, First, and Second mountains in Schuylkill County in Pennsylvania.

**Environmental Description:** This shrubland occurs on extremely shallow, stable acidic soils over bedrock. Open bedrock is common. Periodic fires can help maintain this association in a shrubland state.

**Vegetation Description:** This shrubland is dominated by *Quercus ilicifolia* (bear oak), which occurs with variable cover depending on site conditions. Associated shrubs include *Vaccinium angustifolium* (northern lowbush



Photo by Pennsylvania Natural Heritage Program

blueberry), *Vaccinium pallidum* (hillside blueberry), *Comptonia peregrina* (sweet-fern), *Kalmia angustifolia* (sheep laurel), *Gaylussacia baccata* (black huckleberry), *Photinia melanocarpa* (black chokeberry), *Quercus prinoides* (dwarf chinquapin oak), *Gaultheria procumbens* (wintergreen), and *Prunus pumila* var. *susquehanae* (Susquehanna cherry). Herbaceous species are generally sparse but include *Danthonia spicata* (poverty oatgrass), *Schizachyrium scoparium* (little bluestem), *Pteridium aquilinum* (bracken fern), *Deschampsia flexuosa* (wavy hairgrass), *Carex pensylvanica* (Pennsylvania sedge), *Comandra umbellata* (bastard toadflax), *Melampyrum lineare* (narrowleaf cow-wheat), *Hypericum gentianoides* (pinweed), *Corydalis sempervirens* (rock harlequin), *Sibbaldiopsis tridentata* (mountain-cinquefoil), plus *Andropogon gerardii* (big bluestem) at some sites. Scattered trees are common and include species from the surrounding ridgetop forests, such as *Quercus prinus* (chestnut oak), *Quercus rubra* (northern red oak), *Quercus alba* (white oak), *Pinus rigida* (pitch pine), *Populus tremuloides* (quaking aspen), *Betula populifolia* (gray birch), and *Carya* (hickory) spp.

**Noteworthy Associated Plant and/or Animal Species:** *Prunus pumila* var. *susquehanae* (Susquehanna cherry)

**Characteristic Species:** *Prunus pumila* var. *susquehanae* (Susquehanna cherry), *Quercus ilicifolia* (bear oak)

**Dynamics/Successional Trajectory:** This shrubland is influenced by the extremely thin soils over acidic bedrock, with fire as a secondary influence.

**Management Concerns:** The applicability of utilizing prescribed fire as a restoration technique for this association should be evaluated on a site-specific basis.

**Reference Sites:** Weiser State Forest and Locust Lake State Park, Schuylkill County, PA

**Global and State Conservation Ranks and Reasons:** GNR (10-May-2002). PA: SNR.

**VegBank Link for Plot Data:** [http://vegbank.org/natureserve/element\\_global.2.689771](http://vegbank.org/natureserve/element_global.2.689771)

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

### MOST ABUNDANT SPECIES

STRATUM	LIFEFORM	SPECIES
Shrub/sapling (tall & short)	Broad-leaved deciduous tree	<i>Quercus ilicifolia</i> (bear oak)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Prunus pumila</i> var. <i>susquehanae</i> (Susquehanna cherry)
Short shrub/sapling blueberry)	Broad-leaved deciduous shrub	<i>Vaccinium angustifolium</i> (northern lowbush
Herb (field)	Graminoid	<i>Danthonia spicata</i> (poverty oatgrass)
Herb (field)	Graminoid	<i>Schizachyrium scoparium</i> (little bluestem)