
ECOLOGICAL SYSTEM: CENTRAL APPALACHIAN DRY OAK-PINE FOREST

Summary: These oak and oak-pine forests cover large areas in the low- to mid-elevation central Appalachians and middle Piedmont. The topography and landscape position range from rolling hills to steep slopes, with occasional occurrences on more level, ancient alluvial fans. The soils are coarse and infertile; they may be deep (on glacial deposits in the northern part of the system's range), or more commonly shallow, on rocky slopes of acidic rock (shale, sandstone, other acidic igneous or metamorphic rock). The well-drained soils and exposure create dry conditions. The forest is mostly closed-canopy but can include more open woodlands. It is dominated by a variable mixture of dry-site oak and pine species, most typically *Quercus prinus* (chestnut oak), *Pinus virginiana* (Virginia pine), and *Pinus strobus* (eastern white pine), but sometimes *Quercus alba* (white oak) and/or *Quercus coccinea* (scarlet oak). The system may include areas of oak forest, pine forest (usually small), and mixed oak-pine forest. Heath shrubs such as *Vaccinium pallidum* (hillside blueberry), *Gaylussacia baccata* (black huckleberry), and *Kalmia latifolia* (mountain laurel) are common in the understory and often form a dense layer. Embedded submesic ravines and concave landforms support slightly more diverse forests characterized by mixtures of oaks, several hickories, *Cornus florida* (flowering dogwood), and sometimes *Liriodendron tulipifera* (tuliptree). Small hillslope pockets with impeded drainage may support small isolated wetlands with *Acer rubrum* (red maple) and *Nyssa sylvatica* (blackgum) characteristic. Disturbance agents include fire, windthrow, and ice damage. Increased site disturbance generally leads to secondary forest vegetation with a greater proportion of *Pinus virginiana* (Virginia pine) and weedy hardwoods such as *Acer rubrum* (red maple).

Range: This system is found from central New England through Pennsylvania and south to central Virginia. United States: CT, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV

Delaware Estuary Associations:

- Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest
- Black Locust Successional Forest
- Central Appalachian / Northern Piedmont Low-Elevation Chestnut Oak Forest
- Central Appalachian Forested Acid Seep
- Northeastern Modified Successional Forest
- Pitch Pine - Scarlet Oak Low- to Mid-Elevation Ridgetop
- Ridgetop Scrub Oak Barrens
- Virginia Pine Successional Forest
- White Pine - Oak Forest

CLASSIFIERS FOR CENTRAL APPALACHIAN DRY OAK-PINE FOREST

Primary Division: 202

Land Cover Class: Forest and Woodland

Spatial Scale & Pattern: Matrix

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

Diagnostic Classifiers: Forest and Woodland (Treed); Ridge/Summit/Upper Slope; Acidic Soil; *Pinus* (*strobus*, *rigida*, *echinata*, *virginiana*) - *Quercus prinus*

Non-diagnostic Classifiers: Lowland; Sideslope; Oligotrophic Soil; Mineral: W/ A-Horizon <10 cm; Loam Soil

Texture; Sand Soil Texture; Ustic; F-Patch/Medium Intensity; W-Patch/Low Intensity; Needle-Leaved Tree;

Broad-Leaved Tree

APPALACHIAN LOW-ELEVATION MIXED PINE / HILLSIDE BLUEBERRY FOREST

Pinus virginiana - *Pinus (rigida, echinata)* - (*Quercus prinus*) / *Vaccinium pallidum* Forest

Range: This community occurs primarily in the Appalachian region of the United States, ranging from central Pennsylvania, south and west through the Ridge and Valley, Blue Ridge, and Cumberland Plateau to northern Georgia and Alabama, extending westward to scattered areas in the Interior Low Plateau and eastward into the upper Piedmont. It is reported from the states of Georgia, North Carolina, South Carolina, Tennessee, Kentucky, Pennsylvania, Indiana, Ohio, and is probably in Maryland, Virginia, and West Virginia. It occurs in Pennsylvania's portion of the Delaware Estuary.

Environmental Description: Stands of this forest occur on narrow ridges and knobs, steep upper slopes, bluff and clifftops, and other exposed sites throughout the range of the type. The community is found primarily on south-, southeast- or southwest-facing aspects on excessively drained, shallow soils. In the Blue Ridge Escarpment region, the western margin of the Blue Ridge, and west into the Ridge and Valley and Cumberland Mountains, this xeric forest occurs on convex slopes and ridges below 610 m (2000 feet) elevation, over soils classed as Inceptisols, typically Lithic Dystrochrepts originating from sandstone, shale and other noncalcareous parent material. Occurrences in rugged parts of the western Piedmont are also likely. Its environmental situation in the western Alleghenies is not known. In the Interior Low Plateau of Kentucky, Tennessee, and Indiana, this association occurs in edaphically extreme situations, including blufftops and narrow ridges in thin soils weathered from relatively acidic caprocks with southern and western aspects, as well as other similar slopes, over cherty limestone, siltstones, sandstones, and shales. In particular, in the Knobstone Escarpment Subsection (a few Indiana counties just north of Louisville, Kentucky), it occurs in gladelike situations on steep slopes with thin soils.

Vegetation Description: This community is a needle-leaved evergreen forest with a somewhat open to closed canopy. A deciduous subcanopy may be present, especially in areas where fire has been excluded. The shrub layers can be sparse to very dense and are composed of tall and short shrubs, predominantly ericaceous species. Herb cover is sparse, and leaf litter often dominates the ground layer. *Pinus virginiana* (Virginia pine) and/or *Pinus rigida* (pitch pine) are the canopy dominants throughout the range of the type. Within its range, *Pinus pungens* (Table Mountain pine) may be present as a very minor component. *Quercus prinus* (chestnut oak), *Quercus coccinea* (scarlet oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Acer rubrum* (red maple), and *Nyssa sylvatica* (blackgum) are common in the canopy, subcanopy and sapling strata, particularly in areas where fire has been excluded. Common shrub dominants include *Quercus ilicifolia* (bear oak), *Vaccinium angustifolium* (northern lowbush blueberry), *Vaccinium pallidum* (hillside blueberry), *Vaccinium stamineum* (deerberry), and *Kalmia latifolia* (mountain laurel). Other typical shrubs can include *Gaylussacia baccata* (black huckleberry) and *Sassafras albidum* (sassafras). *Smilax glauca* (whiteleaf greenbrier) and *Smilax rotundifolia* (roundleaf greenbrier) can be common vines. Characteristic herbaceous species include *Chimaphila maculata* (striped pipsissewa), *Danthonia spicata* (poverty oatgrass), *Deschampsia flexuosa* (wavy hairgrass), *Carex communis* (fibrous-root sedge), *Carex rosea* (rosy sedge), *Hieracium venosum* (rattlesnake-weed), *Epigaea repens* (trailing arbutus), *Pteridium aquilinum* (bracken fern), and *Schizachyrium scoparium* (little bluestem).

Characteristic Species: *Chimaphila maculata* (striped pipsissewa), *Epigaea repens* (trailing arbutus), *Pinus rigida* (pitch pine), *Pinus virginiana* (Virginia pine), *Pteridium aquilinum* (bracken fern), *Schizachyrium scoparium* (little bluestem)

Dynamics/Successional Trajectory: This xeric evergreen forest community will be maintained on sites where local soil conditions, topographic extremes, or occasional fire function to retard hardwood invasion. Throughout most of its range, this community occurs as linear features along ridgetops and may be adjacent to or grade into xeric forests dominated by *Quercus coccinea* (scarlet oak) or *Quercus prinus* (chestnut oak) or more mesic forests dominated by *Quercus alba* (white oak), *Quercus rubra* (northern

red oak), *Quercus velutina* (black oak), *Carya glabra* (pignut hickory), and *Carya alba* (mockernut hickory).

Management Concerns: It is important that this community be managed as part of a physiognomic complex with related communities and that natural processes are allowed to occur. Infestations of southern pine beetle (*Dendroctonus frontalis*) are a problem in portions of the range.

Reference Sites: No reference sites identified.

Global and State Conservation Ranks and Reasons: G4? (11-Feb-2001). PA: SNR. This xeric evergreen forest community will be maintained on sites where local soil conditions, topographic extremes, or occasional fire function to retard hardwood invasion. Infestations of southern pine beetle (*Dendroctonus frontalis*) can cause mortality of canopy trees. Examples affected by southern pine beetle in the Great Smoky Mountains can have up to 80-90% standing dead pine.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.688719

References: Allard 1990, Ambrose 1990a, Barden 1977, Burns and Honkala 1990a, CAP pers. comm. 1998, Cooper 1963, Core 1966, Evans 1991, Eyre 1980, Fike 1999, Gettman 1974, Harrison 2004, Homoya pers. comm., Malter 1977, NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Patterson et al. 1999, Peet et al. unpubl. data 2002, Pyne 1994, Racine 1966, Rawinski 1992, Schafale 1998b, Schafale and Weakley 1990, Schmalzer and DeSelm 1982, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, Walton et al. 1997, Whittaker 1956

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Needle-leaved tree	<i>Pinus virginiana</i> (Virginia pine)
Tall shrub/sapling	Broad-leaved evergreen shrub	<i>Kalmia latifolia</i> (mountain laurel)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Gaylussacia baccata</i> (black huckleberry)
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)

BLACK LOCUST SUCCESSIONAL FOREST

Robinia pseudoacacia Forest

Range: This black locust semi-natural forest is found locally throughout the eastern United States. Its distribution is not completely known because many state ecologists have not developed lists of semi-natural types in their state. It occurs in New Jersey, Pennsylvania and Delaware in the Delaware Estuary.

Environmental Description: This type often establishes on old fields abandoned after agricultural cropping.

Vegetation Description: The vegetation is dominated by *Robinia pseudoacacia* (black locust).

Characteristic Species: *Robinia pseudoacacia* (black locust)

Dynamics/Successional Trajectory: Uncertain. This is an early-successional forest type dominated by black locust. Overtime the black locust will be replaced by other, more shade-tolerant species (species composition will depend on available local species pool). The understory of this



Photo by Pennsylvania Natural Heritage Program

community is typically dominated by a dense growth of non-native invasive species which may retard colonization by mid- and late-successional forest species.

Management Concerns: This is a disturbed forest type and is not typically managed for conservation purposes.

Reference Sites: Not a conservation target; reference sites not provided.

Global and State Conservation Ranks and Reasons: GNA (ruderal) (24-Oct-2002). DE: SNA, NJ: SNA, PA: SNA. Although *Robinia pseudoacacia* is a native species found in the Central Appalachian and Ozark Mountains, it does not typically become a dominant species in these natural habitats (Elias 1980). It is now widespread in the eastern U.S. in disturbed habitats. This forest represents early successional vegetation and is thus not of conservation concern and does not receive a conservation status rank.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.684159

References: Baalman 1965, CAP pers. comm. 1998, Elias 1980, Fleming and Coulling 2001, Gaertner 1955, Hoagland 2000, INAI unpubl. data, McDonald 1938, Rawinski et al. 1996, Southeastern Ecology Working Group n.d., TDNH unpubl. data

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Broad-leaved deciduous tree	<i>Robinia pseudoacacia</i> (black locust)

CENTRAL APPALACHIAN / NORTHERN PIEDMONT LOW-ELEVATION CHESTNUT OAK FOREST

Quercus prinus - (*Quercus coccinea*, *Quercus velutina*) / *Kalmia latifolia* / *Vaccinium pallidum* Forest

Range: This association is currently described from the northern Piedmont and central Appalachians in Pennsylvania, Virginia, Maryland and West Virginia. It occurs in the Pennsylvania portion of the Delaware Estuary.

Environmental Description: This association is found on acidic, infertile soils on low-elevation (mostly <900 m), mid and upper slopes (occasionally on lower slopes). Site moisture potential is typically subxeric to xeric. Some exposed bedrock is often present.



Photo by Pennsylvania Natural Heritage Program

Vegetation Description: The canopy is strongly dominated by *Quercus prinus* (chestnut oak). The most frequent canopy associate is *Quercus coccinea* (scarlet oak), which varies from sparse to codominant. *Quercus coccinea* (scarlet oak), *Quercus alba* (white oak), and *Quercus velutina* (black oak) are frequent associates or codominants in the canopy. Minor associates frequently include *Quercus velutina* (black oak) plus *Quercus alba* (white oak), *Quercus rubra* (northern red oak), *Nyssa sylvatica* (blackgum), and *Sassafras albidum* (sassafras). *Acer rubrum* (red maple) and *Nyssa sylvatica* (blackgum) are usually abundant in the understory tree layers. Tall shrubs *Kalmia latifolia* (mountain laurel) (usually dominant), *Viburnum acerifolium* (mapleleaf viburnum), and *Rhododendron periclymenoides* (pink azalea) are often associated, sometimes at low cover. The dwarf- or short-shrub layer is well-developed and includes *Vaccinium pallidum* (hillside blueberry), *Vaccinium stamineum* (deerberry), and *Gaylussacia baccata* (black huckleberry), any one of which can exhibit patch-dominance. The herb layer generally has sparse cover and includes *Aureolaria laevigata*

(entireleaf yellow false foxglove), *Chimaphila maculata* (striped pipsissewa), *Comandra umbellata* (bastard toadflax), *Cypripedium acaule* (pink lady's-slipper), *Danthonia spicata* (poverty oatgrass), *Epigaea repens* (trailing arbutus), *Hieracium venosum* (rattlesnake-weed), *Lysimachia quadrifolia* (whorled yellow loosestrife), *Medeola virginiana* (Indian cucumber-root), *Monotropa uniflora* (Indian-pipe), *Pteridium aquilinum* (bracken fern), and *Uvularia puberula* (mountain bellwort). Strong dominance of *Quercus prinus* (chestnut oak) in the canopy, frequent and sometimes abundant *Rhododendron periclymenoides* (pink azalea) in the tall-shrub layer, and *Vaccinium pallidum* (hillside blueberry) present and often abundant as a dwarf-shrub are diagnostics for this type.

Noteworthy Associated Plant and/or Animal Species: *Tsuga caroliniana* (Carolina hemlock)

Characteristic Species: *Quercus prinus* (chestnut oak), *Rhododendron periclymenoides* (pink azalea), *Vaccinium pallidum* (hillside blueberry)

Dynamics/Successional Trajectory: Windthrow, fire, and ice storms are common natural disturbances in these habitats. Evidence of past fires is present at many sites, and periodic fire appears to be an important ecological factor in oak regeneration. Development of *Acer rubrum* (red maple)-dominated understories in these forests is widely considered to be the result of drastic reductions of fire frequencies or exclusion of fire altogether. *Castanea dentata* (American chestnut) was formerly an important canopy species in these forests prior to chestnut blight.

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: Blue Mountain, State Game Lands 110, PA

Global and State Conservation Ranks and Reasons: G5 (29-Jan-2004). PA: SNR. Abundant examples occur in Virginia, Maryland, and West Virginia.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.728821

References: Allard and Leonard 1943, Eastern Ecology Working Group n.d., Fleming 2002a, Fleming and Coulling 2001, Fleming and Moorhead 1996, Fleming and Moorhead 2000, Fleming et al. 2001, Lea 2003, Rawinski et al. 1994, Rawinski et al. 1996

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> (white oak)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus coccinea</i> (scarlet oak)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i> (chestnut oak)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Viburnum acerifolium</i> (mapleleaf viburnum)
Shrub/sapling (tall & short)	Broad-leaved evergreen shrub	<i>Kalmia latifolia</i> (mountain laurel)

CENTRAL APPALACHIAN FORESTED ACID SEEP

Acer rubrum - *Nyssa sylvatica* High Allegheny Plateau, Central Appalachian Forest

Range: This acidic deciduous swamp occurs in the central Appalachian Mountains north of the Cumberland drainage in the Central Appalachians and High Allegheny ecoregions, as well as the adjacent Cumberlands and Western Allegheny Plateau. This seep community occurs in the Pennsylvania portion of the Delaware Estuary.

Environmental Description: This community occurs on substrates which are saturated for extended periods during the growing season but which rarely have standing water, including forested seeps, hillsides, streamheads, floodplain edges, and poorly drained depressions. Occurrences tend to be small.

Vegetation Description: Characteristic trees are *Acer rubrum* (red maple) and *Nyssa sylvatica* (blackgum), with other associates including *Tsuga canadensis* (eastern hemlock) and *Betula alleghaniensis* (yellow birch). The shrub stratum includes *Alnus serrulata* (smooth alder), *Photinia pyrifolia* (red chokeberry), *Ilex verticillata* (common winterberry), *Vaccinium corymbosum* (highbush blueberry), *Rhododendron maximum* (great laurel), and *Rubus hispidus* (bristly dewberry). Characteristic herbs include *Osmunda cinnamomea* (cinnamon fern), *Osmunda regalis* (royal fern), *Carex folliculata* (northern long sedge), *Carex trisperma* (three-seed sedge), *Carex intumescens* (greater bladder sedge), *Carex stricta* (tussock sedge), and *Poa trivialis* (rough bluegrass). *Sphagnum* (peatmoss) spp. are typical.

Characteristic Species: *Acer rubrum* (red maple), *Nyssa sylvatica* (blackgum), *Osmunda cinnamomea* (cinnamon fern)

Reference Sites: none identified

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

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.689039

References: Anderson et al. 1998, CAP pers. comm. 1998, Eastern Ecology Working Group n.d., Fike 1999, Harrison 2004

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> (red maple)
Tree canopy	Broad-leaved deciduous tree	<i>Nyssa sylvatica</i> (blackgum)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Alnus serrulata</i> (smooth alder)

NORTHEASTERN MODIFIED SUCCESSIONAL FOREST

Prunus serotina - *Liriodendron tulipifera* - *Acer rubrum* - *Fraxinus americana* Forest

Range: This vegetation is currently described from Pennsylvania but is of broader distribution in the northeastern U.S.

Environmental Description: This vegetation occurs on sites that have been cleared for agriculture or otherwise heavily modified in the past. Generally sites are dry-mesic and may have small seepage inclusions in some examples. Environmental setting varies, but generally sites are dry-mesic to mesic, with small seepage inclusions in some examples.



Photo by Pennsylvania Natural Heritage Program

Vegetation Description: Tree species may include *Prunus serotina* (black cherry), *Liriodendron tulipifera* (tuliptree), *Fraxinus americana* (white ash), and *Acer rubrum* (red maple). Other associates can include *Juglans nigra* (black walnut), *Sassafras albidum* (sassafras), *Betula populifolia* (gray birch), *Juniperus virginiana* (eastern red-cedar), *Acer negundo* (box-elder), *Acer saccharinum* (silver maple), *Ailanthus altissima* (tree-of-heaven), *Ulmus americana* (American elm), *Quercus* (oak) spp., *Betula lenta* (sweet birch), *Amelanchier* (serviceberry) spp., and *Robinia pseudoacacia* (black locust). Other woody species may contribute to the canopy or form a tall-shrub layer, including *Lindera benzoin* (northern spicebush) and *Carpinus caroliniana* (American hornbeam). The low-shrub layer, if present, is usually characterized by the presence of *Rubus*

(blackberry) spp. such as *Rubus flagellaris* (northern dewberry), *Rubus allegheniensis* (Allegheny blackberry), *Rubus phoenicolasius* (wine raspberry), or *Rubus hispidus* (bristly dewberry). This layer is often dominated by exotic species such as *Lonicera tatarica* (Tatarian honeysuckle), *Lonicera japonica* (Japanese honeysuckle), *Rhamnus cathartica* (common buckthorn), *Crataegus* (hawthorn) spp., *Rosa multiflora* (multiflora rose), and *Berberis thunbergii* (Japanese barberry). The herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin.

Characteristic Species: *Acer rubrum* (red maple), *Fraxinus americana* (white ash), *Liriodendron tulipifera* (tuliptree), *Prunus serotina* (black cherry), *Robinia pseudoacacia* (black locust)

Dynamics/Successional Trajectory: Physiognomy of this vegetation is highly variable, ranging from closed forest, open forest, tall dense shrubland, to more open tall shrubland. Early-successional woody species dominate the canopy in a widely variable mix, depending on geographic location. This community is associated with disturbed sites and is characterized by early-successional vegetation, often with a high cover of non-native invasive species in one or more strata. The successional trajectory is typically unclear given the often weedy nature of most stands. When occurring in a matrix of relatively intact mature forest, the adjacent forest type may provide a reasonable guide for the long-term successional trajectory of the stand.

Management Concerns: This community represents early-successional, degraded forest stands and is not a management or restoration target. The shrub layer of this community is often dominated by exotic species such as *Lonicera tatarica* (Tatarian honeysuckle), *Lonicera japonica* (Japanese honeysuckle), *Rhamnus cathartica* (common buckthorn), *Crataegus* (hawthorn) spp., *Rosa multiflora* (multiflora rose), and *Berberis thunbergii* (Japanese barberry). The herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin.

Reference Sites: No reference sites were identified because this is not a desired target community for restoration.

Global and State Conservation Ranks and Reasons: GNA (ruderal) (29-Nov-2004). NJ: SNA, PA: SNA. This vegetation is modified by human activity and not of conservation concern.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.754608

References: Eastern Ecology Working Group n.d., Fike 1999, Perles et al. 2005c, Podniesinski et al. 2006

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> (red maple)
Tree canopy	Broad-leaved deciduous tree	<i>Fraxinus americana</i> (white ash)
Tree canopy	Broad-leaved deciduous tree	<i>Liriodendron tulipifera</i> (tuliptree)
Tree canopy	Broad-leaved deciduous tree	<i>Prunus serotina</i> (black cherry)
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> (red maple)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Carpinus caroliniana</i> (American hornbeam)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Lindera benzoin</i> (northern spicebush)

PITCH PINE - SCARLET OAK LOW- TO MID-ELEVATION RIDGETOP

Pinus rigida - *Quercus coccinea* / *Vaccinium angustifolium* Woodland

Range: It occurs in the Central Appalachian ecoregion in Pennsylvania.

Environmental Description: This open oak-pine woodland community type occurs on well-drained, nutrient-poor shallow soils on dry ridges and bedrock ledges. It is closely associated with pine barrens communities and typically intergrades with pitch pine/heath communities. It occurs in the Central Appalachian ecoregion in Pennsylvania.



Photo by Pennsylvania Natural Heritage Program

Vegetation Description: This community type occurs on dry, sandy, acidic soils. *Pinus rigida* (pitch pine) contributes between 25 and 75% relative cover. *Pinus pungens* (Table Mountain pine) or *Pinus resinosa* (red pine) may also occur on some sites. Hardwood associates include *Quercus prinus* (chestnut oak), *Quercus coccinea* (scarlet oak), *Quercus velutina* (black oak), *Nyssa sylvatica* (blackgum), *Sassafras albidum* (sassafras), *Betula lenta* (sweet birch), *Betula populifolia* (gray birch), and *Acer rubrum* (red maple). The shrub layer may be entirely composed of low shrubs, including *Vaccinium corymbosum* (highbush blueberry), *Vaccinium pallidum* (hillside blueberry), *Comptonia peregrina* (sweet-fern), and *Gaylussacia baccata* (black huckleberry), or may have an additional layer of taller shrubs such as *Kalmia latifolia* (mountain laurel), *Vaccinium corymbosum* (highbush blueberry), and *Quercus ilicifolia* (bear oak). Herbaceous species include *Pteridium aquilinum* (bracken fern), *Deschampsia flexuosa* (wavy hairgrass), *Danthonia spicata* (poverty oatgrass), *Epigaea repens* (trailing arbutus), *Gaultheria procumbens* (wintergreen), *Melampyrum lineare* (narrowleaf cow-wheat), *Carex pennsylvanica* (Pennsylvania sedge), *Carex communis* (fibrous-root sedge), *Oryzopsis* (mountain-ricegrass) spp., and *Aralia nudicaulis* (wild sarsaparilla). Lichens, such as *Cladonia* (cup lichen) spp. and *Cladina* (reindeer lichen) spp., are abundant in some areas.

Characteristic Species: *Pinus rigida* (pitch pine), *Pteridium aquilinum* (bracken fern), *Quercus coccinea* (scarlet oak), *Vaccinium corymbosum* (highbush blueberry)

Dynamics/Successional Trajectory: Windthrow, fire and ice storms are common natural disturbances in these habitats. Evidence of past fires is present at many sites, and periodic fire appears to be an important ecological factor in maintaining the structure and composition of this association. Establishment of *Acer rubrum* (red maple) and *Pinus strobus* (eastern white pine) in these woodlands is considered to be the result of drastic reductions of fire frequencies or exclusion of fire altogether.

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 (8-Jul-1999). PA: SNR.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.688348

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

MOST ABUNDANT SPECIES

STRATUM	LIFEFORM	SPECIES
Tree canopy	Needle-leaved tree	<i>Pinus rigida</i> (pitch pine)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus coccinea</i> (scarlet oak)
Shrub/sapling (tall & short)	Broad-leaved evergreen shrub	<i>Kalmia latifolia</i> (mountain laurel)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium corymbosum</i> (highbush blueberry)

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 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 pennsylvanica* (Pennsylvania sedge), *Comandra umbellata* (bastard toadflax), *Melampyrum lineare* (narrowleaf cow-wheat), *Hypericum gentianoides* (pineweed), *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.



Photo by Pennsylvania Natural Heritage Program

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

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 blueberry)
Herb (field)	Graminoid	<i>Danthonia spicata</i> (poverty oatgrass)
Herb (field)	Graminoid	<i>Schizachyrium scoparium</i> (little bluestem)

VIRGINIA PINE SUCCESSIONAL FOREST

Pinus virginiana Successional Forest

Range: This successional community is possible in the Piedmont from Pennsylvania south to Alabama, and ranges west into the Appalachians, Ridge and Valley, the Cumberland Plateau, and in scattered locales of the Interior Low Plateau. It occurs in the Pennsylvania portion of the Delaware Estuary.

Environmental Description: This community occurs in areas where canopy removal has created open conditions and bare mineral soil, allowing for the establishment of *Pinus virginiana* (Virginia pine). These conditions can include old fields, old pastures, clearcuts, and burned or eroded areas. In the Central Appalachians, this vegetation occurs where soft shales have been farmed (primarily in valleys), resulting in stands with nothing but successional species in the understory. Soils underlying these communities are of two general types, i.e., those derived in residuum from calcareous shale and calcareous sandstone of the Middle Ordovician and those of some other origin. Series of the former type include Dandridge (Lithic Ruptic-Alfic Eutrochrepts), Tellico (Typic Rhododults), and Steekee (Ruptic-Ultic Dystrochrepts). Other soil series that this forest type may occur on include Litz, Dewey, Alcoa, Bland, Etowah, Lobdell and Neubert. All of these soils are well-drained and range in pH from moderate acid to very strongly acidic.



Photo by Pennsylvania Natural Heritage Program

Vegetation Description: This forest typically has a very dense canopy of *Pinus virginiana* (Virginia pine) and little understory vegetation. *Pinus echinata* (shortleaf pine) and *Pinus rigida* (pitch pine) may co-occur with *Pinus virginiana* (Virginia pine) in the canopy. The canopy can also have significant admixtures of early-successional deciduous trees (e.g., *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree)). Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species. Shrub and herb strata are absent to sparse in coverage. The subcanopy may contain *Acer saccharum* (sugar maple) and *Cornus florida* (flowering dogwood); other

associated species may include *Cercis canadensis* (eastern redbud), *Parthenocissus quinquefolia* (Virginia creeper), *Lonicera japonica* (Japanese honeysuckle), and *Microstegium vimineum* (Japanese stiltgrass) (Andreu and Tukman 1995). The dense ericaceous shrub stratum contains *Vaccinium* (blueberry) spp., *Gaylussacia* (huckleberry) spp., *Kalmia latifolia* (mountain laurel), and *Rhododendron* (azalea, rhododendron) spp.

Characteristic Species: *Pinus virginiana* (Virginia pine)

Dynamics/Successional Trajectory: This is an early-successional forest type. Damage from ice storms can be a main disturbance observed in these stands. In addition, fire and insect infestation are likely damaging agents.

Management Concerns: These stands can be managed for pulpwood production. They have a low aesthetic value so would not provide suitable recreational opportunities. Since this association is an early-successional forest type, it typically should not be considered as a restoration target.

Reference Sites: (Note: more inventory needs to be done to confirm that this type is in the Delaware Estuary.

Global and State Conservation Ranks and Reasons: GNA (ruderal) (13-Jun-2000). NJ: SNA, PA: SNA. This forest represents early-successional vegetation and is thus not of conservation concern.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.688932

References: Allard 1990, Ambrose 1990a, Andreu and Tukman 1995, Eyre 1980, Fike 1999, Fleming and Coulling 2001, Fleming and Moorhead 2000, Nelson 1986, Patterson et al. 1999, Pyne 1994, Schmalzer and DeSelm 1982, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Needle-leaved tree	<i>Pinus virginiana</i> (Virginia pine)
Tree subcanopy	Needle-leaved tree	<i>Juniperus virginiana</i> (eastern red-cedar)
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> (red maple)
Tree subcanopy	Broad-leaved deciduous tree	<i>Cornus florida</i> (flowering dogwood)
Tree subcanopy	Broad-leaved deciduous tree	<i>Nyssa sylvatica</i> (blackgum)
Tree subcanopy	Broad-leaved deciduous tree	<i>Oxydendrum arboreum</i> (sourwood)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Cornus florida</i> (flowering dogwood)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Nyssa sylvatica</i> (blackgum)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Oxydendrum arboreum</i> (sourwood)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium arboreum</i> (farkleberry)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium stamineum</i> (deerberry)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Cercis canadensis</i> (eastern redbud)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Cornus florida</i> (flowering dogwood)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Oxydendrum arboreum</i> (sourwood)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Quercus alba</i> (white oak)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Sassafras albidum</i> (sassafras)
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> (Japanese honeysuckle)
Herb (field)	Vine/Liana	<i>Smilax glauca</i> (whiteleaf greenbrier)
Herb (field)	Vine/Liana	<i>Toxicodendron radicans</i> (eastern poison-ivy)

WHITE PINE - OAK FOREST

Pinus strobus - *Quercus* (*rubra*, *velutina*) - *Fagus grandifolia* Forest

Range: This association occurs in New England south and west to Pennsylvania, West Virginia and possibly New Jersey.

Environmental Description: This mixed white pine - oak forest is a ridge and valley community that occurs on dry-mesic to mesic, acidic, nutrient-poor, sandy loam to sandy soils along mid and lower slopes, and along the unglaciated plateau on rolling topography underlain by sandstone. In the northern glaciated portion of the range, the forest occurs on outwash plains or moraines, as well as along mid and lower slopes and within protected ravines, and on protected ridges of shale, sandstone, or other sedimentary rock, occasionally underlain by metamorphic or igneous rock. It occurs at elevations below



Photo by Pennsylvania Natural Heritage Program

915 m (3000 feet) throughout the range.

Vegetation Description: The tree canopy is dominated by *Pinus strobus* (eastern white pine) with a mixture of oaks, including *Quercus velutina* (black oak), *Quercus rubra* (northern red oak), *Quercus alba* (white oak), *Quercus prinus* (chestnut oak), and in the southern portions of the range *Quercus coccinea* (scarlet oak). Oak species drop out at the northern extreme of the type's range, leaving only *Quercus rubra* (northern red oak). *Fagus grandifolia* (American beech) is characteristic but not always present. Other less frequent canopy associates may include *Acer rubrum* (red maple), *Carya alba* (mockernut hickory), *Populus tremuloides* (quaking aspen), *Tsuga canadensis* (eastern hemlock), and *Populus grandidentata* (bigtooth aspen). The variable subcanopy may include *Hamamelis virginiana* (American witch-hazel); other species, such as *Carpinus caroliniana* (American hornbeam), *Cornus florida* (flowering dogwood), and *Nyssa sylvatica* (blackgum), may be present in the central and southern portions of the range. The stand can contain a moderately dense to dense tall-shrub layer of *Pinus strobus* (eastern white pine) saplings. The sparse to well-developed, generally ericaceous short-shrub layer includes *Gaylussacia* (huckleberry) spp., *Kalmia latifolia* (mountain laurel), *Vaccinium* (blueberry) spp., as well as *Rubus* (blackberry) spp., *Corylus americana* (American hazelnut), *Gaultheria procumbens* (wintergreen), *Sassafras albidum* (sassafras), and *Viburnum prunifolium* (smooth blackhaw). The herb layer ranges from sparse to moderately dense cover, with species including *Aralia nudicaulis* (wild sarsaparilla), *Ageratina altissima* (white snakeroot), *Amphicarpaea bracteata* (American hog-peanut), *Brachyelytrum erectum* (bearded shorthusk), *Carex communis* (fibrous-root sedge), *Carex pensylvanica* (Pennsylvania sedge), *Carex lucorum* (Blue Ridge sedge), *Melampyrum lineare* (narrowleaf cow-wheat), *Pteridium aquilinum* (bracken fern), *Trientalis borealis* (starflower), *Chimaphila maculata* (striped pipsissewa), *Desmodium nudiflorum* (naked-flower tick-trefoil), *Goodyera pubescens* (downy rattlesnake-plantain), *Hieracium venosum* (rattlesnake-weed), *Maianthemum racemosum* (feathery false lily-of-the-valley), *Maianthemum canadense* (Canada mayflower), *Medeola virginiana* (Indian cucumber-root), *Mitchella repens* (partridgeberry), *Monotropa uniflora* (Indian-pipe), *Poa cuspidata* (early bluegrass), *Polygonatum biflorum* (smooth Solomon's-seal), *Polystichum acrostichoides* (Christmas fern), and/or *Viola hastata* (halberd-leaf yellow violet). The bryophyte layer is not well-documented but supports *Leucobryum* (leucobryum moss) sp. and *Polytrichum* (haircap moss) sp.

Characteristic Species: *Fagus grandifolia* (American beech), *Gaylussacia baccata* (black huckleberry), *Pinus strobus* (eastern white pine), *Quercus rubra* (northern red oak), *Vaccinium angustifolium* (northern lowbush blueberry), *Vaccinium pallidum* (hillside blueberry)

Reference Sites: near Adams Creek and much of the escarpment on the Pennsylvania side of the Delaware Water Gap National Recreation Area

Global and State Conservation Ranks and Reasons: G5 (1-Dec-1997). NJ?: SNA, PA: SNR.

VegBank Link for Plot Data: http://vegbank.org/natureserve/element_global.2.688827

References: Breden et al. 2001, CAP pers. comm. 1998, Eastern Ecology Working Group n.d., Edinger et al. 2002, Enser 1993, Eyre 1980, Fike 1999, Gawler 2002, Kuchler 1956, Lundgren 2001, Moore and Taylor 1927, Rawinski 1984, Sperduto 2000a, Sperduto and Nichols 2004, Swain and Kearsley 2001, Thompson 1996, Thompson and Jenkins 1992, Thompson and Sorenson 2000

MOST ABUNDANT SPECIES		
STRATUM	LIFEFORM	SPECIES
Tree canopy	Needle-leaved tree	<i>Pinus strobus</i> (eastern white pine)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> (white oak)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i> (chestnut oak)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus rubra</i> (northern red oak)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus velutina</i> (black oak)
Tree subcanopy	Broad-leaved deciduous tree	<i>Prunus serotina</i> (black cherry)
Shrub/sapling (tall & short)	Needle-leaved shrub	<i>Pinus strobus</i> (eastern white pine)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Hamamelis virginiana</i> (American witch-hazel)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Gaylussacia baccata</i> (black huckleberry)
Short shrub/sapling blueberry)	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 evergreen shrub	<i>Kalmia latifolia</i> (mountain laurel)
Herb (field)	Forb	<i>Aralia nudicaulis</i> (wild sarsaparilla)
Herb (field)	Forb	<i>Maianthemum canadense</i> (Canada mayflower)
Herb (field)	Forb	<i>Trientalis borealis</i> (starflower)
Herb (field)	Graminoid	<i>Carex pensylvanica</i> (Pennsylvania sedge)