



## *T*errestrial Shrublands



*B*ald Mountain, Carbon County. Photograph by Staff of the Pennsylvania Science Office of The Nature Conservancy.



*M*oosic Mountain, Lackawanna County. Photograph by Staff of the Pennsylvania Science Office of The Nature Conservancy



## CONIFEROUS TERRESTRIAL SHRUBLANDS

### Red-cedar - prickly pear shale shrubland

This community type is restricted to steep, south-facing, eroding slopes composed of thinly bedded, fissile shales. The most representative examples occur along the Delaware River in Pike County. There may be species overlap with the "Red cedar - mixed hardwood rich shale woodland" community type that also occurs on south-facing shale slopes, but examples of this type occur on steeper slopes and lack endemic shale barren species. Typical species here include *Juniperus virginiana* (red-cedar), *Schizachyrium scoparium* (little bluestem), *Opuntia humifusa*<sup>s</sup> (prickly pear), *Quercus ilicifolia* (scrub oak), *Q. montana* (chestnut oak), *Gaylussacia baccata* (black huckleberry), *Carya glabra* (pignut hickory), *Carex pensylvanica* (Pennsylvania sedge), *Hieracium venosum* (rattlesnake-weed), *Hypericum gentianoides* (orange-grass), *Danthonia spicata* (poverty grass), *Deschampsia flexuosa* (common hairgrass), *Vaccinium angustifolium* (low sweet blueberry), *V. pallidum* (lowbush blueberry), *Campanula rotundifolia* (harebell), *Arabis lyrata* (lyre-leaved rock-cress), *Aster patens* (clasping aster), *Corydalis semperuirens* (rock harlequin), *Solidago nemoralis* (gray goldenrod), *Polytrichum* spp. (hairy-cap moss), *Cladina* spp., and *Cladonia* spp. (reindeer lichens).

**Related types:** The "Red cedar - mixed hardwood rich shale woodland" type also occurs on shale slopes, but is more southerly in distribution and, unlike this type, is characterized by the presence of shale barren endemics.

**Range:** Ridge and Valley.

**Selected references:** Dix 1990, Henry 1954, Keener 1983, Platt 1951, PNDI field surveys.

**[Crosswalk:** "Smith's Northern Appalachian Shale Barren," TNC's *Juniperus virginiana* - *Fraxinus americana* Woodland Alliance, *Juniperus virginiana* - *Fraxinus americana* / *Senecio antennarifolius* - *Oenothera argillicola* Community. ]

### Red-cedar - pine serpentine shrubland

This community is part of the "Serpentine barren complex." It is restricted to areas underlain by serpentinite bedrock. It is this part of the serpentine barren complex that supports a dense, prairie-like graminoid cover with scattered trees and shrubs. Although the most typical aspect is that of a shrubland, some examples of this community type may have a woodland physiognomy. The dominant tree species, often less than 5 meters in height, are *Juniperus virginiana* (red-cedar), *Pinus rigida* (pitch pine), *Pinus virginiana* (Virginia pine), and *Robinia*

*pseudoacacia* (black locust). Other trees include *Quercus marilandica* (blackjack oak), *Q. stellata* (post oak), and *Sassafras albidum* (sassafras). Shrubs include *Rhus copallina* (shining sumac), *Quercus prinoides* (chinquapin oak), *R. glabra* (smooth sumac), and *Gaylussacia baccata* (black huckleberry). Characteristic herbaceous species include graminoids like *Schizachyrium scoparium* (little bluestem), *Andropogon gerardii* (big bluestem), *Sporobolus heterolepis*<sup>s</sup> (prairie dropseed), *Panicum depauperatum*<sup>s</sup> (poverty panic-grass), *Sporobolus vaginiflorus* (poverty grass), *Aristida longispica* (slimspike three-awn), *A. purpurascens*<sup>s</sup> (arrow-feather), *A. dichotoma* (churchmouse three-awn), *Muhlenbergia mexicana* (satin grass), *Setaria geniculata* (knotroot fox-tail), *Eragrostis spectabilis* (purple lovegrass), *Scleria pauciflora*<sup>s</sup> (few-flowered nut-rush), *Sorghastrum nutans* (Indian grass), and *Bouteloua curtipendula*<sup>s</sup> (side-oats gramma), and forbs like *Aster depauperatus*<sup>s</sup> (serpentine aster), *Potentilla canadensis* (old-field cinquefoil), *Phlox subulata* ssp. *subulata* (creeping phlox), *Cerastium arvense* var. *uillosissimum*<sup>s</sup> (barrens chickweed), *Achillea millefolium*<sup>i</sup> (yarrow), *Eupatorium aromaticum* (small white snakeroot), *Oenothera fruticosa* (sundrops), *Senecio anonymus*<sup>s</sup> (plain ragwort), *Solidago nemoralis* (gray goldenrod), and *Antennaria plantaginifolia* (plantain pussytoe).

**Related types:** This community may be said to end either where woody cover of at least 25% ends (here the "Serpentine barren grassland community" generally begins), or where trees exceed 5 meters in height and the tree canopy reaches about 60% total cover, becoming sufficiently continuous to prohibit dense graminoid cover (here the "Serpentine Virginia pine-oak" or "Serpentine pitch pine - oak forest" generally begins). This type often grades into the one of the serpentine forest types downslope on somewhat deeper soils. This community shares many dominants with both the "Pitch pine - scrub oak woodland" and "Pitch pine - mixed hardwood woodland." The distinction lies in the less common species present in the serpentine type (e.g. *Sporobolus heterolepis*, *Panicum depauperatum*, *Bouteloua curtipendula*<sup>s</sup>) and the geology itself. This community is associated with several more distinctive community types that are found exclusively on areas of serpentine geology. For a list of those types, and a brief discussion of serpentine ecology, please see the description of the "Serpentine barren complex."

**Range:** Piedmont.

**Selected references:** Brooks 1987, Latham 1992, Miller 1977, Smith 1988.

**[Crosswalk:** Smith's "Eastern Serpentine Barren" (in part), TNC's *Pinus (virginiana, rigida)* / *Schizachyrium*



scoparium Herbaceous Alliance, *Pinus virginiana* - *Pinus rigida* / *Schizachyrium scoparium* - *Scleria pauciflora* Community.]

## CONIFER - BROADLEAF TERRESTRIAL SHRUBLANDS

### Red-cedar - redbud shrubland

This community type occurs in areas of calcareous parent material, where conditions are dry enough to prevent forest development (may also occur successional on calcareous sites that are less extreme). *Juniperus virginiana* (red-cedar) and *Cercis canadensis* (redbud) are both characteristic of these sites. Other shrubs commonly present include *Ostrya virginiana* (hop-hornbeam), *Amelanchier* spp. (shadbush), *Rhus aromatica* (fragrant sumac), and *Cornus florida* (flowering dogwood). Characteristic herbaceous species include *Bouteloua curtipendula*<sup>s</sup> (tall gramma), *Andropogon gerardii* (big bluestem), *Panicum virgatum* (switch grass), *Sorghastrum nutans* (Indian grass), *Aster oblongifolius* (aromatic aster), *Lithospermum latifolium*<sup>s</sup> (American gromwell), and *Aquilegia canadensis* (wild columbine).

**Related types:** This community type is closely related to both the "Yellow oak - redbud woodland" type and the "Side-oats gramma calcareous grassland" type. The three types are easily distinguished from each other on the basis of physiognomy. All three may occur together on some sites.

**Range:** Allegheny Mountain, Piedmont, Pittsburgh Plateau, Ridge and Valley.

**Selected references:** PNDI field surveys.

**[Crosswalk:** Smith's "Northern Appalachian Calcareous Rocky Summit Community," TNC's *Juniperus virginiana* - *Fraxinus americana* Woodland Alliance, *Juniperus virginiana* - *Ostrya virginiana* - *Bouteloua curtipendula* Community and *Quercus muhlenbergii* Woodland Alliance, *Quercus muhlenbergii* - *Cercis canadensis* / *Senecio obovatus* - *Lithospermum canadense* Community.]

## BROADLEAF TERRESTRIAL SHRUBLANDS

### Low heath shrubland

This community type occurs on either sandy soil or on thin soil over bedrock. Soils are acidic, moisture availability is low. This type most commonly occurs on ridgetops or in other situations where exposure to the elements; the frost-pocket phenomenon, or droughty conditions limits the establishment of trees and taller shrubs. These sites are often subject to periodic fire.

The dominant species are *Vaccinium angustifolium* (low sweet blueberry), *V. pallidum* (lowbush blueberry), *Kalmia angustifolia* (sheep laurel), *Aronia melanocarpa* (black chokeberry), and/or *Gaylussacia baccata* (huckleberry). Scattered small trees may occur in some places, for example where soil has accumulated in cracks in the bedrock. Typical species include *Pinus rigida* (pitch pine), *P. strobus* (eastern white pine), *Populus tremuloides* (quaking aspen), and *Betula populifolia* (gray birch). The herbaceous and creeping shrub layer includes such species as *Danthonia compressa* (northern oatgrass), *D. spicata* (poverty grass), *Lysimachia quadrifolia* (whorled loosestrife), *Melampyrum lineare* (cow-wheat), *Deschampsia flexuosa* (hairgrass), *Rubus hispidus* (swamp dewberry), *Mitchella repens* (partridge-berry), *Pteridium aquilinum* (bracken), *Schizachyrium scoparium* (little bluestem), *Carex pennsylvanica* (Pennsylvania sedge), *C. communis* (a sedge), and *Gaultheria procumbens* (teaberry). Moss and lichen cover on rocks may be considerable; more information is needed on non-vascular species. This community may occur as part of the "Ridgetop acidic barren complex."

**Related types:** The "Scrub oak shrubland" and "Pitch pine - scrub oak woodland" types frequently occur adjacent to this type, usually downslope, on slightly deeper soils, or in less exposed areas.

**Range:** Glaciated NE, Glaciated NW, Pittsburgh Plateau, Pocono Plateau, Ridge and Valley, Unglaciated Allegheny Plateau, and perhaps South Mountain.

**Selected references:** Clark 1946, Hough 1945, Schege and Butch 1980.

**[Crosswalk:** Smith's "Northern Appalachian Low Elevation Acidic Rocky Summit." and "Ridgetop Dwarf-Tree Forest" (in part), TNC's *Vaccinium (myrtilloides, pallidum, angustifolium)* Dwarf-Shrubland Alliance, *Vaccinium (myrtilloides, pallidum, angustifolium)* high Alleghenies (HAL) Community.]

### Low heath - mountain ash shrubland

This community type occurs at high elevations, usually on a thin soil layer over bedrock. Scattered trees may occur in pockets of deeper soil. Characteristic tree species include *Pinus strobus* (eastern white pine), *Betula populifolia* (gray birch), *Acer rubrum* (red maple), *Quercus montana* (chestnut oak), and rarely *Picea rubens* (red spruce). The most characteristic shrub species are *Vaccinium pallidum* (lowbush blueberry) and *Sorbus americana* (mountain ash), although *V. angustifolium* (low sweet blueberry), *Kalmia angustifolia* (sheep laurel), *Gaylussacia baccata* (huckleberry), *Aronia melanocarpa* (black chokeberry) also commonly occur.



Herbaceous species include *Potentilla tridentata*<sup>S</sup> (three-toothed cinquefoil), *Schizachyrium scoparium* (little bluestem), *Deschampsia flexuosa* (hairgrass), *Minuartia glabra*<sup>S</sup> (Appalachian sandwort), *Campanula rotundifolia* (harebell), and *Lilium philadelphicum* (wood lily). Moss and lichen cover on rocks may be considerable; more information is needed on non-vascular species. This community type may occur as part of the "Ridgetop acidic barrens complex."

**Related types:** The "Low heath shrubland" is more common than this type and typically occurs at lower elevations than this does. A species mix reflecting a more northern affinity, and specifically the presence of *Sorbus americana* (mountain ash), may be used to distinguish this type. The "Red spruce rocky summit" community type occurs in similar situations, but is much less common in Pennsylvania, with only one known example at the time of writing. Dominance or codominance by *Picea rubens* (red spruce) distinguishes the rarer type from that described here.

**Range:** Glaciated NE, Pocono Plateau, Ridge and Valley, Unglaciated Allegheny Plateau.

**Selected references:** PNDA field surveys, Sneddon, Anderson and Metzler 1996.

**[Crosswalk:** Smith's "Northern Appalachian High Elevation Acidic Rocky Summit," TNC's *Vaccinium (myrtilloides, pallidum, angustifolium)* Dwarf-Shrubland Alliance, *Vaccinium angustifolium - Sorbus americana* Community.]

### Scrub oak shrubland

This community type occurs either on sandy soils or on thin soils over bedrock. Conditions are dry; soils are acidic. It most commonly occurs on rocky ridgetops. In this case, it may be part of the "Ridgetop barren complex." It also may occur on sites where frequent or recent disturbance has removed the tree layer. This type also includes most of what is referred to as "Sand barrens." Sand barrens are areas of sandy (Morrison series) infertile soils that form extensive, gently rolling expanses of mostly scrub oak with occasional patches of blueberries ("Low heath shrubland") and grassy frost pockets ("Little bluestem / Pennsylvania sedge grassy opening"). Sand barrens in Pennsylvania are found primarily in Huntingdon and Centre counties.

*Quercus ilicifolia* (scrub oak) is by far the dominant shrub species, although low shrubs like *Vaccinium angustifolium* (low sweet blueberry), *V. pallidum* (lowbush blueberry), *Gaultheria procumbens* (teaberry), *Kalmia angustifolia* (sheep laurel), *Gaylussacia baccata* (black huckleberry), *Salix humilis* (dwarf upland willow),

*Prunus pumila* var. *susquehanae*<sup>S</sup> (Appalachian sand cherry), and *Comptonia peregrina* (sweet-fern) sometimes occur beneath the taller shrub stratum. Tree species may occur as scattered individuals or as small patches of woodland. Characteristic tree species include *Populus tremuloides* (quaking aspen), *Quercus prinoides* (chinquapin oak), and *Pinus rigida* (pitch pine). Herbs include *Danthonia compressa* (northern oatgrass), *Pteridium aquilinum* (bracken), *Melampyrum lineare* (cow-wheat), *Andropogon gerardii* (big bluestem), *Schizachyrium scoparium* (little bluestem), and *Hypericum gentianoides* (orange-grass). This community type may occur as part of the "Ridgetop acidic barrens complex."

**Related types:** The "Pitch pine - scrub oak woodland" type frequently occur in association with this community type; the two may be delineated at the physiognomic cutoff for woodlands: 10% cover by trees greater than five meters high.

**Range:** Glaciated NE, Pittsburgh Plateau, Pocono Plateau, Ridge and Valley, Unglaciated Allegheny Plateau.

**Selected references:** Slack et al. 1991.

**[Crosswalk:** Smith's "Northern Appalachian Sand Barren" (in part), "Ridgetop Dwarf-Tree Forest" (in part), TNC's *Quercus ilicifolia* Shrubland Alliance.]

### Rhodora - mixed heath - scrub oak shrubland

This is a very rare, highly restricted community type. It is known only from the southern Pocono Plateau. This barren-like vegetation does not appear to be a response to droughty or nutrient-poor soils. The same deep, fine-loamy Illinoian till on which it occurs also underlies nearby forests (Latham et al. 1997). The origin of the barrens, and the processes responsible for their persistence and distribution are not known, but fire appears to be a critical factor. Please see the description for the "Mesic till barrens complex" for more information. The shrub layer is dominated by a combination of *Quercus ilicifolia* (scrub oak), *Kalmia angustifolia* (sheep laurel), *Rhododendron canadense* (rhodora), and *Vaccinium angustifolium* (low sweet blueberry), often with just one or two of these species in much greater abundance than the others, with an admixture of *Aronia melanocarpa* (black chokeberry), *Gaylussacia baccata* (black huckleberry), *V. pallidum* (lowbush blueberry), and *Viburnum cassinoides* (withe-rod). Other shrub species commonly include *Amelanchier sanguinea*<sup>S</sup> (round serviceberry), *A. stolonifera* (low juneberry), *Chamaedaphne calyculata* (leatherleaf), *Comptonia peregrina* (sweet-fern), *Gaylussacia frondosa* (dangleberry), *Hamamelis*



*Virginiana* (witch-hazel), *Lyonia ligustrina* (maleberry), *Spiraea latifolia* (meadow-sweet), *Vaccinium corymbosum* (highbush blueberry), *Viburnum myrtilloides* (sour-top blueberry), and *V. stamineum* (deerberry). Scattered trees may be present, mostly *Pinus rigida* (pitch pine) and *Acer rubrum* (red maple). The most abundant species in the herbaceous and creeping shrub layer are *Carex pensylvanica* (Pennsylvania sedge), *Pteridium aquilinum* (bracken fern), *Gaultheria procumbens* (teaberry), *Oryzopsis racemosa* (ricegrass) and *Rubus hispidus* (dewberry). This is part of the “Mesic till barren complex.”

**Related types:** This type usually occurs in combination with the “Pitch pine – rhodora – scrub oak woodland” type. These two types, together with small herbaceous openings or “frost pockets” constitute the “Mesic till barren complex.” For more information on the ecology of these systems, consult the description of the complex. This community type and its associated complex share many species with several community types belonging to the “Acidic ridgetop barren complex.” The predominance of *Rhododendron canadense* (rhodora), the presence of deep, mesic soils and the restricted distribution of this type easily distinguish it from its ridgetop counterpart.

**Range:** Pocono Plateau

**Selected references:** Latham et al. 1996

[**Crosswalk:** Smith’s “Mesic Scrub Oak – Heath – Pitch Pine Barrens” (in part), TNC’s *Pinus rigida* Seasonally Flooded (sic.) Woodland Alliance, *Pinus rigida* – *Quercus ilicifolia* – *Rhododendron canadense* Community.]

### Great Lakes Region bayberry – cottonwood community (also a woodland type)

In Pennsylvania this community type occurs only on Presque Isle. This community type is dominated by a mixture of trees and shrubs. Characteristic species include *Myrica pensylvanica* (bayberry), *Amelanchier* spp. (shadbush), *Salix* spp. (willows), *Cornus* spp. (dogwoods), *Populus deltoids* (cottonwood), and the exotic species *Betula pendula*<sup>1</sup> (European white birch) and *Lonicera morrowii*<sup>1</sup> (Morrow’s honeysuckle). Herbaceous species include *Sorghastrum nutans* (Indian grass), *Rumex acetosella*<sup>1</sup> (sheep sorrel), *Panicum virgatum* (switch grass), *Schizachyrium scoparium* (little bluestem), *Carex tonsa* (a sedge), and *C. muhlenbergii* (a sedge). This type includes both shrubland and woodland physiognomy. Because of the extremely dynamic nature of this system, a variety of successional stages is maintained in a complex mosaic. This community type is part of the “Great Lakes Region beach – dune – sandplain complex.”

**Related types:** Because of the extremely dynamic nature of this system, the hydrology, physiognomy, and species composition of these sites may shift dramatically over short periods of time. Lake level changes, storm action, and shifting sands cause this community type to intergrade in space and time with the “Great Lakes Region dry sandplain,” the “Great Lakes Region bayberry – mixed shrub palustrine shrubland,” and, to a lesser extent, “Great Lakes Region sparsely vegetated beach.” For more information on the ecology of this system, please see description for the “Great Lakes region beach – dune – sandplain complex.”

**Range:** Great Lakes Region.

**Selected references:** Bissell and Bier, 1987.

[**Crosswalk:** Smith’s “Eastern Lakes Dune Community,” TNC – no crosswalk.]