

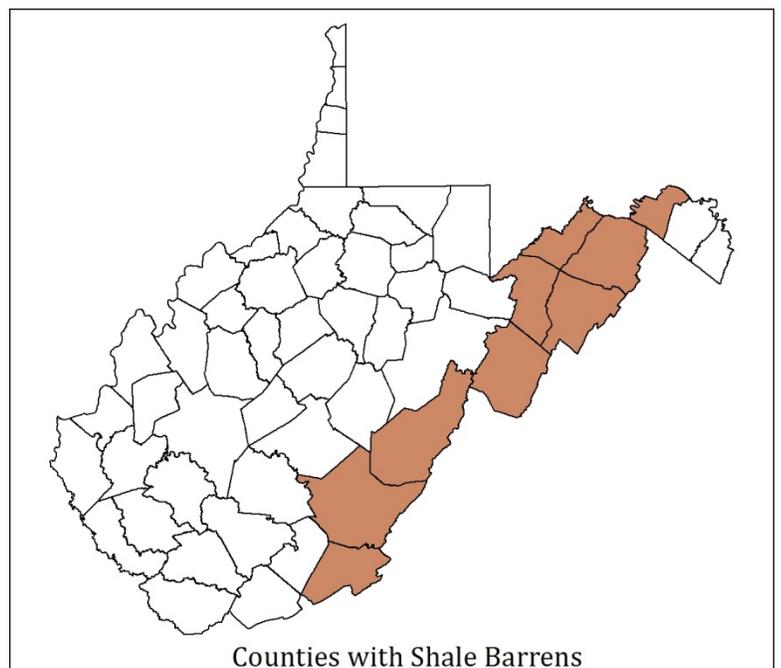
Shale Barrens

Dry shale habitats in eastern West Virginia and bordering states have attracted the attention of botanists and ecologists for over a century. These habitats host a remarkable assemblage of herbaceous plants, called shale barren endemics, which are found nowhere else in the world.

Ecological Description: Shale barrens are mixed evergreen-deciduous woodlands and wooded openings that occur in small patches on hot, dry, often steep slopes, typically on Devonian shales. They occur in low to middle elevations areas with a dry climate produced by the rain shadow on the lee side (east) of the Allegheny Mountains. Substrates are usually acidic, but some are circumneutral and calcareous. An open stand structure and short canopy are maintained by drought stress to trees, compounded by continual erosion of the bare shale substrate. Tree height is usually less than 15 m and total canopy cover is usually less than 60%. The most common trees are Virginia pine (*Pinus virginiana*) and chestnut oak (*Quercus prinus*). Other trees include red oak (*Quercus rubra*), pignut hickory (*Carya glabra*), and eastern red cedar (*Juniperus virginiana*). The most common herb is Pennsylvania sedge (*Carex pensylvanica*), which occurs with sparse to high cover in nearly all shale barrens. The herb layer is often diverse and is characterized by the co-occurrence of several shale barren endemics including white-hair leatherflower (*Clematis albicoma*), shalebarren ragwort (*Packera antennariifolia*), shalebarren rockcress (*Arabis serotina*), Kate's Mountain clover (*Trifolium virginicum*), shalebarren evening-primrose (*Oenothera argillicola*), shalebarren wild buckwheat (*Eriogonum allenii*), and shale bindweed (*Calystegia spithamea* ssp. *purshiana*).

Animals that need these habitats: Several rare butterflies and moths are known in West Virginia only from shale barrens; these include Sweet Underwing (*Catocala dulciola*), Pine Barrens Underwing (*Catocala herodias gerhardi*), Columbine Duskywing (*Erynnis lucilius*), Mottled Duskywing (*Erynnis martialis*), Cobweb Skipper (*Hesperia metea*), and Appalachian Grizzled Skipper (*Pyrgus centaureae wyandot*). The northern fence lizard (*Sceloporus undulates*) is abundant on shale barrens.

Distribution: Shale Barrens are confined to the



Ridge and Valley and the Greenbrier Valley in eastern West Virginia. There are fewer than 1,000 acres mapped by WVDNR in the state, but additional unmapped occurrences are likely.

Places to see and visit: Shale barrens often occur on hot, steep, crumbling slopes which can make visitation treacherous and uncomfortable. There are relatively few sites with developed parking areas or trails, but these can be found at [Larinem Park](#) (Mineral County) and [Slaty Mountain Preserve](#) (Monroe County). Shale barrens may also be seen along the road up [Kate's Mountain](#) (Greenbrier County).

Conservation issues: Shale barrens have benefited from conservation designation on public and private lands but still face direct and indirect threats. Several West Virginia shale barrens have been designated as Botanical Areas on the Monongahela and George Washington National Forests. However, less than half of the area of known shale barrens in West Virginia is protected on public lands. Due to steep topography and dry soil conditions, shale barrens have little economic value for agriculture or timber production, but some barrens have been diminished by quarrying for shale. Many shale barrens have been undercut by roads and railroads, which may disrupt the long-term erosional processes that formed the barrens. Currently, the biggest threats to shale barren vegetation are non-native invasive plant species and excessive herbivory by white-tailed deer. Butterflies and moths that depend on shale barren habitat have experienced drastic population declines due to spraying of insecticides to control gypsy moth, a non-native pest of oaks; most of the rare Lepidoptera species known from shale barrens in West Virginia have not been observed since the 1990s or earlier.

Classification:

NatureServe Ecological System: Appalachian Shale Barrens

USNVC Association Scientific Name [WV Common Name]	Code	G Rank	S Rank	Links
<i>Juniperus virginiana - Fraxinus americana / Carex pensylvanica - Cheilanthes lanosa</i> Wooded Herbaceous Vegetation (calcareous shale prairie)	CEGL006037	G2	S1	
<i>Pinus virginiana - Juniperus virginiana - Quercus rubra / Solidago arguta var. harrisii - Opuntia humifusa</i> Woodland (northern Ridge and Valley shale barren)	CEGL006288	G3	S3	
<i>Pinus virginiana - Quercus prinus / Packera antennariifolia - Phlox subulata</i> Woodland (classic Central Appalachian shale barren)	CEGL006562	G3G4	S3	
<i>Pinus virginiana - Quercus prinus / Quercus ilicifolia / Hieracium greenii, Viola pedata</i> Woodland (xeric sparse herbs shale barren)	CEGL008525	G3	S3	

Key to Associations:

1. Wooded herbaceous communities on calcareous shales. Cover by trees is often patchy and sparse, but includes calciphiles such as white ash (*Fraxinus americana*), redbud (*Cercis canadensis*), and hackberry (*Celtis occidentalis*). Herbs have high cover and diversity = ***Juniperus virginiana - Fraxinus americana / Carex pensylvanica - Cheilanthes lanosa* Wooded Herbaceous Vegetation** (calcareous shale prairie)

1. Woodlands on acidic shales.

2

2. Extremely dry sites dominated by Virginia pine and chestnut oak. Herb layers have very sparse cover and very low diversity, often lacking shale barren endemics = *Pinus virginiana* - *Quercus prinus* / *Quercus ilicifolia* / (*Hieracium greenii*, *Viola pedata*) Woodland (xeric sparse herbs shale barren)

2. Dry sites dominated by eastern red cedar and/or Virginia pine, oaks, and pignut hickory. Herb layers have low to moderate cover and higher diversity, including shale barren endemics

3

3. Shale barrens in the Potomac drainage, from Pendleton County and north. Tree canopy often includes eastern red cedar and post oak. Herb layer has low number of strict shale barren endemics and lack shale barren rock cress and shale barren wild buckwheat = *Pinus virginiana* - *Juniperus virginiana* - *Quercus rubra* / *Solidago arguta* var. *harrisii* - *Opuntia humifusa* Woodland (northern Ridge and Valley shale barren)

3. Shale barrens in the Greenbrier drainage and in the Potomac drainage in Pendleton County. Tree canopy usually lacks eastern red cedar and post oak. Herb layer with multiple shale barren endemics. = *Pinus virginiana* - *Quercus prinus* / *Packera antennariifolia* - *Phlox subulata* Woodland (classic Central Appalachian shale barren)

Photo gallery:



References:

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