

Ecological site F128XY515WV

Mesic Sandstone Residuum

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 128X–Southern Appalachian Ridges and Valleys

MLRA 128 falls into the East and Central Farming and Forest Region. This MLRA is in Tennessee (36 percent), Alabama (27 percent), Virginia (25 percent), and Georgia (12 percent). It makes up about 21,095 square miles (54,660 square kilometers). Most of this MLRA is in the Tennessee Section of the Valley and Ridge Province of the Appalachian Highlands. The thin stringers in the western part of the area are mostly in the Cumberland Plateau Section of the Appalachian Plateaus Province of the Appalachian Highlands. A separate area of the MLRA in northern Alabama is in the Highland Rim Section of the Interior Low Plateaus Province of the Interior Plains. The western side of the area is dominantly hilly to very steep and is rougher and much steeper than the eastern side, much of which is rolling and hilly. Elevation ranges from 660 feet (200 meters) near the southern end of the area to more than 2,400 feet (730 meters) in the part of the area in the western tip of Virginia. Some isolated linear mountain ridges rise to nearly 4,920 feet (1,500 meters) above sea level. The MLRA is highly diversified. It has many parallel ridges, narrow intervening valleys, and large areas of low, irregular hills. The bedrock in this area consists of alternating beds of limestone, dolomite, shale, and sandstone of early Paleozoic age. Ridgetops are capped with more resistant carbonate and sandstone layers, and valleys have been eroded into the less resistant shale beds. These folded and faulted layers are at the southernmost extent of the Appalachian Mountains. The narrow river valleys are filled with unconsolidated deposits of clay, silt, sand, and gravel.

Ecological site concept

This PES occurs dominantly in residuum on uplands underlain by sandstone in the mesic temperature regime of the southern ridge and valley, MLRA 128. NatureServe classifies this as primarily Montane Mixed Oak and Oak-Hickory Forests.

Table 1. Dominant plant species

Tree	(1) <i>Quercus rubra</i> (2) <i>Quercus montana</i>
Shrub	(1) <i>Oxydendrum arboreum</i>
Herbaceous	Not specified

Physiographic features

This PES occurs dominantly in residuum on uplands underlain by sandstone in the mesic temperature regime of the southern ridge and valley, MLRA 128.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Interfluve (3) Ridge
Elevation	310 – 1,320 m
Slope	0 – 80 %
Water table depth	150 cm
Aspect	N, S

Climatic features

The average annual precipitation in most of this area is 41 to 55 inches (1,040 to 1,395 millimeters). It increases to the south and is as much as 66 inches (1,675 millimeters) at the highest elevations in east Tennessee and the northwest corner of Georgia. The maximum precipitation occurs in midwinter and midsummer, and the minimum occurs in autumn. Most of the rainfall occurs as high-intensity, convective thunderstorms. Snowfall may occur in winter. The average annual temperature is 52 to 63 degrees F (11 to 17 degrees C), increasing to the south. The freeze-free period averages 205 days and ranges from 165 to 245 days. It is longest in the southern part of the area and shortest at high elevations and at the northern end.

Table 3 Representative climatic features

Frost-free period (average)	150 days
Freeze-free period (average)	180 days
Precipitation total (average)	1,120 mm

- (1) ROANOKE 8 N [USC00447278], Roanoke, VA
- (2) WYTHEVILLE 1 S [USC00449301], Wytheville, VA
- (3) ABINGDON 3S [USC00440021], Abingdon, VA
- (4) LEBANON [USC00444777], Lebanon, VA

Influencing water features

This ecological site is not influenced by wetland or riparian water features.

Soil features

These soils formed dominantly in residuum on uplands underlain by sandstone. The slopes range from 0 to 85 percent. They are very shallow to deep (7 to 60 inches) to bedrock, and are well to excessively drained. The available water capacity of these soils is very low or low. The depth to a seasonal high water table more than 6 feet. They are not subject to flooding or ponding. The soil reaction ranges from extremely acid to slightly acid (pH from 3.5 to 6.5).

The soil series associated with this site are: Alticrest, Bailegap, Dekalb, Drypond, Lily, Ramsey, Schaffemaker, Wallen

Parent Material Kind: Residuum

Parent Material Origin: Sandstone, Sandstone and siltstone interbedded with shale, Sandstone interbedded with shale, Shale and siltstone, Quartzite

Table 4. Representative soil features

Parent material	(1) Residuum – sandstone
Surface texture	(1) Channery fine sandy loam (2) Cobbly loam (3) Extremely gravelly loamy sand
Drainage class	Well drained to excessively drained
Permeability class	Rapid
Soil depth	40 – 150 cm
Surface fragment cover ≤3"	0 – 40 %
Surface fragment cover >3"	0 – 40 %
Available water capacity (0-101.6cm)	2.29 – 15.49 cm
Soil reaction (1:1 water) (0-101.6cm)	4.2 – 5.4
Subsurface fragment volume ≤3" (Depth not specified)	0 – 70 %
Subsurface fragment volume >3" (Depth not specified)	0 – 80 %

Ecological dynamics

The Virginia Department of Conservation and Recreation, Natural Heritage Program (DCR-DNH) has classified two communities on Lily loam mapunits: Northern Hardwood Forest and Montane Mixed Oak / Oak - Hickory Forest. It is unclear which one is the most prevalent without field investigation but Montane Mixed Oak and Oak-Hickory Forest is most likely based on soil and site characteristics. Following is the DCR-DNH (partial) description of those systems:

Northern Hardwood Forests are dominated by sugar maple, black cherry (*Prunus serotina* var. *serotina*), yellow birch, northern red oak (*Quercus rubra*), red maple (*Acer rubrum*), and sweet birch (*Betula lenta* var. *lenta*), while American beech, and eastern hemlock are less frequent co-dominants. Overstory composition varies occasionally to nearly pure sugar maple. Striped maple, mountain maple, and

mountain holly (*Ilex montana*) are the chief understory species, along with sapling sugar maple and beech. The herb layers of many stands are characterized by patch-dominance of hayscented fern (*Dennstaedtia punctilobula*). Other more or less characteristic herbaceous species include whorled wood aster (*Oclemena acuminata*, = *Aster acuminatus*), evergreen wood fern (*Dryopteris intermedia*), prickly tree-clubmoss (*Dendrolycopodium dendroideum*, stiff clubmoss (*Spinulum annotinum*), tall millet grass (*Milium effusum* var. *cisatlanticum*), grove bluegrass (*Poa alsodes*), northern shorthusk (*Brachyelytrum aristosum*), purple oat grass (*Schizachne purpurascens*), sedges (particularly *Carex appalachica*, *Carex flexuosa*, *Carex digitalis*, *Carex leptoneura*, and *Carex woodii*), eastern rose mandarin (*Streptopus lanceolatus*), and sweet white violet. The importance of red maple, sweet birch, northern red oak, and black cherry in contemporary Central Appalachian examples of this community group reflects secondary succession following catastrophic logging and fire disturbances in the early part of the twentieth century. Sugar maple and beech, both abundant in understory layers and locally co-dominant in the overstory, appear positioned to assume dominance as current secondary stands mature. However, beech-bark disease and excessive deer browsing are serious threats to the future viability of the largest stands on Allegheny Mountain.

Overstory composition (of Montane Mixed Oak and Oak-Hickory Forests) contains mixtures of chestnut oak (*Quercus montana*), northern red oak (*Quercus rubra*), and white oak (*Quercus alba*). Overstory associates vary with geography and site conditions, but often include sweet birch (*Betula lenta* var. *lenta*), magnolias (*Magnolia acuminata* and *Magnolia fraseri*), sourwood (*Oxydendrum arboreum*), hickories (*Carya* spp.), red maple (*Acer rubrum*), tulip-tree (*Liriodendron tulipifera*), and white pine (*Pinus strobus*). The understories of mixed oak communities usually contain a substantial component of heaths, but also contain many non-ericaceous species such as witch hazel (*Hamamelis virginiana* var. *virginiana*), striped maple (*Acer pensylvanicum*), maple-leaved viburnum (*Viburnum acerifolium*), mountain holly (*Ilex montana*), buffalo-nut (*Pyrularia pubera*), and hazelnuts (*Corylus cornuta* var. *cornuta* and *Corylus americana*). The herbaceous component is relatively diverse, but often patchy and composed of both acidophiles and species characteristic of moderately fertile soils, including New York fern (*Parathelypteris noveboracensis*), galax (*Galax urceolata*), Curtis' goldenrod (*Solidago curtisii*), white wood aster (*Eurybia divaricata*), indian cucumber-root (*Medeola virginiana*), squawroot (*Conopholis americana*), halberd-leaved yellow violet (*Viola hastata*), speckled wood lily (*Clintonia umbellulata*), devil's-bit (*Chamaelirium luteum*), mountain golden-alexanders (*Zizia trifoliata*), and American lily-of-the-valley (*Convallaria pseudomajalis*).

Reference: <http://www.dcr.virginia.gov/natural-heritage/natural-communities/nctiuid>

State and transition model

Additional community tables

Table 5. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Other references

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Contributors

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Approval

Matthew Duvall, 5/14/2025

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	09/17/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):

5. Number of gullies and erosion associated with gullies:

6. Extent of wind scoured, blowouts and/or depositional areas:

7. Amount of litter movement (describe size and distance expected to travel):

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):

12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):

Dominant:

Sub-dominant:

Other:

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

14. Average percent litter cover (%) and depth (in):

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

17. Perennial plant reproductive capability:
