USDA Natural Resources
Conservation Service

Ecological site F128XY501WV
Thermic Interbedded Sedimentary Uplands

Accessed: 05/11/2025

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, partially shown as the gray shaded area on the accompanying figure, 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.

Classification relationships

This ESD is within NRCS Major Land Resource Area (MLRA) 128 - Southern Appalachian Ridges and Valleys. It falls within the Environmental Protection Agency's "Southern Shale Valleys" ecoregional classification (Authors: Glenn Griffith, James Omernik, Sandra Azevedo).

Ecological site concept

Taken from the EPA classification: "The Southern Shale Valleys consist of undulating to rolling valleys and some low, rounded hills and knobs that are dominated by fine-grained rock, primarily shale. The soils formed in materials weathered from shale, shaly limestone, and clayey sediments, and tend to be deep, acidic, moderately well-drained, and slowly permeable. The steeper slopes are used for pasture or have reverted to brush and mixed forest land. The forested sections are mostly mixed oak communities and some oak-hickory-pine. Pine plantations are found in some areas. Small fields of hay, corn, soybeans, tobacco, and garden crops are grown on the foot slopes and bottom land."

This site will change from south to north. In some places, hemlock will be important and pine will become more important in southern stands.

Table 1. Dominant plant species

Tree	(1) *Quercus rubra* (2) *Pinus echinata*
Shrub	(1) *Vaccinium pallidum*
Herbaceous	Not specified

Physiographic features

This PES occurs primarily on residuum on uplands underlain by interbedded sedimentary rocks in the Ridge and Valley, MLRA 128.

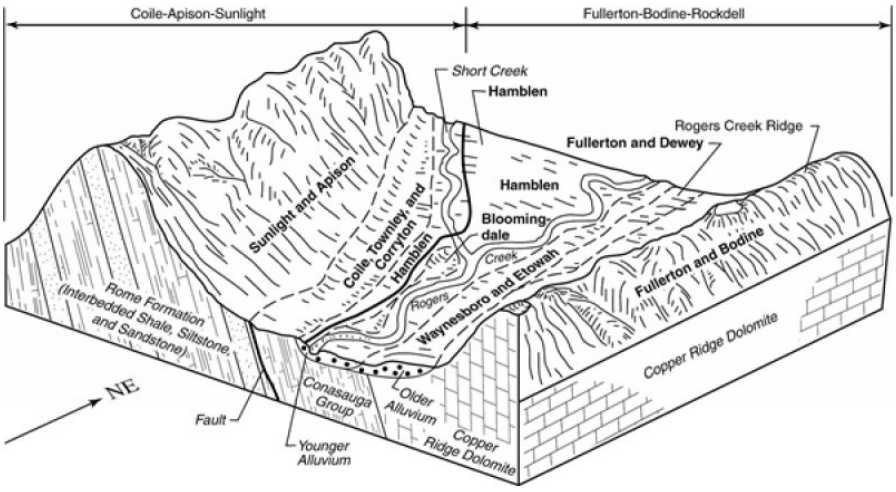

Figure 1. Block Diagram

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Interfluve (3) Ridge
Elevation	499–2,624 ft
Slope	2–60%
Water table depth	12–35 in
Aspect	Aspect is not a significant factor

Climatic features

This area falls under the humid, mesothermal climate classification (Thornwaite, 1948). Precipitation is fairly evenly distributed throughout the year, with little or no water deficiency during any season. The average annual precipitation in most of this area is 45 to 55 inches. It increases to the south. Maximum precipitation occurs in midwinter and midsummer, and the minimum occurs in autumn. Most rainfall occurs as high-intensity, convective thunderstorms. Snowfall may occur in winter. Average annual temperatures range from 46 to 70 degrees F, increasing to the south. The freeze-free period averages 205 days and is longest in the southern part of the area and shortest at higher elevations to the north. The growing season corresponds to climate. Local climate can be variable and microclimates factor into the distribution of plants. In general, topographic features such as slope aspect, landform, steepness, and position of the ridges and valleys are important site variables in the distribution of vegetation across the landscape (Martin, 1989).

Table 3. Representative climatic features

Frost-free period (average)	183 days
Freeze-free period (average)	212 days

Precipitation total (average)	53 in

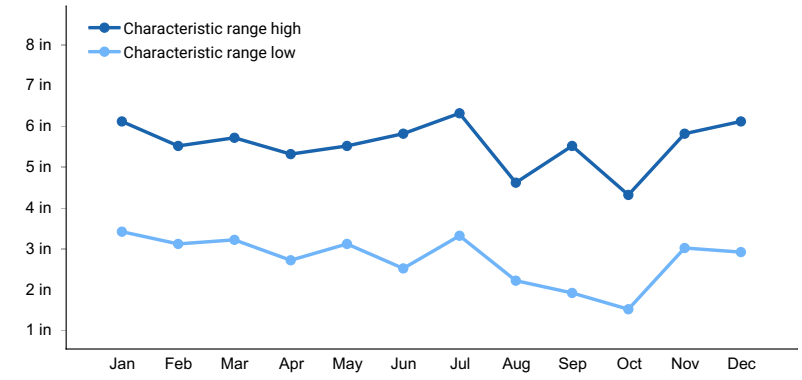

Figure 2. Monthly precipitation range

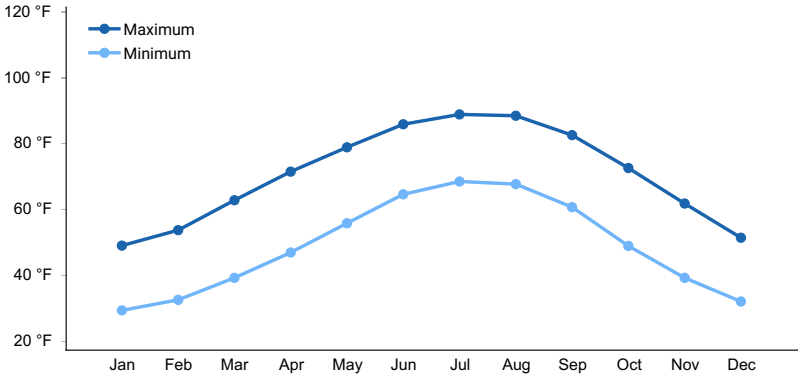

Figure 3. Monthly average minimum and maximum temperature

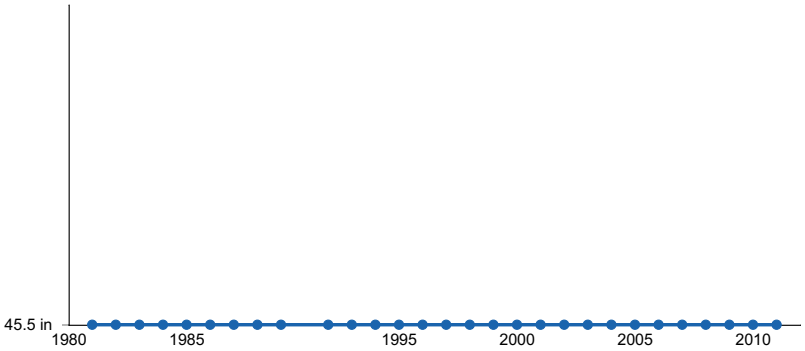

Figure 4. Annual precipitation pattern

Climate stations used

- (1) CLEVELAND FLTR PLT [USC00401808], Charleston, TN
- (2) LENOIR CITY [USC00405158], Loudon, TN
- (3) GADSDEN [USC00013154], Gadsden, AL
- (4) DALTON [USC00092493], Dalton, GA
- (5) KNOXVILLE MCGHEE TYSON AP [USW00013891], Alcoa, TN
- (6) MORRISTOWN WFO [USC00406272], Morristown, TN

Influencing water features

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

Soil features

These soils formed primarily in residuum on uplands underlain by interbedded sedimentary rocks. The slopes range

from 2 to 80 percent. They are shallow to very deep (10 to more than 60 inches) to bedrock, and are moderately well to excessively drained. The available water capacity of these soils ranges from very low to high. The depth to a seasonal high water table ranges from 1.5 to more than 6 feet. They are not subject to flooding or ponding. The soil reaction ranges from extremely acid to moderately alkaline (pH from 3.5 to 8.4).

The soil series associated with this site are: Albertville, Apison, Armuchee, Calvin, Chisca, Chiswell, Coghill, Coile, Corryton, Cunningham, Enders, Euharlee, Farragut, Firestone, Gilpin, Hanceville, Herndon, Lehew, Litz, Montevallo, Muskingum, Nauvoo, Needmore, Pottsville, Rarden, Sequoia, Sunlight, Teas, Tidings, Townley

Parent Material Kind: residuum, colluvium, alluvium, marine deposits

Parent Material Origin: interbedded sedimentary; limestone, sandstone and shale; sandstone and shale; sandstone and siltstone; sandstone, unspecified; sedimentary, unspecified; shale and siltstone; shale, acid; shale, calcareous; shale, clayey; shale, unspecified; metavolcanics

Table 4. Representative soil features

Parent material	(1) Residuum–limestone, sandstone, and shale (2) Colluvium–sandstone and shale (3) Alluvium–sandstone and siltstone
Surface texture	(1) Channery sand (2) Extremely channery loam (3) Gravelly clay loam
Drainage class	Moderately well drained to excessively drained
Soil depth	10–60 in
Surface fragment cover <=3"	1–40%
Surface fragment cover >3"	0–40%
Available water capacity (0-40in)	1–7.2 in
Soil reaction (1:1 water) (0-40in)	4.6–5.5
Subsurface fragment volume <=3" (Depth not specified)	0–60%
Subsurface fragment volume >3" (Depth not specified)	0–70%

Ecological dynamics

This PES is of large extent. Vegetation probably shifts from dominantly hardwood to dominantly pine from the northern to southern extent of the MLRA. For example, one NatureServe plot accessed from VegBank on a Townley silt loam, 10 to 25 percent slope mapunit, classifies this PES as *Pinus palustris* - *Pinus echinata* - (*Pinus virginiana*) / *Quercus marilandica* - (Quercus prinus) / *Vaccinium pallidum* Woodland. The plot was taken in the Taylor Ridge Longleaf pine stand in Georgia so it may not represent the forests in the northern extent of this PES. Pine species probably shift from southern to northern species and hardwoods (primarily the oaks) probably become more important. Another NatureServe plot on the same soil mapunit classifies this as *Pinus echinata* - *Quercus alba* / *Vaccinium pallidum* / *Hexastylis arifolia* - *Chimaphila maculata* Forest, which may confirm that longleaf pine falls out and oak moves in the father north you go in the MLRA.

In Tennessee, DeSelm has several vegetation plots on mapunits in this PES. There is a lot of variability in forest type as a result but he commonly notes stands as mixed oak/hemlock or white oak/hemlock. This is important because hemlock is not common in the ridge and valley and will become even less common as the hemlock woolly adelgid kills trees and stands. It should be noted in the reference community and may be a driver to another (permanent) state. He also lists red maple, black birch, tulip poplar, pine, sweetgum, beech, northern red oak, basswood and others. Forest types tend to look more mesophytic than on other sites in the R&V, probably due to steepness, aspect and the resulting microclimate. He noted that a lot of plots were on steep slopes, gaps, side

slopes or ravines. Some were on ridges. Some plots are listed as bottomland, and these need to be investigated before incorporation into this PES.

DeSelm noted poison ivy and japanese honeysuckle in the ground cover layer on numerous occasions as well as sugar maple regeneration. In some plots, ericads were noted. Disturbances noted were deer browse and grazing in the past.

State and transition model

Other references

DeSelm, Hal. 1989 – 2009. Natural Terrestrial Vegetation of Tennessee (Vegetation Plot Data). Unpublished raw data. http://treeimprovement.utk.edu/DeSelmData/DataDSC.htm

Griffith, G.E., Omernik, J.M., and Azevedo, S.H., 1997, Ecoregions of Tennessee: Corvallis, Oregon, U.S. Environmental Protection Agency EPA/600R-97/022, 51 p.

Martin, William H. 1989. Forest patterns in the Great Valley of Tennessee. Journal of the Tennessee Academy of Science 64(3): 137 – 143.

Thornthwaite, Charles W. 1948. An approach toward a rational classification of climate. Geographical Review 38(1): 55-94.

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Vegetation plot data. 2015. Retrieved from: http://vegbank.org/vegbank/index.jsp

Vegetation community description. 2015. Retrieved from: http://www.basic.ncsu.edu/segap/

Contributors

Belinda Esham Ferro

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	
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:**