

Ecological site F128XY507WV

Thermic Limestone With Interbedded Sedimentary Uplands

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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 is found primarily on residuum or colluvium derived from limestone and interbedded sedimentary rocks in the southern Ridge and Valley, MLRA 128. These are productive sites for oak/hickory forests, although many have been grazed in the past.

Table 1. Dominant plant species

Tree	(1) <i>Quercus alba</i> (2) <i>Quercus rubra</i>
Shrub	(1) <i>Cercis canadensis</i>
Herbaceous	Not specified

Physiographic features

This PES is found primarily on residuum or colluvium derived from limestone and interbedded sedimentary rocks in the southern Ridge and Valley, MLRA 128.

Figure 1. Block Diagram

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Interfluve (3) Ridge
Elevation	30 – 790 m
Slope	0 – 60 %
Water table depth	40 – 90 cm
Aspect	N, S

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 – 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 - 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. 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)	190 days
Freeze-free period (average)	210 days
Precipitation total (average)	1,300 mm

- (1) ROME [USC00097600], Rome, GA
- (2) MORRISTOWN WFO [USC00406272], Morristown, TN
- (3) CHATTANOOGA LOVELL AP [USW00013882], Chattanooga, TN
- (4) KNOXVILLE MCGHEE TYSON AP [USW00013891], Alcoa, TN

Influencing water features

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

Soil features

These soils formed primarily in residuum or colluvium derived from limestone and interbedded sedimentary rocks. The slopes range from 0 to 60 percent. They are deep and very deep (40 to more than 60 inches) to bedrock, and are moderately well to well drained. The available water capacity of these soils is moderate or high. The depth to a seasonal high water table ranges from 1.0 to more than 6 feet. They are not subject to flooding or ponding. The soil reaction ranges from ultra-acid to moderately alkaline (pH from 3.5 to 8.4).

The soil series associated with this site are: Aragon, Barger, Bolton, Christian, Dickson, Groseclose, Landisburg, Pearman, Shack, Tasso

Parent Material Kind: residuum, loess, colluvium, alluvium

Parent Material Origin: dolomite (dolostone); limestone, cherty; limestone, sandstone and shale; limestone, unspecified; sandstone and shale

Table 4. Representative soil features

Parent material	(1) Residuum – dolomite (2) Loess – limestone, sandstone, and shale (3) Colluvium – limestone
Surface texture	(1) Gravelly clay loam (2) Fine sandy loam (3) Loam
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderately rapid
Soil depth	50 – 140 cm
Surface fragment cover <=3"	0 – 40 %
Surface fragment cover >3"	0 – 40 %
Available water capacity (0-101.6cm)	10.16 – 18.03 cm
Soil reaction (1:1 water) (0-101.6cm)	4.6 – 5.7
Subsurface fragment volume <=3" (Depth not specified)	0 – 40 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

A VegBank NatureServe plot classifies *Quercus alba* - *Quercus rubra* - *Carya ovata* / *Cercis canadensis* - *Juniperus virginiana* var. *virginiana* Forest on Shack cherty silt loam, 6 to 10 percent slopes.

DeSelm has three plots on this PES. He classifies it generally as White Oak - Ash, Chestnut Oak, and White Oak - other oak - hickory. This is comparable to the VegBank plot. He characterizes the ground cover dominants as trees and herbs. Two of the three plots have notes that they were probably grazed (heavily) in the past. Basal area ranges from 140 - 160.

The Official Series Descriptions for the soil series included in this PES indicate that the reference community is forested, with a mixture of species. Typically pine species increase in the southern extent of MLRA 128 and hardwoods are more prolific to the north. Managed states do not currently include cropland but probably should, as it is listed as an important land use. Areas on the lesser slopes have been cleared, and are used for the production of corn, small grain, hay, and pasture. As this project progresses, whether or not to include a cropland state should be determined.

State and transition model

Additional community tables

Other references

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

Natureserve. 2016. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, VA. U.S.A. Available <http://explorer.natureserve.org>.

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

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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

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:
