Ecological site F128XY509WV
Thermic Quartzose Limestone And Calcareous Shale 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, 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.

Ecological site concept

This PES occurs on residuum, colluvium, and alluvium derived from reddish quartzose limestone and calcareous shale in the southern Ridge and Valley, MLRA 128.

Martin (1989) reports white oak - northern red oak communities on this site and states that they were probably more common in the past. Due to their high timber value, a lot of those species have been logged out of existing stands where they would historically have been better represented.

Pine can be prevalent on previously disturbed sites. DeSelm notes that most areas have been grazed in the past.

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Quercus rubra*
Shrub	(1) *Parthenocissus quinquefolia*
Herbaceous	Not specified

Physiographic features

This PES occurs on residuum, colluvium, and alluvium derived from reddish quartzose limestone and calcareous shale in the southern Ridge and Valley, MLRA 128.

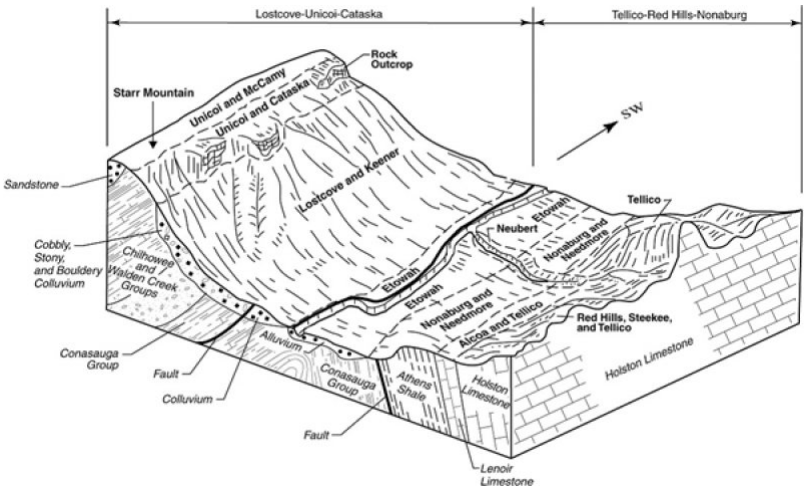

Figure 1. Block diagram

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Elevation	152–549 m
Slope	2–60%
Water table depth	152 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 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)	177 days
Freeze-free period (average)	205 days
Precipitation total (average)	1,422 mm

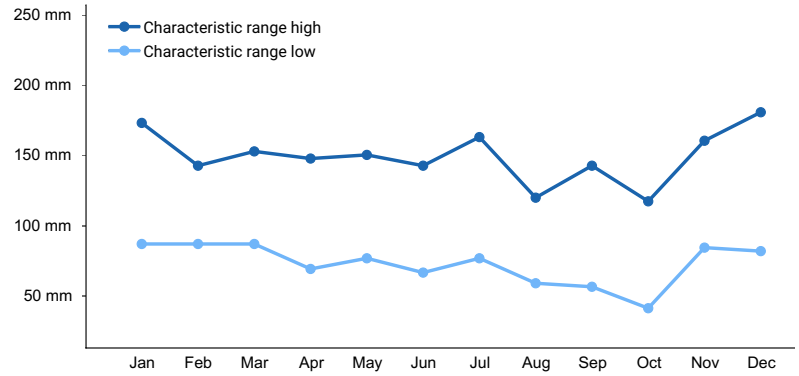

Figure 2. Monthly precipitation range

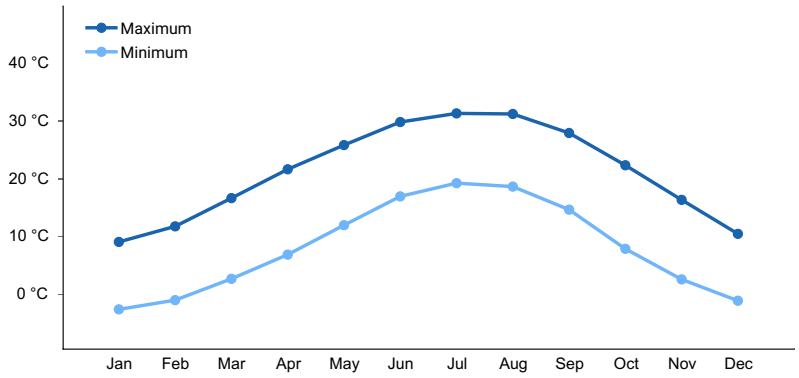

Figure 3. Monthly average minimum and maximum temperature

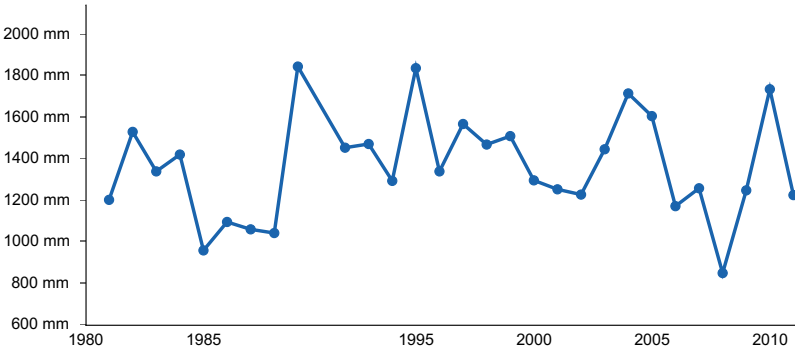

Figure 4. Annual precipitation pattern

Climate stations used

- (1) KNOXVILLE EXP STN [USC00404946], Louisville, TN
- (2) ATHENS [USC00400284], Athens, TN
- (3) CLEVELAND FLTR PLT [USC00401808], Charleston, TN

Influencing water features

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

Soil features

These soils formed in residuum, colluvium, and alluvium derived from reddish quartzose limestone and calcareous shale. The slopes range from 2 to 90 percent. They are shallow to very deep (10 to more than 60 inches) to bedrock, and are well drained. The available water capacity of these soils is very low to moderate. The depth to a seasonal high water table is more than 6 feet. They are not subject to flooding or ponding. The soil reaction ranges from extremely acid to moderately acid (pH from 3.5 to 6.0).

The soil series associated with this site are: Alcoa, Red Hills, Steekee, Tellico

Parent Material Kind: residuum, colluvium, alluvium

Parent Material Origin: limestone and sandstone; limestone, sandstone and shale; limestone, unspecified

Table 4. Representative soil features

Parent material	(1) Residuum–limestone and sandstone (2) Colluvium–limestone, sandstone, and shale (3) Alluvium–limestone
Surface texture	(1) Flaggy clay loam (2) Fine sandy loam (3) Loam
Drainage class	Well drained
Permeability class	Slow to moderately rapid
Soil depth	36–147 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	4.06–16.51 cm
Soil reaction (1:1 water) (0-101.6cm)	5–5.3
Subsurface fragment volume <=3" (Depth not specified)	0–28%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Martin (1989) reports white oak - northern red oak communities on this site and states that they were probably more common in the past. Due to their high timber value, a lot of those species have been logged out of existing stands where they would historically have been better represented.

DeSelm vegetation plots characterize this PES as upland deciduous forest. He noted it was mostly mixed oak (white oak) and could be mixed mesophytic (mixed oak or mixed sugar maple/mixed oak). This probably depends on aspect, past disturbance, etc. He does not note deer browse or grazing. Virginia creeper and poison ivy were noted in the ground cover.

DeSelm had numerous vegetation plots on this PES in Blount, Monroe and McMinn counties (TN). He primarily classifies it as mixed oak or mixed hardwood but notes on certain plots in different topographic positions that box elder-sycamore, tulip poplar-beech-oaks, box elder-hackley-swamp, and hemlock (in a ravine) communities can occur. He notes Parthenocissus commonly in the understory. On several plots, he notes his opinion that they were probably a pasture in the past or grazed in the past or agriculture in the past so, past conversion to agriculture of some sort and subsequent succession back to forst will be important on this site. It needs further investigation to determine reference community beyond "mixed oak."

State and transition model

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.

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Contributors

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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:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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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:**

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17. **Perennial plant reproductive capability:**
