

Ecological site PX136X00X310

Mesic temperature regime, acidic upland forest, seasonally wet

Accessed: 05/18/2024

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): 136X–Southern Piedmont

This area is in North Carolina (29 percent), Georgia (27 percent), Virginia (21 percent), South Carolina (16 percent), and Alabama (7 percent). It makes up about 64,395 square miles (166,865 square kilometers). (Ag Bulletin 296)

The northeast-southwest trending Piedmont ecoregion comprises a transitional area between the mostly mountainous ecoregions of the Appalachians to the northwest and the relatively flat coastal plain to the southeast. It is a complex mosaic of Precambrian and Paleozoic metamorphic and igneous rocks with moderately dissected irregular plains and some hills. (EPA Ecoregions descriptions)

ADD APPROPRIATE ECOREGION DESCRIPTION(S)

Classification relationships

A PROVISIONAL ECOLOGICAL SITE is a conceptual grouping of soil map unit components within a Major Land Resource Area (MLRA) based on the similarities in response to management. Although there may be wide variability in the productivity of the soils grouped into a Provisional Site, the soil vegetation interactions as expressed in the State and Transition Model are similar and the management actions required to achieve objectives, whether maintaining the existing ecological state or managing for an alternative state, are similar. Provisional Sites are likely to be refined into more precise group during the process of meeting the APPROVED ECOLOGICAL SITE DESCRIPTION criteria.

This PROVISIONAL ECOLOGICAL SITE has been developed to meet the standards established in the National Ecological Site Handbook. The information associated with this ecological site does not meet the Approved Ecological Site Description Standard, but it has been through a Quality Control and Quality Assurance processes to assure consistency and completeness. Further investigations, reviews and correlations are necessary before it becomes an Approved Ecological Site Description.

Ecological site concept

Upland Acidic Piedmont Forest, Mesic Temperature Regime, moderately well drained occurs on relatively moist sites over the relatively infertile Udult soils that dominate much of the Piedmont. Schafale reports that this type consists of “mesic hardwood forests of acidic north slopes and other sheltered sites in the Piedmont.” He also suggests that “This community occupies protected low slopes in the acidic Piedmont where creeks have cut small draws or valleys.” The National Vegetation Classification (NVC) description reports that “examples of this association predominantly occur on steep but sheltered slopes adjacent to creeks or rivers in the Piedmont. They can occur further upslope, but occurrences are much more likely as one gets closer to streams.” Soils of this type generally have lower pH (4.4-5.0, versus 4.9-5.9), CEC (4.7-9.4 versus 10.2-17.3), percent base saturation (36-51 versus 46-76), and Calcium content (188-637 versus 649-1632 ppm) than soils of Type 2 (the MESIC BASIC PIEDMONT HARDWOOD FOREST). Soil attributes are essentially equivalent to those of Type 3, the DRY-MESIC ACIDIC PIEDMONT HARDWOOD FOR, which differs from Type 1 in occurring on drier and more topographically

upland settings.

Table 1. Dominant plant species

Tree	(1) <i>Fagus grandifolia</i> (2) <i>Quercus rubra</i>
Shrub	(1) <i>Cercis canadensis</i>
Herbaceous	(1) <i>Polystichum acrostichoides</i> (2) <i>Hexastylis virginica</i>

Legacy ID

F136XY310VA

Physiographic features

Most of MLRA 136 is in the Piedmont Upland Section of the Piedmont Province of the Appalachian Highlands. A very small part of the MLRA, in central North Carolina, is in the Atlantic Plain Division. A very small part in the Roanoke, Virginia, area is on the eastern edge of the Blue Ridge Province of the Appalachian Highlands. This MLRA is a rolling to hilly upland with a well-defined drainage pattern. The original plateau has been dissected by streams, resulting in narrow to fairly broad upland ridgetops and short slopes. Valley floors are very narrow, and stream terraces are minor. Elevation ranges from 330 to 1,310 feet (100 to 400 m), increasing gradually from south to north.

Geology:

Precambrian and Paleozoic metamorphic and igneous rocks underlie almost all of this MLRA. The dominant metamorphic rock types include biotite gneiss, schist, slate, quartzite, phyllite, and amphibolite. The dominant igneous rock types are granite and metamorphosed granite. Some gabbro and other mafic igneous rocks also occur, and diabase dikes are not uncommon. The Carolina Slate terrane occurs just east of an imaginary centerline in this MLRA. It consists of metamorphic rocks with some metavolcanics and metasediments. Scattered graben basins, which are bounded by faults where the ground between the faults has dropped down, occur from South Carolina to south of Charlottesville and Richmond, Virginia. These basins have Triassic and Jurassic siltstone, shale, sandstone, and mudstone. River valleys have recent alluvium and few terraces.

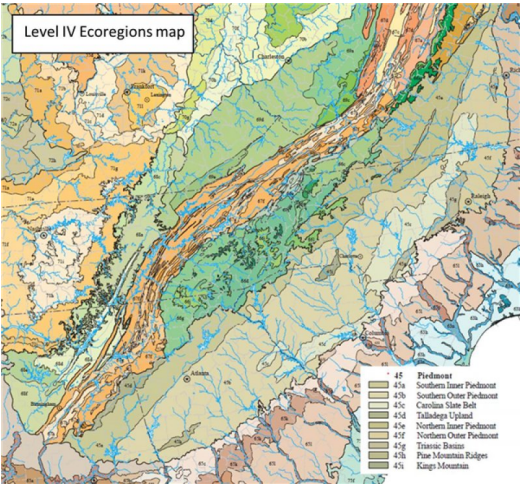


Figure 1. EPA Level IV Ecoregion map.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Interfluve (3) Ridge
Slope	3–10%

Water table depth	51–102 cm
Aspect	N, NW

Climatic features

The average annual precipitation is 37 to 45 inches (940 to 1,145 millimeters) at the northern end of this area, is 45 to 60 inches (1,145 to 1,525 millimeters) at the southern end, and is as much as 75 inches (1,905 millimeters) in a small, high-elevation area in northeastern Georgia. The precipitation generally is evenly distributed throughout the year. It is lowest in autumn. Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Significant moisture also comes from the movement of warm and cold fronts across the MLRA from November to April. High amounts of rain can occur during hurricanes at the same time of the year. Snowfall typically is light. The average annual temperature is 53 to 64 degrees F (12 to 18 degrees C). The freeze-free period averages 230 days and ranges from 185 to 275 days. Both the mean annual temperature and length of the freeze-free period increase from north to south and with decreasing elevation.

Table 3. Representative climatic features

Frost-free period (average)	174 days
Freeze-free period (average)	198 days
Precipitation total (average)	1,219 mm

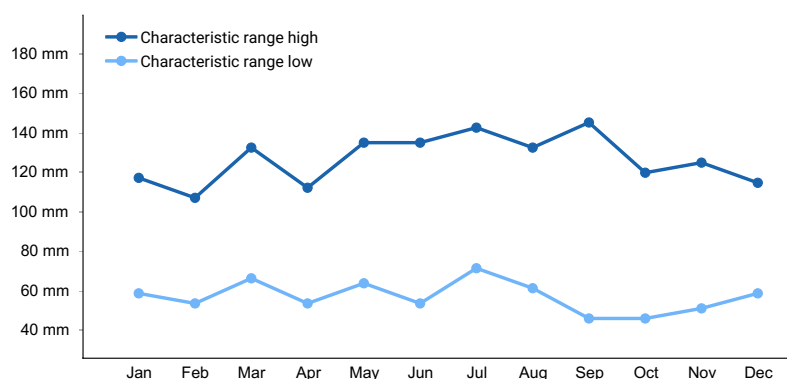


Figure 2. Monthly precipitation range

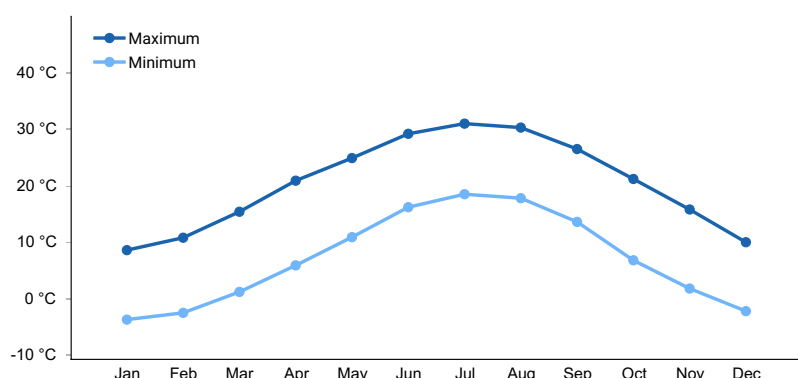


Figure 3. Monthly average minimum and maximum temperature

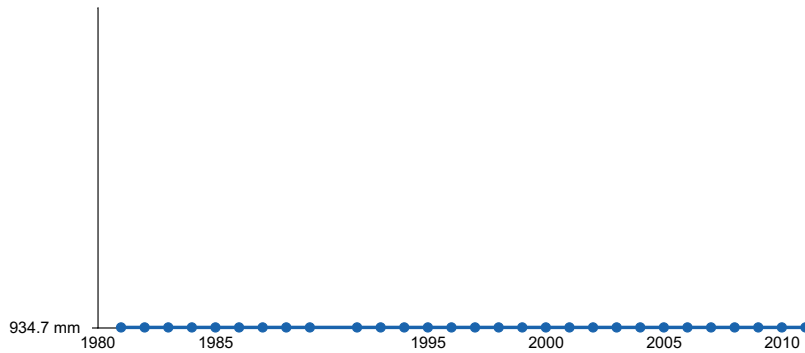


Figure 4. Annual precipitation pattern

Climate stations used

- (1) LOUISA [USC00445050], Louisa, VA
- (2) MARTINSVILLE FLTR PLT [USC00445300], Martinsville, VA
- (3) PALMYRA 3S [USC00446491], Palmyra, VA
- (4) GASTONIA [USC00313356], Gastonia, NC
- (5) YADKINVILLE 6 E [USC00319675], East Bend, NC
- (6) HICKORY FAA AP [USW00003810], Hickory, NC
- (7) WASHINGTON DC DULLES AP [USW00093738], Chantilly, VA
- (8) SHELBY 2 NNE [USC00317845], Shelby, NC
- (9) CROZIER [USC00442142], Maidens, VA
- (10) FOREST CITY 6 SW [USC00313150], Forest City, NC
- (11) LENOIR [USC00314938], Lenoir, NC
- (12) APPOMATTOX [USC00440243], Appomattox, VA
- (13) BROOKNEAL [USC00441082], Brookneal, VA
- (14) ROCKY MT [USC00447338], Rocky Mount, VA
- (15) TYE RIVER 1 SE [USC00448600], Amherst, VA

Influencing water features

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Edisto-Santee (0305), 18 percent; Chowan-Roanoke (0301), 14 percent; Apalachicola (0313), 10 percent; Pee Dee (0304), 10 percent; Ogeechee-Savannah (0306), 10 percent; Alabama (0315), 9 percent; Altamaha-St. Marys (0307), 9 percent; Lower Chesapeake (0208), 9 percent; Neuse-Pamlico (0302), 5 percent; Cape Fear (0303), 5 percent; and Potomac (0207), 1 percent. Some of the major rivers in this MLRA are, from north to south, the Roanoke, Cape Fear, Savannah, Altamaha, Chattahoochee, and Alabama Rivers. These rivers typically form within the Piedmont Province and flow east and south across the Coastal Plain Province and empty into the Atlantic Ocean or Gulf of Mexico.

Soil features

Soils associated with this ecological site occur in the mesic soil temperature regime of MLRA 136. This soil temperature regime is defined as: The mean annual soil temperature is 8 degree C or higher but lower than 15 degrees C, and the difference between mean summer and mean winter soil temperatures is 6 degrees C or more either at a depth of 50 cm below the soil surface or at a densic, lithic, or paralithic contact, whichever is shallower. The soils belong to the Ultisols soil order and are moderately well drained and belong to a fine particle size family. They have mixed mineralogy. Dominant soil components are the Halifax and Flume soil series.

Table 4. Representative soil features

Parent material	(1) Residuum–gneiss
Surface texture	(1) Sandy loam (2) Loam (3) Silt loam

Family particle size	(1) Clayey
Drainage class	Moderately well drained
Soil depth	127 cm
Surface fragment cover <=3"	0–10%
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4.3–6

Ecological dynamics

Under natural conditions these forests are uneven-aged, with old trees present. Reproduction occurs primarily in canopy gaps. Rare, severe natural disturbances such as wind storms may allow pulses of increased regeneration and allow the less shade-tolerant species to remain in the community. However, Skeen, Carter, and Ragsdale (1980) argued that even the shade-intolerant *Liriodendron* could reproduce enough in gaps to persist in the climax Piedmont forests (Schafale and Weakley 1990).

The natural fire regime of the Piedmont is not known but fires certainly occurred periodically. Because Mesic Mixed Hardwood Forests generally occur in moist and topographically sheltered sites, they probably burned only rarely and with low intensity (Schafale and Weakley 1990).

Disturbed areas have increased amounts of pines and weedy hardwoods such as *Liriodendron tulipifera* and *Liquidambar styraciflua*. Many areas have been selectively cut many times and have increased importance of *Fagus grandifolia* and other noncommercial hardwoods relative to oaks (Schafale and Weakley 1990). Other areas that were disturbed in the distant past may be younger and, therefore, may have a higher proportion of oaks with beeches mainly in the understory.

State and transition model

Upland Hardwood

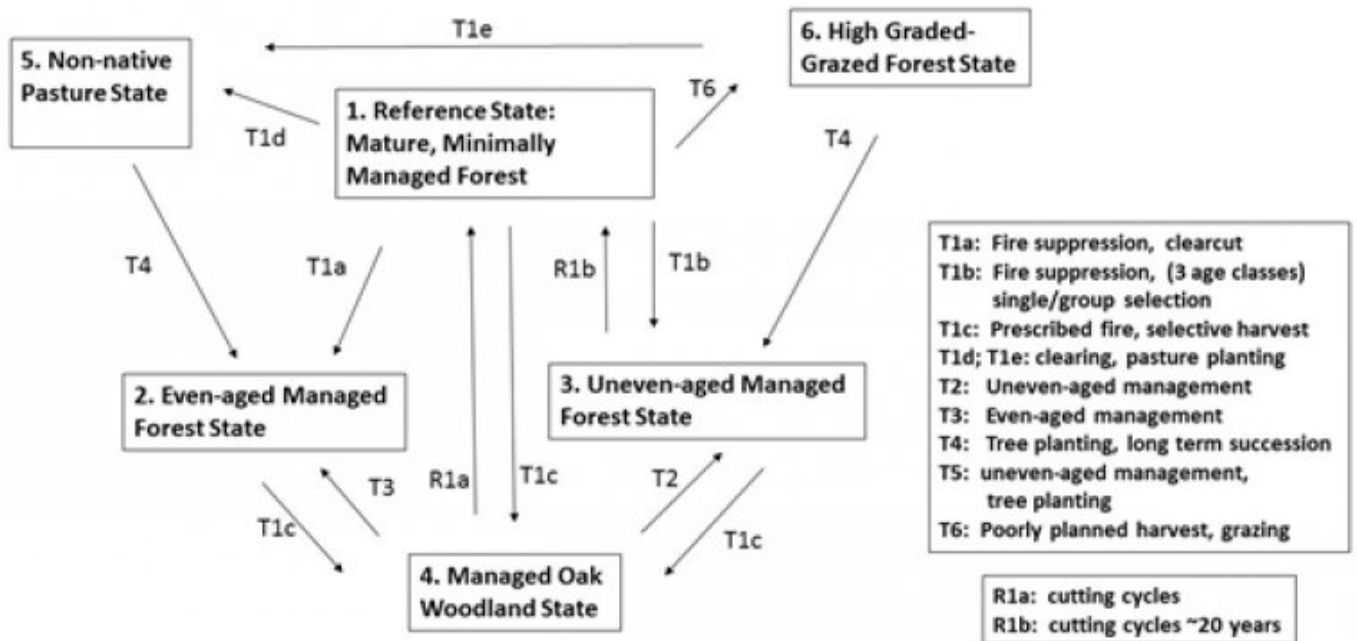


Figure 6. state and transition model

Other references

Edwards, L., J. Ambrose, and L.K. Kirkman. 2013. The Natural Communities of Georgia. The University of Georgia Press. Athens and London.

Environmental Protection Agency (EPA). 2004. Level III and IV Ecoregions of EPA Region 4. U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory. Western Ecology Division, Corvallis, Oregon. Scale 1:2,000,000.

Fleming, Gary P. and Karen D. Patterson. 2013. Natural Heritage Report 13-16. Natural Communities of Virginia: Ecological Groups and Community Types. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. 36 pages.

NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed May 24, 2013).

Nelson, John B. 1986. The natural Communities of South Carolina: Initial Classification and Description. South Carolina Wildlife and Marine Resources Department.

Spira, Timothy P. 2011. Wildflowers and Plant Communities of the Southern Appalachian Mountains and Piedmont. The University of North Carolina Press. Chapel Hill.

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.

Wharton, C.H. 1978. The natural environments of Georgia. Bulletin 114. Georgia Department of Natural Resources. Atlanta.

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:**

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:**
-