

Ecological site PX136X00X320

Mesic Temperature Regime, Acidic Upland Forest, Moist

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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): 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

This forest is found on dry to intermediate moisture uplands throughout the Southern Piedmont. It favors mid- to upper-slope positions with northerly or easterly aspects, or mid- to lower slopes with more southerly aspects. In drier landscapes, this type occupies habitats considered relatively mesic (e.g., concave slopes, lower slopes, shallow ravines). Forest stands are closed to somewhat open and are dominated by mixtures of oaks and hickories. Hickory species are more common in the understory. In forests with a history of disturbance, such as selective logging or windstorms, early-successional species such as *Liriodendron tulipifera* or *Pinus* sp. may codominate. In Virginia examples, *Quercus prinus* is inconstant but sometimes important. In addition, *Pinus* spp., *Liriodendron tulipifera*, *Liquidambar styraciflua*, and *Acer rubrum* may be common. Understory species include *Acer rubrum*, *Cornus florida*, *Oxydendrum arboreum*, *Ilex opaca*, and *Nyssa sylvatica*. Shrubs include *Vaccinium stamineum*, *Vaccinium pallidum*, *Viburnum acerifolium*, *Viburnum rafinesquianum*, and *Euonymus americanus*. The woody vines *Vitis rotundifolia* and *Toxicodendron radicans* often are present. Herbs vary from sparse to moderately dense, with

dry-mesophytic, acid-tolerant species such as *Hexastylis* spp., *Goodyera pubescens*, *Chimaphila maculata*, *Desmodium nudiflorum*, *Maianthemum racemosum*, *Polygonatum biflorum*, *Viola hastata*, *Tipularia discolor*, and *Hieracium venosum* prevalent.

Table 1. Dominant plant species

Tree	(1) <i>Quercus alba</i> (2) <i>Carya alba</i>
Shrub	(1) <i>Vaccinium stamineum</i>
Herbaceous	(1) <i>Desmodium nudiflorum</i>

Legacy ID

F136XY320VA

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.

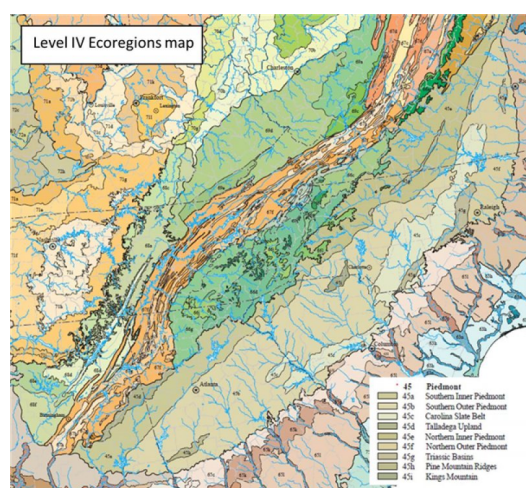


Figure 1. EPA Level IV Ecoregion map.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Interfluve (3) Ridge
Slope	3–70%

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)	48 in

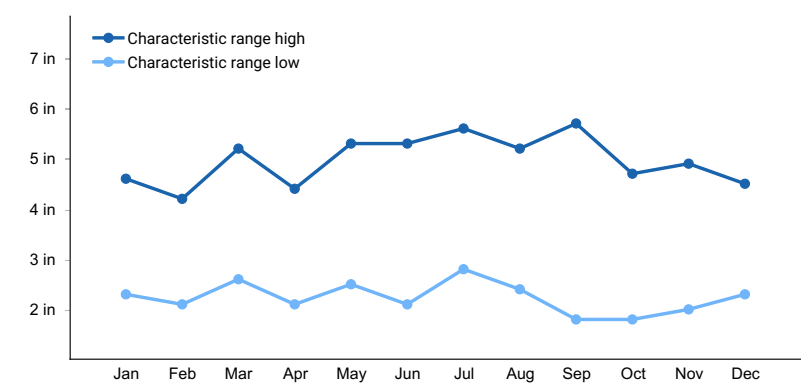


Figure 2. Monthly precipitation range

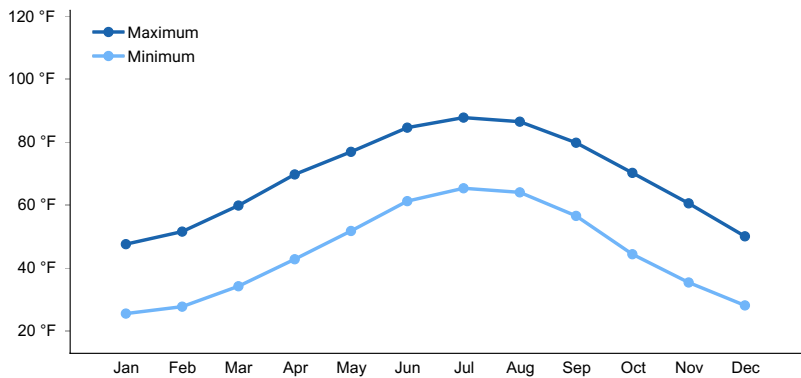


Figure 3. Monthly average minimum and maximum temperature

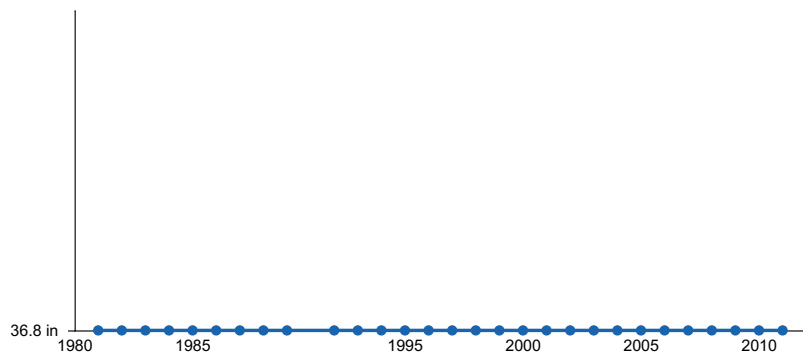


Figure 4. Annual precipitation pattern

Climate stations used

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

The soils associated with this 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. Soil components belong to the soil order Ultisols, are well drained, and do not have a restrictive layer within 50 cm of the soil surface. Some components do have a restrictive layer within 100 cm. Representative soils are: Appomattox, Clifford, Fiarview, Minnieville, Penhook, Poplar Forest, Rhodiss, Stott Knob, Woolwine, and Yadkin.

Table 4. Representative soil features

Surface texture	(1) Stony loam (2) Cobbly sandy loam
Drainage class	Well drained

Permeability class	Moderate to moderately slow
Soil depth	22 in
Surface fragment cover >3"	0–10%
Available water capacity (0–40in)	7–13 in
Calcium carbonate equivalent (0–40in)	0%
Electrical conductivity (0–40in)	0 mmhos/cm
Sodium adsorption ratio (0–40in)	0
Soil reaction (1:1 water) (0–40in)	4.5–6.5
Subsurface fragment volume ≤3" (Depth not specified)	0–34%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Disturbed areas have increased amounts of pines and weedy hardwoods such as *Acer rubrum*, *Liriodendron tulipifera*, and *Liquidambar styraciflua*, with the amounts depending on the degree of canopy opening. Areas that were cultivated are generally dominated by even-aged pine stands which are replaced by the climax oaks and hickories only as the pines die. Logged areas may have a mixture of hardwoods and pines (Schafale and Weakley 1990). 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 et al. (1980) argued that even the shade-intolerant *Liriodendron* could reproduce enough in gaps to persist in the climax Piedmont forests. The natural fire regime of the Piedmont is not known, but fires certainly occurred periodically. Most of the component trees are able to tolerate light surface fires with little effect. In addition, the recruitment of oaks and hickories generally benefits from periodic fires. However, *Acer rubrum* is fairly intolerant of fire (especially when young) and often appears to be out-competing the regeneration of oaks in long-unburned stands. In Virginia, *Fagus grandifolia* and *Ilex opaca* var. *opaca* are additional thin-barked, fire-intolerant species that have invaded many fire-suppressed oak-hickory forests. Regular fire may have created a more open forest, with gaps persisting longer than at present and perhaps forming more frequently (Schafale and Weakley 1990).

State and transition model

Upland Hardwood

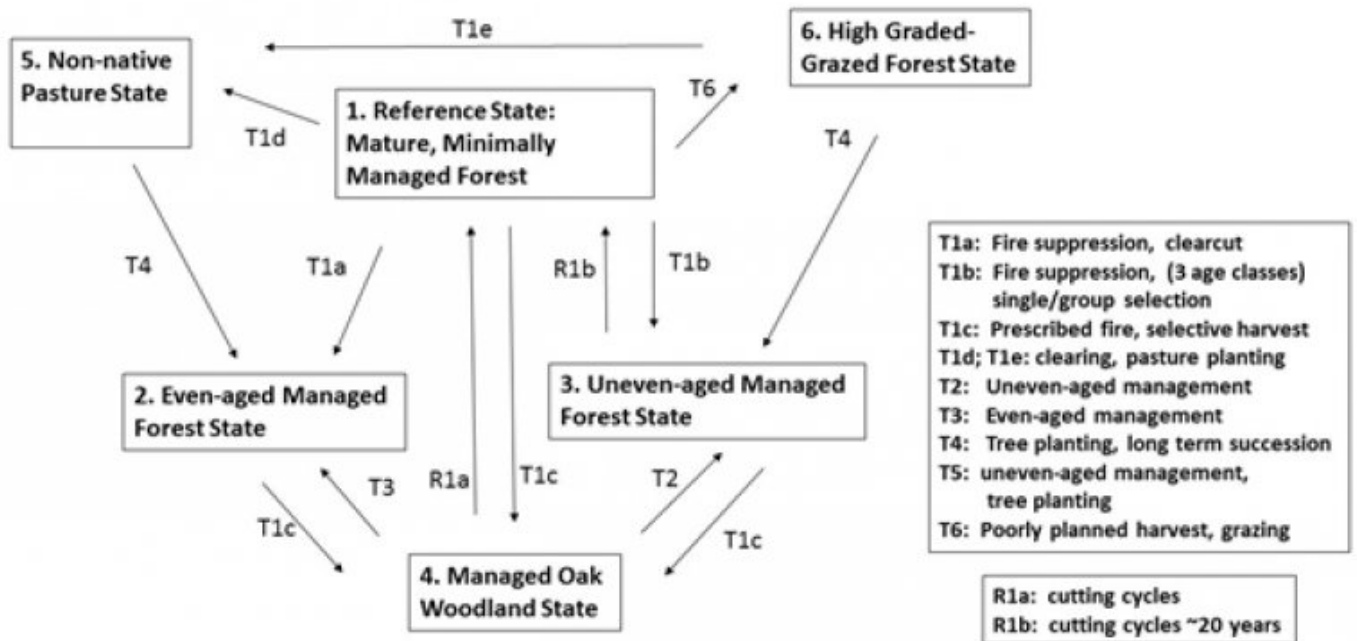


Figure 6. state and transition model

Other references

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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:**

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:**
-