

## **Ecological site PX136X00X210**

### **Mesic temperature regime, basic upland woodland, expansive clay, seasonally wet and dry**

Accessed: 05/19/2024

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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 ecological site occurs in the mesic soil temperature regime of the Southern Piedmont MLRA and represents a range of habitats that are generally small and insular, occur over basic or mafic rock, and have soil rooting depths that limit forest trees and thus are very xeric in character. Nonetheless, they are more extensive on the landscape than acid glades and barrens. In some cases this type is a consequence of montmorillonitic clay soils (shrink-swell hardpans) derived from mafic volcanic rocks on sites with thin, rocky soils (primarily on ridges in the western Uwharrie Mountains). A similar situation occurs with glades over diabase sills in north-central North Carolina. In other cases open woodland occurs on steep rock outcrops of mafic rock which have as much as 70% surface substrate cover of exposed bedrock, and these soils have moderately high levels of calcium and magnesium. These communities also occur on soils derived from mafic rock (metavolcanics of the Carolina Slate Belt), the

substrate containing abundant slate fragments, which makes it sufficiently unstable as to inhibit woody plant growth through mechanical downslope movement of slabs and fragments.

**Table 1. Dominant plant species**

Tree	(1) <i>Juniperus virginiana</i> (2) <i>Ulmus alata</i>
Shrub	Not specified
Herbaceous	(1) <i>Schizachyrium scoparium</i>

## Legacy ID

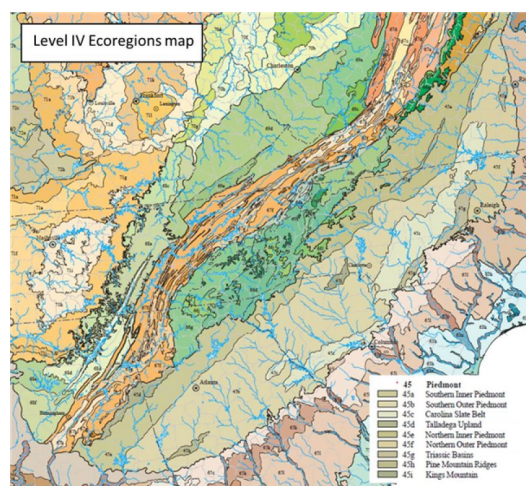
F136XY210VA

## 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) Interfluvium (3) Ridge
Flooding frequency	None

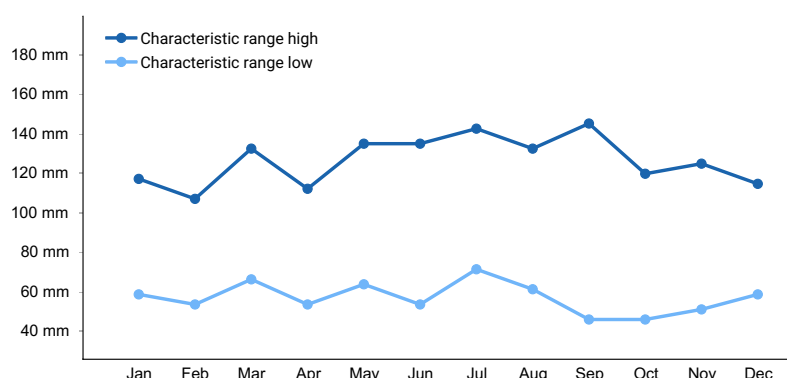
Ponding frequency	None
Slope	2–15%
Water table depth	30–102 cm
Aspect	Aspect is not a significant factor

## Climatic features

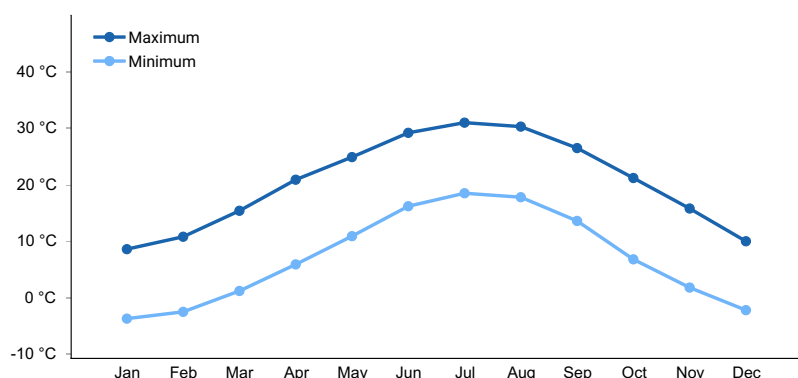
The average annual precipitation is 37 to 45 inches (940 to 1,145 millimeters) at the northern end of this area, is 45 to 60 inches (1,145 to 1,525 millimeters) at the southern end, and is as much as 75 inches (1,905 millimeters) in a small, high-elevation area in northeastern Georgia. The precipitation 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**

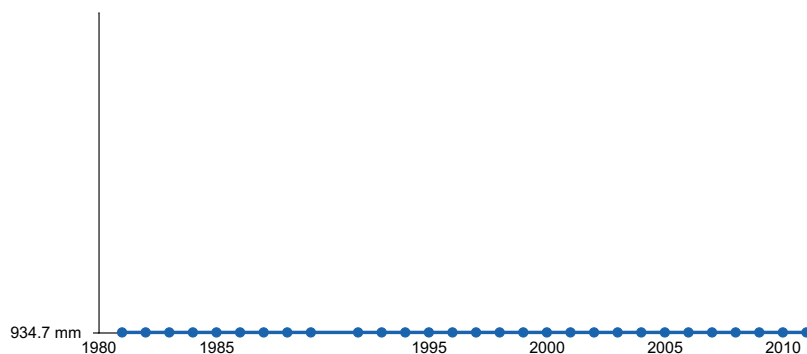
Frost-free period (average)	174 days
Freeze-free period (average)	198 days
Precipitation total (average)	1,219 mm



**Figure 2. Monthly precipitation range**



**Figure 3. Monthly average minimum and maximum temperature**



**Figure 4. Annual precipitation pattern**

## Climate stations used

- (1) GASTONIA [USC00313356], Gastonia, NC
- (2) LOUISA [USC00445050], Louisa, VA
- (3) HICKORY FAA AP [USW00003810], Hickory, NC
- (4) LENOIR [USC00314938], Lenoir, NC
- (5) YADKINVILLE 6 E [USC00319675], East Bend, NC
- (6) CROZIER [USC00442142], Maidens, VA
- (7) ROCKY MT [USC00447338], Rocky Mount, VA
- (8) WASHINGTON DC DULLES AP [USW00093738], Chantilly, VA
- (9) FOREST CITY 6 SW [USC00313150], Forest City, NC
- (10) SHELBY 2 NNE [USC00317845], Shelby, NC
- (11) APPOMATTOX [USC00440243], Appomattox, VA
- (12) BROOKNEAL [USC00441082], Brookneal, VA
- (13) PALMYRA 3S [USC00446491], Palmyra, VA
- (14) MARTINSVILLE FLTR PLT [USC00445300], Martinsville, 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 have mixed or smectitic mineralogy and are in a fine particle size family. Depth to a lithic or paralithic contact occurs between 100 and 150 cm (40 and 60 inches), and the soils are moderately well or somewhat poorly drained.

**Table 4. Representative soil features**

Surface texture	(1) Loam (2) Silt loam (3) Sandy loam
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Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Slow to very slow
Soil depth	102–152 cm
Surface fragment cover <=3"	0–10%
Available water capacity (0-101.6cm)	12.7–22.86 cm
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)	5.8–7.4
Subsurface fragment volume <=3" (Depth not specified)	0–10%

## Ecological dynamics

This ecological site represents a range of habitats that are generally small and insular, occur over basic or mafic rock, and have soil rooting volumes too limited to support forest trees and thus are very dry in character. Nonetheless, they are more extensive on the landscape than the Acid Piedmont Glades and Barrens ecological site. In some cases this type is a consequence of high shrink-swell clay soils derived from mafic parent material on sites with thin, rocky soils (primarily on ridges in the western Uwharrie Mountains). A similar situation occurs with glades over diabase sills in north-central North Carolina. In other cases open woodland occurs on steep rock outcrops of mafic rock which have as much as 70% surface substrate cover of exposed bedrock, and these soils have moderately high levels of calcium and magnesium. These communities also occur on soils derived from mafic rock.

Fires played an important role in maintaining this community historically. With frequently dry conditions and a grassy herbaceous layer, such sites were susceptible to fire. The routine use of fire by Native Americans, coupled with periodic lightning-induced fires, reduced the growth and reproduction of woody plants, resulting in an open canopy of widely spaced trees and a conspicuously dense herbaceous layer. Over the last century, fire suppression has promoted the growth and regeneration of trees such that the forest today typically has a more closed canopy and a less developed herbaceous layer than in the past.(Spira, 2011)

## State and transition model

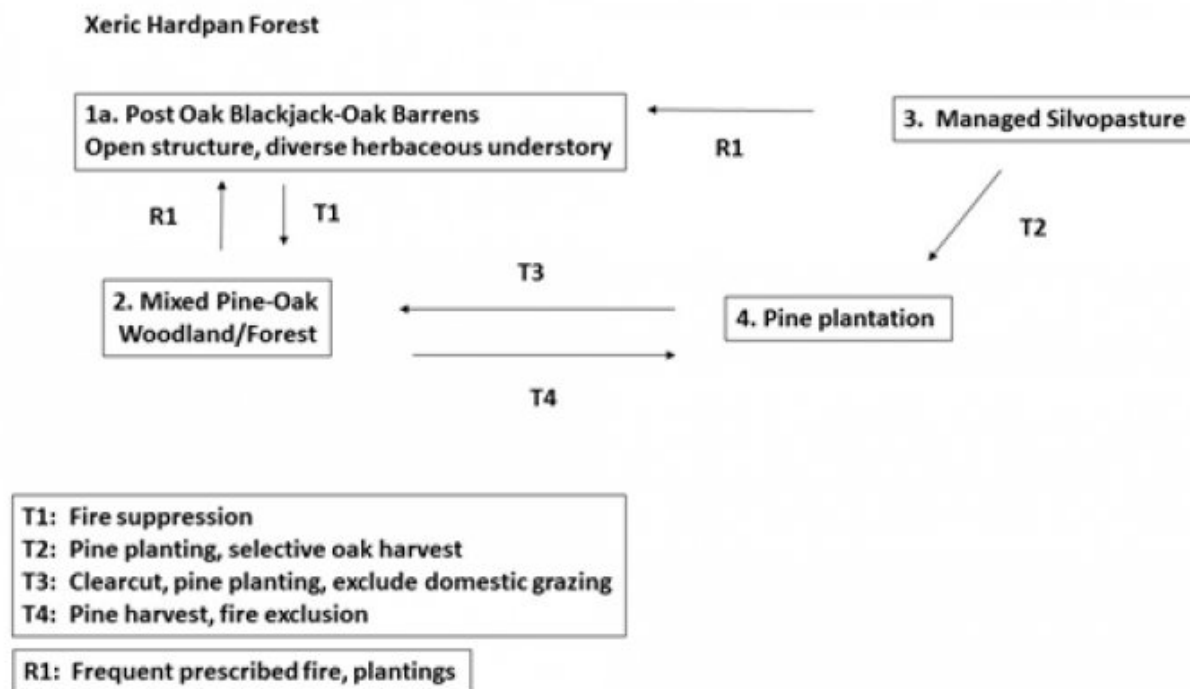


Figure 6. state and transition model

## Other references

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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).

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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.

## 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):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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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:**
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