

Ecological site F129XY006WV Steep Shale

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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): 129X–Sand Mountain

Major Land Resource Area (MLRA) 129 is in Alabama (96 percent), Georgia (3 percent), and Tennessee (1 percent). It makes up about 8,030 square miles (20,805 square kilometers). The towns of Jasper, Cullman, and Fort Payne, Alabama, are in this MLRA. Interstate 65 crosses this area from north to south, and Interstates 24 and 59 join in the area just west of Chattanooga, Tennessee, which is just outside the northeast tip of the MLRA. Areas of the Redstone Arsenal Military Reservation are in the northern part of the MLRA. The William B. Bankhead National Forest and the Sipsey National Forest Wilderness are in the western part.

Most of this area is in the Cumberland Plateau Section of the Appalachian Plateaus Province of the Appalachian Highlands. This MLRA is deeply dissected and consists mainly of a series of rather narrow valleys, steep escarpments, and broad plateaus that are underlain by consolidated bedrock. Elevation ranges from 130 to 1870 feet (40 to 570 meters). Valley floors are commonly about 100 to 400 feet (30 to 120 meters) below the adjacent plateau summits, but local relief may be as much as 1,200 feet (365 meters). The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Mobile-Tombigbee (0316), 50 percent; Middle Tennessee-Elk (0603), 25 percent; Alabama (0315), 21 percent; and Middle Tennessee-Hiwassee (0602), 4 percent. The Sipsey Fork, Locust Fork, and Mulberry Fork Rivers, headwaters of the Black Warrior River, are in this area. The Tennessee River forms part of the northern boundary of the area.

Classification relationships

The United States Forest Service has determined that this PES falls within the 231-Southeastern Mixed Forest Province Ecological Subregion (McNab et al. 2014). This ecoregion has generally uniform maritime climate with mild winters and hot, humid summers. Annual precipitation is evenly distributed, but a brief period of mid to late summer drought occurs in most years. Landscape is hilly with increasing relief farther inland. Forest vegetation is a mixture of deciduous hardwoods and conifers. Because their classification system does not specifically address Sand Mountain, parts of 231C-Southern Cumberland Plateau Section and/or 231D-Southern Ridge and Valley Section could be included.

Ecological site concept

This Provisional Ecological Site (PES) occurs on upland steep shale. Most of this site is forested, primarily because of the steepness. If a site is over 15% slope in this MLRA, in most cases it will not be converted to pasture. Forestry is the most important land-use for this site. Soils are typically shallow and windthrow can be a common disturbance. Reference conditions are difficult to determine but mixed upland hardwoods can be considered the naturalized vegetation.

Associated sites

| | |
|-------------|----------------------------------------------------------------------|
| F129XY005WV | Shale Ridge This site occurs in proximity to shale ridges. |
|-------------|----------------------------------------------------------------------|

Similar sites

| | |
|-------------|---------------------------------------------------------------------------------------------------------------|
| F129XY002WV | Sandstone Steep This PES is very similar to Sandstone Steep in terms of the vegetation it produces. |
|-------------|---------------------------------------------------------------------------------------------------------------|

Table 1. Dominant plant species

| | |
|------------|--------------------------------------------------------------------|
| Tree | (1) <i>Liriodendron tulipifera</i> (2) <i>Fagus grandifolia</i> |
| Shrub | (1) <i>Oxydendrum arboreum</i> |
| Herbaceous | Not specified |

Physiographic features

This site occurs primarily on parent material weathered from shale or interbedded sandstone and shale. Soils are typically well drained and acidic.

Table 2. Representative physiographic features

| | |
|--------------------|--------------------------|
| Landforms | (1) Hills > Upland slope |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 130–1,870 ft |
| Slope | 10–50% |

Climatic features

Table 3. Representative climatic features

| | |
|--------------------------------------------|--------------|
| Frost-free period (characteristic range) | 178-184 days |
| Freeze-free period (characteristic range) | 204-205 days |
| Precipitation total (characteristic range) | 56-59 in |
| Frost-free period (actual range) | 177-186 days |
| Freeze-free period (actual range) | 204-205 days |
| Precipitation total (actual range) | 54-59 in |
| Frost-free period (average) | 181 days |
| Freeze-free period (average) | 205 days |
| Precipitation total (average) | 57 in |

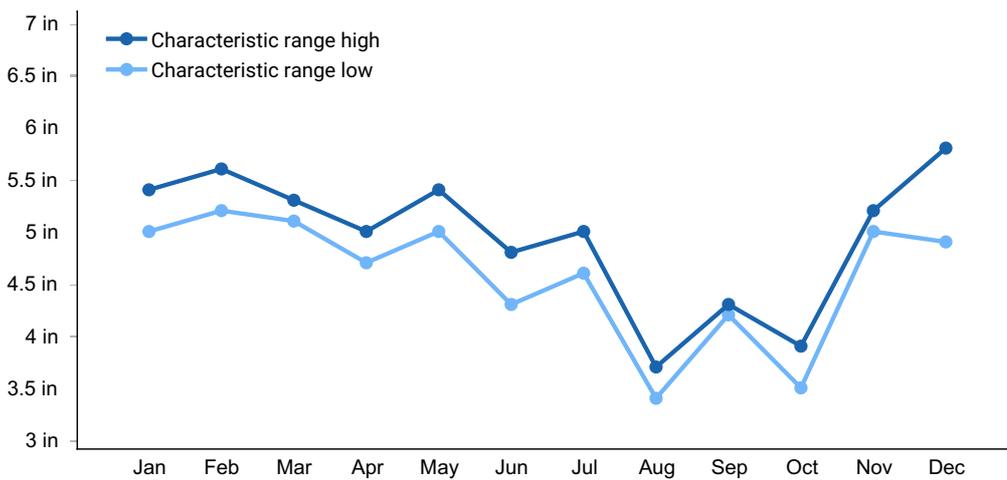


Figure 1. Monthly precipitation range

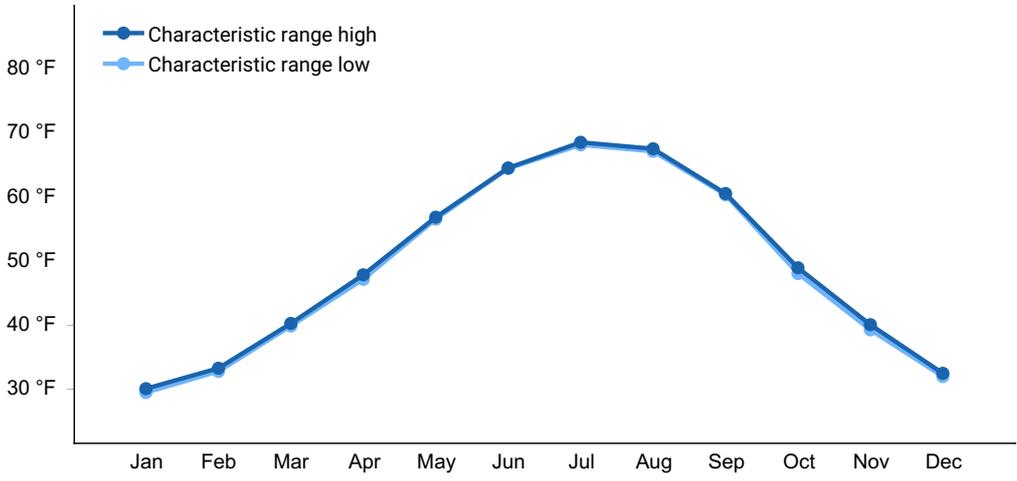


Figure 2. Monthly minimum temperature range

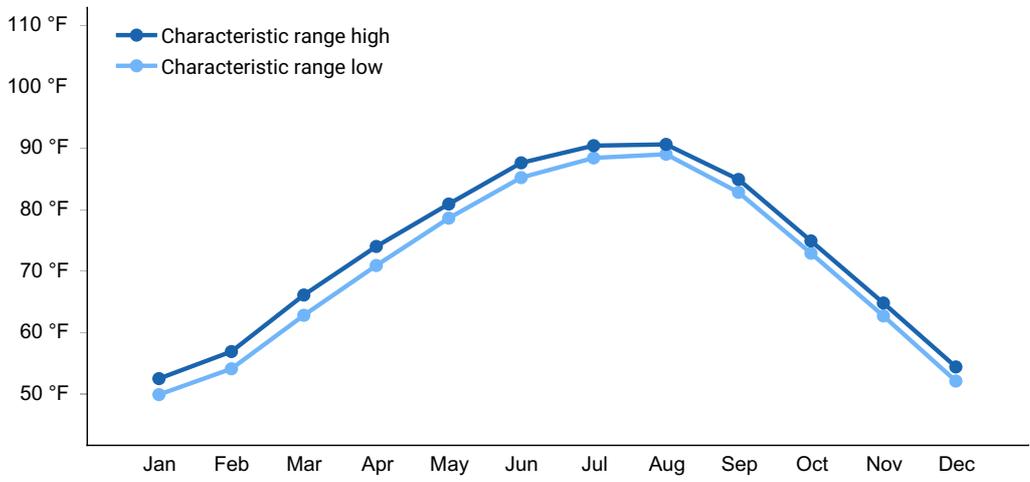


Figure 3. Monthly maximum temperature range

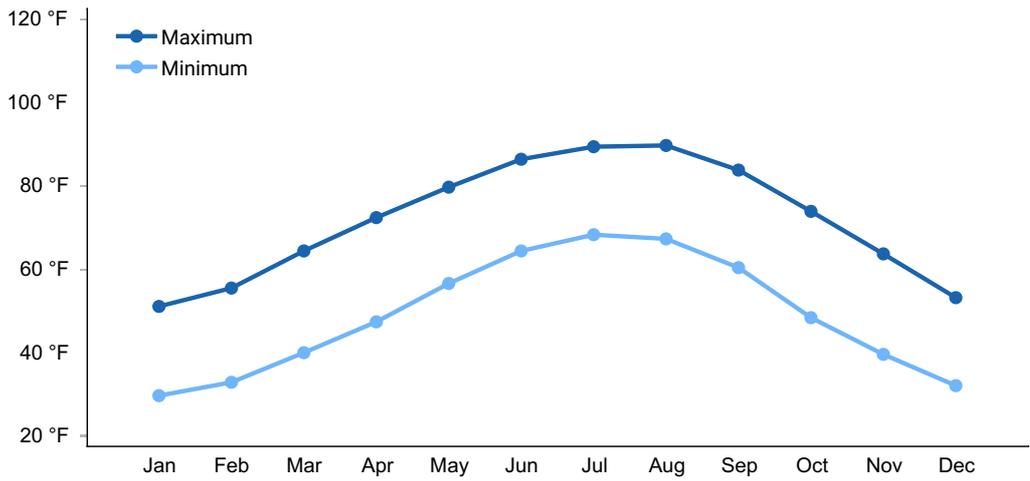


Figure 4. Monthly average minimum and maximum temperature

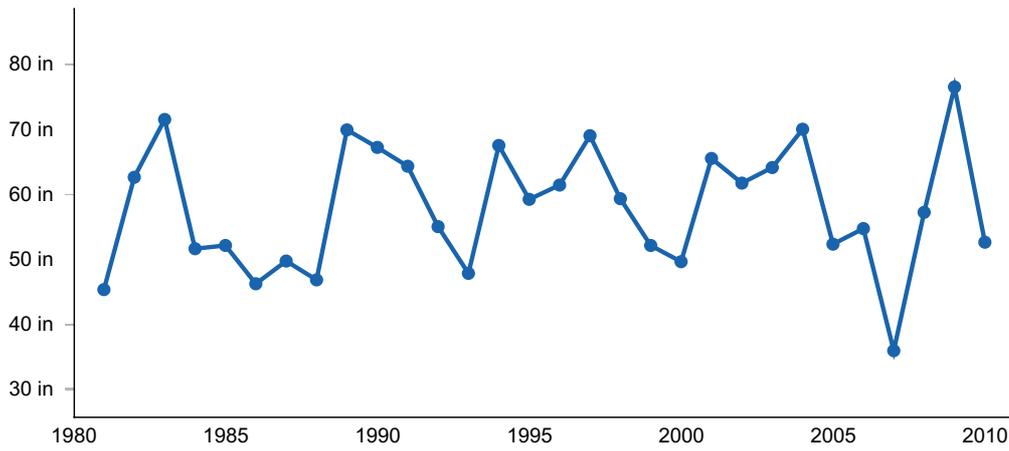


Figure 5. Annual precipitation pattern

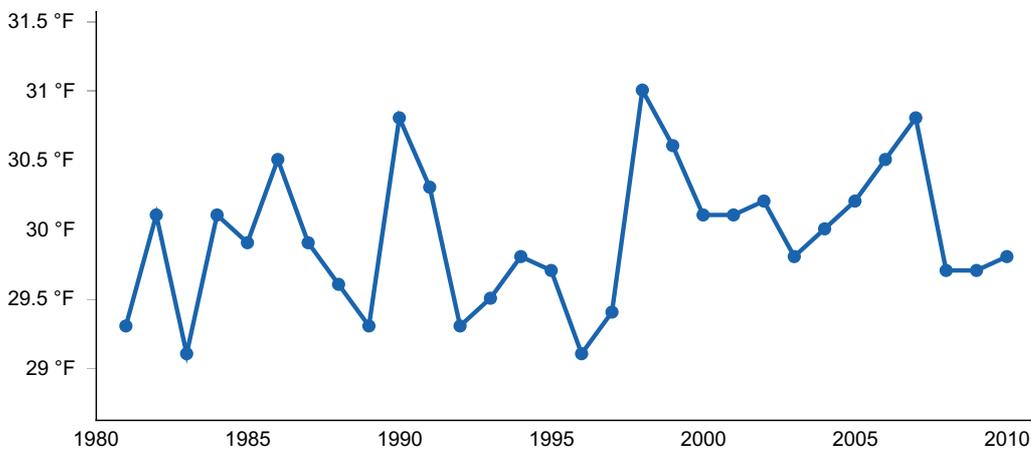


Figure 6. Annual average temperature pattern

Climate stations used

- (1) HANCEVILLE [USC00013655], Hanceville, AL
- (2) ADDISON [USC00010063], Addison, AL
- (3) JASPER [USC00014226], Jasper, AL
- (4) SAND MT SUBSTN [USC00017207], Crossville, AL

Influencing water features

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

Soil features

The soil series associated with this site are: Townley, Sunlight, Sipse, Pottsville, Nauvoo, Montevallo, Linker, Leesburg, Hector, Barfield, Albertville. They have very acidic to strongly acidic soil reaction.

Table 4. Representative soil features

| | |
|----------------------------------------------------|---------------------------------------------------------|
| Parent material | (1) Residuum–shale (2) Colluvium–sandstone and shale |
| Surface texture | (1) Fine sandy loam (2) Loam (3) Loamy sand |
| Drainage class | Well drained |
| Permeability class | Rapid |
| Soil depth | 12–50 in |
| Surface fragment cover ≤3" | 0–25% |
| Surface fragment cover >3" | 10–70% |
| Available water capacity (Depth not specified) | 0.6–6.7 in |
| Soil reaction (1:1 water) (Depth not specified) | 4.6–5.3 |

Ecological dynamics

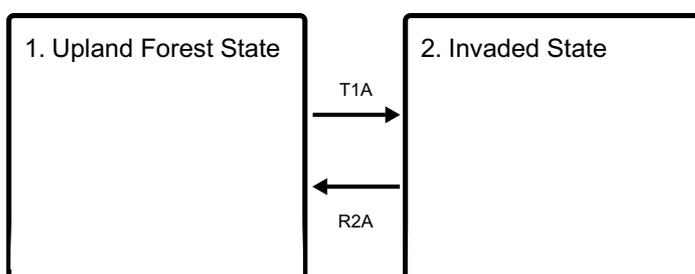
This PES is largely forested and forestry is the most important land-use. Commonly noted overstory trees include American beech and tulip poplar. Some loblolly and shortleaf pine is present. In flatter areas on this site, loblolly pine plantations can be important. Sourwood and sugar maple are common in the mid-story. Red buckeye (*Aesculus pavia*) was a common shrub/small tree.

Localized natural disturbances are important on this site. They include fire, ice storms, wind-throw, and the southern pine beetle. These disturbances can result in a patchwork of forest, younger stands, regenerating forests and relatively open grasslands, where fire is kept on the landscape. However, these open habitats are typically only maintained through human intervention. Left to its own, this site will regenerate to forest.

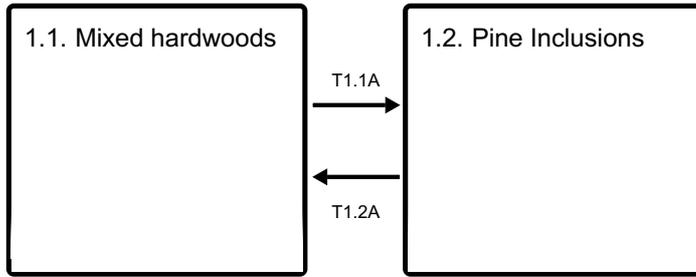
Pasture is not a common land-use due to the steepness of this site. So, while there is some pasture it is not included in the State and Transition Model due to the small extent.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1 Upland Forest State

Mature stands include a mixture of hardwood and pine species. In some cases, pockets of shortleaf pine, Virginia pine and white pine may be present. Forestry is the most important land-use on this site. It is not well suited for crops or pasture. Species noted include white oak, shagbark hickory, pignut hickory, American beech and tulip poplar. Across this state, micro-climate affects the composition and distribution of species. In older stands where there may be more available water due to proximity to streams or a drainage position, hardwoods will dominate. On more exposed ridges, pine typically becomes more prevalent. Natural disturbances include ice, wind, and fire. These have historically been very important in regenerating stands. Human induced disturbances include mining, forestry practices such as clear-cutting, and fire. Loblolly pine plantations are an important land-use on this site. Fire (prescribed) is an important management tool where they are established.

Community 1.1 Mixed hardwoods

These forests are typically dominated by *Quercus alba*, *Quercus falcata*, *Quercus prinus*, *Quercus coccinea*, with lesser amounts of *Acer rubrum*, *Carya glabra*, and *Carya alba*.

Community 1.2 Pine Inclusions

Small inclusions of *Pinus echinata* and/or *Pinus virginiana* may occur, particularly adjacent to escarpments or following fire. It occurs in a variety of situations, including on nutrient-poor or acidic soils.

Pathway T1.1A Community 1.1 to 1.2

Disturbance such as fire, ice storms, wind throws, etc.

Pathway T1.2A Community 1.2 to 1.1

Fire exclusion/lack of disturbance

State 2 Invaded State

Invasive, non-native plants can become problematic on this site. Privet was the most commonly noted species of concern.

Transition T1A State 1 to 2

Invasion by non-native pest plants.

Restoration pathway R2A State 2 to 1

Control of invasive, non-native pest plants. Methods vary and should be tailored to the local conditions of the stand.

Additional community tables

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:**
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17. **Perennial plant reproductive capability:**
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