

Ecological site F129XY007WV Sandstone Ridge

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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 245 to 2,200 feet (75 to 670 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

231C-Southern Cumberland Plateau Section

The terrain is gently sloping tablelands of level-bedded sandstone formations and hilly to mountainous terrain consisting of shale and sandstone slopes forming deep canyons with steep connecting escarpment. Forests are largely oak-pine, loblolly-shortleaf pine, or oak-hickory cover types (McNab et al. 2005).

Ecological site concept

This Provisional Ecological Site (PES) occurs in uplands with underlying acidic sandstone, sometimes containing thin strata of shale or siltstone. This site is used for farming and important crops include soybeans and corn, although other crops are also grown. Pasture and hay are common on this site. The areas on this site that occur as forests are primarily second growth. Important species include white oak, post oak, black oak, chestnut oak, tulip poplar, blackgum and hickory. Some pines occur on areas that have remained continuously in forest, but loblolly and shortleaf pines are the principal cover in abandoned cropland and pasture. Pine plantations do occur. In the past they have been planted to loblolly pine but the shift now is to encourage planting shortleaf pine. Virginia pine also occurs across this site.

It is unclear what the reference condition is for this site.

This site is of large extent.

Associated sites

| | |
|-------------|---|
| F129XY002WV | Sandstone Steep Sandstone Steep can occur in proximity to ridges. |
|-------------|---|

Similar sites

| | |
|-------------|---|
| F125XY001WV | Sandstone Residuum This PES is very similar to the Sandstone Residuum found in MLRA 125 on the Cumberland Plateau, especially in the southern extent of MLRA 125. |
|-------------|---|

Table 1. Dominant plant species

| | |
|------------|--|
| Tree | (1) <i>Quercus alba</i> (2) <i>Pinus echinata</i> |
| Shrub | Not specified |
| Herbaceous | Not specified |

Physiographic features

This site occurs primarily in uplands underlain by sandstone, a mixture of sandstone and shale or a mixture of siltstone and shale. Soils are typically well drained and acidic.

Table 2. Representative physiographic features

| | |
|--------------------|---------------------------------------|
| Landforms | (1) Hills > Upland slope (2) Ridge |
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 75–671 m |
| Slope | 2–20% |
| Water table depth | 46–152 cm |

Climatic features

Table 3. Representative climatic features

| | |
|--|----------------|
| Frost-free period (characteristic range) | 182-190 days |
| Freeze-free period (characteristic range) | 205-218 days |
| Precipitation total (characteristic range) | 1,397-1,524 mm |
| Frost-free period (actual range) | 178-191 days |
| Freeze-free period (actual range) | 204-232 days |
| Precipitation total (actual range) | 1,372-1,524 mm |
| Frost-free period (average) | 186 days |
| Freeze-free period (average) | 213 days |
| Precipitation total (average) | 1,448 mm |

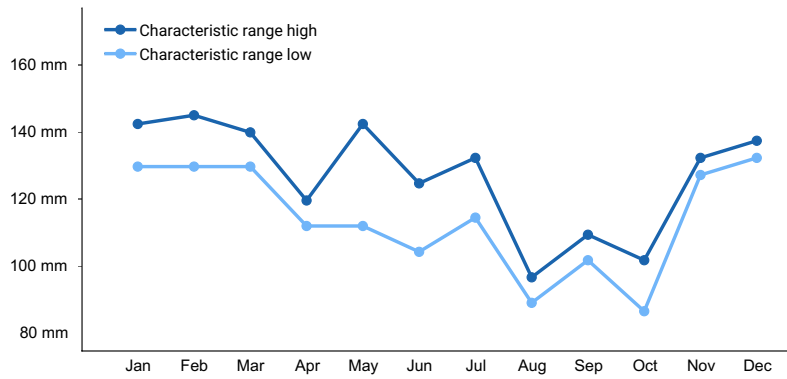


Figure 1. Monthly precipitation range

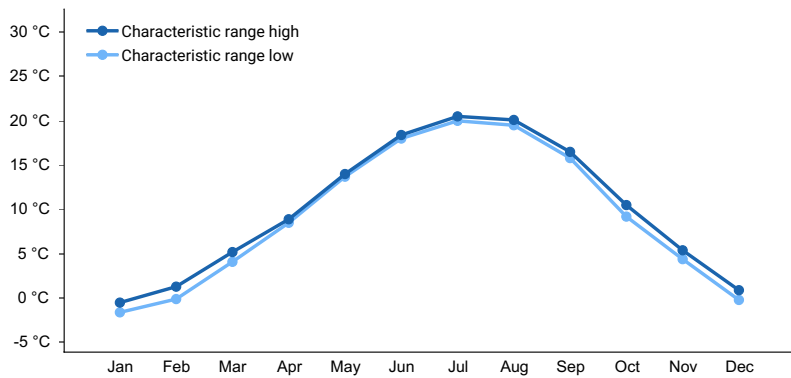


Figure 2. Monthly minimum temperature range

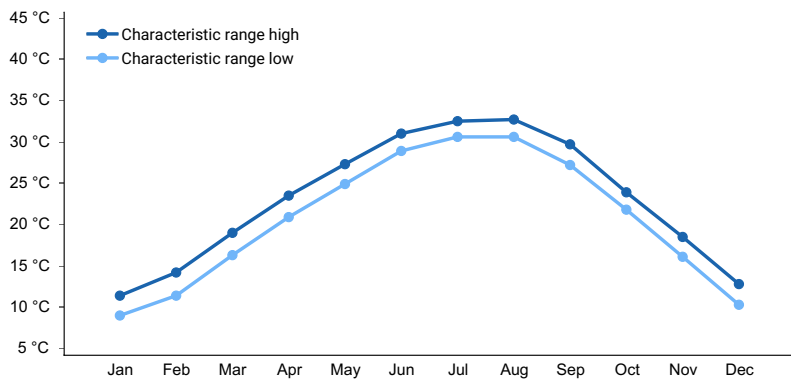


Figure 3. Monthly maximum temperature range

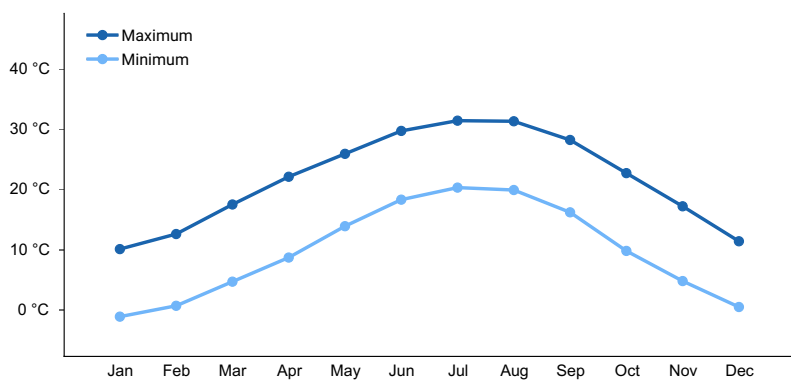


Figure 4. Monthly average minimum and maximum temperature

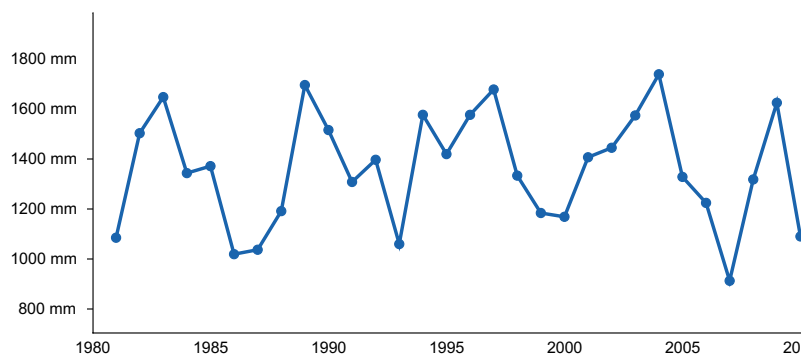


Figure 5. Annual precipitation pattern

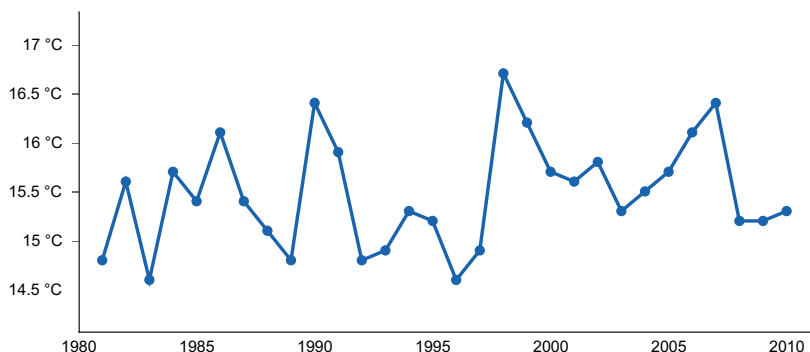


Figure 6. Annual average temperature pattern

Climate stations used

- (1) LOOKOUT MTN-POINT PARK [USC00405431], Lookout Mountain, TN
- (2) SAND MT SUBSTN [USC00017207], Crossville, AL
- (3) BANKHEAD LOCK & DAM [USC00010505], Northport, AL
- (4) JASPER [USC00014226], Jasper, AL
- (5) WEST POINT [USC00018812], Cullman, AL

Influencing water features

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

Soil features

The soil series included in this site include: Wynnville, Townley, Tilsit, Sipsey, Ramsey, Nectar, Nauvoo, Muskingum, Linker, Lily, Leadvale, Hector, Hartsells, Hanceville, Gorgas, Crossville, Apison. They have very acidic to strongly acidic soil reaction, and formed in Alluvium, Residuum from Sandstone, Sandstone and shale, Sandstone and siltstone, Shale, Shale and siltstone.



Figure 7. Road cut on a sandstone ridge site

Table 4. Representative soil features

| | |
|--|--|
| Parent material | (1) Residuum–sandstone (2) Alluvium–sandstone and shale |
| Surface texture | (1) Clay loam (2) Fine sandy loam (3) Loam |
| Drainage class | Moderately well drained to somewhat excessively drained |
| Permeability class | Rapid |
| Soil depth | 36–183 cm |
| Available water capacity (Depth not specified) | 4.06–20.07 cm |
| Soil reaction (1:1 water) (Depth not specified) | 4.6–5.5 |

Ecological dynamics

This PES is utilized for agriculture. Cropland is important. Soybeans and corn are among the most frequently grown crops. Pasture is also a land-use on this site. Most forests are second-growth and are predominated by the upland oak species. However, where cropland or pastureland has been abandoned, shortleaf and loblolly pine often colonize.

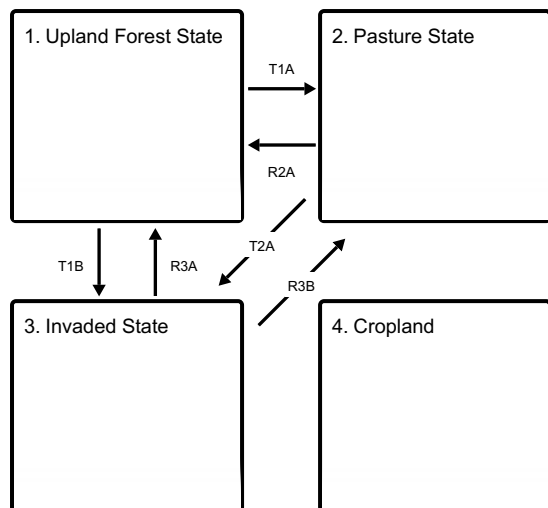
It is impossible to determine reference conditions for this provisional ecological site and very little data exist on vegetation communities. However, it is likely that the most fitting NatureServe description is "Allegheny-Cumberland Dry Oak Forest and Woodland - Hardwood" (CES202.359). This system encompasses dry hardwood forests on predominately acidic substrates. 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*. (NatureServe, 2017).*

Further field investigation is needed to determine the true nature of ecological communities and dynamics associated with this site. Likely, pine species are more important on this site than the NatureServe description indicates because of the farther south location of this site.

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State and transition model

Ecosystem states



State 1 Upland Forest State



Figure 8. Typical forested state in spring.



Figure 9. Sandstone outcrop

Mixed hardwoods and some pines (loblolly, shortleaf and Virginia) occur on this site where it has not been cleared for pasture or crops. When cleared and abandoned, typically pines will colonize. Many of these stands have been logged or disturbed in the past. There is no way to determine true reference conditions so this should be considered a naturalized state.

State 2 Pasture State



Managed pasture for a variety of livestock is a typical land-use on this site.

State 3
Invaded State



Invasive non-native plants are problematic on this site and can colonize to the point of preventing natural regeneration from occurring. Any management recommendation for naturalized stands should consider exotic pest plants as a hazard. Privet was the most commonly noted species.

State 4
Cropland

A variety of crops are grown on this site. For the purposes of this model, no detail will be provided because they are diverse and would have very different management approaches. Crops grown on this site include cotton, corn, oats, sorghum, cowpeas, soybeans, sweet potatoes, Irish potatoes, hay, orchards, and vegetables.

Transition T1A State 1 to 2



Upland Forest State



Pasture State

Forest clearing, herbicide application where needed and establishment of pasture plants.

Transition T1B State 1 to 3



Upland Forest State



Invaded State

Invasion by non-native pest plants.

Restoration pathway R2A State 2 to 1



Pasture State



Upland Forest State

Abandonment. Weed control and tree planting where needed. Often sites will naturally succeed to pine forests and then give way to mixed hardwood and pine stands.

Transition T2A State 2 to 3



Pasture State



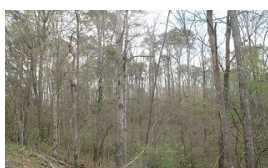
Invaded State

Invasion of non-native pest plants post agricultural abandonment.

Restoration pathway R3A State 3 to 1



Invaded State

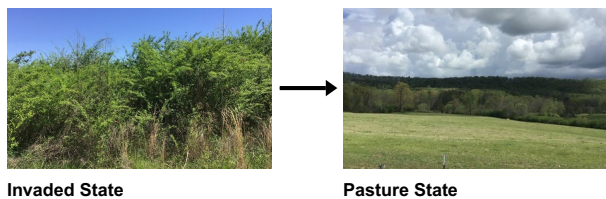


Upland Forest State

Control of non-native pest plants. Practices are numerous and variable. Likely more than one approach will be necessary and often more than one treatment over time. Recommendations should be localized in nature.

Restoration pathway R3B

State 3 to 2



Site-specific control of non-native pest plants and, if necessary, re-establishment of pasture species; fertilization, etc.

Other references

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Contributors

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Approval

Nels Barrett, 9/10/2019

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:**
-